



Monograph

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Afrotropical Ceraphronoidea (Insecta: Hymenoptera) put back on the map with the description of 88 new species

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Abstract. The number of currently described species of Afrotropical parasitoid wasps does not reflect the true species diversity. One of the most severely understudied parasitoid wasp groups is Ceraphronoidea. In this first study on Afrotropical mainland Ceraphronoidea in more than 20 years, which is also the first ever taxonomic monograph focusing on Ceraphronidae, we describe 88 new species of Ceraphronidae (85 new species) and Megaspilidae (3 new species) from Kakamega Forest (Kenya), Mt. Kilimanjaro (Tanzania) and Ivindo NP (Gabon): *Aphanogmus abaluhya* sp. nov., *A. ashitakai* sp. nov., *A. idakho* sp. nov., *A. ikhongamurwi* sp. nov., *A. isiukhu* sp. nov., *A. kakamegaensis* sp. nov., *A. lateritorium* sp. nov., *A. mangimelii* sp. nov., *A. mariae* sp. nov., *A. mashariki* sp. nov., *A. nehbergi* sp. nov., *A. njia* sp. nov., *A. vestrii* sp. nov., *A. yala* sp. nov. (all *clavicornis* species group), *A. dimidiatus* sp. nov., *A. fraterculus* sp. nov., *A. guenteri* sp. nov., *A. kakakili* sp. nov., *A. kisiwa* sp. nov., *A. maua* sp. nov., *A. morriconei* sp. nov., *A. ndefu* sp. nov., *A. ngai* sp. nov., *A. nikii* sp. nov., *A. pilosicoxa* sp. nov., *A. rafikii* sp. nov., *A. robustus* sp. nov., *A. simbai* sp. nov., *A. taji* sp. nov., *A. ukanda* sp. nov. (all *fumipennis* species group), *A. campanula* sp. nov., *A. kikuyu* sp. nov., *A. pagoda* sp. nov. (all *tenuicornis* species group), *Ceraphron banda* sp. nov., *C. brashi* sp. nov., *C. breviharpis* sp. nov., *C. breviscapus* sp. nov., *C. buyangu* sp. nov., *C. chemositi* sp. nov., *C. cingulum* sp. nov., *C. clavatumeris* sp. nov., *C. digiti* sp. nov., *C. eaerendili* sp. nov., *C. ekeru* sp. nov., *C. ellae* sp. nov., *C. eulbergi* sp. nov., *C. herreni* sp. nov., *C. hitagarciai* sp. nov., *C. insolitus* sp. nov., *C. isecheno* sp. nov., *C. isukha* sp. nov., *C. ivindoensis* sp. nov., *C. kaharabu* sp. nov., *C. kaimosiensis* sp. nov., *C. kakamegaensis* sp. nov., *C. kidole* sp. nov., *C. kimathii* sp. nov., *C. lirhanda* sp. nov., *C. longiharpis* sp. nov., *C. longisetae* sp. nov., *C. longumerunus* sp. nov., *C. maathaiiae* sp. nov., *C. malava* sp. nov., *C. mamamutere* sp. nov., *C. metapleuralis* sp. nov., *C. mikoi* sp. nov., *C. mwekaensis* sp. nov., *C. nandi* sp. nov., *C. nzoia* sp. nov., *C. onesimusi* sp. nov., *C. pilosiharpis* sp. nov., *C. pleurosulcus* sp. nov., *C. reinholdi* sp. nov., *C. salazar* sp. nov., *C. sataoi* sp. nov., *C. semira* sp. nov., *C. sungura* sp. nov., *C. tenuimeris* sp. nov., *C. tiriki* sp. nov., *C. trietschae* sp. nov., *Cyoceraphron dhahabudorsalis* sp. nov., *C. harpe* sp. nov., *C. invisibilis* sp. nov., *C. kahawia* sp. nov., *C. njano* sp. nov. (all Ceraphronidae), *Conostigmus kijiko* sp. nov., *C. koleo* sp. nov., and *Dendrocerus wachagga* sp. nov. (all Megaspilidae). In addition, we describe four species of *Aphanogmus* and five species of *Ceraphron* without formal naming. A neotype is designated for *Dendrocerus anneckei* Dessart, 1985 (Megaspilidae). With these new species we more than double

the number described from the Afrotropical mainland (65 vs 153). The species numbers found allow us to estimate the real worldwide species number of Ceraphronoidea as being roughly 12 000–21 000, i.e., 16–29 times the number of the currently described species (~730, including the species described herein). This study is meant to highlight that it is necessary and also possible to study the parasitoid wasps of tropical regions and provide momentum for exploring the diversity of small and diverse insect groups in the Afrotropics and elsewhere while also providing the basic knowledge that is much needed for protecting biodiversity and understanding evolution and the networks of life on earth. All described species are diagnosed and illustrated, with focus on the male genitalia. Furthermore, we provide an identification key to males of Afrotropical Ceraphronidae.

Keywords. Taxonomy, parasitoid wasps, new species, Afrotropics, dark taxa.

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Introduction

Ceraphronoidea Haliday, 1833 is a well-defined, globally distributed (except Antarctica) superfamily of Hymenoptera Linnaeus, 1758, with about 640 currently described, small-bodied (0.5–4 mm) species (Johnson & Musetti 2004, adding data from later publications, e.g., Mikó *et al.* 2016; Trietsch *et al.* 2020). It split from its closest extant relatives almost 220 Ma (Peters *et al.* 2017). Ceraphronoidea consists of two families, Ceraphronidae Haliday, 1833 (about 310 described species) and Megaspilidae Ashmead, 1893 (about 330 described species). Species have been reported as endo-, ecto- or hyperparasitoids of Hemiptera Linnaeus, 1758, Thysanoptera Haliday, 1836, Hymenoptera, Coleoptera Linnaeus, 1758, Neuroptera Linnaeus, 1758, Diptera Linnaeus, 1758, Mecoptera Hyatt & Arms, 1891, Lepidoptera Linnaeus, 1758 and Trichoptera Kirby, 1813 (Parnell 1963; Dessart & Bournier 1971; Cooper & Dessart 1975; Fergusson 1980; Kamarudin *et al.* 1996; Luhmann *et al.* 1999; Hayat *et al.* 2003).

While it is widely acknowledged that the species diversity of Hymenoptera is hugely understudied and that the real number of species of Hymenoptera could reach up to 2.5 million species (Stork 1996; Grissell 1999; Ulrich 1999; Sharkey 2007) [with 153 000 being described (Aguiar *et al.* 2013)] and thereby even surpasses the number of species of Coleoptera (Forbes *et al.* 2018), there are no specific data or estimates on the species diversity of Ceraphronoidea, and no larger scale and recent attempts to address this pressing problem.

In this study, we taxonomically study Afrotropical Ceraphronoidea, specifically a series of 418 male specimens originating from leaf litter traps in Kakamega Forest (Kenya), coloured pan traps (UV-bright blue, yellow and white) on Mt. Kilimanjaro (Tanzania) (Peters *et al.* 2019) and additional collections from Ivindo National Park (Gabon), using external morphology and male genitalia to delimit species. All species are described, diagnosed, illustrated, and keyed for future identifications.

Ceraphronoidea are parasitoid wasps. Parasitoid wasps are small, highly abundant, and vital components of all terrestrial ecosystems (Grissell 1999; Klopstein *et al.* 2013). They are crucial to include when trying to explain global biodiversity and to understand insect evolution. Knowledge of them is mandatory when trying to construct and study ecological networks and when designing and conducting conservation measures. The latter is especially urgent with the world facing an unparalleled biodiversity loss. Parasitoid wasps are highly vulnerable to extinction because of their often specific and interdependent life style and small population sizes (LaSalle & Gauld 1991; Shaw & Hochberg 2001). Already, many parasitoid wasp species have likely gone extinct without even being described. These severe issues are

even more severe in tropical areas with their higher species diversity, lower rate of known species, and ongoing vast habitat destruction or degradation. It is obvious that we need basic knowledge of parasitoid wasps, with taxonomic knowledge (i.e., delimited and named species) being the first step.

Ceraphronoidea of the Afrotropical mainland have not been taxonomically studied since 1999 (Dessart 1999). In addition, many of the few existing studies suffer from low quality or incompatibility with more recent ones. This is because Ceraphronoidea are comparatively monotonous in their external morphology, especially in females, and only male genitalia are currently established to serve as a reliable and character-rich character complex in morphology-based Ceraphronoidea taxonomy (majority of Paul Dessart's publications since 1963; Mikó *et al.* 2013; Ulmer *et al.* 2018). Previous taxonomic studies in Ceraphronoidea are mostly related to the work of Paul Dessart. From the early 1960s till his death in 2001, Dessart has published more than 200 mostly taxonomic publications on Ceraphronoidea (Pauly 2001). These studies, however, are often based on few collected specimens or even single female or male specimens. The Afrotropics, as other tropical regions, is underrepresented. After the death of Dessart, only few researchers have improved our knowledge of Ceraphronoidea. There have been some very valuable contributions such as a species catalogue (Johnson & Musetti 2004), type catalogues (Trietsch *et al.* 2019), as well as detailed descriptions and understanding of the male genitalia (Mikó *et al.* 2013; Ulmer *et al.* 2018; Trietsch *et al.* 2020) and of the Waterston's evaporatorium which might also prove useful in species-level taxonomical studies but is restricted to Ceraphronidae (Dessart 1992; Ulmer *et al.* 2021). However, to date, there have been only very few taxonomic monographs on the superfamily Ceraphronoidea, and none focusing on the enigmatic Ceraphronidae.

The most important and speciose genera within Ceraphronidae are *Aphanogmus* Thomson, 1858 and *Ceraphron* Jurine, 1807, including over 90% of described ceraphronid wasps (Johnson & Musetti 2004). However, definitions of genera are fragile, exemplarily shown by ambiguous measurements of the width/height ratio of the mesosoma in *Aphanogmus* and *Ceraphron* (Ulmer *et al.* 2018). Within Megaspilidae, genera with the highest number of species are *Conostigmus* Dahlbom, 1858 and *Dendrocerus* Ratzeburg, 1853.

Most of the described ceraphronoid species are from the Palaearctic (more than 260 species), followed by the Nearctic (more than 130 species), Australasia/Oceanian (more than 90 species), the Afrotropics (86 species), and the Neotropical region (less than 40 species) (Martínez 2003; Johnson & Musetti 2004; Evans *et al.* 2005; Mikó & Deans 2009; Bijoy & Rajmohana 2014; Bijoy *et al.* 2014; Pezzini *et al.* 2014; Matsuo *et al.* 2016; Mikó *et al.* 2016; Ulmer *et al.* 2018; Trietsch *et al.* 2018, 2020; Bijoy & Rajmohana 2021; Wang *et al.* 2021). This reverse latitudinal diversity gradient (LDG) is likely based on sampling bias, i.e., not reflecting real patterns (Eagalle & Smith 2017), although there is some support for a true reverse LDG in the Megaspilidae genus *Conostigmus* (Mikó *et al.* 2016).

For the Afrotropics, Johnson & Musetti (2004) combined with the Waspweb website (van Noort 2022) list 86 ceraphronoid species in 11 genera. 73 of the listed species are assigned to *Aphanogmus*, *Ceraphron*, *Conostigmus* and *Dendrocerus*. When excluding islands, most notably Madagascar, Seychelles or Réunion, the number of listed species is reduced to 65 for the Afrotropical mainland, 44 in Ceraphronidae and 21 in Megaspilidae. These numbers will not reflect the true species diversity of Afrotropical Ceraphronoidea, knowing that the diversity of the Afrotropical insect fauna is widely unknown (Miller & Rogo 2001; Stork 2018) and that probably not even 10% of the species of the extremely diverse parasitoid wasps are known to scientists (Huber 2009). Knowledge on Afrotropical mainland ceraphronoids is strikingly poor in terms of described species and studied material, since most species are known only from single specimens or small series. Here, we aim at putting them back on the map with the first ever larger scale study on taxonomy and species richness of Afrotropical Ceraphronoidea.

The material for this study stems from the project BIOTA East Africa (BIODiversity Monitoring Transect Analysis in Africa; <https://www.biota-africa.org>) at Kakamega Forest (Kenya), and the KiLi project studying biodiversity and ecosystem processes on Mt. Kilimanjaro, Tanzania, complemented by samples from Ivindo NP in Gabon. Kakamega Forest is in Western Kenya, northeast of Lake Victoria. It is an equatorial rainforest and likely a remaining part of the Guineo-Congolian rainforest belt (Kokwaro 1988; Clausnitzer 1999; Mitchell 2004; Wagner *et al.* 2008; Hita Garcia *et al.* 2009). The vertebrate fauna and some insect groups have been studied in detail, recording over 1000 species of Lepidoptera (Kühne 2008), more than 230 species of bees (Gikungu 2006), 72 species of odonates (Clausnitzer 2005), and 329 species of ants (Hita Garcia *et al.* 2013). Mt. Kilimanjaro is iconic as the highest mountain in Africa and has been recently studied for biodiversity and ecosystem patterns, for the first time, including parasitoid wasp data (Peters *et al.* 2016, 2019; Albrecht *et al.* 2021). Both samples combined allowed for assembling a unique series of Afrotropical Ceraphronoidea material used in this study. The species numbers found allow us to give some first rough estimates on the true species numbers of Ceraphronoidea using species richness estimators and extrapolating from other better-studied insect taxa, resulting in the first ever species number estimate for the world Ceraphronoidea fauna.

This study is a starting point for more in-depth studies on the taxonomy, biology, evolution, and ecology of Afrotropical Ceraphronoidea.

Material and methods

Handling of specimens

This study is based on 418 ethanol-preserved or card-mounted male specimens. The majority of specimens (366) were collected from May 2007 to August 2008 in the Kakamega Forest in Kenya as part of the interdisciplinary project BIOTA East Africa, subproject E16 (BIODiversity Monitoring Transect Analysis in Africa). The examined specimens were collected in 18 different transects, covering Kakamega Forest and surrounding forest fragments between latitudes 00°08'30.5" and 00°22'12.5" N and longitudes 34°46'08.0" and 34°57'26.5" E (Supp. file 1: Fig. S1B). Winkler extractions of a 1 m²-leaf-litter sample were used as collecting method in each transect (Hita Garcia *et al.* 2009, 2013; Ross *et al.* 2018). Samples were stored at room temperature in 70% ethanol at the ZFMK until they were used in the present study.

Another 45 specimens were collected in 2011 and 2012 by the Mount Kilimanjaro research group from the University of Würzburg on Mt. Kilimanjaro in Tanzania, as part of the KiLi project. The samples were collected along different altitudinal gradients and different vegetation zones at the south slope of Mt. Kilimanjaro (Peters *et al.* 2016) (Supp. file 1: Fig. S1C). The specimens were collected with coloured pan traps (UV-bright blue, yellow and white) (Peters *et al.* 2019) and card mounted with shellac gel at the Zoological Research Museum Alexander Koenig (ZFMK).

Four specimens were collected at Ivindo NP, Makokou forest, Gabon in 2012 with pitfall traps and stored in 70% ethanol until they were used in the present study.

All specimens were examined, dissected, described and measured using a Leica M205C stereo microscope with a Leica Planapo 1.0×, M-series (WD 61.5 mm) objective and Leica PI 10×/23 oculars. Measurements were done with a Leica scale ocular. All male specimens were transferred into droplets of 100% glycerol on concave microscope slides. The card mounted specimens from Mt. Kilimanjaro in Tanzania were softened in Na₂HPO₄ (0.5% in distilled H₂O) atmosphere for 24 hours at room temperature, then dipped into ethanol as it solubilizes the shellac gel and removed from the card with a brush, and finally transferred to glycerol. Some specimens' wings stayed attached to the card, as they were directly glued to the card and could not be removed without causing serious damage.

Specimens were left in glycerol for at least two days before dissecting of genitalia was performed. Dissections were done with Dumont Style 5 Inox 02 forceps and a needle of 100 µm diameter. During examination both the male genitalia and the specimens were kept in droplets of 100% glycerol on concave microscope slides. For long-term storage, the male genitalia and the corresponding specimens were put into separate micro vials, stored on one insect pin. The lower vial (BioQuip Products, Inc. #1133C: polyethylene micro vials with silicone stoppers) contains the male genitalia in a small glycerol droplet on the inner wall of the silicone stopper and the upper vial (BioQuip Products, Inc. #1133NC: polyethylene micro vials with neoprene stoppers) contains the specimens in a larger drop of glycerol. Specimens are deposited at ZFMK, SMNS, NHMUK, and NMK.

Digital brightfield images of male genitalia were taken with a Zeiss Plan Apochromat 20x/0.8 objective of a Zeiss Axio Imager.Z2m compound microscope and an attached Zeiss AxioCam HRc digital camera. Adjustment of light conditions, integrating scale bars and regulation of interval size between each image of generated Z-stack images were done by the Zeiss ZEN 2012 software ver. 1.1.2.0. Focus stacking and corrections of Z-stack images at different focus positions were made with the Zerene stacker software ver. 1.04.

Images of habitus were taken with a Keyence VHX-2000 digital microscope and VH-Z20R objective (20×–200×). The lights of the Keyence digital microscope were switched off and two Zeiss CL 6000 LED gooseneck lamps were evenly arranged around a cylinder of greaseproof paper and used instead. For all images, the male genitalia and specimens were immersed in a fresh cooled droplet of 100% glycerol to reduce impurities and movements.

Images were post-processed and assembled into plates with Microsoft® PowerPoint 2010, 2016 and Inkscape ver. 1.2.1.

Maps of sampling localities were generated using QGIS ver. 3.26 based on geographical coordinates.

Previously described species of Ceraphronidae *Ceraphron cephalotes* Sundholm, 1970, *C. confusus* Sundholm, 1970 and *C. longulus* Sundholm, 1970 were imaged by Christoffer Fägerström at the MZLU and the image of *C. masneri* Dessart, 1963 was kindly provided by István Mikó.

Repositories

CIRAD	=	French Agricultural Research Centre for International Development, Montpellier, France
CNC	=	Canadian National Collection of Insects, Arachnids and Nematods, Ottawa, Canada
ICIPE	=	International Center of Insect Physiology and Ecology, Nairobi, Kenya
MCSN	=	Museo Civico di Storia Naturale “Giacomo Doria”, Genoa, Italy
MNHN	=	Museum national d’histoire naturelle, Paris, France
MZLU	=	Lund University Biological Museum, Lund, Sweden
MZUF	=	Zoological Museum of the University of Florence, Florence, Italy
NHMUK	=	Natural History Museum, London, UK
NMK	=	National Museums of Kenya, Nairobi
PPRI	=	Plant Protection Research Institute, Pretoria, South Africa
RBINS	=	Royal Belgian Institute of Natural Sciences, Brussels, Belgium
RMCA	=	Royal Museum for Central Africa, Tervuren, Belgium
SMNS	=	Staatliches Museum für Naturkunde Stuttgart, Stuttgart, Germany
USNM	=	National Museum of Natural History, Smithsonian Institution, Washington DC, USA
WUR	=	Wageningen University & Research, Wageningen, Netherlands
ZMMU	=	Zoological Museum, Moscow Lomonosov State University, Moscow, Russia

Morphological characters and species descriptions

We used body and male genitalia characters for morphological descriptions. 20 characters were measured (Table 1). The number (N) of measured specimens (including holotype) is given in parentheses at the beginning of each description, if more than one specimen was available. Species descriptions based on more than one specimen provide a range, with the data of the holotype given in parentheses. The full list of measurements is given in Supp. file 2: Table S1. Based on the measurements we calculated 17 ratios used in the descriptions (for full list see Supp. file 3: Table S2).

The terminology and definition of morphological characters is based on Mikó & Deans (2009), the Hymenoptera Anatomy Ontology (HAO) (Yoder *et al.* 2010), Mikó *et al.* (2013), Ulmer *et al.* (2018), and Trietsch *et al.* (2020). Body or male genitalia characters which are not explicitly listed or defined in one of the previous references are defined according to the HAO.

As descriptions are focused on male genitalia, we provide a character list (Table 2) as well as an overview on the terms and relative positions of all male genitalia characters used in the descriptions (Fig. 1). Dashed lines specifically highlight the margins of the parts of the genitalia which are otherwise (sometimes) difficult to see or find (Fig. 1). Some characters, especially some margins of the respective parts of the genitalia, could not be seen and described for all species. In descriptions of species of *Conostigmus* and species of the *Aphanogmus clavicornis* and *tenuicornis* species group the ventromedial margin of the harpe was described instead of the dorsomedial margin of the harpe (described in all other species) because it is more visible in these groups. Shapes of the margins result in distinct and definable recurring shapes of the harpes and lobes, briefly explained in the following:

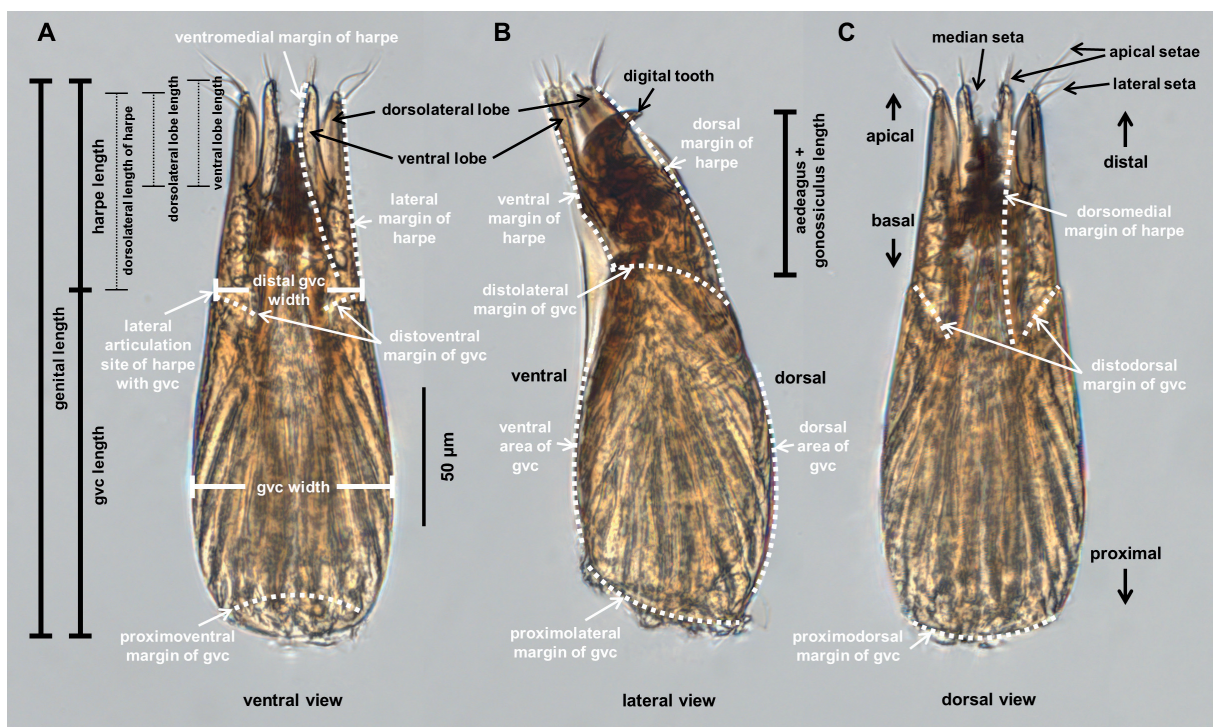


Fig. 1. Exemplary male genitalia of *Aphanogmus dimidiatus* sp. nov. (see Fig. 20) with characters used for species descriptions and diagnoses and terms of relative position. **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) view. Margins, areas, widths, and the lateral articulation site of the harpe with gvc are delineated and labelled in white. Lengths, terms of relative position, and additional structures are labelled in black. Characters are further defined in Table 2.

Table 1. List of characters used for morphometric measurements and their definitions (following Yoder *et al.* 2010, except where indicated).

Character	Definition
body length	The anatomical line between the anteriormost point of the cranium and the posteriormost point of the metasoma
head height	The median anatomical line of the head in anterior view
head width	The anatomical line that is the longest horizontal diameter of the cranium in frontal view
interorbital space	The interocular distance that is the shortest between the inner margin of compound eyes
maximum eye diameter	The longest diameter of the eye height and eye width
minimum eye diameter	The shortest diameter of the eye height and eye width
OOL (ocular ocellar line)	The anatomical line that is shortest and connects the compound eye and the lateral ocellus
POL (posterior ocellar line)	The anatomical line that is the shortest between the margin of the lateral ocelli
LOL (lateral ocellar line)	The anatomical line that is the shortest between the margins of the median and lateral ocelli
lateral ocellus diameter	The maximum diameter of the lateral ocellus (defined herein)
Weber length	The anatomical line that is the distance from the posteroventral corner of the metapleuron to the anteriormost part of the mesoscutum, measured in lateral view
mesosoma width	The maximum width of the mesosoma in dorsal view (defined herein)
mesoscutum width	The maximum width of the mesoscutum in dorsal view (defined herein)
mesoscutellum width	The maximum width of the mesoscutellum in dorsal view (defined herein)
posterior mesoscutal width	The width at the posterior end of the mesoscutum in dorsal view (defined herein)
mesoscutellum length	The anatomical line that is the longest among lines extending between the anterior and posterior margins of the mesoscutellum (defined herein)
fore wing length	The anatomical line that is the longest among lines extending between the proximal and distal margins of the fore wing (defined herein)
fore wing width	The longest width of the fore wing in dorsal view (defined herein)
genital length	The proximodistal anatomical line that is the longest extending between the proximal and distal margins of the genital (excluding setae) (defined herein, Fig. 1A)
gvc width	The longest width of the gonostyle/volsella complex (gvc) in ventral view (defined herein, Fig. 1A)

Table 2 (continued on next page). List of male genitalia characters used for descriptions and diagnoses with corresponding definitions (defined herein, except where indicated, see Fig. 1).

Character	Definition
genital length	see Table 1 (Fig. 1A)
gonostyle/volsella complex (gvc)	The anatomical cluster that is composed of the sclerites that are located distally of the cupula and surround the aedeagus (Yoder <i>et al.</i> 2010)
gvc width	see Table 1 (Fig. 1A)
gvc length	The proximodistal anatomical line that is the longest extending between the proximal and distolateral margins of the gvc (Fig. 1A)
distal gvc width	The width at the distal end of the gvc in ventral view (Fig. 1A)
proximodorsal margin of gvc	The orientation or shape of the proximodorsal margin of the gvc (e.g., ascending proximomedially, convex, straight) (Fig. 1C)
distodorsal margin of gvc	The orientation or shape of the distodorsal margin of the gvc (e.g., descending proximomedially, convex) (Fig. 1C)
proximoventral margin of gvc	The orientation or shape of the proximoventral margin of the gvc (e.g., ascending distomedially, concave, straight) (Fig. 1A)
distoventral margin of gvc	The orientation or shape of the distoventral margin of the gvc (e.g., convex, descending proximomedially) (Fig. 1A)
ventral area of gvc	The shape of the ventral area of the gvc (e.g., concave, convex, straight) (Fig. 1B)
dorsal area of gvc	The shape of the dorsal area of the gvc (e.g., convex, straight) (Fig. 1B), sometimes with distomedial indentation (not visible in lateral view)
proximolateral margin of gvc	The orientation or shape of the proximolateral margin of the gvc (e.g., ascending ventrally, concave, descending dorsally, emarginated ventrally) (Fig. 1B)
distolateral margin of gvc	The orientation or shape of the distolateral margin of the gvc (e.g., convex, descending ventrally) (Fig. 1B)
harpe	The sclerite that is located distally on the gonostyle/volsella complex and does not connect to the cupula, and does not connect to the volsella by conjunctiva or muscles (Yoder <i>et al.</i> 2010)
harpe length	The basoapical anatomical line that is the longest extending between the proximolateral margin and the apex of the harpe (excluding setae) (Fig. 1A)
harpe/gvc index	The index obtained by dividing the harpe length by the gvc width
dorsolateral lobe	The lobe of a bilobed harpe which is more dorsal and lateral than the ventral lobe (Fig. 1A–B)
dorsolateral lobe length	The basoapical anatomical line that is the longest extending between the proximal margin of the gap between the dorsolateral and ventral lobe and the apex of the dorsolateral lobe (excluding setae) (Fig. 1A)
dorsolateral length of harpe	The basoapical anatomical line that is the longest extending between the proximolateral margin of the harpe and the apex of the dorsolateral lobe (excluding setae) (Fig. 1A)
ventral lobe	The lobe of a bilobed harpe which is more ventral than the dorsolateral lobe (Fig. 1A–B)

Table 2 (continued).

Character	Definition
ventral lobe length	The basoapical anatomical line that is the longest extending between the proximal margin of the gap between the dorsolateral and ventral lobe and the apex of the ventral lobe (excluding setae) (Fig. 1A)
lateral articulation site of harpe with gvc	The combined shape of the lateral articulation site of the harpe with the gvc (e.g., flush, not flush) (Fig. 1A)
ventral margin of harpe	The orientation and/or shape of the ventral margin of the harpe (e.g., concave, curved distodorsally, emarginated, straight) (Fig. 1B)
dorsal margin of harpe	The orientation and/or shape of the dorsal margin of the harpe (e.g., concave, convex, oriented distoventrally, straight) (Fig. 1B)
lateral margin of harpe	The orientation and/or shape of the lateral margin of the harpe (e.g., convex, curved/oriented distomedially, straight) (Fig. 1A)
dorsomedial margin of harpe	The orientation and/or shape of the dorsomedial margin of the harpe (e.g., convex, diverging distolaterally, parallel to other harpe, straight) (Fig. 1C)
ventromedial margin of harpe	The orientation and/or shape of the ventromedial margin of the harpe (e.g., convex, converging distomedially, touching) (Fig. 1A)
lateral seta of harpe	The seta that is located on the lateral margin of the harpe or lobe (Fig. 1C)
apical seta of harpe	The seta that is located on the apex of the harpe or lobe (Fig. 1C)
median seta of harpe	The seta that is located on the ventro- or dorsomedial margin of the harpe or lobe (Fig. 1C)
ventral seta of harpe	The seta that is located on the ventral margin of the harpe or lobe (Fig. 30A–B)
ventrobasal seta of aedeagus + gonossiculus	The seta that is located ventrobasal on the aedeagus + gonossiculus (Fig. 30B)
aedeagus	The anatomical cluster that is composed of sclerites that are adjacent to the distal end of the ejaculatory duct (Yoder <i>et al.</i> 2010)
gonossiculus	The sclerite that is located on the distoventral part of the gonostyle/volsella complex, and is articulated with the more proximal sclerites of the gonostyle/volsella complex (Yoder <i>et al.</i> 2010)
aedeagus + gonossiculus length	The basoapical anatomical line that is the longest extending between the proximolateral margin of the harpe and the apex of the aedeagus + gonossiculus (Fig. 1A–C)
digital tooth	The projection that is located apically on the gonossiculus (Yoder <i>et al.</i> 2010, Fig. 1B)
volsella	The anatomical cluster that is composed of the sclerites on the ventral part of the male genitalia that are not connected to the cupula via muscles (Yoder <i>et al.</i> 2010, Fig. 104A)

a sickle shaped harpe is predominantly thin with a concave and a convex margin and the apex is pointed and oriented, usually distomedially (Figs 72, 75, 92A, C). A finger shaped harpe is slightly elongated and has virtually parallel-sided margins (e.g., Figs 23, 30, 40, 64, 68, 81A, C). A cone shaped harpe is broader at the base than at the apex and converging, with at least one slightly convex margin, to the often rounded apex (e.g., Figs 44, 46, 49, 52, 56, 63, 73A, C). A triangular shaped harpe is broader at the base than at the apex and converging with virtually straight margins (sometimes slightly concave or convex) to the pointed apex (e.g., Figs 41, 65A, C). Parts of the harpe, like the dorsolateral lobe in *A. kakakili* sp. nov. (Fig. 23B), can also be triangular without a pointed apex but with distinct symmetrical and/or straight convergent margins. Some species show intermediate forms with triangular to cone-shaped harpes (Figs 42, 47A, C). A trapezoidal shaped harpe shows a combination of a triangular shape and virtually parallel-sided margins (e.g., Figs 53–55, 70, 79, 83A, C). Some species show intermediate forms with trapezoidal to cone-shaped harpes (Figs 58, 67A, C). In a single case, the harpes are bulb-shaped, i.e., the apical half is distinctly more bulbous than the basal half (Fig. 66A, C).

All keyed species of *Aphanogmus* in this monograph are assigned to three different species groups proposed by Evans *et al.* (2005).

Results

Species delimitations

This monograph deals with newly described species of Ceraphronoidea from Gabon, Kenya and Tanzania. Only males were considered, as the male genitalia serve as key character for species delimitation (majority of Paul Dessart's publications since 1963; Mikó *et al.* 2013; Ulmer *et al.* 2018; Trietsch *et al.* 2020). Delimitation of species from previously described species was done only considering those previously described species, for which males (41 species) and specifically male genitalia are known (20 species). Information from examined type material, type image depositories, original descriptions, and additional publications was used, and specified accordingly in the taxonomic treatments of the newly and previously described species. Species delimitations were done mainly considering species previously described from the Afrotropical mainland. Non-Afrotropical mainland species were considered if they had morphological similarities to the species described herein, in body and/or male genitalia. The identification key includes only Afrotropical species of Ceraphronidae for which detailed information on the male genitalia are available.

In cases, in which we only had single specimens at hand, often slightly damaged and not exhibiting sufficiently clear characters for species delimitation, we refrained from formally naming species but still describe them (under preliminary names, for example, *Aphanogmus* sp. 1) because we see some differences to formally described species and intend to make these specimens and their characters visible and accessible to future work. Descriptions of the putative but unnamed species are placed after the formal descriptions of species in the respective genus or species-group and will be introduced by a short explicit statement on the description without formal naming.

Keys

Key to genera of male Ceraphronidae from the Afrotropical mainland (modified from Dessart & Cancemi 1987)

1. Mesosoma laterally compressed (higher than wide); flagellomeres cylindric or trapezoidal with erect and/or sickle-shaped sensillae (longer and/or shorter than width of flagellomeres) 2
 - Mesosoma not laterally compressed (often wider than high); flagellomeres cylindric with sickle-shaped sensillae (rarely longer than width of flagellomeres) (Dessart & Cancemi 1987: e.g., 363, figs 104–111) *Ceraphron* Jurine, 1807
2. Head not dorsoventrally flattened 3
 - Head dorsoventrally flattened and distinctly wider than laterally compressed meso- and metasoma (Dessart & Cancemi 1987: 347, figs 31–32) *Synarsis* Förster, 1878
3. Head without modified vertex and elongated mandibles 4
 - Head with elongated, slightly flattened and medially notched vertex; elongated and thin mandibles (Dessart & Cancemi 1987: 348, figs 35–39) *Gnathoceraphron* Dessart & Bin, 1980
4. Head not enlarged and not subdivided by distinct carinae into concave compartments 5
 - Head enlarged with subdivided concave preoccipital and frontal compartments, subdivision by distinct carinae; elongated mandibles (Dessart & Cancemi 1987: 348, figs 40–42) *Retasus* Dessart, 1984
5. Anterior third of metasoma narrowed, rest of metasoma distinctly convex ventrally; flagellomeres cylindric with sickle-shaped sensillae shorter than width of flagellomeres (Dessart & Cancemi 1987: 350, fig. 49; Fig. 92D) *Cyoceraphron* Dessart, 1975
 - Metasoma without characteristic profile; flagellomeres trapezoidal (rarely cylindric) with erect and/or sickle-shaped sensillae mostly longer than width of flagellomeres (Dessart & Cancemi 1987: 351, figs 52–53; Figs 28D, 30D) *Aphanogmus* Thomson, 1858

Key to male *Aphanogmus* from the Afrotropical mainland

1. Median mesoscutal sulcus absent; basal transverse carina of petiole (on syntergum) present (*tenuicornis* species group) (Dessart 1963a: 410, fig. 45) 2
 - Median mesoscutal sulcus present; basal transverse carina of petiole (on syntergum) present (*fumipennis* species group) (e.g., Fig. 20D; Evans *et al.* 2005: 50, fig. 2; 52, fig. 9) 4
 - Median mesoscutal sulcus absent; basal transverse carina of petiole (on syntergum) absent (*clavicornis* species group) (e.g., Fig. 4D; Dessart 1963a: 405, fig. 31) 24
2. OOL:POL ≤ 1.11 ; preoccipital furrow, with small interocellar pit; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex present (e.g., Fig. 36D); longest lateral seta more than half as long as harpe (Figs 36, 38A, C) 3
 - OOL:POL 1.49; preoccipital furrow, without interocellar pit; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent (Fig. 37D); longest lateral seta less than one quarter as long as harpe (Fig. 37A, C) *A. kikuyu* sp. nov.
3. Scape as long as F1 and F2 combined (Fig. 38D); harpes taken together pagoda-shaped in ventral and dorsal view (Fig. 38A, C) *A. pagoda* sp. nov.
 - Scape longer than F1 and F2 combined (Fig. 36D); harpes taken together bell-shaped in ventral and dorsal view (Fig. 36A, C) *A. campanula* sp. nov.

4. Harpe bilobed [Figs 20, 22–24 (dorsolateral lobe very short), 26–29, 31–32, 34–35, 99; Buffington & Polaszek 2009: 65, fig. 6; Dessart 1971: 97, fig. 13]	5
– Harpe not bilobed (Figs 21, 25, 30, 33; Dessart 1963a: 394, fig. 12; Polaszek & LaSalle 1995: 139, fig. 24)	19
5. Meso- or metapleuron with distinct longitudinal striations (e.g., Fig. 24D)	6
– Meso- or metapleuron without or with very indistinct longitudinal striations (e.g., Fig. 28D)	12
6. Scape longer than F1 and F3 combined (e.g., Fig. 99D)	7
– Scape shorter than F1 and F3 combined (e.g., Fig. 24D)	9
7. Dorsolateral lobe of harpe not finger-shaped (Buffington & Polaszek 2009: 65, fig. 6; Dessart 1971: 97, figs 13–14)	8
– Dorsolateral lobe of harpe finger-shaped (Fig. 99A, C; Dessart 1971: 97, figs 11–12)	<i>A. reticulatus</i> (Fouts, 1934)
8. Flagellomeres trapezoidal (Dessart 1971: 96, figs 6, 8); male genitalia as in Dessart (1971: 97, figs 13–14)	<i>A. fijiensis</i> (Ferrière, 1933)
– Flagellomeres moniliform (Buffington & Polaszek 2009: 64, fig. 3b); male genitalia as in Buffington & Polaszek (2009: 65, fig. 6)	<i>A. dictynna</i> (Waterston, 1923)
9. Scape as long as or longer than F1 and F2 combined, $F1 \leq 2.3 \times$ as long as pedicel; OOL:POL ≥ 0.65	10
– Scape shorter than F1 and F2 combined, $F1 3.7 \times$ as long as pedicel; OOL:POL ≤ 0.50 (Fig. 34D)	<i>A. taji</i> sp. nov.
10. Metacoxa light brown or yellowish; scape light brown or light brown-yellowish; mesometapleural sulcus absent	11
– Metacoxa brown; scape brown; mesometapleural sulcus present (but indistinct) in dorsal third of mesometapleuron (Fig. 31D)	<i>A. rafikii</i> sp. nov.
11. F1 $1.4 \times$ as long as wide (Fig. 32D); dorsolateral lobe of harpe about third as long as ventral lobe (Fig. 32C)	<i>A. robustus</i> sp. nov.
– F1 $3.5 \times$ as long as wide (Fig. 24D); dorsolateral lobe of harpe very short (Fig. 24C)	<i>A. kisiwa</i> sp. nov.
12. Preoccipital furrow, with interocellar pit (e.g., Fig. 22D)	13
– Preoccipital furrow, without interocellar pit	14
13. Scape as long as F1 and F2 combined, sensillae on flagellomeres not sickle-shaped (Fig. 23D); median mesoscutal sulcus not adjacent to transscutal articulation	<i>A. kakakili</i> sp. nov.
– Scape longer than F1 and F2 combined, sensillae on flagellomeres erect and sickle-shaped (Fig. 22D); median mesoscutal sulcus adjacent to transscutal articulation	<i>A. guenterii</i> sp. nov.
14. Metacoxa brown or yellow, not transparent (e.g., Figs 29, 35)	15
– Metacoxa light yellow and transparent (Figs 26–28)	17
15. Scape light brown-yellowish or yellowish; F1 shorter than F9; F6 at least $1.3 \times$ as wide as F9 (Figs 20, 35); Weber length $\leq 1.76 \times$ genital length (Figs 20, 35)	16
– Scape light brown; F1 as long as F9; F6 as wide as F9 (Fig. 29D); Weber length $\geq 1.96 \times$ genital length (Fig. 29)	<i>A. nikii</i> sp. nov.

16. Harpe/gvc index 0.37; dorsolateral lobe of harpe triangular in lateral view (Fig. 35A–C) *A. ukanda* sp. nov.
 – Harpe/gvc index 0.63; dorsolateral lobe of harpe finger-shaped in lateral view (Fig. 20A–C) *A. dimidiatus* sp. nov.
17. Dorsolateral lobe/ventral lobe index ≥ 0.65 ; dorsolateral length of harpe/harpe index ≥ 0.81 (e.g., Fig. 28A–C) 18
 – Dorsolateral lobe/ventral lobe index 0.18; dorsolateral length of harpe/harpe index 0.61 (Fig. 27A–C) *A. ndefu* sp. nov.
18. Harpe/gvc index 0.34; dorsolateral lobe of harpe triangular in lateral view (Fig. 28A–C) *A. ngai* sp. nov.
 – Harpe/gvc index 0.47; dorsolateral lobe of harpe finger-shaped in lateral view (Fig. 26A–C) *A. morriconei* sp. nov.
19. Harpe/gvc index ≤ 0.77 20
 – Harpe/gvc index 1.23 (Polaszek & LaSalle 1995: 139, fig. 24) *A. trasides* Polaszek, 1995
20. Scape and pedicel light brown or lighter; scape longer than F1 and F2 combined; F1 shorter than F9; posterior mesosomal comb distinct (e.g., Fig. 30D); harpe/gvc index ≥ 0.68 (e.g., Fig. 30A–C) 21
 – Scape and pedicel brown; scape as long as F1 and F2 combined; F1 as long as F9; posterior mesosomal comb absent (Fig. 25D); harpe/gvc index 0.77 (Fig. 25A–C) *A. maua* sp. nov.
21. Head dark brown, mesosoma dark brown, metasoma brown; flagellum brown (e.g., Fig. 33D) ... 22
 – Head light brown-amber, mesosoma light brown-amber, metasoma light brown; flagellum light brown (Figs 21, 30) 23
22. Dorsomedial margin of harpe concave from base to apex (Fig. 33C); harpe slightly curved in ventral direction (Fig. 33B) *A. simbai* sp. nov.
 – Dorsomedial margin of harpe convex and slightly diverging in basal third, slightly concave and slightly converging in apical two thirds; harpe distinctly curved in ventral direction (Dessart 1963a: 394, figs 12–13; Mikó 2012c) *A. fumipennis* Thomson, 1858
23. Dorsomedial margin of harpe convex in apical third with indentation below apex, harpe without median setae on basal two thirds (Fig. 30A, C) *A. pilosicoxa* sp. nov.
 – Dorsomedial margin of harpe concave in apical third without indentation below apex, harpe with distinctly crossing median setae on basal two thirds (Fig. 21A, C) *A. fraterculus* sp. nov.
24. Preoccipital furrow present, but not distinct and not widened, with interocellar pit (like in *A. clavicornis*, Dessart 1963a: 405; Figs 30–31) 25
 – Preoccipital furrow distinct and widened, with or without interocellar pit (e.g., Fig. 5D; resembling female of *A. tenuicornis*, Dessart 1963a: 409, fig. 36) 26
 – Preoccipital furrow present, but not distinct and not widened, without interocellar pit (e.g., Fig. 4D; like in *A. fumipennis*, Dessart 1963a: 394, fig. 9) 28
25. Dorsal margin of harpe straight (Fig. 13B) *A. njia* sp. nov.
 – Dorsal margin of harpe straight in basal third and concave in apical two thirds (Fig. 7B) *A. kakamegaensis* sp. nov.
26. Preoccipital furrow, with interocellar pit; ventromedial margin of harpe convex and/or concave in basal three quarters (e.g., Fig. 8A) 27
 – Preoccipital furrow, without interocellar pit (Fig. 5D); ventromedial margin of harpe straight and parallel to other harpe in basal three quarters (Fig. 5A) *A. ikhongamurwi* sp. nov.

27. Harpe with plateau on apex in lateral view (Fig. 2B), not finger-shaped apicoventrally in ventral and dorsal view (Fig. 2A, C) *A. abaluhya* sp. nov.
 – Harpe without plateau on apex in lateral view (Fig. 8B), finger-shaped apicoventrally in ventral and dorsal view (Fig. 8A, C) *A. lateritorum* sp. nov.
28. No or only indistinct pairs of translucent patches on metasomal syntergum and/or synsternum; posterior mesoscutal width $\geq 1.29 \times$ mesoscutellum width 29
 – Distinct pairs of translucent patches on metasomal syntergum and synsternum; posterior mesoscutal width $1.24 \times$ mesoscutellum width (Fig. 4D) *A. idakho* sp. nov.
29. Metacoxa concolourous with metafemur and -tibia (Figs 3, 6, 9–11, 14–15) 30
 – Metacoxa lighter than metafemur and -tibia (Fig. 12D) *A. nebergi* sp. nov.
30. Harpe not rectangular in ventral and dorsal view (Figs 3, 6, 9–10, 14–15); dorsal margin of harpe without protrusion (Figs 3, 6, 9–10, 14–15) 31
 – Harpe rectangular in ventral and dorsal view (Fig. 11A, C); dorsal margin of harpe at its middle with pointed protrusion (Fig. 11B) *A. mashariki* sp. nov.
31. Harpe not triangular apicoventrally in ventral, lateral and dorsal view; longest apical setae of harpe at most one quarter as long as harpe 32
 – Harpe triangular apicoventrally in ventral, lateral and dorsal view (Fig. 14A–C); longest apical setae of harpe one third as long as harpe (Fig. 14A–C) *A. vestrii* sp. nov.
32. Ventromedial margin of harpe not convex in basal half, harpes not overlapping and apices of harpes sometimes close, but not touching 33
 – Ventromedial margin of harpe convex in basal half and concave in apical half, with harpes overlapping in basal half and apices of harpes touching (Fig. 15A) *A. yala* sp. nov.
33. Harpe finger-shaped apicoventrally in lateral view; apical margin of harpe not strongly sclerotized 34
 – Harpe not finger-shaped but broadened apicoventrally in lateral view; apical margin of harpe strongly sclerotized (Fig. 6A–C) *A. isiukhu* sp. nov.
34. Fore wing length $\geq 2.63 \times$ width; ventral margin of harpe without emargination at its middle 35
 – Fore wing length $\leq 2.52 \times$ width (Fig. 9D); ventral margin of harpe with distinct emargination at its middle (Fig. 9B) *A. mangimelii* sp. nov.
35. Mesoscutellum distinctly projecting (Fig. 3D); ventromedial margin of harpe straight in basal two thirds and converging distomedially; longest ventral seta less than one third as long as harpe (Fig. 3A, C) *A. ashitakai* sp. nov.
 – Mesoscutellum not projecting (Fig. 10D); ventromedial margin of harpe concave in basal two thirds; longest ventral seta more than half as long as harpe (Fig. 10A, C) *A. mariae* sp. nov.

Key to male *Ceraphron* from the Afrotropical mainland

1. Scape as long as F1 to F3 combined or longer (e.g., Fig. 82D) 2
 – Scape as long as F1 and F2 combined or shorter (e.g., Fig. 41D) 6
 – Scape longer than F1 and F2 combined and shorter than F1 to F3 combined (e.g., Fig. 47D) 14
2. Scape shorter than F1 to F4 combined (e.g., Fig. 76D) 3
 – Scape as long as F1 to F4 combined (Fig. 54D) *C. insolitus* sp. nov.

3. At least some flagellomeres moniliform (Figs 45, 82)	4
– All flagellomeres cylindric (Figs 51, 76)	5
4. Head, meso- and metasoma brown (Fig. 82D); harpe finger-shaped in ventral and dorsal view (Fig. 82A, C)	<i>C. sungura</i> sp. nov.
– Head light brown, meso- and metasoma light brown-yellowish (Fig. 45D); harpe cone-shaped in ventral and dorsal view (Fig. 45A, C)	<i>C. cingulum</i> sp. nov.
5. Genital weakly sclerotized; harpe not indented apically in lateral view (Fig. 51B); apical setae of harpes not crossing (Fig. 51A, C)	<i>C. eulbergi</i> sp. nov.
– Genital moderately sclerotized; harpe indented apically in lateral view (Fig. 76B); apical setae of harpes distinctly crossing (Fig. 76A, C)	<i>C. pilosiharpis</i> sp. nov.
6. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent (e.g., Fig. 41D)	7
– Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex present (e.g., Fig. 71D)	9
7. Harpe/gvc index ≤ 0.50 (e.g., Fig. 41A–C); harpe cone-shaped or triangular in ventral and dorsal view (e.g., Fig. 41A, C)	8
– Harpe/gvc index 0.81 (Fig. 75A–C); harpe sickle-shaped in ventral and dorsal view (Fig. 75A, C)	<i>C. onesimusi</i> sp. nov.
8. Harpe/gvc index 0.50 (Sundholm 1970: 363, fig. 139)	<i>C. longulus</i> Sundholm, 1970
– Harpe/gvc index 0.33 (Fig. 41A–C)	<i>C. breviharpis</i> sp. nov.
9. Harpe triangular and/or cone-shaped or bulb-shaped, not sickle-shaped and without apicoventral projection (e.g., Figs 42–43, 66, 71A, C)	10
– Harpe sickle-shaped with apicoventral projection (Fig. 72A, C)	<i>C. mwekaensis</i> sp. nov.
10. Mesometapleuron with distinct longitudinal striations (Dessart 1963b: 530, fig. 4 female; Figs 42D, 103)	11
– Mesometapleuron without distinct longitudinal striations	12
11. Mesometapleural sulcus present (Dessart 1963b: 530, fig. 4 female; Fig. 103)	<i>C. masneri</i> Dessart, 1963
– Mesometapleural sulcus absent (Fig. 42D)	<i>C. breviscapus</i> sp. nov.
12. Head brown, mesosoma brown and metasoma light brown or brown (e.g., Fig. 71D)	13
– Head light brown-yellowish, mesosoma yellowish except meso- and metapleuron darker and metasoma light brown-yellowish except anterior third lighter (Fig. 66D)	<i>C. longumerunus</i> sp. nov.
13. Harpe triangular in ventral and dorsal view; harpe/gvc index 0.31 (e.g., Fig. 71A, C)	<i>C. mikoi</i> sp. nov.
– Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.93 (Fig. 43A, C)	<i>C. buyangu</i> sp. nov.
14. Harpe finger-shaped in ventral and dorsal view (e.g., Figs 40, 80)	15
– Harpe not finger-shaped, but cone-shaped, trapezoidal or triangular in ventral and dorsal view (e.g., Figs 44, 58)	23

15. Harpe/gvc index > 1.00 (e.g., Fig. 64A–C)	16
– Harpe/gvc index < 0.70 (e.g., Fig. 50A–C)	19
16. Harpe/gvc index ≤ 1.05 (e.g., Fig. 81A–C)	17
– Harpe/gvc index > 1.30 (e.g., Fig. 64A–C)	<i>C. longiharpis</i> sp. nov.
17. Head brown and mesosoma brown or light brown; flagellum light brown or light brown-yellowish; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex extending to end of mesosoma (Figs 48, 68D)	18
– Head and mesosoma dark brown; flagellum brown; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex exceeding end of mesosoma (Fig. 81D)	<i>C. semira</i> sp. nov.
18. Mesosoma brown; flagellum light brown; F1 2.6 × as long as wide (Fig. 68D); lateral margin of harpe straight; dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex; harpe with at least three lateral setae distributed along apical quarter (Fig. 68A, C)	<i>C. malava</i> sp. nov.
– Mesosoma light brown; flagellum light brown-yellowish; F1 2.1 × as long as wide (Fig. 48D); lateral margin of harpe convex; dorsomedial margin of harpe straight and slightly diverging distolaterally in basal half, straight and parallel to other harpe in apical half; harpe with at least four lateral setae distributed along apical half (Fig. 48A, C)	<i>C. eaerendili</i> sp. nov.
19. Mesosoma dark brown or brown, ventrolateral parts not darker than rest; scape light brown or yellowish; F6 ≤ 1.8 × as long as wide (e.g., Fig. 61D); harpe with at least three lateral setae but not more than four (e.g., Fig. 61A–C)	20
– Mesosoma brown, ventrolateral parts darker than rest; scape brown; F6 2.5 × as long as wide (Fig. 80D); harpe with at least six lateral setae (Fig. 80A–C)	<i>C. sataoi</i> sp. nov.
20. Scape yellowish or partially yellowish (Figs 50, 61–62); harpe/gvc index ≥ 0.64; harpe with at least nine median setae but not more than ten, median setae not convex or brush-like arranged (Figs 50, 61–62)	21
– Scape light brown (Fig. 40D); harpe/gvc index 0.56; harpe with at least eleven convex and brush-like arranged median setae (Fig. 40A, C)	<i>C. brashi</i> sp. nov.
21. Scape and pedicel yellowish; flagellum light brown (Figs 61–62); lateral margin of harpe at least slightly convex; apex of harpe rounded (Figs 61–62)	22
– Scape and pedicel light brown except proximal half of scape yellowish; flagellum brown (Fig. 50D); lateral margin of harpe straight; apex of harpe pointed (Fig. 50A, C)	<i>C. ellae</i> sp. nov.
22. Metasoma light brown; mesometapleural sulcus absent; head height 1.54–1.64 × maximum eye diameter (Fig. 61D); harpe/gvc index 0.55 (Fig. 61A–C)	<i>C. kidole</i> sp. nov.
– Metasoma brown; mesometapleural sulcus present; head height 1.77–1.83 × maximum eye diameter (Fig. 62D); harpe/gvc index 0.68 (Fig. 62A–C)	<i>C. kimathii</i> sp. nov.
23. At least some flagellomeres moniliform (Figs 46, 67)	24
– All flagellomeres cylindrical (e.g., Figs 49, 69)	25
24. Multiporous plates on flagellomeres elongate (Fig. 46D); harpe/gvc index 0.57; gvc slightly wider than long (Fig. 46A–C)	<i>C. clavatumeris</i> sp. nov.
– Multiporous plates on flagellomeres small and round (Fig. 67D); harpe/gvc index 0.44; gvc width two thirds of gvc length (Fig. 67A–C)	<i>C. maathiae</i> sp. nov.

25. Harpe/gvc index > 0.80 (e.g., Fig. 84A–C)	26
– Harpe/gvc index ≤ 0.63 (e.g., Figs 58, 83)	29
26. Harpe/gvc index ≥ 1.00 (e.g., Fig. 78A–C)	27
– Harpe/gvc index ≤ 0.86 (Figs 77, 84)	28
27. Interaxillar sulcus absent; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex exceeding the end of the mesosoma; legs yellowish except proximal third of coxae light brown (Fig. 78D)	<i>C. reinholdi</i> sp. nov.
– Distinct interaxillar sulcus; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex not extending to the end of the mesosoma; legs yellowish (Sundholm 1970: 357–359; Fig. 101B)	<i>C. confusus</i> Sundholm, 1970
28. Longitudinal sulcus on mesometapleuron from procoxa to metacoxa; scape and pedicel brown (Fig. 77D); genital moderately sclerotized; longest apical setae of harpe less than half as long as harpe (Fig. 77A–C)	<i>C. pleurosulcus</i> sp. nov.
– No longitudinal sulcus on mesometapleuron; scape and pedicel yellowish (Fig. 84D); genital weakly sclerotized; longest apical setae of harpe as long as harpe (Fig. 84A–C)	<i>C. tiriki</i> sp. nov.
29. Longest lateral setae of harpe shorter than harpe (e.g., Figs 58, 60)	30
– Longest lateral setae of harpe more than twice as long as harpe (Fig. 65A–C)	<i>C. longisetae</i> sp. nov.
30. Scape brown (Figs 44, 58, 73, 100)	31
– Scape light brown or lighter (e.g., Figs 49, 53, 63, 69)	34
31. Mesosoma dark brown and metasoma brown or partially yellowish, but not amber-coloured (Figs 44, 73, 100)	32
– Mesosoma amber-coloured, ventrolateral parts darker than rest and metasoma amber-coloured (Fig. 58D)	<i>C. kaharabu</i> sp. nov.
32. Head dark brown; legs yellowish except coxae partially dark brown and light brown, syntergite brown (Figs 44, 73); harpe/gvc index ≤ 0.47 (Figs 44, 73)	33
– Head brown, legs brown except tarsi yellowish, syntergite light brown-yellowish (Sundholm 1970: 359; Fig. 100B); harpe/gvc index 0.58 (Sundholm 1970: 361, fig. 135; Fig. 100A)	<i>C. cephalotes</i> Sundholm, 1970
33. Dorsomedial margin of harpe straight and slightly diverging distolaterally only in basal half, straight and parallel to other harpe in apical half (Fig. 44C); harpe with at least three lateral setae distributed along apical third (Fig. 44A, C)	<i>C. chemositi</i> sp. nov.
– Dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex (Fig. 73C); harpe with at least two lateral setae situated closely together at middle of harpe (Fig. 73A, C)	<i>C. nandi</i> sp. nov.
34. Lateral margin of harpe straight or slightly concave (Figs 39, 53, 57, 60, 79, 83)	35
– Lateral margin of harpe at least slightly convex (e.g., Figs 55, 59, 63, 70, 74)	40
35. Longest apical setae of harpe shorter than harpe (e.g., Fig. 60A–C)	36
– Longest apical setae of harpe longer than harpe (Fig. 53A–C)	<i>C. hitagarciai</i> sp. nov.
36. Flagellum gradually darkening from F1 to F9 (e.g., Fig. 57D)	37
– Flagellum with no colour gradient from F1 to F9 (Fig. 39D)	<i>C. banda</i> sp. nov.

37. Weber length $\leq 1.82 \times$ genital length (Figs 57, 60)	38
– Weber length $\geq 2.44 \times$ genital length (Figs 79, 83)	39
38. F1 shorter than F9; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex extending to end of mesosoma (Fig. 60D); harpe/gvc index 0.32 (Fig. 60A–C)	
..... <i>C. kakamegaensis</i> sp. nov.	
– F1 as long as F9; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex exceeding end of mesosoma (Fig. 57D); harpe/gvc index 0.46 (Fig. 57A–C)	
..... <i>C. ivindoensis</i> sp. nov.	
39. F1 $2.8 \times$ as long as wide; F6 $2.1 \times$ as long as wide (Fig. 83D); longest median setae of harpe one quarter as long as harpe (Fig. 83A–C)	<i>C. tenuimeris</i> sp. nov.
– F1 $2.2 \times$ as long as wide, F6 $1.8 \times$ as long as wide (Fig. 79D); longest median setae of harpe more than three quarters as long as harpe (Fig. 79A–C)	<i>C. salazar</i> sp. nov.
40. Harpe trapezoidal (Figs 55, 70)	41
– Harpe triangular to cone-shaped or cone-shaped (e.g., Figs 49, 56)	42
41. F6 $1.4 \times$ as long as wide, metapleuron without sculpture (Fig. 55D); harpe/gvc index 0.30; genital moderately sclerotized (Fig. 55A–C)	<i>C. isecheno</i> sp. nov.
– F6 $1.8 \times$ as long as wide, metapleuron distinctly sculptured (Fig. 70D); harpe/gvc index 0.48; genital weakly sclerotized (Fig. 70A–C)	<i>C. metapleuralis</i> sp. nov.
42. Gvc width more than three quarters of gvc length (e.g., Fig. 74A, C)	43
– Gvc width less than three quarters of gvc length (e.g., Fig. 56A, C)	45
43. OOL:POL ≤ 2.08 ; longest apical setae of harpe two thirds as long as harpe or shorter; genitalia moderately sclerotized (e.g., Fig. 63A–C)	44
– OOL:POL 3.33; longest apical setae of harpe more than three quarters as long as harpe; genitalia weakly sclerotized, almost transparent (Fig. 74A–C)	<i>C. nzoia</i> sp. nov.
44. Scape $4.7 \times$ as long as pedicel; F6 $1.4 \times$ as long as wide (Fig. 63D); gvc width $1.29 \times$ distal gvc width (Fig. 63A, C)	<i>C. lirhanda</i> sp. nov.
– Scape $2.9 \times$ as long as pedicel; F6 $1.8 \times$ as long as wide (Fig. 49D); gvc width $1.16 \times$ distal gvc width (Fig. 49A, C)	<i>C. ekeru</i> sp. nov.
45. Gvc width $\geq 1.33 \times$ distal gvc width (e.g., Fig. 85A, C)	46
– Gvc width $\leq 1.26 \times$ distal gvc width (e.g., Fig. 69A, C)	47
46. Weber length $2.05 \times$ genital length (Fig. 59); harpe/gvc index 0.37; genitalia moderately sclerotized with weakest sclerotization at harpe (Fig. 59A–C)	<i>C. kaimosiensis</i> sp. nov.
– Weber length $3.43\text{--}3.60 \times$ genital length (Fig. 85); harpe/gvc index 0.57; genitalia weakly sclerotized with more strongly sclerotized apex of harpe (Fig. 85A–C)	<i>C. trietschae</i> sp. nov.
47. Mesosoma uniformly dark brown or brown (e.g., Fig. 56D); longest lateral setae of harpe slightly more than half as long as harpe or less than half as long as harpe (e.g., Fig. 56A–C)	48
– Mesosoma brown with light brown mesoscutellum (Fig. 47D); longest lateral setae of harpe more than two thirds as long as harpe (Fig. 47A–C)	<i>C. digiti</i> sp. nov.
48. F6 $\geq 1.9 \times$ as long as wide (Figs 52, 69D); harpe/gvc index ≤ 0.43 (Figs 52, 69A–C)	49
– F6 $1.4 \times$ as long as wide (Fig. 56D); harpe/gvc index 0.52 (Fig. 56A–C)	<i>C. isukha</i> sp. nov.

49. Scape and pedicel light brown; scape $4.8\times$ as long as pedicel (Fig. 69D); longest lateral setae half as long as harpe (Fig. 69A–C) *C. mamamutere* sp. nov.
 – Scape and pedicel yellowish; scape $3.9\times$ as long as pedicel (Fig. 52D); longest lateral setae more than half as long as harpe (Fig. 52A–C) *C. herreni* sp. nov.

Key to male *Cyoceraphron* from the Afrotropical mainland

1. Meso- and metasoma light brown-yellowish or partially golden-yellowish (e.g., Fig. 92D) 2
 – Mesosoma brown, metasoma light brown (Fig. 94D) *C. kahawia* sp. nov.
2. F1 longer than pedicel, F1 $> 1.3\times$ as long as wide (Figs 92–93, 95); pair of translucent patches on metasomal synsternum absent or less distinct; mesosoma distinctly compressed laterally 3
 – F1 as long as pedicel, F1 $1.3\times$ as long as wide (Fig. 91D); distinct pair of translucent patches on metasomal synsternum; mesosoma not distinctly compressed laterally
 *C. dhahabudorsalis* sp. nov.
3. Head light brown or light brown-yellowish; scape longer than F1 and F2 combined (Figs 93, 95); harpe cone-shaped (Figs 93, 95) 4
 – Head dark brown; scape as long as F1 and F2 combined (Fig. 92D); harpe sickle-shaped (Fig. 92A, C) *C. harpe* sp. nov.
4. Legs light yellow, except metacoxa light yellow and transparent; F1 $1.9\times$ as long as wide; F6 $1.7\times$ as long as wide (Fig. 93D); harpe/gvc index 1.00 (Fig. 93A–C) *C. invisibilis* sp. nov.
 – Legs yellowish except coxae light brown-yellowish; F1 $2.3\times$ as long as wide; F6 $2.2\times$ as long as wide (Fig. 95D); harpe/gvc index 0.67 (Fig. 95A–C) *C. njano* sp. nov.

Taxonomy

Class Insecta Linnaeus, 1758
 Order Hymenoptera Linnaeus, 1758
 Suborder Apocrita Latreille, 1810
 Superfamily Ceraphronoidea Haliday, 1833
 Family Ceraphronidae Haliday, 1833
 Genus *Aphanogmus* Thomson, 1858

***clavicornis* species group after Evans *et al.* (2005)**

Aphanogmus abaluhya sp. nov.

urn:lsid:zoobank.org:act:27E5122E-06B4-4B6E-AB58-B7A901AC3106

Fig. 2

Diagnosis

Preoccipital furrow distinct, with interocellar pit; preoccipital carina distinct; fore wing length $3.20\times$ width. Male genitalia: harpe triangular in apical third in ventral and dorsal view and with plateau on apex in lateral view; harpe/gvc index 0.23; ventromedial margins of harpes indistinct at distoventral margin of gvc, ventromedial margin of harpe concave in basal two thirds and concave in apical third and with pointed protrusion in between, protrusion oriented medially; ventral margin of harpe straight and curved distoventrally at apical third, dorsal margin indistinct in basal part, straight and oriented distoventrally in apical part with plateau on apex, lateral margin straight and curved distomedially at its middle.

Etymology

The species is named after the Abaluhya people, an ethnic group native to western Kenya. Many sub-tribes of the Abaluhya, for example, Idakho, Isukha, Tiriki, settled around the Kakamega Forest.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°22'50.5 N, 34°49'21.4 E; 1623 m a.s.l.; 15 Aug. 2007; F. Hita Garcia leg.; Transect 19; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037033.

Description

Male

BODY LENGTH. 0.85 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs light brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.7\times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $2.9\times$ as long as wide, F1 $1.9\times$ as long as pedicel, F1 $1.2\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.0\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.08\times$ head height; head width $1.74\times$ interorbital space; maximum eye diameter $1.18\times$ minimum eye diameter; head height $1.85\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow distinct, with interocellar pit; preoccipital carina distinct. OOL:POL:LOL 1.00:0.86:0.57; OOL $1.75\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.25\times$ mesosoma width; Weber length 288 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.94\times$ mesoscutellum width; posterior mesoscutal width $1.44\times$ mesoscutellum width; mesoscutellum length $1.75\times$ mesoscutellum width; mesoscutellum length $1.22\times$ posterior mesoscutal width; Weber length $1.48\times$ mesoscutum width; Weber length $1.64\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $3.20\times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length 106 μm ; Weber length $2.71\times$ genital length; gvc width 63 μm ; genital length $1.70\times$ gvc width; gvc width three quarters of gvc length; gvc width $1.19\times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 2C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending

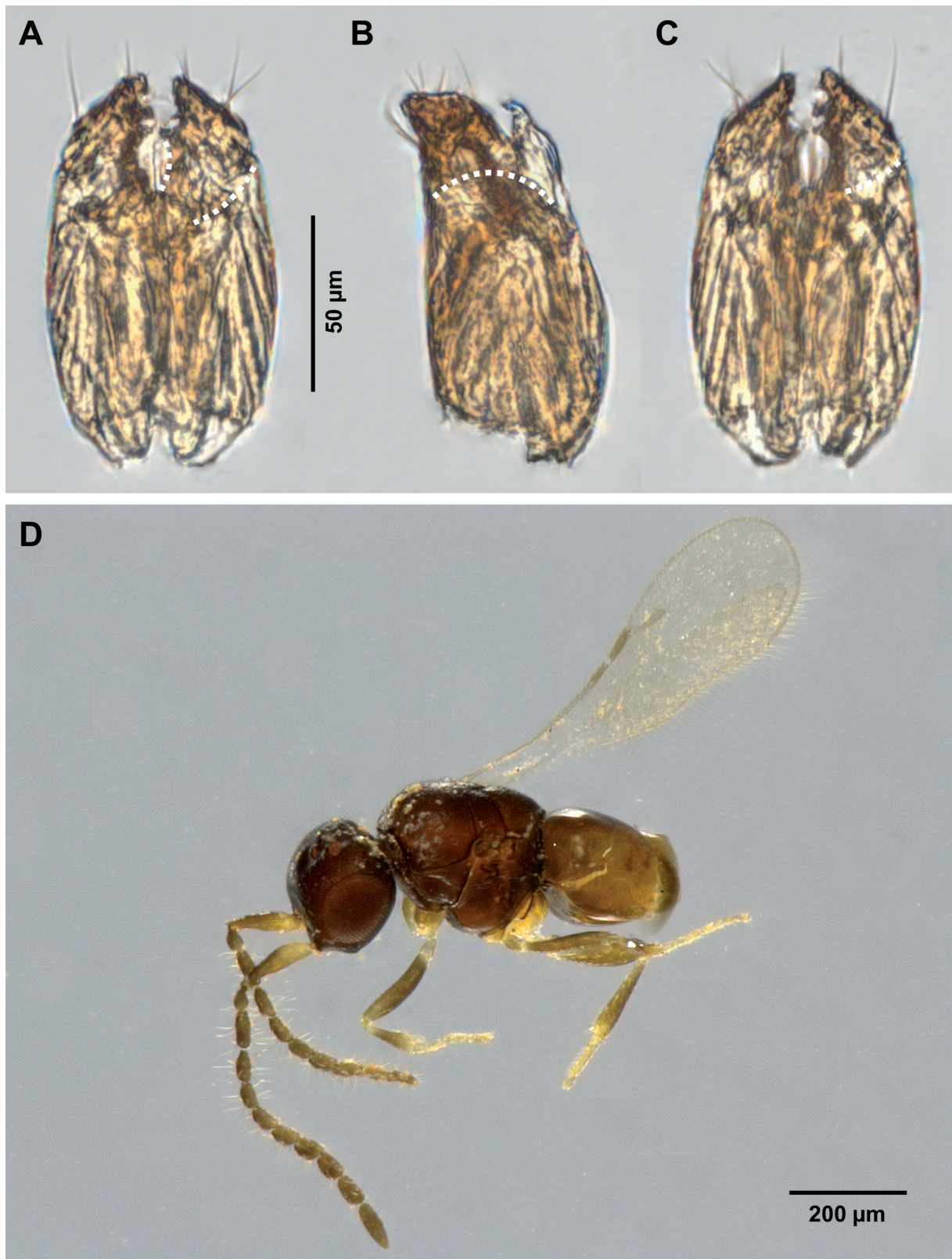


Fig. 2. Holotype of *Aphanogmus abaluhyia* sp. nov. (ZFMK-HYM-00037033). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

proximomedially (Fig. 2A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 2B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc convex, more strongly descending dorsally (Fig. 2B). Harpe triangular in apical third in ventral and dorsal view and with plateau on apex in lateral view; harpe/gvc index 0.23; lateral articulation site of harpe with gvc flush (Fig. 2A, C); ventral margin of harpe straight and curved distoventrally at apical third, dorsal margin indistinct in basal part, straight and oriented distoventrally in apical part with plateau on apex (Fig. 2B), lateral margin straight and curved distomedially at its middle, widest point of harpe at lateral articulation site with gvc (Fig. 2A, C); ventromedial margins of harpes indistinct at distoventral margin of gvc, ventromedial margin of harpe concave in basal two thirds and in apical third and with pointed protrusion in between, protrusion oriented medially (Fig. 2C), apex of harpe pointed, oriented distomedially (Fig. 2A, C). Harpe with at least one lateral seta restricted to basal third, longest lateral seta slightly less than as long as harpe, lateral seta oriented distolaterally; harpe with at least one ventral seta restricted to basal half, longest ventral seta slightly less than as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae more than one third as long as harpe, apical setae oriented distodorsally and distoventrally. Aedeagus + gonossiculus indistinct. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and all margins of harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus abaluhya sp. nov. is similar to *A. lateritorium* sp. nov. in having a very short stigmal vein, a relatively short scape in comparison to F1 and F2 combined, and a very distinct and broad preoccipital furrow with an interocellar pit. However, the two species can be distinguished by very different male genitalia. The male genitalia of *A. abaluhya* are more strongly sclerotized, and the harpe/gvc index is lower in *A. abaluhya* (0.23, compared to 0.37 in *A. lateritorium*). Furthermore, the shape of the harpes is strikingly different. *Aphanogmus abaluhya* has no partially finger-shaped harpes (as in *A. lateritorium*); the apex of the harpe in *A. abaluhya* is plateau-shaped in lateral view (not plateau-shaped in *A. lateritorium*).

For more comparisons with similar species, see remarks under *A. ikhongamurwi* sp. nov.

Condition of type material

In the holotype, the right F9, the left fore and hind wing, the three distal tarsal segments of the left hind leg, and the right fore leg (except coxa) are missing. The right middle leg is detached (except coxa). The posterior part of the metasoma is missing, thus the body length measurement is not precise.

Aphanogmus ashitakai sp. nov.

urn:lsid:zoobank.org:act:2FF180CA-7B2C-4DD8-844C-1AF291258844

Fig. 3

Diagnosis

Scape slightly shorter than F1 and F2 combined. Male genitalia: harpe finger-shaped apicoventrally in lateral view; harpe/gvc index 0.45; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight in basal two thirds and converging distomedially, straight and diverging distolaterally in apical third; ventral margin of harpe straight, dorsal margin indistinct in basal part, straight in apical two thirds, lateral margin slightly convex in basal third, concave in apical two thirds.

Etymology

The species is named after Ashitaka, the protagonist of the Japanese animated fantasy film Princess Mononoke. It is one of the first author's favourite films in which the conflict between man and nature is shown and nature is depicted in a particularly enchanting way.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037039.

Description

Male

BODY LENGTH. 0.61 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape, pedicel and flagellum light brown; legs light brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc hyaline and slightly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.2\times$ as long as pedicel, scape slightly shorter than F1 and F2 combined, F1 $3.2\times$ as long as wide, F1 $1.9\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.0\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.21\times$ head height; head width $1.70\times$ interorbital space; maximum eye diameter $1.23\times$ minimum eye diameter; head height $1.75\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:1.17:0.75; OOL $2.00\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.17\times$ mesosoma width; Weber length 231 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum distinctly projecting and setose, setae curved backwards or straight. Mesoscutum width $2.00\times$ mesoscutellum width; posterior mesoscutal width $1.50\times$ mesoscutellum width; mesoscutellum length $1.79\times$ mesoscutellum

width; mesoscutellum length $1.19 \times$ posterior mesoscutal width; Weber length $1.32 \times$ mesoscutum width; Weber length $1.48 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection

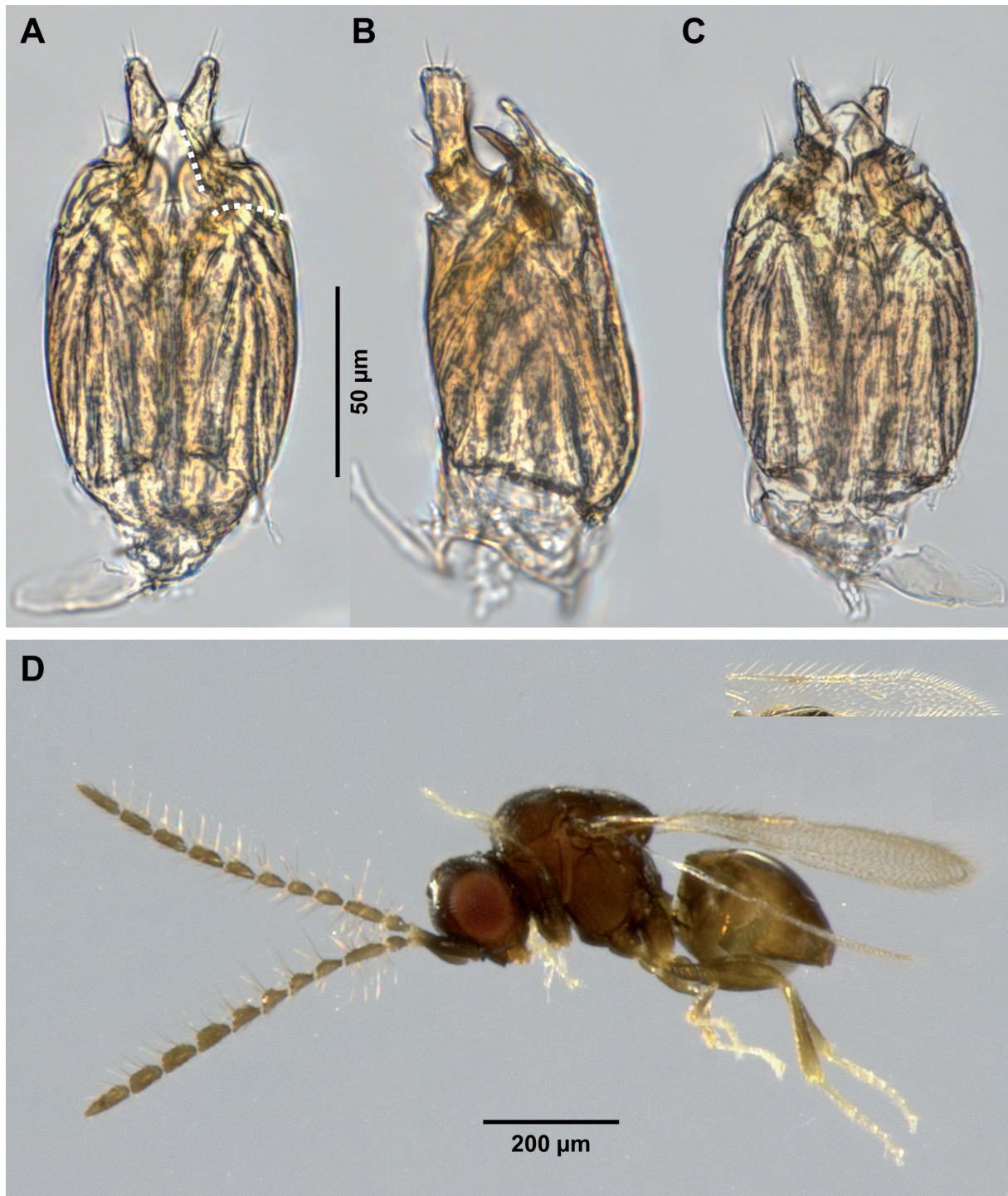


Fig. 3. Holotype of *Aphanogmus ashitakai* sp. nov. (ZFMK-HYM-00037039). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: detail of fore wing venation.

absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.76 \times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length 119 μm ; Weber length $1.95 \times$ genital length; gvc width 63 μm ; genital length $1.90 \times$ gvc width; gvc width three quarters of gvc length; gvc width $1.12 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc indistinct (Fig. 3C); proximoventral margin of gvc concave; distoventral margin of gvc convex and descending proximomedially (Fig. 3A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 3B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc indistinct (Fig. 3B). Harpe finger-shaped apicoventrally in lateral view; harpe/gvc index 0.45; lateral articulation site of harpe with gvc virtually flush (Fig. 3A, C); ventral margin of harpe straight, dorsal margin indistinct in basal part, straight in apical two thirds (Fig. 3B), lateral margin slightly convex in basal third, concave in apical two thirds, widest point of harpe at lateral articulation site with gvc (Fig. 3A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight in basal two thirds and converging distomedially, straight and diverging distolaterally in apical third (Fig. 3C), apex of harpe rounded, oriented distolaterally (Fig. 3A, C). Harpe with at least one lateral seta restricted to basal half, longest lateral seta one third as long as harpe, lateral seta oriented distolaterally; harpe with at least one ventral seta restricted to apical half, longest ventral seta less than one third as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distoventrally. Aedeagus + gonossiculus less than two thirds as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 3A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least two digital teeth, oriented ventrally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus ashitakai sp. nov., and *A. nehbergi* sp. nov. share a projecting mesoscutellum. However, *A. ashitakai* has all coxae concolourous while the metacoxa of *A. nehbergi* is lighter than the pro- and mesocoxa and a present but not distinct – as in *A. nehbergi* – preoccipital carina. In addition, the male genitalia of both species are very different.

Condition of type material

In the holotype, the right hind wing is missing. The metasoma is slightly deformed, thus the body length measurement is not precise.

Aphanogmus idakho sp. nov.

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Fig. 4

Diagnosis

Scape slightly shorter than F1 and F2 combined; F6 2.2× as long as wide; mesoscutum width 1.67× mesoscutellum width; posterior mesoscutal width 1.24× mesoscutellum width; distinct pairs of translucent patches on metasomal syntergum and synsternum. Male genitalia: harpe finger-shaped apicoventrally in ventral and dorsal view and broadened with plateau on apex in lateral view; harpe/gvc index 0.37; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave in basal three quarters, straight and diverging distolaterally in apical quarter; ventral margin of harpe straight, dorsal margin indistinct in basal part, strongly concave in apical half, lateral margin slightly convex and oriented distomedially in basal half, slightly concave and oriented distomedially in apical half.

Etymology

The species is named after the Idakho community, which live primarily in the Kakamega District.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037034.

Description

Male

BODY LENGTH. 0.85 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape, pedicel and flagellum light brown, gradually darkening from F1 to F9; legs light brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape 4.4× as long as pedicel, scape slightly shorter than F1 and F2 combined, F1 3.0× as long as wide, F1 2.4× as long as pedicel, F1 1.2× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 2.2× as long as wide, F6 shorter than F7 and F8 combined, F6 1.1× as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width 1.23× head height; head width 1.54× interorbital space; maximum eye diameter 1.25× minimum eye diameter; head height 1.75× maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL 1.00:1.29:0.71; OOL 1.75× lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width 1.13× mesosoma width; Weber length 281 µm. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width 1.67× mesoscutellum width; posterior mesoscutal width 1.24× mesoscutellum width; mesoscutellum length 1.52× mesoscutellum width; mesoscutellum length 1.23×

posterior mesoscutal width; Weber length $1.29 \times$ mesoscutum width; Weber length $1.41 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; distinct pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.60 \times$ width; stigmal vein as long as pterostigma marginal length.

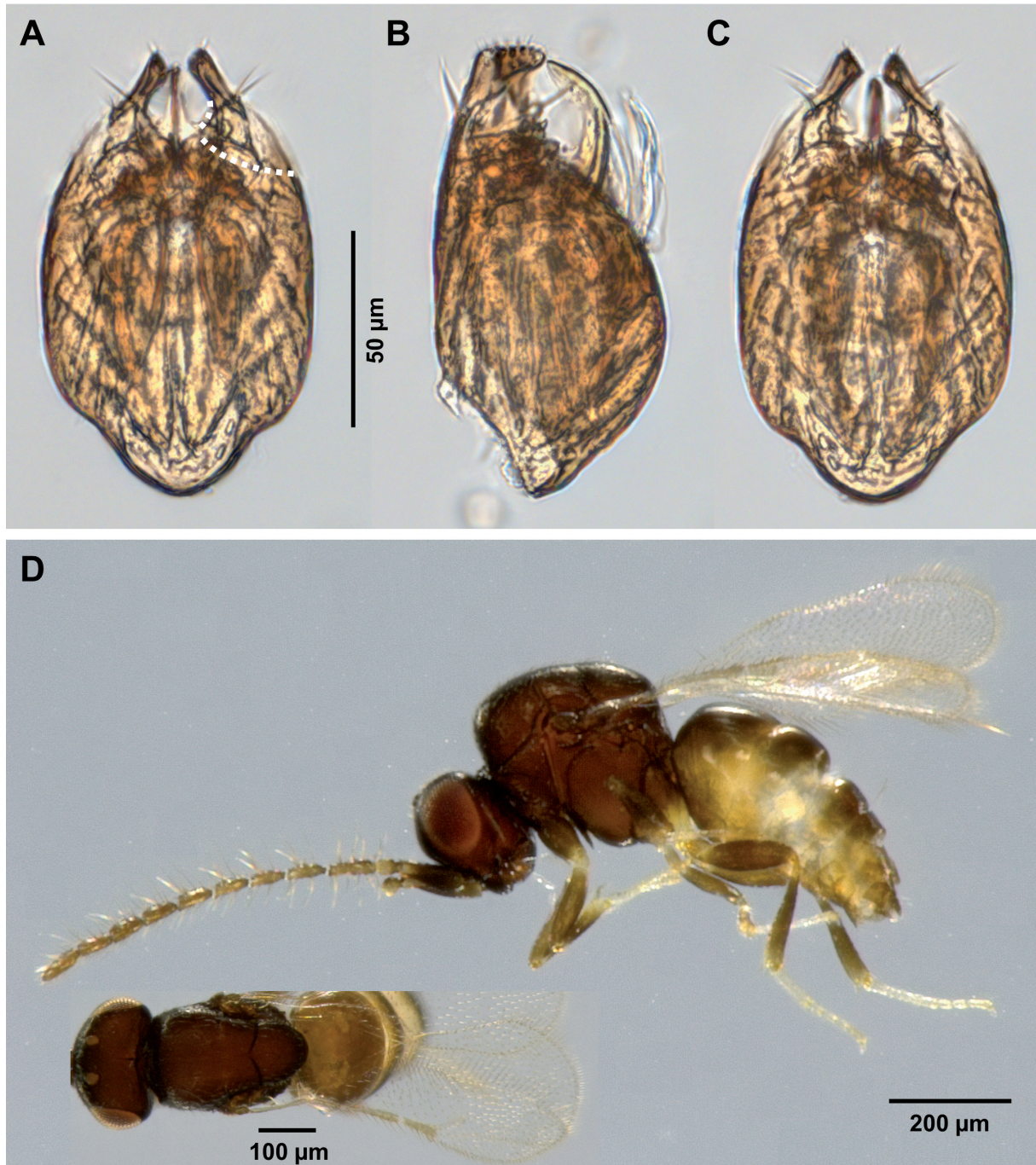


Fig. 4. Holotype of *Aphanogmus idakho* sp. nov. (ZFMK-HYM-00037034). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: habitus in dorsal view.

MALE GENITALIA. Genital length 106 μm ; Weber length $2.65 \times$ genital length; gvc width 69 μm ; genital length $1.55 \times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.13 \times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc indistinct (Fig. 4C); proximoventral margin of gvc strongly ascending distomedially; distoventral margin of gvc ascending proximomedially (Fig. 4A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 4B); proximolateral margin of gvc concave and strongly ascending ventrally; distolateral margin of gvc indistinct (Fig. 4B). Harpes finger-shaped apicoventrally in ventral and dorsal view and broadened with plateau on apex in lateral view; harpe/gvc index 0.37; lateral articulation site of harpe with gvc flush (Fig. 4A, C); ventral margin of harpe straight, dorsal margin indistinct in basal part, strongly concave in apical half (Fig. 4B), lateral margin slightly convex and oriented distomedially in basal half, slightly concave and oriented distomedially in apical half, widest point of harpe at lateral articulation site with gvc (Fig. 4A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave in basal three quarters, straight and diverging distolaterally in apical quarter (Fig. 4C), apex of harpe pointed (Fig. 4A, C). Harpe with at least one indistinct short lateral seta; harpe with at least one ventral seta, longest ventral seta more than one third as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distoventrally. Aedeagus + gonossiculus indistinct. Genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus and at apical part of the harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus idakho sp. nov. can be distinguished from all other treated species of the *clavicornis* species group by the very distinct pairs of translucent patches on the metasomal syntergum and synsternum.

Condition of type material

In the holotype, the right flagellum and the left middle leg (except coxa) are missing. The metasoma is deformed, thus the body length measurement is not precise.

Aphanogmus ikhongamurwi sp. nov.

urn:lsid:zoobank.org:act:B1CB469B-D466-4384-B883-52798E93F268

Fig. 5

Diagnosis

Preoccipital furrow distinct; preoccipital carina distinct; OOL $2.00\text{--}2.40 \times (2.40)$ lateral ocellus diameter; head width $1.23\text{--}1.31 \times (1.31)$ mesosoma width. Male genitalia: harpe finger-shaped apicoventrally and slightly broadened at apex in lateral view; harpe/gvc index 0.55; ventromedial margins of harpes almost

touching at distoventral margin of gvc, ventromedial margin of harpe straight and parallel to other harpe in basal three quarters, straight and diverging distolaterally in apical quarter; ventral margin of harpe slightly convex in basal half, straight in apical half, dorsal margin indistinct in basal part, concave in apical half with approximately apical quarter straight and oriented distoventrally, lateral margin straight in basal third, concave in apical three quarters.

Etymology

The species is named after the Crying Stone of Ilesi “Ikhonga Murwi”. The formation has great cultural and spiritual importance for the Luhya.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°19'25.9 N, 34°30'39.6 E; 1343 m a.s.l.; 15 Aug. 2008; F. Hita Garcia leg.; Transect 32; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037015.

Paratype

KENYA • 1 ♂; same collection data as for holotype; ZFMK-HYM-00034434.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 0.58–0.66 mm (0.58 mm).

COLOUR. Head brown, mesosoma light brown, metasoma light brown except anterior third yellowish; scape yellowish-transparent and pedicel light brown, flagellum light brown; legs yellowish except pro- and mesocoxa light brown, basal half of metacoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.6\times$ as long as pedicel, scape slightly longer than F1 and F2 combined, F1 $3.2\times$ as long as wide, F1 $1.9\times$ as long as pedicel, F1 $1.5\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.17\text{--}1.23\times$ (1.17) head height; head width $1.85\text{--}1.89\times$ (1.89) interorbital space; maximum eye diameter $1.13\text{--}1.18\times$ (1.13) minimum eye diameter; head height $1.50\text{--}1.71$ (1.71) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow distinct; preoccipital carina distinct. OOL:POL:LOL 1.00:0.79–0.88:0.58–0.62 (1.00:0.79:0.58); OOL $2.00\text{--}2.40\times$ (2.40) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.23\text{--}1.31\times$ (1.31) mesosoma width; Weber length 213–219 μm (219 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area sparsely setose, setae curved backwards or straight; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.85\text{--}2.08\times$ (1.85) mesoscutellum width; posterior mesoscutal width $1.38\text{--}1.54\times$ (1.38) mesoscutellum width; mesoscutellum length $1.77\text{--}2.00\times$ (1.77) mesoscutellum width; mesoscutellum length $1.28\text{--}1.30\times$ (1.28) posterior mesoscutal width; Weber length $1.26\text{--}1.46\times$ (1.46) mesoscutum width; Weber

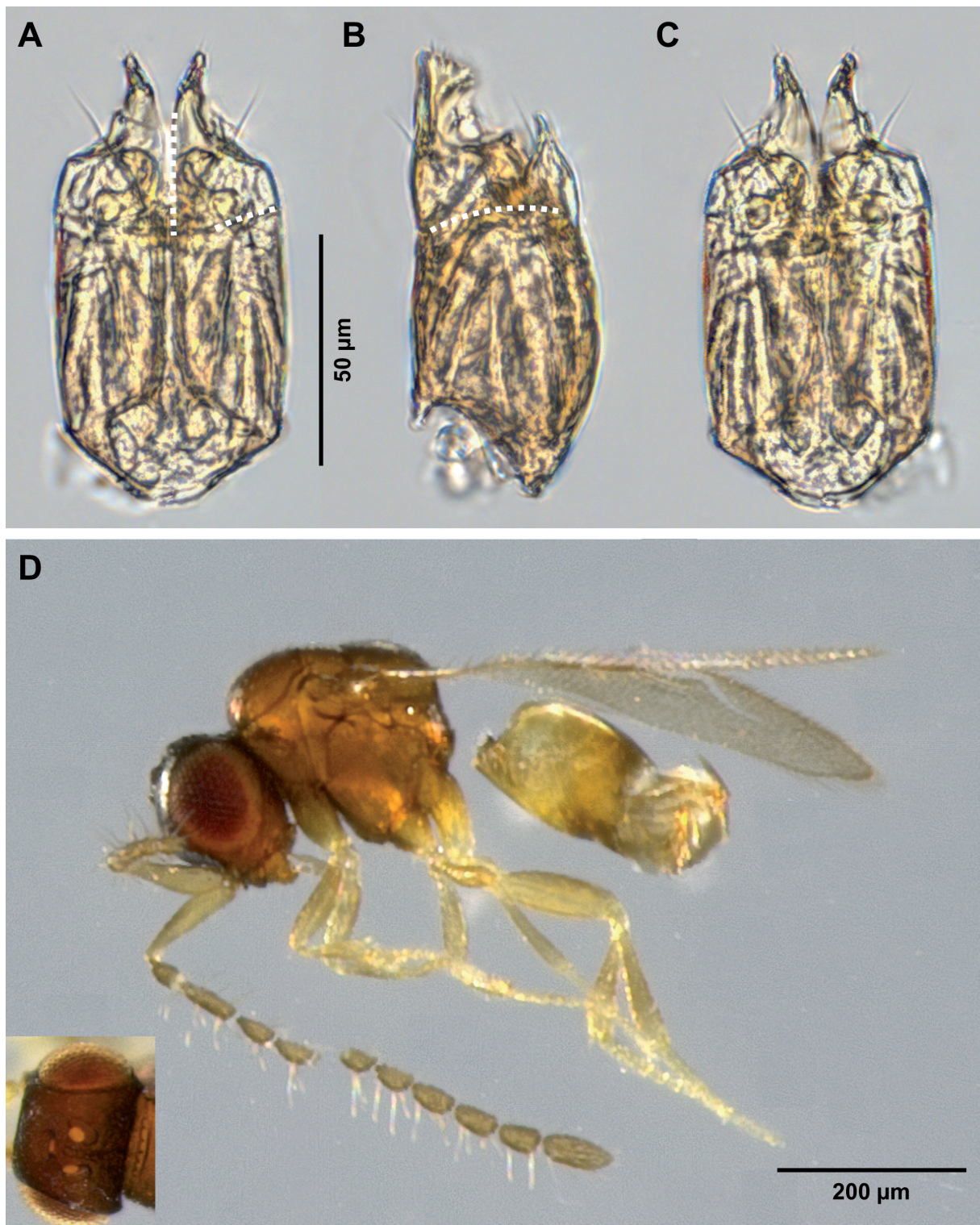


Fig. 5. Holotype of *Aphanogmus ikhongamurwi* sp. nov. (ZFMK-HYM-00037015). A–C. Male genitalia in ventral (A), lateral (B) and dorsal (C) views. D. Habitus in lateral view; inset: head in dorsal view.

length $1.31\text{--}1.52 \times (1.52)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $3.13\text{--}3.20 \times (3.13)$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length $100\text{--}94 \mu\text{m}$ ($100 \mu\text{m}$); Weber length $2.19\text{--}2.27 \times (2.19)$ genital length; gvc width $50\text{--}56 \mu\text{m}$ ($50 \mu\text{m}$); genital length $2.00\text{--}1.67 \times (2.00)$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.04 \times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc indistinct (Fig. 5C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 5A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 5B); proximolateral margin of gvc strongly ascending and emarginated ventrally; distolateral margin of gvc slightly descending ventrally (Fig. 5B). Harpe finger-shaped apicoventrally and slightly broadened at apex in lateral view; harpe/gvc index 0.55; lateral articulation site of harpe with gvc flush (Fig. 5A, C); ventral margin of harpe slightly convex in basal half, straight in apical half, dorsal margin indistinct in basal part, concave in apical half with approximately apical quarter straight and oriented distoventrally (Fig. 5B), lateral margin straight in basal third, concave in apical three quarters, widest point of harpe at apex lateral articulation site with gvc (Fig. 5A, C); ventromedial margins of harpes almost touching at distoventral margin of gvc, ventromedial margin of harpe straight and parallel to other harpe in basal three quarters, straight and diverging distolaterally in apical quarter (Fig. 5C), apex of harpe pointed, oriented distolaterally (Fig. 5A, C). Harpe with at least one lateral seta restricted to apical half, longest lateral seta more than one third as long as harpe, lateral seta oriented distoventrally and distolaterally; ventral setae indistinct; harpe with at least two apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distoventrally. Aedeagus + gonossiculus more than one third as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 5A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus ikhongamurwi sp. nov. is similar to *A. abaluhya* sp. nov. and *A. lateritorium* sp. nov. in having a distinct preoccipital furrow and a very short stigmal vein. However, *A. ikhongamurwi* has no distinct interocellar pit (distinct in *A. abaluhya* and *A. lateritorium*). In addition, the three species can be easily distinguished by male genitalia characters, i.e., the ventromedial margin of the harpe is straight and parallel to the other harpe in basal three quarters in *A. ikhongamurwi* and concave and/or convex in

basal three quarters in *A. abaluhya*, and *A. lateritorium*. Furthermore, the harpe/gvc index is higher in *A. ikhongamurwi* than in *A. abaluhya* and *A. lateritorium* (0.55 in *A. ikhongamurwi*, 0.23 in *A. abaluhya*, and 0.37 in *A. lateritorium*).

Condition of type material

In the holotype, the right fore wing is missing. The left F5 to F9, the right F4 to F9, and the left hind wing are detached. The posterior part of the metasoma is detached and deformed, thus the body length measurement is not precise.

Aphanogmus isiukhu sp. nov.

urn:lsid:zoobank.org:act:9C0FEE4A-269F-41AD-B478-BDAB2F0AE5FF

Fig. 6

Diagnosis

Stigmal vein slightly shorter than pterostigma marginal length. Male genitalia: harpe slightly broadened with plateau on apex in lateral view; harpe/gvc index 0.37; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight and slightly converging and touching distomedially in basal two thirds, straight and slightly diverging distolaterally in apical third; ventral margin of harpe slightly concave in basal two thirds, slightly convex in apical third, dorsal margin indistinct and apex of dorsal margin pointed and oriented dorsally, lateral margin convex and oriented distomedially in basal two thirds, slightly concave in apical third; genital length $1.45\text{--}1.57 \times$ (1.45) gvc width.

Etymology

The species is named after the Isiukhu River close to the sampling location of the holotype and paratype.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 28 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037023.

Paratype

KENYA • 1 ♂; same collection data as for holotype; ZFMK-HYM-00034453.

Description

Male (N = 1 in morphometric measurements)

BODY LENGTH. 0.76 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown; legs light brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.8 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $2.0 \times$ as long as wide, F1 $1.6 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.3 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1 \times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

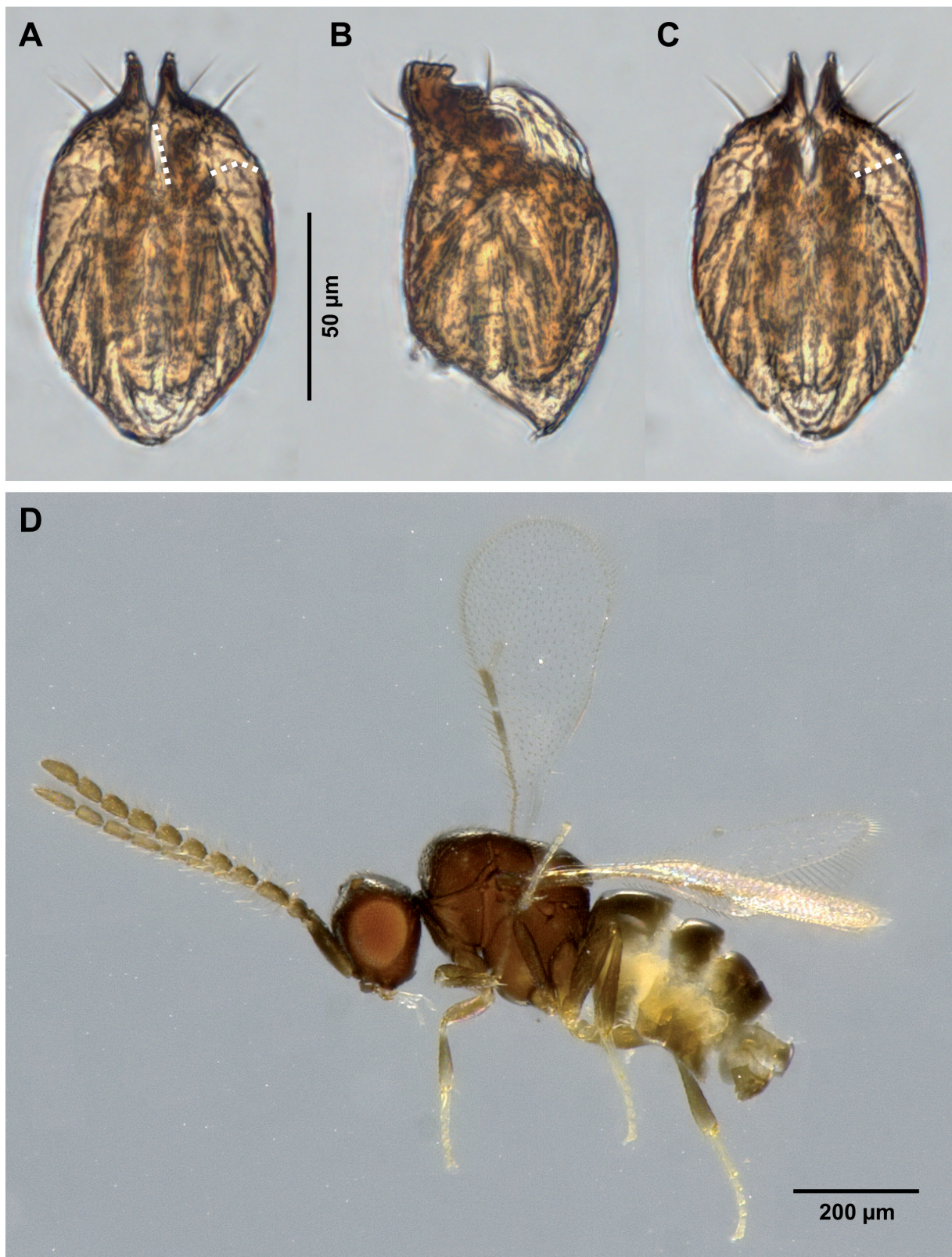


Fig. 6. Holotype of *Aphanogmus isiukhu* sp. nov. (ZFMK-HYM-00037023). **A–C.** Male genitalia ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

HEAD. Head width $1.27 \times$ head height; head width $1.52 \times$ interorbital space; maximum eye diameter $1.21 \times$ minimum eye diameter; head height $1.76 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL 1.00:1.50:0.71; OOL $1.71 \times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.15 \times$ mesosoma width; Weber length 250 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.82 \times$ mesoscutellum width; posterior mesoscutal width $1.35 \times$ mesoscutellum width; mesoscutellum length $1.76 \times$ mesoscutellum width; mesoscutellum length $1.30 \times$ posterior mesoscutal width; Weber length $1.29 \times$ mesoscutum width; Weber length $1.33 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.73 \times$ width; stigmal vein slightly shorter than pterostigma marginal length.

MALE GENITALIA. Genital length 100–113 μm (100 μm); Weber length $2.50 \times$ (2.50) genital length; gvc width 69–72 μm (69 μm); genital length $1.45\text{--}1.57 \times$ (1.45) gvc width; gvc width more than three quarters of gvc length; gvc width $1.19 \times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc descending proximomedially (Fig. 6C); proximoventral margin of gvc strongly concave; distoventral margin of gvc convex and descending proximomedially (Fig. 6A); ventral area of gvc slightly convex; dorsal area of gvc strongly convex (Fig. 6B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc indistinct (Fig. 6B). Harpe slightly broadened with plateau on apex in lateral view; harpe/gvc index 0.37; lateral articulation site of harpe with gvc flush (Fig. 6A, C); ventral margin of harpe slightly concave in basal two thirds, slightly convex in apical third, dorsal margin indistinct and apex of dorsal margin pointed and oriented dorsally (Fig. 6B), lateral margin convex and oriented distomedially in basal two thirds, slightly concave in apical third, widest point of harpe at apex lateral articulation site with gvc (Fig. 6A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight and slightly converging and touching distomedially in basal two thirds, straight and slightly diverging distolaterally in apical third (Fig. 6C), apex of harpe pointed, oriented distolaterally (Fig. 6A, C). Harpe with at least one lateral seta restricted to apical half, longest lateral seta less than two thirds as long as harpe, lateral seta oriented distolaterally; harpe with at least one ventral seta restricted to basal third, longest ventral seta less than two thirds as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distoventrally. Aedeagus + gonossiculus less than one quarter of harpe length, apex of aedeagus + gonossiculus indistinct (Fig. 6A, C) and dorsal to apex of harpe. Genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus and apical margin of harpe.

Female

Unknown.

Variation

The harpes are opened in ZFMK-HYM-00034453; therefore, the ventromedial margins of the harpes are not touching.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *A. isiukhu* sp. nov. and *A. kakamegaensis* sp. nov. are similar in ventral and dorsal view in having the ventromedial margins of the harpes touching and the apical parts of the ventromedial margins being straight and slightly diverging distolaterally. However, the male genitalia of *A. isiukhu* and *A. kakamegaensis* are distinctly different in lateral view, specifically in the shape of the apex of the harpe which is plateau-like in *A. isiukhu* and rounded in *A. kakamegaensis*.

For more comparisons with similar species, see remarks under *A. yala* sp. nov.

Condition of type material

In the holotype, the metasoma is deformed, thus the body length measurement is not precise. The paratype ZFMK-HYM-00034453 was lost during processing, but the male genitalia are still present, i.e., only measurements of the genital length and gvc width of ZFMK-HYM-00034453 are included in the description.

Aphanogmus kakamegaensis sp. nov.

urn:lsid:zoobank.org:act:4897CB3C-CC0B-42B5-AA14-EEAFE7708698

Fig. 7

Diagnosis

Preoccipital furrow present, with interocellar pit; OOL:LOL 1.67–2.08 (1.85). Male genitalia: harpe broad and round in apical half and lateral view; harpe/gvc index 0.46; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave and converging and touching distomedially in basal half, straight and slightly diverging distolaterally in apical half; ventral margin of harpe slightly concave in basal two thirds and straight in apical third, dorsal margin straight in basal third and concave in apical two thirds, lateral margin straight in basal third and concave in apical two thirds.

Etymology

The species is named after the Kakamega Forest which is the sampling location of the holotype and all 15 paratypes.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°12'09 N, 34°52'06 E; 1553 m a.s.l.; 2 May 2007; F. Hita Garcia leg.; Transect 28; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037014.

Paratypes

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°21'4.9 N, 34°51'41.1 E; 1602 m a.s.l.; no date on label, 2007 or 2008; F. Hita Garcia leg.; Transect 1; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389006 • 1 ♂; same collection data as for holotype; SMNS; SMNS-

HYM-T00777 • 2 ♂♂; same collection data as for holotype; ZFMK; ZFMK-HYM-00034420, ZFMK-HYM-00034422 • 1 ♂; same collection data as for holotype; 2 Aug. 2007; NHMUK; NHMUK-013389007 • 2 ♂♂; same collection data as for holotype; 2 Aug. 2007; NMK; NMK (ZFMK-HYM-00034424), NMK (ZFMK-HYM-00034425) • 1 ♂; same collection data as for holotype; 2 Aug. 2007; SMNS; SMNS-HYM-T00778 • 7 ♂♂; same collection data as for holotype; 2 Aug. 2007; ZFMK; ZFMK-HYM-00034427 to ZFMK-HYM-00034433.

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.68–0.73 mm (0.72 mm).

COLOUR. Head brown, mesosoma brown, metasoma brown except anterior third and posterior end lighter; scape light brown-yellowish and pedicel light brown, flagellum light brown; legs light brown-yellowish except joints and tarsi slightly lighter and metacoxa light yellow and transparent; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.7\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.5\times$ as long as wide, F1 $1.7\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.12\text{--}1.20\times$ (1.14) head height; head width $1.60\text{--}1.83\times$ (1.74) interorbital space; maximum eye diameter $1.20\text{--}1.25\times$ (1.24) minimum eye diameter; head height $1.59\text{--}1.80\times$ (1.67) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present, with interocellar pit; preoccipital carina present. OOL:POL:LOL $1.00:0.80\text{--}0.96:0.48\text{--}0.60$ (1.00:0.93:0.54); OOL $1.92\text{--}2.15\times$ (2.15) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.14\text{--}1.18\times$ (1.18) mesosoma width; Weber length $213\text{--}281\ \mu\text{m}$ (263 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscuteellar sulcus not adjacent to transscutal articulation, scutoscuteellar sulcus straight; dorsal axillar area sparsely setose, setae curved backwards or straight; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.92\text{--}2.06\times$ (2.00) mesoscutellum width; posterior mesoscutal width $1.46\text{--}1.59\times$ (1.50) mesoscutellum width; mesoscutellum length $1.69\text{--}1.77\times$ (1.69) mesoscutellum width; mesoscutellum length $1.11\text{--}1.20\times$ (1.13) posterior mesoscutal width; Weber length $1.29\text{--}1.36\times$ (1.31) mesoscutum width; Weber length $1.47\text{--}1.56\times$ (1.56) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.86\text{--}3.18\times$ (3.18) width; stigmal vein as long as pterostigma marginal length.

MALE GENITALIA. Genital length $113\text{--}119\ \mu\text{m}$ (113 μm); Weber length $1.79\text{--}2.37\times$ (2.33) genital length; gvc width $56\text{--}63\ \mu\text{m}$ (63 μm); genital length $1.80\text{--}2.11\times$ (1.80) gvc width; gvc width less than three quarters of gvc length; gvc width $1.06\times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc descending proximomedially (Fig. 7C); proximoventral margin of gvc strongly concave; distoventral margin of gvc convex and descending proximomedially (Fig. 7A); ventral area of gvc straight; dorsal area of gvc strongly convex (Fig. 7B); proximolateral margin of gvc concave and strongly

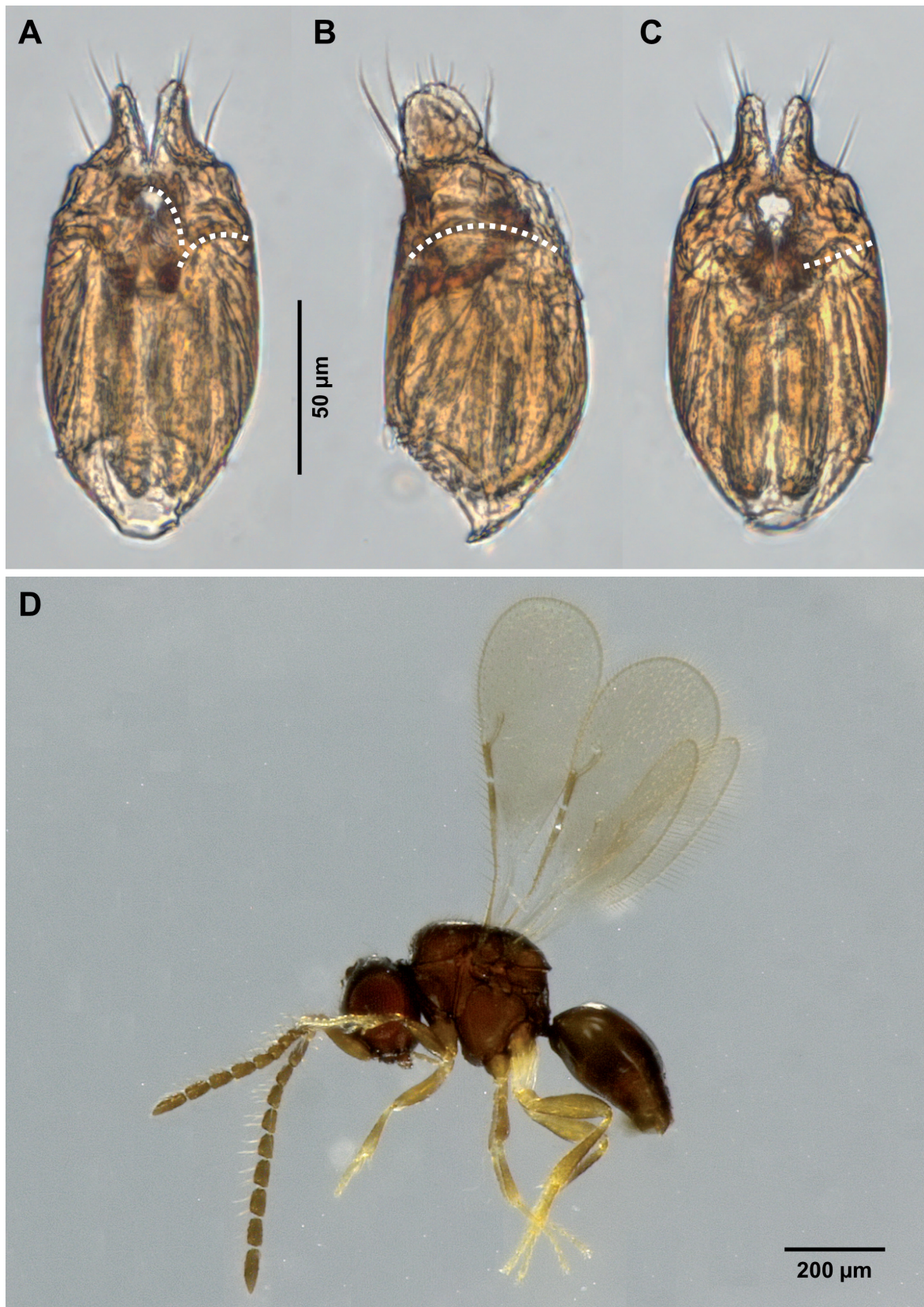


Fig. 7. Holotype of *Aphanogmus kakamegaensis* sp. nov. (ZFMK-HYM-00037014). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

ascending ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 7B). Harpe broad and round in apical half and lateral view; harpe/gvc index 0.46; lateral articulation site of harpe with gvc flush (Fig. 7A, C); ventral margin of harpe slightly concave in basal two thirds and straight in apical third, dorsal margin straight in basal third and concave in apical two thirds (Fig. 7B), lateral margin straight in basal third and concave in apical two thirds, widest point of harpe at lateral articulation site with gvc (Fig. 7A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave and converging and touching distomedially in basal half, straight and slightly diverging distolaterally in apical half (Fig. 7C), apex of harpe rounded, oriented distolaterally (Fig. 7A, C). Harpe with at least one lateral seta restricted to apical half, longest lateral seta more than half as long as harpe, lateral seta oriented distodorsally and distolaterally; harpe with at least one ventral seta restricted to apical half, longest ventral seta three quarters as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distoventrally. Aedeagus + gonossiculus more than one quarter as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 7A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least two digital teeth, oriented ventrally. Genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

ZFMK-HYM-00034433 has a lighter body colouration, and shows more distinct colour contrast in the metasoma, with the anterior third being distinctly lighter than the rest.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus kakamegaensis sp. nov. and *A. njia* sp. nov. share having an interocellar pit and male genitalia with a broad harpe without any thin and finger-like projections in lateral view (as seen in, for example, *A. ashitakai* sp. nov., *A. nehbergi* sp. nov., and *A. mariae* sp. nov.). They can be distinguished by the dorsal, lateral and ventromedial margin of the harpe being very differently shaped, and the genitalia of *A. kakamegaensis* being more strongly sclerotized than those of *A. njia*.

For more comparisons with similar species, see remarks under *A. isiukhu* sp. nov.

Condition of type material

In the holotype, the three distal tarsal segments of the right fore leg are missing.

Aphanogmus lateritorum sp. nov.

urn:lsid:zoobank.org:act:34A3F427-5283-4623-978B-295D8A52EE93

Fig. 8

Diagnosis

Scape longer than F1 and F2 combined; OOL:LOL 2.33; preoccipital furrow distinct, with interocellar pit; preoccipital carina distinct; head width $1.31 \times$ mesosoma width. Male genitalia: harpe finger-shaped apicoventrally in ventral and dorsal view and slightly broadened at apex in lateral view; harpe/gvc index

0.37; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex in basal quarter, concave in middle part, straight and oriented distolaterally in short apical part; ventral margin of harpe straight in basal half, concave in apical half, dorsal margin indistinct in basal part, concave in middle part and straight and oriented distoventrally in apical quarter, lateral margin straight in basal quarter, slightly concave and oriented distomedially in apical three quarters.

Etymology

The species is named after the common tropical reddish soil type laterite, on which the species was collected.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°17'57.6 S, 37°36'58.6 E; 1303 m a.s.l.; 10 Jun. 2011; KiLi project leg.; “high 3”; GRA5, grasland; Coloured pan trap; ZFMK; ZFMK-HYM-00037053.

Description

Male

BODY LENGTH. 0.69 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown except anterior third lighter; scape yellowish and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs yellowish transparent except pro- and mesocoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.0 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $2.2 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 shorter than F7 and F8 combined; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.15 \times$ head height; head width $1.81 \times$ interorbital space; maximum eye diameter $1.18 \times$ minimum eye diameter; head height $1.65 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow distinct, with interocellar pit; preoccipital carina distinct. OOL:POL:LOL 1.00:0.71:0.43; OOL $1.75 \times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.31 \times$ mesosoma width; Weber length 231 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.80 \times$ mesoscutellum width; posterior mesoscutal width $1.33 \times$ mesoscutellum width; mesoscutellum length $1.67 \times$ mesoscutellum width; mesoscutellum length $1.25 \times$ posterior mesoscutal width; Weber length $1.37 \times$ mesoscutum width; Weber length $1.48 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.98 \times$ width; stigmal vein slightly longer thanpterostigma marginal length.

MALE GENITALIA. Genital length 100 μm ; Weber length $2.31 \times$ genital length; gvc width 50 μm ; genital length $2.00 \times$ gvc width; gvc width three quarters of gvc length; gvc width $1.14 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc descending proximomedially

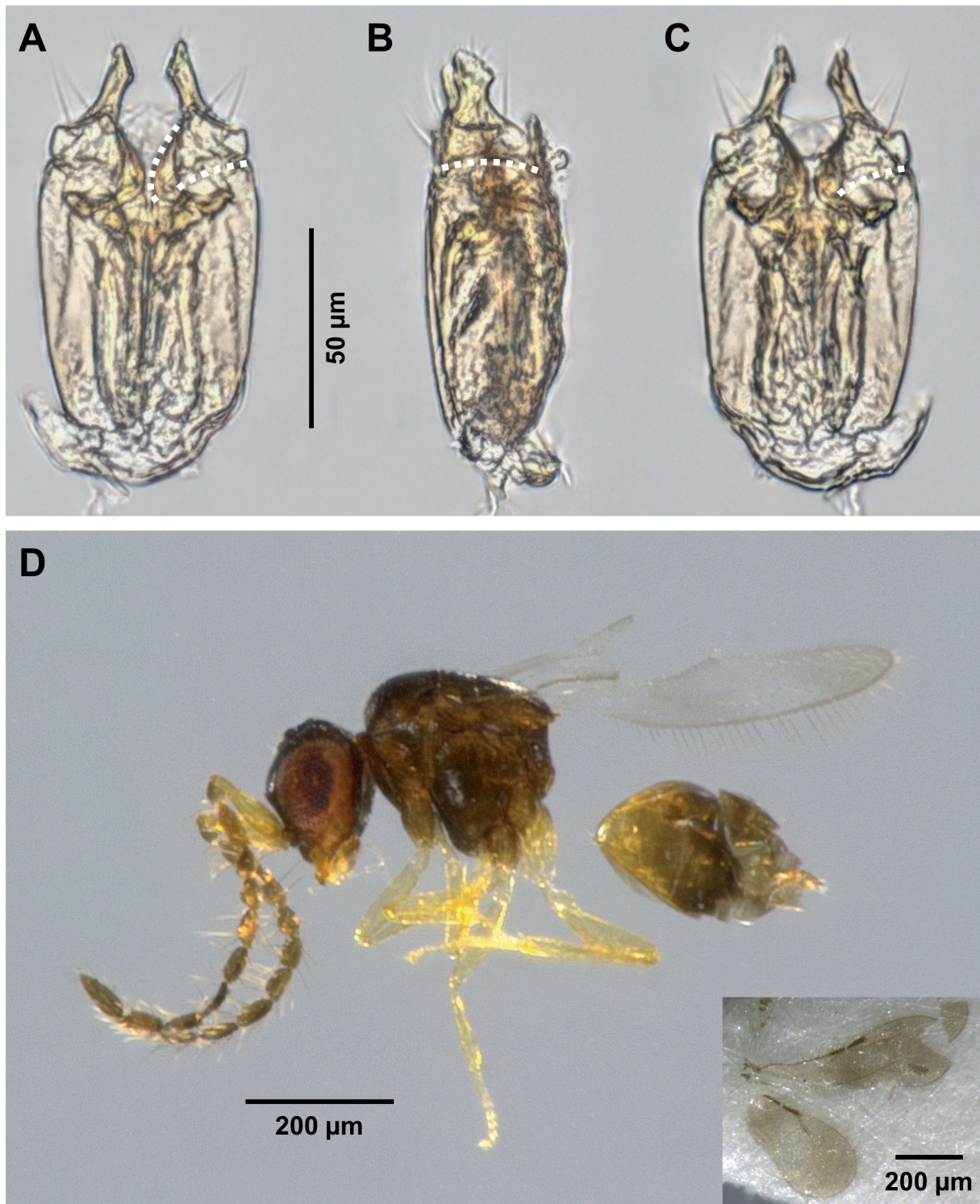


Fig. 8. Holotype of *Aphanogmus lateritorum* sp. nov. (ZFMK-HYM-00037053). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: fore wings.

(Fig. 8C); proximoventral margin of gvc straight; distoventral margin of gvc descending proximomedially (Fig. 8A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 8B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc slightly convex (Fig. 8B). Harpe finger-shaped apicoventrally in ventral and dorsal view and slightly broadened at apex in lateral view; harpe/gvc index 0.37; lateral articulation site of harpe with gvc not flush (Fig. 8A, C); ventral margin of harpe straight in basal half, concave in apical half, dorsal margin indistinct in basal part, concave in middle part and straight and oriented distoventrally in apical quarter (Fig. 8B), lateral margin straight in basal quarter, slightly concave and oriented distomedially in apical three quarters, widest point of harpe at lateral articulation site with gvc (Fig. 8A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex in basal quarter, concave in middle part, straight and oriented distolaterally in short apical part (Fig. 8C), apex of harpe pointed, oriented distolaterally (Fig. 8A, C). Harpe with at least one lateral seta restricted to basal third, longest lateral seta less than half as long as harpe, lateral seta oriented distolaterally; harpe with at least one ventral seta restricted to basal half, longest ventral seta more than half as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally and distolaterally. Aedeagus + gonossiculus length less than half as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 8A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented ventrolaterally. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

See remarks under *A. abaluhya* sp. nov. and *A. ikhongamurwi* sp. nov.

Condition of type material

In the holotype, the proximal margin of the gvc is slightly deformed but condition still allows precise descriptions. The flagellomeres are deformed, thus the width specifications are not precise. The left hind leg is missing (except coxa). Both fore wings and the right hind wing are detached. The metasoma is slightly deformed and detached, thus the body length measurement is not precise.

Aphanogmus mangimelii sp. nov.

urn:lsid:zoobank.org:act:5280D438-97CD-407D-AD70-BDA34CD3F0D5

Fig. 9

Diagnosis

Fore wing length $2.45\text{--}2.52 \times (2.51)$ width. Male genitalia: harpe finger-shaped apicoventrally in ventral, lateral and dorsal view; harpe/gvc index 0.51; ventromedial margins of harpes not touching

at distoventral margin of gvc, ventromedial margin of harpe concave in basal two thirds, convex and harpes overlapping in apical third; ventral margin of harpe straight in basal half and straight and oriented distoventrally in apical half, with distinct emargination at its middle, dorsal margin concave in basal half, straight and oriented distoventrally in apical half, lateral margin slightly convex in basal half and concave in apical half; aedeagus + gonossiculus with at least two distinct digital teeth, oriented ventrolaterally.

Etymology

The species is named in honour of Chief Mangi Meli (1866–1900), who was the leader of the WaChagga and fought against German colonialists and was brutally executed in 1900.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°14'52.4 S, 37°19'13 E; 1305 m a.s.l.; 10 Nov. 2012; KiLi project leg.; “low 1”; COF3, coffee plantation; Coloured pan trap; ZFMK; ZFMK-HYM-00037040.

Paratypes

TANZANIA – **Kilimanjaro Region** • 1 ♂; Mount Kilimanjaro; 3°16'7.1 S, 37°18'28.7 E; 1169 m a.s.l.; 15 Nov. 2012; KiLi project leg.; “tree 3”; HOM2, homegarden; Coloured pan trap; NHMUK; NHMUK-013389008 • 1 ♂; Mount Kilimanjaro; 3°14'34.7 S, 37°15'3.9 E; 1306 m a.s.l.; 10 Nov. 2012; KiLi project leg.; “high ex”; COF1, coffee plantation; Coloured pan trap; ZFMK; ZFMK-HYM-00037042 • 1 ♂; Mount Kilimanjaro; 3°13'59.4 S, 37°16'9.3 E; 1345 m a.s.l.; 10 Nov. 2012; KiLi project leg.; “high 2”; COF2, coffee plantation; Coloured pan trap; NHMUK; NHMUK-013389009 • 1 ♂; same collection data as for preceding; SMNS; SMNS-HYM-T00779 • 1 ♂; same collection data as for preceding; “high 3”; NMK; NMK (ZFMK-HYM-00037045) • 1 ♂; same collection data as for preceding; SMNS; SMNS-HYM-T00780 • 1 ♂; same collection data as for preceding; “tree 2”; ZFMK-HYM-00037050 • 2 ♂♂; same collection data as for holotype; ZFMK-HYM-00037041, ZFMK-HYM-00037047 • 1 ♂; Mount Kilimanjaro; 3°15'27.8 S, 37°25'12.8 E; 1623 m a.s.l.; 22 Nov. 2012; KiLi project leg.; “tree 1”; FLM4, forest lower mont.; Coloured pan trap; NMK; NMK (ZFMK-HYM-00037049).

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.70–0.85 mm (0.70 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown; legs light brown except joints and tarsi lighter; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.4 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $2.8 \times$ as long as wide, F1 $1.7 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.28\text{--}1.30 \times$ (1.28) head height; head width $1.52\text{--}1.65 \times$ (1.52) interorbital space; maximum eye diameter $1.24\text{--}1.28 \times$ (1.24) minimum eye diameter; head height $1.74\text{--}1.78$ (1.78) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus

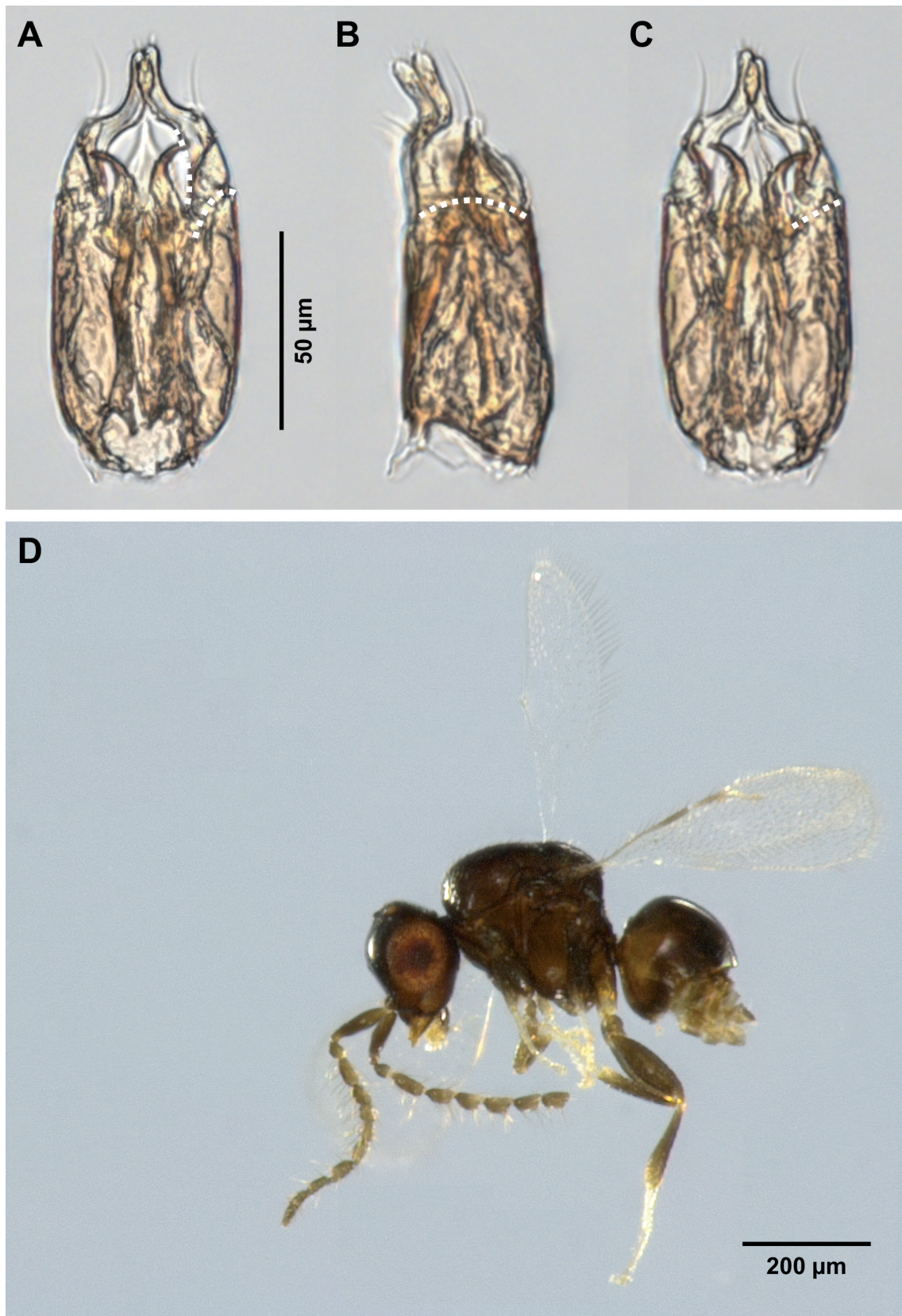


Fig. 9. Holotype of *Aphanogmus mangimelii* sp. nov. (ZFMK-HYM-00037040). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:1.63–1.79:0.81–0.86 (1.00:1.67:0.83); OOL 1.56–1.78 × (1.71) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width 1.21–1.28 × (1.28) mesosoma width; Weber length 231–300 μm (231 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area sparsely setose, setae curved backwards or straight; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width 1.86–2.00 × (2.00) mesoscutellum width; posterior mesoscutal width 1.38–1.60 × (1.60) mesoscutellum width; mesoscutellum length 1.52–1.67 × (1.67) mesoscutellum width; mesoscutellum length 1.04–1.11 × (1.04) posterior mesoscutal width; Weber length 1.23–1.24 × (1.23) mesoscutum width; Weber length 1.48–1.50 × (1.48) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length 2.45–2.52 × (2.51) width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length 100–119 μm (100 μm); Weber length 2.31–2.52 × (2.31) genital length; gvc width 44–56 μm (44 μm); genital length 2.11–2.29 × (2.29) gvc width; gvc width two thirds of gvc length; gvc width 1.09 × distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 9C); proximoventral margin of gvc slightly concave; distoventral margin of gvc strongly descending proximomedially (Fig. 9A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 9B); proximolateral margin of gvc ascending and emarginated ventrally; distolateral margin of gvc convex (Fig. 9B). Harpe finger-shaped apicoventrally in ventral, lateral and dorsal view; harpe/gvc index 0.51; lateral articulation site of harpe with gvc not flush (Fig. 9A, C); ventral margin of harpe straight in basal half and straight and oriented distoventrally in apical half, with distinct emargination at its middle, dorsal margin concave in basal half, straight and oriented distoventrally in apical half (Fig. 9B), lateral margin slightly convex in basal half and concave in apical half, widest point of harpe at lateral articulation site with gvc (Fig. 9A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave in basal two thirds, convex and harpes overlapping in apical third (Fig. 9C), apex of harpe rounded (Fig. 9A, C). Harpe with at least one lateral seta restricted to apical half, longest lateral seta half as long as harpe, lateral seta oriented distoventrally and distomedially; harpe with at least one ventral seta restricted to basal half, longest ventral seta one quarter as long as harpe, ventral seta oriented distomedially and distoventrally; harpe with at least three apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distoventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 9A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented ventrolaterally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and weakest sclerotization at all margins of harpe.

Female

Unknown.

Variation

Some paratypes, for example, ZFMK-HYM-00037041 and ZFMK-HYM-00037042, are distinctly darker, especially in the antennae and the distal end of the stigmal vein.

Biology

Host unknown, specimens collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Aphanogmus mangimelii sp. nov. can be distinguished from all other treated species by the weakly sclerotized and finger-shaped harpe, the distinct emargination at the middle of the ventral margin of the harpe, the overlapping apical thirds of the harpes, the ventrolaterally oriented digital teeth of the aedeagus + gonosticulus, and the relatively high harpe/gvc index (0.51).

Condition of type material

In the holotype, the left F7 to F9 are missing. The distal flagellomeres of the right flagellum are deformed. The posterior half of the metasoma is deformed, thus the body length measurement is not precise. Paratypes SMNS-HYM-T00779 and SMNS-HYM-T00780 were used in an unsuccessful DNA barcoding attempt, i.e., had been put in lysis buffer for non-destructive DNA extraction, and look more transparent.

Aphanogmus mariae sp. nov.

urn:lsid:zoobank.org:act:E7626A2E-77F7-4125-86DF-AD631DC35465

Fig. 10

Diagnosis

Posterior mesoscutal width $1.29 \times (1.29)$ mesoscutellum width. Male genitalia: harpe finger-shaped apicoventrally and slightly broadened at apex in ventral, lateral and dorsal view; harpe/gvc index 0.28; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave in basal two thirds, straight and diverging distolaterally in apical third; ventral margin of harpe straight, dorsal margin indistinct in basal part, concave in apical three quarters, lateral margin convex and oriented distomedially in basal two thirds, straight in apical third; genital length $1.57\text{--}1.71 \times (1.71)$ gvc width; Weber length $2.82\text{--}3.08 \times (3.08)$ genital length.

Etymology

The species is named out of love for Maria Salden, the first author's mother.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 24 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037031.

Paratypes

KENYA • 2 ♂♂; Western Province, Kakamega Forest; 00°21'21.1 N, 34°51'44.9 E; 1632 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034460, ZFMK-HYM-00034461.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 0.53–0.68 mm (0.68 mm).

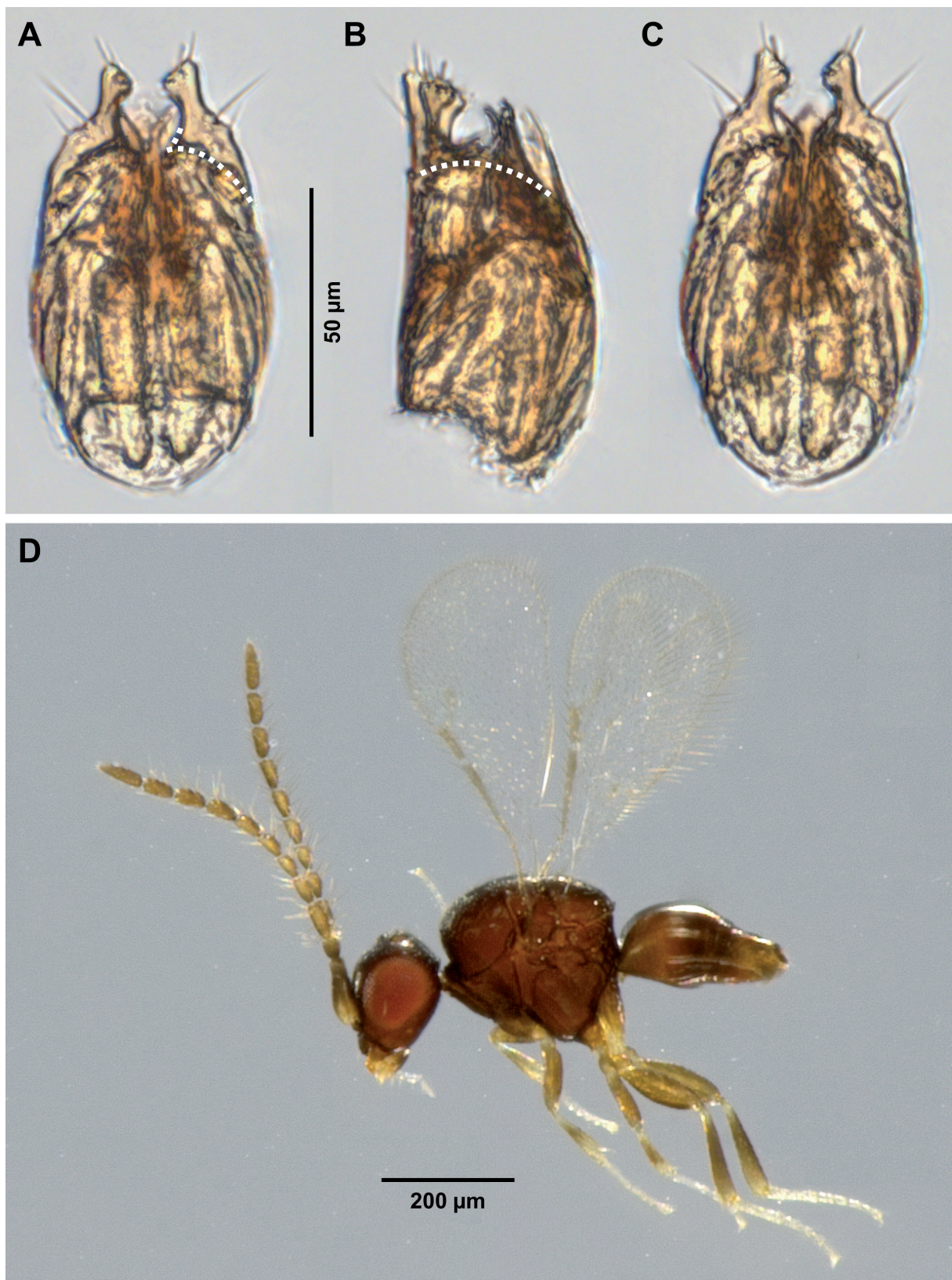


Fig. 10. Holotype of *Aphanogmus mariae* sp. nov. (ZFMK-HYM-00037031). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs light brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.2 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $2.8 \times$ as long as wide, F1 $1.8 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3 \times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.15\text{--}1.19 \times (1.19)$ head height; head width $1.54\text{--}1.63 \times (1.54)$ interorbital space; maximum eye diameter $1.15\text{--}1.29 \times (1.29)$ minimum eye diameter; head height $1.72\text{--}1.80 (1.72)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL $1.00:1.09\text{--}1.33:0.67\text{--}0.73 (1.00:1.33:0.67)$; OOL $1.71\text{--}2.00 \times (1.71)$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.16\text{--}1.19 \times (1.16)$ mesosoma width; Weber length $194\text{--}231 \mu\text{m} (231 \mu\text{m})$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus concave; dorsal axillar area sparsely setose, setae curved backwards or straight; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.79\text{--}1.82 \times (1.82)$ mesoscutellum width; posterior mesoscutal width $1.29 \times (1.29)$ mesoscutellum width; mesoscutellum length $1.53\text{--}1.57 \times (1.53)$ mesoscutellum width; mesoscutellum length $1.18\text{--}1.22 \times (1.18)$ posterior mesoscutal width; Weber length $1.19\text{--}1.24 \times (1.19)$ mesoscutum width; Weber length $1.41\text{--}1.42 \times (1.42)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.67\text{--}2.80 \times (2.67)$ width; stigmal vein as long as pterostigma marginal length.

MALE GENITALIA. Genital length $69\text{--}75 \mu\text{m} (75 \mu\text{m})$; Weber length $2.82\text{--}3.08 \times (3.08)$ genital length; gvc width $44 \mu\text{m} (44 \mu\text{m})$; genital length $1.57\text{--}1.71 \times (1.71)$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.11 \times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc indistinct (Fig. 10C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximolaterally (Fig. 10A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 10B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending dorsally (Fig. 10B). Harpe finger-shaped apicoventrally and slightly broadened at apex in ventral, lateral and dorsal view; harpe/gvc index 0.28; lateral articulation site of harpe with gvc flush (Fig. 10A, C); ventral margin of harpe straight, dorsal margin indistinct in basal part, concave in apical three quarters (Fig. 10B), lateral margin convex and oriented distomedially in basal two thirds, straight in apical third, widest point of harpe at lateral articulation site with gvc (Fig. 10A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave in basal two thirds, straight and diverging distolaterally in apical third (Fig. 10C), apex of harpe pointed (Fig. 10A, C). Harpe with at least one lateral seta restricted to apical half, longest lateral seta less than one quarter as long as harpe, lateral seta oriented distolaterally; harpe with at least one ventral seta restricted to apical half, longest ventral seta more than half as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae less than one quarter as long as

harpe, apical setae oriented distodorsally, distolaterally and distoventrally. Aedeagus + gonossiculus three quarters as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 10A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least two digital teeth, oriented ventrally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

ZFMK-HYM-00034461 is distinctly smaller and lighter.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *A. mariae* sp. nov. are somewhat similar to those of *A.* sp. 1 and *A.* sp. 2 as all share apicoventrally finger-shaped harpes with a broadened apex in ventral, lateral and dorsal view. However, apart from this, *A. mariae* differs strongly in body and male genitalia characters from *A.* sp. 1 and *A.* sp. 2.

Condition of type material

Holotype is immaculate.

Aphanogmus mashariki sp. nov.

urn:lsid:zoobank.org:act:AA73FC1E-81A0-46C9-9BDA-2EE554A7734A

Fig. 11

Diagnosis

Head width $1.39 \times$ head height; Weber length $0.97 \times$ mesoscutum width; Weber length $1.17 \times$ mesoscutellum length; fore wing length $2.46 \times$ width. Male genitalia: harpe rectangular in ventral and dorsal view; harpe/gvc index 0.19; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight and parallel to lateral margin and oriented distomedially in basal third, straight and diverging distolaterally in apical two thirds; ventral margin of harpe straight, dorsal margin straight in basal part, concave with straight apex in apical half, at its middle with pointed and distodorsally oriented protrusion, lateral margin straight and oriented distomedially.

Etymology

The species name is derived from the Swahili word ‘*mashariki*’ which means ‘east’, with reference to the Kakamega Forest as easternmost relic of the Guineo-Congolian rainforest.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}14'22.9$ N, $34^{\circ}51'21$ E; 1594 m a.s.l.; 17 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037028.

Description**Male**

BODY LENGTH. 0.65 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs light brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.6\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.0\times$ as long as wide, F1 $1.6\times$ as long as pedicel, F1 $1.2\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.4\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.39\times$ head height; head width $1.53\times$ interorbital space; maximum eye diameter $1.18\times$ minimum eye diameter; head height $1.65\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL 1.00:1.25:0.69; OOL $2.00\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.21\times$ mesosoma width; Weber length $219\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.80\times$ mesoscutellum width; posterior mesoscutal width $1.35\times$ mesoscutellum width; mesoscutellum length $1.50\times$ mesoscutellum width; mesoscutellum length $1.11\times$ posterior mesoscutal width; Weber length $0.97\times$ mesoscutum width; Weber length $1.17\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.46\times$ width; stigmal vein as long as pterostigma marginal length.

MALE GENITALIA. Genital length $100\ \mu\text{m}$; Weber length $2.19\times$ genital length; gvc width $63\ \mu\text{m}$; genital length $1.60\times$ gvc width; gvc width more than two thirds of gvc length; gvc width $1.33\times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc descending proximomedially (Fig. 11C); proximoventral margin of gvc strongly ascending distomedially; distoventral margin of gvc convex, more strongly descending proximomedially (Fig. 11A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 11B); proximolateral margin of gvc concave and strongly ascending ventrally; distolateral margin of gvc convex, more strongly descending dorsally (Fig. 11B). Harpe rectangular in ventral and dorsal view; harpe/gvc index 0.19; lateral articulation site of harpe with gvc virtually flush (Fig. 11A, C); ventral margin of harpe straight, dorsal margin straight in basal part, concave with straight apex in apical half, at its middle with pointed and distodorsally oriented protrusion (Fig. 11B), lateral margin straight and oriented distomedially, widest point of harpe at lateral articulation site with gvc (Fig. 11A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight and parallel to lateral margin and oriented distomedially in basal third, straight and diverging distolaterally in apical two thirds (Fig. 11C), apex of harpe pointed (Fig. 11A, C). Harpe with at least one lateral seta restricted to basal quarter, longest lateral seta slightly longer than length

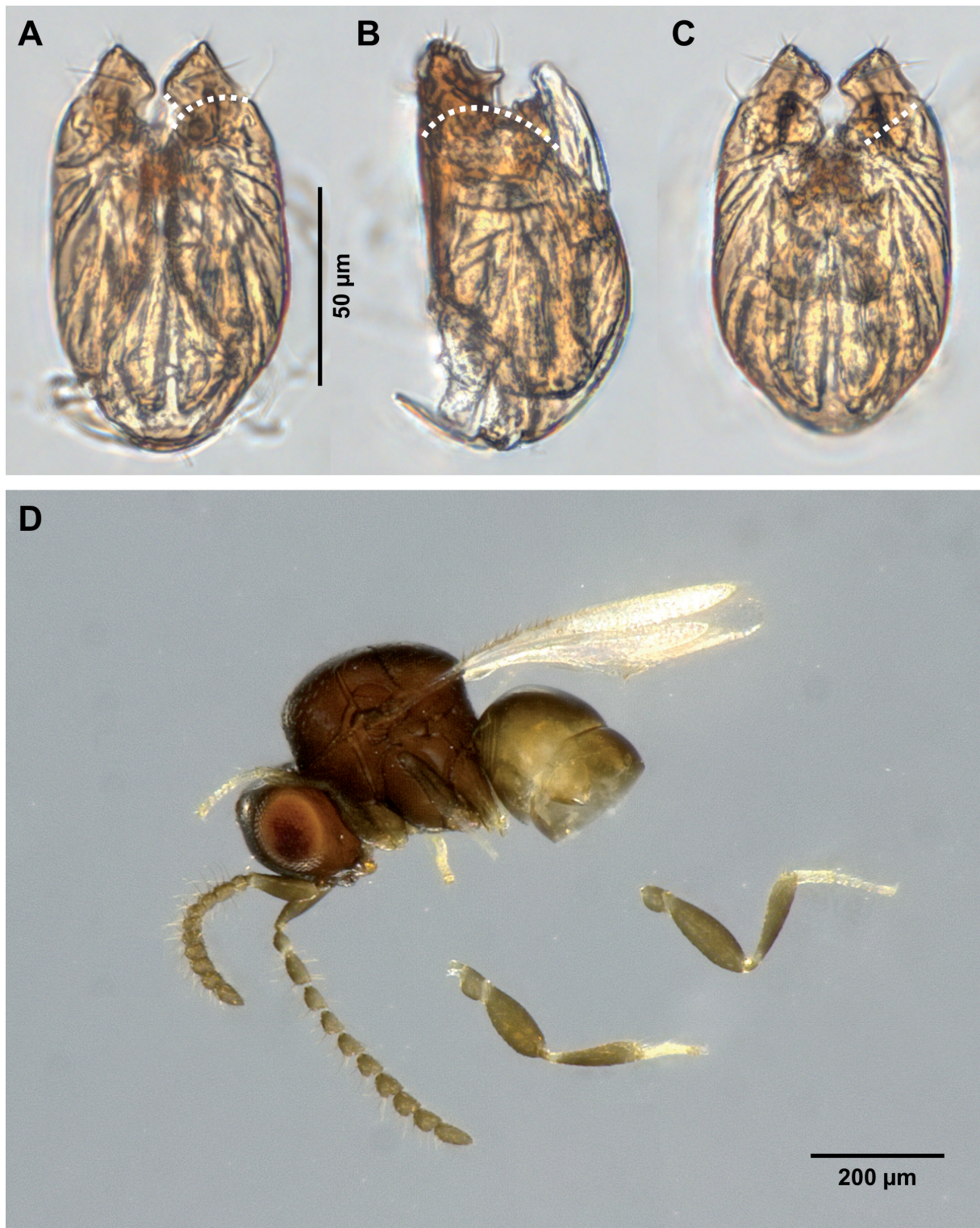


Fig. 11. Holotype of *Aphanogmus mashariki* sp. nov. (ZFMK-HYM-00037028). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

of harpe, lateral seta oriented distolaterally; harpe with at least one ventral seta restricted to basal half, longest ventral seta as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae one quarter as long as harpe, apical setae oriented distodorsally, distolaterally, distomedially and distoventrally. Aedeagus + gonossiculus indistinct. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and all margins of harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus mashariki sp. nov. can be distinguished from all other treated species by the rectangular harpe, and the dorsal margin of the harpe having a pointed protrusion at its middle.

Condition of type material

In the holotype, the hind legs are detached (except coxae). The posterior half of the metasoma is missing, thus the body length measurement is not precise.

Aphanogmus nehbergi sp. nov.

urn:lsid:zoobank.org:act:491DB9AB-C0DA-4106-984B-EE4E1B575FD1

Fig. 12

Diagnosis

Legs light brown except joints, tarsi and metacoxa lighter; scape longer than F1 and F2 combined. Male genitalia: harpe finger-shaped apicoventrally in lateral view; harpe/gvc index 0.47; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex in basal half, straight in apical half and apical part diverging distolaterally, apex of harpe rounded, oriented distolaterally; ventral margin of harpe slightly convex in basal three quarters, concave in apical quarter, dorsal margin indistinct in basal part, concave in middle part, straight and oriented distoventrally in apical part, lateral margin straight in basal half, concave in apical half.

Etymology

The species is named in honour of the survival expert and human rights activist Rüdiger Nehberg (1935–2020). In addition to his breathtaking and inspiring adventures, he has also campaigned for the protection of indigenous peoples and the fight against female genital mutilation.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 17 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037018.

Description

Male

BODY LENGTH. 0.80 mm.

COLOUR. Head brown, mesosoma brown, metasoma brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs light brown except joints, tarsi and metacoxa lighter; fore wing venation light brown, fore and hind wing disc hyaline and slightly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.7\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.6\times$ as long as wide, F1 $1.8\times$ as long as pedicel, F1 $1.2\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.16\times$ head height; head width $1.69\times$ interorbital space; maximum eye diameter $1.21\times$ minimum eye diameter; head height $1.65\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.88:0.63; OOL $2.29\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.13\times$ mesosoma width; Weber length $281\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum slightly projecting and setose, setae curved backwards or straight. Mesoscutum width $1.80\times$ mesoscutellum width; posterior mesoscutal width $1.40\times$ mesoscutellum width; mesoscutellum length $1.70\times$ mesoscutellum width; mesoscutellum length $1.21\times$ posterior mesoscutal width; Weber length $1.25\times$ mesoscutum width; Weber length $1.32\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.71\times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length $106\ \mu\text{m}$; Weber length $2.65\times$ genital length; gvc width $56\ \mu\text{m}$; genital length $1.89\times$ gvc width; gvc width three quarters of gvc length; gvc width $1.05\times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 12C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 12A); ventral area of gvc slightly concave; dorsal area of gvc convex (Fig. 12B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending dorsally (Fig. 12B). Harpe finger-shaped apicoventrally in lateral view; harpe/gvc index 0.47; lateral articulation site of harpe with gvc not flush (Fig. 12A, C); ventral margin of harpe slightly convex in basal three quarters, concave in apical quarter, dorsal margin indistinct in basal part, concave in middle part, straight and oriented distoventrally in apical part (Fig. 12B), lateral margin straight in basal half, concave in apical half, widest point of harpe at lateral articulation site with gvc (Fig. 12A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex in basal half, straight in apical half and apical part diverging distolaterally (Fig. 12C), apex of harpe rounded, oriented distolaterally (Fig. 12A, C). Harpe with at least two lateral setae restricted to

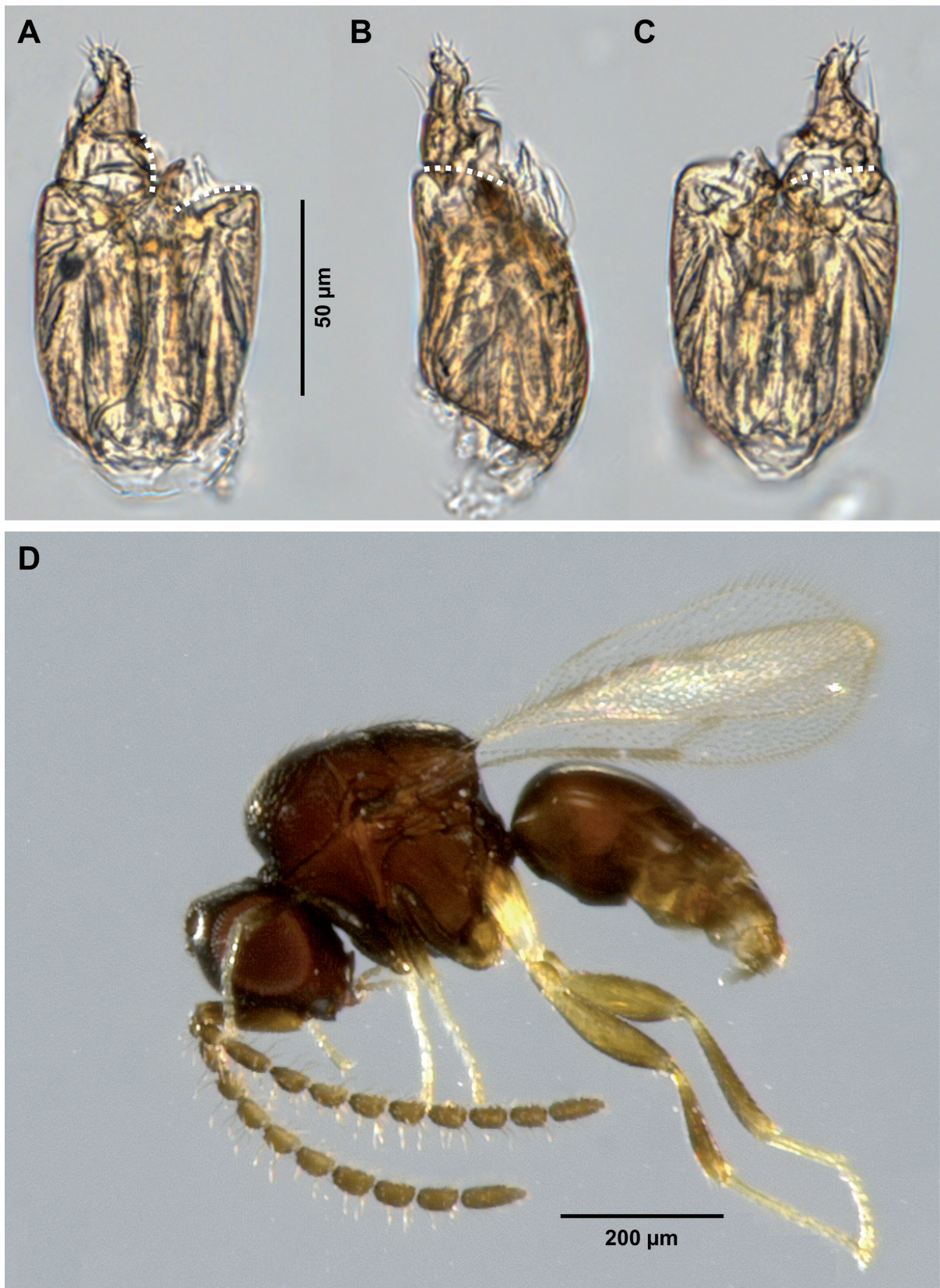


Fig. 12. Holotype of *Aphanogmus nehbergi* sp. nov. (ZFMK-HYM-00037018). A–C. Male genitalia in ventral (A), lateral (B) and dorsal (C) views. D. Habitus in lateral view.

apical half, longest lateral setae less than half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least four apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least four median setae restricted to apical third, longest median setae less than one quarter as long as harpe, median setae oriented distodorsally and distomedially. Aedeagus + gonossiculus less than one quarter as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 12A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least two digital teeth, oriented ventrally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *A. ashitakai* sp. nov.

Condition of type material

In the holotype, the left hind wing, and the left harpe of the male genitalia are missing. The posterior part of the metasoma is deformed, thus the body length measurement is not precise.

Aphanogmus njia sp. nov.

urn:lsid:zoobank.org:act:5BB63D93-45EE-4A7E-8A5F-D77E593FFD97

Fig. 13

Diagnosis

Preoccipital carina distinct; preoccipital furrow present, with interocellar pit. Male genitalia: harpe broad and round in lateral view; harpe/gvc index 0.50; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex and touching in basal third, concave in middle third, straight and diverging distolaterally in apical third; harpe with at least one ventral seta restricted to apical two thirds.

Etymology

The species is named after the Swahili word ‘*njia*’ which means ‘path’ or ‘aisle’, with reference to the large forest aisle of the Kakamega Forest which is the type locality.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°18′13.4 N, 34°48′16 E; 1554 m a.s.l.; 20 Jun. 2007; F. Hita Garcia leg.; Transect 5; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037017.

Description**Male**

BODY LENGTH. 0.74 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown except anterior half yellowish; scape yellowish and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs light brown-yellowish except joints, tarsi and metacoxa light yellow and transparent; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.8\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.9\times$ as long as wide, F1 $1.7\times$ as long as pedicel, F1 $1.1\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.2\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.11\times$ head height; head width $1.81\times$ interorbital space; maximum eye diameter $1.22\times$ minimum eye diameter; head height $1.59\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present, with interocellar pit; preoccipital carina distinct. OOL:POL:LOL 1.00:0.81:0.59; OOL $1.80\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.30\times$ mesosoma width; Weber length $256\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.93\times$ mesoscutellum width; posterior mesoscutal width $1.47\times$ mesoscutellum width; mesoscutellum length $1.80\times$ mesoscutellum width; mesoscutellum length $1.23\times$ posterior mesoscutal width; Weber length $1.41\times$ mesoscutum width; Weber length $1.52\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $3.09\times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length $113\ \mu\text{m}$; Weber length $2.28\times$ genital length; gvc width $50\ \mu\text{m}$; genital length $2.25\times$ gvc width; gvc width more than two thirds of gvc length; gvc width $1.10\times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc descending proximomedially (Fig. 13C); proximoventral margin of gvc straight; distoventral margin of gvc descending proximomedially (Fig. 13A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 13B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc convex (Fig. 13B). Harpe broad and round in lateral view; harpe/gvc index 0.50; lateral articulation site of harpe with gvc virtually flush (Fig. 13A, C); ventral margin of harpe straight, dorsal margin straight (Fig. 13B), lateral margin straight in basal two thirds, concave in apical one third, widest point of harpe at lateral articulation site with gvc (Fig. 13A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex and touching in basal third, concave in middle third, straight and diverging distolaterally in apical third (Fig. 13C), apex of harpe pointed, oriented distolaterally (Fig. 13A, C). Harpe with at least one ventral seta restricted to apical two thirds, longest ventral seta less than half as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least one apical seta, longest apical seta

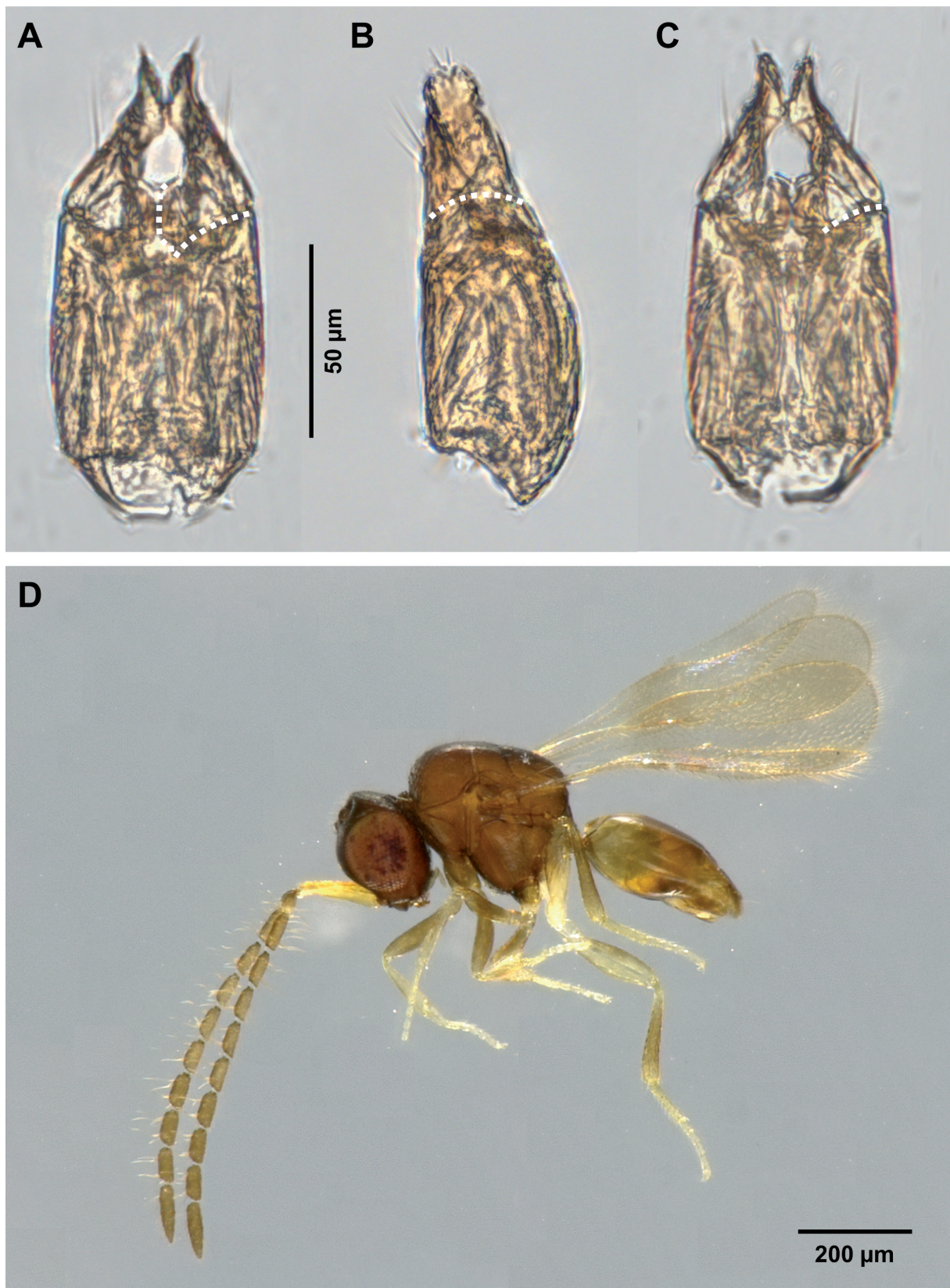


Fig. 13. Holotype of *Aphanogmus njia* sp. nov. (ZFMK-HYM-00037017). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

less than one quarter as long as harpe, apical seta oriented distolaterally and distoventrally. Aedeagus + gonossiculus indistinct. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *A. kakamegaensis* sp. nov.

Condition of type material

The male genitalia were lost during processing of the species. Yet, with the specimen still present and the detailed images and description of the male genitalia at hand, allowing a very robust diagnosis, we decided to describe this species as new.

Aphanogmus vestrii sp. nov.

urn:lsid:zoobank.org:act:F407EB39-92F2-42B4-AC1F-41EC83089723

Fig. 14

Diagnosis

Body length 0.51 mm; mesoscutellum length $1.47 \times$ mesoscutellum width. Male genitalia: harpe triangular apicoventrally in ventral, lateral and dorsal view, and gap between harpes conspicuously arrow-like; harpe/gvc index 0.47; ventromedial margins of harpes touching at distoventral margin of gvc, ventromedial margin of harpe straight and diverging distolaterally with pointed emargination in between basal and apical half; ventral margin of harpe concave, dorsal margin indistinct in basal part, straight and oriented distoventrally in apical two thirds with indentation below apical two thirds, lateral margin straight in basal quarter, concave and slightly oriented distomedially in apical three quarters.

Etymology

The species is named after the dwarf Vestri of the Norse mythology, who braces the firmament in the west. It refers to the sampling location in the western part of Kakamega Forest and the dwarf size of the holotype.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 14 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037032.

Description

Male

BODY LENGTH. 0.51 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs light brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.2\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $1.9\times$ as long as wide, F1 $1.3\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.4\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.18\times$ head height; head width $1.65\times$ interorbital space; maximum eye diameter $1.33\times$ minimum eye diameter; head height $1.75\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL 1.00:1.40:0.80; OOL $2.00\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.14\times$ mesosoma width; Weber length $175\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum slightly projecting and setose, setae curved backwards or straight. Mesoscutum width $1.80\times$ mesoscutellum width; posterior mesoscutal width $1.40\times$ mesoscutellum width; mesoscutellum length $1.47\times$ mesoscutellum width; mesoscutellum length $1.05\times$ posterior mesoscutal width; Weber length $1.04\times$ mesoscutum width; Weber length $1.27\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.67\times$ width; stigmal vein as long as pterostigma marginal length.

MALE GENITALIA. Genital length $75\ \mu\text{m}$; Weber length $2.33\times$ genital length; gvc width $47\ \mu\text{m}$; genital length $1.60\times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.04\times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc indistinct (Fig. 14C); proximoventral margin of gvc slightly convex; distoventral margin of gvc slightly descending proximomedially (Fig. 14A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 14B); proximolateral margin of gvc concave, more descending dorsally; distolateral margin of gvc indistinct (Fig. 14B). Harpe triangular apicoventrally in ventral, lateral and dorsal view, and gap between harpes conspicuously arrow-like; harpe/gvc index 0.47; lateral articulation site of harpe with gvc virtually flush (Fig. 14A, C); ventral margin of harpe concave, dorsal margin indistinct in basal part, straight and oriented distoventrally in apical two thirds with indentation below apical two thirds (Fig. 14B), lateral margin straight in basal quarter, concave and slightly oriented distomedially in apical three quarters, widest point of harpe at lateral articulation site with gvc (Fig. 14A, C); ventromedial margins of harpes touching at distoventral margin of gvc, ventromedial margin of harpe straight and diverging distolaterally with pointed emargination in between basal and apical half (Fig. 14C), apex of harpe

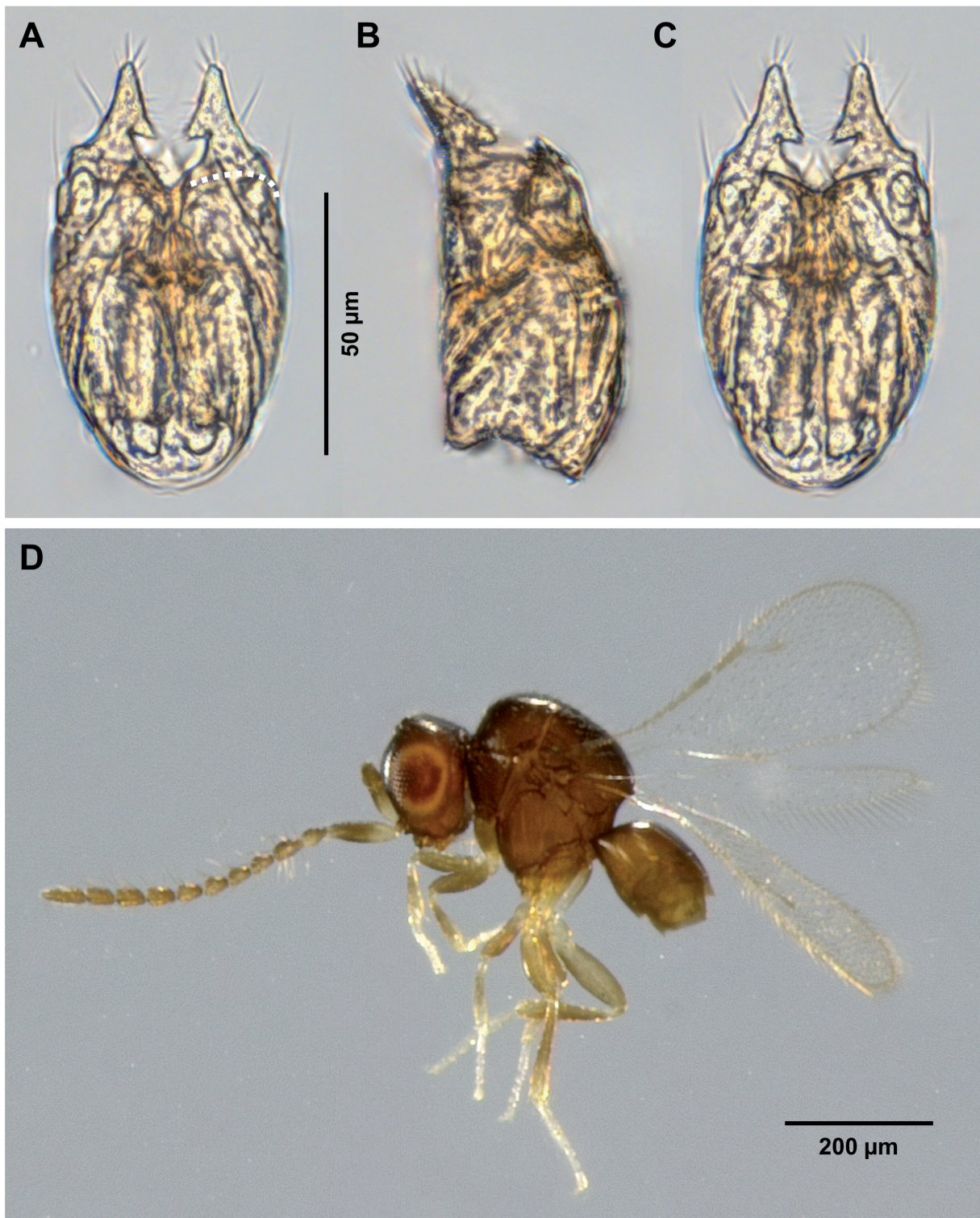


Fig. 14. Holotype of *Aphanogmus vestrii* sp. nov. (ZFMK-HYM-00037032). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

pointed (Fig. 14A, C). Harpe with at least one lateral seta restricted to basal quarter, longest lateral seta half as long as harpe, lateral seta oriented distolaterally; harpe with at least one ventral seta restricted to apical third, longest ventral seta more than one third as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae one third as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least four median setae restricted to apical half, longest median setae less than one quarter as long as harpe, median setae oriented distodorsally, distomedially and medioventrally. Aedeagus + gonossiculus one quarter as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 14A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Considering the holotypes, *Aphanogmus vestrii* sp. nov. is the smallest treated ceraphronid species and together with *A. limbozellatus* the smallest Afrotropical ceraphronid wasp (Dessart 1980). The male genitalia of *A. vestrii* are unique in having triangular harpes in apicoventral part, and the gap between harpes being conspicuously arrow-like (Fig. 18A–B).

Condition of type material

In the holotype, the right flagellum is missing. The posterior part of the metasoma is detached, thus the body length measurement is not precise.

Aphanogmus yala sp. nov.

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Fig. 15

Diagnosis

Mesoscutum width $1.65 \times$ mesoscutellum width; Weber length $1.64 \times$ mesoscutum width. Male genitalia: harpe finger-shaped apicoventrally in ventral and dorsal view and broadened in lateral view; harpe/gvc index 0.32; ventromedial margins of harpes indistinct at distoventral margin of gvc, ventromedial margin of harpe convex and harpes overlapping in basal half, concave in apical half and harpes touching in apical part; ventral margin of harpe straight, dorsal margin indistinct, lateral margin slightly convex and oriented distomedially in basal half, straight and oriented distomedially in apical half; Weber length $2.88 \times$ genital length; genitalia moderately sclerotized with strongest sclerotization at distal margin of harpe.

Etymology

The species is named after the Yala River close to the type locality.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°12'09 N, 34°52'6 E; 1553 m a.s.l.; 2 May 2007; F. Hita Garcia leg.; Transect 28; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037037.

Description

Male

BODY LENGTH. 0.81 mm.

COLOUR. Head brown, mesosoma brown, metasoma brown except anterior third lighter; scape and pedicel light brown, flagellum light brown; legs brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.0\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.4\times$ as long as wide, F1 $1.8\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.19\times$ head height; head width $1.58\times$ interorbital space; maximum eye diameter $1.25\times$ minimum eye diameter; head height $1.60\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL 1.00:1.65:0.87; OOL $1.44\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.23\times$ mesosoma width; Weber length 288 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.65\times$ mesoscutellum width; posterior mesoscutal width $1.29\times$ mesoscutellum width; mesoscutellum length $1.71\times$ mesoscutellum width; mesoscutellum length $1.32\times$ posterior mesoscutal width; Weber length $1.64\times$ mesoscutum width; Weber length $1.59\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.70\times$ width; stigmal vein as long as pterostigma marginal length.

MALE GENITALIA. Genital length 100 μm ; Weber length $2.88\times$ genital length; gvc width 56 μm ; genital length $1.78\times$ gvc width; gvc width less than three quarters of gvc length; gvc width $1.17\times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc descending proximomedially (Fig. 15C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 15A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 15B); proximolateral margin of gvc convex and strongly ascending ventrally; distolateral margin of gvc convex, more strongly descending dorsally (Fig. 15B). Harpe finger-shaped apicoventrally in ventral and dorsal view and broadened in lateral view; harpe/gvc index 0.32; lateral articulation site of harpe with gvc not flush (Fig. 15A, C); ventral margin of harpe straight, dorsal margin indistinct half (Fig. 15B), lateral margin slightly convex



Fig. 15. Holotype of *Aphanogmus yala* sp. nov. (ZFMK-HYM-00037037). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

and oriented distomedially in basal half, straight and oriented distomedially in apical, widest point of harpe at lateral articulation site with gvc (Fig. 15A, C); ventromedial margins of harpes indistinct at distoventral margin of gvc, ventromedial margin of harpe convex and harpes overlapping in basal half, concave in apical half and harpes touching in apical part (Fig. 15C), apex of harpe pointed, oriented distomedially (Fig. 15A, C). Harpe with at least one lateral seta restricted to basal third, longest lateral seta more than three quarters as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least one ventral seta restricted to apical half, longest ventral seta more than half as long as harpe length, ventral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae one quarter as long as harpe, apical setae oriented distodorsally, distomedially and distoventrally; median setae indistinct. Aedeagus + gonossiculus indistinct. Genitalia moderately sclerotized with strongest sclerotization at apical margin of harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *A. yala* sp. nov. are similar to those of *A. isiukhu* sp. nov. in having the apical margins of the harpes showing the strongest sclerotization. However, apart from this specific similarity, the two species are easily distinguishable (e.g., Weber length $1.64 \times$ mesoscutum width in *A. yala* and Weber length $1.29 \times$ mesoscutum width in *A. isiukhu*, mesoscutum width $1.65 \times$ mesoscutellum width in *A. yala* and mesoscutum width $1.82 \times$ mesoscutellum width in *A. isiukhu*, genital length $1.78 \times$ gvc width in *A. yala* and genital length $1.45\text{--}1.57 \times$ gvc width in *A. isiukhu*, and ventromedial margin of harpe convex in basal half and concave in apical half, with harpes overlapping in basal half and apices of harpes touching in *A. yala* and ventromedial margin of harpe straight and slightly converging and touching distomedially in basal two thirds and straight and slightly diverging distolaterally in apical third in *A. isiukhu*).

Condition of type material

Holotype is immaculate.

Taxa in open nomenclature

In the following, four additional potentially new species of the *Aphanogmus clavicornis* species group are described but not named.

Aphanogmus sp. 1

Fig. 16

Diagnosis

Scape longer than F1 to F3 combined; preoccipital furrow absent; preoccipital carina absent; intertorular carina absent. Male genitalia: harpe finger-shaped apicoventrally and slightly broadened at apex in

ventral, lateral and dorsal view; harpe/gvc index 0.54; ventromedial margins of harpes indistinct at distoventral margin of gvc, ventromedial margin of harpe slightly concave from base to apex; ventral margin of harpe convex, dorsal margin indistinct in basal part, concave in apical half, lateral margin slightly convex and oriented distomedially in basal third, concave and oriented ventrally in middle third, straight and oriented distomedially in apical third.

Material examined

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°18'27.5 S, 37°41'2.5 E; 951 m a.s.l.; 31 May 2012; KiLi project leg.; “high 2”; SAV5, savanna; Coloured pan trap; ZFMK; ZFMK-HYM-00037054.

Description

Male

BODY LENGTH. 0.72 mm.

COLOUR. Head light brown, mesosoma light brown, metasoma light brown; scape and pedicel light brown-transparent, flagellum light brown-transparent; legs light brown and transparent; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.3 \times$ as long as pedicel, scape longer than F1 to F3 combined, F1 $2.3 \times$ as long as wide, F1 $1.2 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.19 \times$ head height; head width $1.52 \times$ interorbital space; maximum eye diameter $1.18 \times$ minimum eye diameter; head height $1.65 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow absent; preoccipital carina absent. OOL:POL:LOL 1.00:1.00:0.56; OOL $1.93 \times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina absent; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.28 \times$ mesosoma width; Weber length 231 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.85 \times$ mesoscutellum width; posterior mesoscutal width $1.38 \times$ mesoscutellum width; mesoscutellum length $1.85 \times$ mesoscutellum width; mesoscutellum length $1.33 \times$ posterior mesoscutal width; Weber length $1.54 \times$ mesoscutum width; Weber length $1.54 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metaplecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $3.05 \times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length 100 μm ; Weber length $2.31 \times$ genital length; gvc width 50 μm ; genital length $2.00 \times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.12 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 16C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially

(Fig. 16A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 16B); proximolateral margin of gvc ascending and emarginated ventrally; distolateral margin of gvc convex, more strongly descending dorsally (Fig. 16B). Harpe finger-shaped apicoventrally and slightly broadened at apex in

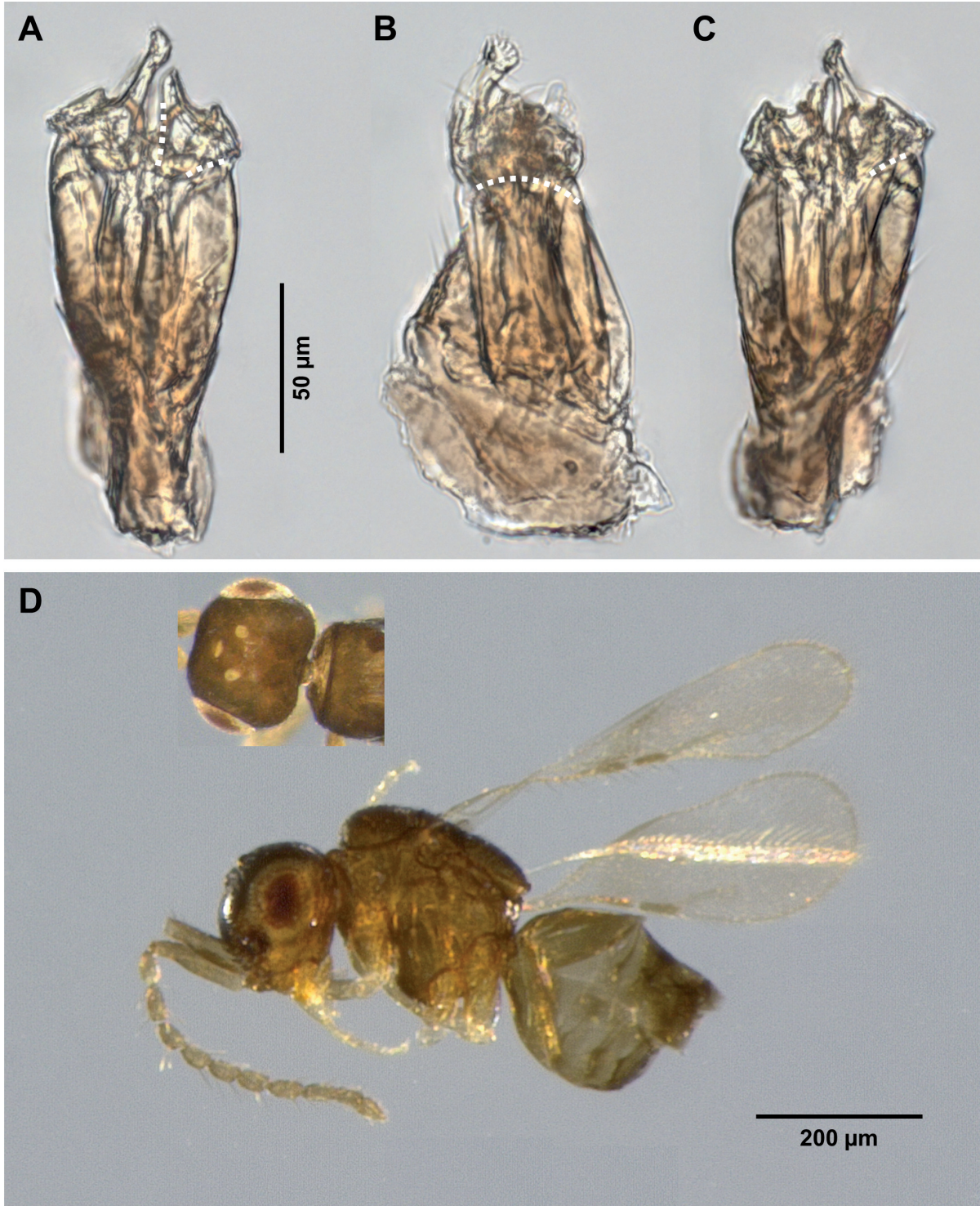


Fig. 16. Specimen of *Aphanogmus* sp. 1 (ZFMK-HYM-00037054). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: head in dorsal view.

ventral, lateral and dorsal view; harpe/gvc index 0.54; lateral articulation site of harpe with gvc not flush (Fig. 16A, C); ventral margin of harpe convex, dorsal margin indistinct in basal part, concave in apical half (Fig. 16B), lateral margin slightly convex and oriented distomedially in basal third, concave and oriented ventrally in middle third, straight and oriented distomedially in apical third, widest point of harpe at lateral articulation site with gvc (Fig. 16A, C); ventromedial margins of harpes indistinct at distoventral margin of gvc, ventromedial margin of harpe slightly concave from base to apex (Fig. 16C), apex of harpe rounded (Fig. 16A, C). Harpe with at least two apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally, distomedially and distoventrally. Aedeagus + gonossiculus indistinct. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented ventrally. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Aphanogmus sp. 1 can be distinguished from all other treated species by the absence of the preoccipital furrow, the intertorular carina and the preoccipital carina.

For more comparisons with similar species, see remarks under *A. mariae* sp. nov.

Condition of the specimen

In *A.* sp. 1, the left pedicel, the left flagellum, the left hind wing, all left legs, and the right fore and hind legs (except coxae), and the apical part of the left harpe are missing. The metasoma is deformed, thus the body length measurement is not precise. Also, the gvc is slightly deformed, especially in its basal part, which is covered with metasomal tissue. The setal arrangement of the male genitalia is very difficult to see, thus some setae characters are not described. *Aphanogmus* sp. 1 is deposited in the ZFMK as ZFMK-HYM-00037054.

Aphanogmus sp. 2

Fig. 17

Diagnosis

Weber length $1.57 \times$ mesoscutum width. Male genitalia: harpe finger-shaped apicoventrally and slightly broadened at apex in ventral, lateral and dorsal view; harpe/gvc index 0.29; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe slightly concave from base to apex; ventral margin of harpe slightly concave, dorsal margin indistinct in basal part, concave in apical half, lateral margin slightly concave; Weber length $3.14 \times$ genital length.

Material examined

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°14'52.4 S, 37°19'13 E; 1305 m a.s.l.; 2 May 2012; KiLi project leg.; “high 3”; COF3, coffee plantation; Coloured pan trap; ZFMK; ZFMK-HYM-00037055.

Description

Male

BODY LENGTH. 0.76 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown; legs brown except joints and tarsi lighter; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.3 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $3.1 \times$ as long as wide, F1 $1.7 \times$ as long as pedicel, F1 $1.1 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.9 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1 \times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.19 \times$ head height; head width $1.58 \times$ interorbital space; maximum eye diameter $1.25 \times$ minimum eye diameter; head height $1.60 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:1.23:0.69; OOL $1.73 \times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.31 \times$ mesosoma width; Weber length 275 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.87 \times$ mesoscutellum width; posterior mesoscutal width $1.40 \times$ mesoscutellum width; mesoscutellum length $1.77 \times$ mesoscutellum width; mesoscutellum length $1.26 \times$ posterior mesoscutal width; Weber length $1.57 \times$ mesoscutum width; Weber length $1.66 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.86 \times$ width; stigmal vein as long as pterostigma marginal length.

MALE GENITALIA. Genital length 88 μm ; Weber length $3.14 \times$ genital length; gvc width 44 μm ; genital length $2.00 \times$ gvc width; gvc width more than two thirds of gvc length. Proximodorsal margin of gvc convex; distodorsal margin of gvc indistinct (Fig. 17C); proximoventral margin of gvc straight; distoventral margin of gvc descending proximomedially (Fig. 17A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 17B); proximolateral margin of gvc descending dorsally; distolateral margin of gvc descending ventrally (Fig. 17B). Harpe finger-shaped apicoventrally and slightly broadened at apex in ventral, lateral and dorsal view; harpe/gvc index 0.29; lateral articulation site of harpe with gvc not flush (Fig. 17A, C); ventral margin of harpe slightly concave, dorsal margin indistinct in basal part, concave in apical half (Fig. 17B), lateral margin slightly concave, widest point of harpe at lateral

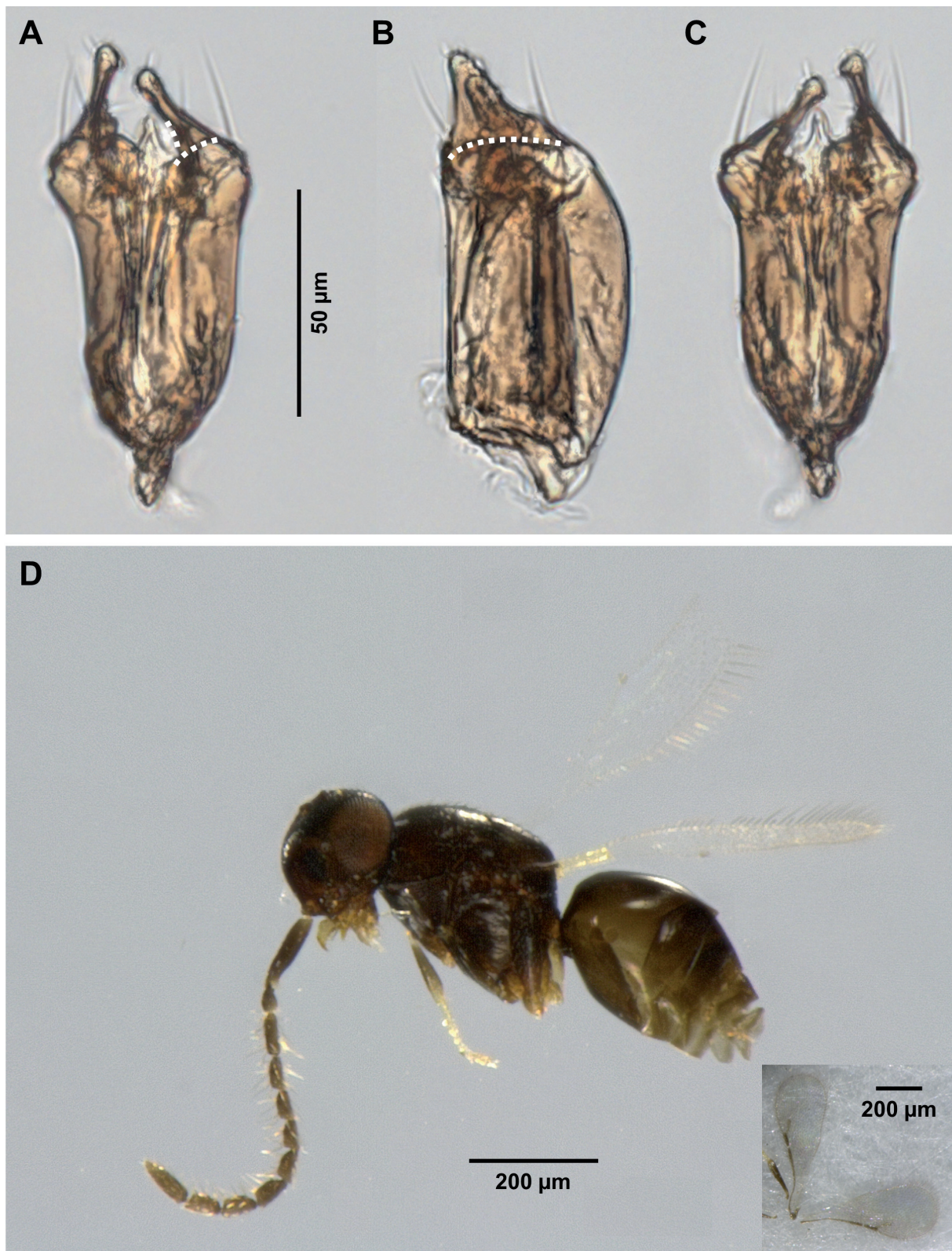


Fig. 17. Specimen of *Aphanogmus* sp. 2 (ZFMK-HYM-00037055). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: fore wings.

articulation site with gvc (Fig. 17A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe slightly concave from base to apex (Fig. 17C), apex of harpe rounded, oriented distomedially (Fig. 17A, C). Harpe with at least one lateral seta restricted to basal quarter, longest lateral seta as long as harpe, lateral seta oriented distomedially and distoventrally; harpe with at least one ventral seta restricted to basal third, longest ventral seta as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally, distomedially and distoventrally. Aedeagus + gonossiculus indistinct. Aedeagus + gonossiculus with at least two digital teeth, oriented ventrally. Genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Aphanogmus sp. 2 can be distinguished from all other treated species by the combination of the apicoventrally finger-shaped and slightly broadened and rounded apex of the harpe, the very long lateral and ventral setae of the harpe, and the high Weber length to genital length ratio. However, the male genitalia of *A.* sp. 2 are deformed and additional specimens would be very helpful to further strengthen delimitation of this species.

For more comparisons with similar species, see remarks under *A. mariae* sp. nov.

Condition of the specimen

In *A.* sp. 2, both antennae, both fore wings, and all legs except the right fore and hind leg are detached. The metasoma is deformed, thus the body length measurement is not precise. Also, the gvc is deformed, which affected specifically the left harpe and made some measurements or descriptions of male genitalia characters impossible (e.g., the gvc width to distal gvc width ratio). *Aphanogmus* sp. 2 is deposited in the ZFMK as ZFMK-HYM-00037055.

Aphanogmus sp. 3

Fig. 18

Diagnosis

Head width $1.41 \times$ interorbital space; OOL $2.57 \times$ lateral ocellus diameter; Weber length $1.59 \times$ mesoscutum width. Male genitalia: harpe finger-shaped and slightly broadened at apex in lateral view; harpe/gvc index 0.18; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight and virtually parallel to lateral margin and oriented distomedially from base to apex; ventral margin of harpe straight, dorsal margin indistinct in basal part and concave in apical half, lateral margin straight and oriented distomedially from base to apex.

Material examined

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°19'49.2 S, 37°38'35.2 E; 1153 m a.s.l.; 31 May 2012; KiLi project leg.; “low 2”; SAV3, savanna; Coloured pan trap; ZFMK; ZFMK-HYM-00037056.

Description

Male

BODY LENGTH. 0.73 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape, pedicel and flagellum light brown; legs light brown; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.0\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $1.9\times$ as long as wide, F1 $1.3\times$ as long as pedicel, F1 $1.2\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.1\times$ as long as wide, F6 shorter than F7 and F8 combined; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.07\times$ head height; head width $1.41\times$ interorbital space; maximum eye diameter $1.45\times$ minimum eye diameter; head height $1.81\times$ maximum eye diameter. Preoccipital furrow indistinct. OOL:POL:LOL 1.00:1.14:0.68; OOL $2.57\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.35\times$ mesosoma width; Weber length 219 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.83\times$ mesoscutellum width; posterior mesoscutal width $1.42\times$ mesoscutellum width; mesoscutellum length $1.83\times$ mesoscutellum width; mesoscutellum length $1.29\times$ posterior mesoscutal width; Weber length $1.59\times$ mesoscutum width; Weber length $1.59\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.90\times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length 100 μm ; Weber length $2.19\times$ genital length; gvc width 56 μm ; genital length $1.78\times$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.26\times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc indistinct (Fig. 18C); proximoventral margin of gvc ascending distomedially; distoventral margin of gvc convex and descending proximomedially (Fig. 18A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 18B); proximolateral margin of gvc concave and strongly ascending ventrally; distolateral margin of gvc descending dorsally (Fig. 18B). Harpe finger-shaped and slightly broadened at apex in lateral view; harpe/gvc index 0.18; lateral articulation site of harpe with gvc not flush (Fig. 18A, C); ventral margin of harpe straight, dorsal margin indistinct in basal part and concave in apical half (Fig. 18B), lateral margin straight and oriented distomedially from base to apex, widest point of harpe at lateral articulation site with gvc (Fig. 18A, C); ventromedial margins of harpes not touching at distoventral

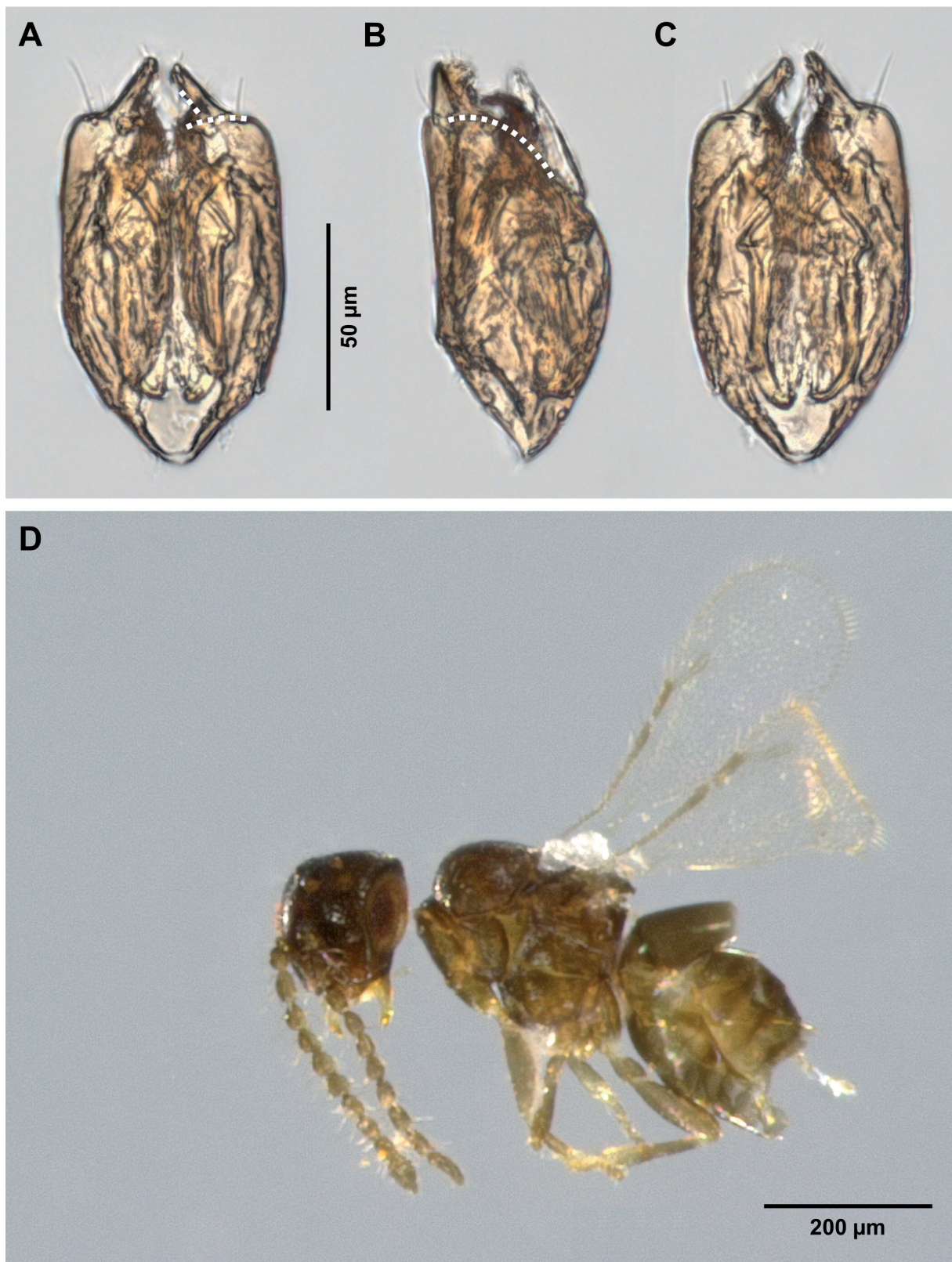


Fig. 18. Specimen of *Aphanogmus* sp. 3 (ZFMK-HYM-00037056). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

margin of gvc, ventromedial margin of harpe straight and virtually parallel to lateral margin and oriented distomedially from base to apex (Fig. 18C), apex of harpe pointed, oriented distomedially (Fig. 18A, C). Harpe with at least one lateral seta restricted to basal quarter, longest lateral seta slightly less than as long as harpe, lateral seta oriented distodorsally and distolaterally; harpe with at least one ventral seta restricted to basal quarter, longest ventral seta slightly less than as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distomedially; median setae indistinct. Aedeagus + gonossiculus indistinct. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented ventrally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

The male genitalia of *A. sp. 3* are similar to those of *A. sp. 4* in having finger-shaped and distomedially converging harpes. However, the harpes of *A. sp. 3* are distinctly thinner and the lateral and ventral margins are not convex. Furthermore, the harpe/gvc index is lower in *A. sp. 3* (0.18, compared to 0.29 in *A. sp. 4*).

Condition of the specimen

In the specimen, the right hind wing, right middle leg (except coxa), and the four distal tarsal segments of the left middle and hind leg are missing. Both F9 are deformed, and the head is deformed and detached. Also, the metasoma is deformed, thus the body length measurement is not precise. These deformations in the holotype made some descriptions and measurements of head and antennal characters impossible or not precise (e.g., head width to mesosoma width). *Aphanogmus sp. 3* is deposited in the ZFMK as ZFMK-HYM-00037056.

Aphanogmus sp. 4

Fig. 19

Diagnosis

Head width $1.40 \times$ head height; head width $1.35 \times$ mesosoma width. Male genitalia: harpe finger-shaped and slightly broadened and with plateau on apex in lateral view; harpe/gvc index 0.29; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight and converging distomedially from base to apex; ventral margin of harpe slightly convex, dorsal margin indistinct in basal part, concave in apical three quarters, lateral margin slightly convex and converging distomedially from base to apex.

Material examined

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°14'52.4 S, 37°19'13 E; 1305 m a.s.l.; 10 Nov. 2012; KiLi project leg.; “low 1”; COF3, coffee plantation; Coloured pan trap; ZFMK; ZFMK-HYM-00037051.

Description

Male

BODY LENGTH. 0.75 mm.

COLOUR. Head brown, mesosoma brown, metasoma brown; scape light brown except proximal third lighter and pedicel light brown, flagellum light brown; legs light brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.4\times$ as long as pedicel, scape slightly longer than F1 and F2 combined, F1 $2.6\times$ as long as wide, F1 $1.9\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.40\times$ head height; head width $1.56\times$ interorbital space; maximum eye diameter $1.19\times$ minimum eye diameter; head height $1.58\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL 1.00:1.19:0.56; OOL $2.13\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.35\times$ mesosoma width; Weber length 238 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.76\times$ mesoscutellum width; posterior mesoscutal width $1.29\times$ mesoscutellum width; mesoscutellum length $1.53\times$ mesoscutellum width; mesoscutellum length $1.18\times$ posterior mesoscutal width; Weber length $1.27\times$ mesoscutum width; Weber length $1.46\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; longitudinal carinae on syntergum absent; translucent patches on metasoma absent.

FORE WING. Length $2.63\times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length 94 μm ; Weber length $2.53\times$ genital length; gvc width 56 μm ; genital length $1.67\times$ gvc width; gvc width less than three quarters of gvc length; gvc width $1.43\times$ distal gvc width. Proximodorsal margin of gvc strongly convex; distodorsal margin of gvc indistinct (Fig. 19C); proximoventral margin of gvc concave; distoventral margin of gvc slightly convex (Fig. 19A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 19B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc descending slightly dorsally (Fig. 19B). Harpe finger-shaped and slightly broadened and with plateau on apex in lateral view; harpe/gvc index 0.29; lateral articulation site of harpe with gvc not flush (Fig. 19A, C); ventral margin of harpe slightly convex, dorsal margin indistinct in basal part, concave in apical three quarters (Fig. 19B), lateral margin slightly convex and converging distomedially from base to apex, widest point of harpe at lateral articulation

site with gvc (Fig. 19A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe straight and converging distomedially from base to apex (Fig. 19C), apex of harpe pointed, oriented distomedially (Fig. 19A, C). Harpe with at least one lateral seta restricted to basal quarter, longest lateral seta more than three quarters as long as harpe, lateral seta oriented

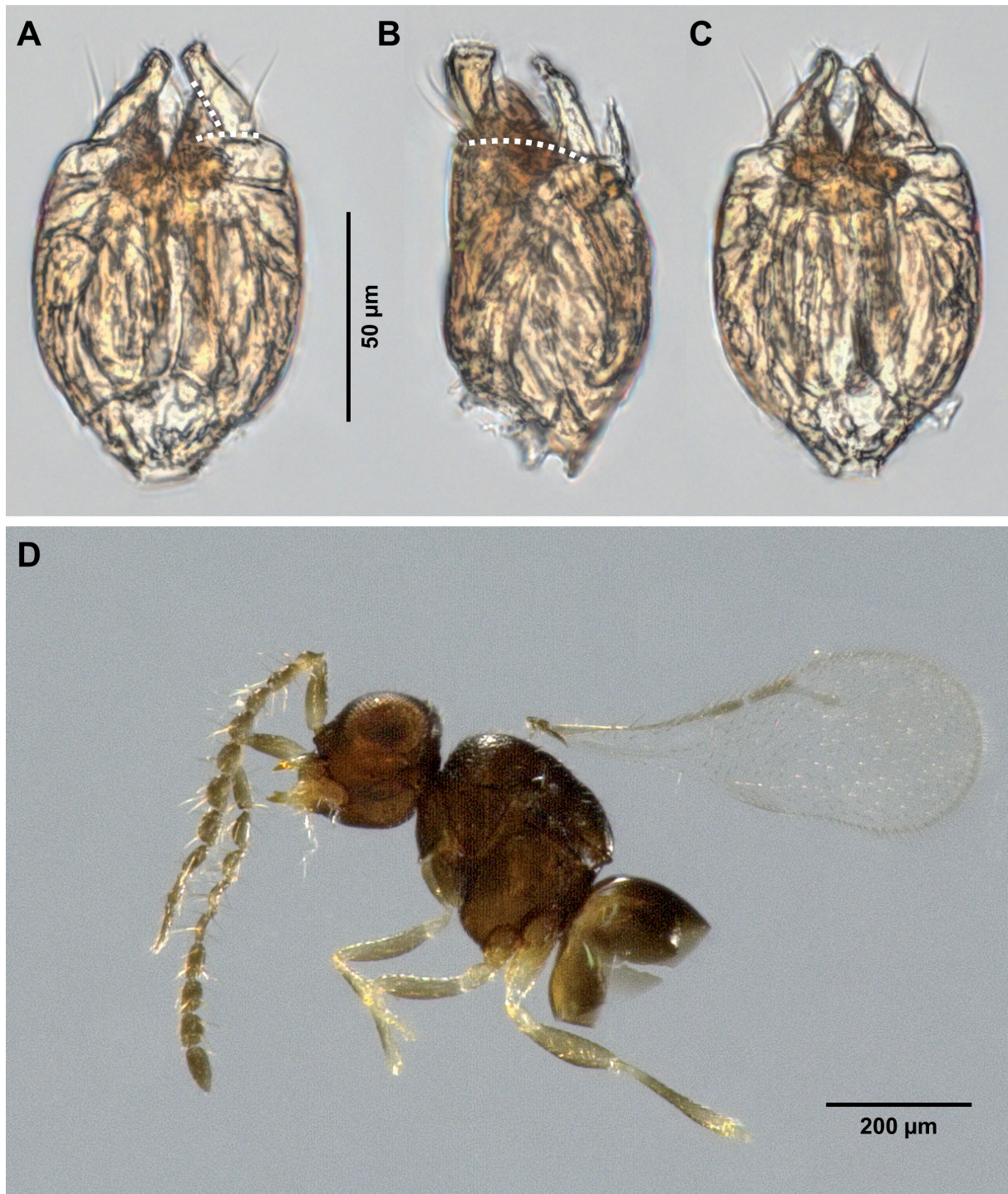


Fig. 19. Specimen of *Aphanogmus* sp. 4 (ZFMK-HYM-00037051). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

distolaterally and distoventrally; harpe with at least one ventral seta restricted to basal quarter, longest ventral seta three quarters as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distoventrally; median setae indistinct. Aedeagus + gonossiculus indistinct. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented ventrally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

See remarks under *A.* sp. 3.

Condition of the specimen

In *A.* sp. 4, one leg, one fore and one hind wing are missing. Four legs, one fore and one hind wing are detached. The distal flagellomeres of both antennae are deformed. Most of the metasoma is missing, thus the body length measurement is not precise. *Aphanogmus* sp. 4 is deposited in the ZFMK as ZFMK-HYM-00037051.

***fumipennis* species group after Evans *et al.* (2005)**

***Aphanogmus dimidiatus* sp. nov.**

urn:lsid:zoobank.org:act:7D040F3C-4368-47D4-85FC-FE92E19EF9A1

Fig. 20

Diagnosis

Head height $1.44\text{--}1.52 \times (1.44)$ maximum eye diameter. Male genitalia: harpe bilobed; ventral and dorsolateral lobe finger-shaped in lateral view; harpe/gvc index 0.63; dorsolateral lobe/ventral lobe index 0.86; dorsolateral length of harpe/harpe index 0.96; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe convex from base to apex; distolateral margin of gvc strongly descending dorsally; lateral setae on dorsolateral lobe oriented distodorsally and distolaterally; genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus; aedeagus + gonossiculus with at least two distinct digital teeth, oriented dorsally.

Etymology

The species name is derived from the Latin word '*dimidiatus*' which means 'halved/bisected', with reference to the harpe being divided into two lobes.

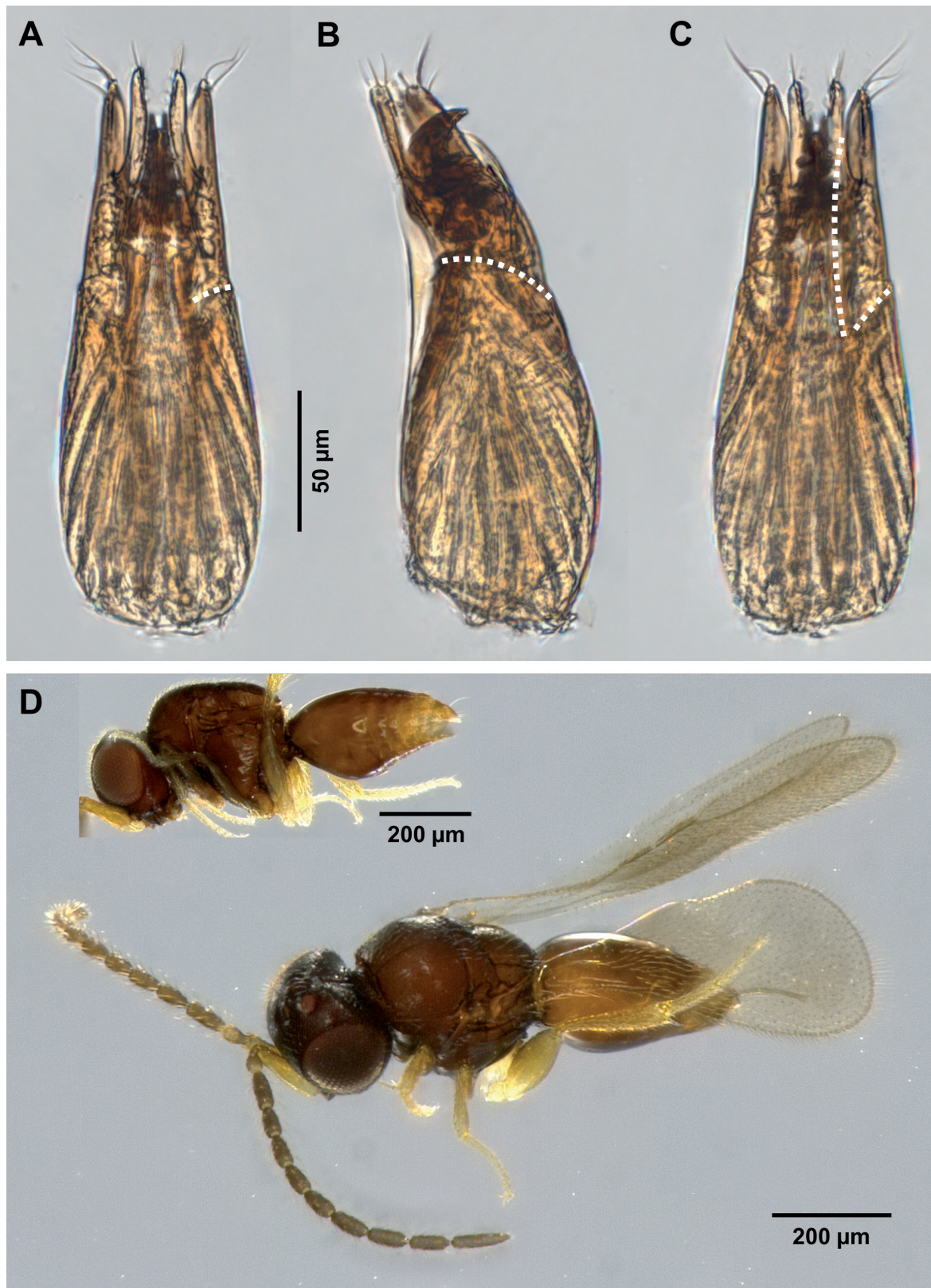


Fig. 20. Holotype of *Aphanogmus dimidiatus* sp. nov. (ZFMK-HYM-00037019). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in dorsolateral view; inset: habitus in lateral view.

Material examined**Holotype**

KENYA • ♂; Western Province, Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037019.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034437 • 2 ♂♂; same collection data as for holotype; ZFMK-HYM-00034438, ZFMK-HYM-00034439 • 1 ♂; same collection data as for holotype; 9 Jul. 2007; ZFMK-HYM-00034440 • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034441 • 1 ♂; Kakamega Forest; 00°19'45.7 N, 34°52'2.8 E; 1573 m a.s.l.; 7 Aug. 2007; F. Hita Garcia leg.; Transect 21; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034442 • 1 ♂; Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 4 Sep. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034443 • 1 ♂; Kakamega Forest; 00°20'52.5 N, 34°51'53 E; 1611 m a.s.l.; 6 Sep. 2007; F. Hita Garcia leg.; Transect 25; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034444.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.86–1.13 mm (0.86 mm).

COLOUR. Head brown, mesosoma brown, metasoma brown; scape and pedicel light brown-yellowish, flagellum light brown; legs yellowish except pro- and mesocoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape 4.0× as long as pedicel, scape longer than F1 and F2 combined, F1 3.0× as long as wide, F1 2.0× as long as pedicel, F1 1.3× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.8× as long as wide, F6 shorter than F7 and F8 combined, F6 1.3× as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and longer than width of F1 to F4.

HEAD. Head width 1.13–1.20× (1.17) head height; head width 1.91–2.04× (1.91) interorbital space; maximum eye diameter 1.20–1.39× (1.39) minimum eye diameter; head height 1.44–1.52× (1.44) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.79–1.00:0.75–1.00 (1.00:0.79:0.75); OOL 1.38–1.58× (1.56) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width 1.20–1.23× (1.20) mesosoma width; Weber length 288–363 μm (288 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width 1.94–2.27× (2.27) mesoscutellum width; posterior mesoscutal width 1.53–1.67× (1.67) mesoscutellum width; mesoscutellum length 1.67–1.93× (1.93) mesoscutellum width; mesoscutellum length 1.06–1.16× (1.16) posterior mesoscutal width; Weber length 1.35–1.45×

(1.35) mesoscutum width; Weber length $1.59\text{--}1.66 \times (1.59)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight and transparent in lateral view with pointed end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.92\text{--}3.09 \times (3.09)$ width; stigmal vein longer than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $181\text{--}206 \mu\text{m}$ ($188 \mu\text{m}$); Weber length $1.53\text{--}1.76 \times (1.53)$ genital length; gvc width $69\text{--}78 \mu\text{m}$ ($69 \mu\text{m}$); genital length $2.64\text{--}2.73 \times (2.73)$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.40 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 20C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 20A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 20B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc strongly descending dorsally (Fig. 20B). Harpe bilobed; ventral and dorsolateral lobe finger-shaped in lateral view; harpe/gvc index 0.63; dorsolateral lobe/ventral lobe index 0.86; dorsolateral length of harpe/harpe index 0.96; lateral articulation site of harpe with gvc flush (Fig. 20A, C); ventral margin of harpe slightly convex, dorsal margin slightly convex (Fig. 20B), lateral margin slightly concave, widest point of harpe at lateral articulation site with gvc (Fig. 20A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe convex from base to apex (Fig. 20C), apices of ventral and dorsolateral lobe slightly pointed, slightly oriented distolaterally (Fig. 20A, C). Harpe with at least two lateral setae on dorsolateral lobe restricted to apical quarter, longest lateral setae more than one third as long as harpe, lateral setae oriented distodorsally and distolaterally; harpe with at least one apical seta on dorsolateral lobe, longest apical seta on dorsolateral lobe less than one quarter as long as harpe, apical seta on dorsolateral lobe oriented distolaterally and distoventrally; harpe with at least one apical seta on ventral lobe, longest apical seta on ventral lobe less than one quarter as long as harpe, apical seta on ventral lobe oriented distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus more than three quarters as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 20A, C) and dorsal to apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented dorsally. Genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

The pedicel of ZFMK-HYM-00034437, ZFMK-HYM-00034438 and ZFMK-HYM-00034439 is concolourous with the light brown flagellum and darker than the yellowish scape.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *A. ngai* sp. nov.

Condition of type material

In the holotype, the left hind wing is detached.

Aphanogmus fraterculus sp. nov.

urn:lsid:zoobank.org:act:6A5379F9-B151-42FB-BD70-C4A00DD58D89

Fig. 21

Diagnosis

Head light brown-amber, mesosoma light brown-amber; maximum eye diameter $1.07\text{--}1.19 \times$ (1.07) minimum eye diameter; posterior mesosomal comb distinct. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.68; dorsomedial margins of harpes converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and slightly diverging distolaterally in basal two thirds with small indentation, concave and converging distomedially in apical third; median setae distinctly crossing at basal two thirds; Weber length $2.19\text{--}2.83 \times$ (2.83) genital length.

Etymology

The species name is derived from the Latin word '*fraterculus*' which means 'little brother', with reference to the similar but larger species *A. pilosicoxa* sp. nov.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}14'6.1$ N, $34^{\circ}52'9.2$ E; 1605 m a.s.l.; 28 Aug. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037025.

Paratypes

KENYA – **Western Province** • 3 ♂♂; Kakamega Forest; $00^{\circ}27'0.9$ N, $34^{\circ}50'52.9$ E; 1649 m a.s.l.; 3 Jul. 2007; F. Hita Garcia leg.; Transect 8; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034454 to ZFMK-HYM-00034456 • 1 ♂; Kakamega Forest; $00^{\circ}21'21.1$ N, $34^{\circ}51'44.9$ E; 1632 m a.s.l.; 8 Aug. 2007; F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034457 • 1 ♂; Kakamega Forest; $00^{\circ}14'20.5$ N, $34^{\circ}51'52.8$ E; 1634 m a.s.l.; 4 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034458 • 1 ♂; Kakamega Forest; $00^{\circ}12'42.6$ N, $34^{\circ}55'52.3$ E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037026 • 1 ♂; same collection data as for holotype; ZFMK-HYM-00034459.

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.51–0.74 mm (0.52 mm).

COLOUR. Head light brown-amber, mesosoma light brown-amber, metasoma light brown; scape, pedicel and flagellum light brown; legs light brown; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part and at proximal half of stigmal vein less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.4 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.3 \times$ as long as wide, F1 $1.6 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.5 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.24\text{--}1.29 \times (1.27)$ head height; head width $1.72\text{--}1.85 \times (1.74)$ interorbital space; maximum eye diameter $1.07\text{--}1.19 \times (1.07)$ minimum eye diameter; head height $1.61\text{--}1.67 \times (1.63)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina absent. OOL:POL:LOL $1.00:0.83\text{--}1.00:0.68\text{--}0.91 (1.00:0.83:0.83)$; OOL $1.69\text{--}2.00 \times (2.00)$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.18\text{--}1.23 \times (1.18)$ mesosoma width; Weber length $188\text{--}219 \mu\text{m} (213 \mu\text{m})$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.94\text{--}2.15 \times (2.00)$ mesoscutellum width; posterior mesoscutal width $1.46\text{--}1.62 \times (1.46)$ mesoscutellum width; mesoscutellum length $1.56\text{--}1.69 \times (1.69)$ mesoscutellum width; mesoscutellum length $1.04\text{--}1.16 \times (1.16)$ posterior mesoscutal width; Weber length $1.13\text{--}1.31 \times (1.31)$ mesoscutum width; Weber length $1.40\text{--}1.58 \times (1.55)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt end; mesometapleural sulcus absent; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb distinct. Basal transverse carina of petiole (on syntergum) present; four distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.94\text{--}3.05 \times (3.01)$ width; stigmal vein shorter than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $69\text{--}100 \mu\text{m} (75 \mu\text{m})$; Weber length $2.19\text{--}2.83 \times (2.83)$ genital length; gvc width $38\text{--}44 \mu\text{m} (38 \mu\text{m})$; genital length $1.85\text{--}2.29 \times (2.00)$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.10 \times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc descending proximomedially (Fig. 21C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 21A); ventral area of gvc convex; dorsal area of gvc straight (Fig. 21B); proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc slightly convex (Fig. 21B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.68; lateral articulation site of harpe with gvc not flush (Fig. 21A, C); ventral margin of harpe concave, dorsal margin slightly convex in basal half and straight in apical half (Fig. 21B), lateral margin slightly convex in basal half and straight in apical half, widest point of harpe at lateral articulation site with gvc (Fig. 21A, C); dorsomedial margins of harpes converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and slightly diverging distolaterally in basal two thirds with small indentation, concave and converging distomedially in apical third (Fig. 21C), apex of harpe rounded, oriented distomedially (Fig. 21A, C). Harpe with at least one ventral seta restricted to apical quarter, longest ventral seta more than one third as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least four apical setae, longest apical setae more than one quarter as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least five median setae restricted to basal two thirds and apical quarter, longest median setae more than one third as long as harpe, median setae distinctly crossing at basal two thirds and oriented distomedially and medioventrally. Aedeagus + gonossiculus one quarter as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 21A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

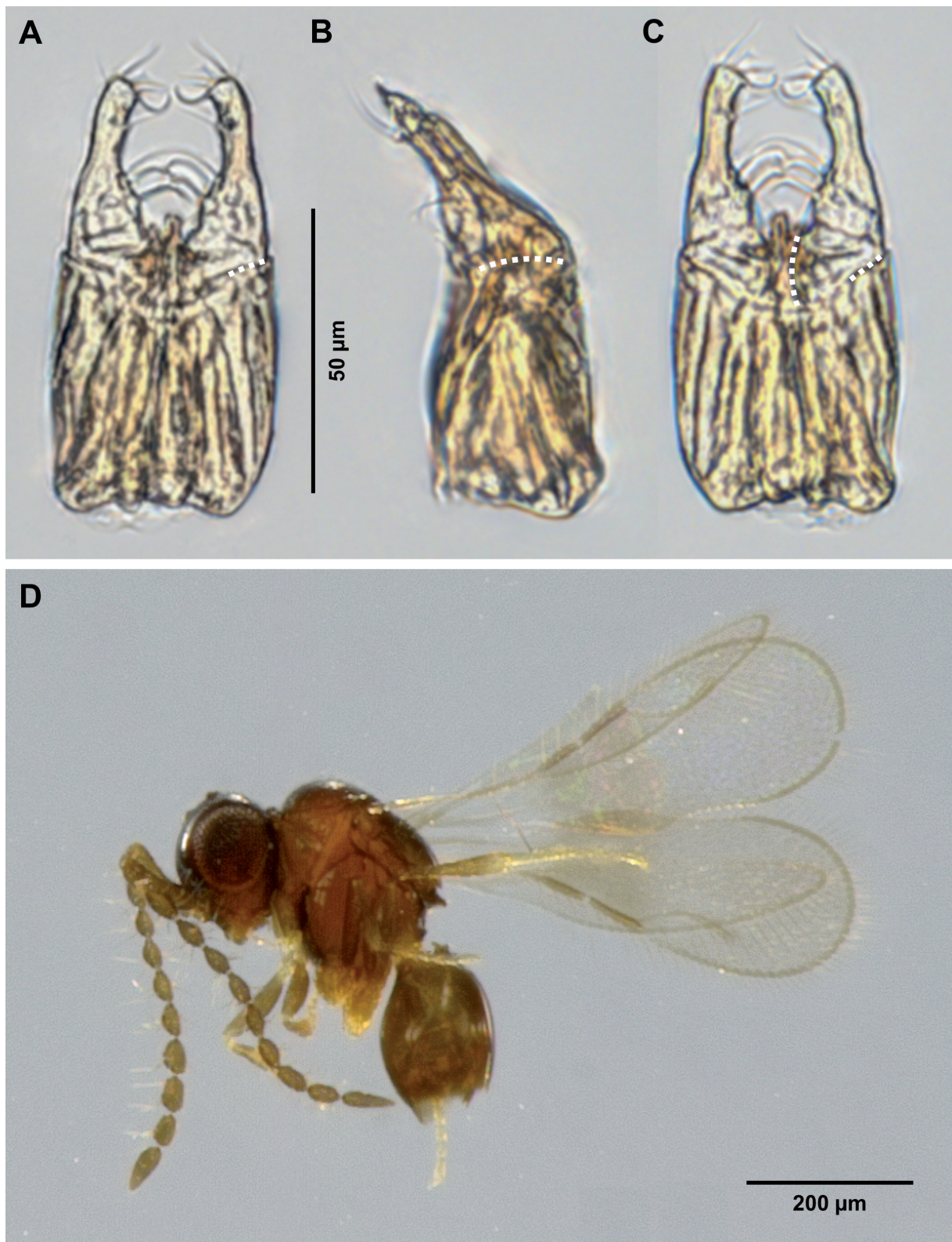


Fig. 21. Holotype of *Aphanogmus fraterculus* sp. nov. (ZFMK-HYM-00037025). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Variation

The apical half of the harpe is more strongly sclerotized and the gvc is longer in ZFMK-HYM-00037026. The anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is longer and extending to the end of the mesosoma in ZFMK-HYM-00034459 and ZFMK-HYM-00037026.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus fraterculus sp. nov. can be distinguished from all other treated species by the harpes of the male genitalia with crossing median setae in the basal two thirds.

For more comparisons with similar species, see remarks under *A. pilosicoxa* sp. nov.

Condition of type material

In the holotype, the right middle leg is missing (except coxa). The posterior part of the metasoma is missing, thus the body length measurement is not precise.

Aphanogmus guenteri sp. nov.

urn:lsid:zoobank.org:act:FD14D458-FE46-4971-BDC9-3F141330372D

Fig. 22

Diagnosis

Preoccipital furrow distinct, with distinct interocellar pit; head width $0.97\text{--}1.19 \times (1.19)$ head height; head width $1.89\text{--}2.29 \times (2.00)$ interorbital space; OOL:LOL $0.80\text{--}1.00 (1.00)$; fore wing length $2.79\text{--}3.30 \times (3.16)$ width. Male genitalia: harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.68; dorsolateral lobe/ventral lobe index 0.13; dorsolateral length of harpe/harpe index 0.74; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, convex and diverging distolaterally in apical two thirds; genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonosticulus and distal half of gvc.

Etymology

The species is named in memory of Günter Salden, whose life was accompanied by a great passion for nature. He was the uncle and idol of the first author and sadly passed away in 2018.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}21'7.9$ N, $34^{\circ}52'2.6$ E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037009.

Paratypes

KENYA – Western Province • 1 ♂; Kakamega Forest; $00^{\circ}21'4.4$ N, $34^{\circ}51'41.1$ E; 1602 m a.s.l.; 5 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; NHMUK;

NHMUK-013389004 • 1 ♂; Kakamega Forest; 00°21'4.4 N, 34°51'41.1 E; 1602 m a.s.l.; 7 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389005 • 1 ♂; Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 28 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00775 • 1 ♂; same collection data as for holotype; ZFMK-HYM-00034392 • 1 ♂; same collection data as for holotype; 9 Jul. 2007; SMNS; SMNS-HYM-T00776 • 1 ♂; Kakamega Forest; 00°23'6.2 N, 34°33'37.8 E; 1602 m a.s.l.; 23 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00034394) • 2 ♂♂; Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 4 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034395, ZFMK-HYM-00034396 • 1 ♂; same collection data as for preceding; NMK; NMK (ZFMK-HYM-00034397).

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.56–1.11 mm (0.87 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape yellowish and pedicel light brown, flagellum light brown; legs yellowish except metacoxa light yellow and transparent; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part and at stigmal vein less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape 4.0× as long as pedicel, scape longer than F1 and F2 combined, F1 2.8× as long as wide, F1 1.8× as long as pedicel, F1 1.4× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.7× as long as wide, F6 shorter than F7 and F8 combined, F6 1.2× as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and longer than width of F1 to F4.

HEAD. Head width 0.97–1.19× (1.19) head height; head width 1.89–2.29× (2.00) interorbital space; maximum eye diameter 1.13–1.18× (1.14) minimum eye diameter; head height 1.48–1.59× (1.48) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow distinct, with distinct interocellar pit; preoccipital carina distinct. OOL:POL:LOL 1.00:0.96–1.25:1.00–1.25 (1.00:0.96:1.00); OOL 1.00–1.50× (1.50) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width 1.13–1.26× (1.26) mesosoma width; Weber length 238–344 μm (300 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width 1.73–2.13× (2.13) mesoscutellum width; posterior mesoscutal width 1.40–1.67× (1.63) mesoscutellum width; mesoscutellum length 1.67–1.88× (1.88) mesoscutellum width; mesoscutellum length 1.10–1.24× (1.15) posterior mesoscutal width; Weber length 1.41–1.59× (1.41) mesoscutum width; Weber length 1.52–1.67× (1.60) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight and transparent in lateral view with pointed end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length 2.79–3.30× (3.16) width; stigmal vein longer than 2× pterostigma marginal length.

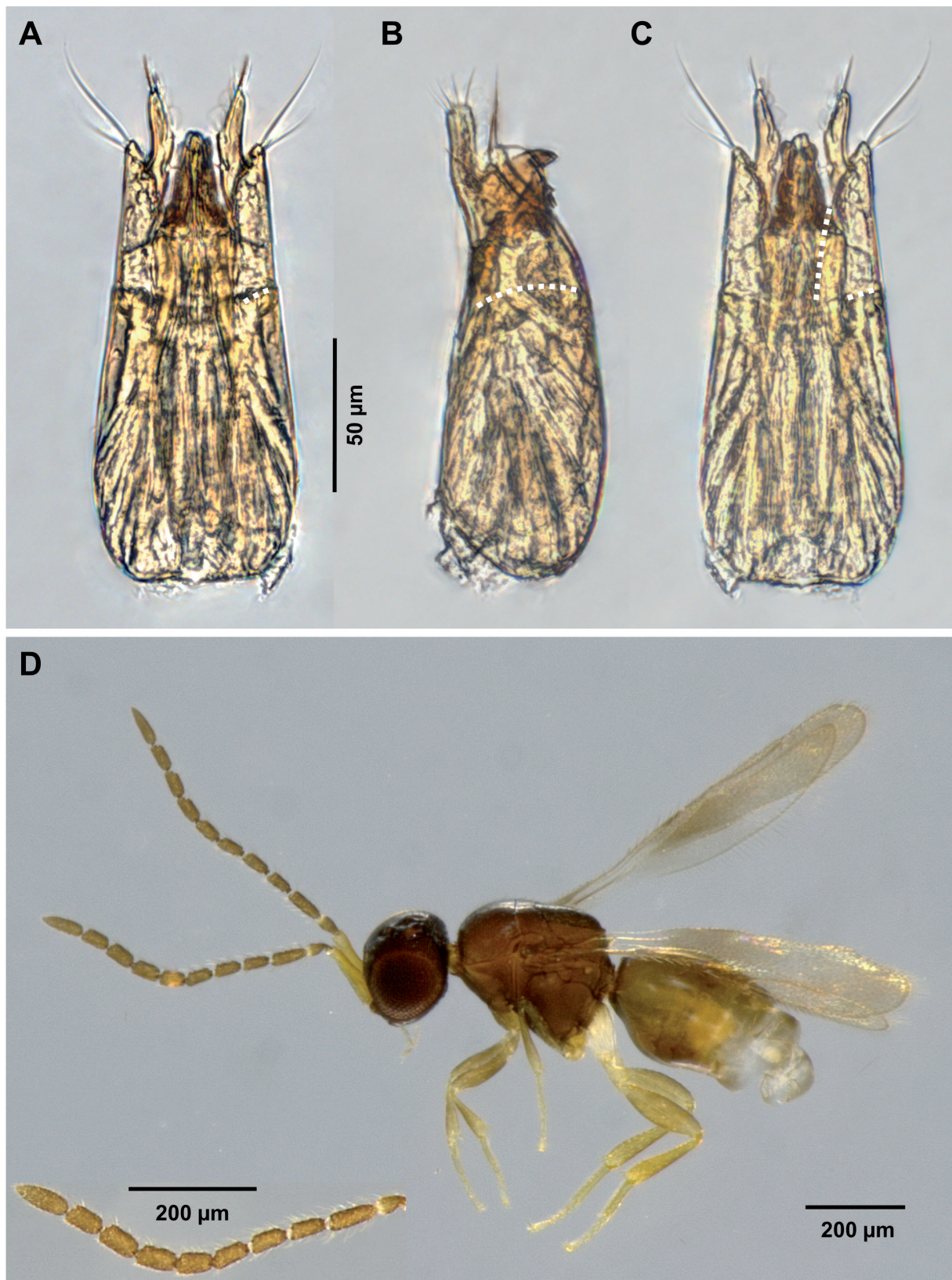


Fig. 22. Holotype of *Aphanogmus guenteri* sp. nov. (ZFMK-HYM-00037009). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: flagellomeres in detail.

MALE GENITALIA. Genital length 113–156 μm (156 μm); Weber length $1.87\text{--}2.20 \times (1.92)$ genital length; gvc width 48–63 μm (63 μm); genital length $2.34\text{--}2.88 \times (2.50)$ gvc width; gvc width more than two thirds of gvc length; gvc width $1.26 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc slightly descending proximomedially (Fig. 22C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 22A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 22B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 22B). Harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.68; dorsolateral lobe/ventral lobe index 0.13; dorsolateral length of harpe/harpe index 0.74; lateral articulation site of harpe with gvc flush (Fig. 22A, C); ventral margin of harpe concave in basal two thirds and straight in apical third, dorsal margin convex (Fig. 22B), lateral margin straight, widest point of harpe at lateral articulation site with gvc (Fig. 22A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, convex and diverging distolaterally in apical two thirds (Fig. 22C), apices of ventral and dorsolateral lobe pointed, oriented distolaterally (Fig. 22A, C). Harpe with at least one lateral seta between apices of ventral and dorsolateral lobe restricted to apical third, longest lateral seta more than one quarter as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least one apical seta on dorsolateral lobe, longest apical seta on dorsolateral lobe more than half as long as harpe, apical seta on dorsolateral lobe oriented distolaterally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distodorsally, distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus three quarters as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 22A, C) and dorsal to apex of dorsolateral lobe. Aedeagus + gonossiculus with two distinct digital teeth, oriented dorsally. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus and distal half of gvc.

Female

Unknown.

Variation

The flagellum of ZFMK-HYM-00034396 darkens gradually from F1 to F9.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus guenteri sp. nov. can be easily distinguished from all other treated species by the shape of the harpes, reflected in the high harpe/gvc index (0.68) and the low dorsolateral lobe/ventral lobe index (0.13). The metacoxae of *A. guenteri* are light yellow and transparent, like other species of the fumipennis species group (*A. morriconei* sp. nov., *A. ndefu* sp. nov. and *A. ngai* sp. nov.). The Nearctic *A. albicoxalis* Evans & Dessart, 2005 which is also part of the fumipennis species group and shows very light metacoxae, was described as the first known species with very light metacoxae in the genus *Aphanogmus* (Evans *et al.* 2005). However, very light metacoxae are apparently not exceptional in the genus *Aphanogmus* and can also be found in species of the clavicornis species group (*A. kakamegaensis* sp. nov., *A. njia* sp. nov. and *A. nehbergi* sp. nov.).

For more comparisons with similar species, see remarks under *A. kakakili* sp. nov.

Condition of type material

In the holotype, the right middle leg is missing (except the coxa). The posterior part of the metasoma is deformed and detached, thus the body length measurement is not precise. Paratype NHMUK-013389005 was used in an unsuccessful DNA barcoding attempt, i.e., had been put in lysis buffer for non-destructive DNA extraction, and looks more transparent.

Aphanogmus kakakili sp. nov.

urn:lsid:zoobank.org:act:15035945-F406-441C-BB2E-06F4CCA15B66

Fig. 23

Diagnosis

Scape as long as F1 and F2 combined; F1 as long as F2; preoccipital furrow present, with interocellar pit; median mesoscutal sulcus present; median mesoscutal sulcus not adjacent to transscutal articulation; mesoscutellum length $2.00\text{--}2.12 \times$ (2.00) mesoscutellum width; mesoscutellum length $1.25\text{--}1.41 \times$ (1.25) posterior mesoscutal width. Male genitalia: harpe bilobed; ventral lobe finger-shaped and broadened in apical two thirds and dorsolateral lobe triangular with plateau on apex in lateral view; harpe/gvc index 0.42; dorsolateral lobe/ventral lobe index 0.48; dorsolateral length of harpe/harpe index 0.55; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in basal quarter, concave in apical three quarters; aedeagus + gonossiculus with at least two digital teeth, oriented ventrolaterally; proximolateral margin of gvc concave and strongly ascending ventrally.

Etymology

The species name is a composition of the respective first two syllables of the sampling locations where holotype and paratypes were collected, Kakamega Forest and Mount Kilimanjaro.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 4 Sep. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037036.

Paratypes

TANZANIA – **Kilimanjaro Region** • 1 ♂; Mount Kilimanjaro; 3°8'18.7 S, 37°18'19.2 E; 2650 m a.s.l.; 8 Oct. 2012; KiLi project leg.; “tree 3”; FOC4, *Ocotea* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037074 • 2 ♂♂; Mount Kilimanjaro; 3°10'43.9 S, 37°30'45.4 E; 2800 m a.s.l.; 26 Jan. 2012; KiLi project leg.; “high 2”; FPO5, *Podocarpus* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037072, ZFMK-HYM-00037076 • 1 ♂; same collection data as for preceding; “low ex”; ZFMK-HYM-00037075 • 1 ♂; same collection data as for preceding; “tree 2”; ZFMK-HYM-00037073 • 1 ♂; Mount Kilimanjaro; 3°9'57.1 S, 37°21'45.4 E; 2940 m a.s.l.; 28 Jan. 2012; KiLi project leg.; “tree 1”; FPO2, *Podocarpus* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037077.

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.90–1.00 mm (0.90 mm).

COLOUR. Head brown, mesosoma brown, metasoma brown; scape, pedicel and flagellum light brown; legs light brown except joints and tarsi lighter; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

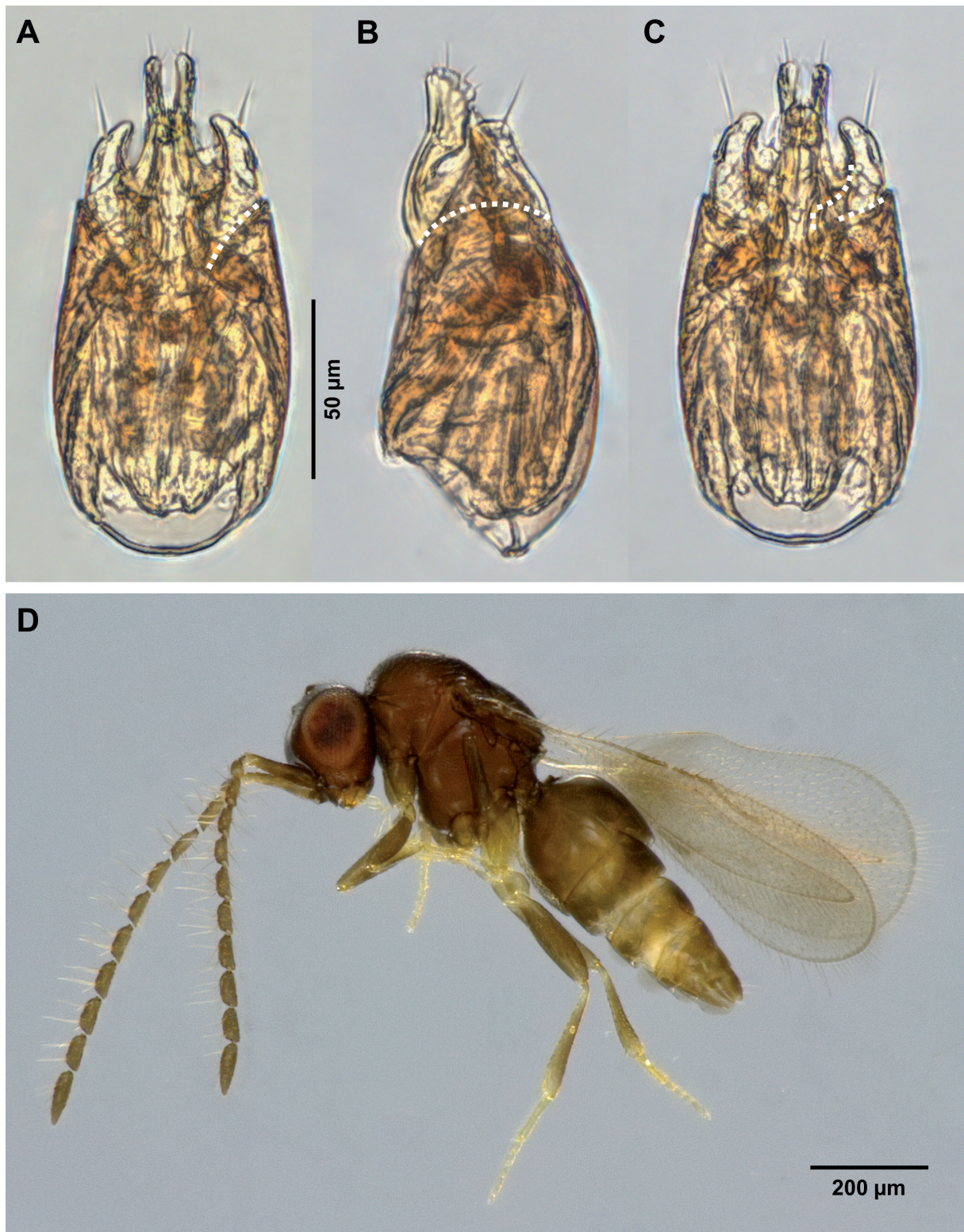


Fig. 23. Holotype of *Aphanogmus kakakili* sp. nov. (ZFMK-HYM-00037036). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.5 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $2.9 \times$ as long as wide, F1 $1.7 \times$ as long as pedicel, F1 as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.6 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.15\text{--}1.24 \times$ (1.15) head height; head width $1.58\text{--}1.78 \times$ (1.78) interorbital space; maximum eye diameter $1.16\text{--}1.40 \times$ (1.40) minimum eye diameter; head height $1.62\text{--}1.74 \times$ (1.62) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present, with interocellar pit; preoccipital carina distinct. OOL:POL:LOL $1.00:1.00\text{--}1.33:0.61\text{--}1.00$ (1.00:1.33:1.00); OOL $1.67\text{--}2.00 \times$ (1.71) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.11\text{--}1.18 \times$ (1.18) mesosoma width; Weber length $269\text{--}369 \mu\text{m}$ ($269 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus not adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.07\text{--}2.35 \times$ (2.07) mesoscutellum width; posterior mesoscutal width $1.50\text{--}1.65 \times$ (1.60) mesoscutellum width; mesoscutellum length $2.00\text{--}2.12 \times$ (2.00) mesoscutellum width; mesoscutellum length $1.25\text{--}1.41 \times$ (1.25) posterior mesoscutal width; Weber length $1.39\text{--}1.48 \times$ (1.39) mesoscutum width; Weber length $1.43\text{--}1.64 \times$ (1.43) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, oriented posterodorsally in lateral view with pointed and lighter end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; diffuse number of indistinct basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.70\text{--}2.83 \times$ (2.83) width; stigmal vein shorter than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $131\text{--}144 \mu\text{m}$ ($131 \mu\text{m}$); Weber length $2.68\text{--}2.05 \times$ (2.05) genital length; gvc width $63\text{--}69 \mu\text{m}$ ($63 \mu\text{m}$); genital length $2.00\text{--}2.10 \times$ (2.10) gvc width; gvc width two thirds of gvc length; gvc width $1.26 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 23C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 23A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 23B); proximolateral margin of gvc concave and strongly ascending ventrally; distolateral margin of gvc convex (Fig. 23B). Harpe bilobed; ventral lobe finger-shaped and broadened in apical two thirds and dorsolateral lobe triangular with plateau on apex lateral view; harpe/gvc index 0.42; dorsolateral lobe/ventral lobe index 0.48; dorsolateral length of harpe/harpe index 0.55; lateral articulation site of harpe with gvc not flush (Fig. 23A, C); ventral margin of harpe convex in basal two thirds and straight in apical third, dorsal margin convex in basal two thirds and slightly concave in apical third (Fig. 23B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 23A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in basal quarter, concave in apical three quarters (Fig. 23C), apices of ventral and dorsolateral lobe rounded, apex of ventral lobe oriented distolaterally and apex of dorsolateral lobe oriented distomedially (Fig. 23A, C). Harpe with at least one lateral seta on dorsolateral lobe restricted to apical half, longest lateral seta one third as long as harpe, lateral seta oriented distodorsally and distolaterally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distodorsally and distolaterally; indistinct number of median setae on ventral lobe, longest median setae

less than one quarter as long as harpe, median setae oriented distodorsally and with indistinct orientation. Aedeagus + gonossiculus with indistinct length (Fig. 23A, C). Aedeagus + gonossiculus with at least two digital teeth, oriented ventrolaterally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and weakest sclerotization at harpes

Female

Unknown.

Variation

All paratypes from Tanzania are darker. The anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is not lighter at the end and slightly longer in some paratypes from Tanzania.

Biology

Host unknown, specimens collected from leaf litter (Kenya) or with coloured pan traps (Tanzania).

Distribution

Afrotropical: Kenya and Tanzania.

Remarks

Comparison with similar species

Aphanogmus kakakili sp. nov. is equipped with an interocellar pit, which is unusual and can – considering the Afrotropical species of the *A. fumipennis* species group – otherwise only be found in *A. guenteri* sp. nov. However, the pit is less oval-shaped in *A. kakakili* than in *A. guenteri*. Apart from this specific similarity, both species are easily distinguishable from each other. Regarding the male genitalia, *A. kakakili* closely resembles the Palearctic *Aphanogmus fasciipennis* Dessart, 1963 (drawing in Dessart 1963a: 401, figs 20–21). Both species share the combination of the broadened apical two thirds of the ventral lobe in lateral view, the concave and strongly ascending ventrally proximolateral margin of the gvc, and the visible digital teeth. However, the dorsolateral lobe of *A. fasciipennis* is distinctly smaller and equipped with two lateral setae instead of one lateral seta.

For more comparisons with similar species, see remarks under *A. kakamegaensis* sp. nov.

Condition of type material

In the holotype, the posterior half of the mesosoma is deformed, thus the body length measurement is not precise.

Aphanogmus kisiwa sp. nov.

urn:lsid:zoobank.org:act:1128A587-CC58-4952-9CDA-6496BFF43082

Fig. 24

Diagnosis

Flagellomeres cylindrical and slightly trapezoidal; scape as long as F1 and F2 combined; F1 3.5 × as long as wide; mesometapleuron with distinct longitudinal striations. Male genitalia: harpe slightly bilobed; ventral lobe finger-shaped and dorsolateral lobe very short in lateral view; harpe/gvc index 0.38; dorsolateral lobe/ventral lobe index 0.00; dorsolateral length of harpe/harpe index 0.56; dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe convex in short basal part, concave in almost basal three quarters, straight and diverging distolaterally in apical quarter.

Etymology

The species name is derived from the Swahili word '*kisiwa*' which means 'island', with reference to the Kakamega Forest as sampling location and heavily fragmented and threatened 'island' ecosystem.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037024.

Description

Male

BODY LENGTH. 0.98 mm.

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel light brown, flagellum brown; legs light brown except joints, tarsi and metacoxa yellowish; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized.

ANTENNA. Flagellomeres cylindrical and slightly trapezoidal; scape $4.2 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $3.5 \times$ as long as wide, F1 $2.3 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of F1 to F5.

HEAD. Head width $1.09 \times$ head height; head width $1.85 \times$ interorbital space; maximum eye diameter $1.25 \times$ minimum eye diameter; head height $1.76 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:1.00:0.70; OOL $1.40 \times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.23 \times$ mesosoma width; Weber length $313 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.18 \times$ mesoscutellum width; posterior mesoscutal width $1.59 \times$ mesoscutellum width; mesoscutellum length $1.89 \times$ mesoscutellum width; mesoscutellum length $1.19 \times$ posterior mesoscutal width; Weber length $1.35 \times$ mesoscutum width; Weber length $1.56 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, transparent, posterodorsally oriented in lateral view with pointed end; mesometapleural sulcus absent, mesometapleuron with distinct longitudinal striations; posterior propodeal projection distinctly short and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least eight, distinct, longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.93 \times$ width; stigmal vein longer than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $138 \mu\text{m}$; Weber length $2.27 \times$ genital length; gvc width $56 \mu\text{m}$; genital length $2.44 \times$ gvc width; gvc width more than half of gvc length; gvc width $1.20 \times$ distal gvc width.

Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc descending proximomedially (Fig. 24C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 24A); ventral area of gvc convex; dorsal area of gvc slightly convex (Fig. 24B); proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 24B). Harpe slightly bilobed; ventral lobe finger-shaped and dorsolateral lobe very short in lateral view; harpe/gvc index 0.38; dorsolateral lobe/ventral lobe index 0.00; dorsolateral length of harpe/harpe index 0.56; lateral articulation site of harpe with gvc not flush (Fig. 24A, C); ventral margin of harpe convex in basal two thirds and concave in apical third, dorsal margin convex (Fig. 24B), lateral margin slightly convex, widest point of harpe at basal half (Fig. 24A, C); dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe convex in short basal part, concave in almost basal three quarters, straight and diverging distolaterally in apical quarter (Fig. 24C), apex of ventral lobe pointed and apex of dorsolateral lobe indistinct, apex of ventral lobe oriented distolaterally (Fig. 24A, C). Harpe with at least one lateral seta on dorsolateral lobe restricted to apical half, longest lateral seta more than three quarters as long as harpe, lateral seta oriented distolaterally; harpe with at least one apical seta on dorsolateral lobe, longest apical seta on dorsolateral lobe more than three quarters as long as harpe, apical seta on dorsolateral lobe oriented distolaterally and distoventrally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distodorsally, distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae oriented distodorsally and with indistinct orientation. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 24A, C) and dorsal to indistinct apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with two distinct digital teeth, oriented dorsally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus kisiwa sp. nov. and *A. dictynna* (Waterston, 1923), which are rather similar at first sight, can be easily distinguished by the long and thin flagellomeres of *A. kisiwa* and the moniliform flagellomeres of *A. dictynna*. *Aphanogmus kisiwa* and *Aphanogmus fijiensis* (Ferrière, 1933) share the slightly bilobed harpes (Dessart 1971; Polaszek & LaSalle 1995). However, they can be distinguished by the gvc being more narrowed in *A. kisiwa* and the harpes being less strongly curved in ventral direction in *A. kisiwa* (for harpes of *A. fijiensis* see Dessart 1971: 97, fig. 14). In addition, the ventral lobe of the harpe is thinner (in lateral view) and the apical seta on the dorsolateral lobe is longer in *A. kisiwa*. Also, the proportions of the flagellomeres differ between *A. kisiwa* and *A. fijiensis*, for example, F1 (= "3rd antennal joint" in Ferrière 1933) is distinctly shorter than the pedicel in *A. kisiwa*, and as long as the pedicel in *A. fijiensis*. *Aphanogmus kisiwa* matches some of the diagnostic characters of the *Aphanogmus hakonensis* species

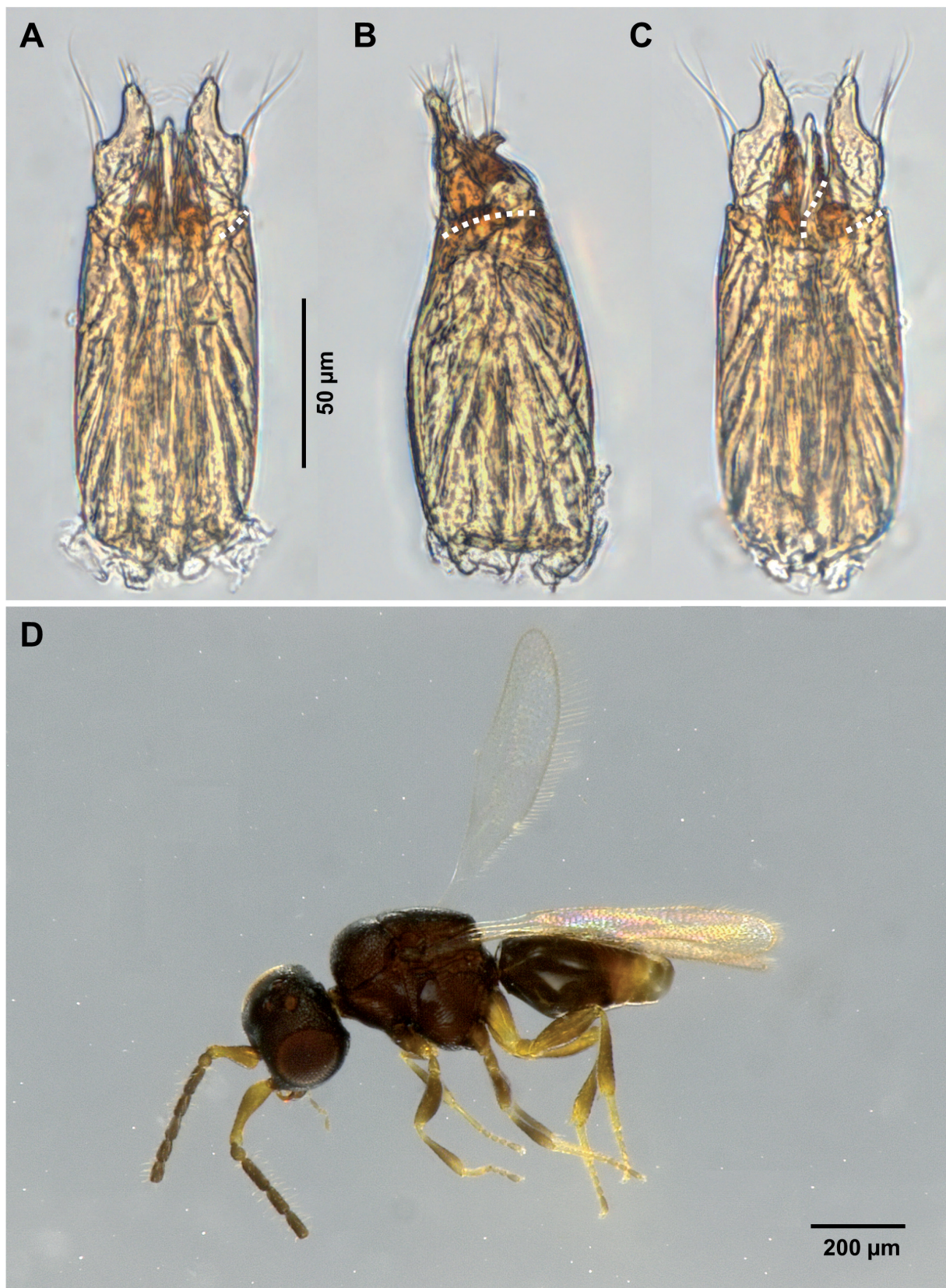


Fig. 24. Holotype of *Aphanogmus kisiwa* sp. nov. (ZFMK-HYM-00037024). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

complex (Polaszek & Dessart 1996): dark body colouration (except for parts of the antennae and the legs), longitudinally striated mesometapleuron without a sulcus, and laterally and posteriorly carinate mesoscutellum. However, because we have only a single specimen and some diagnostic characters, like F6–F9 being black in contrast to F1–F5, cannot be checked because of the incomplete antennae, we refrain from formally assigning *A. kisiwa* to the *Aphanogmus hakonensis* species complex.

For more comparisons with similar species, see remarks under *A. robustus* sp. nov. and *A. rafikii* sp. nov.

Condition of type material

In the holotype, the right F6–F9, the left F4–F9, and the right fore wing are missing. The posterior part of the metasoma is slightly deformed, thus the body length measurement is not precise.

Aphanogmus maua sp. nov.

urn:lsid:zoobank.org:act:4003F40F-71E9-4F98-B699-6F08EEB33BBA

Fig. 25

Diagnosis

Scape, pedicel and flagellum brown; scape as long as F1 and F2 combined; F1 3.0× as long as wide; F1 as long as F9; mesometapleuron with longitudinal striations. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.77; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and slightly diverging distolaterally in basal half, straight and slightly diverging distolaterally in apical half; widest point of harpe at apex; apical setae oriented distodorsally, distolaterally and distomedially; aedeagus + gonossiculus with at least eight digital teeth, six oriented dorsally and two oriented ventrally.

Etymology

The species is named after the Maua Route near the type locality. The Maua Route leads to the summit of Mount Kilimanjaro.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°11'11.1 S, 37°26'25.1 E; 2820 m a.s.l.; 6 Feb. 2012; KiLi project leg.; “low 1”; FPD4, disturbed *Podocarpus* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037069.

Description

Male

BODY LENGTH. 0.76 mm.

COLOUR. Head dark brown, mesosoma dark brown metasoma brown; scape, pedicel and flagellum brown; legs light brown except joints and tarsi lighter and pro- and mesocoxa brown, proximal half of metacoxa brown; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part and distal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape 4.0× as long as pedicel, scape as long as F1 and F2 combined, F1 3.0× as long as wide, F1 2.2× as long as pedicel, F1 1.4× as long as F2, F1 shorter than F7 and F8 combined, F1 as long as F9, F6 1.6× as long as wide, F6 shorter than F7 and F8 combined, F6 1.3× as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of F1 to F5.

HEAD. Head width $1.18 \times$ head height; head width $1.80 \times$ interorbital space; maximum eye diameter $1.26 \times$ minimum eye diameter; head height $1.58 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.93:0.80; OOL $1.88 \times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.22 \times$ mesosoma width; Weber length $300 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.89 \times$ mesoscutellum width; posterior mesoscutal width $1.37 \times$ mesoscutellum width; mesoscutellum length $1.58 \times$ mesoscutellum width; mesoscutellum length $1.15 \times$ posterior mesoscutal width; Weber length $1.33 \times$ mesoscutum width; Weber length $1.60 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex oriented posterodorsally in lateral view with pointed and lighter end; mesometapleural sulcus absent, mesometapleuron with longitudinal striations; posterior propodeal projection short and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six, distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $3.11 \times$ width; stigmal vein longer than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $131 \mu\text{m}$; Weber length $2.29 \times$ genital length; gvc width $50 \mu\text{m}$; genital length $2.63 \times$ gvc width; gvc width more than two thirds of gvc length; gvc width $1.14 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 25C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 25A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 25B), indented distomedially; proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 25B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.77; lateral articulation site of harpe with gvc virtually flush (Fig. 25A, C); ventral margin of harpe concave, dorsal margin convex (Fig. 25B), lateral margin straight, widest point of harpe at apex (Fig. 25A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and slightly diverging distolaterally in basal half, straight and slightly diverging distolaterally in apical half (Fig. 25C), apex of harpe pointed, oriented distolaterally (Fig. 25A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae less than one quarter as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally, distolaterally and distomedially. Aedeagus + gonossiculus less than half as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 25A, C) and ventral to apex of harpe. Aedeagus + gonossiculus with at least eight digital teeth, six oriented dorsally and two oriented ventrally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

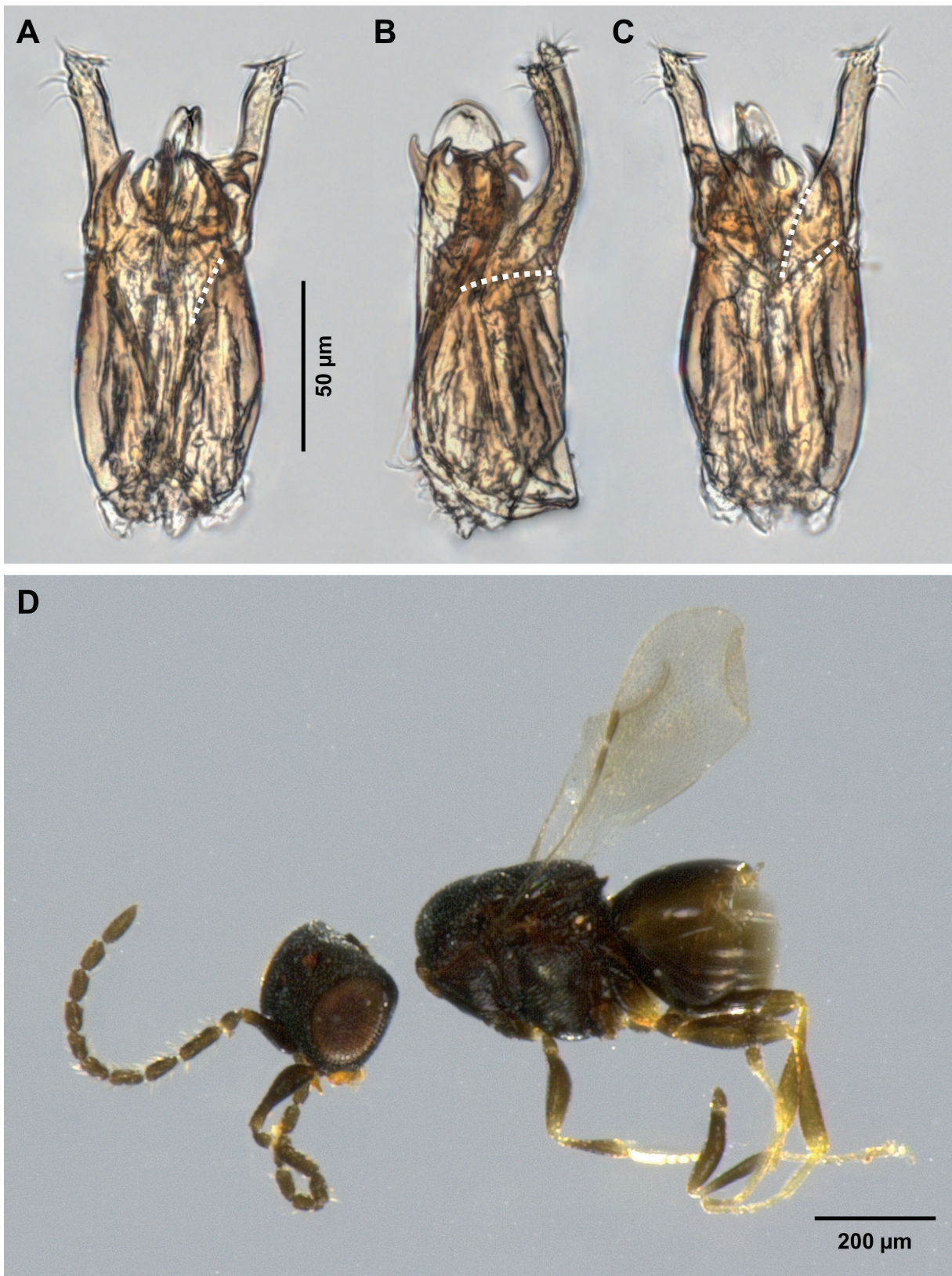


Fig. 25. Holotype of *Aphanogmus maua* sp. nov. (ZFMK-HYM-00037069). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Aphanogmus maua sp. nov. is distinguished from all other treated species by the combination of a short and dark scape, a high harpe/gvc index and the unique genitalia with a rather odd shape of the harpe and aedeagus + gonosticulus.

Aphanogmus maua sp. nov. matches some of the diagnostic characters of the *Aphanogmus hakonensis* species complex (Polaszek & Dessart 1996) (see also *A. rafikii* sp. nov. and *A. taji* sp. nov.): dark body colouration (except for the legs), longitudinally striated mesometapleuron without a sulcus, and laterally and posteriorly carinate mesoscutellum. It does not have a lighter scape, pedicel and F1–F5 (Polaszek & Dessart 1996). We refrain from formally assigning *A. maua* to the *Aphanogmus hakonensis* species complex.

Condition of type material

In the holotype, the left middle leg, the right fore leg (except coxae), the head, the distal part of the left fore wing, and the hind wings are detached, Also, the posterior half of the metasoma is detached, deformed and partially missing, thus the body length measurement is not precise.

Aphanogmus morriconei sp. nov.

urn:lsid:zoobank.org:act:A12C5D3C-BFC5-4CB2-844D-725920BEE2E7

Fig. 26

Diagnosis

Metacoxa light yellow and transparent; posterior mesoscutal width $1.50\text{--}1.73 \times (1.50)$ mesoscutellum width. Male genitalia: harpe bilobed; ventral and dorsolateral lobe finger-shaped in lateral view; harpe/gvc index 0.47; dorsolateral lobe/ventral lobe index 0.65; dorsolateral length of harpe/harpe index 0.82; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in short basal part, concave and diverging distolaterally in almost basal half, straight in apical half; dorsal area of gvc slightly indented distomedially.

Etymology

The species is named in honour of the composer and trumpeter Ennio Morricone who died during the completion of this monograph. He was certainly an inspiration for the first author to learn to play the trumpet and to get into deeper contact with orchestral music.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037020.

Paratypes

KENYA – Western Province • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034445 • 1 ♂; Kakamega Forest; 00°37'24.1 N, 34°51'12 E; 1585 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 10; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034446 • 1 ♂; same collection data as for holotype; 7 Aug. 2007; ZFMK-HYM-00034447 •

1 ♂; Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 4 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034448 • 1 ♂; Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034449 • 1 ♂; Kakamega Forest; 00°12'09 N, 34°52'06 E; 1553 m a.s.l.; 2 May 2007; F. Hita Garcia leg.; Transect 28; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034450.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.80–1.00 mm (1.00 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma brown; scape and pedicel yellowish, flagellum light brown; legs yellowish except pro- and mesocoxa light brown, metacoxa light yellow and transparent; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.7\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $3.0\times$ as long as wide, F1 $2.3\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.9\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.5\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and longer than width of F1 to F4.

HEAD. Head width $1.17\text{--}1.19\times$ (1.17) head height; head width $1.91\text{--}2.13\times$ (2.13) interorbital space; maximum eye diameter $1.20\text{--}1.28\times$ (1.27) minimum eye diameter; head height $1.50\text{--}1.57\times$ (1.50) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.77–0.86:0.64–0.92 (1.00:0.86:0.79); OOL $1.40\text{--}1.65\times$ (1.40) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.13\text{--}1.20\times$ (1.14) mesosoma width; Weber length 281–344 μm (344 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.00\text{--}2.20\times$ (2.00) mesoscutellum width; posterior mesoscutal width $1.50\text{--}1.73\times$ (1.50) mesoscutellum width; mesoscutellum length $1.67\text{--}1.87\times$ (1.70) mesoscutellum width; mesoscutellum length $1.07\text{--}1.13\times$ (1.13) posterior mesoscutal width; Weber length $1.25\text{--}1.39\times$ (1.38) mesoscutum width; Weber length $1.50\text{--}1.64\times$ (1.62) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight and transparent in lateral view with pointed end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.96\text{--}3.05\times$ (3.04) width; stigmal vein longer than $2\times$ pterostigma marginal length.

MALE GENITALIA. Genital length 163–188 μm (163 μm); Weber length $1.53\text{--}2.12\times$ (2.12) genital length; gvc width 63–73 μm (69 μm); genital length $2.36\text{--}2.60\times$ (2.36) gvc width; gvc width more than half of gvc length; gvc width $1.31\times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 26C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 26A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 26B), slightly indented distomedially; proximolateral margin of gvc

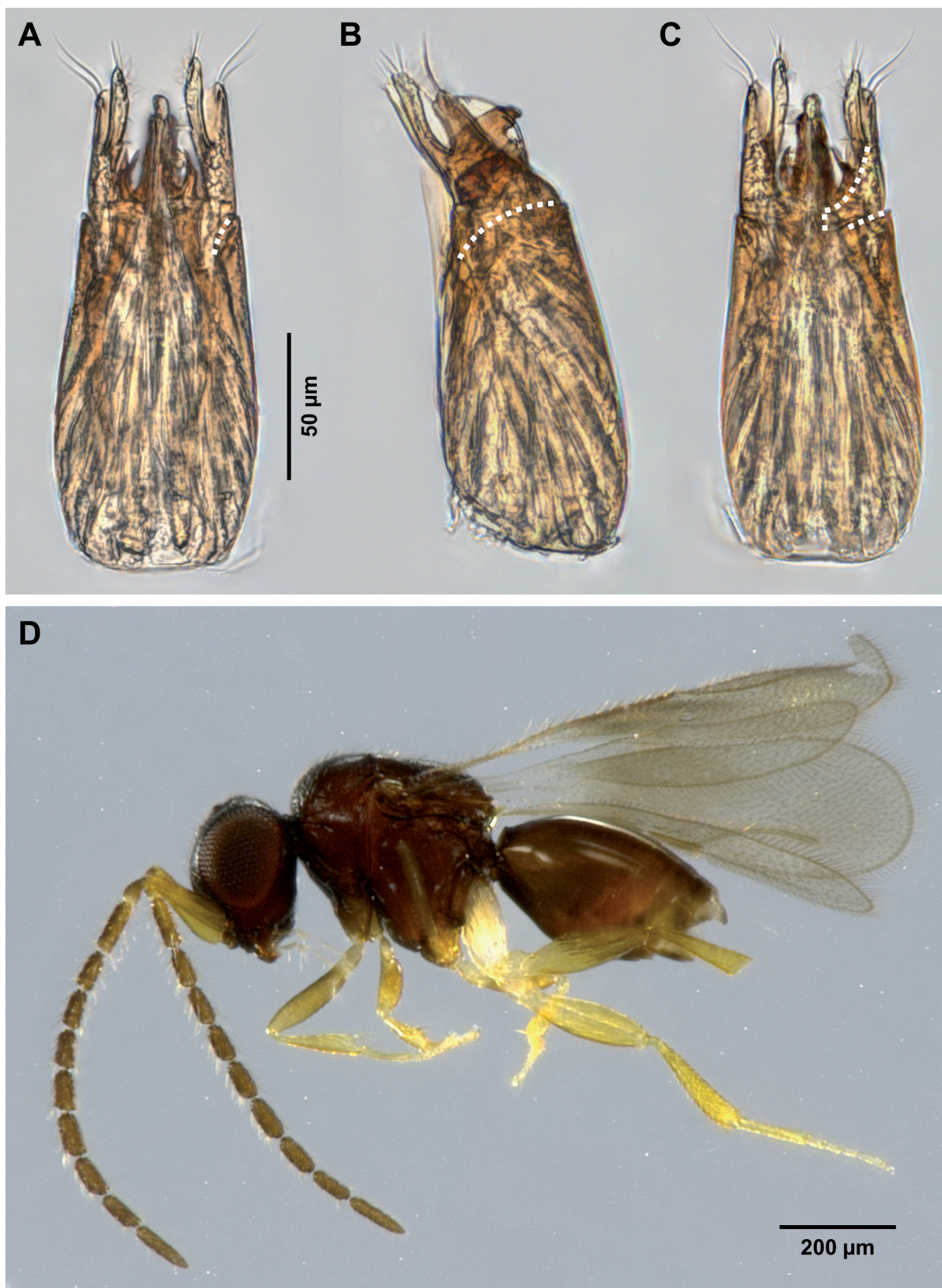


Fig. 26. Holotype of *Aphanogmus morriconei* sp. nov. (ZFMK-HYM-00037020). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 26B). Harpe bilobed; ventral and dorsolateral lobe finger-shaped in lateral view; harpe/gvc index 0.47; dorsolateral lobe/ventral lobe index 0.65; dorsolateral length of harpe/harpe index 0.82; lateral articulation site of harpe with gvc not flush (Fig. 26A, C); ventral margin of harpe straight in basal third and convex in apical two thirds, dorsal margin slightly concave (Fig. 26B), lateral margin straight, widest point of harpe at lateral articulation site with gvc (Fig. 26A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in short basal part, concave and diverging distolaterally in almost basal half, straight in apical half (Fig. 26C), apices of ventral and dorsolateral lobe pointed, apex of ventral lobe oriented slightly distolaterally (Fig. 26A, C). Harpe with at least two apical setae on dorsolateral lobe, longest apical setae on dorsolateral lobe less than half as long as harpe, apical setae on dorsolateral lobe oriented distolaterally and distoventrally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus less than two thirds as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 26A, C) and dorsal to apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented dorsally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and distal half of gvc.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus morriconei sp. nov. can be distinguished from all other treated species by the combination of light yellow and transparent metacoxae, a harpe/gvc index of 0.47, a dorsolateral lobe/ventral lobe index of 0.65 and a dorsolateral length of harpe/harpe index of 0.82.

For more comparisons with similar species, see remarks under *A. guenteri* sp. nov.

Condition of type material

In the holotype, the left mesotarsus, the left mesotibia, the distal half of the left metatibia, and the metatarsus are missing. Paratype ZFMK-HYM-00034447 was used in an unsuccessful DNA barcoding attempt, i.e., had been put in lysis buffer for non-destructive DNA extraction, and looks more transparent.

Aphanogmus ndefu sp. nov.

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Fig. 27

Diagnosis

Metacoxa light yellow and transparent; distal end of marginal vein and pterostigma marginal vein distinctly darker; maximum eye diameter 1.24–1.43 × (1.43) minimum eye diameter. Male genitalia: harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc

index 0.44; dorsolateral lobe/ventral lobe index 0.18; dorsolateral length of harpe/harpe index 0.61; dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and slightly diverging distolaterally in basal quarter, straight and slightly diverging distolaterally between basal and apical quarters, concave and diverging distolaterally in apical quarter; genital length $2.91\text{--}3.08 \times (2.91)$ gvc width.

Etymology

The species name is derived from the Swahili word ‘*ndefu*’ which means ‘long’, with reference to the high genital length to gvc width ratio.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}14'6.1$ N, $34^{\circ}52'9.2$ E; 1605 m a.s.l.; 4 Sep. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037011.

Paratype

KENYA • 1 ♂; Western Province, Kakamega Forest; $00^{\circ}27'10.6$ N, $34^{\circ}51'48.7$ E; 1676 m a.s.l.; 26 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034403.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. $1.06\text{--}1.09$ mm (1.09 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma light brown; scape yellowish and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa light brown, metacoxa light yellow and transparent; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part and at stigmal vein less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.7 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.9 \times$ as long as wide, F1 $2.0 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.7 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3 \times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and longer than width of F1 to F4.

HEAD. Head width $1.11\text{--}1.17 \times (1.11)$ head height; head width $1.96\text{--}2.00 \times (2.00)$ interorbital space; maximum eye diameter $1.24\text{--}1.43 \times (1.43)$ minimum eye diameter; head height $1.50 \times (1.50)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.77\text{--}0.92:0.65\text{--}0.73 (1.00:0.77:0.73)$; OOL $1.30\text{--}1.58 \times (1.58)$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.14\text{--}1.17 \times (1.14)$ mesosoma width; Weber length $319\text{--}350$ μm (350 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved

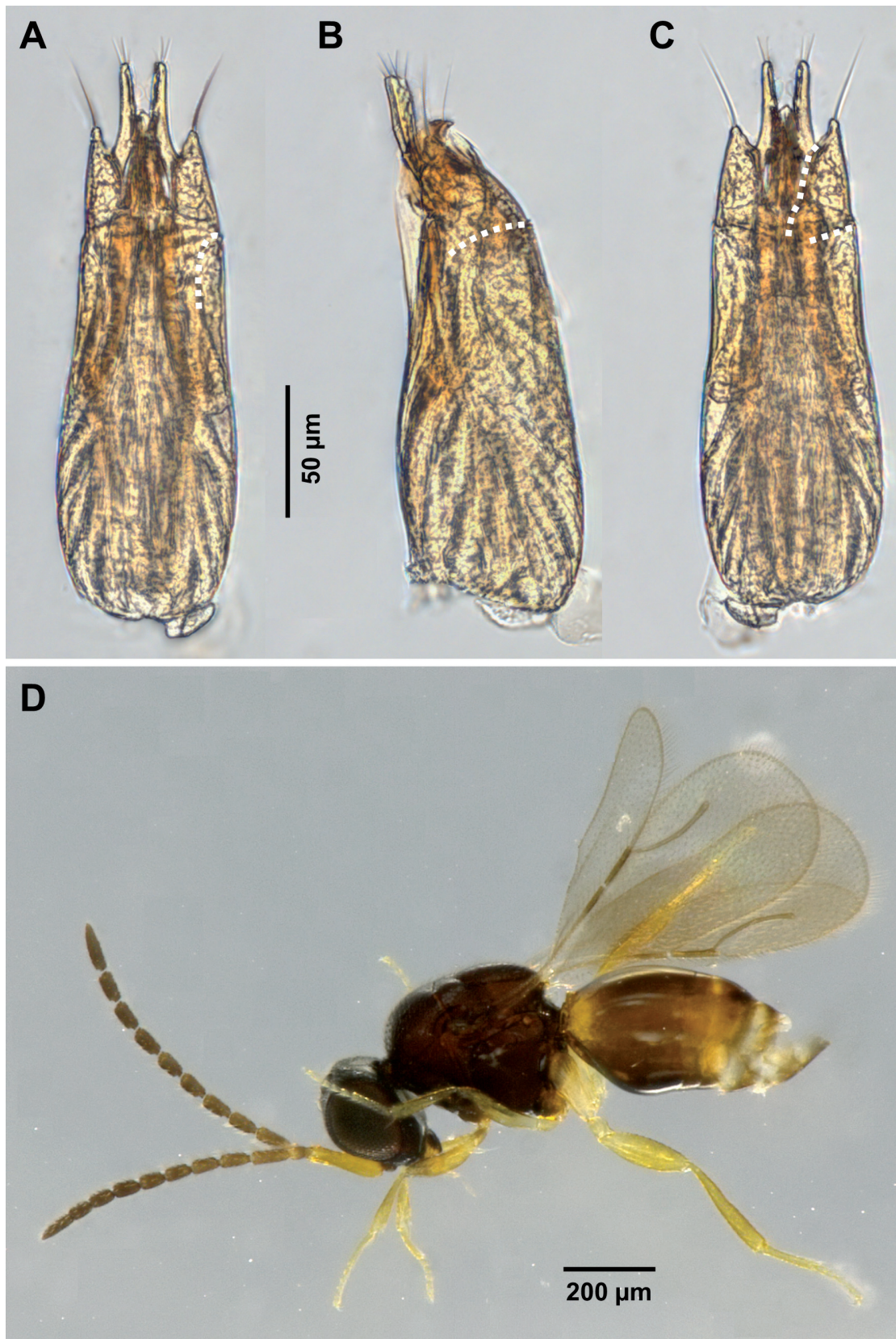


Fig. 27. Holotype of *Aphanogmus ndefu* sp. nov. (ZFMK-HYM-00037011). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

backwards or straight. Mesoscutum width $2.00\text{--}2.21 \times (2.21)$ mesoscutellum width; posterior mesoscutal width $1.58\text{--}1.63 \times (1.63)$ mesoscutellum width; mesoscutellum length $1.79\text{--}1.89 \times (1.89)$ mesoscutellum width; mesoscutellum length $1.13\text{--}1.16 \times (1.16)$ posterior mesoscutal width; Weber length $1.33\text{--}1.34 \times (1.33)$ mesoscutum width; Weber length $1.50\text{--}1.56 \times (1.56)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight and transparent in lateral view with blunt end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.77\text{--}3.20 \times (2.77)$ width; stigmal vein longer than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $200\text{--}231 \mu\text{m}$ ($200 \mu\text{m}$); Weber length $1.38\text{--}1.75 \times (1.75)$ genital length; gvc width $69\text{--}75 \mu\text{m}$ ($69 \mu\text{m}$); genital length $2.91\text{--}3.08 \times (2.91)$ gvc width; gvc width less than half of gvc length; gvc width $1.27 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 27C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 27A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 27B), indented distomedially; proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 27B). Harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.44; dorsolateral lobe/ventral lobe index 0.18; dorsolateral length of harpe/harpe index 0.61; lateral articulation site of harpe with gvc virtually flush (Fig. 27A, C); ventral margin of harpe straight in basal half and slightly convex in apical half, dorsal margin slightly convex (Fig. 27B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 27A, C); dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and slightly diverging distolaterally in basal quarter, straight and slightly diverging distolaterally between basal and apical quarters, concave and diverging distolaterally in apical quarter (Fig. 27C), apices of ventral and dorsolateral lobe slightly rounded, slightly oriented distolaterally (Fig. 27A, C). Harpe with at least one lateral seta between apices of ventral and dorsolateral lobe restricted to apical half (not visible in Fig. 27A–C), longest lateral seta more than one quarter as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least one apical seta on dorsolateral lobe, longest apical seta on dorsolateral lobe more than half as long as harpe, apical seta on dorsolateral lobe oriented distolaterally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 27A, C) and dorsal to apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with two distinct digital teeth, oriented dorsally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

The anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is slightly shorter in ZFMK-HYM-00034403.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus ndefu sp. nov. is similar to *A. ukanda* sp. nov. and *A. ngai* sp. nov. in having very elongated male genitalia, i.e., high genital length to gvc width ratios. However, *A. ndefu* has a distinctly lower dorsolateral lobe/ventral lobe index (0.18) and a distinctly lower dorsolateral length of harpe/harpe index (0.61) than *A. ukanda* (0.80 and 0.95) and *A. ngai* (0.66 and 0.81).

For more comparisons with similar species, see remarks under *A. guenteri* sp. nov. and *A. taji* sp. nov.

Condition of type material

In the holotype, the posterior part of the metasoma is deformed, thus the body length measurement is not precise.

Aphanogmus ngai sp. nov.

urn:lsid:zoobank.org:act:0D6C7D2B-D8CF-4D7C-8206-09330C866D91

Fig. 28

Diagnosis

Metacoxa light yellow and transparent; head height $1.46\text{--}1.54 \times (1.46)$ maximum eye diameter. Male genitalia: harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.34; dorsolateral lobe/ventral lobe index 0.66; dorsolateral length of harpe/harpe index 0.81; dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in basal half, convex and diverging distolaterally in apical half; dorsal margin of harpe convex; genital length $2.64\text{--}2.82 \times (2.64)$ gvc width; genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus; Weber length $1.50\text{--}1.61 \times (1.52)$ genital length.

Etymology

The species is named after the God Ngai, who is considered as creator and “Owner of the dazzling light” by some ethnic groups in Kenya and Tanzania.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}27'10.6$ N, $34^{\circ}51'48.7$ E; 1676 m a.s.l.; 19 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037010.

Paratypes

KENYA – **Western Province** • 1 ♂; same collection data as for holotype; ZFMK-HYM-00034398 • 1 ♂; Kakamega Forest; $00^{\circ}21'7.9$ N, $34^{\circ}52'2.6$ E; 1597 m a.s.l.; 9 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034399 • 1 ♂; Kakamega Forest; $00^{\circ}14'20.5$ N, $34^{\circ}51'52.8$ E; 1634 m a.s.l.; 4 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034400 • 1 ♂; Kakamega Forest; $00^{\circ}14'52.3$ N, $34^{\circ}52'5.3$ E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034401 • 1 ♂; Kakamega Forest; $00^{\circ}20'52.5$ N, $34^{\circ}51'53$ E; 1611 m a.s.l.; 4 Sep. 2007; F. Hita Garcia leg.; Transect 25; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034402.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.75–0.91 mm (0.75 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown except anterior third yellowish; scape yellowish and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa light brown, metacoxa light yellow and transparent; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part and at stigmal vein less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.0\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.1\times$ as long as wide, F1 $2.0\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.7\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.4\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and longer than width of F1 to F4.

HEAD. Head width $1.15\text{--}1.23\times$ (1.23) head height; head width $2.00\text{--}2.05\times$ (2.05) interorbital space; maximum eye diameter $1.14\text{--}1.22\times$ (1.14) minimum eye diameter; head height $1.46\text{--}1.54\times$ (1.46) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.68–0.83:0.71–1.00 (1.00:0.68:0.71); OOL $1.26\text{--}1.65\times$ (1.65) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.15\text{--}1.23\times$ (1.19) mesosoma width; Weber length 275–338 μm (275 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.90\text{--}2.00\times$ (2.00) mesoscutellum width; posterior mesoscutal width $1.45\text{--}1.59\times$ (1.59) mesoscutellum width; mesoscutellum length $1.65\text{--}1.76\times$ (1.76) mesoscutellum width; mesoscutellum length $1.11\text{--}1.14\times$ (1.11) posterior mesoscutal width; Weber length $1.29\text{--}1.42\times$ (1.29) mesoscutum width; Weber length $1.47\text{--}1.64\times$ (1.47) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesoplectal complex straight and transparent in lateral view with pointed end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.94\text{--}2.98\times$ (2.98) width; stigmal vein longer than $2\times$ pterostigma marginal length.

MALE GENITALIA. Genital length 181–225 μm (181 μm); Weber length $1.50\text{--}1.61\times$ (1.52) genital length; gvc width 69–81 μm (69 μm); genital length $2.64\text{--}2.82\times$ (2.64) gvc width; gvc width less than half of gvc length; gvc width $1.46\times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 28C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 28A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 28B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 28B). Harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.34; dorsolateral lobe/ventral lobe index 0.66; dorsolateral length of harpe/harpe index 0.81; lateral articulation site of harpe with gvc virtually flush (Fig. 28A, C); ventral margin of harpe convex, dorsal margin convex (Fig. 28B), lateral margin convex, widest point of

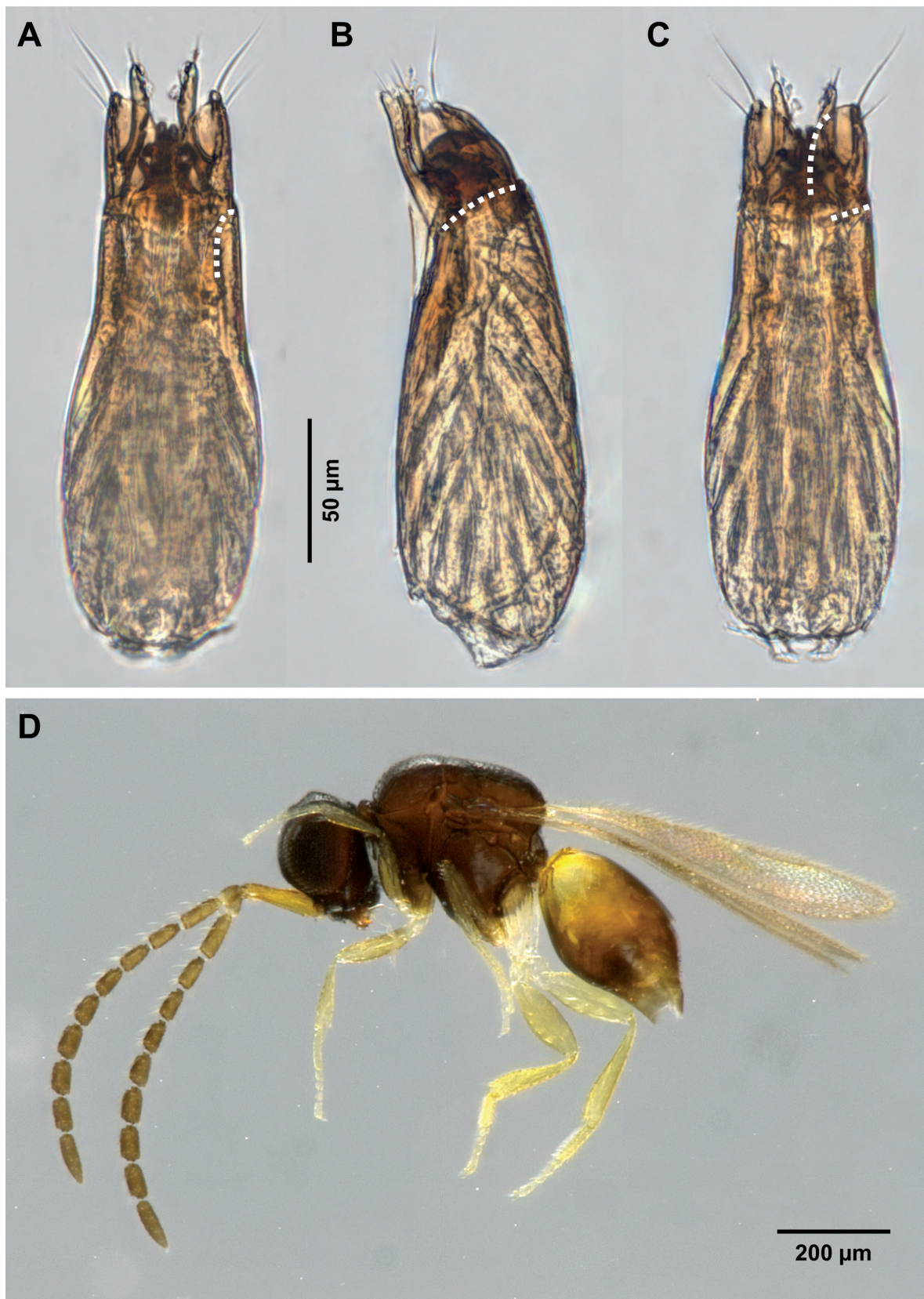


Fig. 28. Holotype of *Aphanogmus ngai* sp. nov. (ZFMK-HYM-00037010). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

harpe at lateral articulation site with gvc (Fig. 28A, C); dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in basal half, convex and diverging distolaterally in apical half (Fig. 28C), apices of ventral and dorsolateral lobe pointed, apex of ventral lobe slightly oriented distolaterally (Fig. 28A, C). Harpe with at least one lateral seta between apices of ventral and dorsolateral lobe restricted to apical third, longest lateral seta one third as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least one apical seta on dorsolateral lobe, longest apical seta on dorsolateral lobe more than half as long as harpe, apical seta on dorsolateral lobe oriented distolaterally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus less than two thirds as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 28A, C) and dorsal to apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented dorsally. Genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus and weakest sclerotization at proximal half of gvc.

Female

Unknown.

Variation

The anterior third of the metasoma is not lighter than the rest of the metasoma in ZFMK-HYM-00034400 and ZFMK-HYM-00034402, and the anteromedian projection of the metanoto-propodeo-metaplecto-mesopectal complex is shorter in ZFMK-HYM-00034402.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus ngai sp. nov. has a distinctly strongly sclerotized aedeagus + gonossiculus, similar to *A. dimidiatus* sp. nov. However, the two species can be easily distinguished, for example, by a very low harpe/gvc index in *A. ngai* (0.34) and a high harpe/gvc index in *A. dimidiatus* (0.63).

For more comparisons with similar species, see remarks under *A. ndefu* sp. nov. and *A. guenteri* sp. nov.

Condition of type material

Holotype is immaculate.

Aphanogmus nikii sp. nov.

urn:lsid:zoobank.org:act:9471D89C-2316-40FB-A3FA-2254F064E06F

Fig. 29

Diagnosis

Scape slightly longer than F1 and F2 combined; F1 as long as F9; F6 as high as F9; mesoscutellum length $2.06\text{--}2.13 \times (2.06)$ mesoscutellum width; mesoscutellum length $1.33\text{--}1.38 \times (1.38)$ posterior mesoscutal width; Weber length $1.44\text{--}1.71 \times (1.71)$ mesoscutum width; Weber length $1.53\text{--}1.76 \times (1.76)$ mesoscutellum length. Male genitalia: harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe

triangular in lateral view; harpe/gvc index 0.37; dorsolateral lobe/ventral lobe index 0.64; dorsolateral length of harpe/harpe index 0.85; dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and diverging distolaterally from base to apex; genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus and harpe.

Etymology

The species is named after the son of the second author.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°11'11.1 S, 37°26'25.1 E; 2820 m a.s.l.; 6 Feb. 2012; KiLi project leg.; “tree 2”; FPD4, disturbed *Podocarpus* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037070.

Paratype

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°11'23.5 S, 37°26'20.5 E; 2880 m a.s.l.; 17 Oct. 2012; KiLi project leg.; “low 3”; FPD3, disturbed *Podocarpus* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037071.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 0.83–1.00 mm (1.00 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape, pedicel and flagellum light brown; legs light brown except pro- and mesocoxa brown, proximal half of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.0 \times$ as long as pedicel, scape slightly longer than F1 and F2 combined, F1 $2.8 \times$ as long as wide, F1 $2.2 \times$ as long as pedicel, F1 $1.6 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 as long as F9, F6 $1.5 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of F1 to F8.

HEAD. Head width $1.13\text{--}1.21 \times$ (1.13) head height; head width $1.77\text{--}1.80 \times$ (1.80) interorbital space; maximum eye diameter $1.21\text{--}1.22 \times$ (1.21) minimum eye diameter; head height $1.73\text{--}1.74 \times$ (1.74) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:1.20–1.70:0.80–1.10 (1.00:1.70:1.10); OOL $1.11\text{--}1.88 \times$ (1.11) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.28\text{--}1.29 \times$ (1.29) mesosoma width; Weber length 306–363 μm (363 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $2.13\text{--}2.27 \times$ (2.13) mesoscutellum width; posterior mesoscutal width $1.50\text{--}1.60 \times$ (1.50) mesoscutellum width; mesoscutellum length $2.06\text{--}2.13 \times$ (2.06) mesoscutellum width; mesoscutellum length $1.33\text{--}1.38 \times$ (1.38) posterior mesoscutal width; Weber

length $1.44\text{--}1.71 \times (1.71)$ mesoscutum width; Weber length $1.53\text{--}1.76 \times (1.76)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, oriented posterodorsally in lateral view with pointed end; mesometapleural sulcus absent; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.76 \times (2.76)$ width; stigmal vein $2 \times$ as long as pterostigma marginal length.

MALE GENITALIA. Genital length $156\text{--}175 \mu\text{m}$ ($175 \mu\text{m}$); Weber length $1.96\text{--}2.07 \times (2.07)$ genital length; gvc width $69 \mu\text{m}$ ($69 \mu\text{m}$); genital length $2.27\text{--}2.55 \times (2.55)$ gvc width; gvc width more than half of gvc length; gvc width $1.25 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 29C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 29A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 29B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 29B). Harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.37; dorsolateral lobe/ventral lobe index 0.64; dorsolateral length of harpe/harpe index 0.85; lateral articulation site of harpe with gvc not flush (Fig. 29A, C); ventral margin of harpe convex, dorsal margin convex (Fig. 29B), lateral margin slightly convex, widest point of harpe at apical third (Fig. 29A, C); dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and diverging distolaterally from base to apex (Fig. 29C), apex of ventral lobe pointed and apex of dorsolateral lobe rounded, oriented distolaterally (Fig. 29A, C). Harpe with at least two apical setae on dorsolateral lobe, longest apical setae on dorsolateral lobe one third as long as harpe, apical setae on dorsolateral lobe oriented distolaterally, distomedially and distoventrally; harpe with at least three apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distodorsally and distolaterally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 29A, C) and dorsal to apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with at least two digital teeth, oriented dorsally. Genitalia strongly sclerotized with strongest sclerotization at aedeagus + gonossiculus and harpe.

Female

Unknown.

Variation

The body and male genitalia of ZFMK-HYM-00037071 are less strongly sclerotized compared to the holotype.

Biology

Host unknown, specimens collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Aphanogmus nikii sp. nov. is easily distinguished from all other treated species by its distinctly erect and long sensillae of the flagellomeres. The only resemblance of *A. nikii* with any other species of

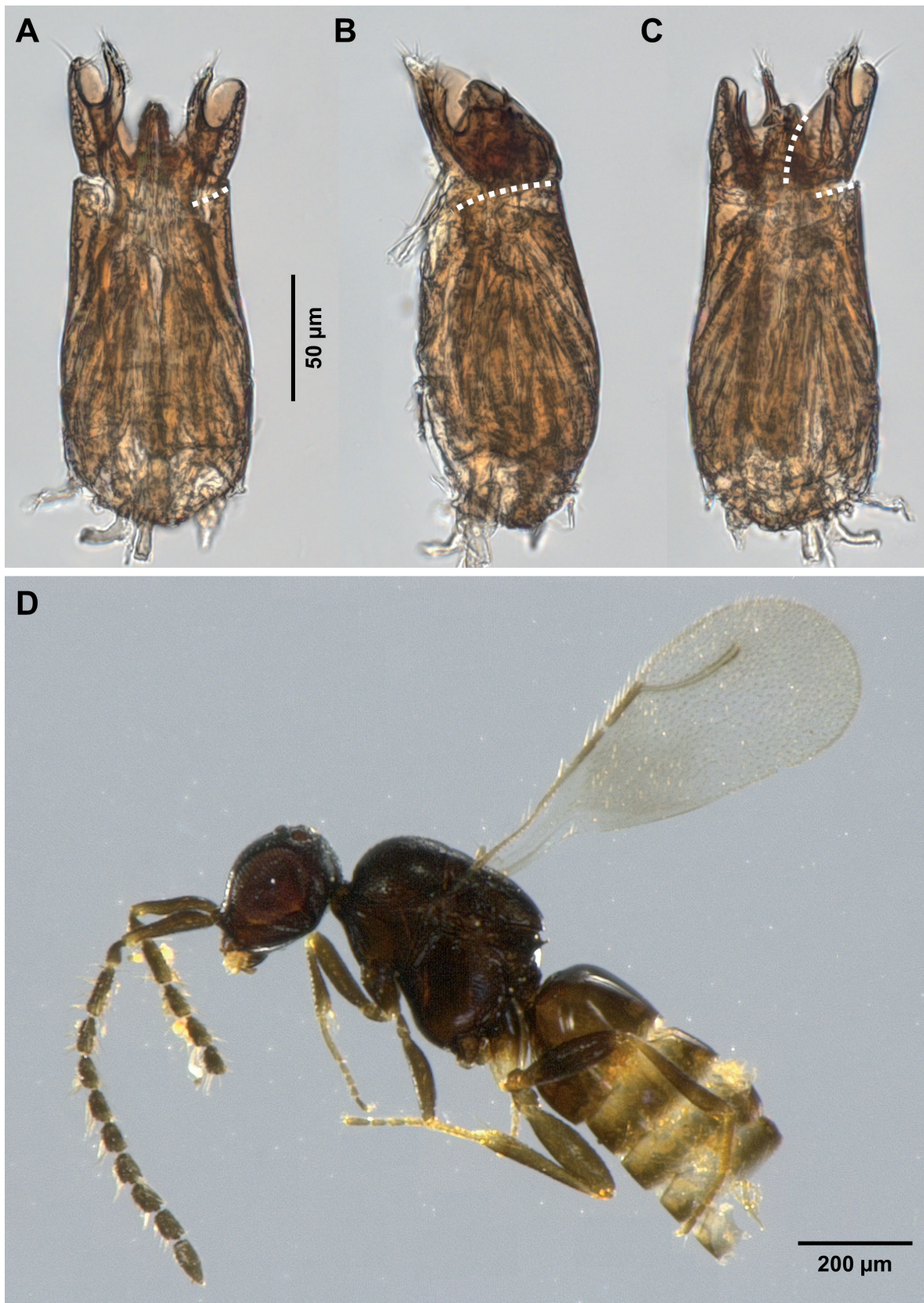


Fig. 29. Holotype of *Aphanogmus nikii* sp. nov. (ZFMK-HYM-00037070). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Aphanogmus is concerning the male genitalia of the Australian *Aphanogmus nigripes* Dodd, 1914. However, next to the very different geographic distribution, the two species can be distinguished by the shapes of the (in both species distinctly bilobed) harpes in lateral view (dorsolateral lobe much broader and triangular in *A. nikii*, both lobes finger-shaped in *A. nigripes*). In addition, the proportions of the flagellomeres, especially F1 and F9, differ between the species (Dessart 1964).

Condition of type material

In the holotype, the right F5 to F9, the left fore leg (except coxa, trochanter, and femur), the left middle leg (except coxa), and the wings (except left fore wing) are missing. The eyes are deformed. The posterior half of the metasoma is deformed, thus the body length measurement is not precise.

Aphanogmus pilosicoxa sp. nov.

urn:lsid:zoobank.org:act:DA837E32-7B91-457C-BE4A-9EC360E53FB9

Fig. 30

Diagnosis

Head light brown-amber, mesosoma light brown-amber; head width $1.19\text{--}1.41 \times (1.32)$ head height; OOL:LOL $1.69\text{--}2.00 (1.69)$; preoccipital carina absent; posterior mesosomal comb distinct and densely setose. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.57; dorsomedial margins of harpes converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight in short basal part, concave in almost basal two thirds, convex in apical third with indentation below apex; median setae of harpe distinctly crossing and oriented distomedially and medioventrally; aedeagus + gonossiculus with at least one ventrobasal seta; Weber length $1.37\text{--}1.91 \times (1.37)$ genital length.

Etymology

The species name is a composition of ‘coxa’ and the Latin word ‘*pilosus*’ which means ‘hairy’, with reference to the distinct and densely setose posterior mesosomal comb. Especially the posterior metacoxa is densely setose.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}14'52.3$ N, $34^{\circ}52'5.3$ E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037012.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; $00^{\circ}21'4.9$ N, $34^{\circ}51'41.1$ E; 1602 m a.s.l.; no date on label, 2007 or 2008; F. Hita Garcia leg.; Transect 1; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389010 • 1 ♂; Kakamega Forest; $00^{\circ}19'36$ N, $34^{\circ}52'14.6$ E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389011 • 1 ♂; same collection data as for preceding; SMNS; SMNS-HYM-T00781 • 1 ♂; same collection data as for holotype; 14 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00034411) • 3 ♂♂; Kakamega Forest; $00^{\circ}14'52.3$ N, $34^{\circ}52'5.3$ E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034412 to ZFMK-HYM-00034414 • 1 ♂; Kakamega Forest; $00^{\circ}12'42.6$ N, $34^{\circ}55'52.3$ E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00782 • 1 ♂; Kakamega Forest; $00^{\circ}14'6.1$ N, $34^{\circ}52'9.2$ E; 1605 m a.s.l.; 28 Aug. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037013 • 1 ♂; same collection data

as for preceding; 4 Sep. 2007; NMK; NMK (ZFMK-HYM-00034408) • 2 ♂♂; Kakamega Forest; 00°20'52.5 N, 34°51'53 E; 1611 m a.s.l.; 6 Sep. 2007; F. Hita Garcia leg.; Transect 25; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034409, ZFMK-HYM-00034410 • 4 ♂♂; Kakamega Forest; 00°12'09 N, 34°52'06 E; 1553 m a.s.l.; 2 May 2007; F. Hita Garcia leg.; Transect 28; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034415 to ZFMK-HYM-00034418.

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.53–0.82 mm (0.67 mm).

COLOUR. Head light brown-amber, mesosoma light brown-amber, metasoma light brown; scape yellowish and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs light brown; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part and at proximal half of stigmal vein less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.0 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.4 \times$ as long as wide, F1 $1.7 \times$ as long as pedicel, F1 $1.5 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3 \times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.19\text{--}1.41 \times (1.32)$ head height; head width $1.80\text{--}2.00 \times (1.88)$ interorbital space; maximum eye diameter $1.17\text{--}1.39 \times (1.17)$ minimum eye diameter; head height $1.54\text{--}1.68 \times (1.62)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina absent. OOL:POL:LOL $1.00:0.75\text{--}1.04:0.50\text{--}0.59 (1.00:1.04:0.59)$; OOL $1.69\text{--}2.35 \times (1.69)$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.11\text{--}1.22 \times (1.22)$ mesosoma width; Weber length $231\text{--}281 \mu\text{m} (231 \mu\text{m})$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $2.00 \times (2.00)$ mesoscutellum width; posterior mesoscutal width $1.47\text{--}1.58 \times (1.47)$ mesoscutellum width; mesoscutellum length $1.45\text{--}1.65 \times (1.59)$ mesoscutellum width; mesoscutellum length $0.94\text{--}1.12 \times (1.08)$ posterior mesoscutal width; Weber length $1.09\text{--}1.24 \times (1.09)$ mesoscutum width; Weber length $1.37\text{--}1.55 \times (1.37)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb distinct and densely setose. Basal transverse carina of petiole (on syntergum) present; at least five, distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.86\text{--}3.05 \times (2.86)$ width; stigmal vein shorter than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $138\text{--}188 \mu\text{m} (169 \mu\text{m})$; Weber length $1.37\text{--}1.91 \times (1.37)$ genital length; gvc width $63\text{--}75 \mu\text{m} (69 \mu\text{m})$; genital length $2.20\text{--}2.50 \times (2.45)$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.19 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of



Fig. 30. Holotype of *Aphanogmus pilosicoxa* sp. nov. (ZFMK-HYM-00037012). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

gvc descending proximomedially (Fig. 30C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 30A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 30B); proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc slightly convex, more strongly descending dorsally (Fig. 30B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.57; lateral articulation site of harpe with gvc virtually flush (Fig. 30A, C); ventral margin of harpe concave, dorsal margin slightly convex in basal half and straight in apical half (Fig. 30B), lateral margin slightly convex in basal half and straight in apical half, widest point of harpe at lateral articulation site with gvc (Fig. 30A, C); dorsomedial margins of harpes converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight in short basal part, concave in almost basal two thirds, convex in apical third with indentation below apex (Fig. 30C), apex of harpe rounded, oriented distomedially (Fig. 30A, C). Harpe with at least one ventral seta restricted to apical quarter, longest ventral seta more than one third as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least four apical setae, longest apical setae more than one third as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least three median setae restricted to apical quarter, longest median setae less than one quarter as long as harpe, median setae distinctly crossing and oriented distomedially and medioventrally. Aedeagus + gonossiculus one third as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 30A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least four digital teeth, oriented dorsally and with at least one ventrobasal seta. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

ZFMK-HYM-00037013 has a lighter body colouration.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus pilosicoxa sp. nov. is very similar to *A. fraterculus* sp. nov. in body colouration and habitus. However, there are major differences in the male genitalia: the harpe/gvc index 0.57 is lower in *A. pilosicoxa* than in *A. fraterculus* (0.68) and the Weber length to genital length ratio is lower in *A. pilosicoxa* (1.37–1.91) than in *A. fraterculus* (2.19–2.83). The proportion of the gvc width to length is less than two thirds in *A. pilosicoxa* and more than three quarters in *A. fraterculus*. Even more striking differences concern the harpes: the medial margin of the harpe is indented below the apex in *A. pilosicoxa* but not in *A. fraterculus*. Furthermore, the setal arrangement of the genitalia of *A. fraterculus* is conspicuous with crossing median setae which are arranged in the basal two thirds (missing in *A. pilosicoxa*). The aedeagus + gonossiculus with at least four digital teeth is well developed in *A. pilosicoxa* but distinctly smaller in *A. fraterculus*. The aedeagus + gonossiculus of *A. pilosicoxa* is very similar to *A. simbai* sp. nov. in having at least four digital teeth, and being equipped with at least one ventrobasal seta. However, the aedeagus + gonossiculus is almost three quarters as long as the harpe in *A. simbai* and only one third as long as the harpe in *A. pilosicoxa*. Also, the harpes of both species are differently shaped and the body colouration is distinctly darker and less amber coloured in *A. simbai* than in *A. pilosicoxa*.

A very distinct character that is shared between *A. pilosicoxa* sp. nov., *A. fraterculus* sp. nov., and *A. simbai* sp. nov. is the distinct and densely setose posterior mesosomal comb. Dessart (1963a) described the same distinct character (“la palissade de soies coxopleurales”) for *A. fumipennis* Thomson, 1858. Dessart (1963a) complemented the description of *A. fumipennis* with a drawing of the male genitalia, which are similar to those of *A. pilosicoxa* sp. nov., *A. fraterculus*, and *A. simbai*. Dessart (1963a) noted that the angle of the harpes (“paramères”) to the gvc (“complexe édéage-volselles”) is very characteristic for *A. fumipennis*, i.e., the harpes are distinctly curved in ventral direction, more than in *A. pilosicoxa*, *A. fraterculus*, and *A. simbai*.

In addition to the differential diagnostic comparisons above, *A. pilosicoxa* sp. nov. can be distinguished from all other treated species by the combination of a light brown-amber head and mesosoma, and the dorsomedial margin of the harpe with an indentation below the apex.

Condition of type material

In the holotype, the posterior part of the metasoma is slightly deformed, thus the body length measurement is not precise.

Aphanogmus rafikii sp. nov.

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Fig. 31

Diagnosis

F1 slightly shorter than F9; sensillae on flagellomeres erect and sickle-shaped and shorter than width of flagellomeres; maximum eye diameter $1.08\text{--}1.09 \times (1.08)$ minimum eye diameter; mesoscutum width $2.26\text{--}2.28 \times (2.28)$ mesoscutellum width; posterior mesoscutal width $1.63\text{--}1.78 \times (1.78)$ mesoscutellum width; mesometapleural sulcus present (but indistinct) in dorsal third of mesometapleuron, mesometapleuron with distinct longitudinal striations. Male genitalia: harpe slightly bilobed; ventral lobe finger-shaped and dorsolateral lobe short in lateral view; harpe/gvc index 0.51; dorsolateral lobe/ventral lobe index 0.08; dorsolateral length of harpe/harpe index 0.55; dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe concave in basal two thirds, straight and diverging distolaterally in apical third; Weber length $2.55\text{--}3.05 \times (2.55)$ genital length.

Etymology

The species is named after the Rafiki Foundation, which is close to the type locality, and the wise and eccentric character Rafiki from The Lion King movie. ‘Rafiki’ is Swahili and means ‘friend’.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; $3^{\circ}18'36.9$ S, $37^{\circ}14'39.6$ E; 1009 m a.s.l.; 27 Jun. 2011; KiLi project leg.; “low 1”; MAIS1, maize field; Coloured pan trap; ZFMK; ZFMK-HYM-00037067.

Paratype

TANZANIA • 1 ♂; same collection data as for holotype; ZFMK-HYM-00037068.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 0.91–1.15 mm (0.91 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma brown; scape, pedicel and flagellum brown; legs brown except joints and tarsi lighter; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.5 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.7 \times$ as long as wide, F1 $2.0 \times$ as long as pedicel, F1 $1.6 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 slightly shorter than F9, F6 $1.3 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.19\text{--}1.21 \times$ (1.19) head height; head width $1.86\text{--}1.88 \times$ (1.88) interorbital space; maximum eye diameter $1.08\text{--}1.09 \times$ (1.08) minimum eye diameter; head height $1.69\text{--}1.79 \times$ (1.69) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:1.43–1.54:1.00–1.23 (1.00:1.43:1.00); OOL $1.30\text{--}1.75 \times$ (1.74) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.18\text{--}1.25 \times$ (1.25) mesosoma width; Weber length $350\text{--}363 \mu\text{m}$ ($350 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.26\text{--}2.28 \times$ (2.28) mesoscutellum width; posterior mesoscutal width $1.63\text{--}1.78 \times$ (1.78) mesoscutellum width; mesoscutellum length $1.84\text{--}2.00 \times$ (2.00) mesoscutellum width; mesoscutellum length $1.13 \times$ (1.13) posterior mesoscutal width; Weber length $1.35\text{--}1.37 \times$ (1.37) mesoscutum width; Weber length $1.56\text{--}1.66 \times$ (1.56) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, transparent, posterodorsally oriented in lateral view with pointed end; mesometapleural sulcus present (but indistinct) in dorsal third of mesometapleuron, mesometapleuron with distinct longitudinal striations; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.72\text{--}2.84 \times$ (2.84) width; stigmal vein longer than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $119\text{--}138 \mu\text{m}$ ($138 \mu\text{m}$); Weber length $2.55\text{--}3.05 \times$ (2.55) genital length; gvc width $38\text{--}50 \mu\text{m}$ ($50 \mu\text{m}$); genital length $2.75\text{--}3.17 \times$ (2.75) gvc width; gvc width more than half of genital length; gvc width $1.19 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 31C); proximoventral margin of gvc concave; distoventral margin of gvc slightly descending proximomedially (Fig. 31A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 31B); proximolateral margin of gvc concave and slightly ascending ventrally; distolateral margin of gvc slightly descending dorsally (Fig. 31B). Harpes slightly bilobed; ventral lobe finger-shaped and dorsolateral lobe short in lateral view; harpe/gvc index 0.51; dorsolateral lobe/ventral lobe index 0.08; dorsolateral length of harpe/harpe index 0.55; lateral articulation site of harpe with gvc not flush (Fig. 31A, C); ventral margin of harpe straight, dorsal margin convex in basal half and straight in apical half (Fig. 31B), lateral margin slightly convex, widest point of harpe at basal third (Fig. 31A, C); dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe concave in basal two thirds, straight and diverging distolaterally in apical third (Fig. 31C), apices of ventral and dorsolateral lobe pointed, oriented

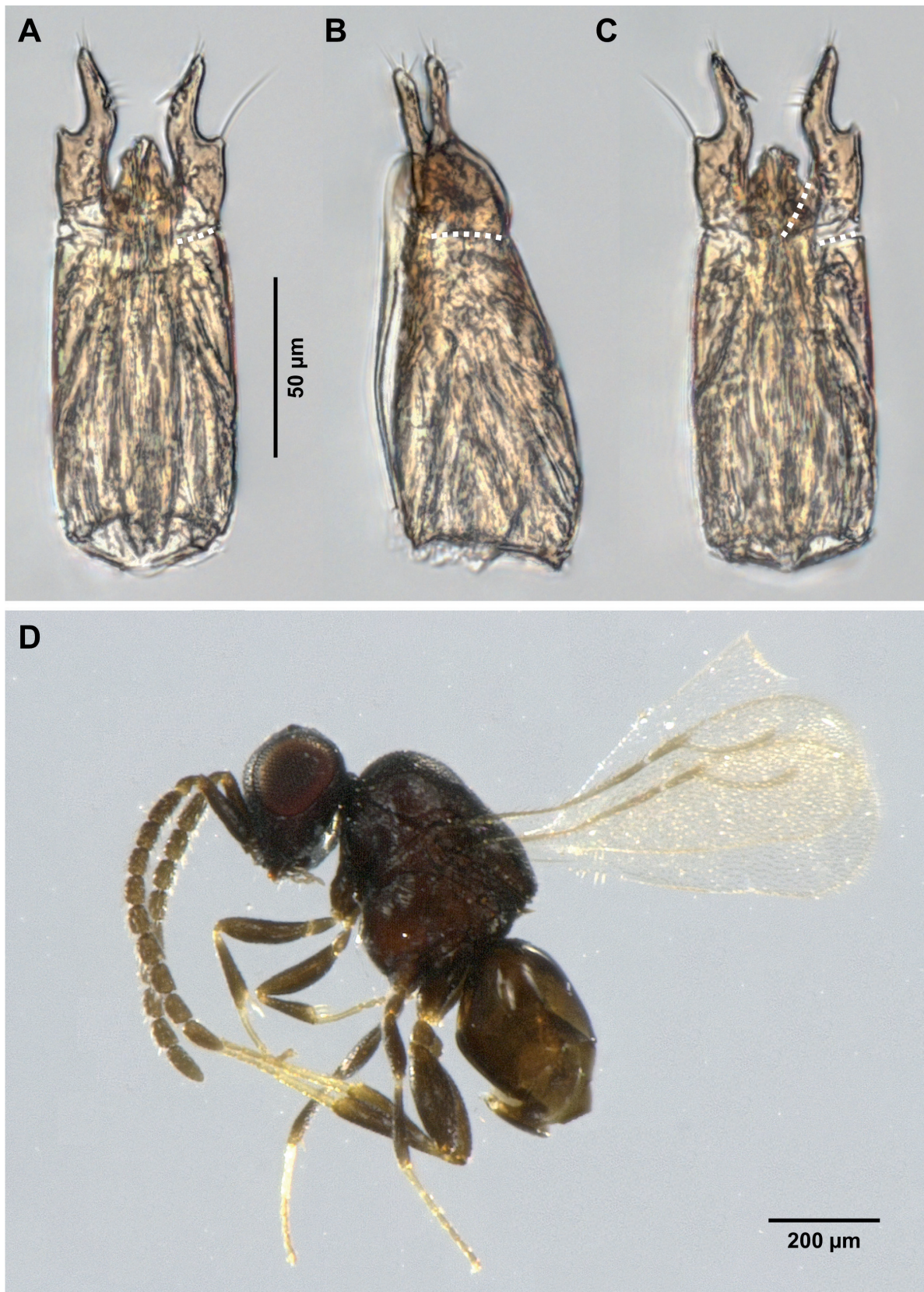


Fig. 31. Holotype of *Aphanogmus rafikii* sp. nov. (ZFMK-HYM-00037067). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

distolaterally (Fig. 31A, C). Harpe with at least one apical seta on dorsolateral lobe, longest apical seta on dorsolateral lobe half as long as harpe, apical seta on dorsolateral lobe oriented distolaterally; harpe with at least three apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distodorsally, distolaterally and distoventrally; indistinct number of median setae on ventral, longest median setae less than one quarter as long as harpe, median setae oriented medioventrally and with indistinct orientation. Aedeagus + gonossiculus half as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 31A, C) and as ventral as apex of ventral lobe of harpe. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Aphanogmus rafikii sp. nov. and *A. kisiwa* sp. nov. differ in colouration, but their male genitalia are very similar (i.e., similar proportions of the gvc, and similar shape of the dorsomedial margin of the dorsolateral lobe). However, *A. rafikii* has a higher harpe/gvc index (0.51 and 0.38 in *A. kisiwa*), a thinner and more elongated ventral lobe in ventral and dorsal view, and a slightly longer dorsolateral lobe. Also, the Afrotropical species *Aphanogmus incredibilis* Dessart, 1978 shares some distinct characters with *A. rafikii*, for example, the POL is relatively long, the preoccipital carina is distinct, the fringe of the wing is distinctly short, the wings are hyaline, the integument is relatively strongly structured/reticulated, and the antennal segments are very similarly proportioned. However, the colouration patterns of the antennae and the legs are very different between *A. rafikii* and *A. incredibilis*, and the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is considerably smaller in *A. rafikii* (Dessart 1978).

Aphanogmus rafikii sp. nov. matches some of the diagnostic characters of the *Aphanogmus hakonensis* species complex (Polaszek & Dessart 1996): dark body colouration (except for the legs), longitudinally striated mesometapleuron without a sulcus, and laterally and posteriorly carinate mesoscutellum. It does not have a lighter scape, pedicel and F1–F5 (Polaszek & Dessart 1996). With these differences in diagnostic colour characters and the low number of two specimens, we refrain from formally assigning *A. rafikii* to the *Aphanogmus hakonensis* species complex.

For more comparisons with similar species, see remarks under *A. taji* sp. nov. and *A. maua* sp. nov.

Condition of type material

In the holotype, the right four distal protarsal segments are missing. The posterior part of the metasoma is deformed, thus the body length measurement is not precise.

Aphanogmus robustus sp. nov.

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Fig. 32

Diagnosis

F1 $1.4\times$ as long as wide; preoccipital furrow distinct; mesometapleuron with distinct longitudinal striations. Male genitalia: harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.41; dorsolateral lobe/ventral lobe index 0.28; dorsolateral length of harpe/harpe index 0.56; dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex.

Etymology

The species name is derived from the Latin word ‘*robustus*’ which means ‘robust’, with reference to the distinctly sculptured head and mesosoma.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°21'36.6 N, 34°52'22.9 E; 1575 m a.s.l.; 5 Jul. 2007; F. Hita Garcia leg.; Transect 9; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037027.

Description

Male

BODY LENGTH. 0.73 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape light brown-yellowish and pedicel light brown, flagellum light brown; legs light brown except joints and tarsi lighter and coxae yellowish; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part and distal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.4\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $1.4\times$ as long as wide, F1 $1.8\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.3\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and longer than width of F1 to F5.

HEAD. Head width $1.13\times$ head height; head width $1.84\times$ interorbital space; maximum eye diameter $1.19\times$ minimum eye diameter; head height $1.63\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow distinct; preoccipital carina present. OOL:POL:LOL 1.00:1.00:1.00; OOL $1.43\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.17\times$ mesosoma width; Weber length 244 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.93\times$ mesoscutellum width; posterior mesoscutal width $1.47\times$ mesoscutellum width; mesoscutellum

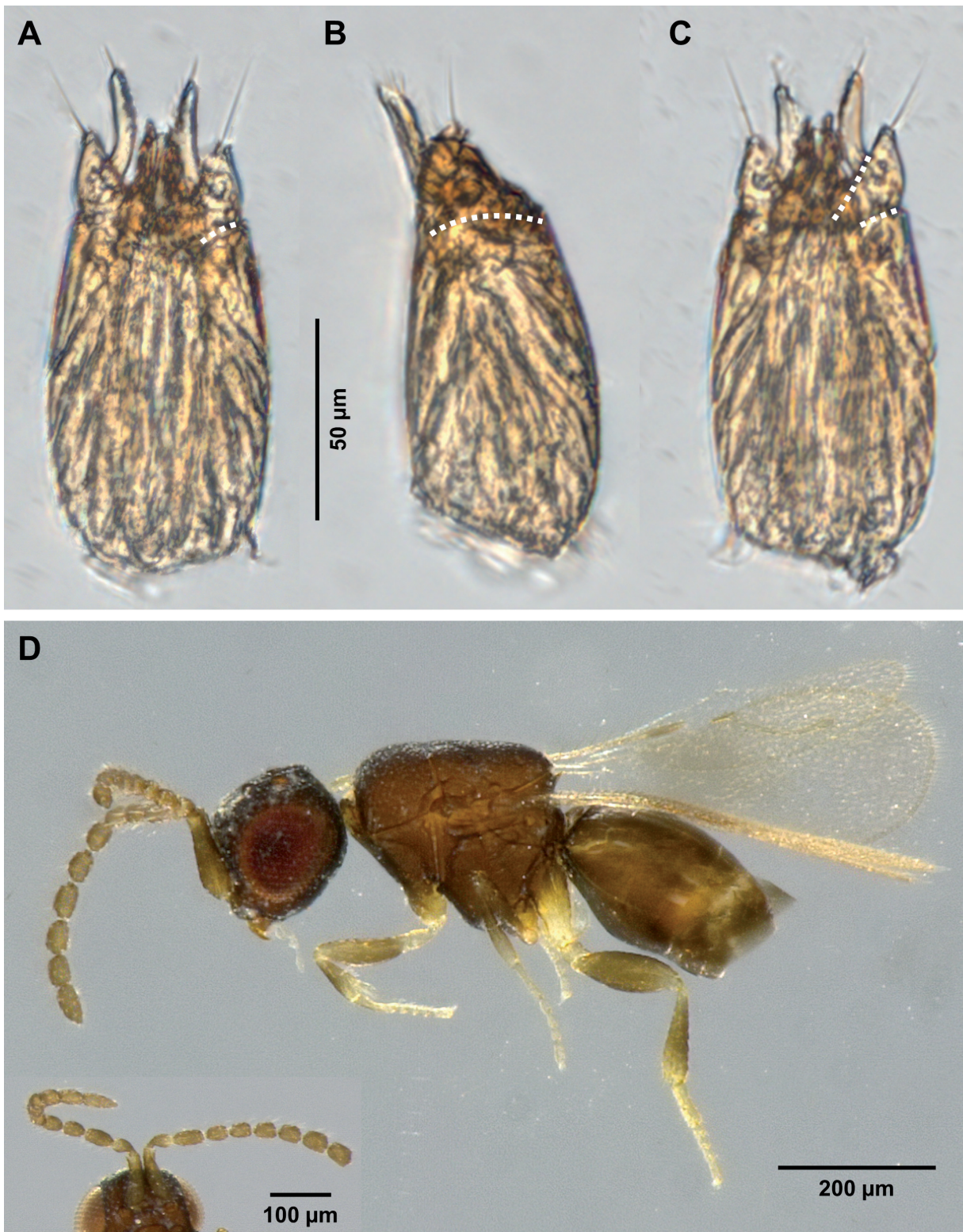


Fig. 32. Holotype of *Aphanogmus robustus* sp. nov. (ZFMK-HYM-00037027). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: head and antenna in frontal view.

length $1.17 \times$ mesoscutellum width; mesoscutellum length $1.14 \times$ posterior mesoscutal width; Weber length $1.34 \times$ mesoscutum width; Weber length $1.56 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, oriented posterodorsally in lateral view with pointed end; mesometapleural sulcus absent, mesometapleuron with distinct longitudinal striations; posterior propodeal projection distinctly short and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $3.10 \times$ width; stigmal vein longer than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $119 \mu\text{m}$; Weber length $2.05 \times$ genital length; gvc width $56 \mu\text{m}$; genital length $2.11 \times$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.40 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 32C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 32A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 32B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc convex (Fig. 32B). Harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.41; dorsolateral lobe/ventral lobe index 0.28; dorsolateral length of harpe/harpe index 0.56; lateral articulation site of harpe with gvc not flush (Fig. 32A, C); ventral margin of harpe straight, dorsal margin slightly concave (Fig. 32B), lateral margin convex, widest point of harpe at basal third (Fig. 32A, C); dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex (Fig. 32C), apices of ventral and dorsolateral lobe slightly pointed, oriented distolaterally (Fig. 32A, C). Harpe with at least two apical setae on dorsolateral lobe, longest apical setae on dorsolateral lobe half as long as harpe, apical setae on dorsolateral lobe oriented distolaterally and distoventrally; harpe with at least one apical seta on ventral lobe, longest apical seta on ventral lobe less than one quarter as long as harpe, apical seta on ventral lobe oriented distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus less than three quarters as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 32A, C) and as dorsal as apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with two digital teeth, oriented dorsally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The head and mesosoma of *A. robustus* sp. nov. is distinctly sculptured, similar to *A. kisiwa* sp. nov. and *A. reticulatus*. *Aphanogmus robustus* and *A. reticulatus* can be easily distinguished by antennal and male genitalia characters, *A. robustus* and *A. kisiwa* preferably by antennal characters (flagellomeres

of *A. robustus* are distinctly shorter than those of *A. kisiwa*); their male genitalia are rather similar. *Aphanogmus robustus* also has distinct longitudinal striations on the meso- or metapleuron, a character that is shared – considering only Afrotropical species of *Aphanogmus* with bilobed harpes – with *A. kisiwa*, *A. rafikii* sp. nov., *A. taji* sp. nov., *A. dictynna*, *A. fijiensis* and *A. reticulatus*. Differences to *A. kisiwa* and to *A. reticulatus* have already been outlined above. *Aphanogmus robustus* differs from *A. dictynna*, which is also similar in the male genitalia, in the flagellomeres being rather short in *A. robustus* but even shorter and moniliform in *A. dictynna* (Buffington & Polaszek 2009), and the scape being shorter than F1 to F3 combined in *A. robustus* and longer in *A. dictynna*. In addition, there are also subtle differences in the male genitalia, i.e., the harpe/gvc index is lower in *A. robustus* and the gap between the lobes is less pronounced in *A. dictynna*. *Aphanogmus robustus* and *A. fijiensis* can be distinguished by the scape being shorter than F1 to F3 combined in *A. robustus* and longer in *A. fijiensis*, by a brown to light brown body colouration in *A. robustus* and a black body colouration (excluding legs and antennae) in *A. fijiensis*, by a distinctly short anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex in *A. robustus* and a long anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex in *A. fijiensis*, and by a less pronounced gap between the ventral and dorsolateral lobe of the harpe of the male genitalia in *A. fijiensis* (more pronounced in *A. robustus*). *Aphanogmus rafikii* and *A. taji* are easy to distinguish from *A. robustus* by various body and male genitalia characters, for example, by a brown scape and metacoxa and the presence of the mesometapleural sulcus (but indistinct) in dorsal third of mesometapleuron in *A. rafikii* sp. nov. (scape light brown-yellowish, metacoxa yellowish and mesometapleural sulcus absent in *A. robustus*). In *A. taji*, the scape is shorter than F1 and F2 combined, F1 is $3.5 \times$ as long as wide and OOL:POL is 0.33–0.50 (scape is longer than F1 and F2 combined, F1 is $1.4 \times$ as long as wide and OOL:POL is 1.00 in *A. robustus*).

Aphanogmus robustus sp. nov. matches some of the diagnostic characters of the *Aphanogmus hakonensis* species complex (Polaszek & Dessart 1996) in which also *A. dictynna* was classified (Buffington & Polaszek 2009): dark body colouration (except for parts of the antennae and the legs), longitudinally striated mesometapleuron without a sulcus, and laterally and posteriorly carinate mesoscutellum (though only weakly carinate). We refrain from formally assigning *A. robustus* to the *Aphanogmus hakonensis* species complex.

For more comparisons with similar species, see remarks under *A. kisiwa* sp. nov.

Condition of type material

In the holotype, the left F8 and F9, and the right hind leg are missing (except coxa). The posterior part of the metasoma is slightly deformed, thus the body length measurement is not precise.

Aphanogmus simbai sp. nov.

urn:lsid:zoobank.org:act:A5447770-C02A-4077-AA05-3512669597E1

Fig. 33

Diagnosis

Head dark brown, mesosoma dark brown; head width $1.09\text{--}1.15 \times$ (1.15) mesosoma width; posterior mesosomal comb distinct and densely setose; four distinct, basal longitudinal carinae on syntergum. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.53; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe concave from base to apex; aedeagus + gonossiculus less than three quarters as long as harpe; aedeagus + gonossiculus with at least one ventrobasal seta.

Etymology

The species name is derived from the Swahili word ‘*simba*’ which means ‘lion’. It refers to the four distinct, basal longitudinal carinae on the syntergum which resemble scratch marks of a lion.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°22'45 N, 34°49'40.8 E; 1618 m a.s.l.; 11 Sep. 2007; F. Hita Garcia leg.; Transect 27; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037022.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1605 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034451 • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034452.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.72–0.92 mm (0.75 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel light brown, flagellum brown; legs brown except joints and tarsi lighter; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part and distal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.0 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.4 \times$ as long as wide, F1 $1.7 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.4 \times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.18\text{--}1.25 \times$ (1.22) head height; head width $1.68\text{--}1.82 \times$ (1.73) interorbital space; maximum eye diameter $1.10\text{--}1.35 \times$ (1.35) minimum eye diameter; head height $1.52\text{--}1.74 \times$ (1.61) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina absent. OOL:POL:LOL 1.00:0.55–0.96:0.60–0.75 (1.00:0.67:0.67); OOL $1.50\text{--}2.35 \times$ (2.25) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.09\text{--}1.15 \times$ (1.15) mesosoma width; Weber length 238–303 μm (288 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; indistinct interaxillar sulcus, scutoscuteellar sulcus not adjacent to transscutal articulation, scutoscuteellar sulcus concave; dorsal axillar area sparsely setose, setae curved backwards or straight; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $2.11\text{--}2.13 \times$ (2.12) mesoscutellum width; posterior mesoscutal width $1.47\text{--}1.60 \times$ (1.47) mesoscutellum width; mesoscutellum length $1.67\text{--}1.71 \times$ (1.71) mesoscutellum width; mesoscutellum length $1.04\text{--}1.16 \times$ (1.16) posterior mesoscutal width; Weber length $1.19\text{--}1.28 \times$ (1.28) mesoscutum width; Weber length $1.52\text{--}1.59 \times$ (1.59) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in

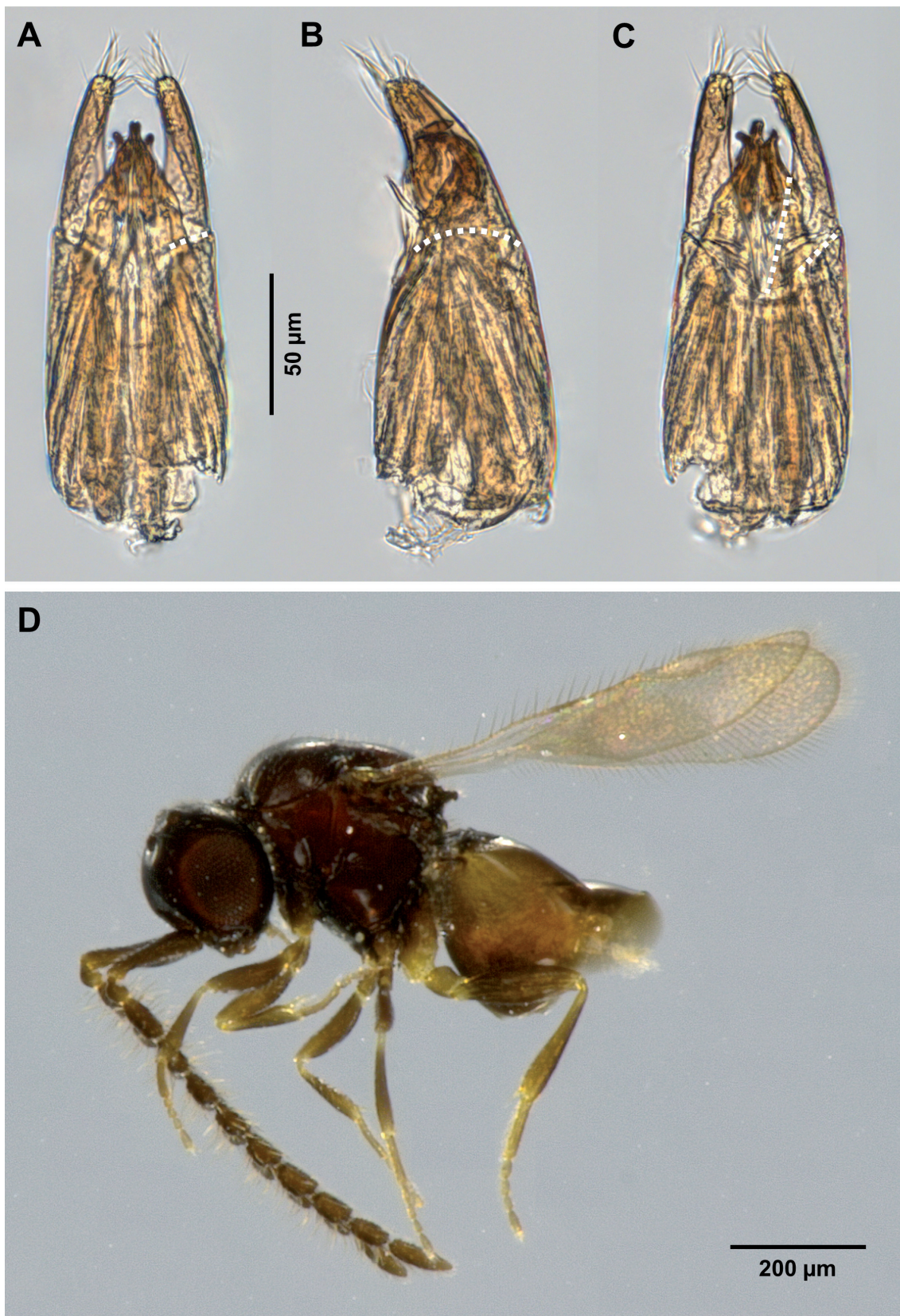


Fig. 33. Holotype of *Aphanogmus simbai* sp. nov. (ZFMK-HYM-00037022). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

lateral view with blunt and emarginated end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb distinct and densely setose. Basal transverse carina of petiole (on syntergum) present; four distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $3.03\text{--}3.18 \times (3.12)$ width; stigmal vein shorter than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $138\text{--}181 \mu\text{m}$ ($156 \mu\text{m}$); Weber length $1.67\text{--}1.84 \times (1.84)$ genital length; gvc width $56\text{--}66 \mu\text{m}$ ($63 \mu\text{m}$); genital length $2.44\text{--}2.76 \times (2.50)$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.16 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc strongly descending proximomedially (Fig. 33C); proximoventral margin of gvc indistinct; distoventral margin of gvc descending proximomedially (Fig. 33A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 33B); proximolateral margin of gvc indistinct; distolateral margin of gvc convex (Fig. 33B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.53; lateral articulation site of harpe with gvc not flush (Fig. 33A, C); ventral margin of harpe concave, dorsal margin convex (Fig. 33B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 33A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe concave from base to apex (Fig. 33C), apex of harpe rounded, oriented distomedially (Fig. 33A, C). Harpe with at least one ventral seta restricted to apical third, longest ventral seta less than half as long as harpe, ventral seta oriented distolaterally and distoventrally; harpe with at least four apical setae, longest apical setae one third as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least three median setae restricted to apical quarter, longest median setae less than one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus less than three quarters as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 33A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least four digital teeth, two oriented dorsally and two oriented ventrally and with at least one ventrobasal seta. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus simbai sp. nov. and the similar *A. fumipennis* Thomson, 1858 can be distinguished by characters of the male genitalia: the dorsomedial margin of the harpe is concave from base to apex in *A. simbai* and convex and slightly diverging distolaterally in basal third and concave and slightly converging distomedially in apical two thirds in *A. fumipennis*. Furthermore, the harpes of *A. simbai* are less distinctly curved in ventral direction than those of *A. fumipennis*.

For more comparisons with similar species, see remarks under *A. pilosicoxa* sp. nov.

Condition of type material

In the holotype, the right fore- and hind wing are missing. The right hind leg is detached (except coxa). The proximal part of the gvc is damaged. The posterior half of the metasoma is detached, thus the body length measurement is not precise.

Aphanogmus taji sp. nov.

urn:lsid:zoobank.org:act:BE9ED6CF-C211-4735-B173-D5B1DB98DA28

Fig. 34

Diagnosis

Scape shorter than F1 and F2 combined; F1 $3.7\times$ as long as pedicel; F1 longer than F9; head height $1.67\text{--}1.86\times$ (1.67) maximum eye diameter; OOL:POL 0.33–0.50 (0.44); OOL:LOL 0.67–0.85 (0.67); OOL $0.92\text{--}1.11\times$ (0.92) lateral ocellus diameter; ocelli distinctly domed; fore wing length $2.51\times$ width; stigmal vein shorter than $2\times$ pterostigma marginal length. Male genitalia: harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe broader with plateau on apex in lateral view; harpe/gvc index 0.26; dorsolateral lobe/ventral lobe index 0.14; dorsolateral length of harpe/harpe index 0.63; dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and diverging distolaterally from base to apex.

Etymology

The species name is derived from the Swahili word ‘*taji*’ which means ‘crown’, with reference to the prominent ocelli.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; $3^{\circ}16'7.1$ S, $37^{\circ}18'28.7$ E; 1169 m a.s.l.; 10 Nov. 2012; KiLi project leg.; “low 3”; HOM2, homegarden; Coloured pan trap; ZFMK; ZFMK-HYM-00037058.

Paratypes

TANZANIA – **Kilimanjaro Region** • 1 ♂; Mount Kilimanjaro; $3^{\circ}16'51.5$ S, $37^{\circ}19'20.5$ E; 1124 m a.s.l.; 2 May 2012; KiLi project leg.; “tree 2”; COF4, coffee plantation; Coloured pan trap; ZFMK; ZFMK-HYM-00037065 • 1 ♂; same collection data as for holotype; “high 3”; HOM2, homegarden; ZFMK-HYM-00037064 • 1 ♂; Mount Kilimanjaro; $3^{\circ}20'15$ S, $37^{\circ}29'34.9$ E; 1275 m a.s.l.; 9 May 2012; KiLi project leg.; “high 3”; HOM4, homegarden; Coloured pan trap; ZFMK; ZFMK-HYM-00037061 • 2 ♂♂; Mount Kilimanjaro; $3^{\circ}20'15$ S, $37^{\circ}29'34.9$ E; 1275 m a.s.l.; 31 Oct. 2012; KiLi project leg.; “tree 3”; HOM4, homegarden; Coloured pan trap; ZFMK; ZFMK-HYM-00037060, ZFMK-HYM-00037062 • 1 ♂; same collection data as for preceding; “low ex”; ZFMK-HYM-00037063 • 1 ♂; same collection data as for preceding; “high 1”; ZFMK-HYM-00037066 • 1 ♂; Mount Kilimanjaro; $3^{\circ}18'15$ S, $37^{\circ}30'4.5$ E; 1485 m a.s.l.; 29 Oct. 2012; KiLi project leg.; “high 1”; GRA3, grasland; Coloured pan trap; ZFMK; ZFMK-HYM-00037059.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.33–1.51 mm (1.43 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape, pedicel and flagellum brown; legs brown except joints lighter and tarsi transparent; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $5.8\times$ as long as pedicel, scape shorter than F1 and F2 combined, F1 $3.5\times$ as long as wide, F1 $3.7\times$ as long as pedicel, F1 $1.6\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 longer than F9, F6 $1.9\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of F1 to F5.

HEAD. Head width $1.28\text{--}1.33\times$ (1.28) head height; head width $1.94\text{--}1.97\times$ (1.94) interorbital space; maximum eye diameter $1.07\text{--}1.19\times$ (1.15) minimum eye diameter; head height $1.67\text{--}1.86\times$ (1.67) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:2.01–3.00:1.18–1.50 (1.00:2.25:1.50); OOL $0.92\text{--}1.11\times$ (0.92) lateral ocellus diameter; ocelli distinctly domed. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.17\text{--}1.25\times$ (1.19) mesosoma width; Weber length 444–488 μm (444 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.16\text{--}2.27\times$ (2.26) mesoscutellum width; posterior mesoscutal width $1.52\text{--}1.65\times$ (1.65) mesoscutellum width; mesoscutellum length $1.84\text{--}2.00\times$ (2.00) mesoscutellum width; mesoscutellum length $1.19\text{--}1.21\times$ (1.21) posterior mesoscutal width; Weber length $1.30\text{--}1.37\times$ (1.37) mesoscutum width; Weber length $1.53\text{--}1.56\times$ (1.54) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight and oriented posterodorsally in lateral view with pointed and lighter end; mesometapleural sulcus absent, mesometapleuron with distinct longitudinal striations; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.51\times$ width; stigmal vein shorter than $2\times$ pterostigma marginal length.

MALE GENITALIA. Genital length 213–238 μm (219 μm); Weber length $1.85\text{--}2.29\times$ (2.03) genital length; gvc width 72–94 μm (94 μm); genital length $2.33\text{--}2.96\times$ (2.33) gvc width; gvc width more than half of genital length; gvc width $1.45\times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 34C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 34A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 34B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 34B). Harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe broader with plateau on apex in lateral view; harpe/gvc index 0.26; dorsolateral lobe/ventral lobe index 0.14; dorsolateral length of harpe/harpe index 0.63; lateral articulation site of harpe with gvc not flush (Fig. 34A, C); ventral margin of harpe slightly convex, dorsal margin convex (Fig. 34B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 34A, C); dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and diverging distolaterally from base to apex (Fig. 34C), apices of ventral and dorsolateral lobe rounded (Fig. 34A, C). Harpe with at least one lateral seta on dorsolateral lobe restricted to apical half, longest lateral seta half as long as harpe, lateral seta oriented distolaterally; harpe with at least one apical seta on dorsolateral lobe, longest apical seta on dorsolateral lobe half as long as harpe, apical seta on dorsolateral lobe oriented distolaterally and distoventrally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distodorsally, distolaterally and distoventrally; indistinct



Fig. 34. Holotype of *Aphanogmus taji* sp. nov. (ZFMK-HYM-00037058). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus less than one third as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 34A, C) and dorsal to apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with indistinct digital teeth. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Paratypes as ZFMK-HYM-00037059, ZFMK-HYM-00037060 and ZFMK-HYM-00037061 have at least two digital teeth [indistinct (i.e., not clearly visible) in the holotype]. The interaxillar sulcus is absent in ZFMK-HYM-00037059 and ZFMK-HYM-00037060.

Biology

Host unknown, specimens collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Aphanogmus taji sp. nov. is very similar to *A. rafikii* sp. nov., both species share a quite dark colouration, a short marginal fringe of the fore wing and an elongated F1. However, their male genitalia are very different, and also OOL:POL and OOL:LOL are very low in *A. taji*. *Aphanogmus taji* has very similar harpe and lobe indices as *A. ndefu* sp. nov. but these two species are easily distinguishable from each other (e.g., mesometapleuron with distinct longitudinal striations in *A. taji* and mesometapleuron without longitudinal striations in *A. ndefu*, scape shorter than F1 and F2 combined in *A. taji* and scape longer than F1 and F2 combined in *A. ndefu*, F1 3.5× as long as wide in *A. taji* and F1 2.9× as long as wide in *A. ndefu*, and metacoxa brown in *A. taji* and metacoxa light yellow and transparent in *A. ndefu*).

Aphanogmus taji sp. nov. matches some of the diagnostic characters of the *Aphanogmus hakonensis* species complex (Polaszek & Dessart 1996): Dark body colouration (except for the legs), longitudinally striated mesometapleuron without a sulcus, and laterally and posteriorly carinate mesoscutellum. It does not have a lighter scape, pedicel and F1–F5 (Polaszek & Dessart 1996). We refrain from formally assigning *A. taji* to the *Aphanogmus hakonensis* species complex.

For more comparisons with similar species, see remarks under *A. maua* sp. nov., and *A. robustus* sp. nov.

Condition of type material

In the holotype, the right fore wing is detached. The metasoma is slightly deformed, thus the body length measurement is not precise.

Aphanogmus ukanda sp. nov.

urn:lsid:zoobank.org:act:D5401007-1D28-442A-B321-65521736AF9A

Fig. 35

Diagnosis

Legs yellowish; Weber length 1.51–1.70× (1.70) mesoscutellum length; fore wing length 3.05–3.28× (3.28) width. Male genitalia: harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular

in lateral view; harpe/gvc index 0.37; dorsolateral lobe/ventral lobe index 0.80; dorsolateral length of harpe/harpe index 0.95; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave from base to apex; genital length $2.54\text{--}3.00 \times (2.54)$ gvc width; Weber length $1.42\text{--}1.55 \times (1.55)$ genital length.

Etymology

The species name is derived from the Swahili word 'ukanda' which means 'belt', with reference to the sampling locations in the rainforest of Gabon, close to the west coast of Central Africa, and in the Kakamega Forest of Kenya, the easternmost remnant of the Guineo-Congolian rainforest belt.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}22'43.7$ N, $34^{\circ}41'57.3$ E; 1452 m a.s.l.; 25 Aug. 2008; F. Hita Garcia leg.; Transect 35; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037016.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; $00^{\circ}27'10.6$ N, $34^{\circ}51'48.7$ E; 1676 m a.s.l.; 26 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034435 • 1 ♂; Kakamega Forest; $00^{\circ}23'6.2$ N, $34^{\circ}33'37.8$ E; 1602 m a.s.l.; 23 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034436.

GABON • 1 ♂; Ogooué-Ivindo, Ivindo NP, Makokou; $00^{\circ}30'44$ N, $12^{\circ}46'12$ E; 518 m a.s.l.; 13–16 Sep. 2012; R.S. Peters leg.; forest near station; Pitfall trap; ZFMK; ZFMK-HYM-00037094.

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. $0.78\text{--}0.98$ mm (0.98 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown-yellowish; scape yellowish and pedicel light brown, flagellum light brown; legs yellowish; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part and distal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.3 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $3.1 \times$ as long as wide, F1 $2.3 \times$ as long as pedicel, F1 $1.4 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.7 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.5 \times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and longer than width of at least F1 to F4.

HEAD. Head width $1.15\text{--}1.21 \times (1.15)$ head height; head width $1.95\text{--}2.08 \times (2.00)$ interorbital space; maximum eye diameter $1.10\text{--}1.30 \times (1.24)$ minimum eye diameter; head height $1.50\text{--}1.59 \times (1.54)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow distinct; preoccipital carina distinct. OOL:POL:LOL $1.00:1.00\text{--}1.33:0.73\text{--}0.96 (1.00:1.08:0.85)$; OOL $1.20\text{--}1.69 \times (1.63)$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.18\text{--}1.24 \times (1.24)$ mesosoma width; Weber length $269\text{--}319$ μm (319 μm). Mesoscutum densely setose, setae curved backwards;

median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.07\text{--}2.22 \times (2.12)$ mesoscutellum width; posterior mesoscutal width $1.53\text{--}1.67 \times (1.59)$ mesoscutellum width; mesoscutellum length $1.76\text{--}1.90 \times (1.76)$ mesoscutellum width; mesoscutellum length $1.10\text{--}1.24 \times (1.11)$ posterior mesoscutal width; Weber length $1.28\text{--}1.42 \times (1.42)$ mesoscutum width; Weber length $1.51\text{--}1.70 \times (1.70)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight and transparent in lateral view with pointed end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; short basal longitudinal carinae on syntergum; translucent patches indistinct.

FORE WING. Length $3.05\text{--}3.28 \times (3.28)$ width; stigmal vein longer than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $188\text{--}225 \mu\text{m}$ ($206 \mu\text{m}$); Weber length $1.42\text{--}1.55 \times (1.55)$ genital length; gvc width $66\text{--}81 \mu\text{m}$ ($81 \mu\text{m}$); genital length $2.54\text{--}3.00 \times (2.54)$ gvc width; gvc width more than half of gvc length; gvc width $1.53 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 35C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 35A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 35B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 35B). Harpe bilobed; ventral lobe finger-shaped and dorsolateral lobe triangular in lateral view; harpe/gvc index 0.37; dorsolateral lobe/ventral lobe index 0.80; dorsolateral length of harpe/harpe index 0.95; lateral articulation site of harpe with gvc flush (Fig. 35A, C); ventral margin of harpe straight, dorsal margin convex (Fig. 35B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 35A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave from base to apex (Fig. 35C), apex of ventral lobe pointed and apex of dorsolateral lobe slightly rounded, apex of ventral lobe slightly oriented distolaterally (Fig. 35A, C). Harpe with at least two lateral setae between apices of ventral and dorsolateral lobe restricted to apical third, longest lateral setae half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae with indistinct orientation. Aedeagus + gonossiculus three quarters as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 35A, C) and dorsal to apex of dorsolateral lobe of harpe. Aedeagus + gonossiculus with at least four distinct digital teeth, oriented dorsally. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

In ZFMK-HYM-00037094, the ventral area of the gvc is slightly differently structured and the contrast between the yellowish scape and the brownish pedicel and flagellum is higher than in the holotype. Pro- and mesocoxa of ZFMK-HYM-00034436 are light brown. Pairs of translucent patches on the metasomal syntergum and systernum are visible in all paratypes but indistinct in the holotype.

Biology

Host unknown, specimens collected from leaf litter (Kenya) or with pitfall trap (Gabon).

Distribution

Afrotropical: Gabon and Kenya.



Fig. 35. Holotype of *Aphanogmus ukanda* sp. nov. (ZFMK-HYM-00037016). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Remarks

Comparison with similar species

The distinctly uniformly coloured yellowish legs of *A. ukanda* sp. nov. resemble the legs of specimen ZFMK-HYM-00037038, which we identified as *A. reticulatus* (Fouts, 1934) (see also treatment of *A. reticulatus*). However, the species are easily distinguishable by antennal and male genitalia characters.

For more comparisons with similar species, see remarks under *A. ndefu* sp. nov.

Condition of type material

In the holotype, the metasoma is deformed, thus the body length measurement is not precise. Paratype ZFMK-HYM-00037094 was used in an unsuccessful DNA barcoding attempt, i.e., had been put in lysis buffer for non-destructive DNA extraction, and looks more transparent. Paratype ZFMK-HYM-00037094 was collected later than the holotype and the other paratypes, i.e., storage time in ethanol was shorter, which might explain its stronger antennal colour contrast.

tenuicornis species group after Evans *et al.* (2005)

Aphanogmus campanula sp. nov.

urn:lsid:zoobank.org:act:15ED567C-8051-4F0B-910C-3D38B6D604B0

Fig. 36

Diagnosis

Preoccipital furrow present, with small interocellar pit; posterior mesosomal comb present. Male genitalia: harpes taken together bell-shaped in ventral and dorsal view; harpe/gvc index 0.41; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex in basal half, concave in apical half and converging and touching distomedially; ventral margin of harpe convex, dorsal margin straight with indentation between basal and apical half, lateral margin straight and curved at its middle in basal third, convex and oriented distomedially in apical two thirds.

Etymology

The species name is derived from the Latin word ‘*campanula*’ which means ‘bell’, with reference to the bell-shaped harpes of the male genitalia.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°13'42.2 S, 37°31'11.1 E; 2040 m a.s.l.; 21 Jan. 2012; KiLi project leg.; “tree 1”; FLM5, forest lower mont.; Coloured pan trap; ZFMK; ZFMK-HYM-00037057.

Description

Male

BODY LENGTH. 0.92 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape, pedicel and flagellum light brown, gradually darkening from F1 to F9; legs light brown except joints and tarsi lighter; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape 3.7× as long as pedicel, scape longer than F1 and F2 combined, F1 3.0× as long as wide, F1 1.7× as long as pedicel, F1 1.2× as long as F2,

F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.0\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.33\times$ head height; head width $1.70\times$ interorbital space; maximum eye diameter $1.05\times$ minimum eye diameter; head height $1.60\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present, with small interocellar pit; preoccipital carina present. OOL:POL:LOL 1.00:1.00:0.71; OOL $1.75\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.21\times$ mesosoma width; Weber length $269\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.20\times$ mesoscutellum width; posterior mesoscutal width $1.67\times$ mesoscutellum width; mesoscutellum length $1.87\times$ mesoscutellum width; mesoscutellum length $1.12\times$ posterior mesoscutal width; Weber length $1.30\times$ mesoscutum width; Weber length $1.54\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with pointed and lighter end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection distinctly short and light; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least seven, short, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.83\times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length $125\ \mu\text{m}$; Weber length $2.15\times$ genital length; gvc width $69\ \mu\text{m}$; genital length $1.82\times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.23\times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 36C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 36A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 36B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc convex, more strongly descending dorsally (Fig. 36B). Harpes taken together bell-shaped in ventral and dorsal view; harpe/gvc index 0.41; lateral articulation site of harpe with gvc virtually flush (Fig. 36A, C); ventral margin of harpe convex, dorsal margin straight with indentation between basal and apical half (Fig. 36B), lateral margin straight and curved at its middle in basal third, convex and oriented distomedially in apical two thirds, widest point of harpe at lateral articulation site with gvc (Fig. 36A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex in basal half, concave in apical half and converging and touching distomedially (Fig. 36C), apex of harpe rounded, oriented distomedially (Fig. 36A, C). Harpe with at least one lateral seta restricted to basal third, longest lateral seta more than half as long as harpe, lateral seta oriented distodorsally and distolaterally; harpe with at least two apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distodorsally and distolaterally; harpe with at least two median setae restricted to apical half, longest median setae one quarter as long as harpe, median setae oriented distodorsally. Aedeagus + gonossiculus indistinct. Aedeagus + gonossiculus with at least two digital teeth, oriented ventrally. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus and harpe.

Female

Unknown.

Variation

Unknown.

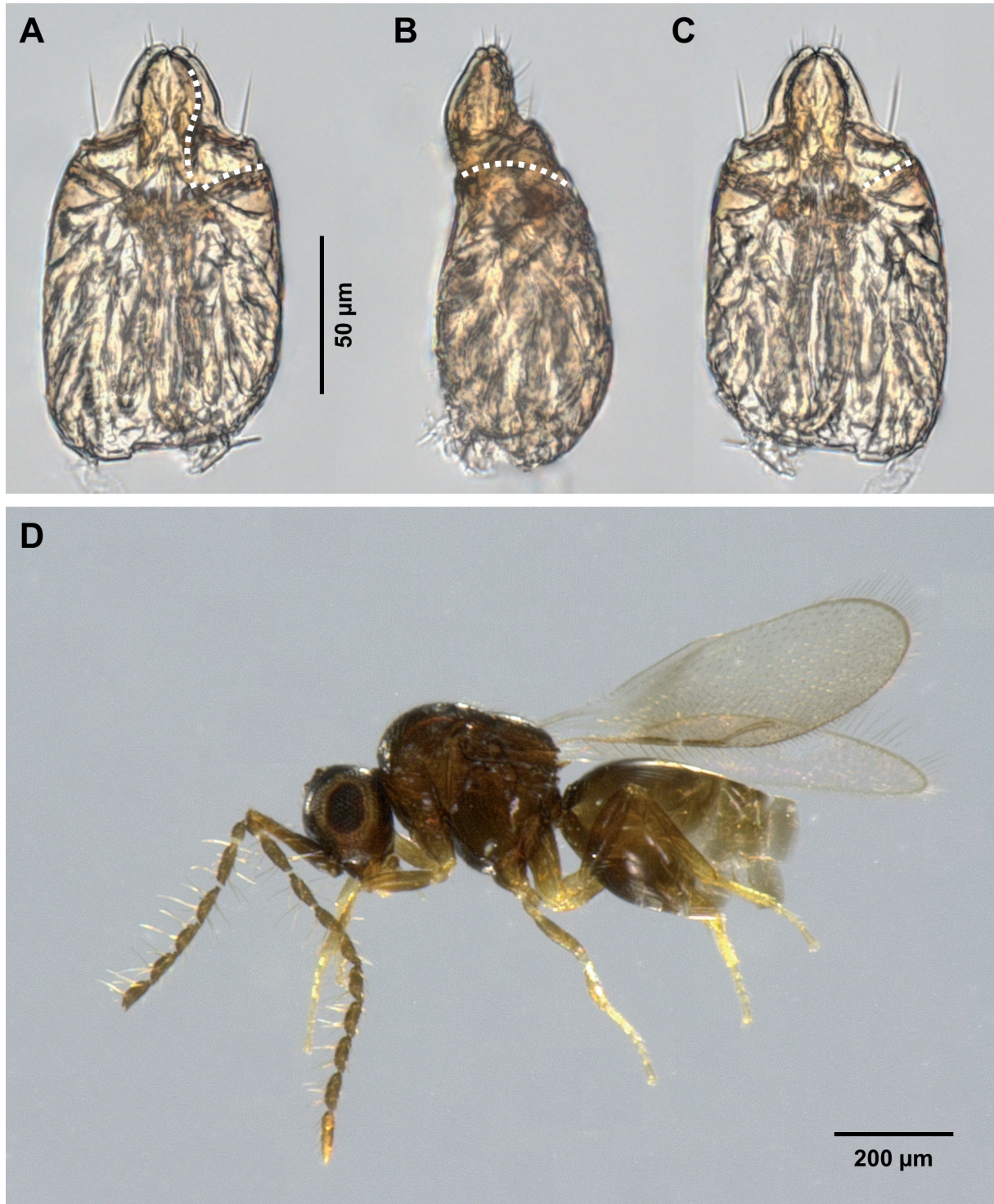


Fig. 36. Holotype of *Aphanogmus campanula* sp. nov. (ZFMK-HYM-00037057). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Aphanogmus campanula sp. nov. and *A. pagoda* sp. nov. are very similar in having a small interocellar pit, a posterior mesosomal comb and similar stigmal vein to pterostigma marginal length ratios. However, in *A. campanula* the scape is longer than F1 and F2 combined (scape as long as F1 and F2 combined in *A. pagoda*), and the harpe/gvc index is higher (0.41 in *A. campanula*, 0.27 in *A. pagoda*). In addition, the two species differ in the shapes of the ventral, dorsal and lateral margins of the harpes.

Condition of type material

In the holotype, the right F6 to F9, and the left mesotarsus are missing. The left middle leg (except coxa) and the left fore and hind wing are detached. The metasoma is slightly deformed and the posterior third of the metasoma is missing, thus the body length measurement is not precise.

Aphanogmus kikuyu sp. nov.

urn:lsid:zoobank.org:act:FE7B0168-DCE9-419E-A046-EA39B1D4C11B

Fig. 37

Diagnosis

OOL:POL 1.49 (1.49); interaxillar sulcus distinct (= scutoscutellar sulcus not adjacent to transscutal articulation); stigmal vein shorter than $2 \times$ pterostigma marginal length. Male genitalia: harpe pear-shaped in ventral and dorsal view and with emargination in lateral view; harpe/gvc index 0.42 (see remarks); ventromedial margins of harpes not touching in basal part, straight and converging distomedially and crossing distomedially in basal two thirds, straight and diverging distolaterally in apical third; harpe with at least one lateral seta adjacent to distolateral margin of gvc.

Etymology

The species is named after the Kikuyu people, an ethnic group native to Kenya.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°37'24.1 N, 34°51'12 E; 1585 m a.s.l.; 8 Aug. 2007; F. Hita Garcia leg.; Transect 10; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037030.

Paratype

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037035.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 0.60–0.66 mm (0.66 mm).

COLOUR. Head brown, mesosoma brown, metasoma brown; scape yellowish-transparent and pedicel light brown-yellowish, flagellum light brown-yellowish; legs yellowish except pro- and mesocoxa light brown, proximal third of metacoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part and distal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.5 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.9 \times$ as long as wide, F1 $1.7 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.9 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.18\text{--}1.27 \times$ (1.18) head height; head width $1.74\text{--}1.77 \times$ (1.77) interorbital space; maximum eye diameter $1.12\text{--}1.13 \times$ (1.12) minimum eye diameter; head height $1.53\text{--}1.74 \times$ (1.74) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL $1.00:0.67:0.47\text{--}0.50$ ($1.00:0.67:0.47$); OOL $2.00\text{--}2.14 \times$ (2.14) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.11\text{--}1.14 \times$ (1.11) mesosoma width; Weber length $206\text{--}263 \mu\text{m}$ ($263 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus distinct (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area sparsely setose, setae curved backwards or straight; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.87\text{--}2.20 \times$ (2.20) mesoscutellum width; posterior mesoscutal width $1.27\text{--}1.67 \times$ (1.67) mesoscutellum width; mesoscutellum length $1.67\text{--}2.00 \times$ (2.00) mesoscutellum width; mesoscutellum length $1.20\text{--}1.32 \times$ (1.20) posterior mesoscutal width; Weber length $1.18\text{--}1.27 \times$ (1.27) mesoscutum width; Weber length $1.32\text{--}1.40 \times$ (1.40) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection absent; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least seven, distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and sternum.

FORE WING. Length $3.10\text{--}3.14 \times$ (3.14) width; stigmal vein shorter than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $94\text{--}144 \mu\text{m}$ ($144 \mu\text{m}$); Weber length $1.83\text{--}2.20 \times$ (1.83) genital length; gvc width $59\text{--}81 \mu\text{m}$ ($81 \mu\text{m}$); genital length $1.58\text{--}1.77 \times$ (1.77) gvc width; gvc width three quarters of gvc length; gvc width $1.26 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc indistinct (Fig. 37C); proximoventral margin of gvc straight; distoventral margin of gvc indistinct (Fig. 37A); ventral area of gvc slightly concave; dorsal area of gvc convex (Fig. 37B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending dorsally (Fig. 37B). Harpe pear-shaped in ventral and dorsal view and with emargination in lateral view; harpe/gvc index 0.42 (see remarks); lateral articulation site of harpe with gvc indistinct (Fig. 37A, C); ventral margin of harpe straight, dorsal margin convex in basal and middle third and with emargination in between and straight in apical third (Fig. 37B), lateral margin indistinct in basal third and convex in middle third and concave in apical third, widest point of harpe indistinct (Fig. 37A, C); ventromedial margins of harpes not touching in basal part, straight and converging distomedially and crossing distomedially in basal two thirds, straight and diverging distolaterally in apical third (Fig. 37C), apex of harpe pointed, oriented distolaterally (Fig. 37A, C). Harpe with at least one lateral seta adjacent to distolateral margin of gvc, longest lateral seta less than one quarter as long as harpe, lateral seta oriented distolaterally and distomedially; harpe with at least two apical setae, longest apical setae less than one quarter as long as



Fig. 37. Holotype of *Aphanogmus kikuyu* sp. nov. (ZFMK-HYM-00037030). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

harpe, apical setae oriented distodorsally, distolaterally and distoventrally. Aedeagus + gonossiculus indistinct. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

The harpe of the male genitalia in ZFMK-HYM-00037035 has visible median setae at the medially converging part below the apex. The orientation of the median setae is indistinct.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Aphanogmus kikuyu sp. nov. can be distinguished from all other treated species by a combination of the presence of the basal transverse carina of the petiole (on syntergum), the absence of the median mesoscutal sulcus, the relatively high OOL:POL ratio 1.49, the absence of the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex, and the pear-shaped harpe of the male genitalia in ventral and dorsal view.

Condition of type material

In the holotype, the left fore wing and the left middle leg (except coxa) are missing. The distal margins of the gvc and the basal part of the harpes are indistinct in the very small and comparatively transparent male genitalia, i.e., some descriptions of characters are missing. The posterior third of the metasoma is detached, thus the body length measurement is not precise.

Aphanogmus pagoda sp. nov.

urn:lsid:zoobank.org:act:EBD6F4AB-F6C9-4DE9-8380-704A0AD0A313

Fig. 38

Diagnosis

Scape as long as F1 and F2 combined; preoccipital furrow present, with small interocellar pit; OOL $2.58 \times$ lateral ocellus diameter; posterior mesosomal comb present. Male genitalia: harpes taken together pagoda-shaped in ventral and dorsal view; harpe/gvc index 0.27; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex in basal third, slightly concave in apical two thirds and converging and touching distomedially; ventral margin of harpe straight, dorsal margin convex in basal half and straight in apical half, lateral margin concave.

Etymology

The species is named after the pagoda-shaped harpes of the male genitalia.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037021.

Description**Male**

BODY LENGTH. 0.78 mm.

COLOUR. Head brown, mesosoma brown, metasoma brown except anterior third lighter; scape light brown-yellowish and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs light brown-yellowish except joints and tarsi lighter; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $3.6\times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $3.0\times$ as long as wide, F1 $1.7\times$ as long as pedicel, F1 $1.1\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.0\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of flagellomeres.

HEAD. Head width $1.33\times$ head height; head width $2.00\times$ interorbital space; maximum eye diameter $1.22\times$ minimum eye diameter; head height $1.50\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present, with small interocellar pit; preoccipital carina distinct. OOL:POL:LOL 1.00:0.90:0.65; OOL $2.58\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.29\times$ mesosoma width; Weber length $275\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus absent; interaxillar sulcus superficial, scutoscutellar sulcus not adjacent to transscutal articulation, scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.88\times$ mesoscutellum width; posterior mesoscutal width $1.35\times$ mesoscutellum width; mesoscutellum length $1.76\times$ mesoscutellum width; mesoscutellum length $1.30\times$ posterior mesoscutal width; Weber length $1.38\times$ mesoscutum width; Weber length $1.47\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with pointed and lighter end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection distinctly short and light; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least five, short, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.99\times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length $106\ \mu\text{m}$; Weber length $2.59\times$ genital length; gvc width $63\ \mu\text{m}$; genital length $1.70\times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.19\times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 38C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 38A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 38B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc descending dorsally (Fig. 38B). Harpes taken together pagoda-shaped in ventral and dorsal view; harpe/gvc index 0.27; lateral articulation site of harpe with gvc virtually flush (Fig. 38A, C); ventral margin of harpe straight, dorsal margin convex in basal half and straight in apical half (Fig. 38B), lateral margin concave, widest point of harpe at lateral articulation site with gvc (Fig. 38A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe convex in basal third, slightly concave in apical two thirds and converging and touching distomedially (Fig. 38C), apex of harpe pointed, oriented distomedially (Fig. 38A, C). Harpe with at least one lateral seta restricted to basal

third, longest lateral seta more than three quarters as long as harpe, lateral seta oriented distomedially; harpe with at least one apical seta, longest apical seta less than one quarter as long as harpe, apical seta oriented distolaterally; harpe with at least two median setae restricted to apical half, longest median setae more than one quarter as long as harpe, median setae oriented distodorsally. Aedeagus + gonossiculus

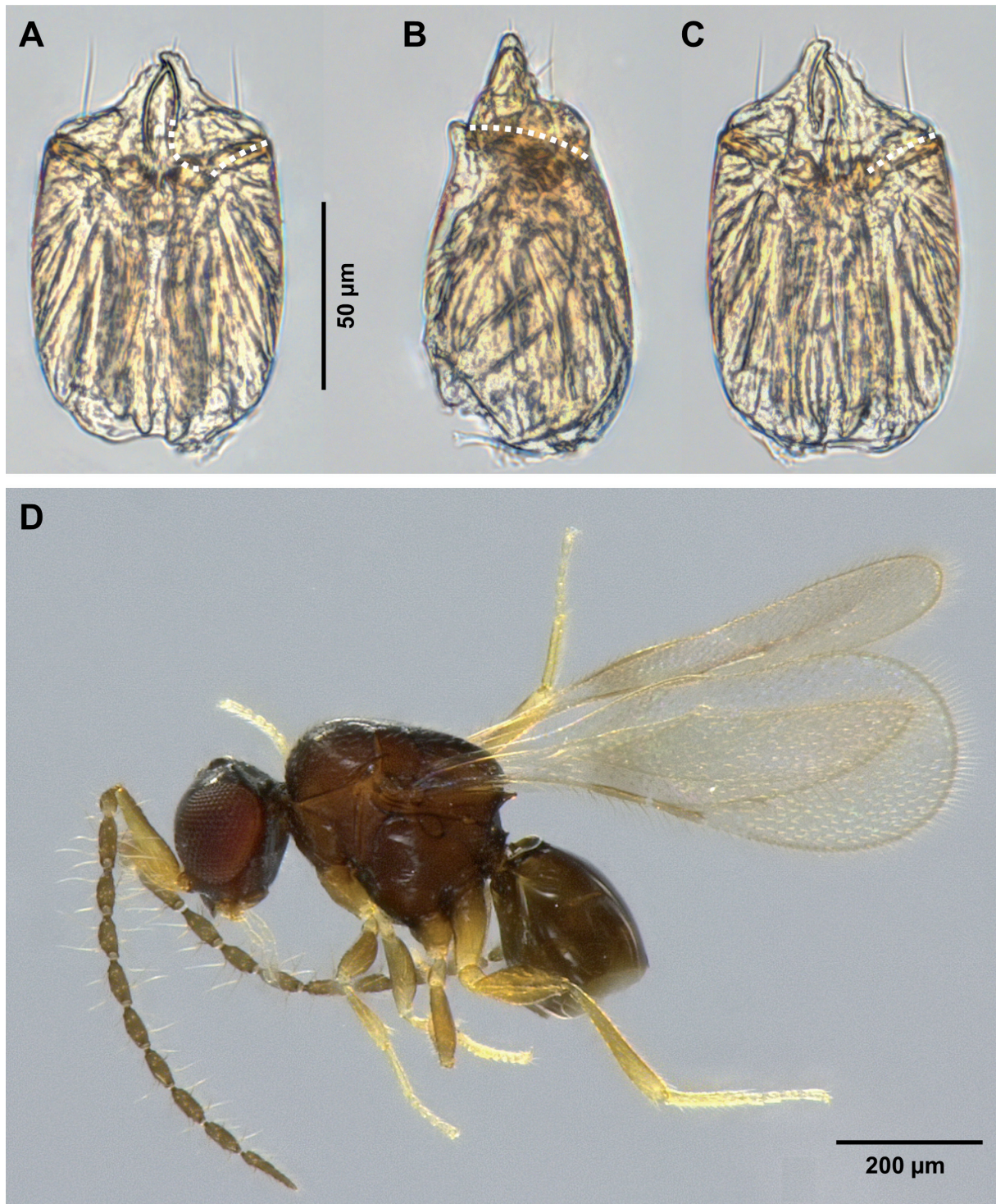


Fig. 38. Holotype of *Aphanogmus pagoda* sp. nov. (ZFMK-HYM-00037021). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

indistinct. Aedeagus + gonossiculus with at least two digital teeth, oriented ventrally. Genitalia weakly sclerotized with strongest sclerotization at distal margin of gvc.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *A. campanula* sp. nov.

Condition of type material

In the holotype, the posterior third of the metasoma is missing, thus the body length measurement is not precise.

Genus *Ceraphron* Jurine, 1807

***Ceraphron banda* sp. nov.**

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Fig. 39

Diagnosis

OOL:POL 1.41–2.27 (1.41); OOL:LOL 1.56–2.27 (1.56); OOL 1.56–1.88× (1.56) lateral ocellus diameter. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.42; lateral articulation site of harpe with gvc flush; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, convex and diverging distolaterally in middle third, straight and diverging distolaterally in apical third, apex of harpe pointed, oriented distolaterally; distoventral margin of gvc strongly descending proximomedially; harpe with at least two lateral setae restricted to apical half; longest apical setae more than half as long as harpe; aedeagus + gonossiculus three quarters as long as harpe; distodorsal margin of gvc slightly convex in lateral parts; harpe with at least five median setae restricted to apical quarter.

Etymology

The species is named after the Banda, a traditional round and grass-thatched African house. Bandas can be used for accommodation in Kakamega Forest.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°21'21.1 N, 34°51'44.9 E; 1632 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036879.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°27'10.6 N, 34°51'48.7 E; 1676 m a.s.l.; 19 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036842 • 1 ♂; Kakamega Forest; 00°27'10.6 N, 34°51'48.7 E; 1676 m a.s.l.; 26 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036843 • 1 ♂; same collection data as for holotype; ZFMK-HYM-00036844 • 1 ♂; same collection data as for holotype; 16 Aug. 2007; ZFMK-HYM-00036845.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.95–1.06 mm (0.95 mm).

COLOUR. Head brown, mesosoma brown, metasoma brown except anterior third lighter; scape, pedicel and flagellum light brown; legs yellowish except pro- and mesocoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.6× as long as pedicel, scape longer than F1 and F2 combined, F1 2.0× as long as wide, F1 1.5× as long as pedicel, F1 1.3× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.5× as long as wide, F6 shorter than F7 and F8 combined, F6 1.2× as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.11–1.21× (1.11) head height; head width 1.92–2.22× (2.22) interorbital space; maximum eye diameter 1.24–1.29× (1.24) minimum eye diameter; head height 1.55–1.77× (1.77) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.44–0.71:0.44–0.64 (1.00:0.71:0.64); OOL 1.56–1.88× (1.56) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 0.99–1.04× (1.02) mesosoma width; Weber length 338–372 µm (350 µm); mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width 1.74–1.88× (1.83) mesoscutellum width; posterior mesoscutal width 1.35–1.46× (1.35) mesoscutellum width; mesoscutellum length 1.52–1.63× (1.57) mesoscutellum width; mesoscutellum length 1.09–1.16× (1.16) posterior mesoscutal width; Weber length 1.32–1.35× (1.33) mesoscutum width; Weber length 1.53–1.56× (1.56) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end; mesometapleural sulcus absent; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length 2.70–2.90× (2.90) width; stigmal vein longer than 3× pterostigma marginal length.

MALE GENITALIA. Genital length 169–175 µm (175 µm); Weber length 1.96–2.20× (2.00) genital length; gvc width 75–78 µm (78 µm); genital length 2.20–2.25× (2.24) gvc width; gvc width less than two

thirds of gvc length; gvc width $1.39 \times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc slightly convex in lateral parts (Fig. 39C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 39A); ventral area of gvc

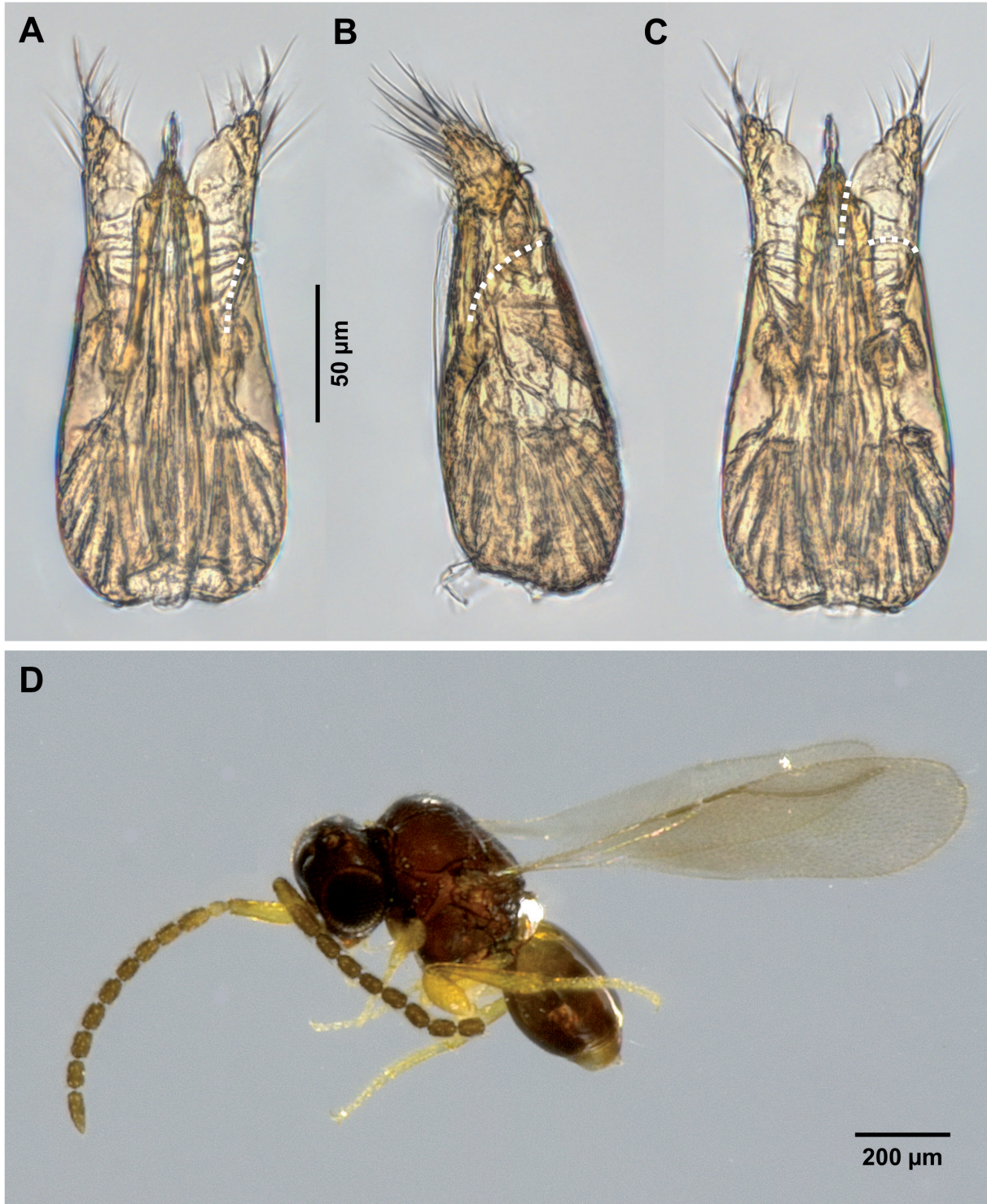


Fig. 39. Holotype of *Ceraphron banda* sp. nov. (ZFMK-HYM-00036879). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

slightly convex; dorsal area of gvc slightly convex (Fig. 39B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc strongly descending ventrally (Fig. 39B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.42; lateral articulation site of harpe with gvc flush (Fig. 39A, C); ventral margin of harpe concave, dorsal margin convex, (Fig. 39B), lateral margin straight, widest point of harpe at apex of harpe (Fig. 39A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, convex and diverging distolaterally in middle third, straight and diverging distolaterally in apical third (Fig. 39C), apex of harpe pointed, oriented distolaterally (Fig. 39A, C). Harpe with at least two lateral setae restricted to apical half, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae more than half as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least five median setae restricted to apical quarter, longest median setae one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus three quarters as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 39A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

The proximal third of the metacoxa is brown in ZFMK-HYM-00036845 and the end of the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is slightly bifurcated in ZFMK-HYM-00036843.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron banda sp. nov. and *C. kakamegaensis* sp. nov. can be distinguished by body colour (a bit darker in *C. kakamegaensis*), and by the following differences in the male genitalia: the genital length to gvc width ratio is lower in *C. banda* (2.20–2.25) than in *C. kakamegaensis* (2.54–2.67) and the harpe/gvc index is higher in *C. banda* (0.42) than in *C. kakamegaensis* (0.32). The Weber length to genital length ratio is lower in *C. kakamegaensis* (1.70–1.82) than in *C. banda* (1.96–2.20). Most strikingly, the setal arrangement on the harpes differs in number and relative length. The harpe of *C. banda* seem to be open on the ventral side and therefore it looks less sclerotized than in *C. kakamegaensis*.

For more comparisons with similar species, see remarks under *C. isecheno* sp. nov.

Condition of type material

In the holotype, the left F9 and the left hind wing are missing. The left middle leg (except coxa) and the right fore wing are detached.

Ceraphron brashi sp. nov.

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Fig. 40

Diagnosis

Sensillae on flagellomeres distinctly shorter than width of flagellomeres; posterolateral processes of gena present; OOL:LOL 2.63–3.23 (2.63); posterior mesoscutal width 1.58–1.71 × (1.58) mesoscutellum width. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.56; dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and diverging distolaterally in approximately basal third, straight and parallel to other harpe in approximately apical two thirds; harpe with at least eleven brush-like arranged and convex median setae; harpe with at least two lateral setae restricted to apical quarter; genitalia moderately sclerotized with strongest sclerotization at distal margin of gvc and apical aedeagus + gonossiculus and weakest sclerotization at harpe.

Etymology

The species name is derived from the Swahili word ‘brashi’ which means ‘brush’, with reference to the brush-like median setae of the harpe.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 4 Sep. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036857.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036858 • 1 ♂; Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036859 • 1 ♂; Kakamega Forest; 00°19'45.7 N, 34°52'2.8 E; 1573 m a.s.l.; 7 Aug. 2007; F. Hita Garcia leg.; Transect 21; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036860 • 2 ♂♂; same collection data as for holotype; ZFMK-HYM-00036861, ZFMK-HYM-00036862.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.27–1.43 mm (1.43 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel light brown, flagellum brown, gradually darkening from F1 to F9; legs yellowish except coxae dark brown with distal third light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 4.8 × as long as pedicel, scape longer than F1 and F2 combined, F1 2.6 × as long as wide, F1 2.5 × as long as pedicel, F1 1.4 × as long as F2, F1 shorter than F7 and F8 combined, F1 slightly shorter than F9, F6 1.7 × as long as wide, F6 shorter than F7 and F8 combined, F6 1.3 × as high as F9; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and distinctly shorter than width of flagellomeres.

HEAD. Head width $1.05\text{--}1.15 \times (1.15)$ head height; head width $1.98\text{--}2.08 \times (1.98)$ interorbital space; maximum eye diameter $1.26\text{--}1.44 \times (1.44)$ minimum eye diameter; head height $1.64\text{--}1.82 \times (1.64)$ maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.46\text{--}0.50:0.31\text{--}0.38$ ($1.00:0.46:0.38$); OOL $1.86\text{--}2.36 \times (1.86)$ lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus distinctly raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.97\text{--}0.99 \times (0.97)$ mesosoma width; Weber length $480\text{--}525 \mu\text{m}$ ($525 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area sparsely setose, setae curved backwards; mesoscutellum sparsely setose in anterior half, setae curved backwards or straight. Mesoscutum width $1.83\text{--}1.96 \times (1.86)$ mesoscutellum width; posterior mesoscutal width $1.58\text{--}1.71 \times (1.58)$ mesoscutellum width; mesoscutellum length $1.53\text{--}1.79 \times (1.53)$ mesoscutellum width; mesoscutellum length $0.90\text{--}1.06 \times (0.96)$ posterior mesoscutal width; Weber length $1.25\text{--}1.45 \times (1.25)$ mesoscutum width; Weber length $1.53\text{--}1.67 \times (1.53)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and slightly bifurcated end, exceeding end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.66\text{--}2.67 \times (2.67)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $200\text{--}230 \mu\text{m}$ ($230 \mu\text{m}$); Weber length $2.28\text{--}2.40 \times (2.28)$ genital length; gvc width $81\text{--}88 \mu\text{m}$ ($88 \mu\text{m}$); genital length $2.46\text{--}2.63 \times (2.63)$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.20 \times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc slightly descending proximomedially (Fig. 40C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 40A); ventral area of gvc discontinuous slightly convex; dorsal area of gvc convex (Fig. 40B), indented distomedially; proximolateral margin of gvc ascending and slightly emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 40B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.56; lateral articulation site of harpe with gvc not flush (Fig. 40A, C); ventral margin of harpe slightly concave, dorsal margin concave (Fig. 40B), lateral margin straight, widest point of harpe at articulation site with gvc (Fig. 40A, C); dorsomedial margins of harpes converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and diverging distolaterally in approximately basal third, straight and parallel to other harpe in approximately apical two thirds (Fig. 40C), apex of harpe slightly pointed (Fig. 40A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae one third as long as harpe, lateral setae oriented distodorsally and distolaterally; harpe with at least three apical setae, longest apical setae less than half as long as harpe, apical setae oriented distodorsally and distolaterally; harpe with at least eleven brush-like arranged median setae, longest median setae more than one third as long as harpe, median setae convex and oriented distomedially and medioventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 40A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at distal margin of gvc and apical aedeagus + gonossiculus and weakest sclerotization at harpe.

Female

Unknown.

Variation

The posterolateral processes of the gena are distinct in ZFMK-HYM-00036858 and comparatively smaller in ZFMK-HYM-00036857. The proximodorsal margin of the gvc is straight in ZFMK-HYM-00036858.

Biology

Host unknown, specimens collected from leaf litter.

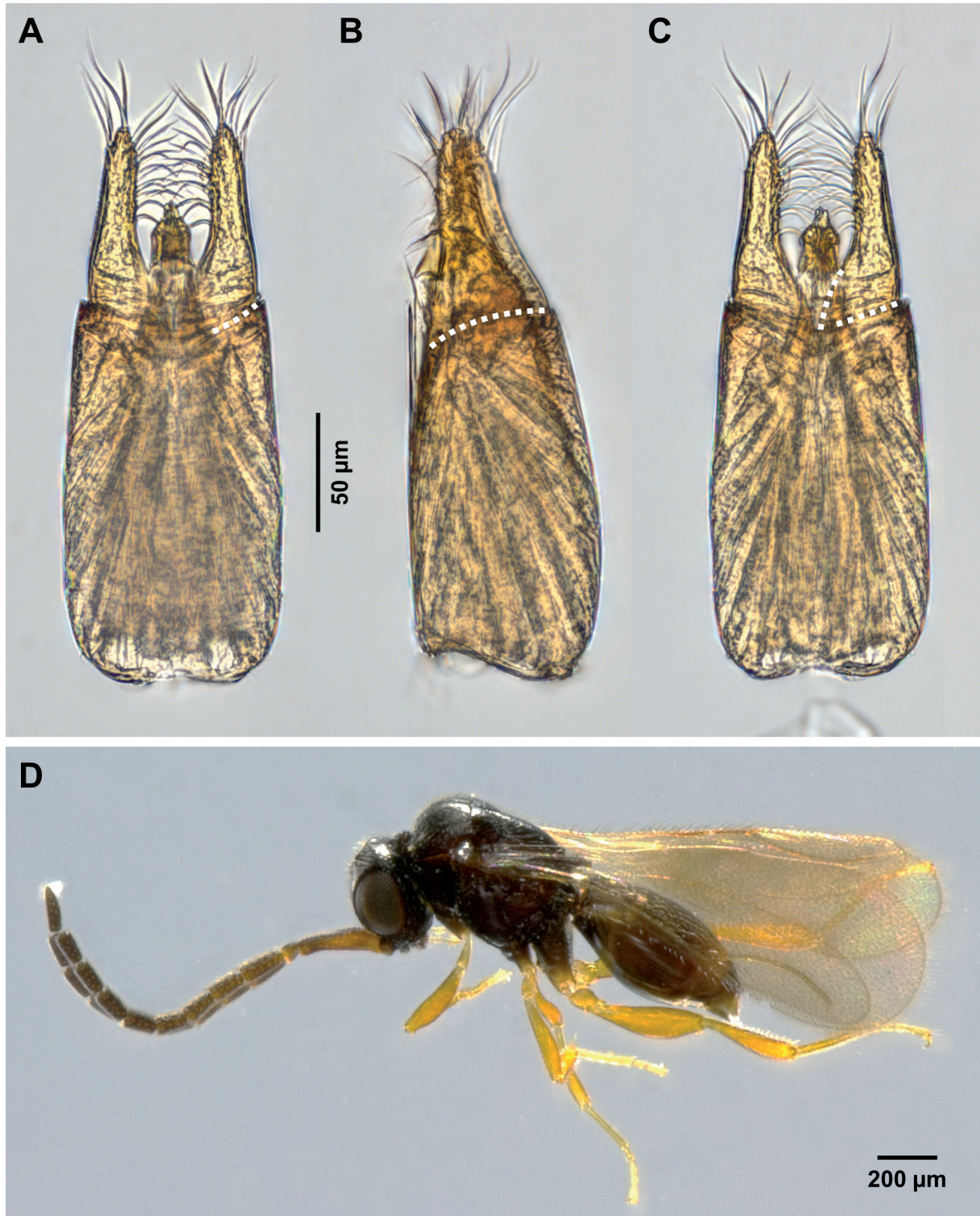


Fig. 40. Holotype of *Ceraphron brashi* sp. nov. (ZFMK-HYM-00036857). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. chemositi* sp. nov. and *C. mamamutere* sp. nov.

Condition of type material

In the holotype, the left F9 is missing.

Ceraphron breviharpis sp. nov.

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Fig. 41

Diagnosis

F8 and F9 concolourous with F1 and F2; scape shorter than F1 and F2 combined; dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; head width $1.69\text{--}1.79 \times (1.79)$ interorbital space; mesoscutellum length $1.34\text{--}1.32 \times (1.34)$ mesoscutellum width; mesoscutellum length $0.93 \times (0.93)$ posterior mesoscutal width; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent. Male genitalia: harpe triangular in ventral and dorsal view and indented apically in lateral view; harpe/gvc index 0.33; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex from base to apex, apex of harpe pointed; gvc width slightly less than gvc length; Weber length $3.41\text{--}3.78 \times (3.41)$ genital length; genital length $1.38\text{--}1.42 \times (1.42)$ gvc width; harpe with at least one lateral seta on indentation restricted to apical third; distoventral margin of gvc descending proximolaterally; distolateral margin of gvc descending dorsally; genitalia moderately sclerotized with weakest sclerotization at harpe and median gvc.

Etymology

The species name is a composition of the Latin word ‘*brevis*’, which means ‘short’, and the anatomical term ‘harpe’, with reference to the short harpes of the male genitalia.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}12'09$ N, $34^{\circ}52'06$ E; 1553 m a.s.l.; 2 May 2007; F. Hita Garcia leg.; Transect 28; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036972.

Paratype

KENYA • 1 ♂; same collection data as for holotype; ZFMK-HYM-00036973.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 1.19–1.48 mm (1.19 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel light brown, flagellum brown, gradually darkening from F1 to F7, F8 and F9 concolourous with F1 and F2; legs yellowish; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.6\times$ as long as pedicel, scape shorter than F1 and F2 combined, F1 $2.3\times$ as long as wide, F1 $2.1\times$ as long as pedicel, F1 $1.1\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.1\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.17\text{--}1.23\times$ (1.23) head height; head width $1.69\text{--}1.79\times$ (1.79) interorbital space; maximum eye diameter $1.29\text{--}1.36\times$ (1.29) minimum eye diameter; head height $1.73\text{--}1.78\times$ (1.78) maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.57–0.70:0.36–0.48 (1.00:0.70:0.48); OOL $2.10\text{--}2.80\times$ (2.10) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.94\text{--}0.97\times$ (0.97) mesosoma width; Weber length 394–425 μm (394 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.77\text{--}1.79\times$ (1.79) mesoscutellum width; posterior mesoscutal width $1.42\text{--}1.45\times$ (1.45) mesoscutellum width; mesoscutellum length $1.34\text{--}1.32\times$ (1.34) mesoscutellum width; mesoscutellum length $0.93\times$ (0.93) posterior mesoscutal width; Weber length $1.21\text{--}1.24\times$ (1.21) mesoscutum width; Weber length $1.62\text{--}1.66\times$ (1.62) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection indistinct in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) absent; diffuse number of indistinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.73\text{--}2.79\times$ (2.79) width; stigmal vein longer than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length 113–116 μm (116 μm); Weber length $3.41\text{--}3.78\times$ (3.41) genital length; gvc width 81 μm (81 μm); genital length $1.38\text{--}1.42\times$ (1.42) gvc width; gvc width slightly less than gvc length; gvc width $1.13\times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 41C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximolaterally (Fig. 41A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 41B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending dorsally (Fig. 41B). Harpe triangular in ventral and dorsal view and indented apically in lateral view; harpe/gvc index 0.33; lateral articulation site of harpe with gvc virtually flush (Fig. 41A, C); ventral margin of harpe slightly concave, dorsal margin straight (Fig. 41B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 41A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex from base to apex (Fig. 41C), apices of harpe pointed (Fig. 41B). At least one lateral seta on indentation restricted to apical third, longest lateral seta more than three quarters as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least one apical seta on each apex, longest apical setae three quarters as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least four median setae, longest median setae half as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 41A, C) and as ventral as dorsal apex harpe. Genitalia moderately sclerotized with weakest sclerotization at harpe and median gvc.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

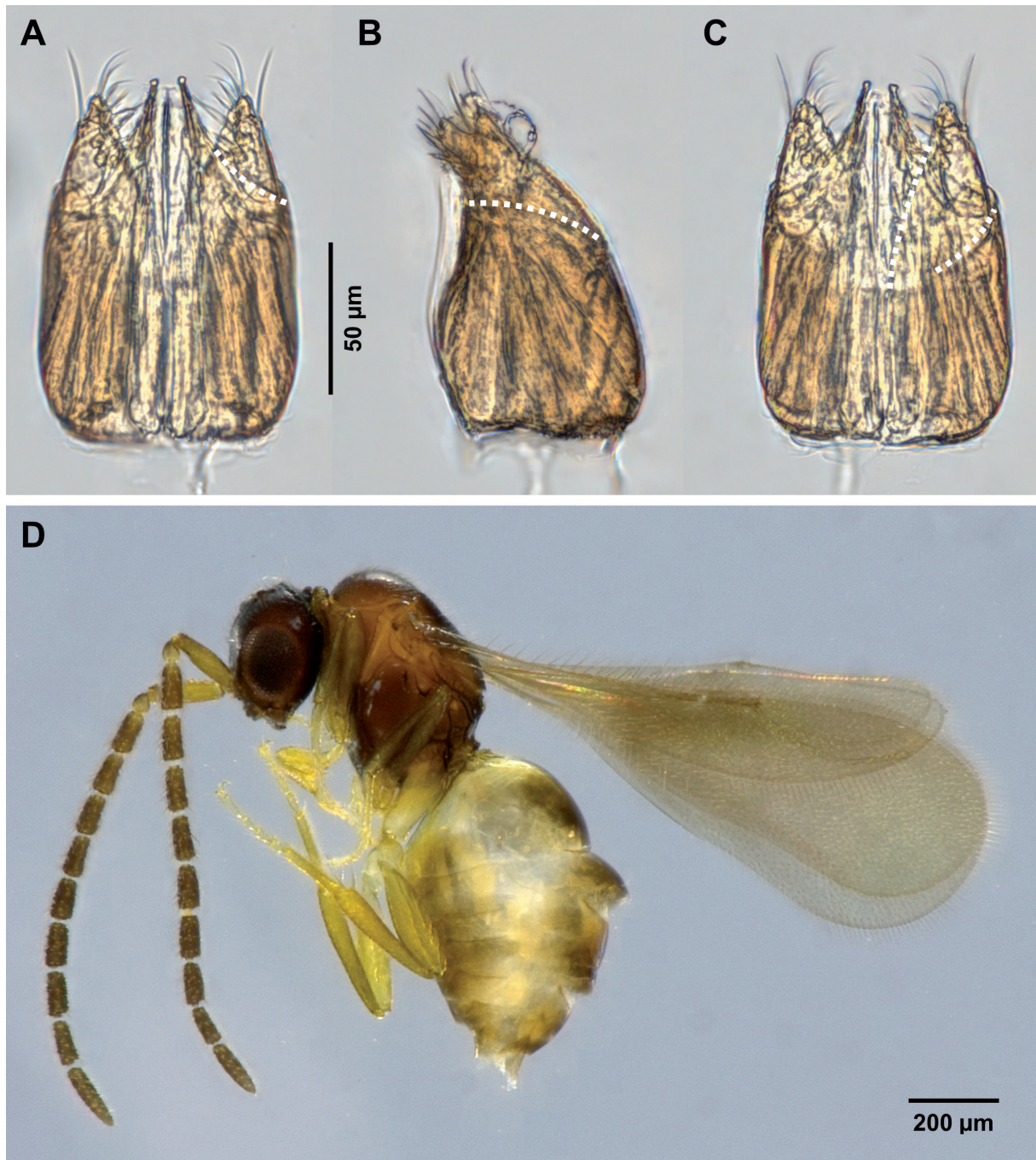


Fig. 41. Holotype of *Ceraphron breviharpis* sp. nov. (ZFMK-HYM-00036972). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron breviharpis sp. nov. can be distinguished from all other treated species of *Ceraphron* by a very short scape, the absence of the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex, the absence of the basal transverse carina of the petiole (on syntergum), and very unique male genitalia with an apical indentation, a combination of characters that otherwise can only be found in some species of the genus *Aphanogmus*. However, based on the current genus diagnoses, the assignment of *C. breviharpis* to *Ceraphron* is clear.

Condition of type material

In the holotype, the metasoma is deformed, thus the body length measurement is not precise.

Ceraphron breviscapus sp. nov.

urn:lsid:zoobank.org:act:533F23B6-3B67-4A02-ABDD-D4A4FDCA4CAF

Fig. 42

Diagnosis

Distal end of marginal and pterostigma marginal vein distinctly darker than remaining venation; flagellomeres cylindrical and F5 to F8 slightly compressed laterally; scape $2.9\times$ as long as pedicel, scape as long as F1 and F2 combined; head width $1.05\text{--}1.07\times$ (1.05) head height; Weber length $1.29\text{--}1.33\times$ (1.29) mesoscutellum length; mesometapleural sulcus absent, mesometapleuron with distinct longitudinal striations. Male genitalia: harpe triangular to cone-shaped in ventral and dorsal view; harpe/gvc index 0.74; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe from base to apex, apex of harpe rounded, oriented slightly distomedially; dorsal area of gvc indistinct and straight, strongly indented distomedially; ventral and dorsal area of gvc straight; harpe with at least two lateral setae restricted to apical half, longest lateral setae more than half as long as harpe.

Etymology

The species name is a composition of the Latin word '*brevis*', which means 'short', and the anatomical term 'scape', with reference to the short scape.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}27'0.9$ N, $34^{\circ}50'52.9$ E; 1649 m a.s.l.; 3 Jul. 2007; F. Hita Garcia leg.; Transect 8; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036916.

Paratype

KENYA • 1 ♂; same collection data as for holotype; ZFMK-HYM-00036917.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 0.88–1.06 mm (0.88 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum brown, gradually darkening from F1 to F9; legs yellowish except proximal half of pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, distal end of marginal and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing more strongly melanized along wing venation.

ANTENNA. 11-segmented, flagellomeres cylindric and F5 to F8 slightly compressed laterally; scape $2.9 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $1.9 \times$ as long as wide, F1 $1.4 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.3 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3 \times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.05\text{--}1.07 \times (1.05)$ head height; head width $1.81\text{--}2.07 \times (1.81)$ interorbital space; maximum eye diameter $1.21\text{--}1.35 \times (1.35)$ minimum eye diameter; head height $1.71\text{--}1.77 \times (1.77)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL $1.00:0.55\text{--}0.67:0.45\text{--}0.61 (1.00:0.55:0.45)$; OOL $2.00\text{--}2.75 \times (2.75)$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus light and slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.02\text{--}1.07 \times (1.07)$ mesosoma width; Weber length $331\text{--}381 \mu\text{m} (331 \mu\text{m})$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum slightly projecting and setose, setae curved backwards. Mesoscutum width $1.86\text{--}2.08 \times (1.86)$ mesoscutellum width; posterior mesoscutal width $1.52\text{--}1.58 \times (1.52)$ mesoscutellum width; mesoscutellum length $1.64\text{--}1.74 \times (1.64)$ mesoscutellum width; mesoscutellum length $1.08\text{--}1.10 \times (1.08)$ posterior mesoscutal width; Weber length $1.11\text{--}1.14 \times (1.14)$ mesoscutum width; Weber length $1.29\text{--}1.33 \times (1.29)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, oriented posterodorsally in lateral view with broad, blunt and lighter end; mesometapleural sulcus absent, mesometapleuron with distinct longitudinal striations; posterior propodeal projection distinctly short, posterodorsally oriented and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least five basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.81\text{--}2.84 \times (2.81)$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $125\text{--}134 \mu\text{m} (125 \mu\text{m})$; Weber length $2.65\text{--}2.84 \times (2.65)$ genital length; gvc width $42\text{--}48 \mu\text{m} (42 \mu\text{m})$; genital length $2.77\text{--}2.96 \times (2.96)$ gvc width; gvc width two thirds of gvc length; gvc width $1.06 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 42C); proximoventral margin of gvc convex; distoventral margin of gvc descending proximomedially (Fig. 42A); ventral area of gvc straight; dorsal area of gvc indistinct and straight (Fig. 42B), strongly indented distomedially; proximolateral margin of gvc concave; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 42B). Harpe triangular to cone-shaped in ventral and dorsal view; harpe/gvc index 0.74; lateral articulation site of harpe with gvc not flush (Fig. 42A, C); ventral margin of harpe straight, dorsal margin straight (Fig. 42B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 42A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe from base to apex (Fig. 42C), apex of harpe rounded, oriented slightly distomedially (Fig. 42A,

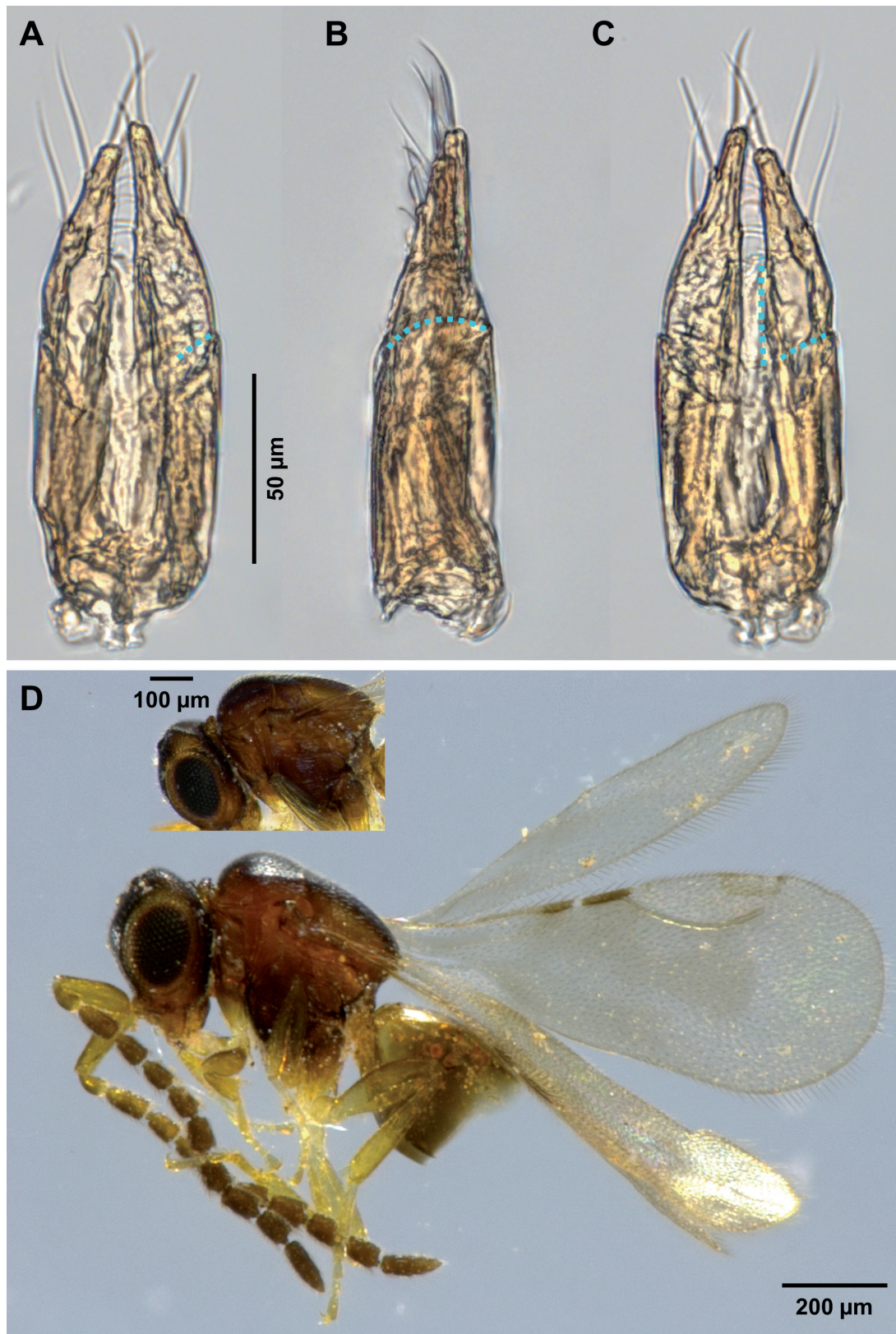


Fig. 42. Holotype of *Ceraphron breviscapus* sp. nov. (ZFMK-HYM-00036916). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: mesometapleuron in slightly different lateral view.

C). Harpe with at least two lateral setae restricted to apical half, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least three median setae, longest median setae less than one quarter as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus half as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 42A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with weakest sclerotization at harpe and aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron breviscapus sp. nov. is a unique species, easily distinguishable from all other species by body and/or male genitalia characters. It has a very short scape, slightly compressed flagellomeres, a slightly projecting mesoscutellum, and male genitalia with long lateral setae. The longitudinal striation on the mesometapleuron in *C. breviscapus* somehow resembles the longitudinal striations in many *Aphanogmus*-species but narrows towards the posterior end of the mesometapleuron, i.e., is distinctly different from *Aphanogmus*.

Condition of type material

In the holotype, the posterior half of the metasoma is missing, thus the body length measurement is not precise. The dorsal area of the gvc is slightly deformed.

Ceraphron buyangu sp. nov.

urn:lsid:zoobank.org:act:C8E7D470-957B-4F6E-AB4E-3837C7BF0C6D

Fig. 43

Diagnosis

Legs yellowish except metacoxa light yellow; scape shorter than F1 and F2 combined; F1 2.6 × as long as wide; fore wing length 3.09–3.33 × (3.09) width. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.93; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe from base to apex, apex of harpe pointed, oriented slightly distomedially; apical and median setae of harpe distinctly crossing; longest apical setae more than two thirds as long as harpe; gvc width slightly less than gvc length; gvc width equal to distal gvc width; genitalia weakly sclerotized with strongest sclerotization at apical third of harpe and weakest sclerotization at aedeagus + gonossiculus;

Etymology

The species is named after the Buyangu hill which is close to the type locality.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°21'4.4 N, 34°51'41.1 E; 1602 m a.s.l.; 5 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036929.

Paratypes

KENYA – **Western Province** • 2 ♂♂; same collection data as for holotype; ZFMK-HYM-00036930, ZFMK-HYM-00036932 • 4 ♂♂; Kakamega Forest; 00°21'4.4 N, 34°51'41.1 E; 1602 m a.s.l.; 7 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036931, ZFMK-HYM-00036933 to ZFMK-HYM-00036935.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.06–1.18 mm (1.06 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape, pedicel and flagellum light brown, gradually darkening from F1 to F9; legs yellowish except metacoxa light yellow; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing more strongly melanized along wing venation.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.5 × as long as pedicel, scape shorter than F1 and F2 combined, F1 2.6 × as long as wide, F1 2.1 × as long as pedicel, F1 1.5 × as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 2.0 × as long as wide, F6 shorter than F7 and F8 combined, F6 1.3 × as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.06–1.11 × (1.11) head height; head width 1.96–2.04 × (2.00) interorbital space; maximum eye diameter 1.25–1.27 × (1.27) minimum eye diameter; head height 1.67–1.73 × (1.68) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.36–0.44:0.34–0.53 (1.00:0.36:0.34); OOL 1.50–2.20 × (2.20) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus light and slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 1.06–1.16 × (1.16) mesosoma width; Weber length 313–356 μm (313 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width 1.75–1.89 × (1.89) mesoscutellum width; posterior mesoscutal width 1.36–1.38 × (1.36) mesoscutellum width; mesoscutellum length 1.45–1.50 × (1.45) mesoscutellum width; mesoscutellum length 1.07–1.09 × (1.07) posterior mesoscutal width; Weber length 1.20–1.36 × (1.20) mesoscutum width; Weber length 1.56–1.58 × (1.56) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, oriented posterodorsally in lateral view with broad, blunt and lighter end; mesometapleural sulcus absent; posterior propodeal projection very short and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; Basal longitudinal carinae on syntergum indistinct; pair of translucent patches on metasomal syntergum.

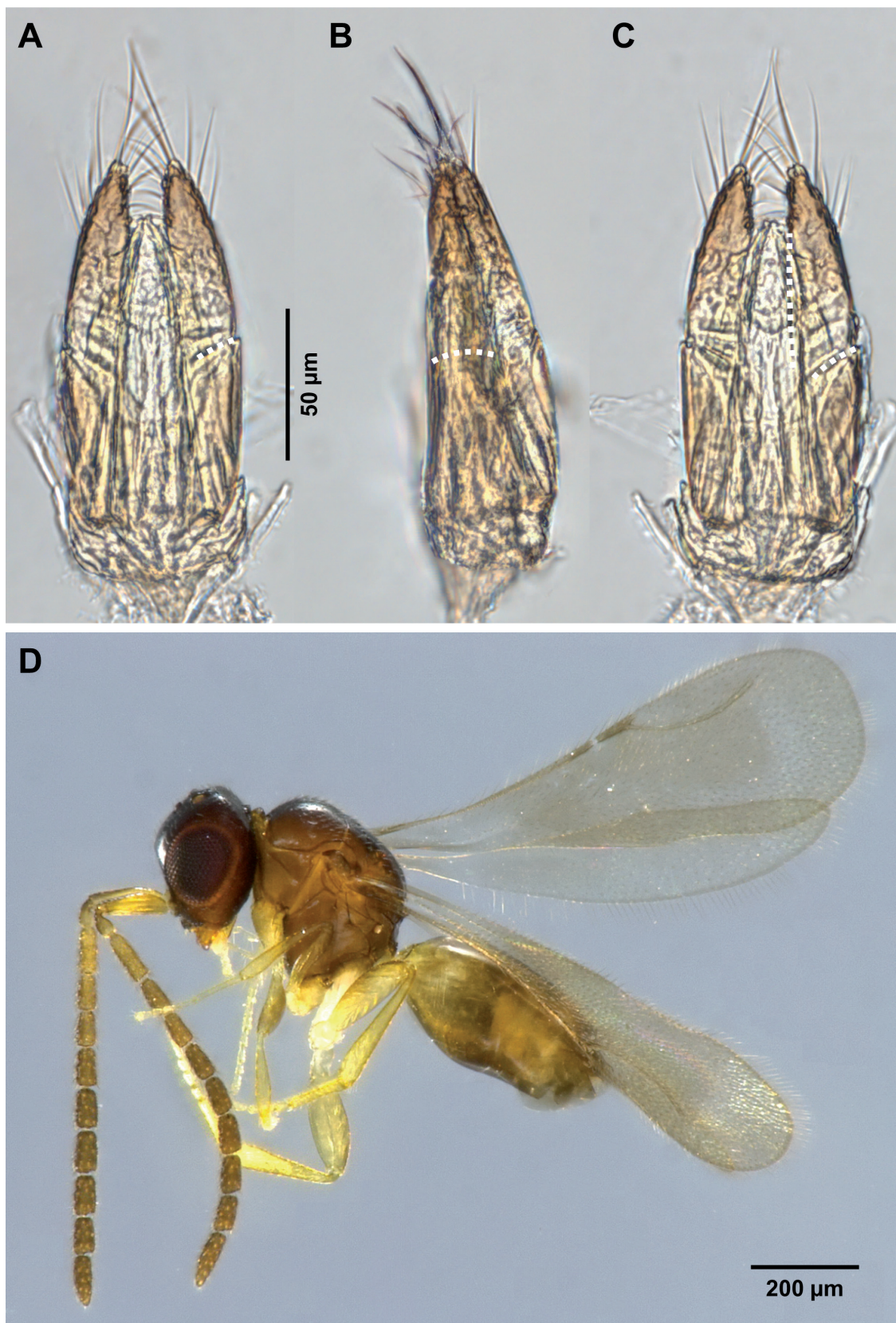


Fig. 43. Holotype of *Ceraphron buyangu* sp. nov. (ZFMK-HYM-00036929). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

FORE WING. Length $3.09\text{--}3.33 \times (3.09)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $119\text{--}138 \mu\text{m}$ ($119 \mu\text{m}$); Weber length $2.59\text{--}2.65 \times (2.63)$ genital length; gvc width $56\text{--}63 \mu\text{m}$ ($56 \mu\text{m}$); genital length $2.11\text{--}2.26 \times (2.11)$ gvc width; gvc width slightly less than gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc concave; distodorsal margin of gvc descending proximomedially (Fig. 43C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 43A); ventral area of gvc straight; dorsal area of gvc indistinct and slightly convex (Fig. 43B), indented distomedially; proximolateral margin of gvc slightly concave; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 43B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.93; lateral articulation site of harpe with gvc virtually flush (Fig. 43A, C); ventral margin of harpe straight, dorsal margin slightly convex (Fig. 43B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 43A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe from base to apex (Fig. 43C), apex of harpe pointed, oriented slightly distomedially (Fig. 43A, C). Harpe with at least four lateral setae restricted to apical third, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae more than two thirds as long as harpe, apical setae distinctly crossing and oriented distomedially and distoventrally; harpe with at least three median setae, longest median setae more than one quarter as long as harpe, median setae distinctly crossing and oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus three quarters as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 43A, C) and as ventral as apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at apical third of harpe and weakest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

ZFMK-HYM-00036932 is comparatively small and light.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. pleurosulcus* sp. nov. and *C. breviscapus* sp. nov.

Condition of type material

In the holotype, the end of the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron chemositi sp. nov.

urn:lsid:zoobank.org:act:233262C3-9CC0-4BD7-932F-3C179FD93718

Fig. 44

Diagnosis

Scape, pedicel and flagellum brown; sensillae on flagellomeres distinctly shorter than width of flagellomeres; posterolateral processes of gena present; head width $2.08\text{--}2.28 \times (2.28)$ interorbital

space; OOL:LOL 2.78–3.33 (2.78); fore wing length $2.53\text{--}2.89 \times (2.53)$ width. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.47; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal half, straight and parallel to other harpe in apical half; harpe with at least eight brush-like arranged and slightly convex median setae; harpe with at least four lateral setae restricted to apical third; dorsal area of gvc indented distomedially; genitalia moderately sclerotized with strongest sclerotization at apical aedeagus + gonossiculus and weakest sclerotization at harpes.

Etymology

The species is named after the Nandi bear ‘Chemosit’, which is part of east African folklore.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036863.

Paratypes

KENYA • 2 ♂♂; Western Province, Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 28 Aug. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036864, ZFMK-HYM-00036865.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.40–1.56 mm (1.56 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape, pedicel and flagellum brown; legs yellowish except coxae dark brown with distal third light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.2 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.3 \times$ as long as wide, F1 $2.0 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 slightly shorter than F9, F6 $1.8 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.4 \times$ as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and distinctly shorter than width of flagellomeres.

HEAD. Head width $1.12\text{--}1.18 \times (1.17)$ head height; head width $2.08\text{--}2.28 \times (2.28)$ interorbital space; maximum eye diameter $1.15\text{--}1.33 \times (1.15)$ minimum eye diameter; head height $1.71\text{--}1.79 \times (1.79)$ maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.40–0.46:0.30–0.36 (1.00:0.46:0.36); OOL $2.00\text{--}2.31 \times (2.15)$ lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus distinctly raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.00\text{--}1.03 \times (1.03)$ mesosoma width; Weber length 500–513 μm (513 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.57\text{--}1.74 \times (1.60)$ mesoscutellum width; posterior mesoscutal width $1.46\text{--}1.56 \times (1.51)$ mesoscutellum width; mesoscutellum length $1.42\text{--}1.54 \times (1.42)$ mesoscutellum width;

mesoscutellum length $0.94\text{--}1.05 \times (0.94)$ posterior mesoscutal width; Weber length $1.35\text{--}1.42 \times (1.35)$ mesoscutum width; Weber length $1.49\text{--}1.53 \times (1.52)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt, lighter and slightly bifurcated end, exceeding end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.53\text{--}2.89 \times (2.53)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $206\text{--}225 \mu\text{m}$ ($225 \mu\text{m}$); Weber length $2.28\text{--}2.48 \times (2.28)$ genital length; gvc width $88\text{--}100 \mu\text{m}$ ($94 \mu\text{m}$); genital length $2.06\text{--}2.40 \times (2.40)$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.25 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc descending proximomedially (Fig. 44C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 44A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 44B), indented distomedially; proximolateral margin of gvc slightly ascending and emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 44B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.47; lateral articulation site of harpe with gvc not flush (Fig. 44A, C); ventral margin of harpe slightly concave, dorsal margin slightly concave (Fig. 44B), lateral margin convex, widest point of harpe at articulation site with gvc (Fig. 44A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal half, straight and parallel to other harpe in apical half (Fig. 44C), apex of harpe rounded (Fig. 44A, C). Harpe with at least three lateral setae restricted to apical third, longest lateral setae half as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae less than one third as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least eight brush-like arranged median setae, longest median setae less than one third as long as harpe, median setae slightly convex and oriented distomedially and medioventrally. Aedeagus + gonossiculus less than three quarters as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 44A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at apical aedeagus + gonossiculus and weakest sclerotization at harpe.

Female

Unknown.

Variation

The arrangement and the number of distinct longitudinal carinae on the syntergum varies between at least six (ZFMK-HYM-00036863, ZFMK-HYM-00036864) and at least seven (ZFMK-HYM-00036865).

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron chemositi sp. nov., *C. nandi* sp. nov. and *C. brashi* sp. nov. share a dark body colouration and large body size, but differ in rather subtle characters of the male genitalia, most importantly the dorsomedial margins of the harpes and the arrangement of the lateral setae of the harpes. In *C. chemositi*,

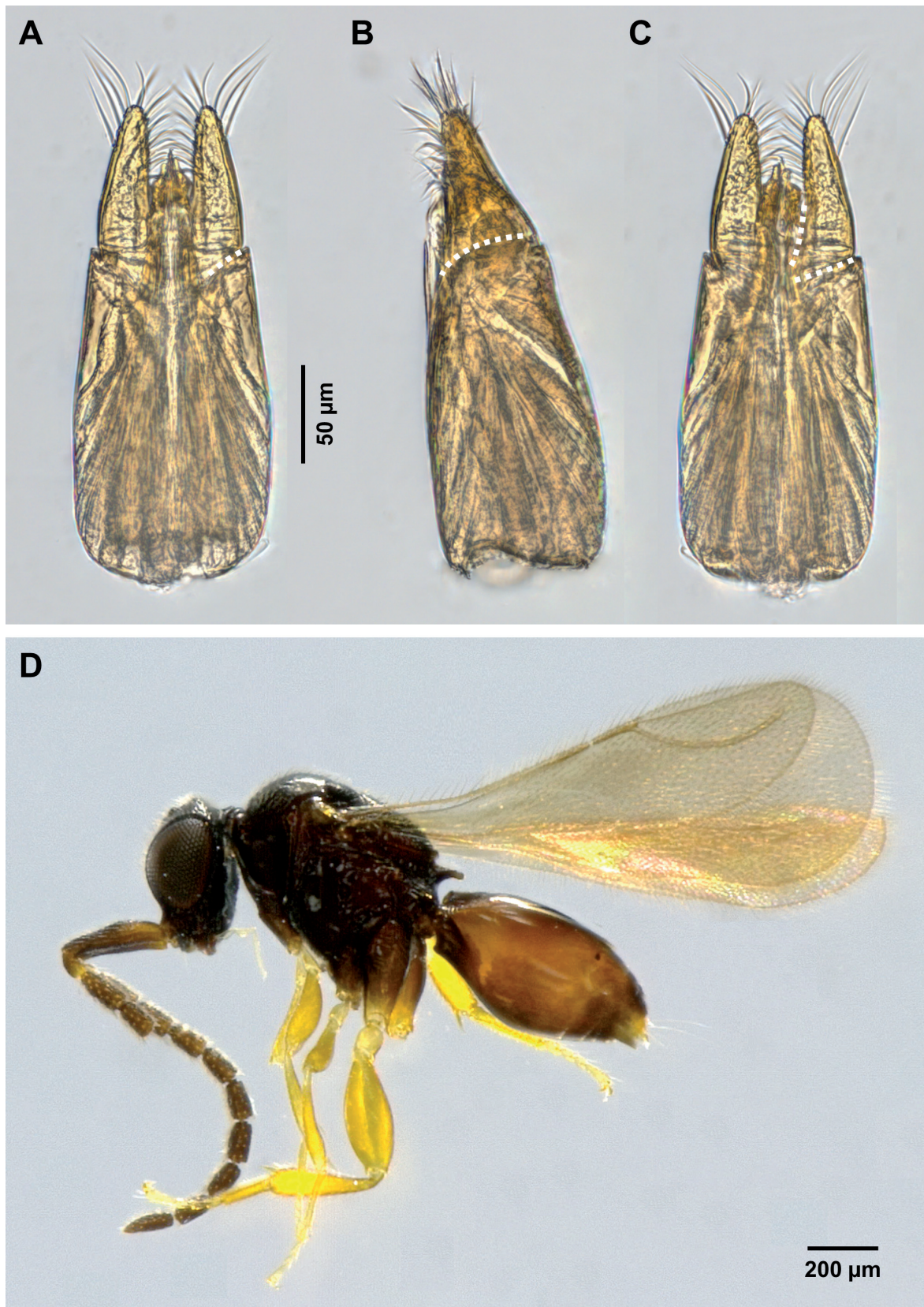


Fig. 44. Holotype of *Ceraphron chemositi* sp. nov. (ZFMK-HYM-00036863). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

the dorsomedial margin of the harpe is straight and slightly diverging distolaterally in the basal half and straight and parallel to the other harpe in the apical half. In *C. nandi*, the dorsomedial margin of the harpe is straight and slightly diverging distolaterally from base to apex; in *C. brashi* it is slightly convex and diverging distolaterally in approximately the basal third and straight and parallel to the other harpe in approximately the apical two thirds. The arrangement of the lateral setae of the harpes is different in all three species (for details, see descriptions). In addition, the harpes of *C. brashi* are finger-shaped; those of *C. chemositi* and *C. nandi* are cone-shaped.

For more comparisons with similar species, see remarks under *C. mamamutere* sp. nov.

Condition of type material

In the holotype, the left F3–F9, the right middle leg (except coxa) and the right fore leg (except coxa and femur) are missing. The gvc of paratype ZFMK-HYM-00036864 was accidentally darkened/stained probably during marking the slide with a black permanent marker.

Ceraphron cingulum sp. nov.

urn:lsid:zoobank.org:act:A20F2821-7206-4198-89D2-A2F4CEBA0EA9

Fig. 45

Diagnosis

Mesosoma light brown-yellowish, metasoma light brown-yellowish; flagellomeres cylindric and moniliform (F2–F4); scape as long as F1 to F3 combined; F1 $0.9 \times$ as long as pedicel; head width $1.71\text{--}1.90 \times (1.77)$ interorbital space; head height $1.57\text{--}1.83 \times (1.83)$ maximum eye diameter. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.79; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe concave from base to apex; ventral margin of harpe straight and emarginated at apical third; genital length $1.87\text{--}2.06 \times (2.00)$ gvc width.

Etymology

The species name is derived from the Latin word ‘*cingulum*’ which means ‘belt’, with reference to the sampling locations in the Kakamega Forest of Kenya, the easternmost remnant of the Guineo-Congolian rainforest belt and the rainforest of Gabon, close to the west coast of Central Africa.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}14'20.5$ N, $34^{\circ}51'52.8$ E; 1634 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036998.

Paratypes

KENYA • 1 ♂; same collection data as for holotype; ZFMK-HYM-00036999.

GABON • 1 ♂; Ogooué-Ivindo, Ivindo NP, Makokou; $00^{\circ}30'44$ N, $12^{\circ}46'12$ E; 518 m a.s.l.; 13–16 Sep. 2012; R.S. Peters leg.; forest near station; Pitfall trap; ZFMK; ZFMK-HYM-00037091.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.63–0.85 mm (0.85 mm).

COLOUR. Head light brown, mesosoma light brown-yellowish, metasoma light brown-yellowish; scape and pedicel light yellow and transparent, flagellum light brown and transparent, gradually darkening from F1 to F9; legs yellowish; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindric and moniliform (F2–F4); scape $2.7 \times$ as long as pedicel, scape as long as F1 to F3 combined, F1 $1.5 \times$ as long as wide, F1 $0.9 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.2 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and slightly shorter than width of flagellomeres.

HEAD. Head width $1.13\text{--}1.15 \times$ (1.15) head height; head width $1.71\text{--}1.90 \times$ (1.77) interorbital space; maximum eye diameter $1.20\text{--}1.54 \times$ (1.20) minimum eye diameter; head height $1.57\text{--}1.83 \times$ (1.83) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL $1.00:0.50\text{--}0.67:0.53\text{--}0.67$ (1.00:0.67:0.67); OOL $2.46\text{--}2.67 \times$ (2.50) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.03\text{--}1.09 \times$ (1.06) mesosoma width; Weber length $225\text{--}250 \mu\text{m}$ (250 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards. Mesoscutum width $1.82\text{--}1.88 \times$ (1.83) mesoscutellum width; posterior mesoscutal width $1.35\text{--}1.49 \times$ (1.49) mesoscutellum width; mesoscutellum length $1.47\text{--}1.64 \times$ (1.54) mesoscutellum width; mesoscutellum length $1.04\text{--}1.13 \times$ (1.04) posterior mesoscutal width; Weber length $1.16\text{--}1.29 \times$ (1.25) mesoscutum width; Weber length $1.44\text{--}1.48 \times$ (1.48) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt and lighter end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least five, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.86\text{--}3.16 \times$ (3.09) width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $84\text{--}90 \mu\text{m}$ (88 μm); Weber length $2.67\text{--}2.86 \times$ (2.86) genital length; gvc width $44\text{--}45 \mu\text{m}$ (44 μm); genital length $1.87\text{--}2.06 \times$ (2.00) gvc width; gvc width slightly less than gvc length; gvc width $1.05 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 45C); proximoventral margin of gvc convex; distoventral margin of gvc slightly descending proximomedially (Fig. 45A); ventral area of gvc convex; dorsal area of gvc straight (Fig. 45B); proximolateral margin of gvc descending ventrally; distolateral margin of gvc convex (Fig. 45B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.79; lateral articulation site of harpe with gvc not flush (Fig. 45A, C); ventral margin of harpe straight and emarginated at apical third, dorsal margin convex in basal third and concave in apical two thirds, emarginated at apical quarter (Fig. 45B), lateral margin slightly convex and emarginated at apical third, widest point of harpe at lateral articulation site with gvc (Fig. 45A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe concave from base to apex (Fig. 45C), apex of harpe pointed (Fig. 45A, C). At least two lateral setae restricted to apical third, longest lateral setae less than half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae more than one third as long as harpe, apical setae oriented

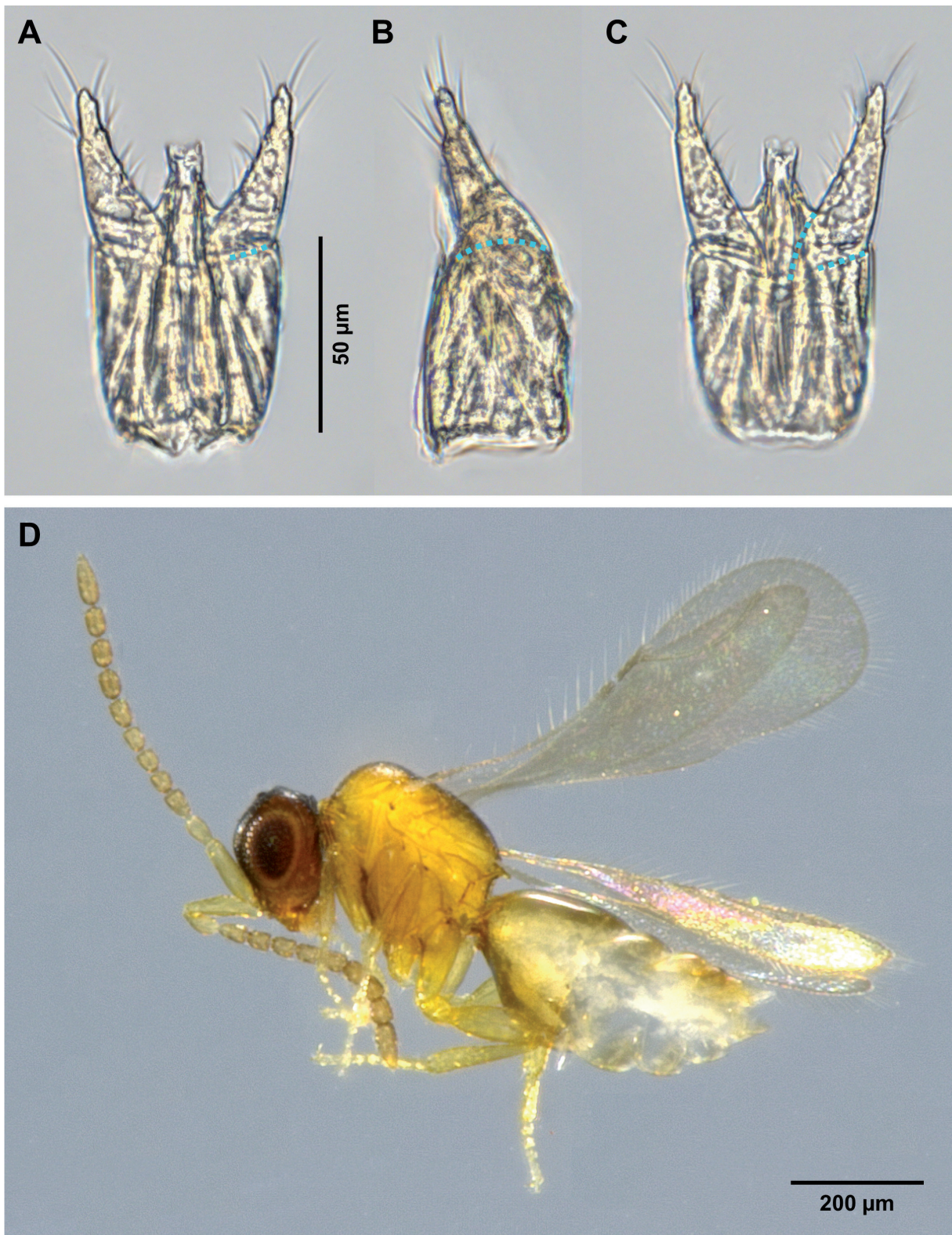


Fig. 45. Holotype of *Ceraphron cingulum* sp. nov. (ZFMK-HYM-00036998). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

distolaterally, distomedially and distoventrally; harpe with at least four median setae, longest median setae more than one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 45A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized, almost transparent.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter (Kenya) or with pitfall trap (Gabon).

Distribution

Afrotropical: Gabon and Kenya.

Remarks

Comparison with similar species

The combination of the light body colouration and the weakly sclerotized, almost transparent genitalia is shared between *Ceraphron cingulum* sp. nov., *Cyoceraphron invisibilis* sp. nov., and *Cyoceraphron njano* sp. nov., which makes them similar at first sight. However, *C. cingulum* does not belong to *Cyoceraphron*, and species can be easily distinguished from each other by numerous body and male genitalia characters

For more comparisons with similar species, see remarks under *C. longumerunus* sp. nov.

Condition of type material

In the holotype, the right middle leg is missing (except coxa). The metasoma is deformed, thus the body length measurement is not precise. The paratype ZFMK-HYM-00037091 was used in an unsuccessful DNA barcoding attempt, i.e., had been put in lysis buffer for non-destructive DNA extraction, and looks more transparent.

Ceraphron clavatumeris sp. nov.

urn:lsid:zoobank.org:act:84CACE36-2DDC-488B-9FCD-E10C149012CC

Fig. 46

Diagnosis

Proximal half of scape lighter; legs light brown-yellowish except coxae lighter; few elongate multiporous plates on flagellomeres; flagellomeres cylindric and moniliform (F2–F7); head width $1.70 \times$ interorbital space; OOL $3.50 \times$ lateral ocellus diameter; mesoscutellum length $1.24 \times$ mesoscutellum width; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, oriented posterodorsally in lateral view with broad and blunt end. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.57; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc (see remarks), concave and slightly diverging distolaterally in approximately basal three quarters, straight and diverging distolaterally in approximately apical quarter, apex of harpe straight; aedeagus + gonossiculus as long as harpe; genitalia weakly sclerotized, almost transparent with weaker sclerotization at aedeagus + gonossiculus; gvc width slightly more than gvc length; genital length 63 μm ; gvc width 38 μm .

Etymology

The species name is a composition of the Latin word '*clavatus*', which means 'striped', and the flagellomere, with reference to the elongate multiporous plates on the flagellomeres.

Material examined

Holotype

GABON • ♂; Ogooué-Ivindo, Ivindo NP, Makokou; 00°30'44 N, 12°46'12 E; 518 m a.s.l.; 13–16 Sep. 2012; R.S. Peters leg.; forest near station; Pitfall trap; ZFMK; ZFMK-HYM-00037092.

Description

Male

BODY LENGTH. 0.68 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel light brown-yellowish except proximal half of scape lighter, flagellum light brown; legs light brown-yellowish except coxae lighter; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing more strongly melanized along wing venation.

ANTENNA. Flagellomeres cylindric and moniliform (F2–F7); scape $2.8\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $1.9\times$ as long as wide, F1 $1.3\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F6 $1.2\times$ as long as wide; few elongate multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.13\times$ head height; head width $1.70\times$ interorbital space; maximum eye diameter $1.31\times$ minimum eye diameter; head height $1.76\times$ maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.54:0.57; OOL $3.50\times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.06\times$ mesosoma width; Weber length 194 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area sparsely setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.65\times$ mesoscutellum width; posterior mesoscutal width $1.29\times$ mesoscutellum width; mesoscutellum length $1.24\times$ mesoscutellum width; mesoscutellum length $0.95\times$ posterior mesoscutal width; Weber length $1.11\times$ mesoscutum width; Weber length $1.48\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short, oriented posterodorsally in lateral view with broad and blunt end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) indistinct; at least four basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.92\times$ width; stigmal vein shorter than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length 63 μm ; Weber length $3.10\times$ genital length; gvc width 38 μm ; genital length $1.67\times$ gvc width; gvc width slightly more than gvc length; gvc width $1.09\times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 46C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending

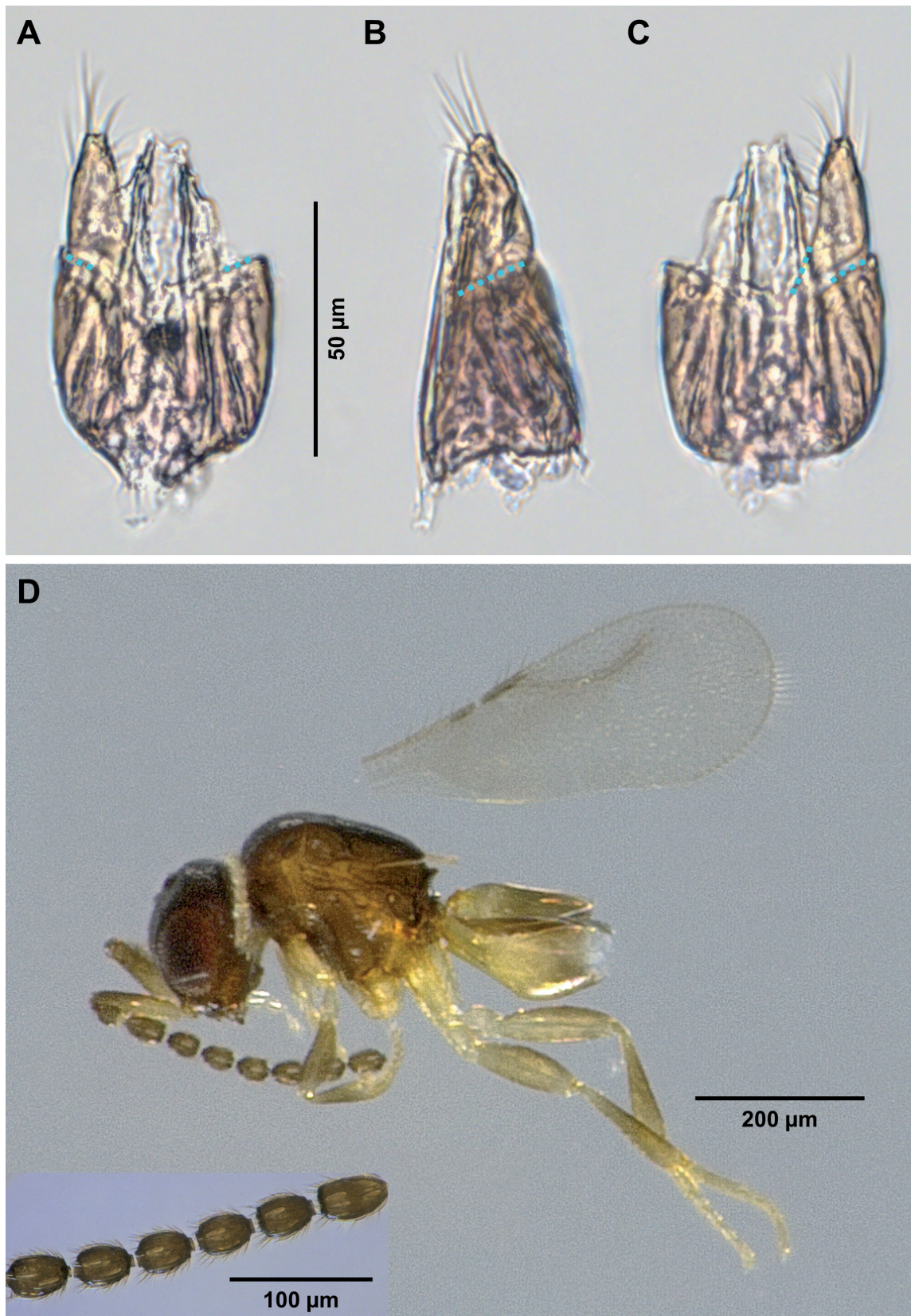


Fig. 46. Holotype of *Ceraphron clavatumeris* sp. nov. (ZFMK-HYM-00037092). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: flagellomeres in detail.

proximomedially (Fig. 46A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 46B); proximolateral margin of gvc descending ventrally; distolateral margin of gvc descending ventrally (Fig. 46B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.57; lateral articulation site of harpe with gvc not flush (Fig. 46A, C); ventral margin of harpe slightly concave, dorsal margin convex (Fig. 46B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 46A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc (see remarks), concave and slightly diverging distolaterally in approximately basal three quarters, straight and diverging distolaterally in approximately apical quarter (Fig. 46C), apex of harpe straight (Fig. 46A, C). Harpe with at least one lateral seta restricted to apical third, longest lateral seta more than half as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae two thirds as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least two median setae, longest median setae one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus as long as harpe, apex of aedeagus + gonossiculus broad (Fig. 46A, C) and as ventral as apex of harpe. Genitalia weakly sclerotized, almost transparent with weakest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with pitfall trap.

Distribution

Afrotropical: Gabon.

Remarks

Comparison with similar species

Ceraphron clavatumeris sp. nov. is easily distinguishable from all other treated species by the combination of elongate multiporous plates on cylindrical and moniliform flagellomeres and the very small and weakly sclerotized male genitalia with the aedeagus + gonossiculus as long as the harpe.

Condition of type material

In the holotype, the left F7–F9, and the right F8 and F9 are missing. One hind and one fore wing are missing and the other hind (not visible in Fig. 46D) and fore wing are detached. The left middle leg (except coxa) is missing. The posterior half of the metasoma is missing, thus the body length measurement is not precise. The most distal metatarsal segments of the left hind leg and the most distal metatarsal segments of the right hind leg are missing. The male genitalia are lacking the left harpe and the gvc was accidentally stained while marking the slide with a permanent marker. The holotype was used in an unsuccessful DNA barcoding attempt, i.e., had been put in lysis buffer for non-destructive DNA extraction, and looks rather transparent.

***Ceraphron digiti* sp. nov.**

urn:lsid:zoobank.org:act:35B2013D-F758-4BF4-8031-D61230CA915A

Fig. 47

Diagnosis

Mesosoma brown with light brown mesoscutellum; flagellum light brown, gradually darkening from F1 to F9. Male genitalia: harpe triangular to cone-shaped in ventral and dorsal view; harpe/gvc index

0.46; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal quarter, slightly concave and slightly diverging distolaterally in apical three quarters, apex of harpe pointed; proximolateral margin of gvc strongly ascending and slightly emarginated ventrally; longest lateral setae of harpe more than two thirds as long as harpe.

Etymology

The species is named in honour of the murdered mountain gorilla Digit, which was observed and named by Dian Fossey. The name refers to the light brown mesoscutellum of the otherwise brown mesosoma which reminded us of the famous silverback.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°23'6.2 N, 34°33'37.8 E; 1602 m a.s.l.; 23 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036883.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°27'0.9 N, 34°50'52.9 E; 1649 m a.s.l.; 3 Jul. 2007; F. Hita Garcia leg.; Transect 8; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036884 • 1 ♂; Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036885.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.88–1.03 mm (0.88 mm).

COLOUR. Head brown, mesosoma brown with light brown mesoscutellum, metasoma brown; scape and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except coxae brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.6× as long as pedicel, scape longer than F1 and F2 combined, F1 2.0× as long as wide, F1 1.5× as long as pedicel, F1 1.2× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.5× as long as wide, F6 shorter than F7 and F8 combined, F6 1.3× as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.06–1.15× (1.09) head height; head width 1.92–2.00× (1.92) interorbital space; maximum eye diameter 1.05–1.38× (1.19) minimum eye diameter; head height 1.62–2.14× (1.80) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.35–0.50:0.39–0.50 (1.00:0.39:0.43); OOL 1.67–2.56× (2.30) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 1.00–1.13× (1.02) mesosoma width; Weber length 344–375 μm (356 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar

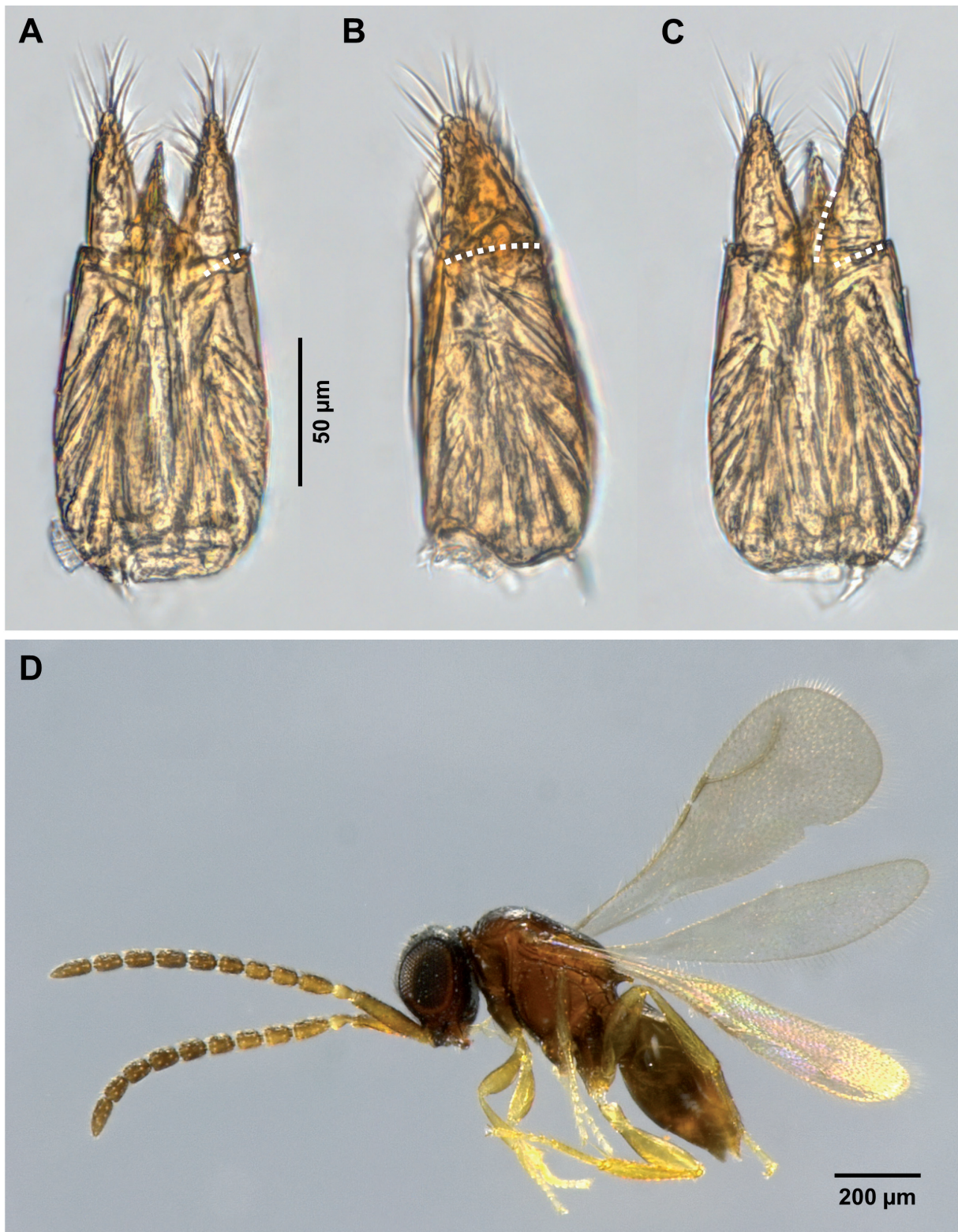


Fig. 47. Holotype of *Ceraphron digiti* sp. nov. (ZFMK-HYM-00036883). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.81\text{--}1.96 \times (1.81)$ mesoscutellum width; posterior mesoscutal width $1.48\text{--}1.53 \times (1.48)$ mesoscutellum width; mesoscutellum length $1.43\text{--}1.58 \times (1.43)$ mesoscutellum width; mesoscutellum length $0.97\text{--}1.03 \times (0.97)$ posterior mesoscutal width; Weber length $1.28\text{--}1.50 \times (1.50)$ mesoscutum width; Weber length $1.62\text{--}1.90 \times (1.90)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct and straight in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.81\text{--}2.91 \times (2.91)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $150\text{--}156 \mu\text{m}$ ($150 \mu\text{m}$); Weber length $2.24\text{--}2.40 \times (2.38)$ genital length; gvc width $69\text{--}73 \mu\text{m}$ ($69 \mu\text{m}$); genital length $2.13\text{--}2.18 \times (2.18)$ gvc width; gvc width two thirds of gvc length; gvc width $1.26 \times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc descending proximomedially (Fig. 47C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 47A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 47B); proximolateral margin of gvc strongly ascending and slightly emarginated ventrally; distolateral margin of gvc slightly descending ventrally (Fig. 47B). Harpe triangular to cone-shaped in ventral and dorsal view; harpe/gvc index 0.46; lateral articulation site of harpe with gvc not flush (Fig. 47A, C); ventral margin of harpe slightly concave, dorsal margin convex (Fig. 47B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 47A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal quarter, slightly concave and slightly diverging distolaterally in apical three quarters (Fig. 47C), apex of harpe pointed (Fig. 47A, C). Harpe with at least three lateral setae restricted to apical third, longest lateral setae more than two thirds as long as harpe, lateral setae oriented distolaterally; harpe with at least three apical setae, longest apical setae half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least six median setae restricted to apical half, longest median setae more than one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 47A, C) and as ventral as apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at harpe and aedeagus + gonossiculus.

Female

Unknown.

Variation

The anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex has a bifurcated end in ZFMK-HYM-00036884 and ZFMK-HYM-00036885.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron digiti sp. nov. and *C. sp. 5* differ distinctly in their body colouration patterns. However, the genitalia of the two species are similar, but *C. digiti* can be separated from *C. sp. 5* by the pointed apex of the harpe (rounded in *C. sp. 5*) and the different setal arrangement in both species.

For more comparisons with similar species, see remarks under *C. sp. 2*.

Condition of type material

In the holotype, the left hind wing is detached.

Ceraphron eaerendili sp. nov.

urn:lsid:zoobank.org:act:6403C051-E6A1-42E1-95E4-116C4AFFB938

Fig. 48

Diagnosis

Mesosoma light brown; lateral margin of torulus light and raised; OOL:POL 1.52; Weber length $1.31 \times$ mesoscutellum length; fore wing length $2.60 \times$ width. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 1.05; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal half, straight and parallel to other harpe in apical half, apex of harpe slightly pointed; lateral margin of harpe convex; harpe with at least four lateral setae restricted to apical half; gvc width more than three quarters of gvc length; gvc width equal to distal gvc width; genitalia weakly sclerotized with strongest sclerotization at lateral gvc; genital length $2.67 \times$ gvc width.

Etymology

The species is named after Eärendil, a character of J.R.R. Tolkien's mythology who carried a star across the sky. The light of Eärendil's star was content of the Phial of Galadriel, a gift to use in dark places from Galadriel to Frodo Baggins, which was essential for Frodo and Samwise Gamgee to escape from death. The light of Eärendil refers to the description of new species of a Dark Taxon, to shed light into the dark, and to the rather light coloured species.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036914.

Description

Male

BODY LENGTH. 0.88 mm.

COLOUR. Head brown, mesosoma light brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum light brown-yellowish, gradually darkening from F1 to F9; legs yellowish; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.6 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.1 \times$ as long as wide, F1 $1.6 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8 \times$ as long as wide, F6 shorter than F7 and F8 combined,

F6 $1.3 \times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.12 \times$ head height; head width $1.79 \times$ interorbital space; maximum eye diameter $1.44 \times$ minimum eye diameter; head height $1.80 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.66:0.50; OOL $2.67 \times$ lateral ocellus diameter. White, thick setae on upper face indistinct; supraclypeal depression present; lateral margin of torulus light and raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.01 \times$ mesosoma width; Weber length 288 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.80 \times$ mesoscutellum width; posterior mesoscutal width $1.36 \times$ mesoscutellum width; mesoscutellum length $1.59 \times$ mesoscutellum width; mesoscutellum length $1.17 \times$ posterior mesoscutal width; Weber length $1.16 \times$ mesoscutum width; Weber length $1.31 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and emarginated end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; basal longitudinal carinae on syntergum indistinct; translucent patches on metasoma absent.

FORE WING. Length $2.60 \times$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length 125 μm ; Weber length $2.30 \times$ genital length; gvc width 47 μm ; genital length $2.67 \times$ gvc width; gvc width more than three quarters of gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 48C); proximoventral margin of gvc slightly convex; distoventral margin of gvc strongly descending proximomedially (Fig. 48A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 48B), slightly indented distomedially; proximolateral margin of gvc descending and emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 48B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 1.05; lateral articulation site of harpe with gvc flush (Fig. 48A, C); ventral margin of harpe straight, dorsal margin straight (Fig. 48B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 48A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal half, straight and parallel to other harpe in apical half (Fig. 48C), apex of harpe slightly pointed, oriented slightly distomedially (Fig. 48A, C). Harpe with at least four lateral setae restricted to apical half, longest lateral setae less than half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae more than two thirds as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least three median setae restricted to apical quarter, longest median setae less than one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus half as long as harpe, apex of aedeagus + gonossiculus broad (Fig. 48A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at lateral gvc.

Female

Unknown.

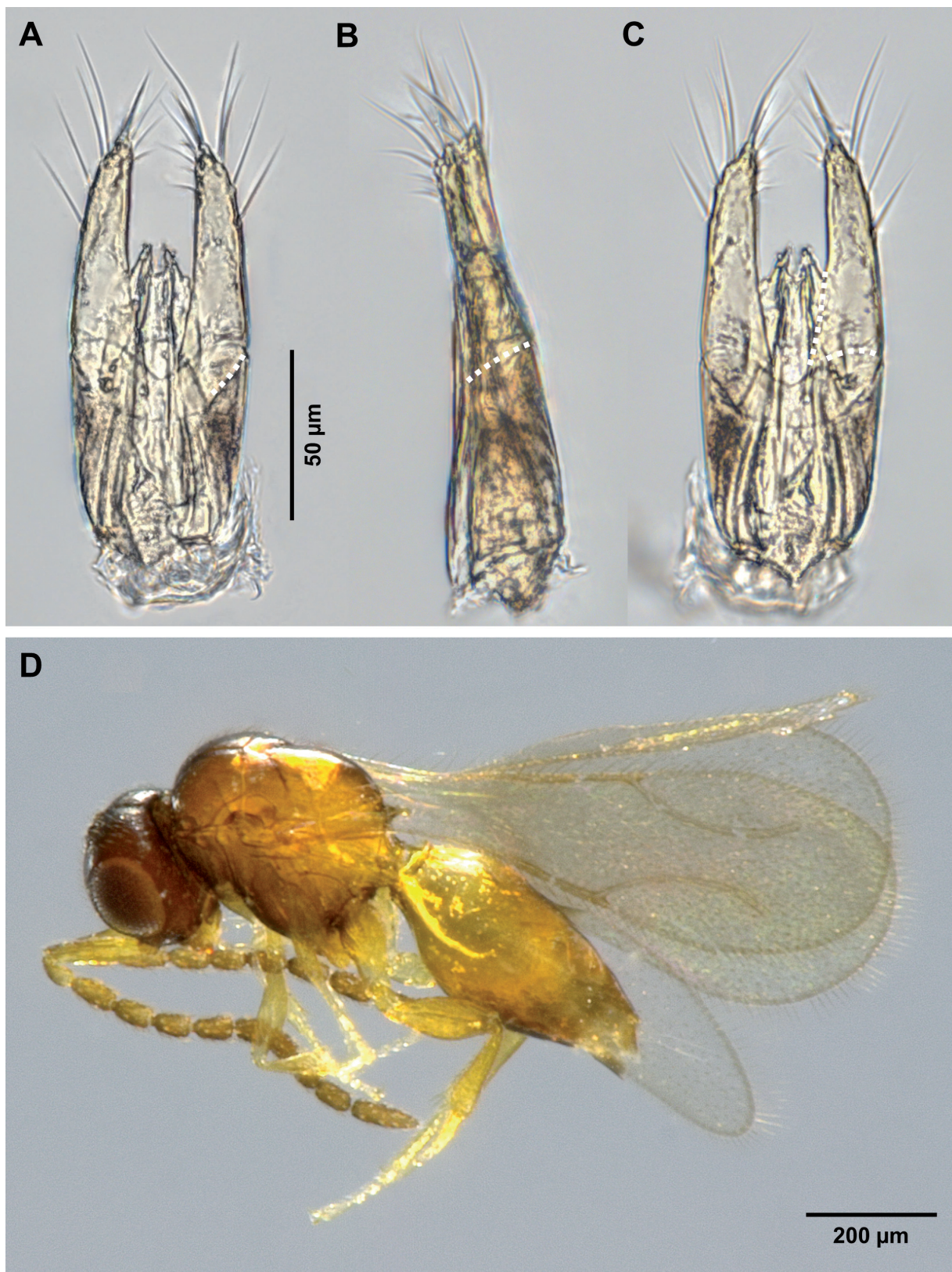


Fig. 48. Holotype of *Ceraphron eaerendili* sp. nov. (ZFMK-HYM-00036914). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *C. eaerendili* sp. nov. and *C. malava* sp. nov. are very similar in having weakly sclerotized genitalia with finger-shaped harpes and similar harpe/gvc indices. However, the lateral margin of the harpe in *C. eaerendili* is convex and straight in *C. malava*, the dorsomedial margin of the harpe is straight and slightly diverging distolaterally in basal half, straight and parallel to other harpe in apical half in *C. eaerendili*, and straight and slightly diverging distolaterally from base to apex in *C. malava*, and there are at least four lateral setae of the harpe distributed along the apical half in *C. eaerendili* and at least three distributed along the apical quarter in *C. malava*. In addition, *C. eaerendili* is overall very light and has a light brown mesosoma (brown in *C. malava*), and the flagellomeres of *C. eaerendili* are slightly wider and shorter than those of *C. malava*.

For more comparisons with similar species, see remarks under *C. semira* sp. nov.

Condition of type material

Holotype is immaculate.

Ceraphron ekero sp. nov.

urn:lsid:zoobank.org:act:A22C5855-E7FD-4B9C-B061-9A2CED5B8B70

Fig. 49

Diagnosis

Scape slightly longer than F1 and F2 combined; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex short with pointed and slightly bifurcated end. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.42; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and diverging distolaterally from base to apex; genitalia moderately sclerotized with strongest sclerotization at all margins of harpe.

Etymology

The species is named after the Ekero area, near the town Mumias, which is the type locality.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°19'25.9 N, 34°30'39.6 E; 1343 m a.s.l.; 15 Aug. 2008; F. Hita Garcia leg.; Transect 32; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036909.

Paratype

KENYA • 1 ♂; same collection data as for holotype; ZFMK-HYM-00036910.

Description**Male** (N = 2 in morphometric measurements)

BODY LENGTH. 0.78–0.90 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape, pedicel and flagellum light brown; legs yellowish except proximal half of coxae light brown; fore wing venation light brown, fore and hind wing disc slightly melanized (ZFMK-HYM-00036910).

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $2.9\times$ as long as pedicel, scape slightly longer than F1 and F2 combined, F1 $2.8\times$ as long as wide, F1 $1.4\times$ as long as pedicel, F1 $1.2\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9 (ZFMK-HYM-00036910), F6 $1.8\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9 (ZFMK-HYM-00036910); few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.19\text{--}1.25\times$ (1.25) head height; head width $1.74\text{--}1.83\times$ (1.74) interorbital space; maximum eye diameter $1.31\text{--}1.33\times$ (1.33) minimum eye diameter; head height $1.60\text{--}1.71\times$ (1.60) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.59–0.63:0.50–0.63 (1.00:0.59:0.63); OOL $2.67\times$ (2.67) lateral ocellus diameter. White, thick setae on upper face indistinct; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.08\text{--}1.13\times$ (1.08) mesosoma width; Weber length 269–306 μm (269 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus slightly concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards. Mesoscutum width $1.82\text{--}1.84\times$ (1.82) mesoscutellum width; posterior mesoscutal width $1.35\text{--}1.37\times$ (1.35) mesoscutellum width; mesoscutellum length $1.53\text{--}1.59\times$ (1.59) mesoscutellum width; mesoscutellum length $1.12\text{--}1.17\times$ (1.17) posterior mesoscutal width; Weber length $1.39\text{--}1.40\times$ (1.39) mesoscutum width; Weber length $1.59\text{--}1.69\times$ (1.59) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex short and straight in lateral view with pointed and slightly bifurcated end; mesometapleural sulcus indistinct; posterior propodeal projection straight in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least five, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $3.20\times$ width; stigmal vein $3\times$ as long as pterostigma marginal length. (ZFMK-HYM-00036910)

MALE GENITALIA. Genital length 100–103 μm (100 μm); Weber length $2.69\text{--}2.97\times$ (2.69) genital length; gvc width 50–56 μm (50 μm); genital length $1.83\text{--}2.00\times$ (2.00) gvc width; gvc width more than three quarters of gvc length; gvc width $1.16\times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc slightly descending proximomedially (Fig. 49C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 49A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 49B); proximolateral margin of gvc slightly emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 49B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.42; lateral articulation site of harpe with gvc not flush (Fig. 49A, C); ventral margin of harpe concave, dorsal margin slightly convex (Fig. 49B), lateral margin convex,

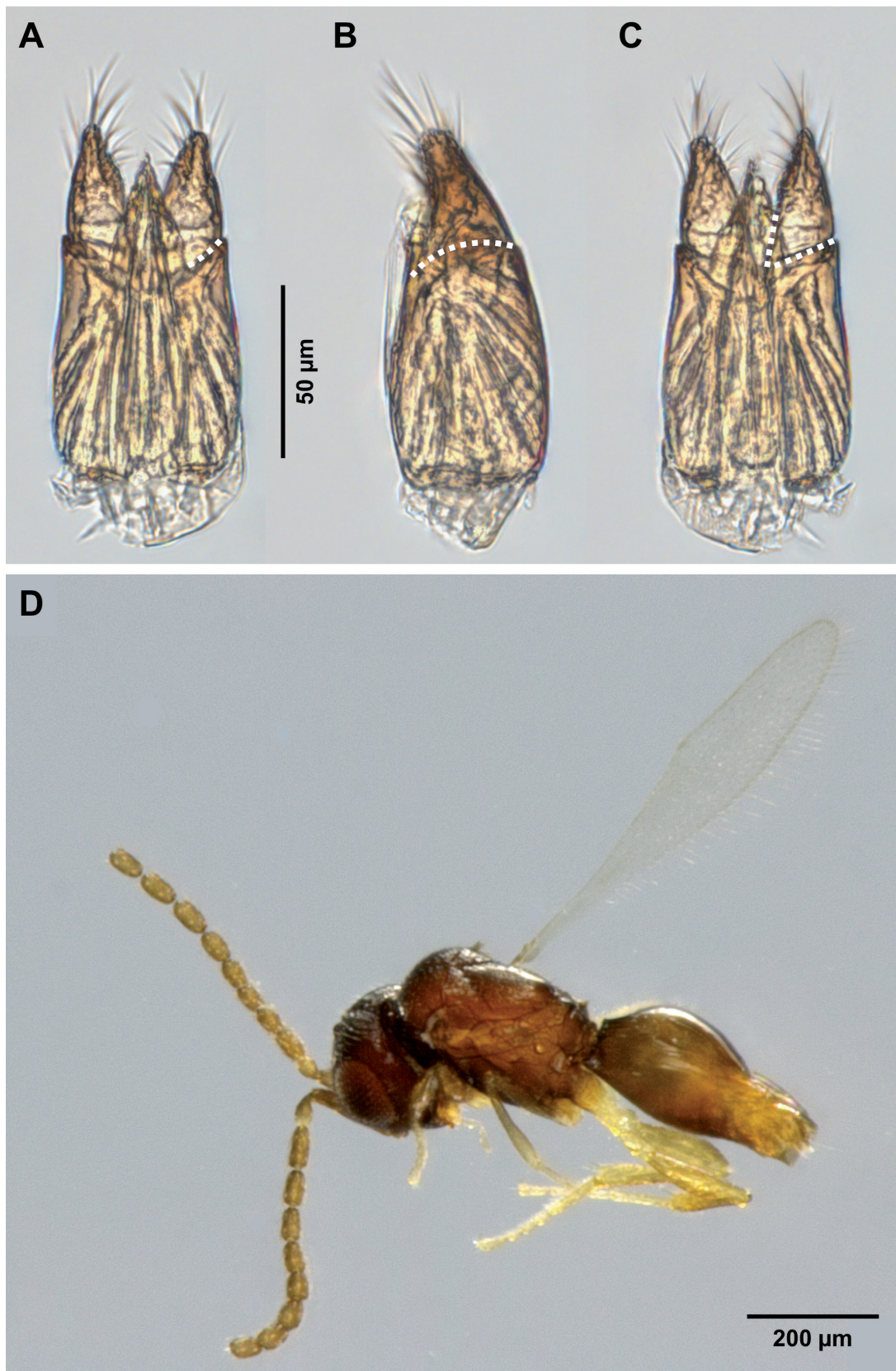


Fig. 49. Holotype of *Ceraphron ekeru* sp. nov. (ZFMK-HYM-00036909). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

widest point of harpe at lateral articulation site with gvc (Fig. 49A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and diverging distolaterally from base to apex (Fig. 49C), apex of harpe slightly pointed, oriented distolaterally (Fig. 49A, C). Harpe with at least two lateral setae restricted to apical third, longest lateral setae half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae two thirds as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least four median setae, longest median setae more than one third as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus more than two thirds as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 49A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at distal margin of gvc and all margins of harpe.

Female

Unknown.

Variation

ZFMK-HYM-00036910 has at least seven basal longitudinal carinae on the syntergum.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron ekeru sp. nov. and *C. sp. 5* are similar but they can be distinguished by the flagellomeres of *C. ekeru* being longer and thinner than those of *C. sp. 5*. In addition, *C. ekeru* has a smaller head height to maximum eye diameter ratio (1.60–1.71) than *C. sp. 5* (1.86), and *C. ekeru* has a higher gvc width to gvc length ratio (> 0.75) than *C. sp. 5* (< 0.66). Also, the dorsomedial margin of harpe is slightly convex in *C. ekeru* and straight in *C. sp. 5*.

For more comparisons with similar species, see remarks under *C. maathaiae* sp. nov.

Condition of type material

In the holotype, both F9, both fore wings, and the left hind wing are missing.

Ceraphron ellae sp. nov.

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Fig. 50

Diagnosis

Scape and pedicel light brown except proximal half of scape yellowish; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus present. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.65; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and diverging distolaterally from base to apex; apex oriented distolaterally; harpe with at least ten median

setae; lateral margin of harpe straight; genitalia strongly sclerotized with strongest sclerotization at harpe and aedeagus + gonosticulus.

Etymology

The species is named after the daughter of the second author.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°12'42.7 S, 37°20'35.8 E; 1800 m a.s.l.; 9 Nov. 2012; KiLi project leg.; “high 3”; FLM2, forest lower mont.; Coloured pan trap; ZFMK; ZFMK-HYM-00037083.

Description

Male

BODY LENGTH. 1.25 mm.

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel light brown except proximal half of scape yellowish, flagellum brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.3\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $1.9\times$ as long as wide, F1 $1.6\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.5\times$ as long as wide, F6 shorter than F7 and F8 combined; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.04\times$ head height; head width $1.79\times$ interorbital space; maximum eye diameter $1.29\times$ minimum eye diameter; head height $1.78\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.55:0.55; OOL $3.67\times$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.96\times$ mesosoma width; Weber length $369\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.80\times$ mesoscutellum width; posterior mesoscutal width $1.40\times$ mesoscutellum width; mesoscutellum length $1.48\times$ mesoscutellum width; mesoscutellum length $1.06\times$ posterior mesoscutal width; Weber length $1.53\times$ mesoscutum width; Weber length $1.59\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least ten distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $3.18\times$ width; stigmal vein longer than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length $181\ \mu\text{m}$; Weber length $2.03\times$ genital length; gvc width $75\ \mu\text{m}$; genital length $2.42\times$ gvc width; gvc width two thirds of gvc length; gvc width $1.20\times$ distal gvc

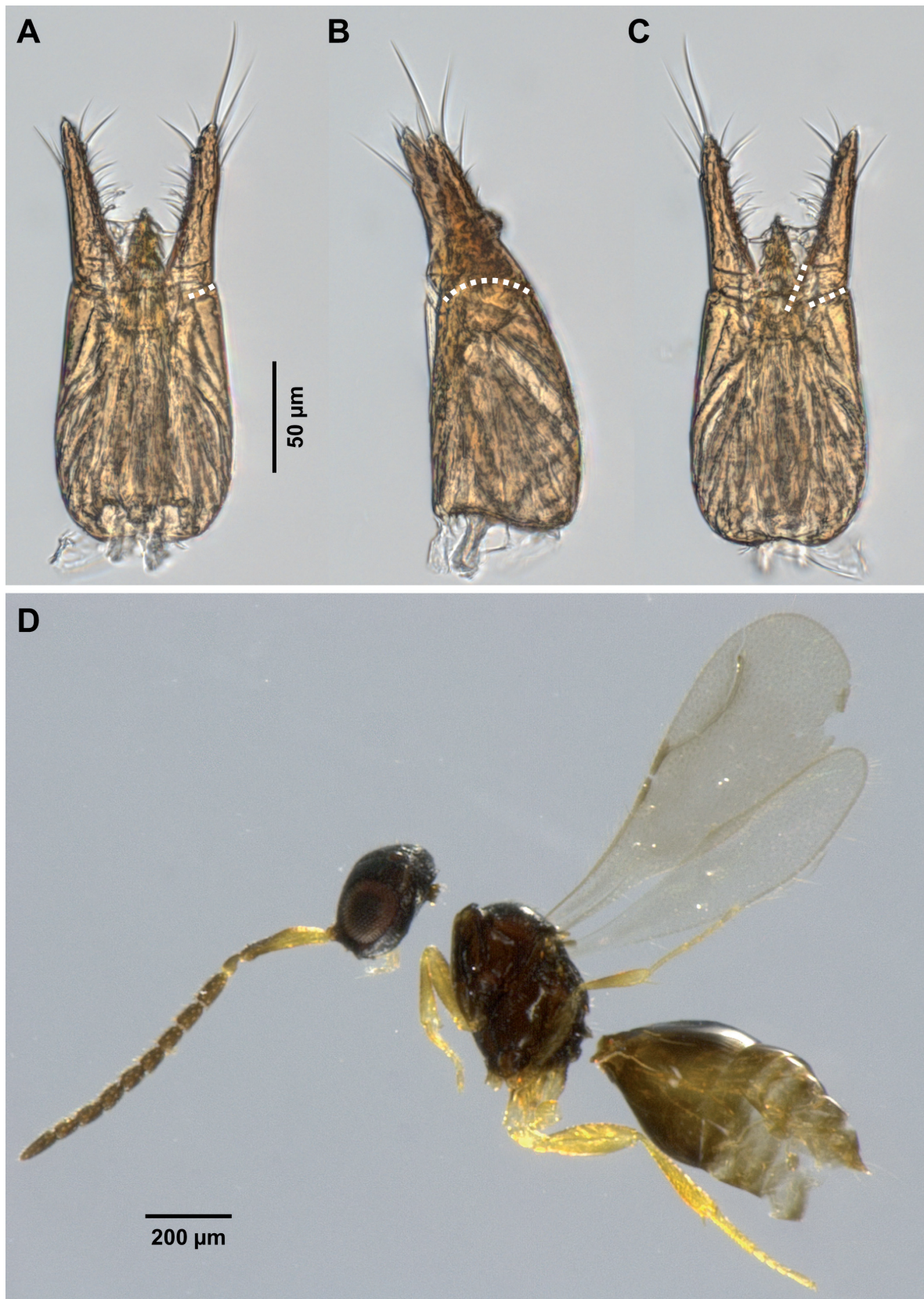


Fig. 50. Holotype of *Ceraphron ellae* sp. nov. (ZFMK-HYM-00037083). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 50C); proximoventral margin of gvc slightly concave; distoventral margin of gvc slightly descending proximomedially (Fig. 50A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 50B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc convex (Fig. 50B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.65; lateral articulation site of harpe with gvc not flush (Fig. 50A, C); ventral margin of harpe slightly concave, dorsal margin slightly concave (Fig. 50B), lateral margin straight, widest point of harpe at apical quarter (Fig. 50A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and diverging distolaterally from base to apex (Fig. 50C), apex of harpe pointed, oriented distolaterally (Fig. 50A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae half as long as harpe, lateral setae oriented distodorsally, distolaterally and distoventrally; harpe with at least one apical seta, longest apical seta two thirds as long as harpe, apical seta oriented distolaterally and distoventrally; harpe with at least ten median setae restricted to apical two thirds, longest median setae one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus less than half as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 50A, C) and dorsal to apex of harpe. Genitalia strongly sclerotized with strongest sclerotization at harpe and aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Ceraphron ellae sp. nov. can be distinguished from all other species by its quite distinctive and strongly sclerotized male genitalia with finger-shaped harpe, pointed apex of harpe and with at least ten median setae distributed along the apical two thirds of the median margin of the harpe.

Condition of type material

In the holotype, the head, mesosoma and metasoma are detached, thus the body length measurement is not precise, and the right antenna is missing. The left antenna is slightly deformed (e.g., F9) and the posterior half of the metasoma is deformed which can also lead to imprecise body length measurement. The left fore wing is detached and the left hind wing is glued to a card. Left fore and hind legs as well as the right middle leg are missing (except coxae).

Ceraphron eulbergi sp. nov.

urn:lsid:zoobank.org:act:BAEC1327-DCBB-4B64-812D-70EACD103FB6

Fig. 51

Diagnosis

Scape longer than F1 to F3 combined; preoccipital carina distinct; OOL:LOL 1.45; OOL 1.60 × lateral ocellus diameter; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and bifurcated end, exceeding end of mesosoma. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.60; dorsomedial margins of harpes not

touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in basal third, straight and diverging distolaterally with small indentations in apical two thirds, apex of harpe slightly rounded; longest apical setae as long as harpe; genitalia weakly sclerotized with weakest sclerotization at harpe; gvc width equal to distal gvc width.

Etymology

The species is named after the DJ and graduated ecologist Dominik Eulberg. He combines the great art of nature with his musical art and emotions, and creates an acoustic image of it. His music is regularly part of the first author's playlist.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 9 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036994.

Description

Male

BODY LENGTH. 1.00 mm.

COLOUR. Head dark brown, mesosoma brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.9\times$ as long as pedicel, scape longer than F1 to F3 combined, F1 $1.8\times$ as long as wide, F1 $1.3\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.3\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.16\times$ head height; head width $1.86\times$ interorbital space; maximum eye diameter $1.47\times$ minimum eye diameter; head height $1.61\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.59:0.69; OOL $1.60\times$ lateral ocellus diameter. White, thick setae on upper face indistinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.93\times$ mesosoma width; Weber length $350\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.92\times$ mesoscutellum width; posterior mesoscutal width $1.48\times$ mesoscutellum width; mesoscutellum length $1.64\times$ mesoscutellum width; mesoscutellum length $1.11\times$ posterior mesoscutal width; Weber length $1.17\times$ mesoscutum width; Weber length $1.37\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and bifurcated end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal

comb present. Basal transverse carina of petiole (on syntergum) present; at least six basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.93 \times$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length 116 μm ; Weber length $3.03 \times$ genital length; gvc width 56 μm ; genital length $2.06 \times$ gvc width; gvc width three quarters of gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 51C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 51A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 51B), slightly indented distomedially; proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 51B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.60; lateral articulation site of harpe with gvc not flush (Fig. 51A, C); ventral margin of harpe slightly concave, dorsal margin slightly concave (Fig. 51B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 51A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in basal third, straight and diverging distolaterally with small indentations in apical two thirds (Fig. 51C), apex of harpe slightly rounded (Fig. 51A, C). Harpe with at least one lateral seta restricted to apical quarter, longest lateral seta one third as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae as long as harpe, apical setae oriented distolaterally and distoventrally; harpe with at least seven median setae, longest median setae one third as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 51A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with weakest sclerotization at harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron eulbergi sp. nov. can be distinguished from *C. longisetae* sp. nov. by the different setal arrangement on the harpes (*C. eulbergi* has distinctly shorter lateral setae and longer apical setae than *C. longisetae*), the shorter aedeagus + gonossiculus in *C. eulbergi* and the different harpe/gvc index (0.60 in *C. eulbergi* and 0.39 in *C. longisetae*).

Condition of type material

In the holotype, the left hind wing and right hind leg (except coxa) are detached. The posterior end of the metasoma is slightly deformed, thus the body length measurement is not precise.

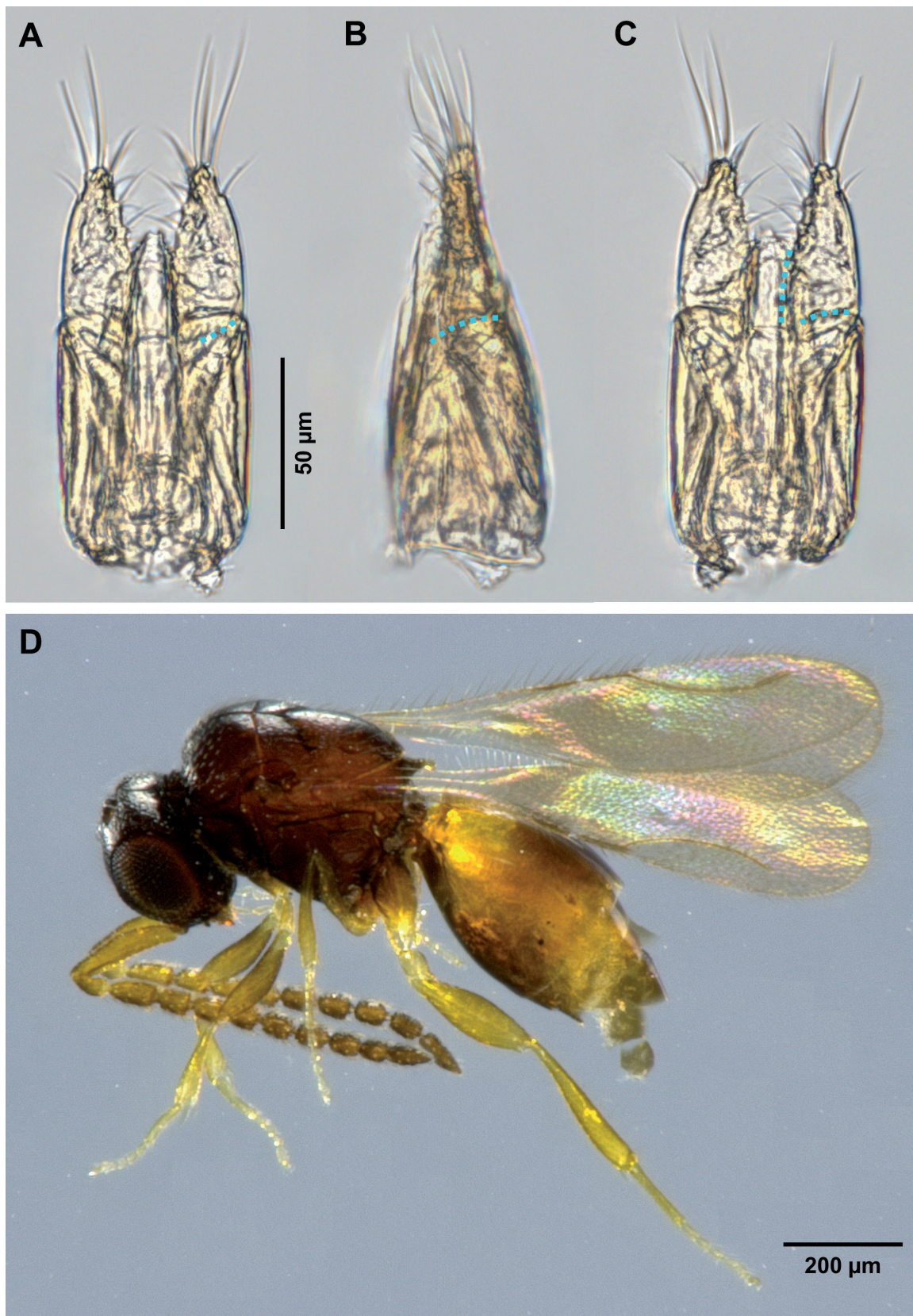


Fig. 51. Holotype of *Ceraphron eulbergi* sp. nov. (ZFMK-HYM-00036994). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Ceraphron herreni sp. nov.

urn:lsid:zoobank.org:act:45FA2651-9F89-44B1-966E-A50B4C53F6ED

Fig. 52

Diagnosis

Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital carina distinct; maximum eye diameter $1.39\text{--}1.62\times$ (1.39) minimum eye diameter; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt, lighter and bifurcated end, exceeding end of mesosoma; posterolateral processes of gena present; mesometapleural sulcus present; fore wing length $3.06\text{--}3.19\times$ (3.12) width. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.41; dorsomedial margins of harpes slightly converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight in approximately basal quarter, concave and slightly diverging distolaterally in approximately apical three quarters; dorsal margin of harpe concave.

Etymology

The species is named after the entomologist Hans Rudolf Herren (*1947). He was the leader of the spectacular biological pest management campaign fighting the cassava mealybug *Phenacoccus manihoti* Matile-Ferrero, 1977 (Hemiptera: Pseudococcidae) with the parasitoid wasp *Anagyrus lopezi* (De Santis, 1964) (Hymenoptera: Encyrtidae), which in the 1980s saved about 20 million Africans from a major food crisis. Herren was awarded with the World Food Prize 1995.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°21'21.1 N, 34°51'44.9 E; 1632 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036874.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 17 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036851 • 1 ♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 23 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036853 • 1 ♂; Kakamega Forest; 00°13'59.1 N, 34°51'43.7 E; 1614 m a.s.l.; 5 Aug. 2007; F. Hita Garcia leg.; Transect 24; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036855 • 1 ♂; Kakamega Forest; 00°07'40.8 N, 34°50'24 E; 1656 m a.s.l.; 12 Aug. 2008; F. Hita Garcia leg.; Transect 30; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036856.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.21–1.23 mm (1.21).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel yellowish, flagellum brown, gradually darkening from F1 to F9; legs yellowish except proximal half of coxae brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.9\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.4\times$ as long as wide, F1 $1.9\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter

than F7 and F8 combined, F1 shorter than F9, F6 $2.0\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.4\times$ as high as F9; numerous large multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.09\text{--}1.12\times$ (1.09) head height; head width $1.85\text{--}2.00\times$ (2.00) interorbital space; maximum eye diameter $1.39\text{--}1.62\times$ (1.39) minimum eye diameter; head height $1.63\text{--}1.72\times$ (1.72) maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.40\text{--}0.48:0.52\text{--}0.55$ ($1.00:0.48:0.52$); OOL $1.92\text{--}2.35\times$ (1.92) lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.96\text{--}1.00\times$ (1.00) mesosoma width; Weber length $350\text{--}438\ \mu\text{m}$ ($438\ \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose in anterior half, setae curved backwards or straight. Mesoscutum width $1.76\text{--}2.00\times$ (2.00) mesoscutellum width; posterior mesoscutal width $1.41\text{--}1.62\times$ (1.62) mesoscutellum width; mesoscutellum length $1.48\text{--}1.65\times$ (1.65) mesoscutellum width; mesoscutellum length $1.02\text{--}1.05\times$ (1.02) posterior mesoscutal width; Weber length $1.24\text{--}1.35\times$ (1.35) mesoscutum width; Weber length $1.51\text{--}1.63\times$ (1.63) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt, lighter and bifurcated end, exceeding end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least eight distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $3.06\text{--}3.19\times$ (3.12) width; stigmal vein slightly longer than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length $153\text{--}175\ \mu\text{m}$ ($175\ \mu\text{m}$); Weber length $2.29\text{--}2.50\times$ (2.50) genital length; gvc width $69\text{--}72\ \mu\text{m}$ ($72\ \mu\text{m}$); genital length $2.13\text{--}2.44\times$ (2.44) gvc width; gvc width two thirds of gvc length; gvc width $1.20\times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc slightly descending proximomedially (Fig. 52C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 52A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 52B), slightly indented distomedially; proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 52B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.41; lateral articulation site of harpe with gvc not flush (Fig. 52A, C); ventral margin of harpe slightly concave, dorsal margin concave (Fig. 52B), lateral margin convex, widest point of harpe at apical half (Fig. 52A, C); dorsomedial margins of harpes slightly converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight in approximately basal quarter, concave and slightly diverging distolaterally in approximately apical three quarters (Fig. 52C), apex of harpe slightly rounded (Fig. 52A, C). Harpe with at least two lateral setae restricted to apical half, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally; harpe with at least three apical setae, longest apical setae more than half as long as harpe; apical setae oriented distomedially and distoventrally; harpe with at least eight median setae, longest median setae more than one third as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 52A, C) and ventral to apex of harpe. Genitalia strongly sclerotized with strongest sclerotization at distal margin of gvc and all margins of harpe.

Female
Unknown.

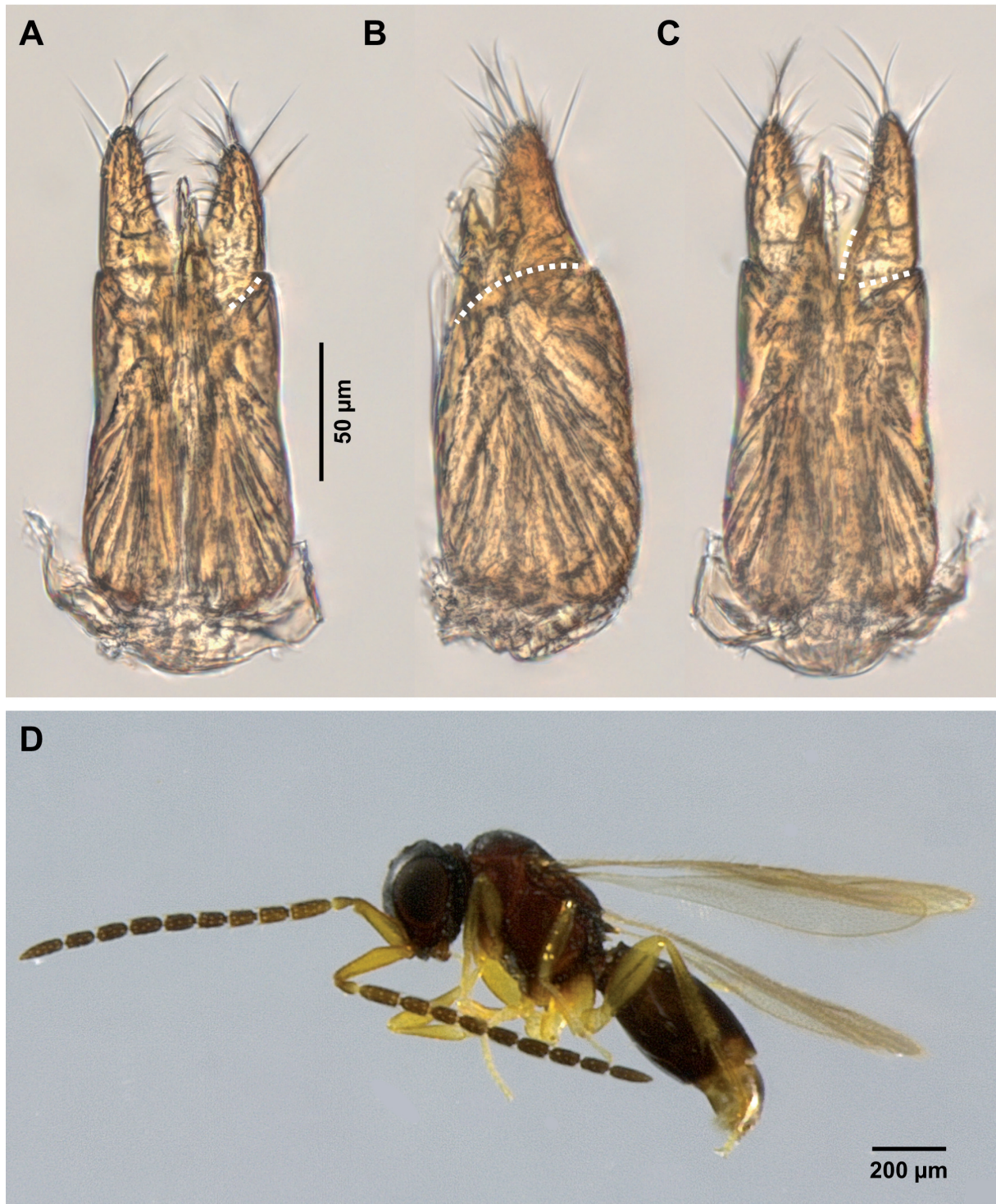


Fig. 52. Holotype of *Ceraphron herreni* sp. nov. (ZFMK-HYM-00036874). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Variation

The number of longitudinal carinae on the syntergum is nine in ZFMK-HYM-00036855 and the indentation of the dorsal area of the gvc is absent in ZFMK-HYM-00036851.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron herreni sp. nov. and *C. sp. 2* can be easily distinguished by, for example, a dark brown mesosoma, a uniformly coloured metasoma, a brown flagellum with a less distinct colour gradient and a metacoxa with proximal half brown and distal half yellowish in *C. herreni* and a brown mesosoma, a metasoma with a lighter anterior third than the rest of the metasoma, a flagellum with a very distinct colour gradient from yellowish to brown and a yellowish metacoxa in *C. sp. 2*. The male genitalia are rather similar, but those of *C. herreni* show a concave dorsal margin of the harpe, whereas that margin is straight in *C. sp. 2*. In addition, the apex of the harpe is slightly rounded in *C. herreni* and pointed in *C. sp. 2* and the setal arrangements of the harpes also differ between the two species.

The male genitalia of *C. herreni* sp. nov. and the Palearctic species *Ceraphron barbieri* Dessart, 1975 are similar, but those of *C. herreni* have a lower harpe/gvc index (0.41) than those of *C. barbieri* (0.55) and the proportions of the gvc differ between the species (gvc width two thirds of gvc length and gvc width $1.20 \times$ distal gvc width in *C. herreni*, and gvc width three quarters of gvc length and gvc width equal to distal gvc width in *C. barbieri*) (Dessart 1975c). Furthermore, both species can be distinguished by a strongly sculptured/reticulated head and a long F1 in *C. barbieri* (head not strongly sculptured in *C. herreni*; F1 $3.4 \times$ as long as wide in *C. barbieri* and F1 $2.4 \times$ as long as wide in *C. herreni*) (Dessart 1975c). For more comparisons with similar species, see remarks under *C. lirhanda* sp. nov. and *C. mamamutere* sp. nov.

Condition of type material

In the holotype, the proximal part of the genitalia is covered with tissue and the ventral area of the gvc is slightly deformed.

Ceraphron hitagarciai sp. nov.

urn:lsid:zoobank.org:act:9373039D-83D5-4290-AED4-8B3567747044

Fig. 53

Diagnosis

OOL $1.60\text{--}1.80 \times (1.60)$ lateral ocellus diameter; scape slightly longer than F1 and F2 combined; Weber length $1.35\text{--}1.48 \times (1.35)$ mesoscutum width; fore wing length $2.67\text{--}2.73 \times (2.68)$ width; preoccipital carina distinct. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.36; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, concave and diverging distolaterally in middle third, straight and diverging distolaterally in apical third; harpe with at least two lateral setae of harpe restricted to apical quarter, longest lateral setae half as long as harpe; longest apical setae longer than as long as harpe; apex of aedeagus + gonossiculus dorsal to apex of harpe; genital length $2.21\text{--}2.55 \times (2.55)$ gvc width.

Etymology

The species is named after the myrmecologist Francisco Hita García, who collected all examined ceraphronoid wasps from Kakamega Forest.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°22'43.7 N, 34°41'57.3 E; 1452 m a.s.l.; 25 Aug. 2008; F. Hita Garcia leg.; Transect 35; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036876.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°21'4.9 N, 34°51'41.1 E; 1602 m a.s.l.; no date on label, 2007 or 2008; F. Hita Garcia leg.; Transect 1; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034473 • 1 ♂; Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034474 • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034476 • 2 ♂♂; Kakamega Forest; 00°23'6.2 N, 34°33'37.8 E; 1602 m a.s.l.; 23 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034479, ZFMK-HYM-00036875 • 1 ♂; Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 4 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034475 • 1 ♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 23 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034477 • 1 ♂; same collection data as for preceding; 25 Aug. 2007; ZFMK-HYM-00034478.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.90–1.45 mm (0.94 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown and proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.9\times$ as long as pedicel, scape slightly longer than F1 and F2 combined, F1 $2.0\times$ as long as wide, F1 $1.6\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.5\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; few medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.04\text{--}1.14\times$ (1.14) head height; head width $1.81\text{--}2.00\times$ (1.81) interorbital space; maximum eye diameter $1.21\text{--}1.25\times$ (1.25) minimum eye diameter; head height $1.68\text{--}1.79\times$ (1.72) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.56–0.63:0.50–0.67 (1.00:0.63:0.50); OOL $1.60\text{--}1.80\times$ (1.60) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.96\text{--}1.08 \times (1.08)$ mesosoma width; Weber length $338\text{--}406 \mu\text{m}$ ($338 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave. Dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.57\text{--}1.90 \times (1.90)$ mesoscutellum width; posterior mesoscutal width $1.36\text{--}1.55 \times (1.52)$ mesoscutellum width; mesoscutellum length $1.43\text{--}1.67 \times (1.67)$ mesoscutellum width; mesoscutellum length $1.00\text{--}1.09 \times (1.09)$ posterior mesoscutal width; Weber length $1.35\text{--}1.48 \times (1.35)$ mesoscutum width; Weber length $1.54\text{--}1.74 \times (1.54)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and bifurcated end; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.67\text{--}2.73 \times (2.68)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $175\text{--}194 \mu\text{m}$ ($175 \mu\text{m}$); Weber length $1.80\text{--}2.10 \times (1.93)$ genital length; gvc width $69\text{--}88 \mu\text{m}$ ($69 \mu\text{m}$); genital length $2.21\text{--}2.55 \times (2.55)$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.31 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 53C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 53A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 53B), slightly indented distomedially; proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 53B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.36; lateral articulation site of harpe with gvc virtually flush (Fig. 53A, C); ventral margin of harpe concave, dorsal margin convex (Fig. 53B), lateral margin straight, widest point of harpe at apical quarter (Fig. 53A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, concave and diverging distolaterally in middle third, straight and diverging distolaterally in apical third (Fig. 53C), apex of harpe pointed (Fig. 53A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae longer than as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least three median setae restricted to apical half, longest median setae one third as long as harpe, median setae oriented distomedially and medioventrally. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 53A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at all margins of harpe and aedeagus + gonossiculus.

Female

Unknown.

Variation

Paratype ZFMK-HYM-00034478 is darker. The anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is longer in ZFMK-HYM-00034478 and without a bifurcated end in ZFMK-HYM-00034475. Pairs of translucent patches on the metasomal syntergum and synsternum are present in ZFMK-HYM-00034475.

Biology

Host unknown, specimens collected from leaf litter.

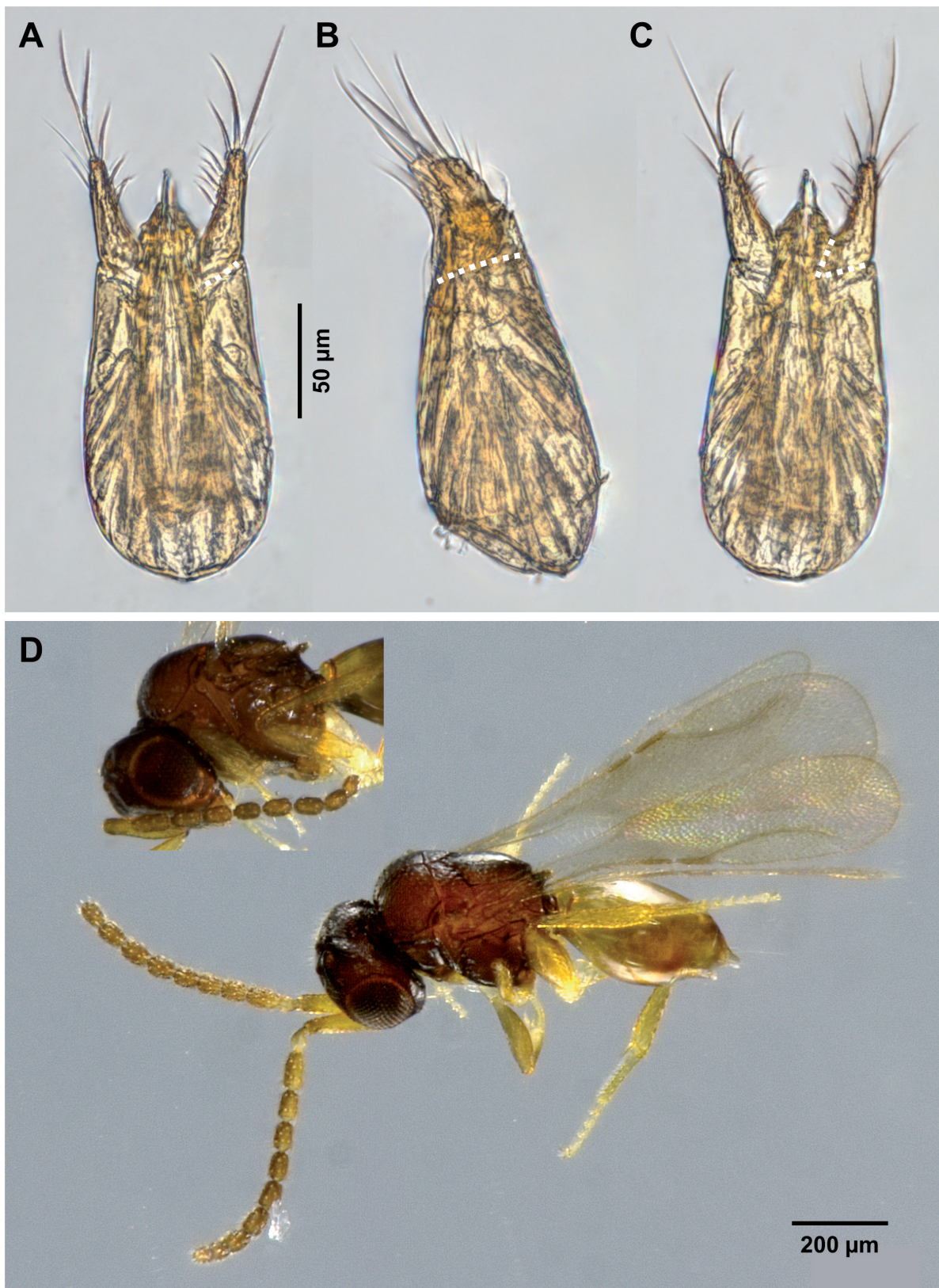


Fig. 53. Holotype of *Ceraphron hitagarciai* sp. nov. (ZFMK-HYM-00036876). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in dorsolateral view; inset: head and mesosoma in lateral view.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *C. hitagarciai* sp. nov. and *C. isecheno* sp. nov. can be distinguished by the very long apical setae in *C. hitagarciai* and by the elongated harpes in *C. hitagarciai*, which result in a higher harpe/gvc index (0.36 in *C. hitagarciai* and 0.30 in *C. isecheno*).

Condition of type material

In the holotype, the right F9, and the mesotibia and mesotarsus of the left fore leg are missing.

Ceraphron insolitus sp. nov.

urn:lsid:zoobank.org:act:939ED017-FC99-442B-A2E1-59D0E030FA1D

Fig. 54

Diagnosis

Metacoxa light yellow and transparent; 10 segmented antennae; flagellomeres cylindric and trapezoidal; scape as long as F1 to F4 combined; F6 1.1 × as wide as F8 in lateral view; Weber length 1.49 × mesoscutum width. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.56; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in approximately basal third, slightly concave and diverging distolaterally in approximately apical two thirds; ventral margin of harpe straight with small indentations in apical half; lateral setae oriented distodorsally and distolaterally; genitalia moderately sclerotized with weakest sclerotization at harpe.

Etymology

The species name is derived from the Latin word ‘*insolitus*’ which means ‘unusual’, with reference to the atypical appearance of the antennae.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 9 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036926.

Description

Male

BODY LENGTH. 1.03 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape yellowish, pedicel light brown, flagellum light brown, gradually darkening from F1 to F8; legs yellowish except metacoxa light yellow and transparent; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 10 segmented, flagellomeres cylindric and trapezoidal; scape 3.4 × as long as pedicel, scape as long as F1 to F4 combined, F1 1.8 × as long as wide, F1 1.1 × as long as pedicel, F1 1.5 × as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F8, F6 1.3 × as long as wide, F6 shorter than F7 and F8 combined, F6 1.1 × as wide as F8 in lateral view; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.10 \times$ head height; head width $1.82 \times$ interorbital space; maximum eye diameter $1.26 \times$ minimum eye diameter; head height $1.86 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.42:0.40; OOL $2.50 \times$ lateral ocellus diameter. White, thick setae on upper face indistinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.00 \times$ mesosoma width; Weber length $334 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.71 \times$ mesoscutellum width; posterior mesoscutal width $1.43 \times$ mesoscutellum width; mesoscutellum length $1.57 \times$ mesoscutellum width; mesoscutellum length $1.10 \times$ posterior mesoscutal width; Weber length $1.49 \times$ mesoscutum width; Weber length $1.62 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex slightly curved in lateral view with lighter end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least five basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.99 \times$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $131 \mu\text{m}$; Weber length $2.55 \times$ genital length; gvc width $50 \mu\text{m}$; genital length $2.63 \times$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.15 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 54C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 54A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 54B); proximolateral margin of gvc ascending and slightly emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 54B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.56; lateral articulation site of harpe with gvc virtually flush (Fig. 54A, C); ventral margin of harpe straight with small indentations in apical half, dorsal margin straight (Fig. 54B), lateral margin slightly convex, widest point of harpe at apical quarter (Fig. 54A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in approximately basal third, slightly concave and diverging distolaterally in approximately apical two thirds (Fig. 54C), apex of harpe pointed (Fig. 54A, C). Harpe with at least two lateral setae restricted to apical third, longest lateral setae less than one third as long as harpe, lateral setae oriented distodorsally and distolaterally; harpe with at least three apical setae, longest apical setae half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least seven median setae restricted to apical half, longest median setae third of harpe length, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus less than one third as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 54A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with weakest sclerotization at harpe.

Female

Unknown.

Variation

Unknown.



Fig. 54. Holotype of *Ceraphron insolitus* sp. nov. (ZFMK-HYM-00036926). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male holotype of *C. insolitus* sp. nov. has cylindrical and trapezoidal flagellomeres, a very long scape, and a 10-segmented antenna, characters otherwise found mainly in female ceraphronids. However, based on the genitalia it is clearly a male specimen. Abnormal antennal segments, as shown in the holotype of *Conostigmus difformis* (Boheman, 1832) and a female specimen of *Ceraphron longistriatus* Dessart, 1973 are based on fusions or partial fusions of segments (Dessart 1993). However, the male of the Nearctic *Ceraphron macroneurus* (Ashmead, 1887) has also a true 10-segmented antenna. *Ceraphron insolitus* can be distinguished from *C. macroneurus*, in addition to the differences in distribution, by the length of the antennal segments, i.e., the scape of *C. macroneurus* is shorter than F1 to F4 combined but longer than F1 to F3 combined (scape as long as F1 to F4 combined in *C. insolitus*), and by the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex which is absent in *C. macroneurus* and present in *C. insolitus* (for list of characters of *C. macroneurus*, see Dessart (1975a: 253). *Ceraphron macroneurus* had been transferred to its own genus *Neoceraphron* Ashmead, 1893 based on the 10-segmented antenna, but was transferred back into the genus *Ceraphron* by Dessart (1979b). Dessart (1979b) argued that a 10-segmented antenna in the male alone is not sufficient for diagnosing a separate genus, and accordingly we also place *C. insolitus* in *Ceraphron*. Future systematic studies using molecular sequence data might help solving this issue.

Condition of type material

Holotype is immaculate.

Ceraphron isecheno sp. nov.

urn:lsid:zoobank.org:act:EC9EAA76-A9F6-4DA5-92EE-ECCF7B784835

Fig. 55

Diagnosis

F6 $1.1 \times$ as high as F9; fore wing length $2.56\text{--}2.83 \times (2.76)$ width. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.30; dorsomedial margins of harpes slightly converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, concave and diverging distolaterally in apical two thirds; gvc width $1.67 \times$ distal gvc width; harpe with at least three lateral setae restricted to apical third, longest lateral setae half as long as harpe; aedeagus + gonosticulus as long as harpe; longest apical setae more than half as long as harpe.

Etymology

The species is named after Isecheno in the western part of the Kakamega Forest which is the type locality.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}14'6.1$ N, $34^{\circ}52'9.2$ E; 1605 m a.s.l.; 28 Aug. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036877.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 14 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036811 • 1 ♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 23 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036812.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.90–1.00 mm (1.00 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown and proximal half of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindric; scape $3.4 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.0 \times$ as long as wide, F1 $1.7 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.4 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1 \times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.09\text{--}1.16 \times$ (1.11) head height; head width $1.93\text{--}1.96 \times$ (1.96) interorbital space; maximum eye diameter $1.27\text{--}1.35 \times$ (1.35) minimum eye diameter; head height $1.61\text{--}1.84 \times$ (1.84) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.32–0.50:0.45–0.69 (1.00:0.45:0.50); OOL $1.45\text{--}2.86 \times$ (2.86) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.88\text{--}1.00 \times$ (1.00) mesosoma width; Weber length 344–416 μm (344 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.62\text{--}1.88 \times$ (1.86) mesoscutellum width; posterior mesoscutal width $1.23\text{--}1.54 \times$ (1.48) mesoscutellum width; mesoscutellum length $1.38\text{--}1.54 \times$ (1.43) mesoscutellum width; mesoscutellum length $0.97\text{--}1.13 \times$ (0.97) posterior mesoscutal width; Weber length $1.36\text{--}1.41 \times$ (1.41) mesoscutum width; Weber length $1.60\text{--}1.83 \times$ (1.83) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least five distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.56\text{--}2.83 \times$ (2.76) width; stigmal vein slightly longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length 138–181 μm (163 μm); Weber length $1.99\text{--}3.03 \times$ (2.12) genital length; gvc width 69–88 μm (81 μm); genital length $2.00\text{--}2.07 \times$ (2.00) gvc width; gvc width more than two

thirds of gvc length; gvc width $1.67 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 55C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 55A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 55B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 55B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.30; lateral articulation site of harpe with gvc virtually flush



Fig. 55. Holotype of *Ceraphron isecheno* sp. nov. (ZFMK-HYM-00036877). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

(Fig. 55A, C); ventral margin of harpe slightly concave, dorsal margin convex in basal half and straight in apical half (Fig. 55B), lateral margin slightly convex, widest point of harpe at articulation site with gvc (Fig. 55A, C); dorsomedial margins of harpes slightly converging at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, concave and diverging distolaterally in apical two thirds (Fig. 55C), apex of harpe pointed (Fig. 55A, C). Harpe with at least three lateral setae restricted to apical third, longest lateral setae half as long as harpe, lateral setae oriented distolaterally; harpe with at least three apical setae, longest apical setae more than half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least six median setae, longest median setae more than one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 55A, C) and ventral to apex of harpe. Genitalia moderately sclerotized.

Female

Unknown.

Variation

The paratype ZFMK-HYM-00036811 differs from all other types in the following characters: the metacoxa is uniformly coloured, the proximolateral margin of the genitalia is slightly emarginated and the distodorsal area of gvc is slightly indented. The dorsomedial margin of the harpe is almost straight from base to apex (triangular harpe) and the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is bifurcated and slightly shorter. The mesometapleural sulcus is absent and the syntergum has at least nine visible longitudinal carinae. This paratype might even represent a separate species but based on many characters shared with the other types (see diagnosis), we treat it here as a slightly odd representative of *C. isecheno* sp. nov.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The gvc of *C. isecheno* sp. nov. is bulbous and therefore similar to *C. sp. 3*, *C. sp. 4* and *C. banda* sp. nov. However, these species can be easily distinguished by the shapes of the dorsomedial margin of the harpe and the setal arrangement, especially of the lateral setae.

For more comparisons with similar species, see remarks under *C. hitagarciai* sp. nov.

Condition of type material

In the holotype, the posterior half of the metasoma is deformed, thus the body length measurement is not precise.

Ceraphron isukha sp. nov.

urn:lsid:zoobank.org:act:7CA93EE7-6EDD-493A-BDD1-BC2066E388DE

Fig. 56

Diagnosis

Scape and pedicel yellowish, flagellum light brown; mesometapleural sulcus present; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with

pointed, lighter and bifurcated end. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.52; dorsomedial margins of harpes slightly converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex; harpe with at least seven median setae restricted to apical half; harpe with at least eight distinct, basal longitudinal carinae on syntergum; fore wing length $3.22 \times$ width.

Etymology

The species is named after the Isukha community, which lives primarily in the Kakamega District.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°13'59.1 N, 34°51'43.7 E; 1614 m a.s.l.; 5 Aug. 2007; F. Hita Garcia leg.; Transect 24; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036915.

Description

Male

BODY LENGTH. 0.97 mm.

COLOUR. Head brown, mesosoma brown, metasoma brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except proximal half of pro- and mesocoxa brown, proximal quarter of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.0 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.1 \times$ as long as wide, F1 $1.5 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.4 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3 \times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.10 \times$ head height; head width $1.92 \times$ interorbital space; maximum eye diameter $1.48 \times$ minimum eye diameter; head height $1.83 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.50:0.63; OOL $2.00 \times$ lateral ocellus diameter. White, thick setae on upper face indistinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.02 \times$ mesosoma width; Weber length $331 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.77 \times$ mesoscutellum width; posterior mesoscutal width $1.41 \times$ mesoscutellum width; mesoscutellum length $1.55 \times$ mesoscutellum width; mesoscutellum length $1.10 \times$ posterior mesoscutal width; Weber length $1.36 \times$ mesoscutum width; Weber length $1.59 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with pointed, lighter and bifurcated end; mesometapleural sulcus present; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least eight distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

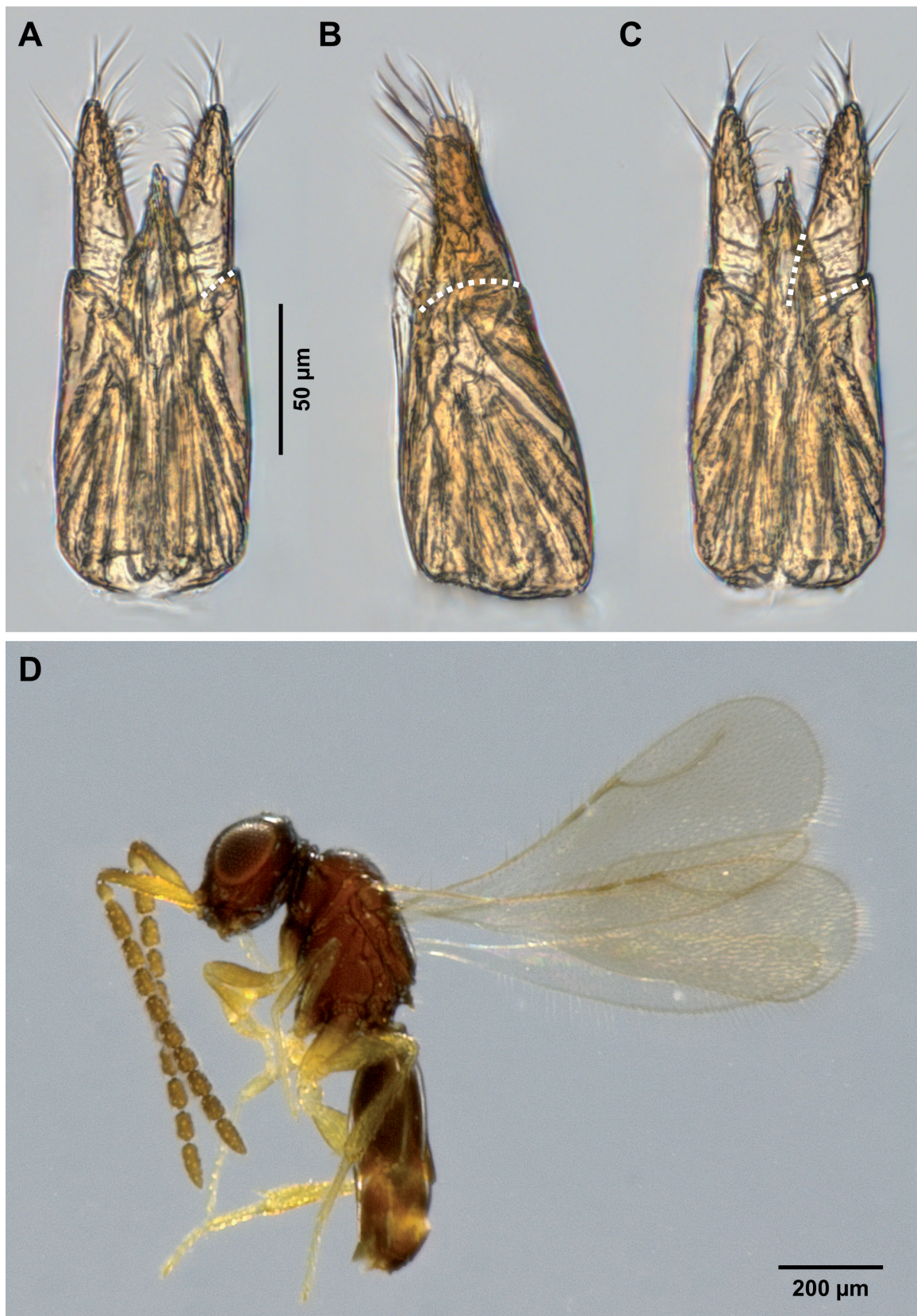


Fig. 56. Holotype of *Ceraphron isukha* sp. nov. (ZFMK-HYM-00036915). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

FORE WING. Length $3.22 \times$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $150 \mu\text{m}$; Weber length $2.21 \times$ genital length; gvc width $64 \mu\text{m}$; genital length $2.34 \times$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.16 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 56C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 56A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 56B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 56B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.52; lateral articulation site of harpe with gvc not flush (Fig. 56A, C); ventral margin of harpe slightly concave, dorsal margin straight (Fig. 56B), lateral margin slightly convex, widest point of harpe at apical third (Fig. 56A, C); dorsomedial margins of harpes slightly converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex (Fig. 56C), apex of harpe rounded (Fig. 56A, C). Harpe with at least two lateral setae restricted to apical half, longest lateral setae less than half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least seven median setae restricted to apical half, longest median setae more than one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 56A, C) and as ventral as apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at all margins of harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. sp. 1* and *C. sp. 5*.

Condition of type material

In the holotype, the end of the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron ivindoensis sp. nov.

urn:lsid:zoobank.org:act:F1F1A5C7-B5BA-4643-9EE5-B052A27623EA

Fig. 57

Diagnosis

Head width $2.09 \times$ interorbital space; fore wing more strongly melanized along wing venation; F1 as long as F9; posterolateral processes of gena present; Weber length $0.98 \times$ mesoscutum width; Weber

length $1.29 \times$ mesoscutellum length; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex exceeding end of mesosoma. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.46; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in approximately basal third, slightly concave and slightly diverging distolaterally in approximately apical two thirds; harpe with at least two lateral setae of harpe restricted to apical two thirds; distolateral margin of gvc straight; lateral margin of harpe straight; aedeagus + gonossiculus with two digital teeth, oriented dorsally; genitalia moderately sclerotized with strongest sclerotization at apex of aedeagus + gonossiculus and distal half of gvc; Weber length $1.66 \times$ genital length.

Etymology

The species is named after the Ivindo National Park in Gabon which is the type locality.

Material examined

Holotype

GABON • ♂; Ogooué-Ivindo, Ivindo NP, Makokou; 00°30'44 N, 12°46'12 E; 518 m a.s.l.; 13–16 Sep. 2012; R.S. Peters leg.; forest near station; Pitfall trap; ZFMK; ZFMK-HYM-00037090.

Description

Male

BODY LENGTH. 1.24 mm.

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown, proximal two thirds of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing more strongly melanized along wing venation.

ANTENNA. 11-segmented, flagellomeres cylindric; scape $4.7 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.7 \times$ as long as wide, F1 $2.1 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 as long as F9, F6 $1.9 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.20 \times$ head height; head width $2.09 \times$ interorbital space; maximum eye diameter $1.42 \times$ minimum eye diameter; head height $1.65 \times$ maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.46:0.50; OOL $2.40 \times$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.06 \times$ mesosoma width; Weber length 363 μ m. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.00 \times$ mesoscutellum width; posterior mesoscutal width $1.33 \times$ mesoscutellum width; mesoscutellum length $1.50 \times$ mesoscutellum width; mesoscutellum length $1.13 \times$ posterior mesoscutal width; Weber length $0.98 \times$ mesoscutum width; Weber length $1.29 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, exceeding end of mesosoma; mesometapleural sulcus present; posterior propodeal projection straight



Fig. 57. Holotype of *Ceraphron ivindoensis* sp. nov. (ZFMK-HYM-00037090). A–C. Male genitalia in ventral (A), lateral (B) and dorsal (C) views. D. Habitus in lateral view.

and light in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least seven, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.95 \times$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length 219 μm ; Weber length $1.66 \times$ genital length; gvc width 96 μm ; genital length $2.28 \times$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.24 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 57C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 57A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 57B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc straight (Fig. 57B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.46; lateral articulation site of harpe with gvc not flush (Fig. 57A, C); ventral margin of harpe straight, dorsal margin straight (Fig. 57B); lateral margin straight, widest point of harpe at lateral articulation site with gvc (Fig. 57A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in approximately basal third, slightly concave and slightly diverging distolaterally in approximately apical two thirds (Fig. 57C), apex of harpe pointed (Fig. 57A, C). Harpe with at least two lateral setae restricted to apical two thirds, longest lateral setae more than one third as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae half as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least four median setae restricted to apical third, longest median setae less than one third as long as harpe, median setae oriented distodorsally, distomedially and distoventrally. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 57A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with two digital teeth, oriented dorsally. Genitalia moderately sclerotized with strongest sclerotization at apex of aedeagus + gonossiculus and distal half of gvc.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with pitfall trap.

Distribution

Afrotropical: Gabon.

Remarks

Comparison with similar species

The male genitalia of *C. ivindoensis* sp. nov. and *C. tenuimeris* sp. nov. can be distinguished by differently arranged lateral setae of the harpes, the different aedeagus + gonossiculus with at least two digital teeth in *C. ivindoensis*, differences of the distal gvc margins, and different sclerotization patterns. Furthermore, the Weber length to genital length ratio is distinctly low in *C. ivindoensis* (1.66, compared to 2.44–2.52 in *C. tenuimeris*).

Condition of type material

In the holotype, the left F9, the right hind leg (except coxa) and the apex of the right harpe are missing. The right fore and both hind wings are detached and the posterior end of the metasoma is deformed, thus the body length measurement is not precise. The holotype was used in an unsuccessful DNA barcoding attempt, i.e., had been put in lysis buffer for non-destructive DNA extraction, and looks rather transparent.

Ceraphron kaharabu sp. nov.

urn:lsid:zoobank.org:act:F1B81FEC-2031-4235-8087-E54F49B43E00

Fig. 58

Diagnosis

Mesosoma amber-coloured and ventrolateral parts darker than rest; scape brown, pedicel light brown, flagellum brown; scape $5.1 \times$ as long as pedicel; dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital carina distinct; OOL $2.73\text{--}3.33 \times (2.73)$ lateral ocellus diameter; lateral margin of torulus distinctly raised; posterolateral processes of gena present; translucent patches on metasoma absent. Male genitalia: harpe trapezoidal to cone-shaped in ventral and dorsal view; harpe/gvc index 0.38; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and slightly diverging distolaterally in basal half, slightly concave and diverging distolaterally in apical half, apex of harpe slightly rounded; harpe with at least four lateral setae restricted to apical half, longest lateral setae more than two thirds as long as harpe; harpe with at least four apical setae, longest apical setae more than three quarters as long as harpe.

Etymology

The species name is derived from the Swahili word ‘*kaharabu*’ which means ‘amber’, with reference to the amber-coloured body.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}12'09$ N, $34^{\circ}52'06$ E; 1553 m a.s.l.; 2 May 2007; F. Hita Garcia leg.; Transect 28; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036980.

Paratypes

KENYA – Western Province • 2 ♂♂; Kakamega Forest; $00^{\circ}12'42.6$ N, $34^{\circ}55'52.3$ E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036981, ZFMK-HYM-00036987 • 1 ♂; Kakamega Forest; $00^{\circ}14'6.1$ N, $34^{\circ}52'9.2$ E; 1605 m a.s.l.; 4 Sep. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036982.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.00–1.54 mm (1.27 mm).

COLOUR. Head dark brown, mesosoma amber-coloured and ventrolateral parts darker than rest, metasoma amber-coloured; scape brown, pedicel light brown, flagellum brown; legs golden-yellowish except pro- and mesocoxa light brown, proximal three quarters of metacoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindric; scape $5.1 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.1 \times$ as long as wide, F1 $2.1 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2,

F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.18\text{--}1.27\times$ (1.27) head height; head width $1.91\text{--}2.03\times$ (1.94) interorbital space; maximum eye diameter $1.30\text{--}1.74\times$ (1.30) minimum eye diameter; head height $1.57\text{--}1.68\times$ (1.57) maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.37\text{--}0.47:0.42\text{--}0.47$ (1.00:0.47:0.42); OOL $2.73\text{--}3.33\times$ (2.73) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus distinctly raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.98\text{--}1.05\times$ (1.04) mesosoma width; Weber length $400\text{--}431\ \mu\text{m}$ (431 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards or straight; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.72\text{--}1.90\times$ (1.82) mesoscutellum width; posterior mesoscutal width $1.38\text{--}1.52\times$ (1.39) mesoscutellum width; mesoscutellum length $1.48\text{--}1.55\times$ (1.48) mesoscutellum width; mesoscutellum length $1.02\text{--}1.08\times$ (1.07) posterior mesoscutal width; Weber length $1.15\text{--}1.28\times$ (1.15) mesoscutum width; Weber length $1.41\text{--}1.49\times$ (1.41) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and slightly bifurcated end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least seven distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.75\text{--}2.78\times$ (2.75) width; stigmal vein $3\times$ as long as pterostigma marginal length.

MALE GENITALIA. Genital length $194\text{--}222\ \mu\text{m}$ (222 μm); Weber length $1.94\text{--}2.09\times$ (1.94) genital length; gvc width $97\text{--}117\ \mu\text{m}$ (97 μm); genital length $1.65\text{--}2.29\times$ (2.29) gvc width; gvc width less than two thirds of gvc length; gvc width $1.28\times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc descending proximomedially (Fig. 58C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 58A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 58B); proximolateral margin of gvc ascending and slightly emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 58B). Harpe trapezoidal to cone-shaped in ventral and dorsal view; harpe/gvc index 0.38; lateral articulation site of harpe with gvc not flush (Fig. 58A, C); ventral margin of harpe slightly concave, dorsal margin slightly convex (Fig. 58B), lateral margin convex, widest point of harpe at basal third (Fig. 58A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex and slightly diverging distolaterally in basal half, slightly concave and diverging distolaterally in apical half (Fig. 58C), apex of harpe slightly rounded (Fig. 58A, C). Harpe with at least four lateral setae restricted to apical half, longest lateral setae more than two thirds as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least four apical setae, longest apical setae more than three quarters as long as harpe, apical setae oriented distodorsally, distolaterally, distomedially and distoventrally; harpe with at least six median setae, longest median setae more than half as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 58A, C) and dorsal to apex of harpe. Strong sclerotization with strongest sclerotization at harpe and aedeagus + gonossiculus and weakest sclerotization at distal third of gvc.

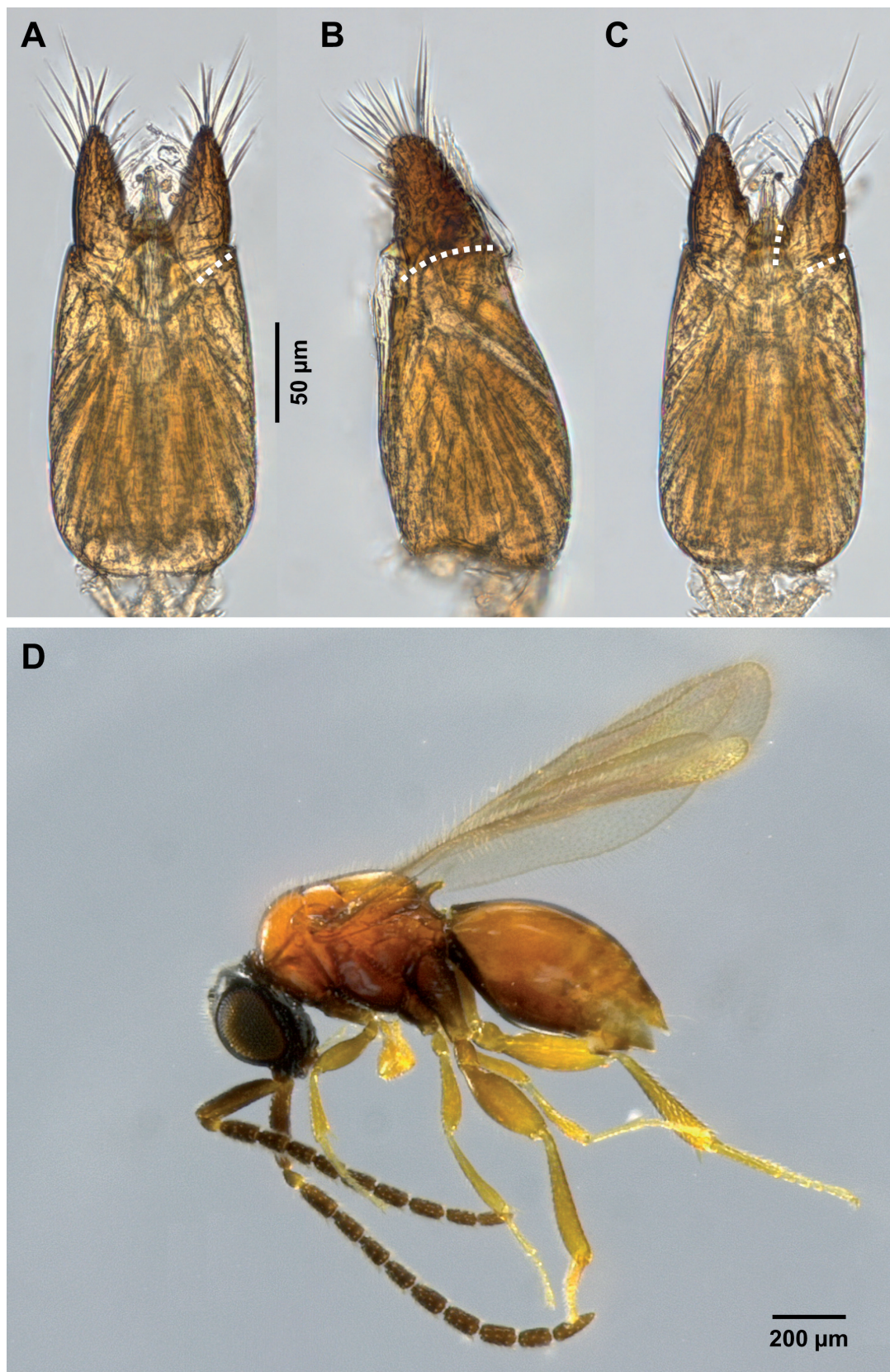


Fig. 58. Holotype of *Ceraphron kaharabu* sp. nov. (ZFMK-HYM-00036980). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Female

Unknown.

Variation

In ZFMK-HYM-00036982 the posterolateral processes of the gena is less distinctly developed, has at least six basal longitudinal carinae on the syntergum, and its lateral margin of the harpe is less convex.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron kaharabu sp. nov., *C. cephalotes* Sundholm, 1970, and *C. longulus* Sundholm, 1970 have harpes of generally similar shape. They can be distinguished by the harpe/gvc index being distinctly higher in *C. cephalotes* and *C. longulus* (0.58 and 0.50) than in *C. kaharabu* (0.38), and the gvc width to length ratios also being higher in *C. cephalotes* and *C. longulus* (width to length almost equal) than in *C. kaharabu* (less than two thirds). In addition, *C. kaharabu* is very differently coloured than *C. cephalotes* and *C. longulus*, i.e., the species are easy distinguishable.

For more comparisons with similar species, see remarks under *C. sataoi* sp. nov.

Condition of type material

Holotype is immaculate.

Ceraphron kaimosiensis sp. nov.

urn:lsid:zoobank.org:act:1E6D87A1-E8A7-4251-8A86-9ECFC8B25C89

Fig. 59

Diagnosis

Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with pointed end. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.37; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex; harpe with at least one lateral seta restricted to apical quarter; longest apical setae more than two thirds as long as harpe; genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and weakest sclerotization at harpe.

Etymology

The species is named after the town Kaimosi in the Kakamega Forest region which is the type locality.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°07'40.8 N, 34°50'24 E; 1656 m a.s.l.; 2008; F. Hita Garcia leg.; Transect 30; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036912.

Description

Male

BODY LENGTH. 0.77 mm.

COLOUR. Head brown, mesosoma light brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum light brown; legs yellowish except pro- and mesocoxa light brown, proximal third of metacoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.4\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.1\times$ as long as wide, F1 $1.4\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.5\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.22\times$ head height; head width $1.86\times$ interorbital space; maximum eye diameter $1.15\times$ minimum eye diameter; head height $1.68\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.50:0.50; OOL $2.67\times$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.13\times$ mesosoma width; Weber length $244\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.71\times$ mesoscutellum width; posterior mesoscutal width $1.41\times$ mesoscutellum width; mesoscutellum length $1.59\times$ mesoscutellum width; mesoscutellum length $1.13\times$ posterior mesoscutal width; Weber length $1.34\times$ mesoscutum width; Weber length $1.44\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with pointed end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.79\times$ width; stigmal vein longer than $3\times$ pterostigma marginal length.5

MALE GENITALIA. Genital length $119\ \mu\text{m}$; Weber length $2.05\times$ genital length; gvc width $61\ \mu\text{m}$; genital length $1.95\times$ gvc width; gvc width more than two thirds of gvc length; gvc width $1.33\times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc slightly descending proximomedially (Fig. 59C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 59A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 59B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 59B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.37; lateral articulation site of harpe with gvc not flush (Fig. 59A, C); ventral margin of harpe slightly concave, dorsal margin slightly convex (Fig. 59B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 59A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex (Fig. 59C), apex of harpe slightly pointed (Fig. 59A, C). Harpe with at least one lateral seta restricted to apical quarter, longest lateral seta one third as long as harpe, lateral seta oriented distolaterally; harpe with at least two apical setae, longest apical

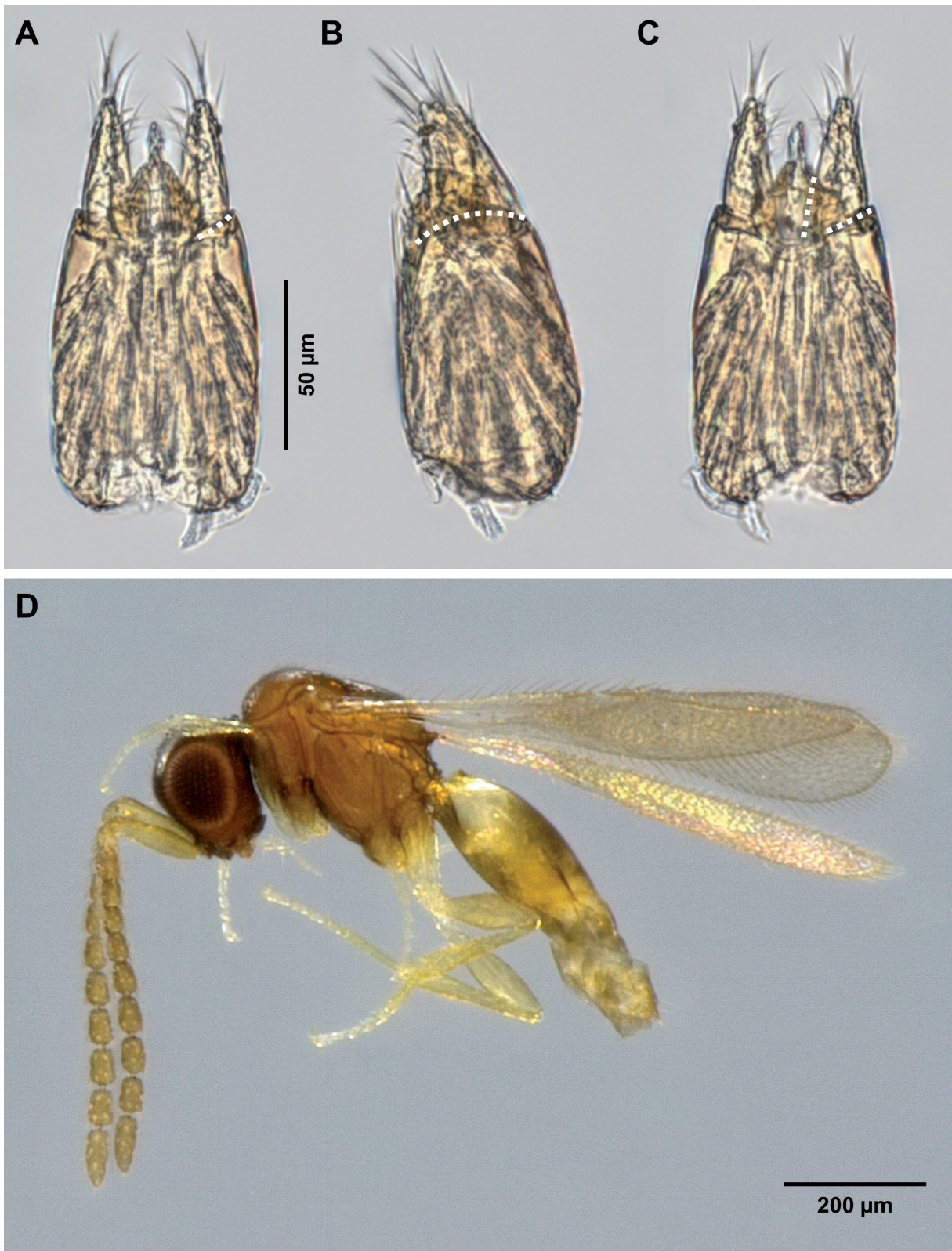


Fig. 59. Holotype of *Ceraphron kaimosiensis* sp. nov. (ZFMK-HYM-00036912). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view

setae more than two thirds as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least five median setae restricted to apical half, longest median setae two thirds as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 59A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and weakest sclerotization at harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *C. kaimosiensis* sp. nov. and *C. sp. 5* are very similar. However, in *C. kaimosiensis* the harpe is the most weakly sclerotized structure of the genitalia, and in *C. sp. 5* all margins of the harpe are the most strongly sclerotized structures of the genitalia. Furthermore, the harpe/gvc index of *C. kaimosiensis* is 0.37 and that of *C. sp. 5* is 0.42, the gvc width is more than two thirds of the gvc length in *C. kaimosiensis* and less than two thirds in *C. sp. 5*, and the setal arrangement and relative length of the setae differ between the two species.

Condition of type material

In the holotype, the end of the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron kakamegaensis sp. nov.

urn:lsid:zoobank.org:act:AC093FF9-25D0-46C5-BB6E-F4C90F54D861

Fig. 60

Diagnosis

OOL:LOL 1.43–1.72 (1.72). Male genitalia: Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.32; lateral articulation site of harpe with gvc flush; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in approximately basal half, straight and diverging distolaterally in approximately apical half; distoventral margin of gvc strongly descending proximomedially; harpe with at least one lateral seta restricted to apical third, longest lateral seta more than half as long as harpe; harpe with at least four median setae restricted to apical quarter; aedeagus + gonossiculus as long as harpe; genital length 2.54–2.67 × (2.54) gvc width; Weber length 1.70–1.82 × (1.70) genital length.

Etymology

The species is named after the Kakamega Forest which is the sampling location of the holotype and all 29 paratypes.

Material examined**Holotype**

KENYA • ♂; Western Province, Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036878.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°21'4.4 N, 34°51'41.1 E; 1602 m a.s.l.; 5 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00783 • 1 ♂; same collection data as for preceding; 7 Jun. 2007; NHMUK; NHMUK-013389012 • 1 ♂; Kakamega Forest; 00°27'10.6 N, 34°51'48.7 E; 1676 m a.s.l.; 19 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389013 • 1 ♂; same collection data as for preceding; SMNS; SMNS-HYM-T00784 • 2 ♂♂; same collection data as for preceding; 26 Jun. 2007; NMK; (ZFMK-HYM-00036818), NMK (ZFMK-HYM-00036819) • 1 ♂; same collection data as for preceding; ZFMK; ZFMK-HYM-00036820 • 1 ♂; Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036821 • 1 ♂; same collection data as for preceding; 28 Jun. 2007; ZFMK-HYM-00036822 • 5 ♂♂; same collection data as for holotype; ZFMK-HYM-00036823 to ZFMK-HYM-00036827 • 1 ♂; Kakamega Forest; 00°37'24.1 N, 34°51'12 E; 1585 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 10; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036813 • 2 ♂♂; same collection data as for preceding; 16 Aug. 2007; ZFMK-HYM-00036828, ZFMK-HYM-00036829 • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036830 • 1 ♂; Kakamega Forest; 00°21'21.1 N, 34°51'44.9 E; 1632 m a.s.l.; 1vAug. 2007; F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036831 • 2 ♂♂; Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 4 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036832, ZFMK-HYM-00036833 • 2 ♂♂; same collection data as for preceding; 10 Aug. 2007; ZFMK-HYM-00036834, ZFMK-HYM-00036835 • 1 ♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 25 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036836 • 2 ♂♂; Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 28 Aug. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036837, ZFMK-HYM-00036838 • 2 ♂♂; same collection data as for preceding; 4 Sep. 2007; ZFMK-HYM-00036839, ZFMK-HYM-00036840 • 1 ♂; Kakamega Forest; 00°07'40.8 N, 34°50'24 E; 1656 m a.s.l.; 2008; F. Hita Garcia leg.; Transect 30; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036841.

Description

Male (N = 5 in morphometric measurements)

BODY LENGTH. 0.81–1.22 mm (1.00 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma brown; scape, pedicel and flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown and proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.8× as long as pedicel, scape longer than F1 and F2 combined, F1 1.9× as long as wide, F1 1.5× as long as pedicel, F1 1.2× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.7× as long as wide, F6 shorter than F7 and F8 combined, F6 1.2× as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.04\text{--}1.37 \times (1.13)$ head height; head width $1.85\text{--}2.13 \times (1.86)$ interorbital space; maximum eye diameter $1.13\text{--}1.37 \times (1.33)$ minimum eye diameter; head height $1.56\text{--}1.73 \times (1.64)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL $1.00:0.42\text{--}0.56:0.58\text{--}0.70 (1.00:0.42:0.58)$; OOL $2.00\text{--}2.40 \times (2.40)$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.01\text{--}1.14 \times (1.04)$ mesosoma width; Weber length $350\text{--}388 \mu\text{m} (350 \mu\text{m})$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.86\text{--}2.13 \times (1.91)$ mesoscutellum width; posterior mesoscutal width $1.50\text{--}1.67 \times (1.55)$ mesoscutellum width; mesoscutellum length $1.50\text{--}1.71 \times (1.66)$ mesoscutellum width; mesoscutellum length $1.00\text{--}1.07 \times (1.07)$ posterior mesoscutal width; Weber length $1.32\text{--}1.44 \times (1.33)$ mesoscutum width; Weber length $1.53\text{--}1.67 \times (1.53)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.71\text{--}3.08 \times (2.97)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $194\text{--}213 \mu\text{m} (206 \mu\text{m})$; Weber length $1.70\text{--}1.82 \times (1.70)$ genital length; gvc width $75\text{--}81 \mu\text{m} (81 \mu\text{m})$; genital length $2.54\text{--}2.67 \times (2.54)$ gvc width; gvc width more than half of gvc length; gvc width $1.38 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 60C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximomedially (Fig. 60A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 60B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc strongly descending ventrally (Fig. 60B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.32; lateral articulation site of harpe with gvc flush (Fig. 60A, C); ventral margin of harpe concave, dorsal margin convex (Fig. 60B), lateral margin straight, widest point of harpe at articulation site with gvc (Fig. 60A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in approximately basal half, straight and diverging distolaterally in approximately apical half (Fig. 60C), apex of harpe slightly rounded (Fig. 60A, C). Harpe with at least one lateral seta restricted to apical third, longest lateral seta more than half as long as harpe, lateral setae oriented distolaterally; harpe with at least three apical setae, longest apical setae half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least four median setae restricted to apical quarter, longest median setae one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 60A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at apical aedeagus + gonossiculus.

Female

Unknown.

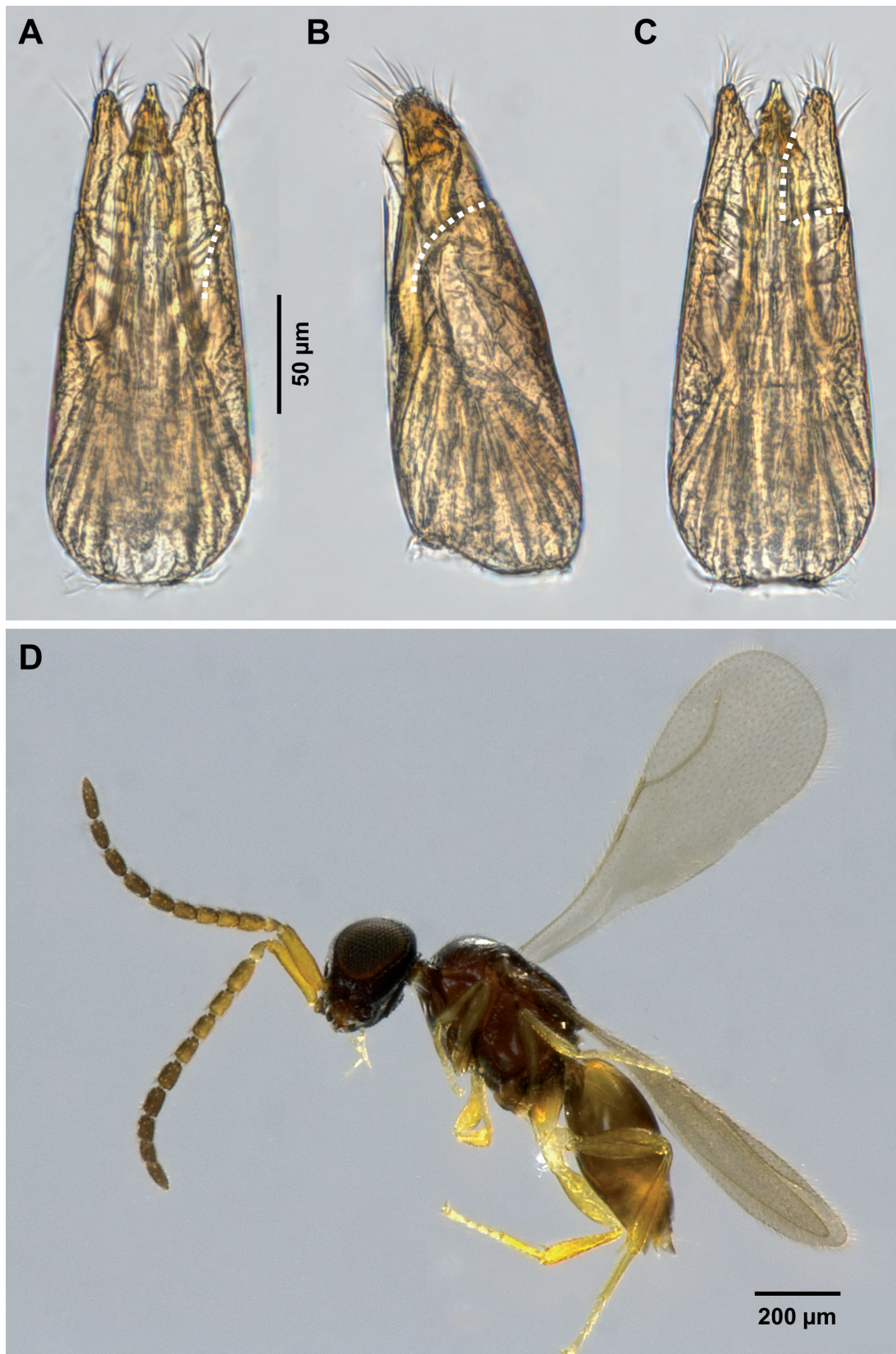


Fig. 60. Holotype of *Ceraphron kakamegaensis* sp. nov. (ZFMK-HYM-00036878). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Variation

The size of the multiporous plates on the flagellomeres is larger in ZFMK-HYM-00036822 and ZFMK-HYM-00036840. The longitudinal carinae on the syntergum are very indistinct in ZFMK-HYM-00036834. The widest point of the harpe at the lateral margin is the apex in ZFMK-HYM-00036822 and ZFMK-HYM-00036828 and the apex is oriented distolaterally in ZFMK-HYM-00036822. The length of the aedeagus + gonosticulus can vary slightly and is shorter than the harpe length in ZFMK-HYM-00036840. This paratype has more strongly sclerotized harpes. The Weber length to genital length ratio is distinctly higher in ZFMK-HYM-00036841.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. banda* sp. nov.

Condition of type material

In the holotype, the right hind wing is missing. Paratypes NMK (ZFMK-HYM-00036818) and NMK (ZFMK-HYM-00036819) were used in an unsuccessful DNA barcoding attempt, i.e., had been put in lysis buffer for non-destructive DNA extraction, and look more transparent.

Ceraphron kidole sp. nov.

urn:lsid:zoobank.org:act:A3228D0D-99F8-4B91-817D-070EFD29E041

Fig. 61

Diagnosis

Mesoscutellum length $1.52\text{--}1.77 \times (1.65)$ mesoscutellum width; mesoscutellum length $1.06\text{--}1.14 \times (1.10)$ posterior mesoscutal width. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.55; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally in basal third, straight and parallel to other harpe in apical two thirds; dorsal margin of harpe slightly concave; harpe with at least three apical setae, longest apical setae as long as harpe; genital length $2.34\text{--}2.51 \times (2.34)$ gvc width.

Etymology

The species name is derived from the Swahili word ‘*kidole*’ which means ‘finger’, with reference to the finger-shaped harpes of the male genitalia.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}21'7.9$ N, $34^{\circ}52'2.6$ E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036938.

Paratypes

KENYA – Western Province • 1 ♂; Kakamega Forest; $00^{\circ}21'4.4$ N, $34^{\circ}51'41.1$ E; 1602 m a.s.l.; 5 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; NHMUK;

NHMUK-013389014 • 1 ♂; same collection data as for holotype; NHMUK-013389015 • 2 ♂♂; same collection data as for holotype; SMNS-HYM-T00785, SMNS-HYM-T00786 • 1 ♂; same collection data as for holotype; ZFMK-HYM-00036790 • 2 ♂♂; same collection data as for holotype; 9 Jul. 2007; NMK; NMK (ZFMK-HYM-00036793), NMK (ZFMK-HYM-00036794) 1 ♂; same collection data as for holotype; 9 Jul. 2007; ZFMK; ZFMK-HYM-00036795 • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036796 • 3 ♂♂; same collection data as for preceding; 7 Aug. 2007; ZFMK; ZFMK-HYM-00036797 to ZFMK-HYM-00036799 • 1 ♂; Kakamega Forest; 00°21'21.1 N, 34°51'44.9 E; 1632 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036800 • 5 ♂♂; same collection data as for preceding; 8 Aug. 2007; ZFMK-HYM-00036801 to ZFMK-HYM-00036805 • 1 ♂; Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036806.

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.83–0.95 mm (0.92 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except proximal half of coxae brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.5 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.1 \times$ as long as wide, F1 $1.4 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.10\text{--}1.21 \times$ (1.10) head height; head width $1.81\text{--}2.08 \times$ (1.96) interorbital space; maximum eye diameter $1.22\text{--}1.33 \times$ (1.22) minimum eye diameter; head height $1.54\text{--}1.64 \times$ (1.64) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.45–0.56:0.52–0.56 (1.00:0.56:0.56); OOL $2.25\text{--}2.63 \times$ (2.25) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.02\text{--}1.09 \times$ (1.02) mesosoma width; Weber length 313–356 μm (319 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.71\text{--}1.95 \times$ (1.90) mesoscutellum width; posterior mesoscutal width $1.38\text{--}1.53 \times$ (1.50) mesoscutellum width; mesoscutellum length $1.52\text{--}1.77 \times$ (1.65) mesoscutellum width; mesoscutellum length $1.06\text{--}1.14 \times$ (1.10) posterior mesoscutal width; Weber length $1.27\text{--}1.39 \times$ (1.34) mesoscutum width; Weber length $1.50\text{--}1.55 \times$ (1.55) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and slightly bifurcated end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least seven distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.



Fig. 61. Holotype of *Ceraphron kidole* sp. nov. (ZFMK-HYM-00036938). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

FORE WING. Length $2.86\text{--}2.93 \times (2.93)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $150\text{--}177 \mu\text{m}$ ($150 \mu\text{m}$); Weber length $1.96\text{--}2.13 \times (2.13)$ genital length; gvc width $63\text{--}70 \mu\text{m}$ ($64 \mu\text{m}$); genital length $2.34\text{--}2.51 \times (2.34)$ gvc width; gvc width less than three quarters of gvc length; gvc width $1.29 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 61C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 61A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 61B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 61B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.55; lateral articulation site of harpe with gvc virtually flush (Fig. 61A, C); ventral margin of harpe slightly concave, dorsal margin slightly concave (Fig. 61B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 61A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, straight and parallel to other harpe in apical two thirds (Fig. 61C), apex of harpe rounded (Fig. 61A, C). Harpe with at least two lateral setae restricted to apical third, longest lateral setae more than two thirds as long harpe, lateral setae oriented distodorsally and distolaterally; harpe with at least three apical setae, longest apical setae as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least six median setae, longest median setae less than two thirds as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus less than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 61A, C) and as ventral as apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at all margins of harpe, distal gvc and apical aedeagus + gonossiculus.

Female

Unknown.

Variation

The flagellum is uniformly coloured, the mesometapleural sulcus is present and a small interaxillar sulcus is indicated in ZFMK-HYM-00036801. The dorsomedial margin of the harpe and the sclerotization of the genitalia are slightly different in ZFMK-HYM-00036802.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. kimathii* sp. nov. and *C. sataoi* sp. nov.

Condition of type material

In the holotype, the posterior end of the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron kimathii sp. nov.

urn:lsid:zoobank.org:act:D147FDA3-9767-4B27-95AF-B5283669F576

Fig. 62

Diagnosis

Metasoma brown; OOL:POL 1.47–2.00 (2.00); lateral margin of torulus distinctly raised; head height $1.77\text{--}1.83 \times (1.83)$ maximum eye diameter; mesometapleural sulcus present; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and bifurcated end, extending to end of mesosoma. Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.68; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and slightly diverging distolaterally in basal third, straight and parallel to other harpe in apical two thirds; harpe with at least three lateral setae restricted to apical half, longest lateral setae slightly less than as long as harpe, lateral setae oriented distodorsally, distolaterally and distoventrally; gvc width more than three quarters of gvc length.

Etymology

The species is named in honour of Dedan Kimathi (1920–1957), the leader of the Kenyan independence movement KLF. He fought against British colonialists and was executed in 1957.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°27'10.6 N, 34°51'48.7 E; 1676 m a.s.l.; 19 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036988.

Paratypes

KENYA – **Western Province** • 3 ♂♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 23 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036807 to ZFMK-HYM-00036809 • 1 ♂; same collection data as for preceding; 25 Aug. 2007; ZFMK-HYM-00036810.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.00–2.00 mm (1.27 mm).

COLOUR. Head brown, mesosoma brown, metasoma brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown and proximal two thirds of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.2 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.1 \times$ as long as wide, F1 $1.8 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.14\text{--}1.19 \times (1.19)$ head height; head width $1.85\text{--}1.92 \times (1.85)$ interorbital space; maximum eye diameter $1.25\text{--}1.38 \times (1.38)$ minimum eye diameter; head height $1.77\text{--}1.83 \times (1.83)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.50–

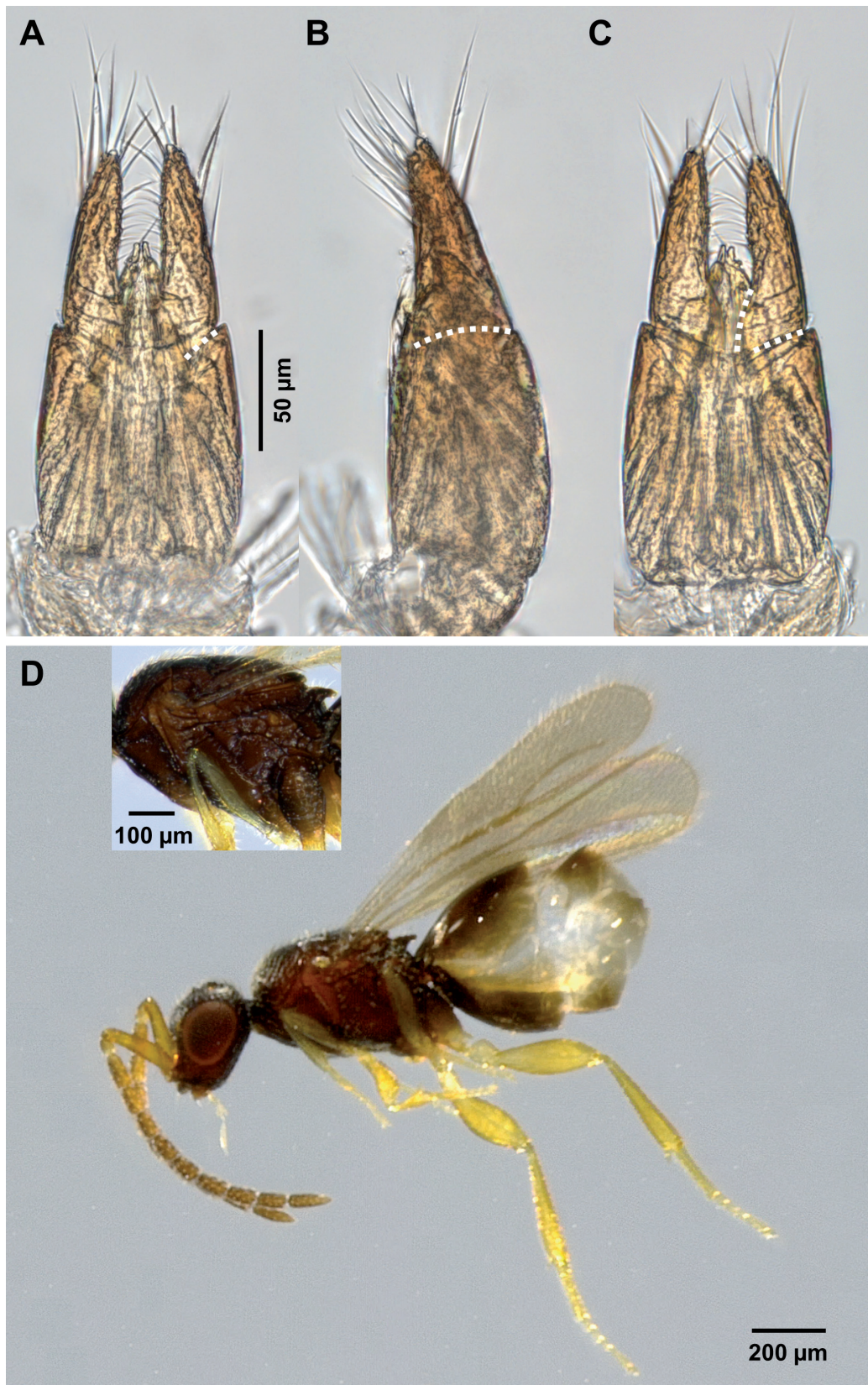


Fig. 62. Holotype of *Ceraphron kimathii* sp. nov. (ZFMK-HYM-00036988). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: mesosoma in lateral view.

0.68:0.44–0.46 (1.00:0.50:0.46); OOL 1.92–2.16 × (1.92) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus distinctly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 0.91–1.00 × (1.00) mesosoma width; Weber length 400–488 μm (438 μm); mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width 1.70–1.81 × (1.81) mesoscutellum width; posterior mesoscutal width 1.33–1.50 × (1.39) mesoscutellum width; mesoscutellum length 1.39–1.42 × (1.42) mesoscutellum width; mesoscutellum length 0.93–1.05 × (1.02) posterior mesoscutal width; Weber length 1.16–1.25 × (1.25) mesoscutum width; Weber length 1.47–1.59 × (1.59) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and bifurcated end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least seven distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length 2.78–2.88 × (2.85) width; stigmal vein longer than 3 × pterostigma marginal length.

MALE GENITALIA. Genital length 169–219 μm (169 μm); Weber length 2.23–2.59 × (2.59) genital length; gvc width 81–100 μm (84 μm); genital length 2.00–2.19 × (2.00) gvc width; gvc width more than three quarters of gvc length; gvc width 1.23 × distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 62C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 62A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 62B); proximolateral margin of gvc ascending and slightly emarginated ventrally; distolateral margin of gvc slightly descending ventrally (Fig. 62B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.68; lateral articulation site of harpe with gvc not flush (Fig. 62A, C); ventral margin of harpe slightly concave, dorsal margin slightly convex (Fig. 62B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 62A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and slightly diverging distolaterally in basal third, straight and parallel to other harpe in apical two thirds (Fig. 62C), apex of harpe rounded (Fig. 62A, C). Harpe with at least three lateral setae restricted to apical half, longest lateral setae slightly less than as long as harpe, lateral setae oriented distodorsally, distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae half as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least nine median setae, longest median setae less than half as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus less than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 62A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at apical harpe and distal gvc.

Female

Unknown.

Variation

The aedeagus + gonossiculus is about one quarter as long as harpe in ZFMK-HYM-00036809. The dorsal part of the gena is equipped with small processes in ZFMK-HYM-00036807 and the number of basal longitudinal carinae on the syntergum is higher than seven in ZFMK-HYM-00036988 and ZFMK-HYM-00036807.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron kimathii sp. nov. and *C. kidole* sp. nov. can be distinguished by a brown metasoma, the presence of the mesometapleural sulcus and a higher head height to maximum eye diameter (1.77–1.83) in *C. kimathii* and a light brown metasoma, the absence of the mesometapleural sulcus and a lower head height to maximum eye diameter (1.54–1.64) in *C. kidole* while the male genitalia are rather similar. However, there are also differences in male genitalia, i.e., the harpe/gvc index is higher in *C. kimathii* (0.68) than in *C. kidole* (0.55), the gvc width to length ratio is higher in *C. kimathii* (more than three quarters) than in *C. kidole* (less than three quarters), and the setal arrangement is different between both species.

For more comparisons with similar species, see remarks under *C. sataoi* sp. nov.

Condition of type material

In the holotype, the posterior half of the metasoma is missing, thus the body length measurement is not precise.

Ceraphron lirhanda sp. nov.

urn:lsid:zoobank.org:act:CEEC92FA-9249-47B2-A67E-AAD4253EAD05

Fig. 63

Diagnosis

Metasoma brown except anterior third lighter; dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital carina distinct; posterolateral processes of gena present. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.49; dorsomedial margins of harpes slightly converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and diverging distolaterally from base to apex, apex of harpe rounded; dorsal margin of harpe straight; gvc width more than three quarters of gvc length; gvc width $1.29 \times$ distal gvc width; harpe with at least three lateral setae restricted to apical half, longest lateral setae more than one third as long as harpe.

Etymology

The species is named after the Lirhanda Hill (1734 m a.s.l.) in Kakamega Forest.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 9 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036925.

Paratypes

KENYA – Western Province • 1 ♂; Kakamega Forest; 00°21'4.4 N, 34°51'41.1 E; 1602 m a.s.l.; 7 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-

HYM-00036846 • 4 ♂♂; same collection data as for holotype; 7 Jul. 2007; ZFMK-HYM-00036847 to ZFMK-HYM-00036850 • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 7 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036852 • 1 ♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 23 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036854.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 1.25–1.07 mm (1.25 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown except anterior third lighter; scape and pedicel yellowish, flagellum brown, gradually darkening from F1 to F9; legs yellowish except proximal third of coxae brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.7\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.1\times$ as long as wide, F1 $2.0\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 slightly shorter than F9, F6 $1.4\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3\times$ as high as F9; numerous large multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.09\text{--}1.30\times$ (1.30) head height; head width $1.94\text{--}2.03\times$ (2.03) interorbital space; maximum eye diameter $1.23\text{--}1.27\times$ (1.23) minimum eye diameter; head height $1.56\text{--}1.68\times$ (1.56) maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.48–0.61:0.52–0.55 (1.00:0.61:0.50); OOL $2.00\times$ (2.00) lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.00\text{--}1.03\times$ (1.03) mesosoma width; Weber length 388–481 μm (481 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.68\text{--}2.11\times$ (2.11) mesoscutellum width; posterior mesoscutal width $1.36\text{--}1.70\times$ (1.70) mesoscutellum width; mesoscutellum length $1.38\text{--}1.70\times$ (1.70) mesoscutellum width; mesoscutellum length $1.00\text{--}1.01\times$ (1.00) posterior mesoscutal width; Weber length $1.35\text{--}1.48\times$ (1.35) mesoscutum width; Weber length $1.67\text{--}1.80\times$ (1.67) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt, lighter and bifurcated end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least five distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $3.05\text{--}3.10\times$ (3.10) width; stigmal vein longer than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length 136–163 μm (163 μm); Weber length $2.85\text{--}2.96\times$ (2.96) genital length; gvc width 78–86 μm (86 μm); genital length $1.74\text{--}1.89\times$ (1.89) gvc width; gvc width more than three quarters of gvc length; gvc width $1.29\times$ distal gvc width. Proximodorsal margin of gvc

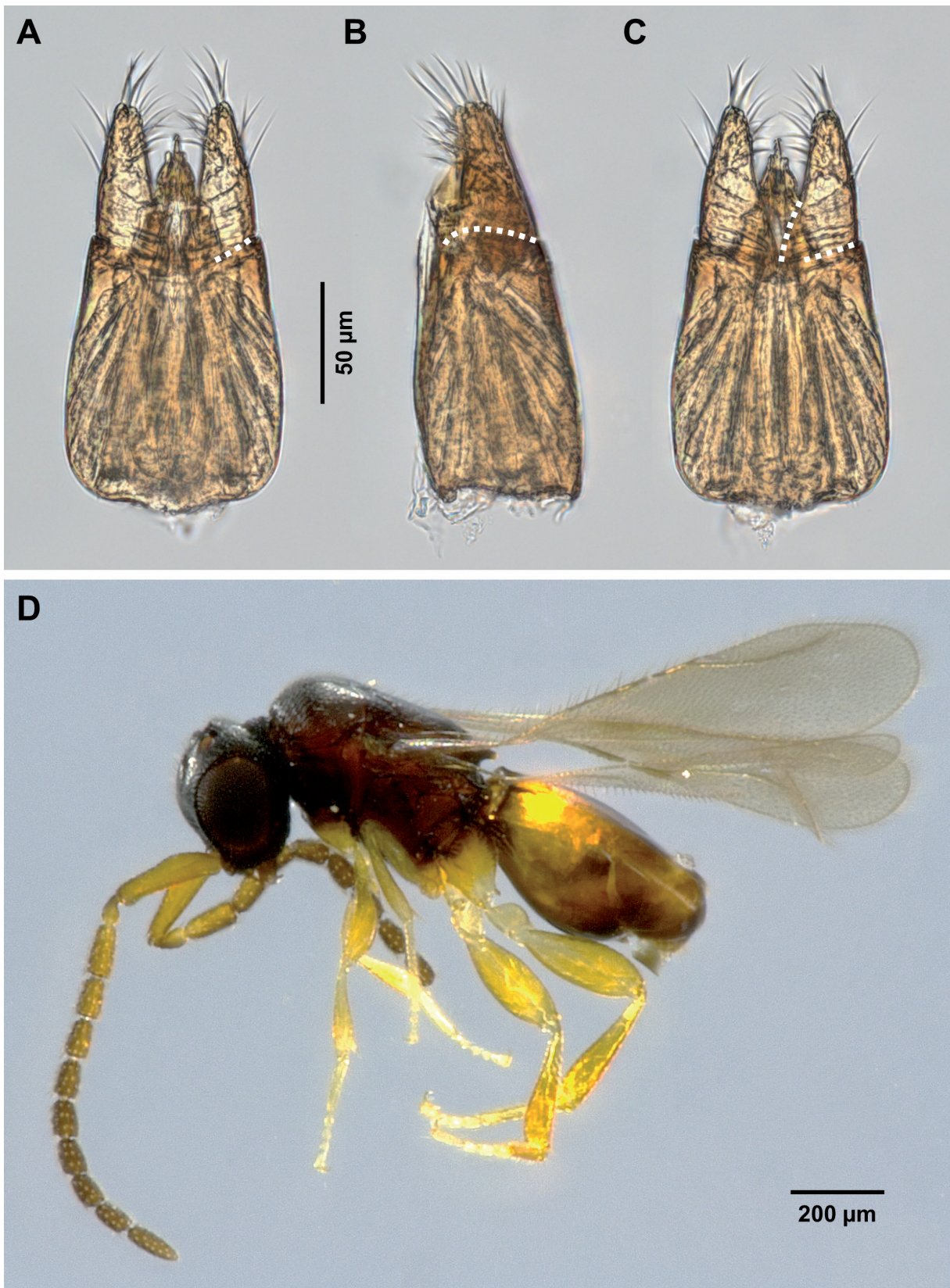


Fig. 63. Holotype of *Ceraphron lirhanda* sp. nov. (ZFMK-HYM-00036925). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

slightly convex; distodorsal margin of gvc descending proximomedially (Fig. 63C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 63A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 63B), slightly indented distomedially; proximolateral margin of gvc slightly ascending and emarginated ventrally; distolateral margin of gvc descending dorsally (Fig. 63B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.49; lateral articulation site of harpe with gvc not flush (Fig. 63A, C); ventral margin of harpe slightly concave, dorsal margin straight (Fig. 63B), lateral margin convex, widest point of harpe at articulation site with gvc (Fig. 63A, C); dorsomedial margins of harpes slightly converging and touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and diverging distolaterally from base to apex (Fig. 63C), apex of harpe rounded (Fig. 63A, C). Harpe with at least three lateral setae restricted to apical half, longest lateral setae more than one third as long as harpe, lateral setae oriented distolaterally; harpe with at least three apical setae, longest apical setae longer than one third as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least eight median setae, longest median setae more than one quarter as long as harpe, median setae oriented distomedially and medioventrally. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 63A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at distal margin of gvc and all margins of harpe.

Female

Unknown.

Variation

Translucent patches are absent in ZFMK-HYM-00036848. The apex of the harpe is slightly pointed in ZFMK-HYM-00036847 and ZFMK-HYM-00036854.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron lirhandia sp. nov. and *C. herreni* sp. nov. can be distinguished by the colour of the anterior third of the metasoma which is lighter than the rest of the metasoma in *C. lirhandia* and concolourous with the rest of the metasoma in *C. herreni*. The male genitalia of both species differ in the harpe/gvc index (0.49 in *C. lirhandia* and 0.41 in *C. herreni*) and the gvc width to gvc length ratio (more than three quarters in *C. lirhandia* and two thirds in *C. herreni*).

For more comparisons with similar species, see remarks under *C. mamamutere* sp. nov.

Condition of type material

In the holotype, the right F9 is missing, the right hind wing is detached and the posterior part of the metasoma is deformed, thus the body length measurement is not precise.

Ceraphron longiharpis sp. nov.

urn:lsid:zoobank.org:act:B136EFBD-85B2-4F78-AEAB-4879175FDE81

Fig. 64

Diagnosis

Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and emarginated end, exceeding end of mesosoma; mesoscutum width 1.18–

2.25 × (2.00) mesoscutellum width; mesoscutellum length 1.52–1.90 × (1.62) mesoscutellum width. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 1.74; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, straight and slightly converging distomedially in apical two thirds, apex of harpe pointed, oriented distomedially; gvc width more than three quarters of gvc length; gvc width equal to distal gvc width; harpe with at least three lateral setae restricted to apical third; apical and median setae distinctly crossing; genital length 2.44–3.10 × (3.10) gvc width.

Etymology

The species name refers to the long harpes of the male genitalia.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 6 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036948.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 17 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036945 • 1 ♂; Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 24 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036974 • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 7 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036949 • 1 ♂; Kakamega Forest; 00°22'50.5 N, 34°49'21.4 E; 1623 m a.s.l.; 15 Aug. 2007; F. Hita Garcia leg.; Transect 19; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036950 • 1 ♂; Kakamega Forest; 00°19'45.7 N, 34°52'2.8 E; 1573 m a.s.l.; 17 Aug. 2007; F. Hita Garcia leg.; Transect 21; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036975 • 1 ♂; Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 4 Sep. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036976 • 1 ♂; Kakamega Forest; 00°22'45 N, 34°49'40.8 E; 1618 m a.s.l.; 11 Sep. 2007; F. Hita Garcia leg.; Transect 27; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036947 • 1 ♂; Kakamega Forest; 00°22'43.7 N, 34°41'57.3 E; 1452 m a.s.l.; 25 Aug. 2008; F. Hita Garcia leg.; Transect 35; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036946.

Description

Male (N = 5 in morphometric measurements)

BODY LENGTH. 0.91–1.35 mm (1.35 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma brown; scape and pedicel yellowish, flagellum brown, gradually darkening from F1 to F9; legs yellowish except basal half of pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindric; scape 4.2 × as long as pedicel, scape longer than F1 and F2 combined, F1 2.4 × as long as wide, F1 1.9 × as long as pedicel, F1 1.3 × as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.6 × as long as wide, F6 shorter than F7 and F8 combined, F6 1.4 × as high as F9; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and slightly shorter than width of flagellomeres.

HEAD. Head width $1.12\text{--}1.38 \times (1.26)$ head height; head width $1.81\text{--}2.12 \times (1.85)$ interorbital space; maximum eye diameter $1.15\text{--}1.43 \times (1.15)$ minimum eye diameter; head height $1.53\text{--}1.67 \times (1.67)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL $1.00:0.34\text{--}0.78:0.43\text{--}0.67$ ($1.00:0.58:0.50$); OOL $2.08\text{--}2.33 \times (2.29)$ lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus distinctly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.02\text{--}1.13 \times (1.05)$ mesosoma width; Weber length $331\text{--}444 \mu\text{m}$ ($419 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.18\text{--}2.25 \times (2.00)$ mesoscutellum width; posterior mesoscutal width $1.36\text{--}1.85 \times (1.54)$ mesoscutellum width; mesoscutellum length $1.52\text{--}1.90 \times (1.62)$ mesoscutellum width; mesoscutellum length $1.00\text{--}1.15 \times (1.05)$ posterior mesoscutal width; Weber length $1.15\text{--}1.29 \times (1.29)$ mesoscutum width; Weber length $1.34\text{--}1.60 \times (1.60)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and emarginated end, exceeding end of mesosoma; mesometapleural sulcus indistinct; posterior propodeal projection distinctly short and light in ventrolateral view; posterior mesosomal comb distinct. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.63\text{--}3.14 \times (2.63)$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $138\text{--}194 \mu\text{m}$ ($194 \mu\text{m}$); Weber length $2.15\text{--}2.68 \times (2.16)$ genital length; gvc width $56\text{--}72 \mu\text{m}$ ($63 \mu\text{m}$); genital length $2.44\text{--}3.10 \times (3.10)$ gvc width; gvc width more than three quarters of gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 64C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 64A); ventral area of gvc straight; dorsal area of gvc straight (Fig. 64B), indented distomedially; proximolateral margin of gvc slightly emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 64B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 1.74; lateral articulation site of harpe with gvc not flush (Fig. 64A, C); ventral margin of harpe concave, dorsal margin slightly convex in basal third and straight in apical two thirds (Fig. 64B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 64A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, straight and slightly converging distomedially in apical two thirds (Fig. 64C), apex of harpe pointed, oriented slightly distomedially (Fig. 64A, C). Harpe with at least three lateral setae restricted to apical third, longest lateral setae more than one third as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae one third as long as harpe, apical setae distinctly crossing and oriented distodorsally, distolaterally and distomedially; harpe with at least four median setae restricted to apical third, longest median setae less than one third as long as harpe, median setae distinctly crossing and oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus more than one third as long as harpe, apex of aedeagus + gonossiculus broad (Fig. 64A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at apical third of harpe.

Female

Unknown.

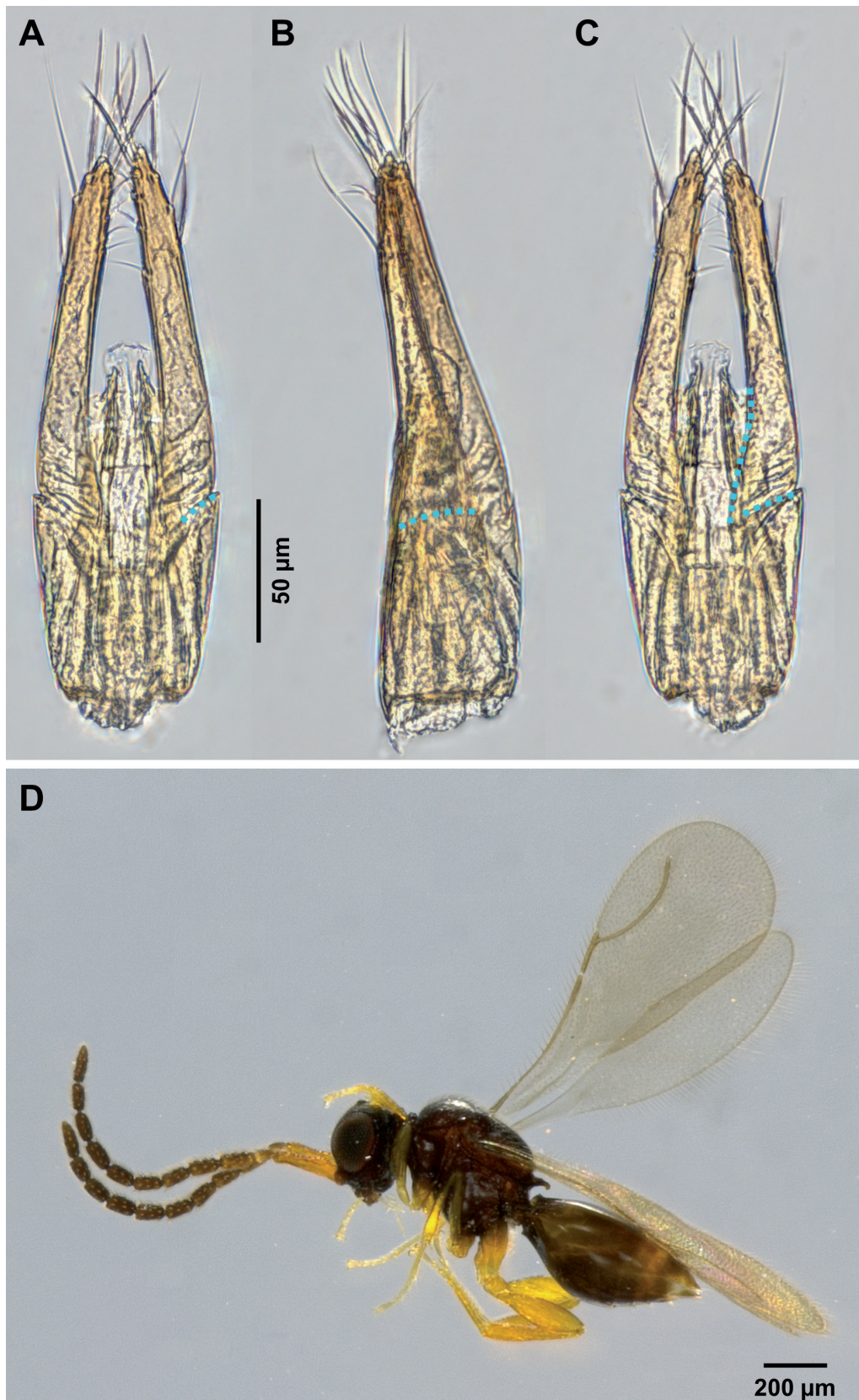


Fig. 64. Holotype of *Ceraphron longiharpis* sp. nov. (ZFMK-HYM-00036948). A–C. Male genitalia in ventral (A), lateral (B) and dorsal (C) views. D. Habitus in lateral view.

Variation

Larger types have a higher harpe/gvc index (ZFMK-HYM-00036948, ZFMK-HYM-00036949, ZFMK-HYM-00036976) than smaller types (ZFMK-HYM-00036945, ZFMK-HYM-00036946, ZFMK-HYM-00036947, ZFMK-HYM-00036950, ZFMK-HYM-00036974, ZFMK-HYM-00036975). White, thick setae on the upper face are less distinct in ZFMK-HYM-00036945, ZFMK-HYM-00036946, ZFMK-HYM-00036947 and ZFMK-HYM-00036950, and posterolateral processes of the gena are present in ZFMK-HYM-00036949. The anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is slightly bifurcated at the end in ZFMK-HYM-00036945, and the posterior mesosomal comb is indistinct in ZFMK-HYM-00036945, ZFMK-HYM-00036946 and ZFMK-HYM-00036947. ZFMK-HYM-00036946 has at least eight basal longitudinal carinae on the syntergum. The paratype ZFMK-HYM-00036950 differs from all other specimens in the following characters: the scutoscuteellar sulcus is straight, the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is straight in lateral view and extending to the end of the mesosoma, the metasoma is light brown, the flagellum is light brown-yellowish and slightly lightening from F1 to F9. The setae on the harpe are slightly differently arranged and the harpe/gvc index is 1.33. Considering the indicated positive correlation between body size and harpe/gvc index and many characters shared with the other specimens (see diagnosis), we treat ZFMK-HYM-00036950 here as conspecific but slightly odd representative of *C. longiharpis* sp. nov.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron longiharpis sp. nov. can be distinguished from all other treated species by the distinctly high harpe/gvc index (1.33–1.74).

Condition of type material

Holotype is immaculate.

Ceraphron longisetae sp. nov.

urn:lsid:zoobank.org:act:C9079ED4-D230-450B-99BC-DB3562357427

Fig. 65

Diagnosis

Weber length $1.11\text{--}1.23 \times (1.21)$ mesoscutum width; Weber length $1.36\text{--}1.44 \times (1.44)$ mesoscutellum length. Male genitalia: harpe triangular in ventral and dorsal view; harpe/gvc index 0.39; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex, small indentations in apical half, apex of harpe pointed, oriented distomedially; longest lateral setae more than twice as long as harpe; longest apical setae as long as harpe; genitalia weakly sclerotized with weakest sclerotization at harpe and aedeagus + gonosticulus; gvc width more than three quarters of gvc length; Weber length $3.21\text{--}4.16 \times (4.16)$ genital length.

Etymology

The species name refers to the long lateral setae of the harpes of the male genitalia.

Material examined**Holotype**

KENYA • ♂; Western Province, Kakamega Forest; 00°27'10.6 N, 34°51'48.7 E; 1676 m a.s.l.; 26 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036941.

Paratypes

KENYA – **Western Province** • 1 ♂; same collection data as for holotype; 19 Jun. 2007; NHMUK; NHMUK-013389016 • 1 ♂; same collection data as for holotype; ZFMK-HYM-00036959 • 2 ♂♂; Kakamega Forest; 00°18'13.4 N, 34°48'16 E; 1554 m a.s.l.; 20 Jun. 2007; F. Hita Garcia leg.; Transect 5; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036960, ZFMK-HYM-00036961 • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 9 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036942 • 1 ♂; Kakamega Forest; 00°37'24.1 N, 34°51'12 E; 1585 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 10; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036969 • 1 ♂; Kakamega Forest; 00°23'6.2 N, 34°33'37.8 E; 1602 m a.s.l.; 16 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389017 • 2 ♂♂; same collection data as for preceding; ZFMK; ZFMK-HYM-00036962, ZFMK-HYM-00036963 • 2 ♂♂; Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 17 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00787, SMNS-HYM-T00788 • 2 ♂♂; same collection data as for preceding; NMK; NMK (ZFMK-HYM-00036955), NMK (ZFMK-HYM-00036956) • 2 ♂♂; same collection data as for preceding; ZFMK; ZFMK-HYM-00036943, ZFMK-HYM-00036957 • 1 ♂; Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 24 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036964 • 2 ♂♂; Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036965, ZFMK-HYM-00036966 • 2 ♂♂; Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036967, ZFMK-HYM-00036970 • 2 ♂♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 23 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036968, ZFMK-HYM-00036971 • 1 ♂; Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 28 Aug. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036944 • 1 ♂; Kakamega Forest; 00°13'59.1 N, 34°51'43.7 E; 1614 m a.s.l.; 5 Aug. 2007; F. Hita Garcia leg.; Transect 24; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036958.

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.88–1.25 mm (0.88 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.6× as long as pedicel, scape longer than F1 and F2 combined, F1 1.9× as long as wide, F1 1.4× as long as pedicel, F1 1.3× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.2× as long as wide, F6 shorter than F7 and F8 combined, F6 1.1× as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.17\text{--}1.32 \times (1.19)$ head height; head width $1.88\text{--}2.00 \times (1.92)$ interorbital space; maximum eye diameter $1.04\text{--}1.26 \times (1.04)$ minimum eye diameter; head height $1.47\text{--}1.75 \times (1.75)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.41\text{--}0.63:0.45\text{--}0.68 (1.00:0.41:0.45)$; OOL $1.73\text{--}2.77 \times (2.44)$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.98\text{--}1.04 \times (1.04)$ mesosoma width; Weber length $306\text{--}394 \mu\text{m} (325 \mu\text{m})$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.70\text{--}1.96 \times (1.87)$ mesoscutellum width; posterior mesoscutal width $1.36\text{--}1.43 \times (1.43)$ mesoscutellum width; mesoscutellum length $1.33\text{--}1.60 \times (1.57)$ mesoscutellum width; mesoscutellum length $0.98\text{--}1.13 \times (1.09)$ posterior mesoscutal width; Weber length $1.11\text{--}1.23 \times (1.21)$ mesoscutum width; Weber length $1.36\text{--}1.44 \times (1.44)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and bifurcated end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.66\text{--}2.94 \times (2.76)$ width; stigmal vein longer than $2 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $78\text{--}100 \mu\text{m} (78 \mu\text{m})$; Weber length $3.21\text{--}4.16 \times (4.16)$ genital length; gvc width $44\text{--}55 \mu\text{m} (44 \mu\text{m})$; genital length $1.79\text{--}2.14 \times (1.79)$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.13 \times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc descending proximomedially (Fig. 65C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 65A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 65B), slightly indented distomedially; proximolateral margin of gvc slightly ascending and emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 65B). Harpe triangular in ventral and dorsal view; harpe/gvc index 0.39; lateral articulation site of harpe with gvc not flush (Fig. 65A, C); ventral margin of harpe straight, dorsal margin convex (Fig. 65B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 65A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex, small indentations in apical half (Fig. 65C), apex of harpe pointed, oriented distomedially (Fig. 65A, C). Harpe with at least two lateral setae restricted to apical third, longest lateral setae more than twice as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least four median setae, longest median setae less than half as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus slightly less than as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 65A, C) and as ventral as apex of harpe. Genitalia weakly sclerotized with weakest sclerotization at harpe and aedeagus + gonossiculus.

Female

Unknown.

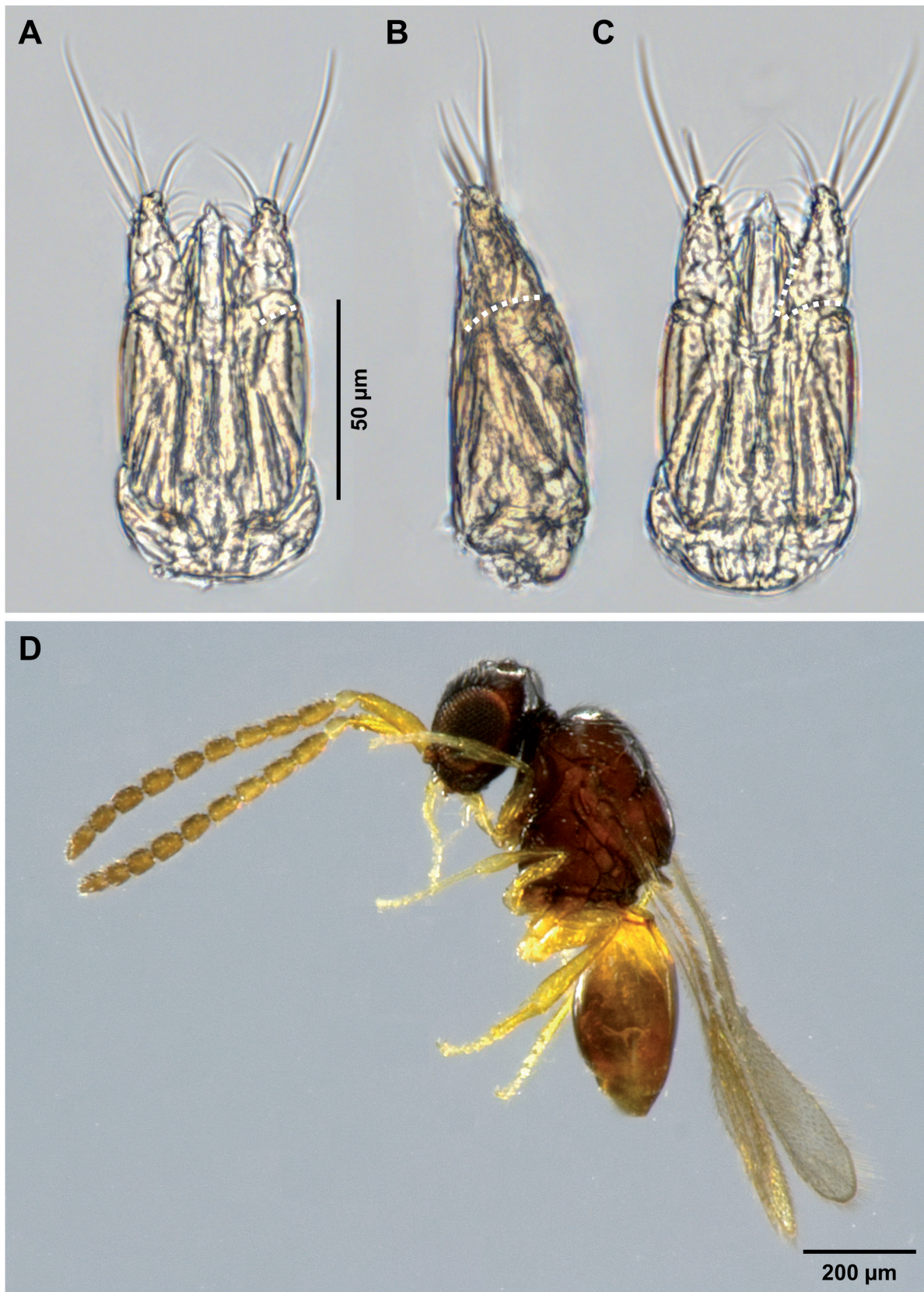


Fig. 65. Holotype of *Ceraphron longisetae* sp. nov. (ZFMK-HYM-00036941). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Variation

The metasoma is uniformly coloured and the posterolateral processes of the gena are indistinct in ZFMK-HYM-00036942.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. eulbergi* sp. nov.

Condition of type material

In the holotype, the right hind wing is detached.

Ceraphron longumerunus sp. nov.

urn:lsid:zoobank.org:act:194318FF-36D8-4CB7-ADE6-AD12C18409BD

Fig. 66

Diagnosis

Mesosoma yellowish except meso- and metapleuron darker, metasoma light brown-yellowish except anterior third lighter; scape shorter than F1 and F2 combined, F1 4.8× as long as wide, F1 3.8× as long as pedicel, F1 slightly shorter than F7 and F8 combined, F1 longer than F9; few distinctly small multiporous plates on flagellomeres; head width 1.09–1.29× (1.29) mesosoma width; mesoscutum width 1.32–1.68× (1.32) mesoscutellum width; posterior mesoscutal width 1.26–1.32× (1.32) mesoscutellum width; mesoscutellum length 1.17–1.21× (1.21) posterior mesoscutal width; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex dorsally oriented in lateral view with pointed and bifurcated end. Male genitalia: harpe bulb-shaped in ventral and dorsal view; harpe/gvc index 0.34; dorsomedial margins of harpes indistinct at distodorsal margin of gvc, dorsomedial margin of harpe indistinct in basal third, concave in middle third, convex in apical third, apex of harpe rounded; ventral area of gvc convex with indistinct distal setae; longest lateral seta as long as harpe, longest apical setae 2.5× as long as harpe; gvc width 1.44× distal gvc width; aedeagus + gonossiculus with at least two distinct digital teeth, oriented dorsally.

Etymology

The species name is a composition of the word long, the flagellomere and the Latin word ‘*unus*’, which means ‘one’, with reference to the elongate F1.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036940.

Paratypes

KENYA – Western Province • 2 ♂♂; Kakamega Forest; 00°21'4.9 N, 34°51'41.1 E; 1602 m a.s.l.; no date on label, 2007 or 2008; F. Hita Garcia leg.; Transect 1; primary rain forest; Winkler leaf litter extraction;

NHMUK; NHMUK-013389018, NHMUK-013389019 • 2 ♂♂; same collection data as for preceding; ZFMK; ZFMK-HYM-00034462, ZFMK-HYM-00034472 • 1 ♂; Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00789 • 1 ♂; Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 28 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00790 • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00034467) • 1 ♂; Kakamega Forest; 00°27'0.9 N, 34°50'52.9 E; 1649 m a.s.l.; 10 Jul. 2007; F. Hita Garcia leg.; Transect 8; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00034468) • 1 ♂; Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 4 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034469 • 1 ♂; Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034470 • 1 ♂; Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034471.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.76–0.91 mm (0.88 mm).

COLOUR. Head light brown-yellowish, mesosoma yellowish except meso- and metapleuron darker, metasoma light brown-yellowish except anterior one third lighter; scape and pedicel yellowish, F1 yellowish, F2 to F9 light brown except F2 lighter; legs yellowish except metacoxa light yellow and transparent; fore wing venation light brown, distal end of marginal vein and pterostigma marginal vein distinctly darker, fore and hind wing disc slightly melanized, fore wing at proximal part and at proximal half of stigmal vein less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.5 \times$ as long as pedicel, scape shorter than F1 and F2 combined, F1 $4.8 \times$ as long as wide, F1 $3.8 \times$ as long as pedicel, F1 $1.6 \times$ as long as F2, F1 slightly shorter than F7 and F8 combined, F1 longer than F9, F6 $2.3 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3 \times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and longer than width of F1 to F4.

HEAD. Head width $1.18\text{--}1.30 \times$ (1.18) head height; head width $1.86\text{--}1.96 \times$ (1.88) interorbital space; maximum eye diameter $1.11\text{--}1.39 \times$ (1.32) minimum eye diameter; head height $1.50\text{--}1.60 \times$ (1.52) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina indistinct. OOL:POL:LOL 1.00:0.37–0.44:0.42–0.56 (1.00:0.44:0.56); OOL $2.13\text{--}3.17 \times$ (2.25) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.09\text{--}1.29 \times$ (1.29) mesosoma width; Weber length 263–294 μm (294 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.32\text{--}1.68 \times$ (1.32) mesoscutellum width; posterior mesoscutal width $1.26\text{--}1.32 \times$ (1.32) mesoscutellum width; mesoscutellum length $1.47\text{--}1.59 \times$ (1.59) mesoscutellum width; mesoscutellum length $1.17\text{--}1.21 \times$ (1.21) posterior mesoscutal width; Weber length $1.27\text{--}1.62 \times$

(1.62) mesoscutum width; Weber length $1.34\text{--}1.50 \times$ (1.34) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex dorsally oriented in lateral view with pointed and bifurcated end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least five basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.98\text{--}3.10 \times$ (3.02) width; stigmal vein $3 \times$ as long as pterostigma marginal length.

MALE GENITALIA. Genital length $86\text{--}113 \mu\text{m}$ ($113 \mu\text{m}$); Weber length $2.61\text{--}3.05 \times$ (2.61) genital length; gvc width $59\text{--}63 \mu\text{m}$ ($63 \mu\text{m}$); genital length $1.38\text{--}1.80 \times$ (1.80) gvc width; gvc width three quarters of gvc length; gvc width $1.44 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 66C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 66A); ventral area of gvc convex with indistinct distal setae; dorsal area of gvc straight (Fig. 66B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 66B). Harpe bulb-shaped in ventral and dorsal view; harpe/gvc index 0.34; lateral articulation site of harpe with gvc not flush (Fig. 66A, C); ventral margin of harpe straight, dorsal margin slightly concave (Fig. 66B), lateral margin straight and emarginated at apical third, widest point of harpe at lateral articulation site with gvc (Fig. 66A, C); dorsomedial margins of harpes indistinct at distodorsal margin of gvc, dorsomedial margin of harpe indistinct in basal third, concave in middle third, convex in apical third (Fig. 66C), apex of harpe rounded (Fig. 66A, C). Harpe with at least one lateral seta restricted to apical third, longest lateral seta as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae $2.5 \times$ as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least three median setae restricted to apical third, longest median setae more than one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than two thirds as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 66A, C) and dorsal to apex of of harpe. Aedeagus + gonossiculus with at least two distinct digital teeth, oriented dorsally. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Longest apical setae are as long as the harpe in ZFMK-HYM-00034462 (apical setae might be broken). The digital teeth of the aedeagus + gonossiculus are indistinct in NHMUK-013389019 and ZFMK-HYM-00034472. The sensillae of the flagellomeres are longer than the width of all flagellomeres in ZFMK-HYM-00034471.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The colouration pattern of *Ceraphron longumerunus* sp. nov. is somewhat similar to that of *Ceraphron cingulum* sp. nov., *Cyoceraphron invisibilis* sp. nov. and *Cyoceraphron njano* sp. nov. However, by

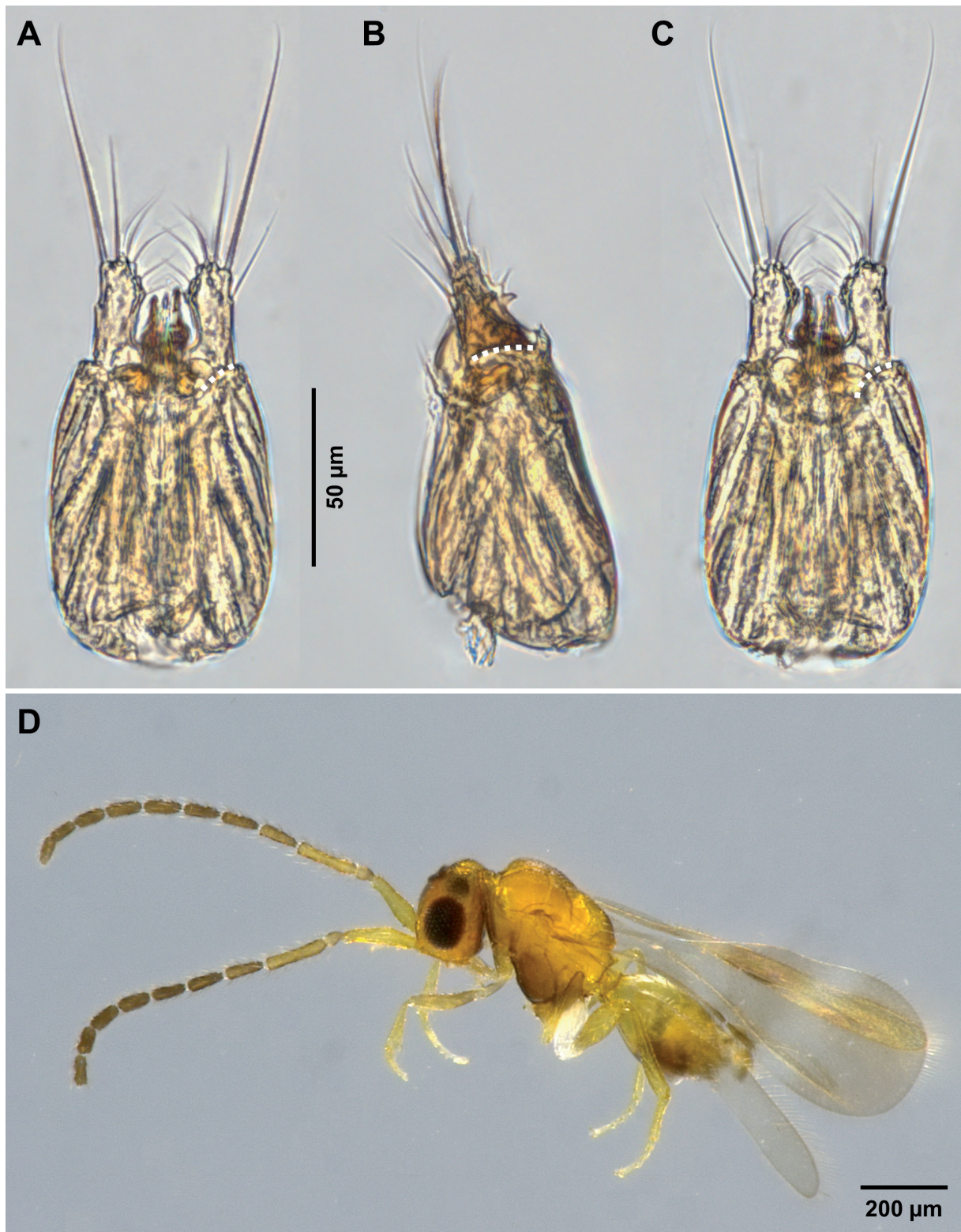


Fig. 66. Holotype of *Ceraphron longumerunus* sp. nov. (ZFMK-HYM-00036940). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

many body and male genitalia characters *C. longumerunus* can be easily distinguished from all other treated species.

Condition of type material

In the holotype, the left F9, the left mesotarsus and the last two left protarsal segments are missing. The posterior end of the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron maathaiae sp. nov.

urn:lsid:zoobank.org:act:2A430253-E004-455C-9ECB-67B06877150D

Fig. 67

Diagnosis

Flagellomeres cylindric and moniliform (F3–F5); scape slightly shorter than F1 to F3 combined; F6 as high as F9; OOL 3.19 x lateral ocellus diameter; mesoscutellum length $1.21 \times$ posterior mesoscutal width; Weber length $3.69 \times$ genital length. Male genitalia: harpe trapezoidal to cone-shaped in ventral and dorsal view; harpe/gvc index 0.44; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in approximately basal third, convex and diverging distolaterally in approximately apical two thirds.

Etymology

The species is named in honour of the Kenyan activist Wangarĩ Muta Maathai (1940–2011) who founded the Green Belt Movement and won the Nobel Peace Prize as first African woman.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036895.

Description

Male

BODY LENGTH. 0.95 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindric and moniliform (F3–F5); scape $3.6 \times$ as long as pedicel, scape slightly shorter than F1 to F3 combined, F1 $2.0 \times$ as long as wide, F1 $1.3 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.3 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.14 \times$ head height; head width $1.88 \times$ interorbital space; maximum eye diameter $1.20 \times$ minimum eye diameter; head height $1.71 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.41:0.40; OOL $3.19 \times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.09 \times$ mesosoma width; Weber length $300 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus slightly concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards. Mesoscutum width $1.68 \times$ mesoscutellum width; posterior mesoscutal width $1.27 \times$ mesoscutellum width; mesoscutellum length $1.54 \times$ mesoscutellum width; mesoscutellum length $1.21 \times$ posterior mesoscutal width; Weber length $1.29 \times$ mesoscutum width. Weber length $1.41 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex short and straight in lateral view with blunt and lighter end; mesometapleural sulcus indistinct; posterior propodeal projection straight and short in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.98 \times$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $81 \mu\text{m}$; Weber length $3.69 \times$ genital length; gvc width $48 \mu\text{m}$; genital length $1.68 \times$ gvc width; gvc width two thirds of gvc length; gvc width $1.24 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 67C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 67A); ventral area of gvc convex; dorsal area of gvc slightly convex (Fig. 67B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc convex (Fig. 67B). Harpe trapezoidal to cone-shaped in ventral and dorsal view; harpe/gvc index 0.44; lateral articulation site of harpe with gvc not flush (Fig. 67A, C); ventral margin of harpe concave, dorsal margin slightly convex (Fig. 67B), lateral margin convex, widest point of harpe in basal third (Fig. 67A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in approximately basal third, convex and diverging distolaterally in approximately apical two thirds (Fig. 67C), apex of harpe slightly pointed, oriented distolaterally (Fig. 67A, C). Harpe with at least one lateral seta restricted to apical quarter, longest lateral seta one third as long as harpe, lateral seta oriented distolaterally; harpe with at least two apical setae, longest apical setae more than half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least four median setae, longest median setae one third as long as harpe, median setae oriented distomedially and medioventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 67A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *C. maathiaiae* sp. nov. are similar to those of *C. ekeru* sp. nov. However, the dorsomedial margin of the harpe of *C. maathiaiae* is straight and parallel to the other harpe in

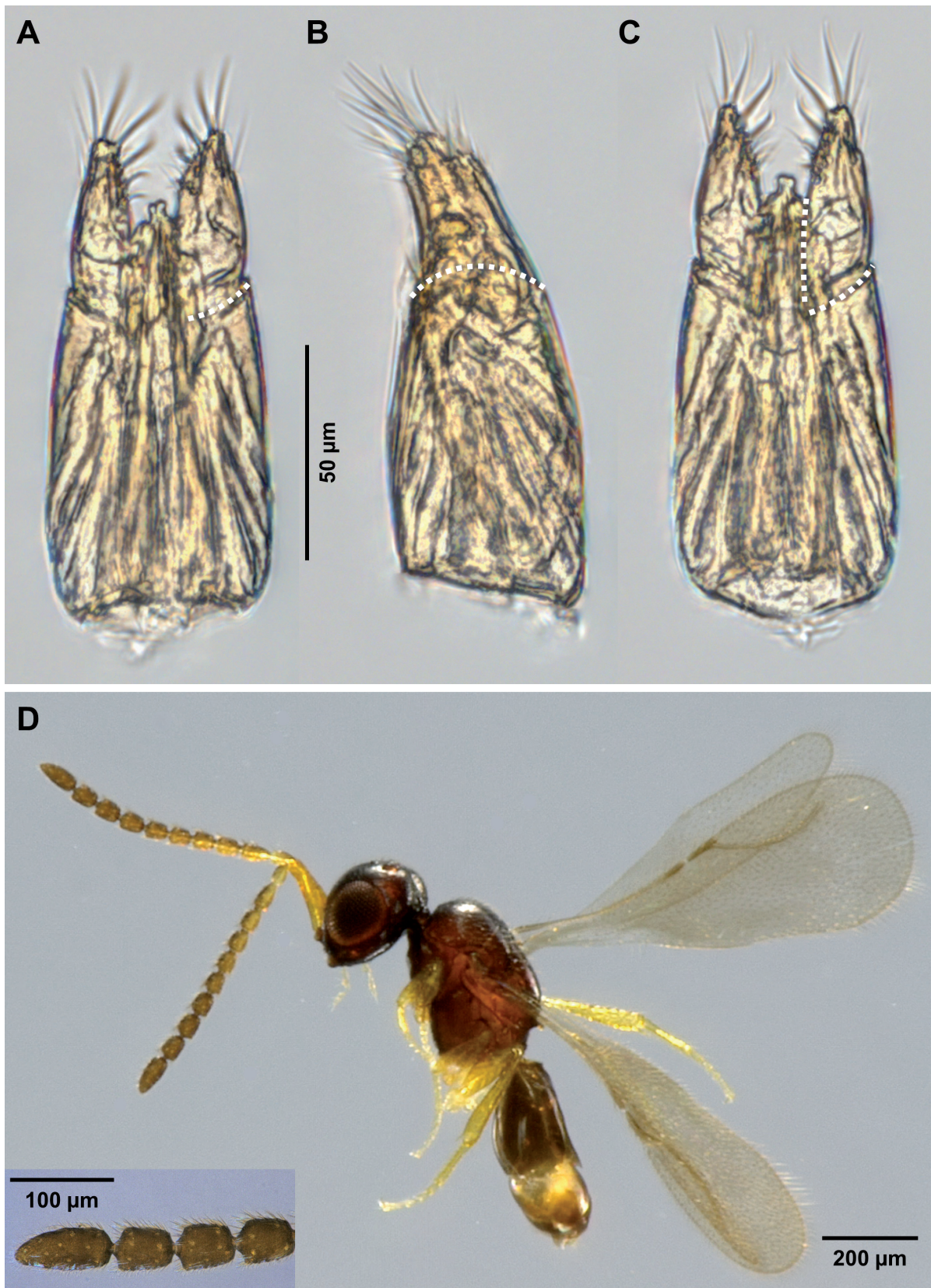


Fig. 67. Holotype of *Ceraphron maathaiae* sp. nov. (ZFMK-HYM-00036895). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: flagellomeres in detail.

approximately basal third and convex and diverging distolaterally in approximately apical two thirds, and the dorsomedial margin of the harpe of *C. ekeru* is slightly convex and diverging distolaterally from base to apex. The proximolateral margin of the gvc of *C. maathaiiae* is ascending ventrally, whereas the proximolateral margin of the gvc of *C. ekeru* is not ascending ventrally but is slightly emarginated ventrally. The genitalia of *C. maathaiiae* are uniformly sclerotized and the genitalia of *C. ekeru* have the strongest sclerotization at the distal margin of the gvc and at all margins of the harpe. In addition to these male genitalia character, the two species are easily distinguished by the flagellum of *C. maathaiiae* being gradually darkening from F1 to F9 and the flagellum of *C. ekeru* being uniformly coloured, and by some of the flagellomeres of *C. maathaiiae* being moniliform and shorter than those of *C. ekeru*.

Condition of type material

In the holotype, the right middle leg is missing, except the coxa, and the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron malava sp. nov.

urn:lsid:zoobank.org:act:0541440A-A865-4610-9D3D-7C3B5E8FF929

Fig. 68

Diagnosis

F1 $2.6\times$ as long as wide; OOL:POL 1.45–1.61 (1.45); head width $1.24\text{--}1.34\times$ (1.24) head height; Weber length $1.09\text{--}1.16\times$ (1.16) mesoscutum width; posterior mesoscutal width $1.33\text{--}1.36\times$ (1.33) mesoscutellum width; genital length $2.72\text{--}2.86\times$ (2.80) gvc width. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 1.02; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex, apex of harpe slightly pointed; lateral margin of harpe straight; harpe with at least three lateral setae restricted to apical quarter; genitalia weakly sclerotized with strongest sclerotization at apical third of harpe; gvc width more than three quarters of gvc length; gvc width equal to distal gvc width.

Etymology

The species is named after the Malava Forest, a part of the Kakamega Forest region, which is the type locality.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}27'0.9$ N, $34^{\circ}50'52.9$ E; 1649 m a.s.l.; 3 Jul. 2007; F. Hita Garcia leg.; Transect 8; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036937.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; $00^{\circ}21'4.4$ N, $34^{\circ}51'41.1$ E; 1602 m a.s.l.; 5 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389020 • 1 ♂; Kakamega Forest; $00^{\circ}21'4.4$ N, $34^{\circ}51'41.1$ E; 1602 m a.s.l.; 7 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389021 • 1 ♂; same collection data as for preceding; ZFMK; ZFMK-HYM-00036785 • 1 ♂; Kakamega Forest; $00^{\circ}21'7.9$ N, $34^{\circ}52'2.6$ E; 1597 m a.s.l.; 9 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036780 • 1 ♂; same collection data as for holotype; 10 Jul. 2007; NMK; NMK (ZFMK-HYM-00036779) • 1 ♂; same collection data as for holotype; ZFMK-HYM-00036778 • 2 ♂♂; Kakamega Forest; $00^{\circ}23'6.2$ N, $34^{\circ}33'37.8$ E; 1602 m a.s.l.; 16 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00791, SMNS-HYM-T00792 • 1 ♂; Kakamega Forest;

00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00036783) • 1 ♂; Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036784 • 2 ♂♂; Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036781, ZFMK-HYM-00036786 • 1 ♂; Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 28 Aug. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036777.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.88–1.15 mm (0.88 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel yellowish, flagellum light brown; legs yellowish except proximal half of coxae brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.4× as long as pedicel, scape longer than F1 and F2 combined, F1 2.6× as long as wide, F1 1.6× as long as pedicel, F1 1.3× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.8× as long as wide, F6 shorter than F7 and F8 combined, F6 1.3× as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.24–1.34× (1.24) head height; head width 1.89–2.09× (1.89) interorbital space; maximum eye diameter 1.18–1.30× (1.18) minimum eye diameter; head height 1.58–1.67× (1.58) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.62–0.69:0.52–0.64 (1.00:0.69:0.53); OOL 2.20–2.63× (2.25) lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 0.98–1.04× (1.02) mesosoma width; Weber length 303–376 μm (325 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width 1.76–1.96× (1.88) mesoscutellum width; posterior mesoscutal width 1.33–1.36× (1.33) mesoscutellum width; mesoscutellum length 1.29–1.48× (1.29) mesoscutellum width; mesoscutellum length 0.97–1.10× (0.97) posterior mesoscutal width; Weber length 1.09–1.16× (1.16) mesoscutum width; Weber length 1.31–1.68× (1.68) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length 2.65–2.88× (2.88) width; stigmal vein shorter than 3× pterostigma marginal length.

MALE GENITALIA. Genital length 125–140 μm (131 μm); Weber length 2.43–2.68× (2.48) genital length; gvc width 44–52 μm (47 μm); genital length 2.72–2.86× (2.80) gvc width; gvc width more than three quarters of gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc slightly descending proximomedially (Fig. 68C); proximoventral margin of

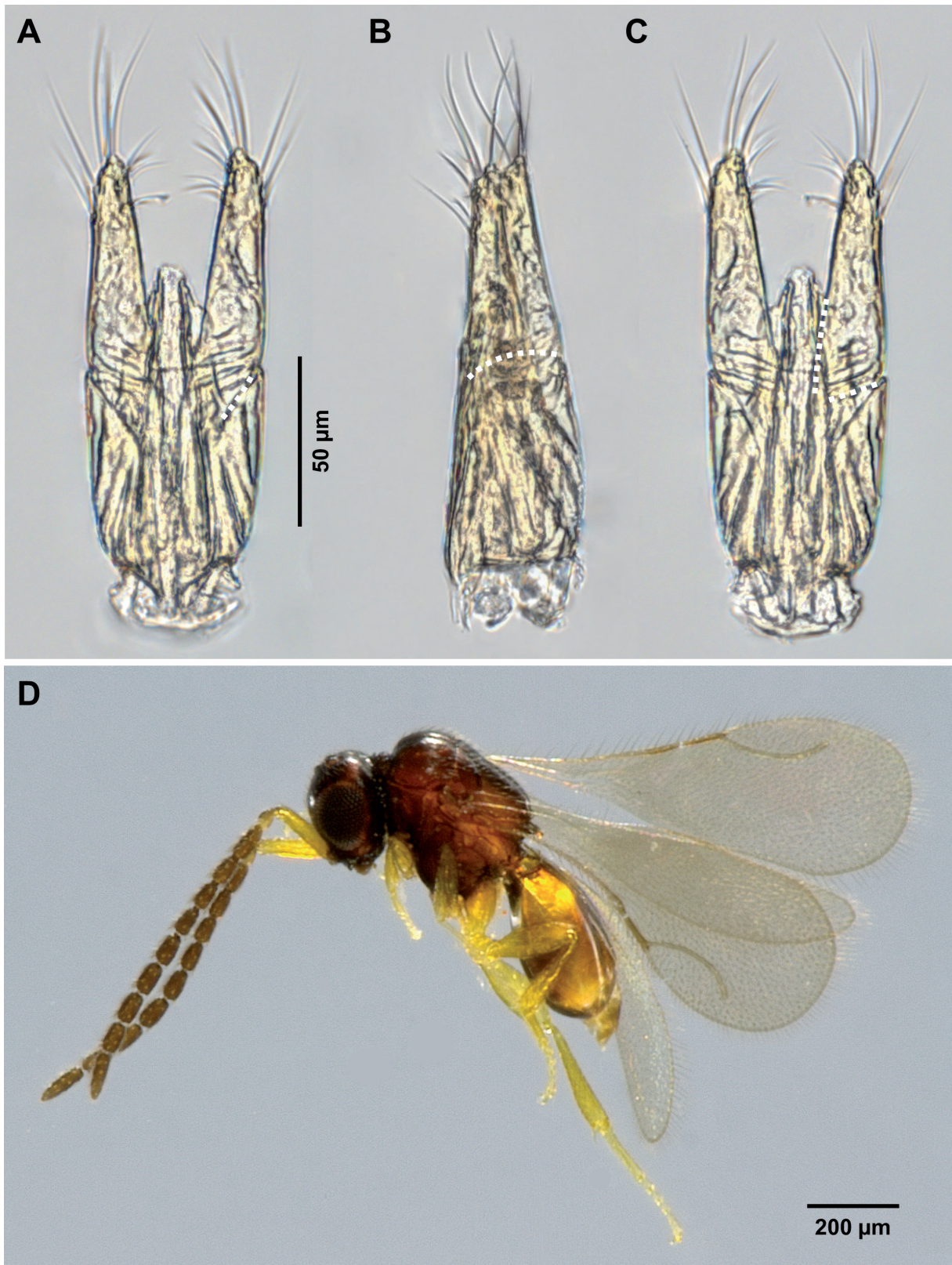


Fig. 68. Holotype of *Ceraphron malava* sp. nov. (ZFMK-HYM-00036937). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

gvc slightly convex; distoventral margin of gvc strongly descending proximomedially (Fig. 68A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 68B), slightly indented distomedially; proximolateral margin of gvc slightly descending and emarginated ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 68B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 1.02; lateral articulation site of harpe with gvc virtually flush (Fig. 68A, C); ventral margin of harpe straight, dorsal margin straight (Fig. 68B), lateral margin straight, widest point of harpe at lateral articulation site with gvc (Fig. 68A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex (Fig. 68C), apex of harpe slightly pointed (Fig. 68A, C). Harpe with at least three lateral setae restricted to apical quarter, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae more than two thirds as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least four median setae restricted to apical quarter, longest median setae one third as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus less than half as long as harpe, apex of aedeagus + gonossiculus broad (Fig. 68A, C) and as ventral as apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at apical third of harpe.

Female

Unknown.

Variation

The flagellum gradually darkens from F1 to F9 in ZFMK-HYM-00036777 and ZFMK-HYM-00036780.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. tiriki* sp. nov., *C. semira* sp. nov., and *C. eaerendili* sp. nov.

Condition of type material

In the holotype, the end of the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron mamamutere sp. nov.

urn:lsid:zoobank.org:act:F6449B06-B4F4-4AE6-8743-4D4C601BBF2C

Fig. 69

Diagnosis

F1 slightly shorter than F9; sensillae on flagellomeres sickle-shaped and distinctly shorter than width of flagellomeres; dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; maximum eye diameter $1.48\text{--}1.52 \times (1.52)$ minimum eye diameter; fore wing length $3.05\text{--}3.21 \times (3.08)$ width. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.43; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, slightly concave and slightly diverging distolaterally in apical two thirds, apex of harpe pointed, oriented slightly distomedially; dorsal margin of harpe concave; harpe with at least three lateral setae restricted to apical third of harpe, longest lateral setae

half as long as harpe; genitalia strongly sclerotized with strongest sclerotization at distal margin of gvc, apical aedeagus + gonosticulus and all margins of harpe.

Etymology

The species is named after the famous Mama Mutere tree in Kakamega Forest.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°13'59.1 N, 34°51'43.7 E; 1614 m a.s.l.; 29 Aug. 2007; F. Hita Garcia leg.; Transect 24; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036920.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036921 • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 7 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036924 • 1 ♂; Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 28 Aug. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036922.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.25–1.30 mm (1.30 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma dark brown; scape and pedicel light brown, flagellum brown; legs yellowish except proximal third of coxae dark brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 4.8× as long as pedicel, scape longer than F1 and F2 combined, F1 2.0× as long as wide, F1 2.1× as long as pedicel, F1 1.4× as long as F2, F1 shorter than F7 and F8 combined, F1 slightly shorter than F9, F6 1.9× as long as wide, F6 shorter than F7 and F8 combined, F6 1.2× as high as F9; numerous large multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and distinctly shorter than width of flagellomeres.

HEAD. Head width 1.07–1.18× (1.07) head height; head width 1.90–1.97× (1.97) interorbital space; maximum eye diameter 1.48–1.52× (1.52) minimum eye diameter; head height 1.61–1.74× (1.74) maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.36–0.49:0.32–0.49 (1.00:0.49:0.49); OOL 2.00–2.20× (2.04) lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 0.94–0.99× (0.94) mesosoma width; Weber length 419–469 μm (469 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width 1.68–1.93× (1.68) mesoscutellum width; posterior mesoscutal width 1.43–1.60× (1.43) mesoscutellum width; mesoscutellum length 1.38–1.69× (1.38)

mesoscutellum width; mesoscutellum length $0.96\text{--}1.00 \times (0.96)$ posterior mesoscutal width; Weber length $1.29\text{--}1.31 \times (1.29)$ mesoscutum width; Weber length $1.52\text{--}1.66 \times (1.58)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and bifurcated end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least seven distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $3.05\text{--}3.21 \times (3.08)$ width; stigmal vein slightly longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $175\text{--}184 \mu\text{m}$ ($184 \mu\text{m}$); Weber length $2.31\text{--}2.54 \times (2.54)$ genital length; gvc width $76\text{--}84 \mu\text{m}$ ($84 \mu\text{m}$); genital length $2.19\text{--}2.37 \times (2.19)$ gvc width; gvc width more than two thirds of gvc length; gvc width $1.10 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc descending proximomedially (Fig. 69C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 69A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 69B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 69B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.43; lateral articulation site of harpe with gvc not flush (Fig. 69A, C); ventral margin of harpe slightly concave, dorsal margin concave (Fig. 69B), lateral margin convex, widest point of harpe at articulation site with gvc (Fig. 69A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, slightly concave and slightly diverging distolaterally in apical two thirds (Fig. 69C), apex of harpe pointed, oriented slightly distomedially (Fig. 69A, C). Harpe with at least three lateral setae restricted to apical third, longest lateral setae half as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae more than half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least eight median setae, longest median setae more than one third as long as harpe, median setae oriented distomedially and medioventrally. Aedeagus + gonossiculus more than two thirds as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 69A, C) and ventral to apex of harpe. Genitalia strongly sclerotized with strongest sclerotization at distal margin of gvc, apical aedeagus + gonossiculus and all margins of harpe.

Female

Unknown.

Variation

The minimum number of basal longitudinal carinae on the syntergum is eight in the paratypes ZFMK-HYM-00036920 and ZFMK-HYM-00036921.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron mamamutere sp. nov. is comparatively large and dark and therefore resembles *C. brashi* sp. nov., *C. chemositi* sp. nov. and *C. nandi* sp. nov. However, the four species can be easily distinguished

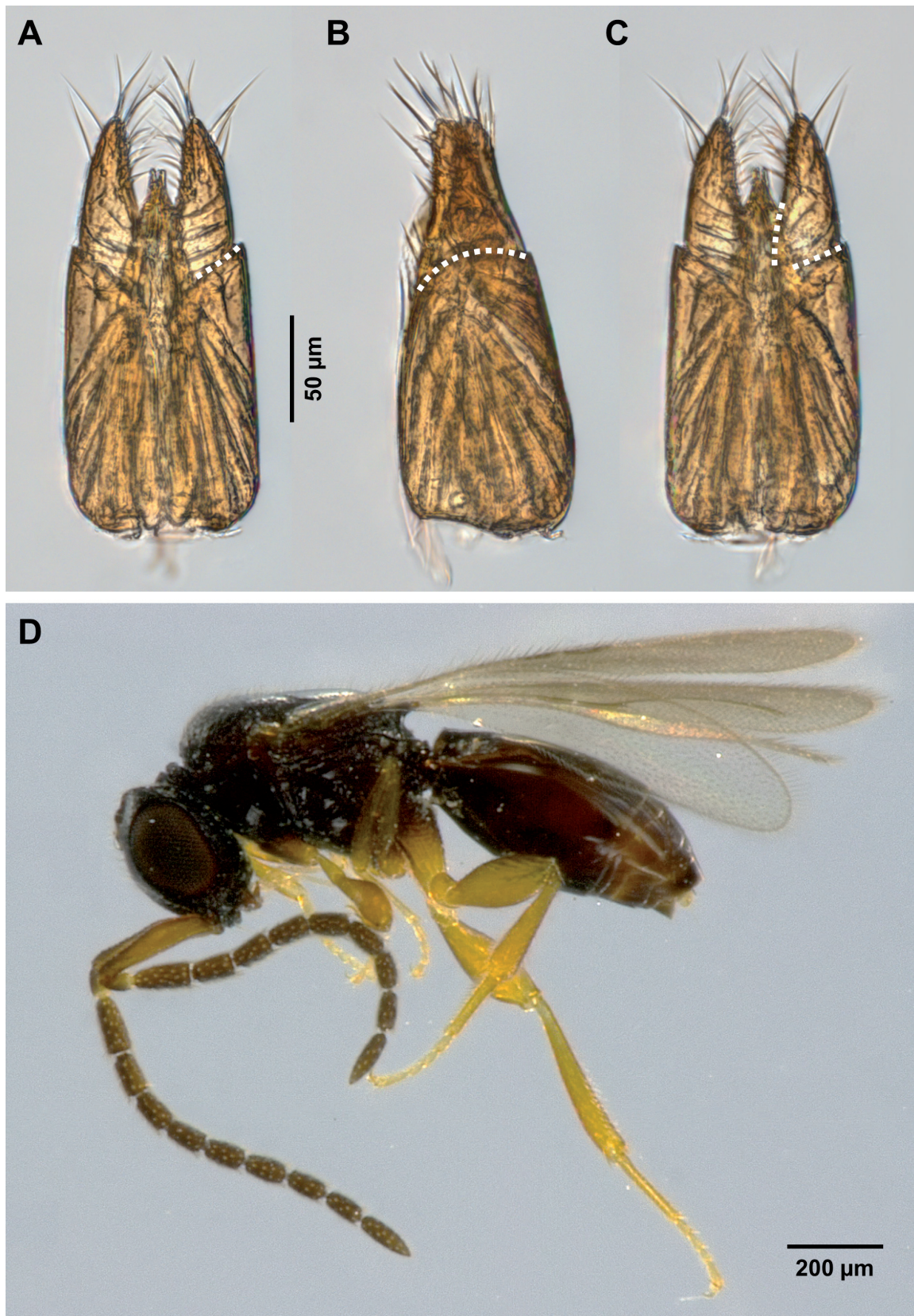


Fig. 69. Holotype of *Ceraphron mamamutere* sp. nov. (ZFMK-HYM-00036920). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

by characters of the male genitalia. Male genitalia of *C. mamamutere* are similar to those of *C. lirhandia* sp. nov. and *C. herreni* sp. nov. *Ceraphron mamamutere* and *C. lirhandia* can be separated by differences in the dorsal margin of the harpe (concave in *C. mamamutere*, slightly convex in *C. lirhandia*), the apex of the harpe (pointed and oriented slightly distomedially in *C. mamamutere*, rounded in *C. lirhandia*) and the lateral setae of the harpe (distributed along apical third in *C. mamamutere*, distributed along apical half in *C. lirhandia*). *Ceraphron mamamutere* and *C. herreni* can be separated by the setal arrangement and the apices of the harpes (pointed and oriented slightly distomedially in *C. mamamutere*, slightly rounded in *C. herreni*), and by antennal characters, i.e., the antenna of *C. mamamutere* is darker, the scape is longer compared to the pedicel, the flagellomeres are a bit shorter and wider and the sensillae of the flagellomeres are shorter.

For more comparisons with similar species, see remarks under *C. confusus* Sundholm, 1970.

Condition of type material

In the holotype, the right F5–F9 are detached.

Ceraphron metapleuralis sp. nov.

urn:lsid:zoobank.org:act:E72E4AB8-43AE-412F-A6BD-3F7D0D0C304D

Fig. 70

Diagnosis

Preoccipital carina distinct; OOL:POL 2.94; OOL:LOL 4.17; metapleuron distinctly sculptured. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.48; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in approximately basal two thirds, straight and diverging distolaterally with small emargination below apex in approximately apical third, apex of harpe pointed, oriented slightly distomedially; median setae of harpe distinctly crossing; genitalia weakly sclerotized with strongest sclerotization at emarginated apex of harpe; Weber length $4.00 \times$ genital length.

Etymology

The species is named after the distinct sculpturing of the metapleuron.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°27'0.9 N, 34°50'52.9 E; 1649 m a.s.l.; 3 Jul. 2007; F. Hita Garcia leg.; Transect 8; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036913.

Description

Male

BODY LENGTH. 1.16 mm.

COLOUR. Head brown, mesosoma brown, metasoma brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except proximal two thirds of pro- and mesocoxa brown, proximal half of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. Flagellomeres cylindrical; scape $3.8 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.5 \times$ as long as wide, F1 $1.7 \times$ as long as pedicel, F1 $1.4 \times$ as long as F2, F1 shorter than F7 and F8

combined, F6 $1.8\times$ as long as wide, F6 shorter than F7 and F8 combined; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.16\times$ head height; head width $1.79\times$ interorbital space; maximum eye diameter $1.30\times$ minimum eye diameter; head height $1.73\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.34:0.24; OOL $2.50\times$ lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.02\times$ mesosoma width; Weber length $375\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.80\times$ mesoscutellum width; posterior mesoscutal width $1.55\times$ mesoscutellum width; mesoscutellum length $1.51\times$ mesoscutellum width; mesoscutellum length $0.97\times$ posterior mesoscutal width; Weber length $1.36\times$ mesoscutum width; Weber length $1.62\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with pointed and lighter end, extending to end of mesosoma; mesometapleural sulcus present, metapleuron distinctly sculptured; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $3.06\times$ width; stigmal vein slightly shorter than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length $94\ \mu\text{m}$; Weber length $4.00\times$ genital length; gvc width $44\ \mu\text{m}$; genital length $2.14\times$ gvc width; gvc width more than two thirds of gvc length; gvc width $1.14\times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc descending proximomedially (Fig. 70C); proximoventral margin of gvc convex; distoventral margin of gvc descending proximomedially (Fig. 70A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 70B); proximolateral margin of gvc slightly ascending and emarginated ventrally; distolateral margin of gvc convex (Fig. 70B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.48; lateral articulation site of harpe with gvc not flush (Fig. 70A, C); ventral margin of harpe slightly concave, dorsal margin convex (Fig. 70B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 70A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in approximately basal two thirds, straight and diverging distolaterally with small emargination below apex in approximately apical third (Fig. 70C), apex of harpe pointed, oriented slightly distomedially (Fig. 70A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least three median, longest median setae more than half as long as harpe, median setae distinctly crossing and oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus half as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 70A, C) and more dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at emarginated apex of harpe.

Female

Unknown.

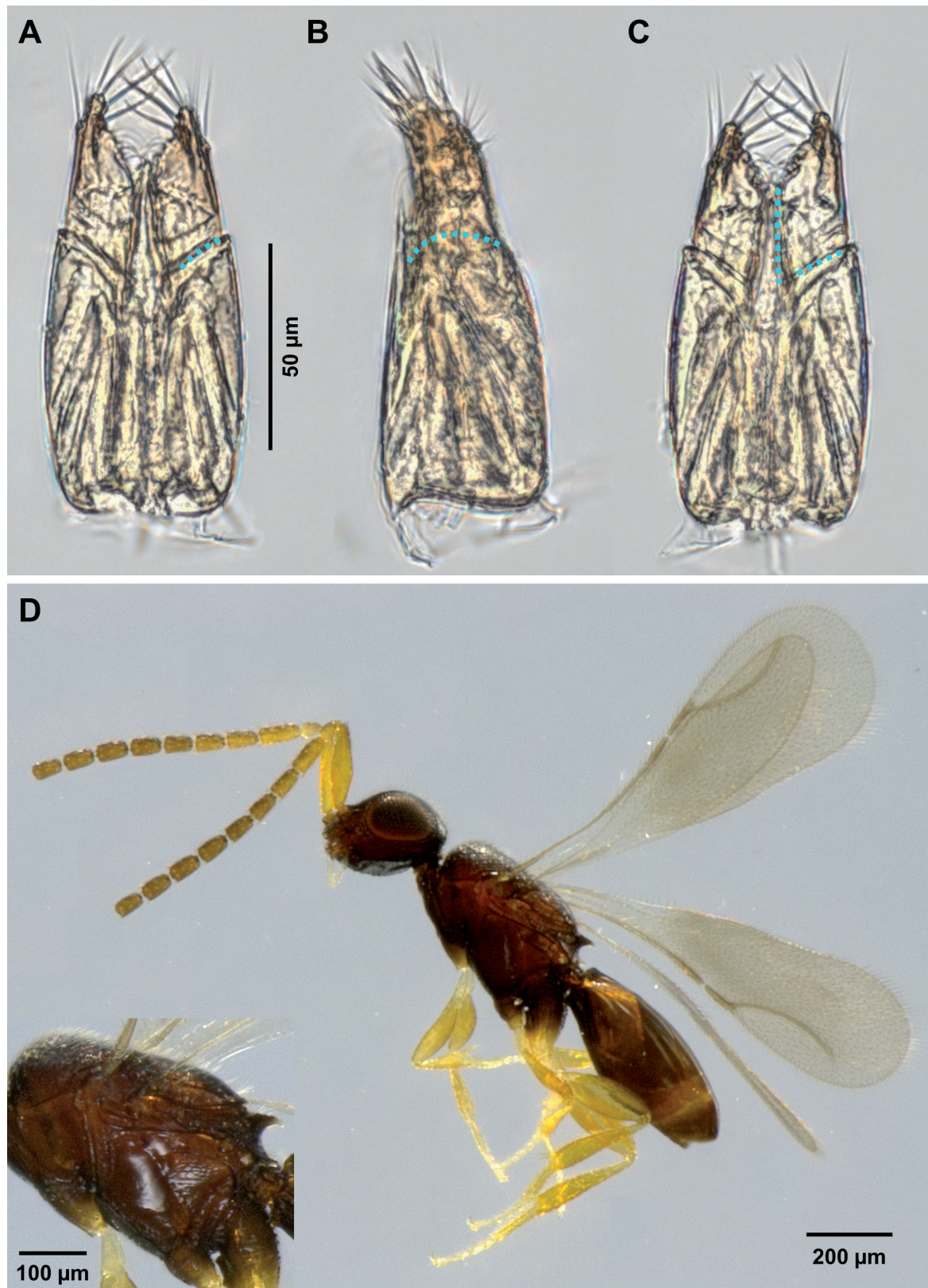


Fig. 70. Holotype of *Ceraphron metapleuris* sp. nov. (ZFMK-HYM-00036913). A–C. Male genitalia in ventral (A), lateral (B) and dorsal (C) views. D. Habitus in lateral view; inset: mesosoma in lateral view.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. trietschae* sp. nov.

Condition of type material

In the holotype, both F9 are missing.

Ceraphron mikoi sp. nov.

urn:lsid:zoobank.org:act:2F2C0A99-A8B7-4FDF-93DF-C014D160DB9A

Fig. 71

Diagnosis

Scape as long as F1 and F2 combined; F1 2.3 × as long as wide; OOL:LOL 1.43; mesometapleural sulcus present; stigmal vein shorter than 3 × pterostigma marginal length. Male genitalia: harpe triangular in ventral and dorsal view; harpe/gvc index 0.31; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and diverging distolaterally from base to apex, apex of harpe pointed, oriented distolaterally; lateral margin of harpe convex in basal half and straight in apical half, widest point of harpe at basal quarter; harpe with at least one lateral seta restricted to apical half, longest lateral seta slightly less than as long as harpe; aedeagus + gonossiculus slightly less than as long as harpe.

Etymology

The species is named after István Mikó, who has made important contributions to the study of ceraphronoid wasps and provided a plethora of guidance and inspiration for our work.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036890.

Description

Male

BODY LENGTH. 1.10 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel yellowish, flagellum light brown; legs yellowish except proximal half of pro- and mesocoxa brown and basal quarter of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.3 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $2.3 \times$ as long as wide, F1 $1.6 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.7 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.24 \times$ head height; head width $1.90 \times$ interorbital space; maximum eye diameter $1.16 \times$ minimum eye diameter; head height $1.59 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.50:0.70; OOL $2.00 \times$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.10 \times$ mesosoma width; Weber length $369 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.92 \times$ mesoscutellum width; posterior mesoscutal width $1.55 \times$ mesoscutellum width; mesoscutellum length $1.59 \times$ mesoscutellum width; mesoscutellum length $1.03 \times$ posterior mesoscutal width; Weber length $1.26 \times$ mesoscutum width; Weber length $1.51 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and slightly bifurcated end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.69 \times$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $138 \mu\text{m}$; Weber length $2.68 \times$ genital length; gvc width $72 \mu\text{m}$; genital length $1.91 \times$ gvc width; gvc width two thirds of gvc length; gvc width $1.20 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 71C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 71A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 71B); proximolateral margin of gvc ascending and emarginated ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 71B). Harpe triangular in ventral and dorsal view; harpe/gvc index 0.31; lateral articulation site of harpe with gvc virtually flush (Fig. 71A, C); ventral margin of harpe slightly concave, dorsal margin convex (Fig. 71B), lateral margin convex in basal half and straight in apical half, widest point of harpe at basal quarter (Fig. 71A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and diverging distolaterally from base to apex (Fig. 71C), apex of harpe pointed, oriented distolaterally (Fig. 71A, C). Harpe with at least one lateral seta restricted to apical half, longest lateral seta slightly less than as long as harpe, lateral seta oriented distolaterally; harpe with at least two apical setae, longest apical setae more than one third as long as harpe, apical setae oriented distolaterally and distoventrally; harpe with at least three median setae restricted to apical quarter, longest median setae more than one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus slightly less than as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 71A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at all margins of harpe.

Female

Unknown.

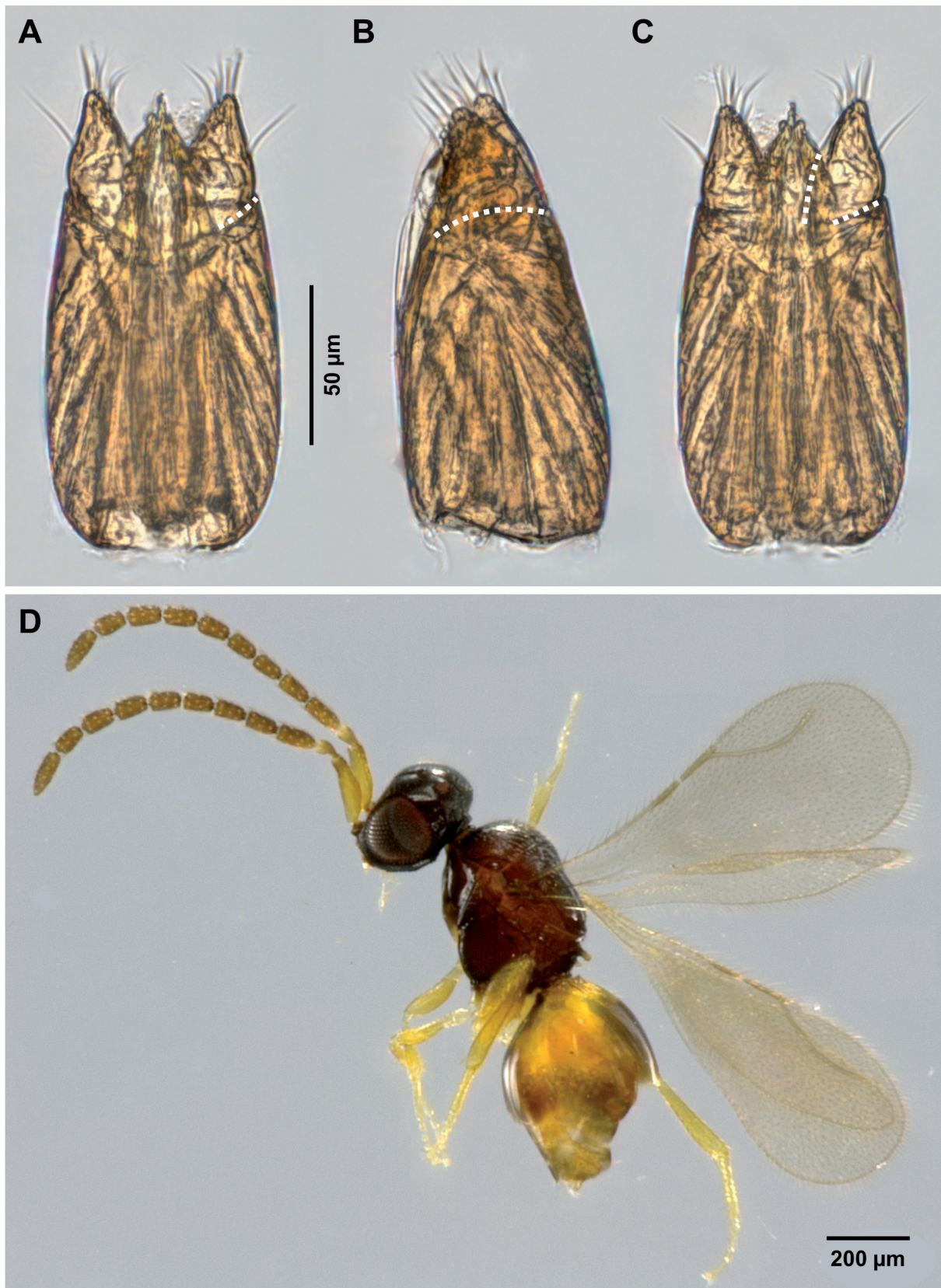


Fig. 71. Holotype of *Ceraphron mikoi* sp. nov. **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron mikoi sp. nov. can be distinguished from *C. sp. 4*. by differently shaped lateral margins of the harpes (convex and straight in *C. mikoi* and straight in *C. sp. 4*), the longer lateral seta in *C. mikoi*, the higher Weber length to genital length ratio in *C. mikoi* (2.68, compared to 1.94 in *C. sp. 4*), the uniformly coloured flagellum in *C. mikoi* (gradually lightening in *C. sp. 4*), and the relatively long LOL in *C. mikoi* (OOL:LOL 1.43, compared to 1.89 in *C. sp. 4*).

For more comparisons with similar species, see remarks under *C. sp. 3*.

Condition of type material

In the holotype, the posterior half of the metasoma is deformed, thus the body length measurement is not precise.

Ceraphron mwekaensis sp. nov.

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Fig. 72

Diagnosis

Scape shorter than F1 and F2 combined, F1 longer than F9; head height $1.84\text{--}1.94 \times (1.94)$ maximum eye diameter; head width $1.06 \times (1.06)$ mesosoma width; mesometapleural sulcus absent, mesometapleuron with longitudinal striations and longitudinal sulcus from middle of mesometapleuron to metacoxa. Male genitalia: harpe sickle-shaped with apicoventral projection in ventral and dorsal view; harpe/gvc index 0.50; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe concave from base to apex; apicoventral projection lighter and slightly crossing; dorsal margin straight and curved in basal quarter with serrations in apical three quarters; Weber length $2.89\text{--}2.93 \times (2.93)$ genital length.

Etymology

The species is named after the Mweka Camp close to the type locality, and the Mweka village in Tanzania at the southern foot of Mount Kilimanjaro.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°9'41.8 S, 37°21'47.4 E; 2970 m a.s.l.; 11 Oct. 2012; KiLi project leg.; “high 1”; FPO3, *Podocarpus* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037078.

Paratype

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°11'36.9 S, 37°26'31.6 E; 2720 m a.s.l.; 17 Oct. 2012; KiLi project leg.; “tree 1”; FPO4, *Podocarpus* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037079.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 1.43 mm (1.43 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel light brown, flagellum brown; legs light brown except joints and tarsi yellowish; fore wing venation brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.2\times$ as long as pedicel, scape shorter than F1 and F2 combined, F1 $2.9\times$ as long as wide, F1 $2.7\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 longer than F9, F6 $1.9\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.11\text{--}1.12\times$ (1.11) head height; head width $1.77\text{--}1.83\times$ (1.77) interorbital space; maximum eye diameter $1.23\text{--}1.28\times$ (1.23) minimum eye diameter; head height $1.84\text{--}1.94\times$ (1.94) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina absent. OOL:POL:LOL 1.00:0.72–0.74:0.56–0.59 (1.00:0.74:0.59); OOL $2.25\text{--}2.50\times$ (2.25) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.06\times$ (1.06) mesosoma width; Weber length 488–494 μm (494 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.00\text{--}2.15\times$ (2.00) mesoscutellum width; posterior mesoscutal width $1.50\text{--}1.60\times$ (1.50) mesoscutellum width; mesoscutellum length $1.87\text{--}1.78\times$ (1.87) mesoscutellum width; mesoscutellum length $1.11\text{--}1.24\times$ (1.24) posterior mesoscutal width; Weber length $1.32\text{--}1.34\times$ (1.32) mesoscutum width; Weber length $1.41\text{--}1.63\times$ (1.41) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex distinctly short and oriented posterodorsally in lateral view with broad end; mesometapleural sulcus absent, mesometapleuron with longitudinal striations and longitudinal sulcus from middle of mesometapleuron to metacoxa; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.81\text{--}2.86\times$ (2.81) width; stigmal vein shorter than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length 169 μm (169 μm); Weber length $2.89\text{--}2.93\times$ (2.93) genital length; gvc width 81–88 μm (88 μm); genital length $1.93\text{--}2.08\times$ (1.93) gvc width; gvc width more than three quarters of gvc length; gvc width $1.06\times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 72C); proximoventral margin of gvc convex; distoventral margin of gvc descending proximomedially (Fig. 72A); ventral area of gvc convex; dorsal area of gvc slightly convex (Fig. 72B), indented distomedially; proximolateral margin of gvc descending ventrally; distolateral margin of gvc descending dorsally (Fig. 72B). Harpe sickle-shaped with apicoventral projection in ventral and dorsal view; harpe/gvc index 0.50; lateral articulation site of harpe with gvc not flush (Fig. 72A, C); ventral margin of harpe straight in basal half and convex in apical half, dorsal margin straight and curved in basal quarter with serrations in apical three quarters (Fig. 72B), lateral margin

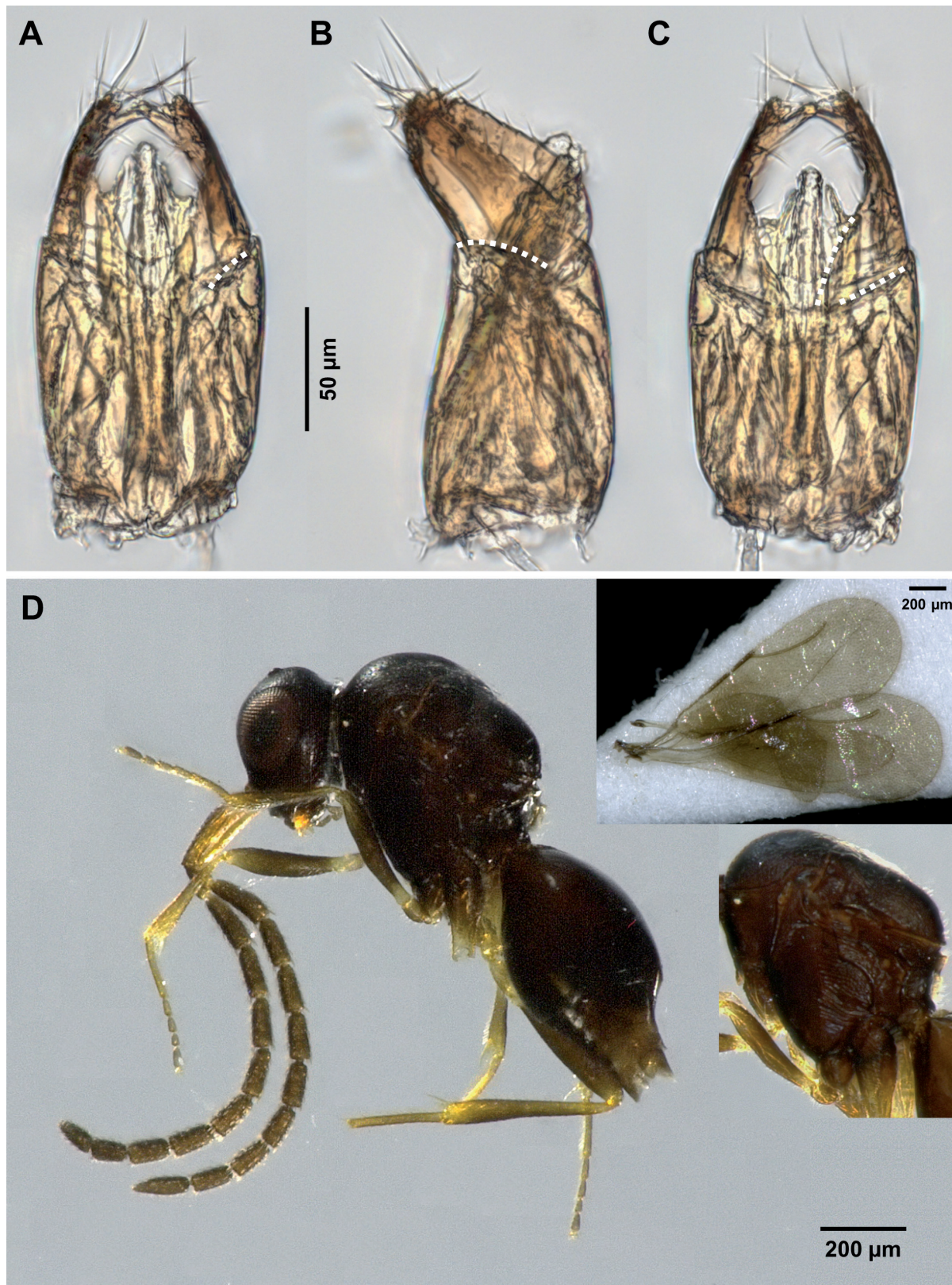


Fig. 72. Holotype of *Ceraphron mwekaensis* sp. nov. (ZFMK-HYM-00037078). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; insets: fore wings (top), mesosoma in lateral view (bottom).

convex, widest point of harpe at lateral articulation site with gvc (Fig. 72A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe concave from base to apex (Fig. 72C), apex of harpe pointed and oriented distomedially, apicoventral projection lighter and slightly crossing (Fig. 72A, C). Harpe with at least four lateral setae restricted to apical quarter, longest lateral setae more than half as long as harpe, lateral setae oriented distomedially and distoventrally; apicoventral projection of harpe with at least two apical setae, longest apical setae less than half as long as harpe, apical setae distinctly crossing and oriented distomedially and distoventrally; harpe with at least five median setae restricted to apical three quarters on serrations, longest median setae less than one third as long as harpe, median setae oriented distodorsally, distomedially and distoventrally. Aedeagus + gonossiculus more than two thirds as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 72A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at harpe and weakest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

The flagellum of ZFMK-HYM-00037079 is brown and gradually darkens from F1 to F9.

Biology

Host unknown, specimens collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Ceraphron mwekaensis sp. nov. can be distinguished from all other treated species by the combination of longitudinal striations on the mesometapleuron, a longitudinal sulcus from middle of the mesometapleuron to the metacoxa, the absence of a preoccipital carina, and an apicoventral projection on the harpe. The longitudinal sulcus is rather similar to that of *C. pleurosulcus* sp. nov. but it is shorter in *C. mwekaensis*, i.e., restricted to the metapleuron, and does not extend to the procoxa.

Condition of type material

In the holotype, the left middle leg and the wings are detached. The posterior part of the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron nandi sp. nov.

urn:lsid:zoobank.org:act:834E960F-4619-489B-A0DE-1DAD0758890A

Fig. 73

Diagnosis

Scape, pedicel and flagellum brown; sensillae on flagellomeres distinctly shorter than width of flagellomeres; posterolateral processes of gena present; head width $2.06\text{--}2.14 \times (2.10)$ interorbital space; OOL:LOL $2.78\text{--}3.03 (2.78)$. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.43; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex; harpe with at least ten brush-like arranged and slightly convex median setae; harpe with at least two lateral setae restricted to apical half; dorsal area of gvc indented distomedially; genitalia moderately

sclerotized with strongest sclerotization at distal half of gvc and apical aedeagus + gonossiculus and weakest sclerotization at harpe.

Etymology

The species is named after the Nandi people, an ethnic group in the south-eastern Kakamega Forest area.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°19'36 N, 34°52'14.6 E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036866.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036867 • 1 ♂; Kakamega Forest; 00°27'0.9 N, 34°50'52.9 E; 1649 m a.s.l.; 3 Jul. 2007; F. Hita Garcia leg.; Transect 8; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036868 • 1 ♂; Kakamega Forest; 00°14'6.1 N, 34°52'9.2 E; 1605 m a.s.l.; 4 Sep. 2007; F. Hita Garcia leg.; Transect 23; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036869.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.40–1.70 mm (1.50 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape, pedicel and flagellum brown; legs yellowish except coxae dark brown with distal third light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.3 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.4 \times$ as long as wide, F1 $1.9 \times$ as long as pedicel, F1 $1.4 \times$ as long as F2, F1 shorter than F7 and F8 combined (ZFMK-HYM-00036869), F1 slightly shorter than F9 (ZFMK-HYM-00036869), F6 $2.0 \times$ as long as wide, F6 shorter than F7 and F8 combined (ZFMK-HYM-00036869), F6 $1.3 \times$ as high as F9 (ZFMK-HYM-00036869); numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and distinctly shorter than width of flagellomeres.

HEAD. Head width $1.03\text{--}1.13 \times$ (1.12) head height; head width $2.06\text{--}2.14 \times$ (2.10) interorbital space; maximum eye diameter $1.39\text{--}1.41 \times$ (1.39) minimum eye diameter; head height $1.71\text{--}1.81 \times$ (1.81) maximum eye diameter. Dorsal margin of occipital carina dorsal to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.43–0.58:0.33–0.36 (1.00:0.43:0.36); OOL $2.17\text{--}2.33 \times$ (2.17) lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus distinctly raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.90\text{--}1.02 \times$ (1.02) mesosoma width; Weber length 536–600 μm (584 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose in anterior half, setae curved backwards or straight. Mesoscutum width $1.58\text{--}1.72 \times$ (1.58) mesoscutellum width; posterior mesoscutal width $1.35\text{--}1.64 \times$ (1.50) mesoscutellum width; mesoscutellum length $1.35\text{--}1.43 \times$

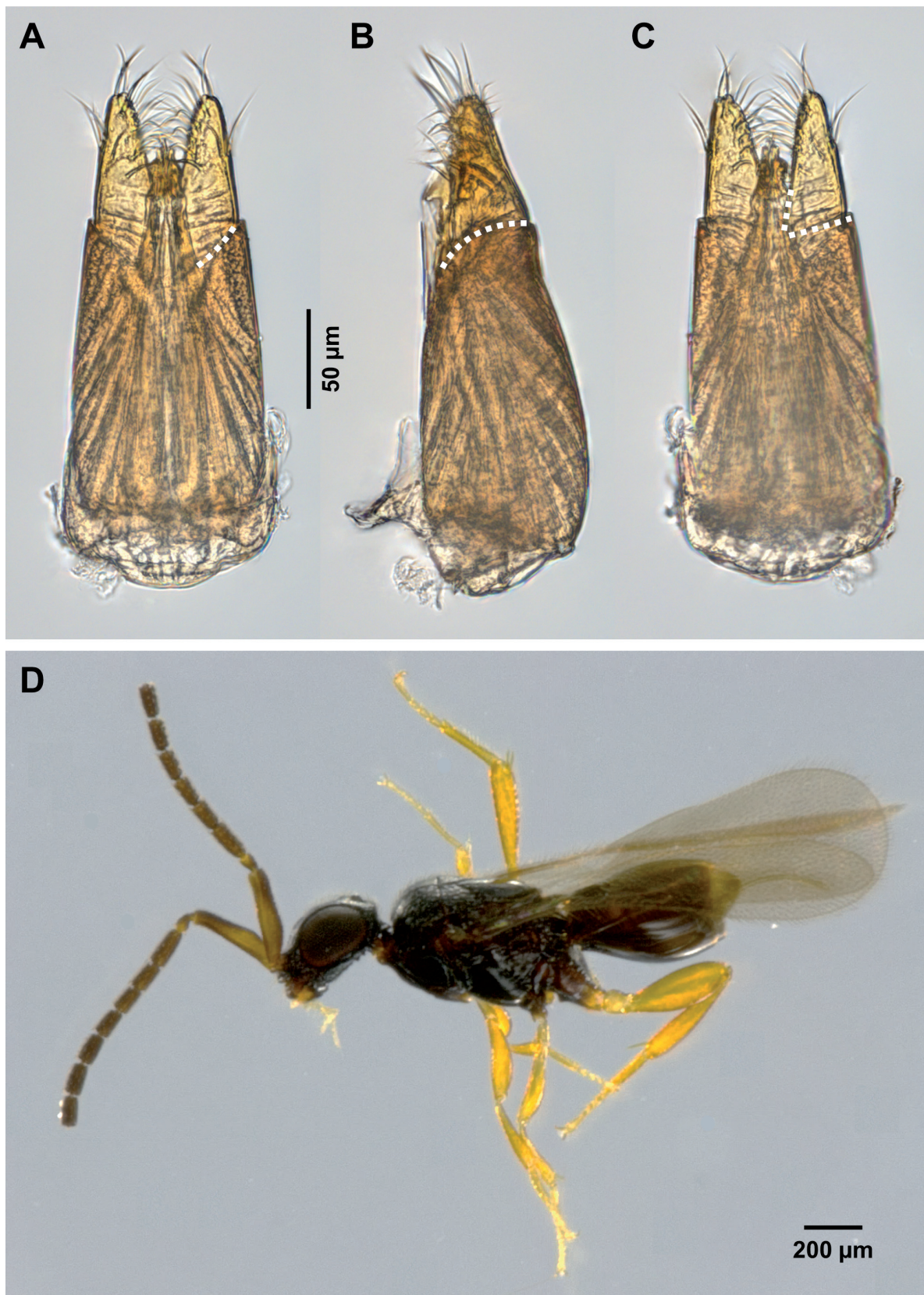


Fig. 73. Holotype of *Ceraphron nandi* sp. nov. (ZFMK-HYM-00036866). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

(1.40) mesoscutellum width; mesoscutellum length $0.87\text{--}1.00 \times (0.93)$ posterior mesoscutal width; Weber length $1.34\text{--}1.54 \times (1.54)$ mesoscutum width; Weber length $1.58\text{--}1.74 \times (1.74)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, exceeding end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.69\text{--}2.84 \times (2.69)$ width; stigmal vein slightly longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $213\text{--}219 \mu\text{m}$ ($219 \mu\text{m}$); Weber length $2.52\text{--}2.78 \times (2.67)$ genital length; gvc width $94\text{--}100 \mu\text{m}$ ($97 \mu\text{m}$); genital length $2.16\text{--}2.27 \times (2.26)$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.22 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 73C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 73A); ventral area of gvc straight or slightly convex; dorsal area of gvc slightly convex (Fig. 73B), indented distomedially; proximolateral margin of gvc slightly ascending and emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 73B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.43; lateral articulation site of harpe with gvc not flush (Fig. 73A, C); ventral margin of harpe slightly concave, dorsal margin slightly concave (Fig. 73B), lateral margin straight, widest point of harpe at articulation site with gvc (Fig. 73A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex (Fig. 73C), apex of harpe rounded (Fig. 73A, C). Harpe with at least two lateral setae restricted to apical half, longest lateral setae one third as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae one third as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least ten brush-like arranged median setae, longest median setae less than one third as long as harpe, median setae slightly convex and oriented distomedially and medioventrally. Aedeagus + gonossiculus two thirds as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 73A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at distal half of gvc and apical aedeagus + gonossiculus and weakest sclerotization at harpe.

Female

Unknown.

Variation

Translucent patches are absent in ZFMK-HYM-00036868 and the proximodorsal margin of the gvc is slightly concave in ZFMK-HYM-00036868. The posterolateral processes of the gena are differently shaped in the paratypes.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. chemositi* sp. nov. and *C. mamamutere* sp. nov.

Condition of type material

In the holotype, left F7–F9 and right F8 and F9 and the right hind wing are missing. The posterior part of the metasoma is missing, thus the body length measurement is not precise.

Ceraphron nzoia sp. nov.

urn:lsid:zoobank.org:act:1D7D50FA-1475-437A-8A8C-6A40C9B481D9

Fig. 74

Diagnosis

OOL:POL 3.33; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and emarginated end, exceeding end of mesosoma. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.52; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex, apex of harpe slightly rounded; longest apical setae slightly less than as long as harpe; genitalia weakly sclerotized, almost transparent; gvc width more than three quarters of gvc length; Weber length $3.44 \times$ genital length.

Etymology

The species is named after the Nzoia River which is close to the type locality.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°23'6.2 N, 34°33'37.8 E; 1602 m a.s.l.; 16 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036993.

Description

Male

BODY LENGTH. 0.77 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa light brown, proximal third of metacoxa light brown; hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.4 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $1.8 \times$ as long as wide, F1 $1.3 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.4 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3 \times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.22 \times$ head height; head width $1.73 \times$ interorbital space; maximum eye diameter $1.20 \times$ minimum eye diameter; head height $1.54 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.30:0.50; OOL $2.86 \times$ lateral ocellus diameter. White, thick setae on upper face indistinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.02 \times$ mesosoma width; Weber length 269 μm . Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (=

scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.95 \times$ mesoscutellum width; posterior mesoscutal width $1.50 \times$ mesoscutellum width; mesoscutellum length $1.60 \times$ mesoscutellum width; mesoscutellum length $1.07 \times$ posterior mesoscutal width; Weber length $1.10 \times$ mesoscutum width; Weber length $1.34 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and emarginated end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection distinctly short and light in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least five basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Missing.

MALE GENITALIA. Genital length $78 \mu\text{m}$; Weber length $3.44 \times$ genital length; gvc width $44 \mu\text{m}$; genital length $1.79 \times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.14 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 74C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 74A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 74B); proximolateral margin of gvc straight and slightly emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 74B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.52; lateral articulation site of harpe with gvc not flush (Fig. 74A, C); ventral margin of harpe straight, dorsal margin slightly convex (Fig. 74B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 74A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex (Fig. 74C), apex of harpe slightly rounded (Fig. 74A, C). Harpe with at least one lateral seta restricted to apical third, longest lateral seta less than one third as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae slightly less than as long as harpe, apical setae oriented distolaterally and distoventrally; harpe with at least four median setae, longest median setae one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 74A, C) and as ventral as apex of harpe. Genitalia weakly sclerotized, almost transparent.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron nzoia sp. nov. can be distinguished from all other treated species by the combination of a high OOL:POL (3.33), weakly sclerotized, almost transparent genitalia, a high Weber length to genital length ratio (3.44), and apical setae on the harpe which are almost as long as the harpe.

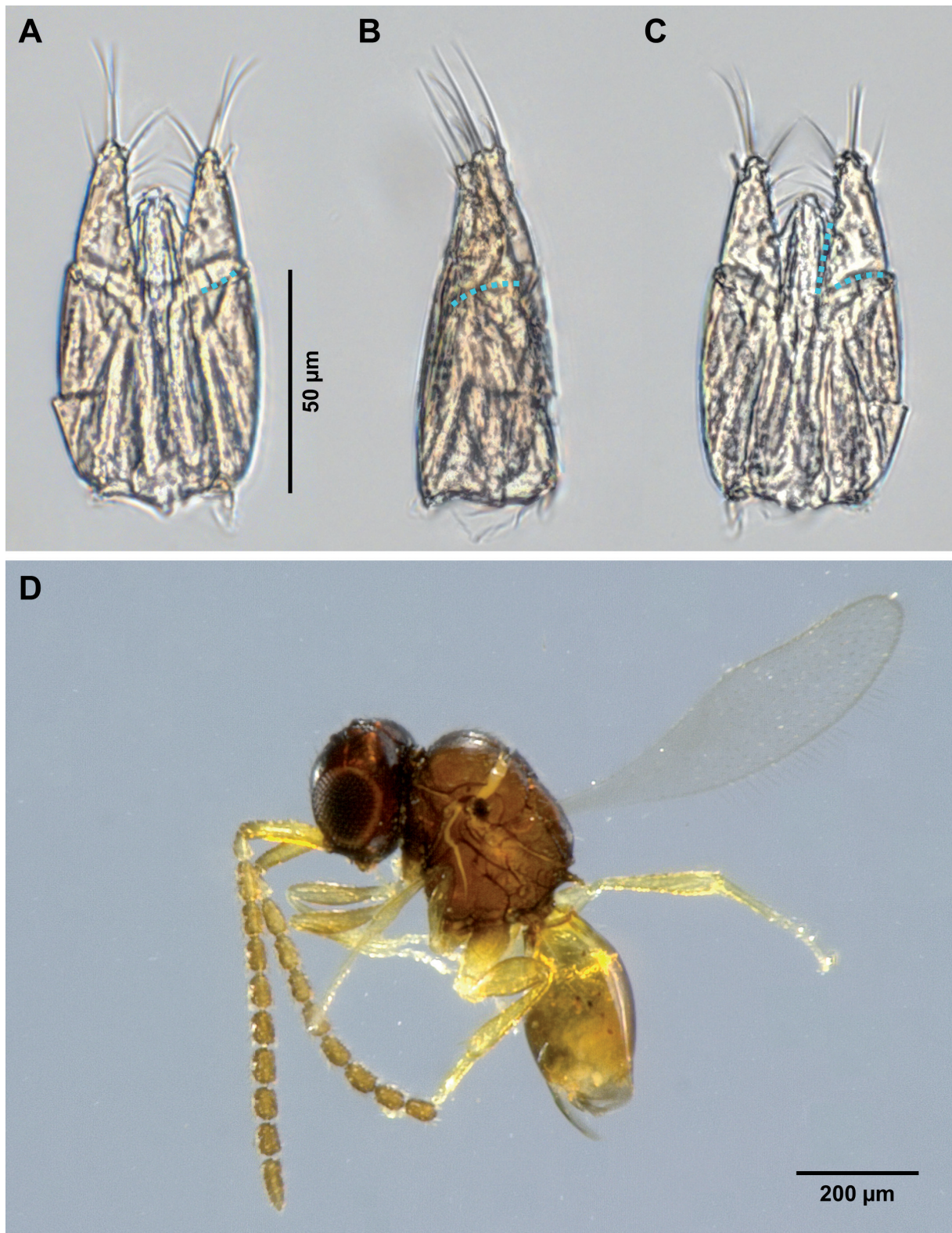


Fig. 74. Holotype of *Ceraphron nzoia* sp. nov. (ZFMK-HYM-00036993). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Condition of type material

In the holotype, the right F9, both fore wings and the right hind wing are missing. The posterior end of the metasoma is slightly deformed, thus the body length measurement is not precise.

Ceraphron onesimusi sp. nov.

urn:lsid:zoobank.org:act:1421EE4D-A34C-4CF7-883E-9FF0B404261A

Fig. 75

Diagnosis

Scape $2.5\times$ as long as pedicel, scape shorter than F1 and F2 combined, F6 $2.0\times$ as long as wide, sensillae on flagellomeres slightly shorter or longer than width of flagellomeres; preoccipital carina distinct; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; diffuse number of indistinct, basal longitudinal carinae on syntergum. Male genitalia: harpe sickle-shaped in ventral and dorsal view; harpe/gvc index 0.81; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in approximately basal third, concave in approximately apical two thirds, apex of harpe pointed, oriented distomedially; harpe with at least one lateral seta restricted to apical quarter, lateral seta oriented distoventrally, not distolaterally; distolateral margin of gvc convex, more strongly descending dorsally; genitalia weakly sclerotized with strongest sclerotization at apex of harpe; genital length $1.53\times$ gvc width; gvc width slightly more than gvc length; Weber length $3.00\text{--}3.39\times$ (3.39) genital length.

Etymology

The species is named after Onesimus, whose knowledge of variolation, a precursor of modern vaccination, is usually seen as the origin of this technique in North America. Onesimus was a slave of African origin. Onesimus is a slave name, the birth name is unknown.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}19'49.9$ N, $34^{\circ}52'16.1$ E; 1580 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036990.

Paratype

KENYA • 1 ♂; Western Province, Kakamega Forest; $00^{\circ}21'4.4$ N, $34^{\circ}51'41.1$ E; 1602 m a.s.l.; 7 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036991.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 0.67–0.70 mm (0.67 mm).

COLOUR. Head brown, mesosoma light brown, metasoma light brown except anterior third lighter; scape and pedicel transparent-yellowish, flagellum light brown; legs transparent-yellowish; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented (ZFMK-HYM-00036991), flagellomeres cylindrical; scape $2.5\times$ as long as pedicel, scape shorter than F1 and F2 combined, F1 $1.8\times$ as long as wide, F1 $1.8\times$ as long as pedicel, F1 $1.1\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9 (ZFMK-HYM-00036991), F6 $2.0\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9 (ZFMK-

HYM-00036991); few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and slightly shorter or longer than width of flagellomeres.

HEAD. Head width $1.16\text{--}1.27 \times (1.27)$ head height; head width $1.76\text{--}1.81 \times (1.81)$ interorbital space; maximum eye diameter $1.38\text{--}1.44 \times (1.38)$ minimum eye diameter; head height $1.67\text{--}1.78 \times (1.67)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.56\text{--}0.61:0.56\text{--}0.58 (1.00:0.56:0.56)$; OOL $2.54\text{--}2.77 \times (2.77)$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.06 \times$ mesosoma width; Weber length $225\text{--}244 \mu\text{m} (244 \mu\text{m})$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.71\text{--}1.76 \times (1.71)$ mesoscutellum width; posterior mesoscutal width $1.41\text{--}1.45 \times (1.41)$ mesoscutellum width; mesoscutellum length $1.39\text{--}1.41 \times (1.41)$ mesoscutellum width; mesoscutellum length $0.96\text{--}1.00 \times (1.00)$ posterior mesoscutal width; Weber length $1.24\text{--}1.34 \times (1.34)$ mesoscutum width; Weber length $1.57\text{--}1.63 \times (1.63)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus absent; posterior propodeal projection indistinct in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; diffuse number of indistinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING (ZFMK-HYM-00036991). Length $3.09 \times$ width; stigmal vein more than $3 \times$ as long as perostigma marginal length.

MALE GENITALIA. Genital length $72\text{--}75 \mu\text{m} (72 \mu\text{m})$; Weber length $3.00\text{--}3.39 \times (3.39)$ genital length; gvc width $47 \mu\text{m}$; genital length $1.53 \times$ gvc width; gvc width slightly more than gvc length; gvc width $1.12 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc slightly descending proximomedially (Fig. 75C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 75A); ventral area of gvc convex; dorsal area of gvc slightly convex (Fig. 75B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc convex, more strongly descending dorsally (Fig. 75B). Harpe sickle-shaped in ventral and dorsal view; harpe/gvc index 0.81; lateral articulation site of harpe with gvc not flush (Fig. 75A, C); ventral margin of harpe slightly concave, dorsal margin slightly convex (Fig. 75B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 75A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in approximately basal third, concave in approximately apical two thirds (Fig. 75C), apex of harpe pointed, oriented distomedially (Fig. 75A, C). Harpe with at least one lateral seta restricted to apical quarter, longest lateral seta less than two thirds as long as harpe, lateral seta oriented distoventrally; harpe with at least two apical setae, longest apical setae less than two thirds as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least four median setae, longest median setae less than half as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than one third as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 75A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at apex of harpe.

Female

Unknown.

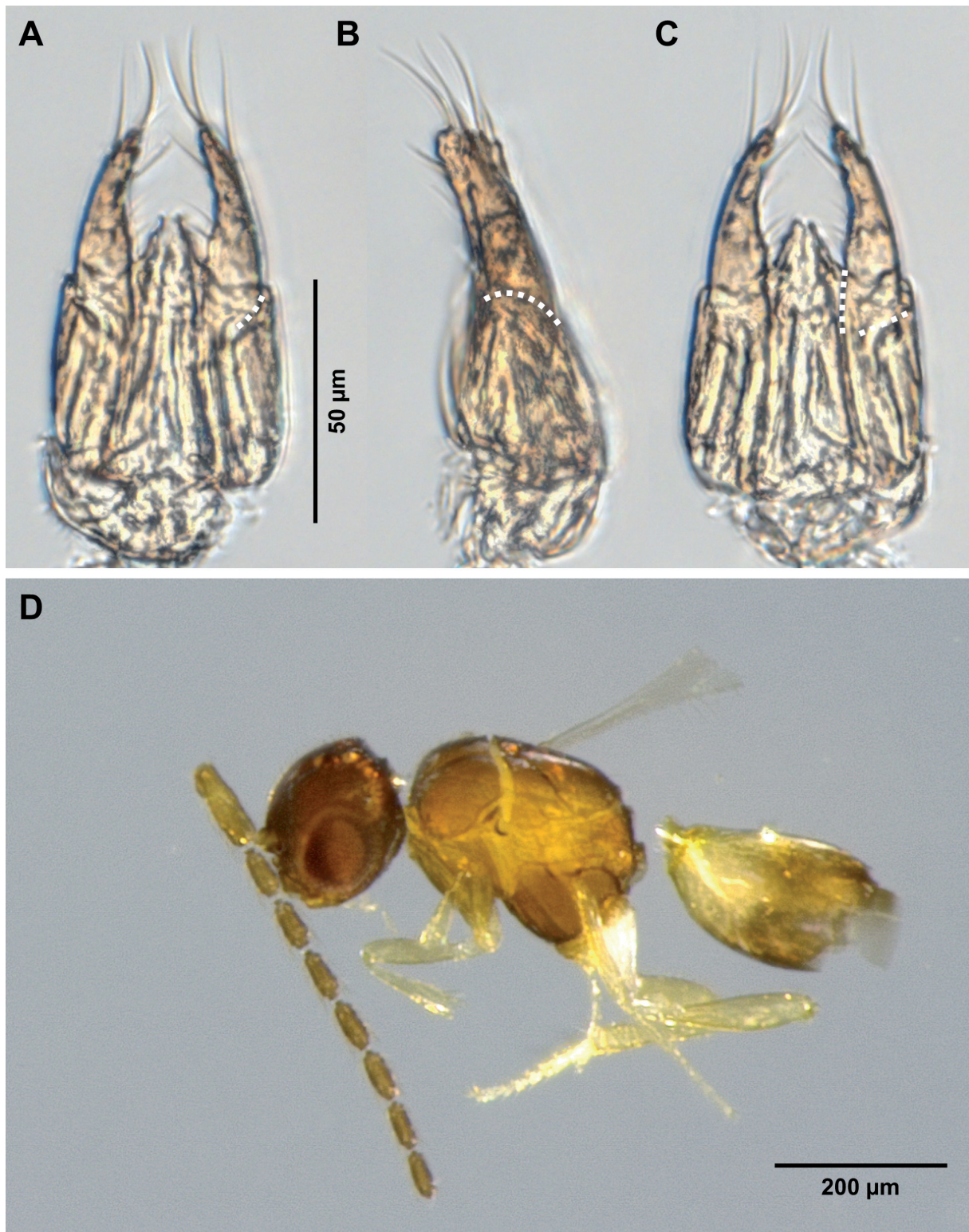


Fig. 75. Holotype of *Ceraphron onesimusi* sp. nov. (ZFMK-HYM-00036990). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The sickle-shaped harpe of *Ceraphron onesimusi* sp. nov. resembles that of *Cyoceraphron harpe* sp. nov., but both species differ distinctly in various other characters and even belong to different genera.

Condition of type material

In the holotype, the head, mesosoma and metasoma are detached. The left antenna and the right F9 are missing (paratype ZFMK-HYM-00036991 was used for some antennal measurements). The wings and the posterior third of the metasoma are missing. The protarsi, left metatibia and metatarsi are missing. In ZFMK-HYM-00036991, the gvc is broken, thus measurements of the genitalia are taken only from the holotype.

Ceraphron pilosiharpis sp. nov.

urn:lsid:zoobank.org:act:1EB72ACB-B452-4BD6-A007-8540EA2C82EF

Fig. 76

Diagnosis

Scape as long as F1 to F3 combined; preoccipital carina distinct; OOL $1.64 \times$ lateral ocellus diameter; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and bifurcated end, exceeding end of mesosoma. Male genitalia: harpe trapezoidal in ventral and dorsal view and indented apically in lateral view; harpe/gvc index 0.50; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in basal third, slightly concave and diverging distolaterally in apical two thirds, apex of harpe pointed, oriented distomedially; harpe with at least four apical setae, longest apical setae slightly longer than as long as harpe, apical setae distinctly crossing and oriented distolaterally, distomedially and distoventrally; median setae distinctly crossing and longest median setae as long as harpe; genital length $1.39 \times$ gvc width.

Etymology

The species name is a composition of the anatomical term 'harpe' and the Latin word '*pilosus*' which means 'hairy', with reference to the distinct setae of the harpes.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036984.

Description

Male

BODY LENGTH. 1.06 mm.

COLOUR. Head dark brown, mesosoma brown, metasoma brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except proximal half of pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.3\times$ as long as pedicel, scape as long as F1 to F3 combined, F1 $1.9\times$ as long as wide, F1 $1.6\times$ as long as pedicel, F1 $1.5\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.4\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.20\times$ head height; head width $1.93\times$ interorbital space; maximum eye diameter $1.37\times$ minimum eye diameter; head height $1.61\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.56:0.56; OOL $1.64\times$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.02\times$ mesosoma width; Weber length $369\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.84\times$ mesoscutellum width; posterior mesoscutal width $1.48\times$ mesoscutellum width; mesoscutellum length $1.52\times$ mesoscutellum width; mesoscutellum length $1.03\times$ posterior mesoscutal width; Weber length $1.28\times$ mesoscutum width; Weber length $1.55\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metaplecto-mesoplectal complex curved in lateral view with blunt, lighter and bifurcated end, exceeding end of mesosoma; mesometapleural sulcus indistinct; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least seven, basal longitudinal carinae on syntergum; translucent patches indistinct.

FORE WING. Length $3.04\times$ width; stigmal vein longer than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length $156\ \mu\text{m}$; Weber length $2.36\times$ genital length; gvc width $113\ \mu\text{m}$; genital length $1.39\times$ gvc width; gvc width less than three quarters of gvc length; gvc width $1.22\times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 76C); proximoventral margin of gvc concave; distoventral margin of gvc slightly descending proximomedially (Fig. 76A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 76B), slightly indented distomedially; proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 76B). Harpe trapezoidal in ventral and dorsal view and indented apically in lateral view; harpe/gvc index 0.50; lateral articulation site of harpe with gvc not flush (Fig. 76A, C); ventral margin of harpe concave, dorsal margin straight in basal half and convex in apical half (Fig. 76B), lateral margin convex, widest point of harpe at basal third (Fig. 76A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in basal third, slightly concave and diverging distolaterally in apical two thirds (Fig. 76C), apex of harpe pointed, oriented distomedially (Fig. 76A, C). Harpe with at least four lateral setae restricted to apical half, longest lateral setae one third as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least four apical setae, longest apical setae slightly longer than as long as harpe, apical setae distinctly crossing and oriented distolaterally, distomedially and distoventrally; harpe with at least five median setae, longest median setae as long as harpe, median setae distinctly crossing and oriented distomedially, distoventrally and medioventrally. Aedeagus + gonosticulus three quarters as long as harpe,

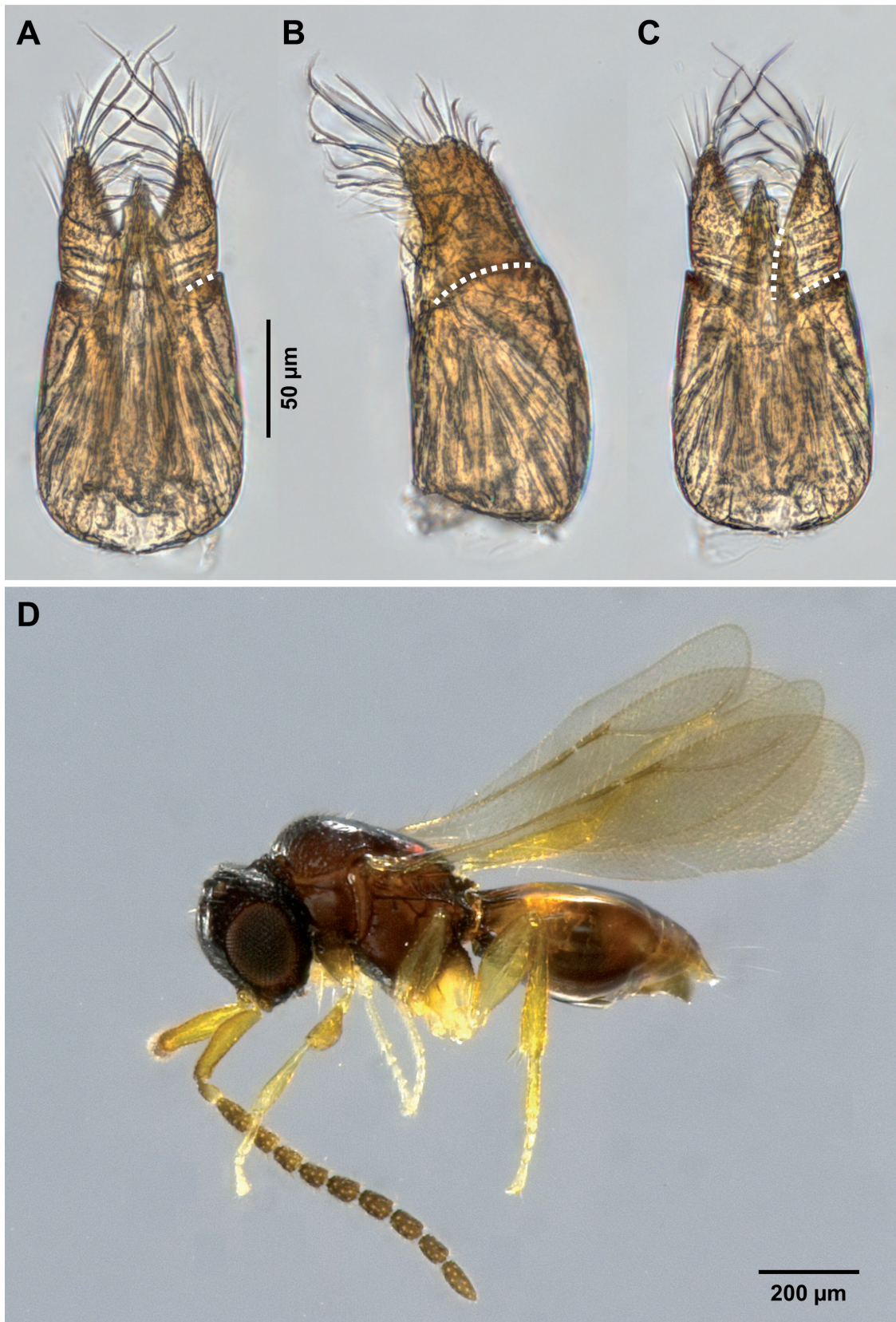


Fig. 76. Holotype of *Ceraphron pilosiharpis* sp. nov. (ZFMK-HYM-00036984). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

apex of aedeagus + gonossiculus pointed (Fig. 76A, C) and oriented dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at distal margin of gvc and all margins of harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *C. pilosiharpis* sp. nov. and *C. longulus* Sundholm, 1970 (Fig. 103) are very similar in ventral and dorsal view. Information about the setae of the harpe of *C. longulus* is only indicated in Sundholm 1970 (363: fig. 139). According to his drawing, *C. longulus* has rather short and less distinct setae than *C. pilosiharpis*. There is no information, whether the harpe of *C. longulus* is indented apically or not. However, *C. pilosiharpis* and *C. longulus* are clearly distinguished by, for example, the flagellomeres being distinctly shorter in *C. pilosiharpis*, the stigmal vein in comparison to the pterostigma marginal length being longer in *C. pilosiharpis*, and the colouration of the profemur and -tibia being darker in *C. longulus*.

For more comparisons with similar species, see remarks under *C. breviharpis* sp. nov.

Condition of type material

In the holotype, the right F5 to F9, and the right protibia and protarsus are missing.

Ceraphron pleurosulcus sp. nov.

urn:lsid:zoobank.org:act:BC64C47A-8D33-43C8-8EEF-7EB249869DAA

Fig. 77

Diagnosis

Scape, pedicel and flagellum brown; mesometapleural sulcus absent, longitudinal sulcus on mesometapleuron from procoxa to metacoxa; mesoscutum width $2.15\text{--}2.23 \times (2.23)$ mesoscutellum width; mesoscutellum length $1.75\text{--}1.77 \times (1.77)$ mesoscutellum width; posterior mesoscutal width $1.65\text{--}1.68 \times (1.68)$ mesoscutellum width; fore wing length $3.13\text{--}3.14 \times (3.13)$ width. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.86; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and virtually parallel to other harpe from base to apex, apex of harpe pointed, oriented distomedially; apical and median setae of harpe distinctly crossing; gvc width more than three quarters of gvc length; gvc width equal to distal gvc width; genitalia moderately sclerotized with strongest sclerotization at apical third of harpe and weakest sclerotization at aedeagus + gonossiculus.

Etymology

The species name is a composition of the anatomical terms ‘pleuron’ and ‘sulcus’, with reference to the long longitudinal sulcus on the mesometapleuron.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°13'59.1 N, 34°51'43.7 E; 1614 m a.s.l.; 5 Aug. 2007; F. Hita Garcia leg.; Transect 24; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036919.

Paratype

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 17 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036918.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 0.93–1.03 mm (0.93 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape, pedicel and flagellum brown; legs yellowish except proximal half of pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.9\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.3\times$ as long as wide, F1 $1.6\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.11\text{--}1.12\times$ (1.12) head height; head width $1.92\text{--}1.93\times$ (1.93) interorbital space; maximum eye diameter $1.35\times$ (1.35) minimum eye diameter; head height $1.67\text{--}1.81\times$ (1.81) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.45–0.52:0.55–0.57 (1.00:0.52:0.57); OOL $2.10\text{--}2.47\times$ (2.10) lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.00\text{--}1.04\times$ (1.04) mesosoma width; Weber length 356–400 μm (400 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.15\text{--}2.23\times$ (2.23) mesoscutellum width; posterior mesoscutal width $1.65\text{--}1.68\times$ (1.68) mesoscutellum width; mesoscutellum length $1.75\text{--}1.77\times$ (1.77) mesoscutellum width; mesoscutellum length $1.05\text{--}1.06\times$ (1.05) posterior mesoscutal width; Weber length $1.31\text{--}1.33\times$ (1.31) mesoscutum width; Weber length $1.63\text{--}1.64\times$ (1.64) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt end, extending to end of mesosoma; mesometapleural sulcus absent, longitudinal sulcus on mesometapleuron from procoxa to metacoxa; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least eight distinct, basal longitudinal carinae on syntergum; pair of translucent patches on metasomal syntergum.

FORE WING. Length $3.13\text{--}3.14\times$ (3.13) width; stigmal vein shorter than $3\times$ pterostigma marginal length.

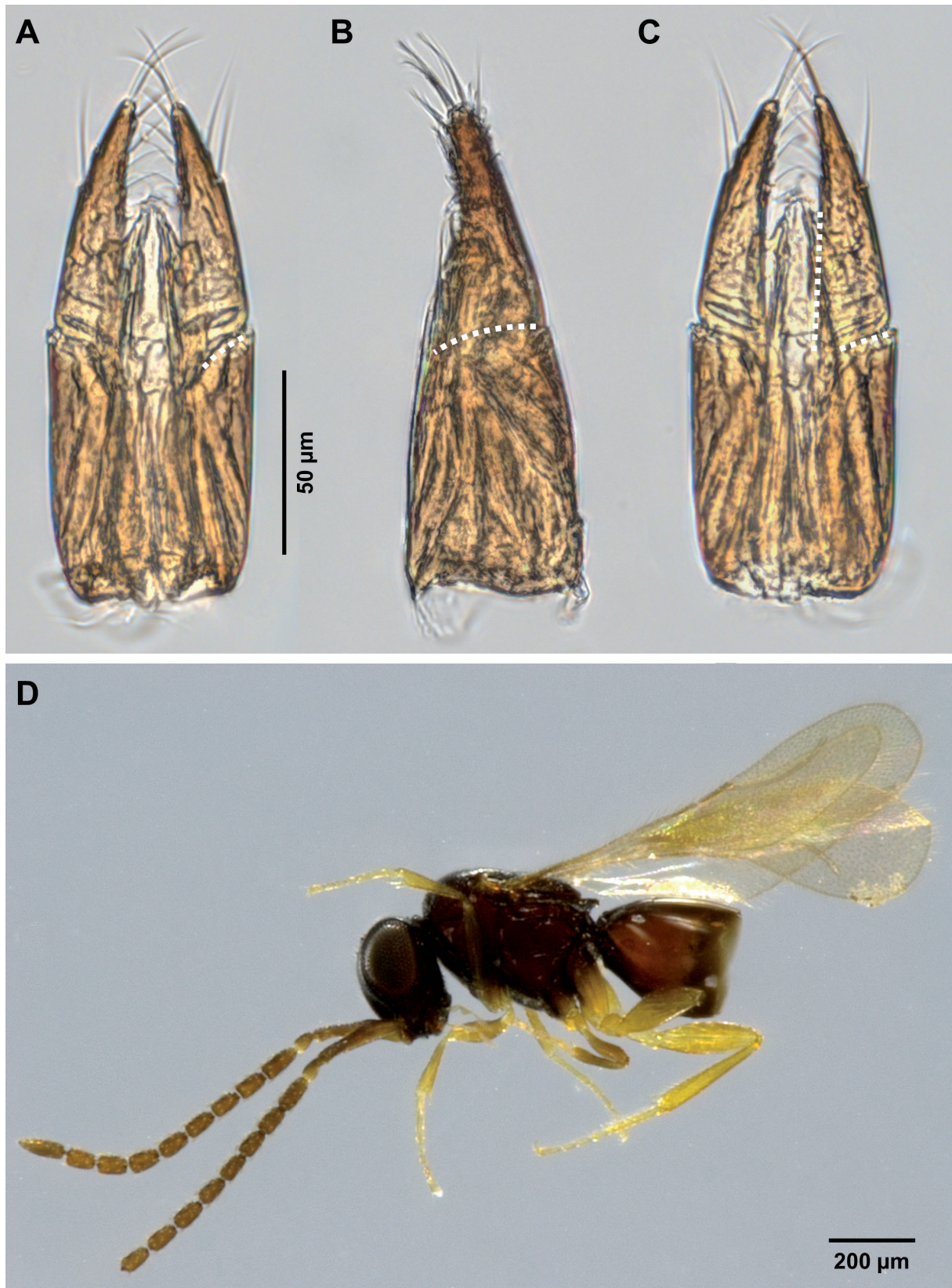


Fig. 77. Holotype of *Ceraphron pleurosulcus* sp. nov. (ZFMK-HYM-00036919). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

MALE GENITALIA. Genital length 113–128 μm (128 μm); Weber length $3.12\text{--}3.17 \times (3.12)$ genital length; gvc width 44–56 μm (56 μm); genital length $2.28\text{--}2.57 \times (2.28)$ gvc width; gvc width more than three quarters of gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc slightly descending proximomedially (Fig. 77C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 77A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 77B); proximolateral margin of gvc slightly ascending and emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 77B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.86; lateral articulation site of harpe with gvc not flush (Fig. 77A, C); ventral margin of harpe concave, dorsal margin slightly convex (Fig. 77B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 77A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and virtually parallel to other harpe from base to apex (Fig. 77C), apex of harpe pointed, oriented distomedially (Fig. 77A, C). Harpe with at least two lateral setae restricted to apical third, longest lateral setae more than one third as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae less than half as long as harpe, apical setae distinctly crossing and oriented distomedially and distoventrally; harpe with at least four median setae, longest median setae less than one third as long as harpe, median setae distinctly crossing and oriented distomedially and distoventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 77A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at apical third of harpe and weakest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron pleurosulcus sp. nov. can be distinguished from all other treated species by the longitudinal sulcus on the mesometapleuron from the procoxa to the metacoxa. However, the male genitalia of *C. pleurosulcus* is similar to those of *C. buyangu* sp. nov., differing in the harpe/gvc index (0.86 in *C. pleurosulcus*, 0.93 in *C. buyangu*), the stronger sclerotization in *C. pleurosulcus* (although the sclerotization pattern is very similar), the arrangement of the lateral setae, and the dorsomedial margin of the harpe being slightly concave in *C. pleurosulcus* which makes the apex of the harpe more pointed and narrow and straight in *C. buyangu*.

Condition of type material

In the holotype, the left F9 and the left metatibia and tarsus are missing. The posterior third of the metasoma is detached, thus the body length measurement is not precise.

Ceraphron reinholdi sp. nov.

urn:lsid:zoobank.org:act:D3267C29-7E87-4327-B5D0-FCF7790A943D

Fig. 78

Diagnosis

Preoccipital carina distinct; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex exceeding end of mesosoma; fore wing length $3.12\text{--}3.14 \times (3.12)$ width. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 1.17; lateral articulation site of harpe with gvc virtually flush; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex in basal third and slightly concave in apical two thirds, apex of harpe pointed, oriented slightly distomedially; harpe with at least four lateral setae restricted to apical half, longest lateral setae more than three quarters as long as harpe; apical and median setae distinctly crossing; gvc width more than three quarters of gvc length; gvc width $1.03 \times$ distal gvc width.

Etymology

The species is named out of love for Reinhold Salden, the first author's father.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}13'59.1$ N, $34^{\circ}51'43.7$ E; 1614 m a.s.l.; 29 Aug. 2007; F. Hita Garcia leg.; Transect 24; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036927.

Paratype

KENYA • 1 ♂; Western Province, Kakamega Forest; $00^{\circ}22'43.7$ N, $34^{\circ}41'57.3$ E; 1452 m a.s.l.; 2008; F. Hita Garcia leg.; Transect 35; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036928.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. $0.94\text{--}1.03$ mm (0.94 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel yellowish, flagellum light brown; legs yellowish except proximal third of coxae light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.3 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.2 \times$ as long as wide, F1 $1.9 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.11\text{--}1.23 \times (1.11)$ head height; head width $1.79\text{--}2.04 \times (1.79)$ interorbital space; maximum eye diameter $1.27\text{--}1.39 \times (1.39)$ minimum eye diameter; head height $1.54\text{--}1.80 \times (1.80)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.56\text{--}0.65:0.54\text{--}0.59 (1.00:0.56:0.54)$; OOL $1.89\text{--}2.17 \times (2.17)$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.04\text{--}1.06 \times (1.04)$ mesosoma width; Weber length $325\text{--}331 \mu\text{m}$ ($325 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.48\text{--}1.64 \times (1.64)$ mesoscutellum width; posterior mesoscutal width $1.40\text{--}1.45 \times (1.45)$ mesoscutellum width; mesoscutellum length $1.48\text{--}1.64 \times (1.64)$ mesoscutellum width; mesoscutellum length $1.06\text{--}1.13 \times (1.13)$ posterior mesoscutal width; Weber length $1.18\text{--}1.33 \times (1.18)$ mesoscutum width; Weber length $1.43\text{--}1.44 \times (1.44)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and emarginated end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; translucent patches indistinct.

FORE WING. Length $3.12\text{--}3.14 \times (3.12)$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $125\text{--}131 \mu\text{m}$ ($131 \mu\text{m}$); Weber length $2.48\text{--}2.65 \times (2.48)$ genital length; gvc width $55\text{--}56 \mu\text{m}$ ($56 \mu\text{m}$); genital length $2.29\text{--}2.33 \times (2.33)$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.03 \times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc slightly descending proximomedially (Fig. 78C); proximoventral margin of gvc convex; distoventral margin of gvc descending proximomedially (Fig. 78A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 78B), indented distomedially; proximolateral margin of gvc descending and emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 78B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 1.17; lateral articulation site of harpe with gvc virtually flush (Fig. 78A, C); ventral margin of harpe straight, dorsal margin slightly concave (Fig. 78B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 78A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex in basal third and slightly concave in apical two thirds (Fig. 78C), apex of harpe pointed, oriented slightly distomedially (Fig. 78A, C). Harpe with at least four lateral setae restricted to apical half, longest lateral setae more than three quarters as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae three quarters as long as harpe, apical setae distinctly crossing and oriented distomedially; harpe with at least six median setae, longest median setae more than one third as long as harpe, median setae distinctly crossing and oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus more than one third as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 78A, C) and as ventral as apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at gvc and apical half of harpe.

Female

Unknown.

Variation

ZFMK-HYM-00036928 has seven distinct basal longitudinal carinae on the syntergum.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

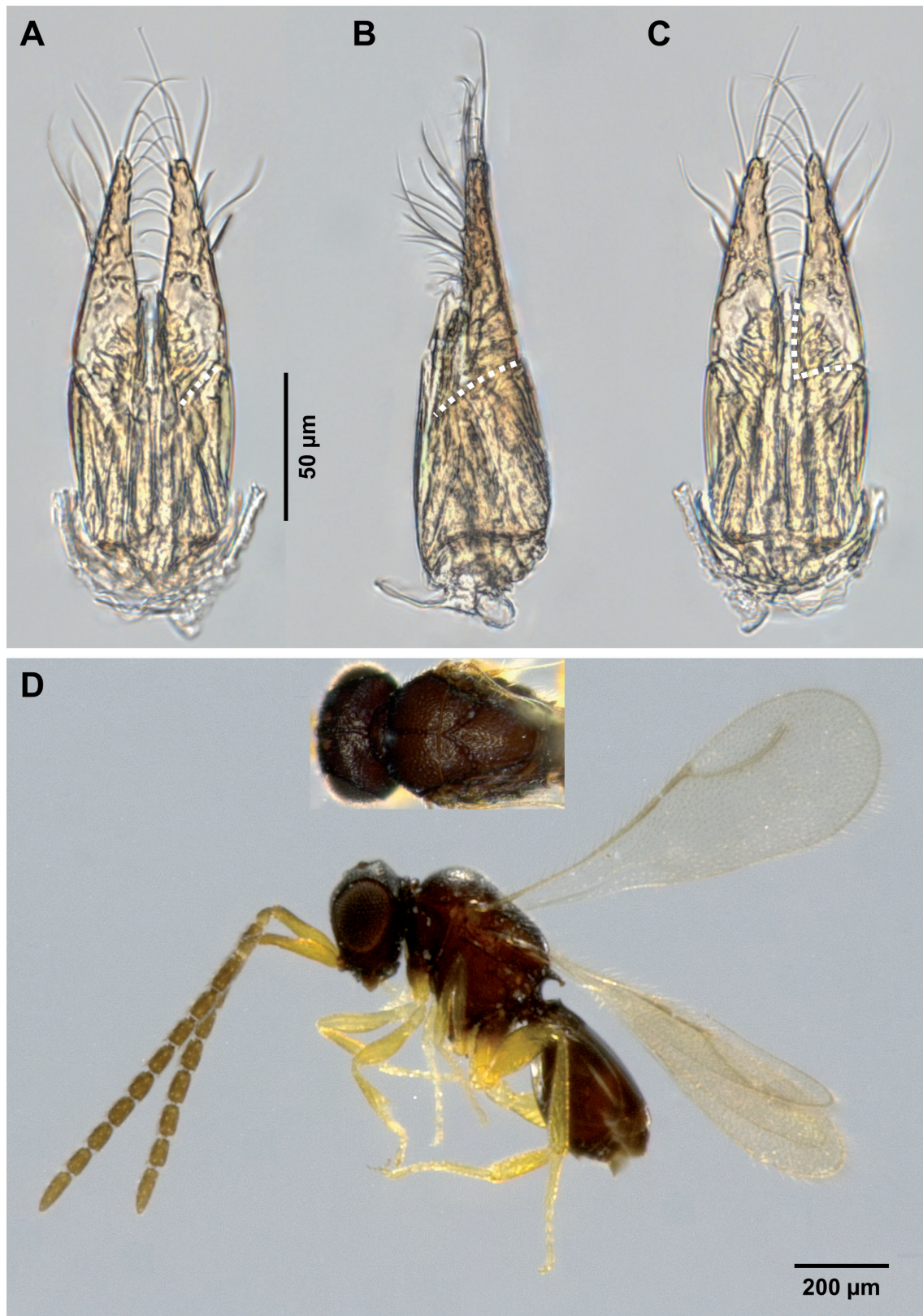


Fig. 78. Holotype of *Ceraphron reinholdi* sp. nov. (ZFMK-HYM-00036927). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: head and mesosoma in dorsal view.

Remarks**Comparison with similar species**

Ceraphron reinholdi sp. nov. and *C. tiriki* sp. nov. are both very dark in colour, but can be distinguished by their male genitalia. The harpe/gvc index of *C. reinholdi* (1.17) is higher than that of *C. tiriki* (0.80). The dorsomedial margin of the harpe is slightly convex in basal third and slightly concave in apical two thirds in *C. reinholdi*, and slightly concave and virtually parallel to the other harpe from base to apex in *C. tiriki*, and the setal arrangement does also differ between the two species. *Ceraphron reinholdi* and *Ceraphron confusus* Sundholm, 1970 can be distinguished by the absent interaxillar sulcus in *C. reinholdi* (present in *C. confusus*), the longer anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex in *C. reinholdi*, and the yellowish legs with darker proximal thirds of the coxae in *C. reinholdi* (legs uniformly yellowish in *C. confusus*). The image of the male genitalia of the holotype of *C. confusus* (Fig. 102A) does not show any setae on the harpe, but the drawing of the male genitalia by Sundholm 1970 (358: fig. 127) indicates the setal arrangement: the lateral and apical setae and the number of the setae are distinctly different from those of *C. reinholdi*. Future studies using larger series and molecular sequence data are recommended to further confirm delimitation of *C. reinholdi* from *C. confusus*.

For more comparisons with similar species, see remarks under *C. breviscapus* sp. nov.

Condition of type material

Holotype is immaculate.

***Ceraphron salazar* sp. nov.**

urn:lsid:zoobank.org:act:74328F6A-0F27-45F6-A522-3983F37D1489

Fig. 79

Diagnosis

Sensillae on flagellomeres distinctly shorter than width of flagellomeres; preoccipital carina distinct; head width $1.06\text{--}1.18 \times (1.07)$ head height. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.43; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in basal third, slightly concave and slightly diverging distolaterally in apical two thirds; lateral margin of harpe slightly concave; genitalia moderately sclerotized with strongest sclerotization at distal margin of gvc and apical aedeagus + gonosticulus and weakest sclerotization at harpe; longest median setae more than three quarters as long as harpe.

Etymology

The species is named after the Salazar Circuit which is part of a hiking trail in the Kakamega Forest and close to the type locality.

Material examined**Holotype**

KENYA • ♂; Western Province, Kakamega Forest; 00°19'36.1 N, 34°52'14.6 E; 1570 m a.s.l.; 28 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036886.

Paratypes

KENYA – Western Province • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 9 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389022 • 1 ♂; Kakamega Forest; 00°21'21.1 N, 34°51'44.9 E; 1632 m a.s.l.; 1 Aug. 2007;

F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00036901) • 1 ♂; Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 14 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036907 • 1 ♂; same collection data as for preceding; 21 Aug. 2007; ZFMK-HYM-00036908 • 1 ♂; Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00036902) • 1 ♂; same collection data as for preceding; 16 Aug. 2007; NHMUK; NHMUK-013389023 • 2 ♂♂; same collection data as for preceding; SMNS; SMNS-HYM-T00793, SMNS-HYM-T00794 • 5 ♂♂; same collection data as for preceding; ZFMK; ZFMK-HYM-00036887, ZFMK-HYM-00036888, ZFMK-HYM-00036900, ZFMK-HYM-00036903, ZFMK-HYM-00036904 • 3 ♂♂; Kakamega Forest; 00°19'45.7 N, 34°52'2.8 E; 1573 m a.s.l.; 17 Aug. 2007; F. Hita Garcia leg.; Transect 21; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036889, ZFMK-HYM-00036905, ZFMK-HYM-00036906.

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.84–1.35 mm (1.21 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel light brown, flagellum brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown and proximal quarter of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.8\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.2\times$ as long as wide, F1 $1.7\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.8\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3\times$ as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and distinctly shorter than width of flagellomeres.

HEAD. Head width $1.06\text{--}1.18\times$ (1.07) head height; head width $1.81\text{--}1.97\times$ (1.97) interorbital space; maximum eye diameter $1.25\text{--}1.41\times$ (1.39) minimum eye diameter; head height $1.60\text{--}1.77\times$ (1.72) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.36–0.50:0.45–0.63 (1.00:0.50:0.45); OOL $1.83\text{--}2.20\times$ (2.20) lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.97\text{--}1.09\times$ (0.97) mesosoma width; Weber length 331–400 μm (400 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.79\text{--}1.88\times$ (1.79) mesoscutellum width; posterior mesoscutal width $1.40\text{--}1.57\times$ (1.54) mesoscutellum width; mesoscutellum length $1.52\text{--}1.74\times$ (1.57) mesoscutellum width; mesoscutellum length $1.02\text{--}1.10\times$ (1.02) posterior mesoscutal width; Weber length $1.24\text{--}1.38\times$ (1.28) mesoscutum width; Weber length $1.38\text{--}1.66\times$ (1.45) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt, lighter and bifurcated end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal

comb absent. Basal transverse carina of petiole (on syntergum) present; at least seven distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.97\text{--}3.27 \times (2.97)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

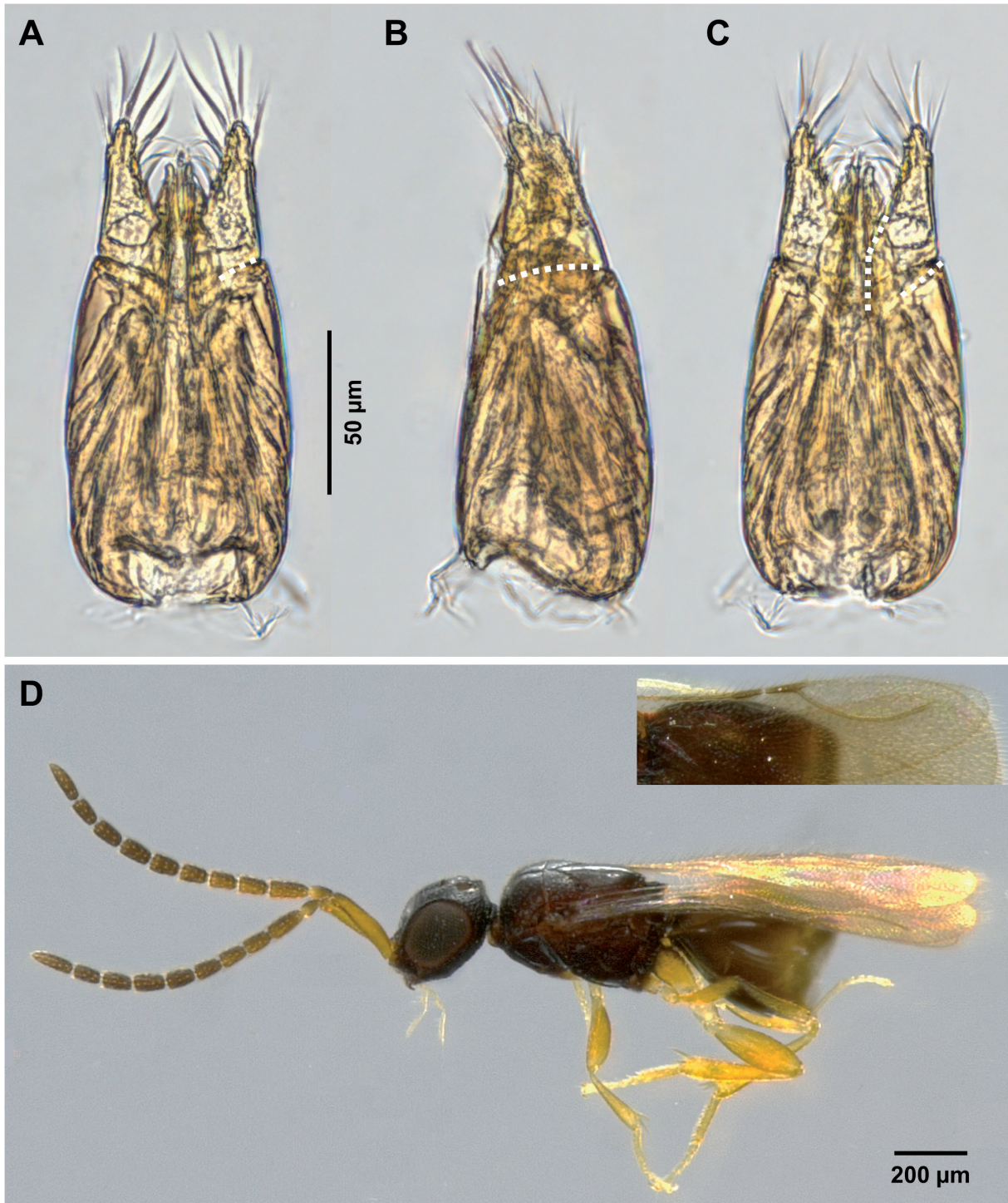


Fig. 79. Holotype of *Ceraphron salazar* sp. nov. (ZFMK-HYM-00036886). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

MALE GENITALIA. Genital length 116–141 μm (141 μm); Weber length $2.84\text{--}3.15 \times (2.84)$ genital length; gvc width 50–66 μm (66 μm); genital length $2.05\text{--}2.31 \times (2.14)$ gvc width; gvc width two thirds of gvc length; gvc width $1.35 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc descending proximomedially (Fig. 79C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 79A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 79B), slightly indented distomedially; proximolateral margin of gvc ascending and emarginated ventrally; distolateral margin of gvc slightly descending ventrally (Fig. 79B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.43; lateral articulation site of harpe with gvc virtually flush (Fig. 79A, C); ventral margin of harpe slightly concave, dorsal margin slightly convex (Fig. 79B), lateral margin slightly concave, widest point of harpe at articulation site with gvc (Fig. 79A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in basal third, slightly concave and slightly diverging distolaterally in apical two thirds (Fig. 79C), apex of harpe pointed (Fig. 79A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae one third as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae two thirds as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least five median setae, longest median setae more than three quarters as long as harpe, median setae oriented distomedially and medioventrally. Aedeagus + gonossiculus three quarters as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 79A, C) and as ventral as apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at distal margin of gvc and apical aedeagus + gonossiculus and weakest sclerotization at harpe.

Female

Unknown.

Variation

The number of longitudinal carinae on the syntergum varies between at least seven (ZFMK-HYM-00036886) and at least ten (ZFMK-HYM-00036889). A pair of translucent patches are present on the metasomal syntergum in ZFMK-HYM-00036887 and ZFMK-HYM-00036889. Multiporous plates on the flagellomeres are larger in ZFMK-HYM-00036889.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. tenuimeris* sp. nov.

Condition of type material

In the holotype, the posterior third of the metasoma is detached, thus the body length measurement is not precise.

***Ceraphron sataoi* sp. nov.**

urn:lsid:zoobank.org:act:DF64D595-7BED-405E-8422-8DE05E164922

Fig. 80

Diagnosis

Mesosoma brown and ventrolateral parts darker than rest; scape brown, pedicel light brown, flagellum brown; F6 $2.5 \times$ as long as wide. Male genitalia: harpe cone- to finger-shaped in ventral and dorsal

view; harpe/gvc index 0.55; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and slightly diverging distolaterally in basal third, straight and parallel to other harpe in apical two thirds, apex of harpe pointed, oriented distomedially; harpe with at least six lateral setae restricted to apical half, longest lateral setae more than three quarters as long as harpe; longest apical setae as long as harpe; strong sclerotization with strongest sclerotization at harpe and aedeagus + gonossiculus; genital length 288 μm ; gvc width 119 μm .

Etymology

The species is named in honour of the elephant Satao, which was one of Kenya's largest African elephants and was killed by poachers in 2014. The large size and the long antennae of the wasp are reminiscent of the size and the long tusks of the elephant.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 14 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036989.

Description

Male

BODY LENGTH. 1.60 mm.

COLOUR. Head dark brown, mesosoma brown and ventrolateral parts darker than rest, metasoma brown; scape brown, pedicel light brown, flagellum brown, gradually darkening from F1 to F9; legs yellowish except proximal two thirds of pro- and mesocoxa brown, proximal half of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; F1 2.5 \times as long as wide, F1 2.1 \times as long as pedicel, F1 1.2 \times as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 2.5 \times as long as wide, F6 shorter than F7 and F8 combined, F6 1.3 \times as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. White, thick setae on upper face present; lateral margin of torulus distinctly raised.

MESOSOMA, METASOMA. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Anteromedian projection of the metanoto-propodeo-metaplecto-mesopectal complex curved in lateral view with lighter end, exceeding end of mesosoma.

FORE WING. Stigmal vein longer than 3 \times pterostigma marginal length.

MALE GENITALIA. Genital length 288 μm ; gvc width 119 μm ; genital length 2.42 \times gvc width; gvc width less than two thirds of gvc length; gvc width 1.14 \times distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 80C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 80A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 80B); proximolateral margin of gvc strongly ascending and slightly emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 80B). Harpe cone- to finger-shaped in ventral and dorsal view; harpe/gvc index 0.55; lateral articulation site of harpe with gvc not flush (Fig. 80A, C); ventral margin of harpe concave, dorsal margin slightly convex

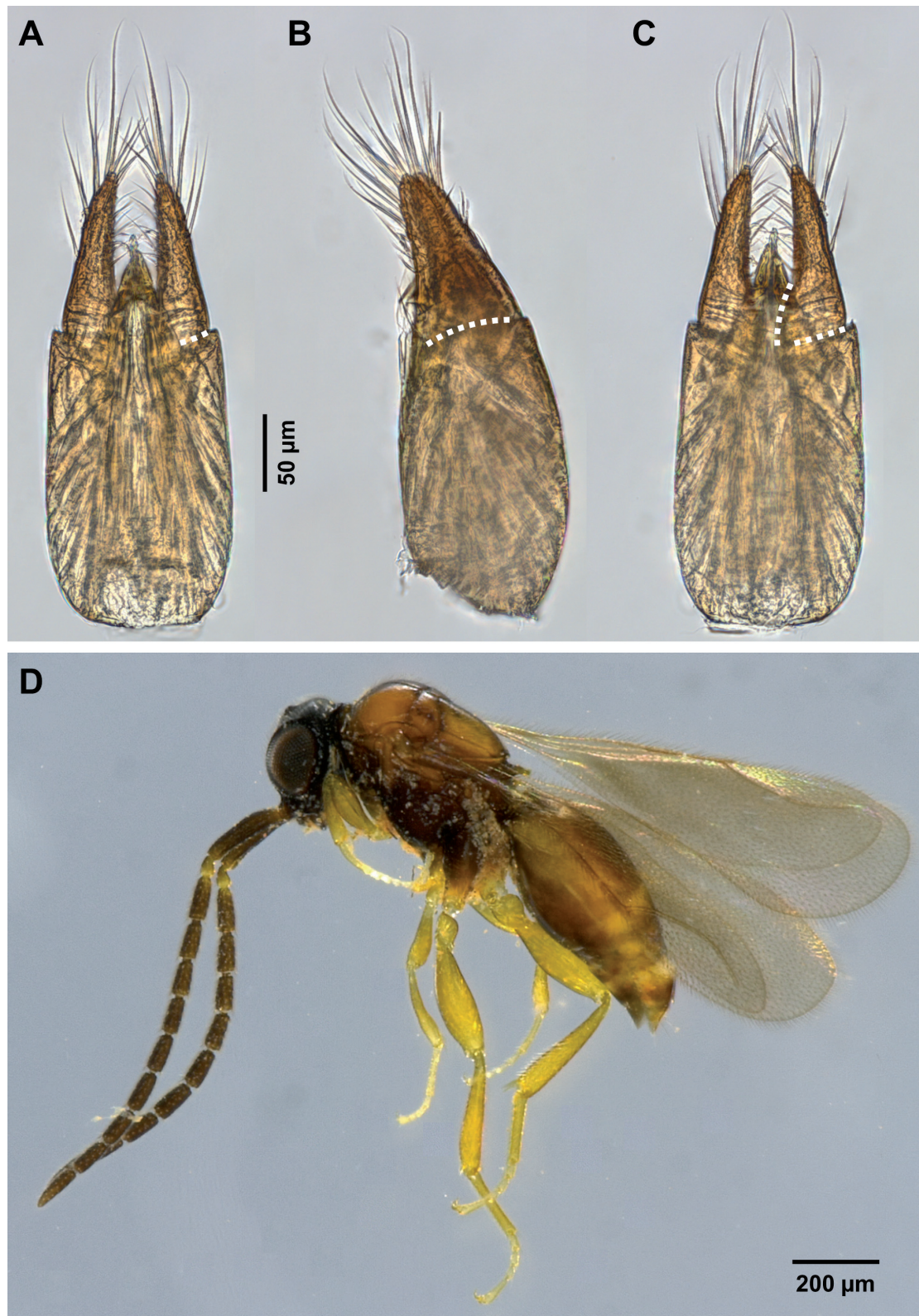


Fig. 80. Holotype of *Ceraphron sataoi* sp. nov. (ZFMK-HYM-00036989). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

(Fig. 80B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 80A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and slightly diverging distolaterally in basal third, straight and parallel to other harpe in apical two thirds (Fig. 80C), apex of harpe pointed, oriented distomedially (Fig. 80A, C). Harpe with at least six lateral setae restricted to apical half, longest lateral setae more than three quarters as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least nine median setae, longest median setae less than one third as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 80A, C) and dorsal to apex of harpe. Strong sclerotization with strongest sclerotization at harpe and aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron sataoi sp. nov. and *C. kaharabu* sp. nov. share a dark brown head, a ventrolaterally darkened mesosoma, and harpes that are distinctly more strongly sclerotized than the gvc, which is also strongly sclerotized. *Ceraphron sataoi* and *C. kaharabu* can be distinguished by the more elongated and finger-shaped harpes of *C. sataoi* (trapezoidal to cone-shaped in *C. kaharabu*).

Condition of type material

The body of the holotype was lost during processing, after imaging (Fig. 80D); the male genitalia are present and represent the most important part of the holotype for solid species delimitation and description. Description of non-genitalia characters is incomplete, and based on Fig. 80D. Fig. 80D images the holotype in a slightly oblique way, i.e., some measurements of the body were not possible.

Ceraphron semira sp. nov.

urn:lsid:zoobank.org:act:DA0BC924-3AAD-4589-B697-D40551D0FF96

Fig. 81

Diagnosis

Scape and pedicel light brown except proximal half of scape lighter; scape $4.6\times$ as long as pedicel; OOL $3.16\text{--}3.71\times$ (3.16) lateral ocellus diameter; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex exceeding end of mesosoma. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 1.05; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, straight and virtually parallel to other harpe in apical two thirds; harpe with at least four lateral setae

restricted to apical two thirds; gvc width three quarters of gvc length; gvc width $1.05 \times$ distal gvc width; genital length $2.61\text{--}2.84 \times (2.61)$ gvc width.

Etymology

The species is named after the Semira River which is close to the type locality.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; $3^{\circ}10'3.1$ S, $37^{\circ}14'10.5$ E; 1920 m a.s.l.; 26 Sep. 2012; KiLi project leg.; “tree 1”; FLM1, forest lower mont.; Coloured pan trap; ZFMK; ZFMK-HYM-00037081.

Paratype

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; $3^{\circ}8'41.5$ S, $37^{\circ}14'35.2$ E; 2120 m a.s.l.; 7 Nov. 2012; KiLi project leg.; “low ex”; FOC1, *Ocotea* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037082.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. $1.25\text{--}1.50$ mm (1.05 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel light brown except proximal half of scape lighter, flagellum brown; legs yellowish except proximal half of pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.6 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.7 \times$ as long as wide, F1 $2.0 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.0 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.3 \times$ as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.14\text{--}1.22 \times (1.22)$ head height; head width $1.76\text{--}1.86 \times (1.86)$ interorbital space; maximum eye diameter $1.19\text{--}1.33 \times (1.19)$ minimum eye diameter; head height $1.77\text{--}1.82 \times (1.72)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL $1.00:0.53\text{--}0.62:0.40\text{--}0.44$ ($1.00:0.53:0.40$); OOL $3.16\text{--}3.71 \times (3.16)$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.93\text{--}0.97 \times (0.93)$ mesosoma width; Weber length $375\text{--}500$ μm (500 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.82\text{--}1.88 \times (1.83)$ mesoscutellum width; posterior mesoscutal width $1.97\text{--}2.00 \times (1.97)$ mesoscutellum width; mesoscutellum length $1.56\text{--}1.67 \times (1.56)$ mesoscutellum width; mesoscutellum length $1.06\text{--}1.10 \times (1.06)$ posterior mesoscutal width; Weber length $1.11\text{--}1.19 \times (1.19)$ mesoscutum width; Weber length $1.33\text{--}1.51 \times (1.51)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral

view with blunt end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.66\text{--}2.77 \times (2.77)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $169\text{--}188 \mu\text{m}$ ($188 \mu\text{m}$); Weber length $2.22\text{--}2.67 \times (2.67)$ genital length; gvc width $59\text{--}72 \mu\text{m}$ ($72 \mu\text{m}$); genital length $2.61\text{--}2.84 \times (2.61)$ gvc width; gvc width three quarters of gvc length; gvc width $1.05 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc slightly descending proximomedially (Fig. 81C); proximoventral margin of gvc convex; distoventral margin of gvc descending proximomedially (Fig. 81A); ventral area of gvc straight; dorsal area of gvc straight (Fig. 81B), indented distomedially; proximolateral margin of gvc strongly descending and emarginated ventrally; distolateral margin of gvc convex (Fig. 81B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 1.05; lateral articulation site of harpe with gvc flush (Fig. 81A, C); ventral margin of harpe straight, dorsal margin straight (Fig. 81B), lateral margin convex, widest point of harpe at apical third (Fig. 81A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in basal third, straight and virtually parallel to other harpe in apical two thirds (Fig. 81C), apex of harpe slightly rounded (Fig. 81A, C). Harpe with at least four lateral setae restricted to apical two thirds, longest lateral setae less than half as long as harpe, lateral setae oriented distodorsally, distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae two thirds as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least seven median setae restricted to apical third, longest median setae less than one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than one third as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 81A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at apical third of harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

The male genitalia of *C. semira* sp. nov., *C. malava* sp. nov. and *C. eaerendili* sp. nov. are very similar, but the species can be distinguished by non-genitalia characters. The head and the mesosoma are dark brown in *C. semira* and light brown or brown in *C. malava* and *C. eaerendili*. The flagellum is brown in *C. semira* and light brown or light brown-yellowish in *C. malava* and *C. eaerendili*. The scape is distinctly longer in comparison to the pedicel in *C. semira*, and the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is exceeding the end of the mesosoma in *C. semira*, whereas it is extending only to the end of the mesosoma in *C. malava* and *C. eaerendili*.

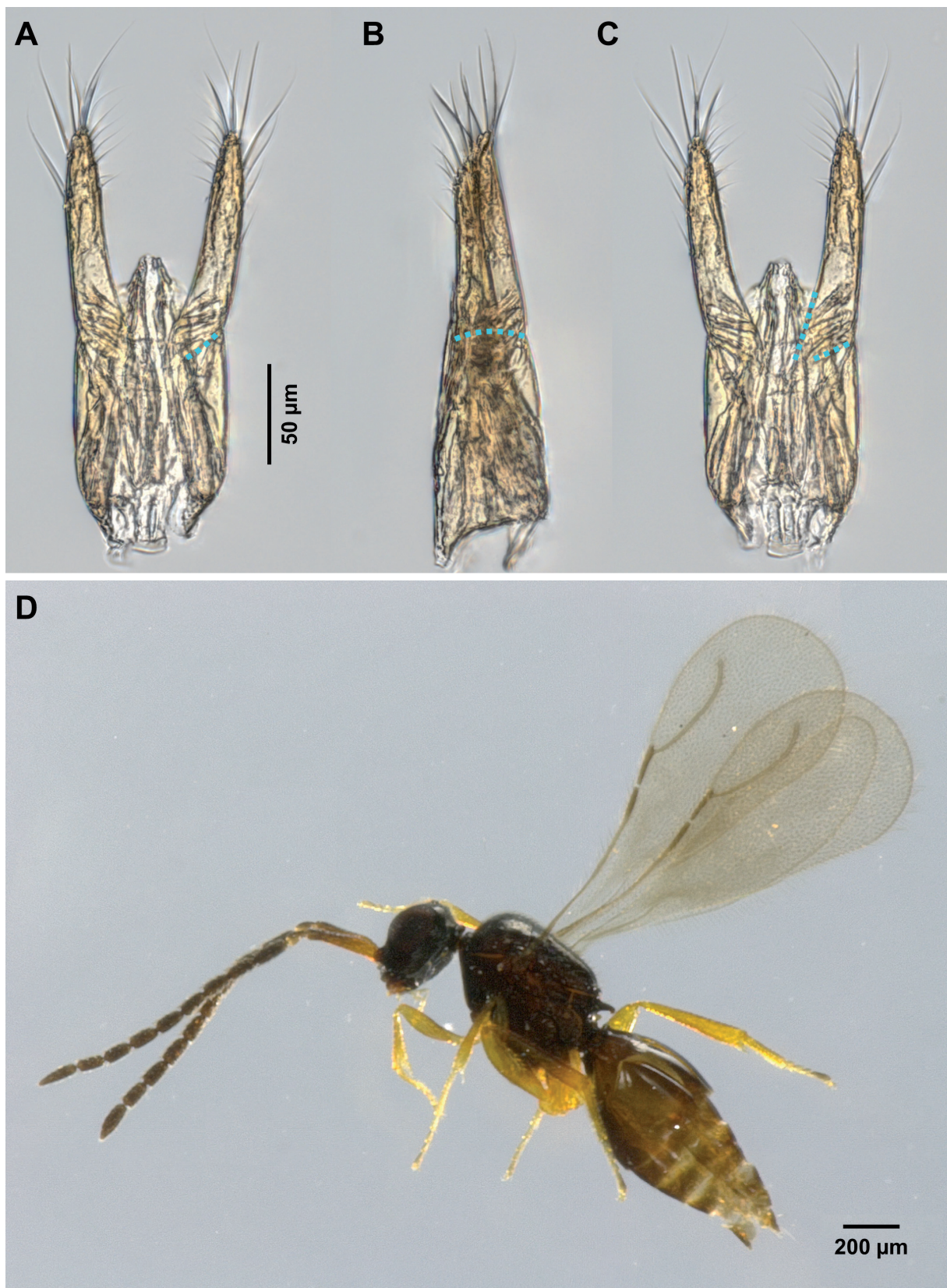


Fig. 81. Holotype of *Ceraphron semira* sp. nov. (ZFMK-HYM-00037081). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Condition of type material

In the holotype, the right F9 is deformed and the left hind wing is missing. The posterior half of the metasoma is deformed, thus the body length measurement is not precise.

Ceraphron sungura sp. nov.

urn:lsid:zoobank.org:act:81550E10-9140-48DB-8146-65541A8B52B7

Fig. 82

Diagnosis

Flagellomeres cylindric and moniliform (F3–F6); scape slightly shorter than F1 to F4 combined; F1 1.1 × as long as pedicel; F6 1.1 × as long as wide. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.77; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex, apex of harpe rounded; dorsal area of gvc indented distomedially; harpe with at least three median setae restricted to apical quarter, longest median setae less than one quarter as long as harpe; gvc width more than two thirds of gvc length; gvc width 1.15 × distal gvc width; gvc width 38 μm; Weber length 3.92 × genital length.

Etymology

The species name is derived from the Swahili word ‘*sungura*’ which means ‘hare’, with reference to the harpes of the male genitalia resembling the ears of a hare.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°22′50.5 N, 34°49′21.4 E; 1623 m a.s.l.; 15 Aug. 2007; F. Hita Garcia leg.; Transect 19; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036983.

Description

Male

BODY LENGTH. 0.78 mm.

COLOUR. Head brown, mesosoma brown, metasoma brown; scape and pedicel transparent-yellowish, flagellum transparent-brown, gradually darkening from F1 to F9; legs transparent-yellowish except coxae light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindric and moniliform (F3–F6); scape 3.4 × as long as pedicel, scape slightly shorter than F1 to F4 combined, F1 1.5 × as long as wide, F1 1.1 × as long as pedicel, F1 1.3 × as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.1 × as long as wide, F6 shorter than F7 and F8 combined, F6 1.1 × as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.17 × head height; head width 1.64 × interorbital space; maximum eye diameter 1.24 × minimum eye diameter; head height 1.67 × maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.53:0.53; OOL 2.27 × lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.98 \times$ mesosoma width; Weber length $306 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.80 \times$ mesoscutellum width; posterior mesoscutal width $1.40 \times$ mesoscutellum width; mesoscutellum length $1.60 \times$ mesoscutellum width; mesoscutellum length $1.14 \times$ posterior mesoscutal width; Weber length $1.36 \times$ mesoscutum width; Weber length $1.53 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with blunt and lighter end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $2.91 \times$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $78 \mu\text{m}$; Weber length $3.92 \times$ genital length; gvc width $38 \mu\text{m}$; genital length $2.08 \times$ gvc width; gvc width more than two thirds of gvc length; gvc width $1.15 \times$ distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc descending proximomedially (Fig. 82C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 82A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 82B), indented distomedially; proximolateral margin of gvc strongly ascending and emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 82B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.77; lateral articulation site of harpe with gvc virtually flush (Fig. 82A, C); ventral margin of harpe slightly concave, dorsal margin convex in basal third and straight in apical two thirds (Fig. 82B), lateral margin convex, widest point of harpe at apical quarter (Fig. 82A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex (Fig. 82C), apex of harpe rounded (Fig. 82A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae more than one quarter as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae less than one third as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least three median setae restricted to apical quarter, longest median setae less than one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus less than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 82A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with weakest sclerotization at harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

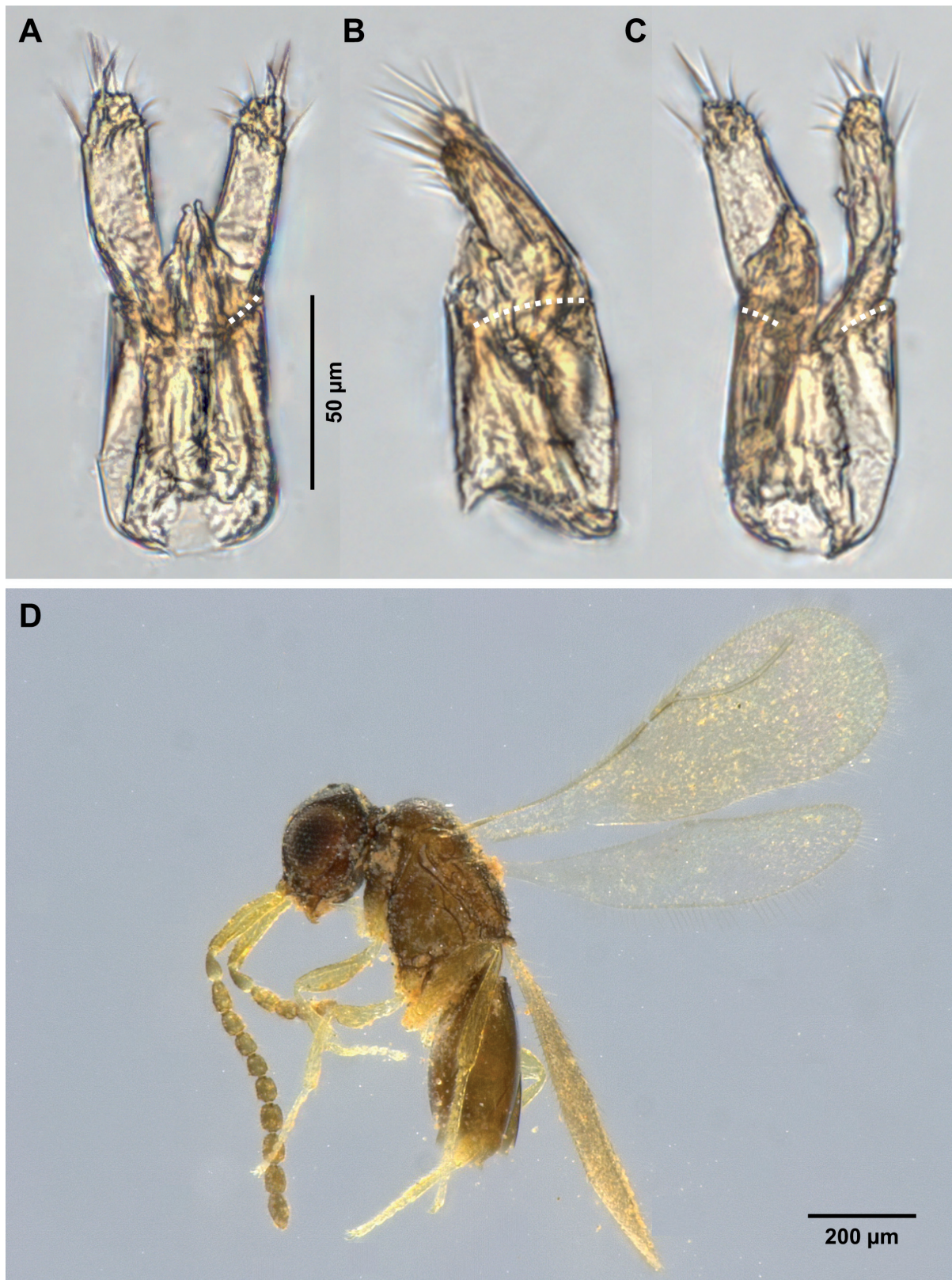


Fig. 82. Holotype of *Ceraphron sungura* sp. nov. (ZFMK-HYM-00036983). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view. Fig. 82C images the genitalia in a slightly oblique way, see Fig. 82A for shapes of margins.

Remarks

Comparison with similar species

Ceraphron sungura sp. nov. can be easily distinguished from all other treated species by its uniquely shaped harpes, and the moniliform flagellomeres.

Condition of type material

The holotype is slightly covered with dirt. The right F5 to F9 are missing and the right fore and middle leg are missing (except coxae). The end of the metasoma is missing, thus the body length measurement is not precise. The gvc is proximally slightly deformed, thus the measurement of the gvc width is not precise.

Ceraphron tenuimeris sp. nov.

urn:lsid:zoobank.org:act:5F7C3B6D-AD11-40A1-BF0B-21440835DFEE

Fig. 83

Diagnosis

Metasoma brown except anterior third lighter; F1 $2.8\times$ as long as wide, F6 $2.1\times$ as long as wide; fore wing length $2.61\text{--}2.70\times$ (2.62) width. Male genitalia: harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.43; dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in approximately basal half, slightly concave and slightly diverging distolaterally in approximately apical half, apex of harpe pointed, oriented distolaterally; lateral margin of harpe slightly concave; aedeagus + gonosticulus as long as harpe.

Etymology

The species name is a composition of the Latin word ‘*tenuis*’, which means ‘thin’, and the flagellomere, with reference to the thin flagellomeres.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}19'49.9$ N, $34^{\circ}52'16.1$ E; 1580 m a.s.l.; 7 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036870.

Paratypes

KENYA • 2 ♂♂; Western Province, Kakamega Forest; $00^{\circ}27'10.6$ N, $34^{\circ}51'48.7$ E; 1676 m a.s.l.; 26 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036871, ZFMK-HYM-00036872.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 1.14–1.38 mm (1.26 mm).

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown except anterior third lighter; scape and pedicel light brown, flagellum brown, gradually darkening from F1 to F9; legs yellowish except coxae dark brown and proximal third light brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.0\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.8\times$ as long as wide, F1 $1.7\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.1\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.09\text{--}1.13\times$ (1.10) head height; head width $1.94\text{--}2.04\times$ (2.04) interorbital space; maximum eye diameter $1.27\text{--}1.41\times$ (1.41) minimum eye diameter; head height $1.62\text{--}1.82\times$ (1.62) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.58–0.64:0.50–0.55 (1.00:0.58:0.50); OOL $1.69\text{--}2.17\times$ (2.17) lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.96\times$ (0.96) mesosoma width; Weber length 480–520 μm (520 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.67\text{--}1.79\times$ (1.79) mesoscutellum width; posterior mesoscutal width $1.37\text{--}1.54\times$ (1.54) mesoscutellum width; mesoscutellum length $1.33\text{--}1.57\times$ (1.35) mesoscutellum width; mesoscutellum length $0.88\text{--}1.15\times$ (0.88) posterior mesoscutal width; Weber length $1.37\text{--}1.45\times$ (1.37) mesoscutum width; Weber length $1.67\text{--}1.81\times$ (1.81) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt, lighter and bifurcated end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinct, straight in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.61\text{--}2.70\times$ (2.62) width; stigmal vein longer than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length 194–206 μm (206 μm); Weber length $2.44\text{--}2.52\times$ (2.52) genital length; gvc width 94–97 μm (94 μm); genital length $2.03\text{--}2.20\times$ (2.20) gvc width; gvc width less than two thirds of gvc length; gvc width $1.30\times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 83C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 83A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 83B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc strongly descending ventrally (Fig. 83B). Harpe trapezoidal in ventral and dorsal view; harpe/gvc index 0.43; lateral articulation site of harpe with gvc virtually flush (Fig. 83A, C); ventral margin of harpe slightly concave, dorsal margin convex in basal third and straight in apical two thirds (Fig. 83B), lateral margin slightly concave, widest point of harpe at articulation site with gvc (Fig. 83A, C); dorsomedial margins of harpes slightly converging and not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and virtually parallel to other harpe in approximately basal half, slightly concave and slightly diverging distolaterally in approximately apical half (Fig. 83C), apex of harpe pointed, oriented distolaterally (Fig. 83A, C). Harpe with at least two lateral setae restricted to apical third, longest lateral setae half as long as harpe, lateral setae oriented distolaterally; harpe with at least three apical setae, longest apical setae half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least four median setae restricted to apical third, longest median setae one quarter as long as harpe, median setae oriented distomedially and medioventrally. Aedeagus +

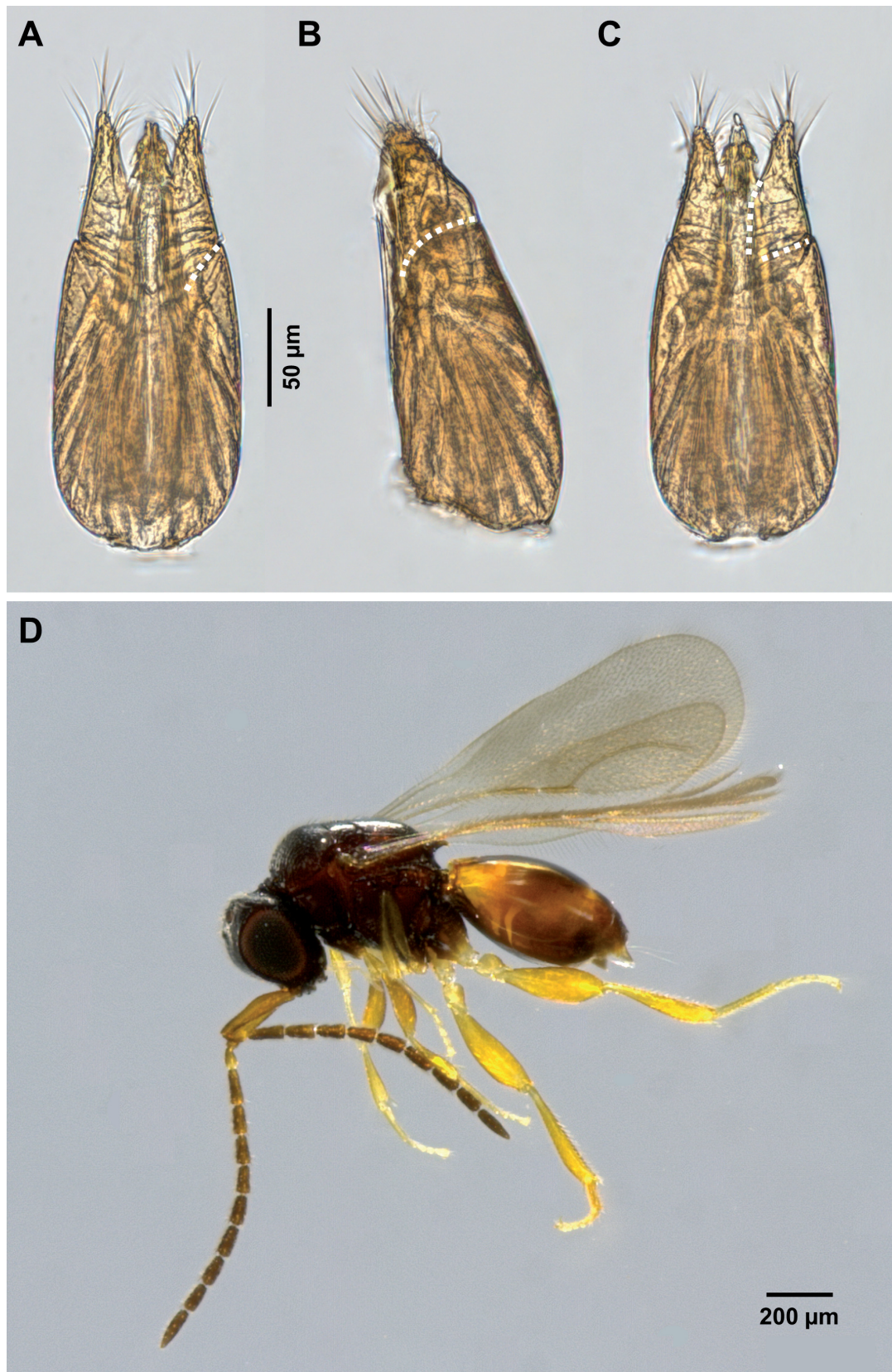


Fig. 83. Holotype of *Ceraphron tenuimeris* sp. nov. (ZFMK-HYM-00036870). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

gonossiculus as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 83A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized.

Female

Unknown.

Variation

The end of the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is more strongly bifurcated in ZFMK-HYM-00036870 and more weakly bifurcated in ZFMK-HYM-00036871. The number of distinct, basal longitudinal carinae on the syntergum varies between six (ZFMK-HYM-00036872) and seven (ZFMK-HYM-00036870, ZFMK-HYM-00036871).

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron tenuimeris sp. nov. and *C. salazar* sp. nov. can be distinguished by the longer and thinner flagellomeres in *C. tenuimeris*. Their male genitalia can be distinguished by a different setal arrangement, especially the long median setae in *C. salazar*, a different dorsal margin at the harpe (convex and straight in *C. tenuimeris* and straight in *C. salazar*) and a more weakly sclerotized harpe in *C. salazar*.

For more comparisons with similar species, see remarks under *C. ivindoensis* sp. nov.

Condition of type material

Holotype is immaculate.

Ceraphron tiriki sp. nov.

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Fig. 84

Diagnosis

OOL:LOL 1.32–1.64 (1.64); Weber length 1.34–1.41 × (1.39) mesoscutellum length; fore wing length 2.66–3.01 × (3.01) width. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.80; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and virtually parallel to other harpe from base to apex, apex of harpe slightly pointed, oriented slightly distolaterally; harpe with at least three apical setae, longest apical setae as long as harpe, apical and median setae distinctly crossing; gvc width slightly less than gvc length; gvc width equal to distal gvc width; genitalia weakly sclerotized with strongest sclerotization at apical third of harpe.

Etymology

The species is named after the Tiriki community, which lives in the south-east of Kakamega Forest. The Tiriki people are closely connected spiritually and culturally with the Kakamega Forest.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°12'42.6 N, 34°55'52.3 E; 1615 m a.s.l.; 16 Aug. 2007; F. Hita Garcia leg.; Transect 20; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036936.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°21'4.9 N, 34°51'41.1 E; 1602 m a.s.l.; no date on label, 2007 or 2008; F. Hita Garcia leg.; Transect 1; primary rain forest; Winkler leaf litter extraction; NHMUK; NHMUK-013389024 • 1 ♂; Kakamega Forest; 00°27'10.6 N, 34°51'48.7 E; 1676 m a.s.l.; 26 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034492 • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034482 • 1 ♂; same collection data as for preceding; 9 Jul. 2007; ZFMK-HYM-00034493 • 1 ♂; Kakamega Forest; 00°27'0.9 N, 34°50'52.9 E; 1649 m a.s.l.; 3 Jul. 2007; F. Hita Garcia leg.; Transect 8; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034490 • 1 ♂; Kakamega Forest; 00°23'6.2 N, 34°33'37.8 E; 1602 m a.s.l.; 16 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034494 • 1 ♂; same collection data as for preceding; 23 Jul. 2007; NHMUK; NHMUK-013389025 • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00795 • 1 ♂; Kakamega Forest; 00°21'21.1 N, 34°51'44.9 E; 1632 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00034489 • 1 ♂; Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; SMNS; SMNS-HYM-T00796 • 1 ♂; same collection data as for preceding; ZFMK; ZFMK-HYM-00034491 • 1 ♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 23 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00034485) • 2 ♂♂; same collection data as for preceding; ZFMK; ZFMK-HYM-00034487, ZFMK-HYM-00034488 • 1 ♂; Kakamega Forest; 00°12'09 N, 34°52'06 E; 1553 m a.s.l.; 2 Aug. 2008; F. Hita Garcia leg.; Transect 28; primary rain forest; Winkler leaf litter extraction; NMK; NMK (ZFMK-HYM-00034486).

Description

Male (N = 4 in morphometric measurements)

BODY LENGTH. 0.73–1.35 mm (0.90 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma brown; scape and pedicel yellowish, flagellum light brown; legs yellowish except pro- and mesocoxa brown, proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.4× as long as pedicel, scape longer than F1 and F2 combined, F1 2.0× as long as wide, F1 1.3× as long as pedicel, F1 1.2× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.7× as long as wide, F6 shorter than F7 and F8 combined, F6 1.3× as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.15–1.44× (1.17) head height; head width 1.91–2.02× (1.96) interorbital space; maximum eye diameter 1.16–1.50× (1.39) minimum eye diameter; head height 1.37–1.68× (1.68) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.50–

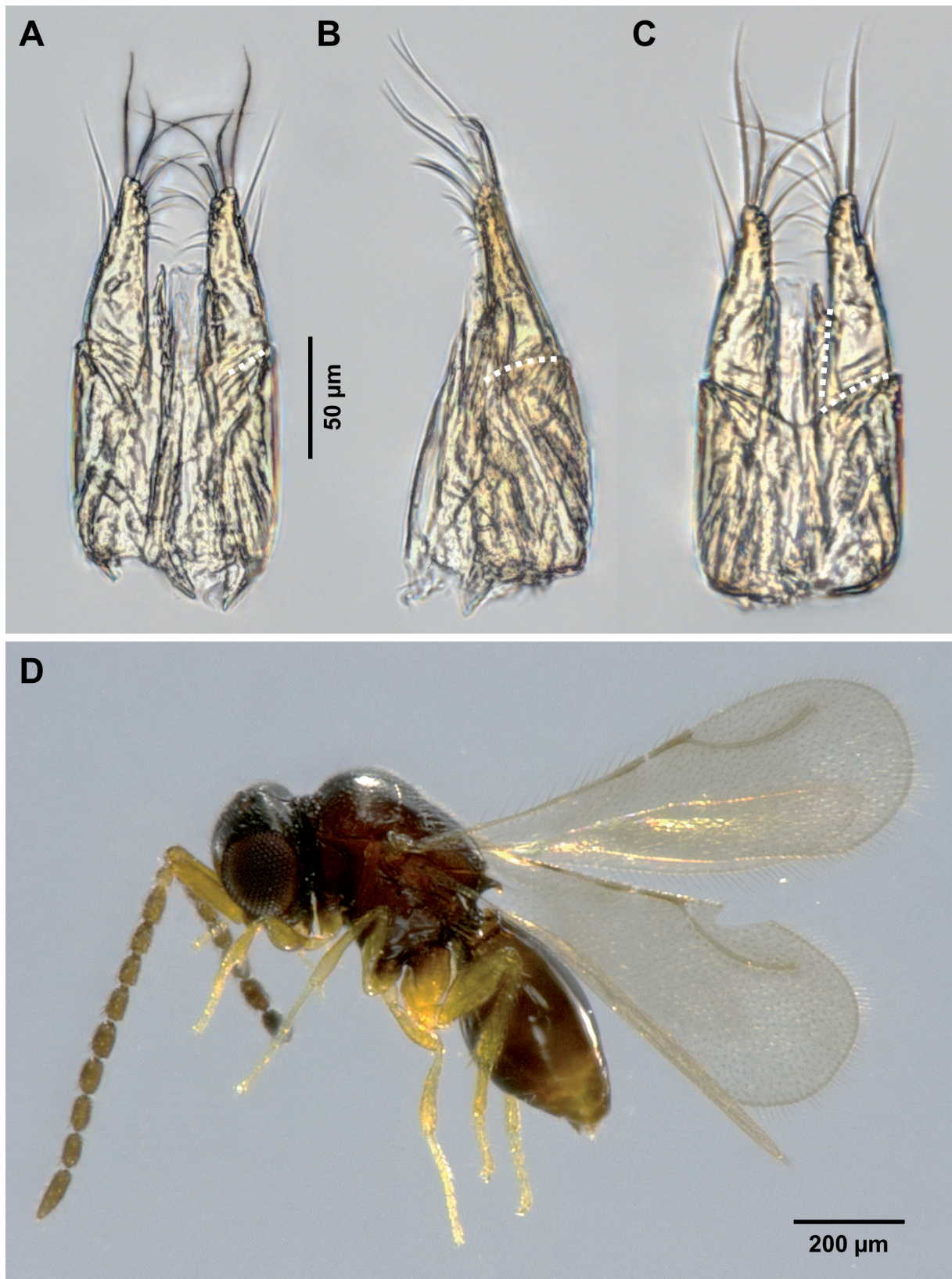


Fig. 84. Holotype of *Ceraphron tiriki* sp. nov. (ZFMK-HYM-00036936). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

0.81:0.61–0.76 (1.00:0.50:0.61); OOL $1.96\text{--}2.57 \times (2.57)$ lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.02\text{--}1.09 \times (1.09)$ mesosoma width; Weber length $281\text{--}463 \mu\text{m}$ ($313 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.75\text{--}1.94 \times (1.80)$ mesoscutellum width; posterior mesoscutal width $1.30\text{--}1.56 \times (1.39)$ mesoscutellum width; mesoscutellum length $1.57\text{--}1.78 \times (1.57)$ mesoscutellum width; mesoscutellum length $1.04\text{--}1.29 \times (1.13)$ posterior mesoscutal width; Weber length $1.16\text{--}1.29 \times (1.20)$ mesoscutum width; Weber length $1.34\text{--}1.41 \times (1.39)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.66\text{--}3.01 \times (3.01)$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $97\text{--}100 \mu\text{m}$ ($100 \mu\text{m}$); Weber length $2.81\text{--}4.63 \times (3.13)$ genital length; gvc width $44\text{--}56 \mu\text{m}$ ($45 \mu\text{m}$); genital length $1.78\text{--}2.29 \times (2.21)$ gvc width; gvc width slightly less than gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 84C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 84A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 84B), slightly indented distomedially; proximolateral margin of gvc slightly descending and emarginated ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 84B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.80; lateral articulation site of harpe with gvc not flush (Fig. 84A, C); ventral margin of harpe slightly concave, dorsal margin straight (Fig. 84B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 84A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and virtually parallel to other harpe from base to apex (Fig. 84C), apex of harpe slightly pointed, oriented slightly distolaterally (Fig. 84A, C). Harpe with at least two lateral setae restricted to apical half, longest lateral setae two thirds as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least three apical setae, longest apical setae as long as harpe, apical setae distinctly crossing and oriented distomedially and distoventrally; harpe with at least six median setae, longest median setae less than two thirds as long as harpe, median setae distinctly crossing and oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus half as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 84A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at apical third of harpe.

Female

Unknown.

Variation

The flagellum gradually darkens from F1 to F9 in NHMUK-013389025 and ZFMK-HYM-00034494, and the proximal third of the metacoxa is lighter in ZFMK-HYM-00034489 than in the holotype. The number of distinct basal longitudinal carinae on the syntergum can be five (ZFMK-HYM-00034482) or even seven (ZFMK-HYM-00034494), and the translucent patches on the metasoma can be indistinct (ZFMK-HYM-00034482). In addition to the differences in antenna colour and number of distinct basal

longitudinal carinae on the syntergum (see above), the comparatively large ZFMK-HYM-00034494 also has the dorsal margin of the occipital carina dorsal to the dorsal margin of the lateral ocellus in lateral view, basal longitudinal high head width to height ratio (1.44), a long POL (OOL:POL 1.23), and small genitalia (Weber length:genital length ratio 4.63). This paratype ZFMK-HYM-00034494 might even represent a separate species but based on many characters shared with the other types (see diagnosis), we treat it here as a slightly odd representative of *C. tiriki* sp. nov.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Body and male genitalia are similar in *C. tiriki* sp. nov. and *C. malava* sp. nov. *Ceraphron tiriki* can be distinguished from *C. malava* by being slightly lighter, by the genital length to gvc width ratio (1.78–2.29 in *C. tiriki*, compared to *C. malava* 2.72–2.86), and by the Weber length to genital length ratio (2.81–4.63 in *C. tiriki*, 2.43–2.68 in *C. malava*).

Among the examined material from the Kakamega Forest, we found a single specimen which is very similar to *C. tiriki* sp. nov. in both body and male genitalia. However, the specimen was somehow damaged, and body and male genitalia both appear hollow and slightly transparent. The specimen probably belongs to another new species, separated from *C. tiriki* by differences in OOL:POL:LOL, and in the setal arrangement on the harpes. Because of the strange damage, we refrained from describing it as a new species. The specimen is deposited in the ZFMK as ZFMK-HYM-00036939.

For more comparisons with similar species, see remarks under *C. reinholdi* sp. nov.

Condition of type material

In the holotype, the right F8 and F9 are missing.

Ceraphron trietschae sp. nov.

urn:lsid:zoobank.org:act:EAB89B7B-0909-42ED-865D-B3892AD2F2B2

Fig. 85

Diagnosis

Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.57; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in approximately basal three quarters, concave emargination in approximately apical quarter; median setae of harpe distinctly crossing; proximodorsal margin of gvc straight; Weber length $3.43\text{--}3.60 \times (3.43)$ genital length; genitalia weakly sclerotized with strongest sclerotization at emarginated apex of harpe.

Etymology

The species is named after Carolyn Trietsch, who recently made important contributions to the study of the poorly known ceraphronoid wasps.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'52.3 N, 34°52'5.3 E; 1607 m a.s.l.; 21 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036892.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°21'21.1 N, 34°51'44.9 E; 1632 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 16; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036893 • 1 ♂; Kakamega Forest; 00°13'15.5 N, 34°53'24.7 E; 1597 m a.s.l.; 23 Aug. 2007; F. Hita Garcia leg.; Transect 22; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036894.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.85–1.11 mm (1.11 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel yellowish, flagellum light brown; legs yellowish except pro- and mesocoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented (ZFMK-HYM-00036893), flagellomeres cylindric; scape $4.3\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.2\times$ as long as wide, F1 $1.6\times$ as long as pedicel, F1 $1.3\times$ as long as F2, F1 shorter than F7 and F8 combined. F1 shorter than F9 (ZFMK-HYM-00036893), F6 $1.8\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2\times$ as high as F9 (ZFMK-HYM-00036893); few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.15\text{--}1.18\times$ (1.15) head height; head width $1.73\text{--}1.88\times$ (1.88) interorbital space; maximum eye diameter $1.16\text{--}1.36\times$ (1.16) minimum eye diameter; head height $1.55\text{--}1.86\times$ (1.86) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.40–0.50:0.40–0.56 (1.00:0.44:0.56); OOL $1.60\text{--}2.50\times$ (1.60) lateral ocellus diameter. White, thick setae on upper face slightly present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.08\text{--}1.10\times$ (1.09) mesosoma width; Weber length 306–338 μm (322 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus slightly concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.74\text{--}1.94\times$ (1.94) mesoscutellum width; posterior mesoscutal width $1.42\text{--}1.72\times$ (1.72) mesoscutellum width; mesoscutellum length $1.32\text{--}1.78\times$ (1.78) mesoscutellum width; mesoscutellum length $0.83\text{--}1.15\times$ (1.03) posterior mesoscutal width; Weber length $1.47\text{--}1.50\times$ (1.47) mesoscutum width; Weber length $1.58\text{--}2.16\times$ (1.61) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with pointed and lighter end, extending to end of mesosoma; mesometapleural sulcus indistinct; posterior propodeal projection straight in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

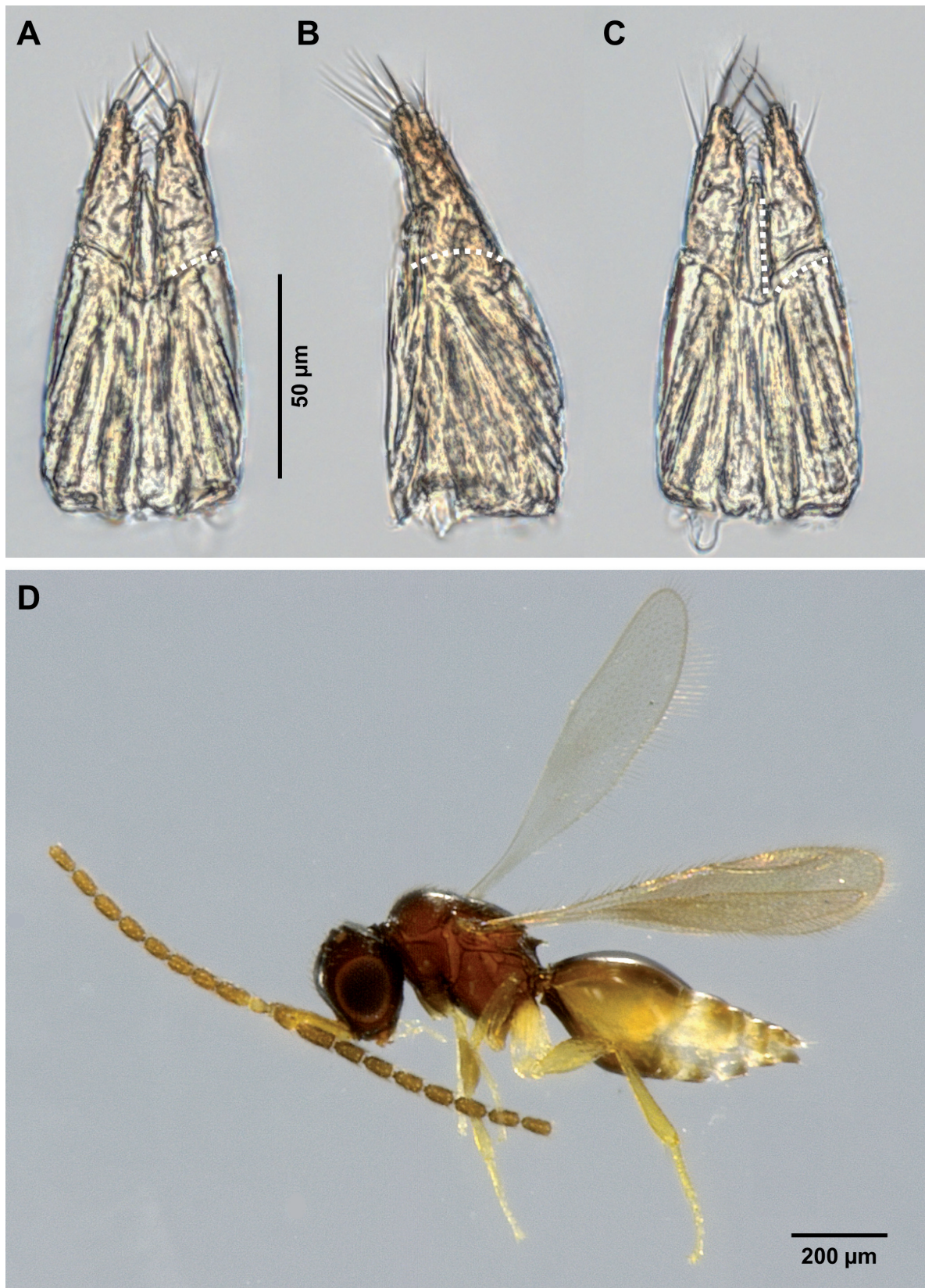


Fig. 85. Holotype of *Ceraphron trietschae* sp. nov. (ZFMK-HYM-00036892). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

FORE WING. Length $2.79\text{--}3.26 \times (2.96)$ width; stigmal vein slightly longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $86\text{--}94 \mu\text{m}$ ($94 \mu\text{m}$); Weber length $3.43\text{--}3.60 \times (3.43)$ genital length; gvc width $44\text{--}48 \mu\text{m}$ ($48 \mu\text{m}$); genital length $1.94\text{--}2.07 \times (1.94)$ gvc width; gvc width less than three quarters of gvc length; gvc width $1.34 \times$ distal gvc width. Proximodorsal margin of gvc straight. Distodorsal margin of gvc descending proximomedially (Fig. 85C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 85A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 85B); proximolateral margin of gvc slightly ascending and emarginated ventrally; distolateral margin of gvc convex (Fig. 85B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.57; lateral articulation site of harpe with gvc virtually flush (Fig. 85A, C); ventral margin of harpe slightly concave, dorsal margin straight (Fig. 85B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 85A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in approximately basal three quarters, concave emargination in approximately apical quarter (Fig. 85C), apex of harpe pointed, oriented slightly distomedially (Fig. 85A, C). Harpe with at least two lateral setae restricted to apical third, longest lateral setae less than half as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least three median setae, longest median setae more than one third as long as harpe, median setae distinctly crossing and oriented distomedially and medioventrally. Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 85A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at emarginated apex of harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron trietschae sp. nov. and *C. metapleuris* sp. nov. differ in the harpe/gvc indices (0.57 in *C. trietschae* and 0.48 in *C. metapleuris*), and the dorsomedial margin of the harpe which is parallel over a longer distance and without a straight and diverging distolaterally part in *C. trietschae* (i.e., the harpe of *C. trietschae* is cone-shaped and that of *C. metapleuris* is trapezoidal).

Condition of type material

In the holotype, both F9, the right fore wing and the right fore leg (except coxa) are missing, and the posterior third of the metasoma is deformed, thus the body length measurement is not precise.

Taxa in open nomenclature

In the following, five additional potentially new species of *Ceraphron* are described but not named.

Ceraphron sp. 1

Fig. 86

Diagnosis

F1 2.8× as long as wide; F6 1.9× as long as wide; head height 1.91× maximum eye diameter; pairs of translucent patches on metasomal syntergum and synsternum. Male genitalia: harpe triangular to cone-shaped in ventral and dorsal view; harpe/gvc index 0.63; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and diverging distolaterally from base to apex; apex of harpe pointed; longest lateral setae as long as harpe; harpe with at least seven median setae restricted to apical half, longest median setae two thirds as long as harpe.

Material examined

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°8'18.7 S, 37°18'19.2 E; 2650 m a.s.l.; 8 Oct. 2012; KiLi project leg.; “low ex”; FOC4, *Ocotea* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037080.

Description

Male

BODY LENGTH. 1.15 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel light brown-yellowish, flagellum light brown; legs light brown-yellowish except coxae brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.9× as long as pedicel, scape longer than F1 and F2 combined, F1 2.8× as long as wide, F1 1.8× as long as pedicel, F1 1.1× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.9× as long as wide, F6 shorter than F7 and F8 combined; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.14× head height; head width 1.72× interorbital space; maximum eye diameter 1.28× minimum eye diameter; head height 1.91× maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.54:0.42; OOL 3.00× lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 0.94× mesosoma width; Weber length 363 μm. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width 1.92× mesoscutellum width; posterior mesoscutal width 1.50× mesoscutellum width; mesoscutellum length 1.71× mesoscutellum width; mesoscutellum length 1.14× posterior mesoscutal width; Weber length 1.26× mesoscutum width; Weber length 1.41× mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in

lateral view with pointed and lighter end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb indistinct. Basal transverse carina of petiole (on syntergum) present; at least eight distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.89 \times$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length 188 μm ; Weber length $1.93 \times$ genital length; gvc width 78 μm ; genital length $2.40 \times$ gvc width; gvc width two thirds of gvc length; gvc width $1.09 \times$ distal gvc width. Distodorsal margin of gvc slightly descending proximomedially (Fig. 86C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 86A); ventral area of gvc straight (Fig. 86B); proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 86B). Harpe triangular to cone-shaped in ventral and dorsal view; harpe/gvc index 0.63; lateral articulation site of harpe with gvc not flush (Fig. 86A, C); ventral margin of harpe slightly concave and with small emargination at apical quarter, dorsal margin straight in basal quarter and slightly concave in apical three quarters (Fig. 86B), lateral margin slightly convex, widest point of harpe at apical third (Fig. 86A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and diverging distolaterally from base to apex (Fig. 86C), apex of harpe pointed (Fig. 86A, C). Harpe with at least four lateral setae restricted to apical half, longest lateral setae as long as harpe, lateral setae oriented distodorsally, distolaterally and distoventrally; harpe with at least seven median setae restricted to apical half, longest median setae two thirds as long as harpe, median setae oriented distodorsally, distomedially and distoventrally. Aedeagus + gonossiculus half as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 86A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus and harpe.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Ceraphron sp. 1 and *C. isukha* sp. nov. are easily distinguishable, for example by the differently shaped flagellomeres. The genitalia of both species are very similar, but can be distinguished by the following characters: the harpe/gvc index of *C. sp. 1* is 0.63 and that of *C. isukha* is 0.52, the apex of the harpe is pointed in *C. sp. 1* and rounded in *C. isukha*, the dorsomedial margin of the harpe is slightly concave in *C. sp. 1* and straight in *C. isukha* and the setal arrangement with lateral setae as long as the harpe is very distinctive in *C. sp. 1*.

Condition of the specimen

Ceraphron sp. 1 had been card-mounted and was later removed from the card and placed in glycerol. Parts of the proximal and dorsal gvc are deformed, thus the proximal margin and the dorsal area of

the gvc cannot be described. Also, the distal flagellomeres are deformed, i.e., reliable comparisons of flagellomere width are not possible. The right fore wing and one hind wing are separately glued to a card, and one hind wing is missing. The left middle leg is missing. The left hind leg is detached

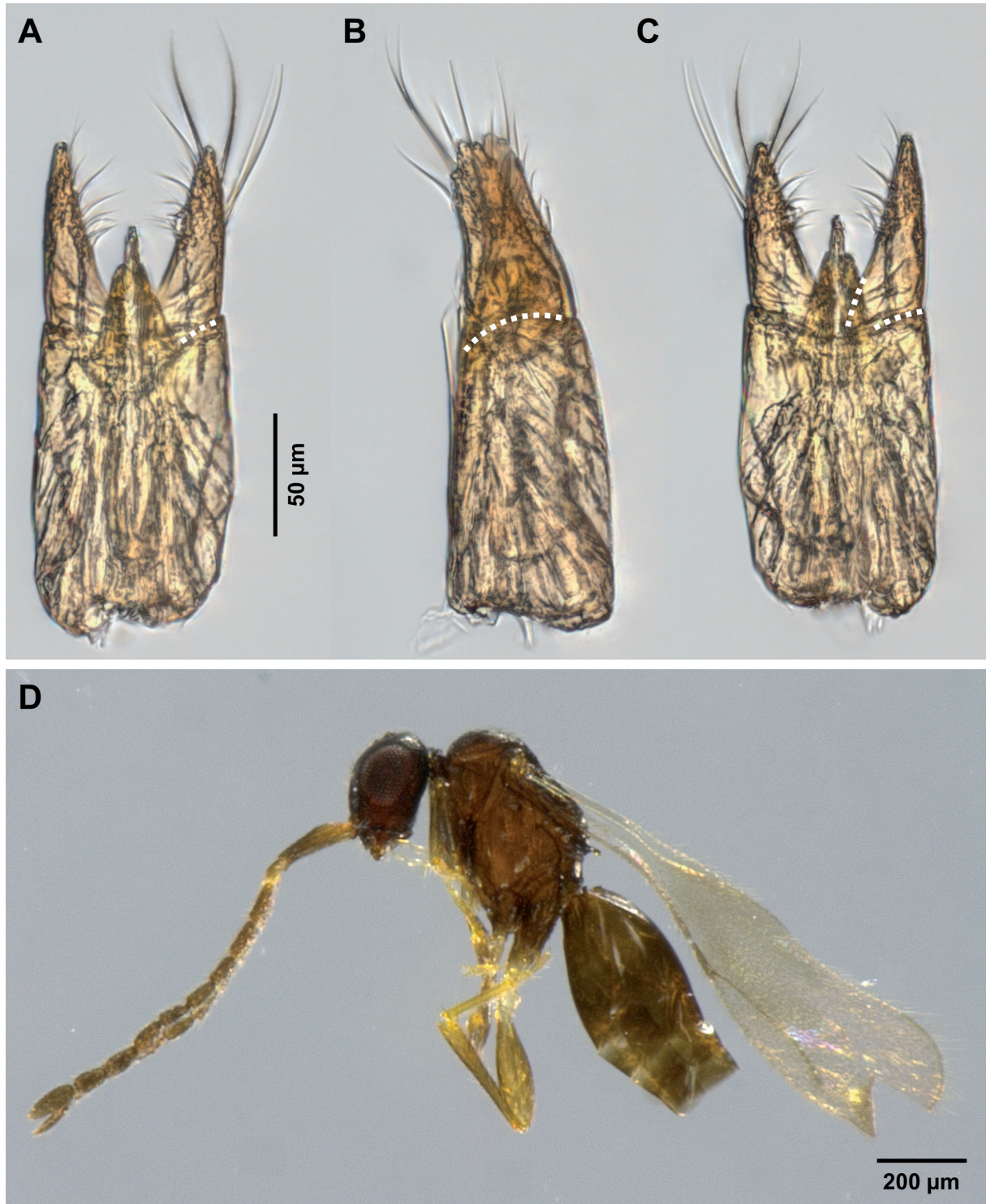


Fig. 86. Specimen of *Ceraphron* sp. 1 (ZFMK-HYM-00037080). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

(except coxa) but separately glued to the card. The posterior half of the metasoma is deformed and partly missing, thus the body length measurement is not precise. *Ceraphron* sp. 1 is deposited in the ZFMK as ZFMK-HYM-00037080.

Ceraphron sp. 2

Fig. 87

Diagnosis

Scape and pedicel yellowish, flagellum yellowish to brown, gradually darkening from F1 to F9; sensillae on flagellomeres sickle-shaped and distinctly shorter than width of flagellomeres; legs yellowish except pro- and mesocoxa brown; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation). Male genitalia: harpe triangular to cone-shaped in ventral and dorsal view; harpe/gvc index 0.44; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in approximately basal quarter, slightly concave and slightly diverging distolaterally in approximately apical three quarters; longest lateral setae more than two thirds as long as harpe; dorsal area of gvc slightly indented distomedially; aedeagus + gonossiculus as long as harpe; genitalia moderately sclerotized with strongest sclerotization at apical margin of harpe and apical aedeagus + gonossiculus.

Material examined

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°18'13.4 N, 34°48'16 E; 1554 m a.s.l.; 20 Jun. 2007; F. Hita Garcia leg.; Transect 5; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036873.

Description

Male

BODY LENGTH. 1.11 mm.

COLOUR. Head dark brown, mesosoma brown, metasoma brown except anterior third lighter; scape and pedicel yellowish, flagellum yellowish to brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown, fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. Flagellomeres cylindrical; scape 3.9 × as long as pedicel, scape longer than F1 and F2 combined, F1 2.3 × as long as wide, F1 1.7 × as long as pedicel, F1 1.2 × as long as F2, F1 shorter than F7 and F8 combined, F6 1.7 × as long as wide, F6 shorter than F7 and F8 combined; few medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and distinctly shorter than width of flagellomeres.

HEAD. Head width 1.12 × head height; head width 1.97 × interorbital space; maximum eye diameter 1.24 × minimum eye diameter; head height 1.65 × maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.56:0.61; OOL 2.00 × lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 0.98 × mesosoma width; Weber length 413 μm. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar

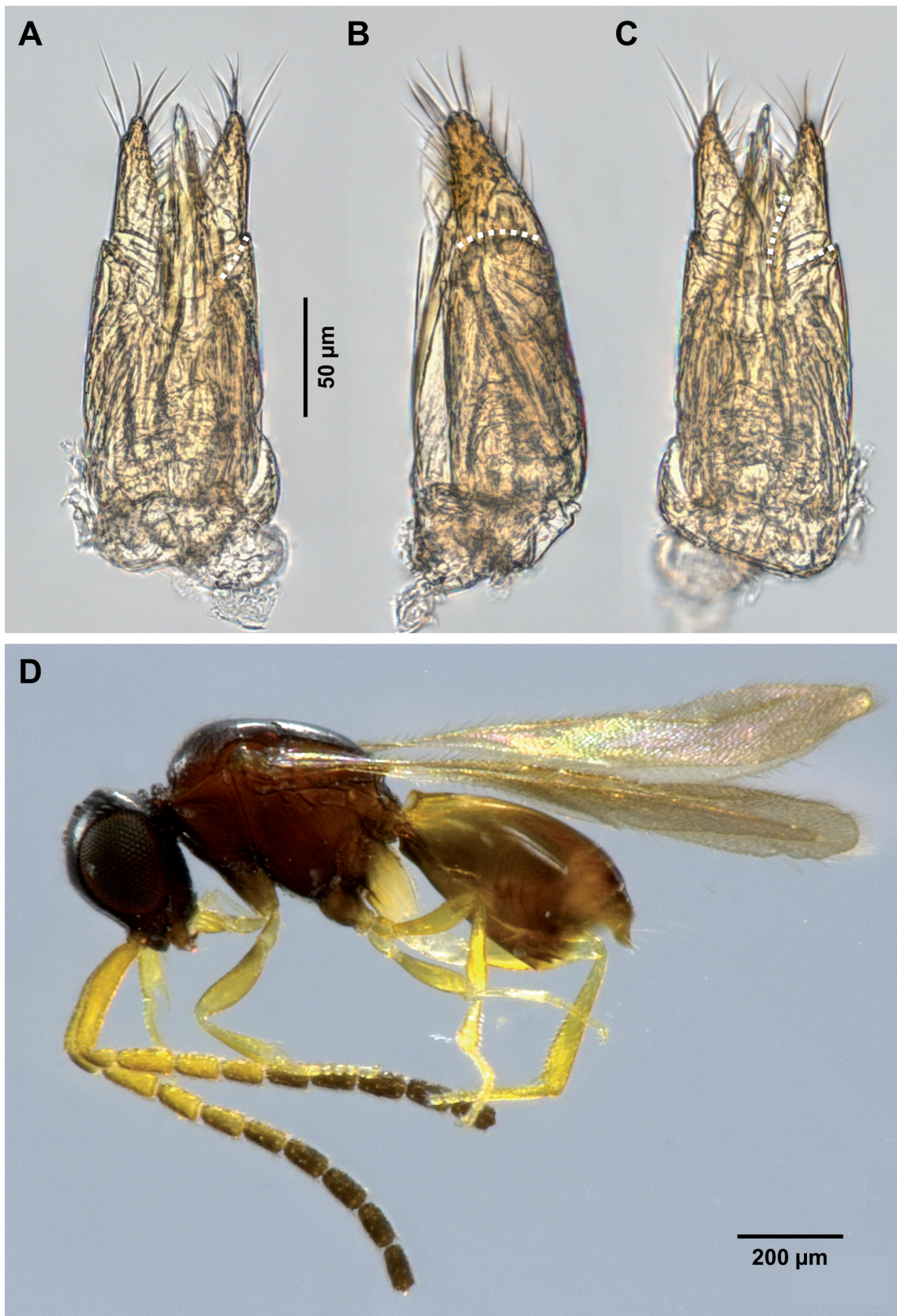


Fig. 87. Specimen of *Ceraphron* sp. 2 (ZFMK-HYM-00036873). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

area setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $1.85 \times$ mesoscutellum width; posterior mesoscutal width $1.31 \times$ mesoscutellum width; mesoscutellum length $1.38 \times$ mesoscutellum width; mesoscutellum length $1.06 \times$ posterior mesoscutal width; Weber length $1.38 \times$ mesoscutum width; Weber length $1.83 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $3.29 \times$ width; stigmal vein slightly longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $188 \mu\text{m}$; Weber length $2.20 \times$ genital length; gvc width $72 \mu\text{m}$; genital length $2.61 \times$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.23 \times$ distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc descending proximomedially (Fig. 87C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 87A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 87B), slightly indented distomedially; proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 87B). Harpe triangular to cone-shaped in ventral and dorsal view; harpe/gvc index 0.44; lateral articulation site of harpe with gvc not flush (Fig. 87A, C); ventral margin of harpe slightly concave, dorsal margin straight (Fig. 87B), lateral margin slightly convex, widest point of harpe at apical half (Fig. 87A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally in approximately basal quarter, slightly concave and slightly diverging distolaterally in approximately apical three quarters (Fig. 87C), apex of harpe pointed, oriented slightly distomedially (Fig. 87A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae more than two thirds as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae less than half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least seven median setae, longest median setae more than half as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 87A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at apical margin of harpe and apical aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron sp. 2 and *C. digiti* sp. nov. have very similar male genitalia, distinguishable only by small differences of the setal arrangement of the harpe and the sclerotization of the male genitalia. However,

both species are distinguishable by other characters: *C. sp. 2* has a dark brown head and *C. digiti* has a brown head. The scape and pedicel and the metacoxa of *C. sp. 2* are yellowish and the scape and pedicel of *C. digiti* are light brown and the metacoxa is brown. The flagellomeres of *C. sp. 2* are slightly longer and thinner than those of *C. digiti*.

For more comparisons with similar species, see remarks under *C. herreni* sp. nov.

Condition of the specimen

In the holotype, both F9, left hind leg (except coxa), and terminal parts of the metasoma are missing. Proximal parts of the genitalia are covered with tissue and the ventral area of the gvc is slightly deformed. *Ceraphron sp. 2* is deposited in the ZFMK as ZFMK-HYM-00036873.

Ceraphron sp. 3

Fig. 88

Diagnosis

Scape as long as F1 and F2 combined; F1 2.7× as long as wide, F6 1.9× as long as wide; preoccipital carina distinct; posterolateral processes of gena present. Male genitalia: harpe triangular in ventral and dorsal view; harpe/gvc index 0.36; dorsomedial margins of harpes converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex; harpe with at least one lateral seta restricted to apical third, longest lateral seta more than three quarters as long as harpe; harpe with at least two apical setae, longest apical setae more than three quarters as long as harpe; aedeagus + gonossiculus slightly less than as long as harpe; gvc width 1.39× distal gvc width; genitalia weakly sclerotized with strongest sclerotization at harpe and aedeagus + gonossiculus.

Material examined

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°23'6.2 N, 34°33'37.8 E; 1602 m a.s.l.; 23 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036891.

Description

Male

BODY LENGTH. 1.05 mm.

COLOUR. Head brown, mesosoma brown, metasoma brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except pro- and mesocoxa brown and proximal two thirds of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.5× as long as pedicel, scape as long as F1 and F2 combined, F1 2.7× as long as wide, F1 2.0× as long as pedicel, F1 1.3× as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.9× as long as wide, F6 shorter than F7 and F8 combined, F6 1.3× as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.13× head height; head width 1.89× interorbital space; maximum eye diameter 1.24× minimum eye diameter; head height 1.73× maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.50:0.50; OOL 2.00× lateral ocellus diameter. White, thick setae

on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.96 \times$ mesosoma width; Weber length $375 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present;

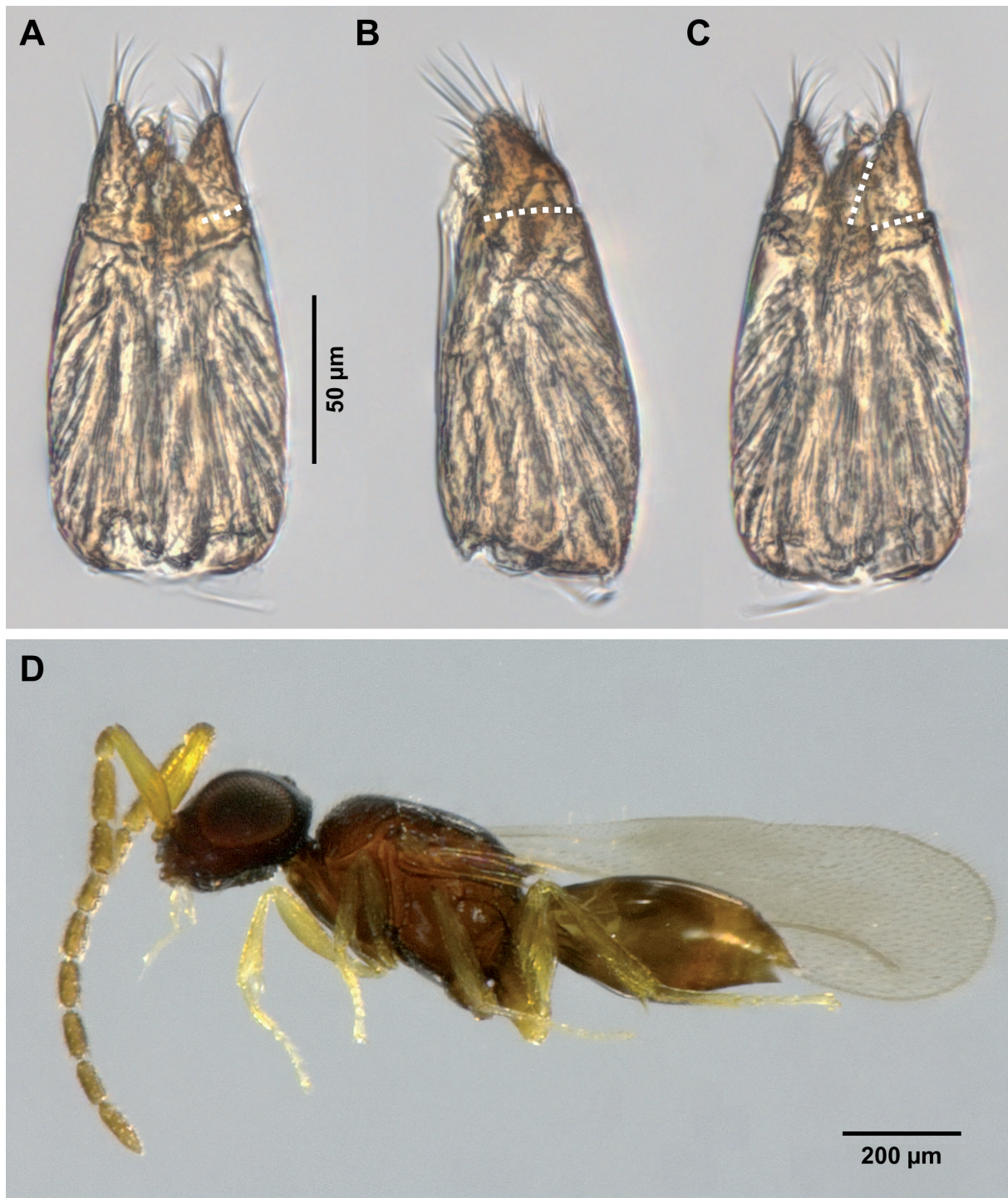


Fig. 88. Specimen of *Ceraphron* sp. 3 (ZFMK-HYM-00036891). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.75 \times$ mesoscutellum width; posterior mesoscutal width $1.46 \times$ mesoscutellum width; mesoscutellum length $1.50 \times$ mesoscutellum width; mesoscutellum length $1.03 \times$ posterior mesoscutal width; Weber length $1.43 \times$ mesoscutum width; Weber length $1.67 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus indistinct; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.75 \times$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $131 \mu\text{m}$; Weber length $2.86 \times$ genital length; gvc width $69 \mu\text{m}$; genital length $1.91 \times$ gvc width; gvc width two thirds of gvc length; gvc width $1.39 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc slightly descending proximomedially (Fig. 88C); proximoventral margin of gvc concave; distoventral margin of gvc slightly descending proximomedially (Fig. 88A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 88B); proximolateral margin of gvc ascending and emarginated ventrally; distolateral margin of gvc slightly descending ventrally (Fig. 88B). Harpe triangular in ventral and dorsal view; harpe/gvc index 0.36; lateral articulation site of harpe with gvc virtually flush (Fig. 88A, C); ventral margin of harpe concave; dorsal margin convex in basal half and straight in apical half (Fig. 88B), lateral margin straight, widest point of harpe at lateral articulation site with gvc (Fig. 88A, C); dorsomedial margins of harpes converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and diverging distolaterally from base to apex (Fig. 88C), apex of harpe pointed (Fig. 88A, C). Harpe with at least one lateral seta restricted to apical third, longest lateral seta more than three quarters as long as harpe, lateral seta oriented distolaterally; harpe with at least two apical setae, longest apical setae more than three quarters as long as harpe, apical setae oriented distolaterally and distoventrally; harpe with at least three median setae, longest median setae more than one third as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus slightly less than as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 88A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized with strongest sclerotization at harpe and aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

The male genitalia of *C. sp. 3* are similar to those of *C. sp. 4* and *C. mikoi sp. nov.* but can be distinguished by differences in the sclerotization pattern, in the setal arrangement, the length of the setae and the shape of the margins of the harpes.

For more comparisons with similar species, see remarks under *C. isecheno sp. nov.*

Condition of the specimen

In the specimen, the left F3–F9, the left fore wing, both hind wings, and the right middle and hind leg (except coxae) are missing. *Ceraphron* sp. 3 is deposited in the ZFMK as ZFMK-HYM-00036891.

Ceraphron sp. 4

Fig. 89

Diagnosis

Flagellum gradually lightening from F1 to F9; F1 2.8× as long as wide, scape slightly longer than F1 and F2 combined, F1 slightly shorter than F9. Male genitalia: harpe triangular in ventral and dorsal view; harpe/gvc index 0.29; lateral articulation site of harpe with gvc flush; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and diverging distolaterally from base to apex, apex of harpe slightly pointed, oriented distolaterally; dorsal area of gvc slightly indented distomedially; harpe with at least one lateral seta restricted to basal third, longest lateral seta more than half as long as harpe; longest apical setae more than two thirds as long as harpe; aedeagus + gonosticulus more than as long as harpe; gvc width 1.47× distal gvc width.

Material examined

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°21'4.4 N, 34°51'41.1 E; 1602 m a.s.l.; 5 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036923.

Description

Male

BODY LENGTH. 0.98 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown except anterior third lighter; scape and pedicel yellowish, flagellum light brown, gradually lightening from F1 to F9; legs yellowish except pro- and mesocoxa brown and proximal third of metacoxa brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.5× as long as pedicel, scape slightly longer than F1 and F2 combined, F1 2.8× as long as wide, F1 1.8× as long as pedicel, F1 1.4× as long as F2, F1 shorter than F7 and F8 combined, F1 slightly shorter than F9, F6 1.8× as long as wide, F6 shorter than F7 and F8 combined, F6 1.2× as high as F9; numerous medium-sized multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width 1.18× head height; head width 1.79× interorbital space; maximum eye diameter 1.14× minimum eye diameter; head height 1.78× maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.53:0.53; OOL 2.25× lateral ocellus diameter. White, thick setae on upper face present; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width 1.07× mesosoma width; Weber length 303 µm. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width

1.92 × mesoscutellum width; posterior mesoscutal width 1.57 × mesoscutellum width; mesoscutellum length 1.67 × mesoscutellum width; mesoscutellum length 1.06 × posterior mesoscutal width; Weber length 1.28 × mesoscutum width; Weber length 1.47 × mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least seven distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length 2.91 × width; stigmal vein longer than 3 × pterostigma marginal length.

MALE GENITALIA. Genital length 156 μm; Weber length 1.94 × genital length; gvc width 70 μm; genital length 2.22 × gvc width; gvc width less than two thirds of gvc length; gvc width 1.47 × distal gvc width. Proximodorsal margin of gvc convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 89C); proximoventral margin of gvc concave; distoventral margin of gvc slightly descending proximomedially (Fig. 89A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 89B), slightly indented distomedially; proximolateral margin of gvc ascending ventrally; distolateral margin of gvc slightly descending ventrally (Fig. 89B). Harpe triangular in ventral and dorsal view; harpe/gvc index 0.29; lateral articulation site of harpe with gvc flush (Fig. 89A, C); ventral margin of harpe convex, dorsal margin straight (Fig. 89B), lateral margin straight, widest point of harpe at lateral articulation site with gvc (Fig. 89A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and diverging distolaterally from base to apex (Fig. 89C), apex of harpe slightly pointed, oriented distolaterally (Fig. 89A, C). Harpe with at least one lateral seta restricted to basal third, longest lateral seta more than half as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae more than two thirds as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least three median setae restricted to apical quarter, longest median setae half as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 89A, C) and as ventral as apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *C. mikoi* sp. nov., *C. isecheno* sp. nov., and *C.* sp. 3.

Condition of of the specimen

In the specimen, the posterior end of the metasoma is slightly deformed, thus the body length measurement is not precise. *Ceraphron* sp. 4 is deposited in the ZFMK as ZFMK-HYM-00036923.

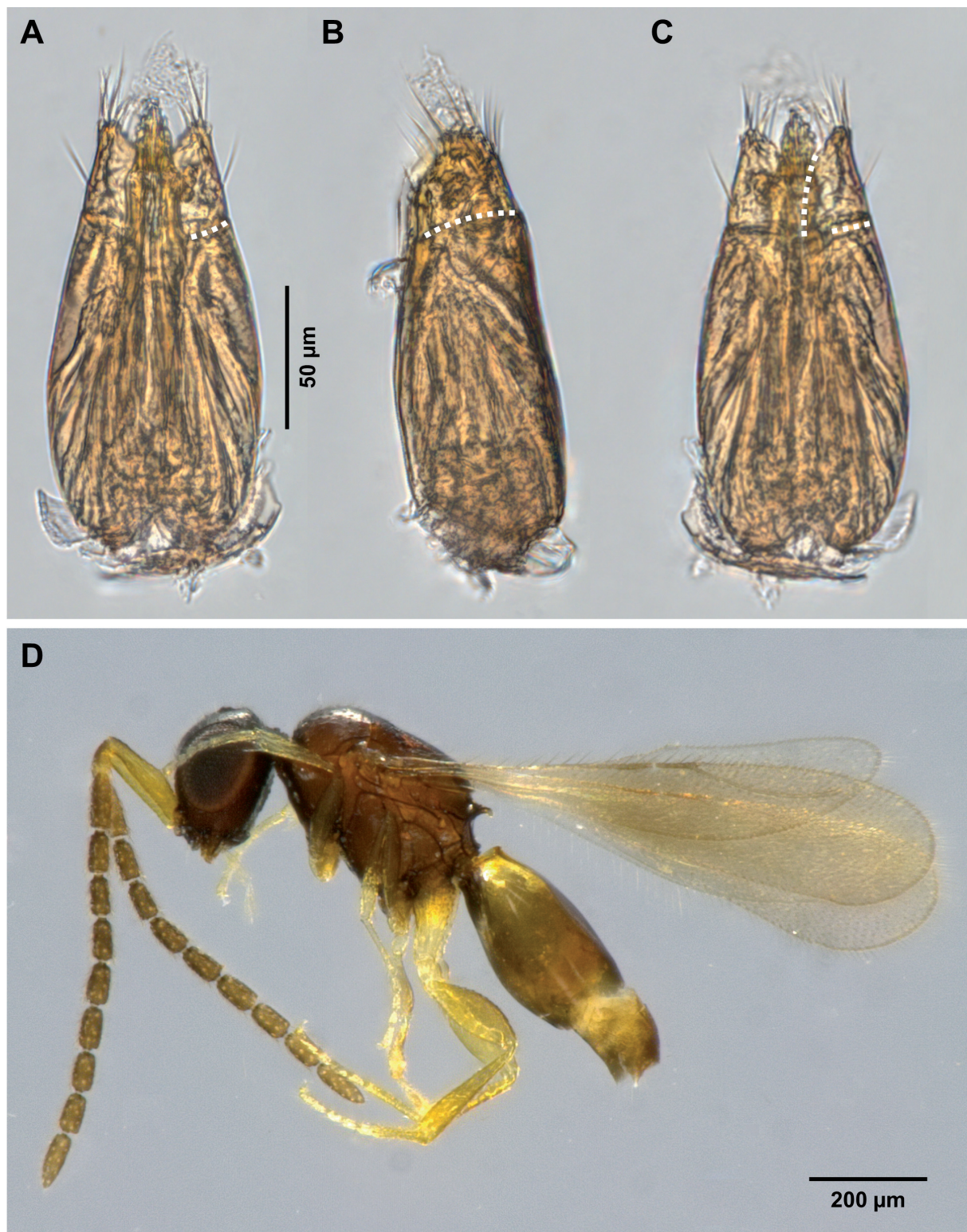


Fig. 89. Specimen of *Ceraphron* sp. 4 (ZFMK-HYM-00036923). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Ceraphron sp. 5

Fig. 90

Diagnosis

Head width $1.03 \times$ head height; head width $1.67 \times$ interorbital space; anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with pointed and slightly bifurcated end. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.42; dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex; apex of harpe rounded; proximolateral margin of gvc strongly ascending ventrally.

Material examined

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°22'43.7 N, 34°41'57.3 E; 1452 m a.s.l.; 2008; F. Hita Garcia leg.; Transect 35; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036911.

Description

Male

BODY LENGTH. 0.90 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape, pedicel and flagellum light brown; legs yellowish except proximal half of pro- and mesocoxa light brown, proximal quarter of metacoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.3 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.4 \times$ as long as wide, F1 $1.6 \times$ as long as pedicel, F1 $1.4 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.5 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.03 \times$ head height; head width $1.67 \times$ interorbital space; maximum eye diameter $1.40 \times$ minimum eye diameter; head height $1.86 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.50:0.50; OOL $2.00 \times$ lateral ocellus diameter. White, thick setae on upper face indistinct; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.05 \times$ mesosoma width; Weber length $263 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscuteellar sulcus adjacent to transscutal articulation), scutoscuteellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.89 \times$ mesoscutellum width; posterior mesoscutal width $1.47 \times$ mesoscutellum width; mesoscutellum length $1.61 \times$ mesoscutellum width; mesoscutellum length $1.09 \times$ posterior mesoscutal width; Weber length $1.24 \times$ mesoscutum width; Weber length $1.45 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with pointed and slightly bifurcated end; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least five distinct, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $3.03 \times$ width; stigmal vein slightly shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $141 \mu\text{m}$; Weber length $1.87 \times$ genital length; gvc width $61 \mu\text{m}$; genital length $2.14 \times$ gvc width; gvc width less than two thirds of gvc length; gvc width $1.27 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc slightly descending proximomedially (Fig. 90C); proximoventral margin of gvc concave; distoventral margin of gvc descending proximomedially (Fig. 90A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 90B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 90B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.42; lateral articulation site of harpe with gvc not flush (Fig. 90A, C); ventral margin of harpe slightly concave, dorsal margin straight (Fig. 90B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 90A, C); dorsomedial margins of harpes slightly converging and almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex (Fig. 90C), apex of harpe rounded (Fig. 90A, C). Harpe with at least two lateral setae restricted to apical half, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally; harpe with at least two apical setae, longest apical setae more than half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least five median setae, longest median setae less than half as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus two thirds as long as harpe, apex pointed (Fig. 90A, C) and ventral to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at all margins of harpe and aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Ceraphron sp. 5 can be distinguished from *C. isukha* sp. nov. by a uniformly coloured antenna (scape and pedicel yellowish, flagellum light brown and gradually darkening from F1 to F9 in *C. isukha*), a head width to interorbital space ratio of 1.67 (1.92 in *C. isukha*) and the absence of the mesometapleural sulcus (present in *C. isukha*). The male genitalia of both species differ mainly in their harpe/gvc indices (0.42 in *C. sp. 5* and 0.52 in *C. isukha*) and the arrangement of the lateral setae of the harpe.

For more comparisons with similar species, see remarks under *C. ekeru* sp. nov., *C. kaimosiensis* sp. nov. and *C. digiti* sp. nov.

Condition of the specimen

In the specimen, the proximal part of the gvc was accidentally stained while marking the slide with a permanent marker, and the posterior end of the metasoma is deformed, thus the body length measurement is not precise. *Ceraphron* sp. 5 is deposited in the ZFMK as ZFMK-HYM-00036911.

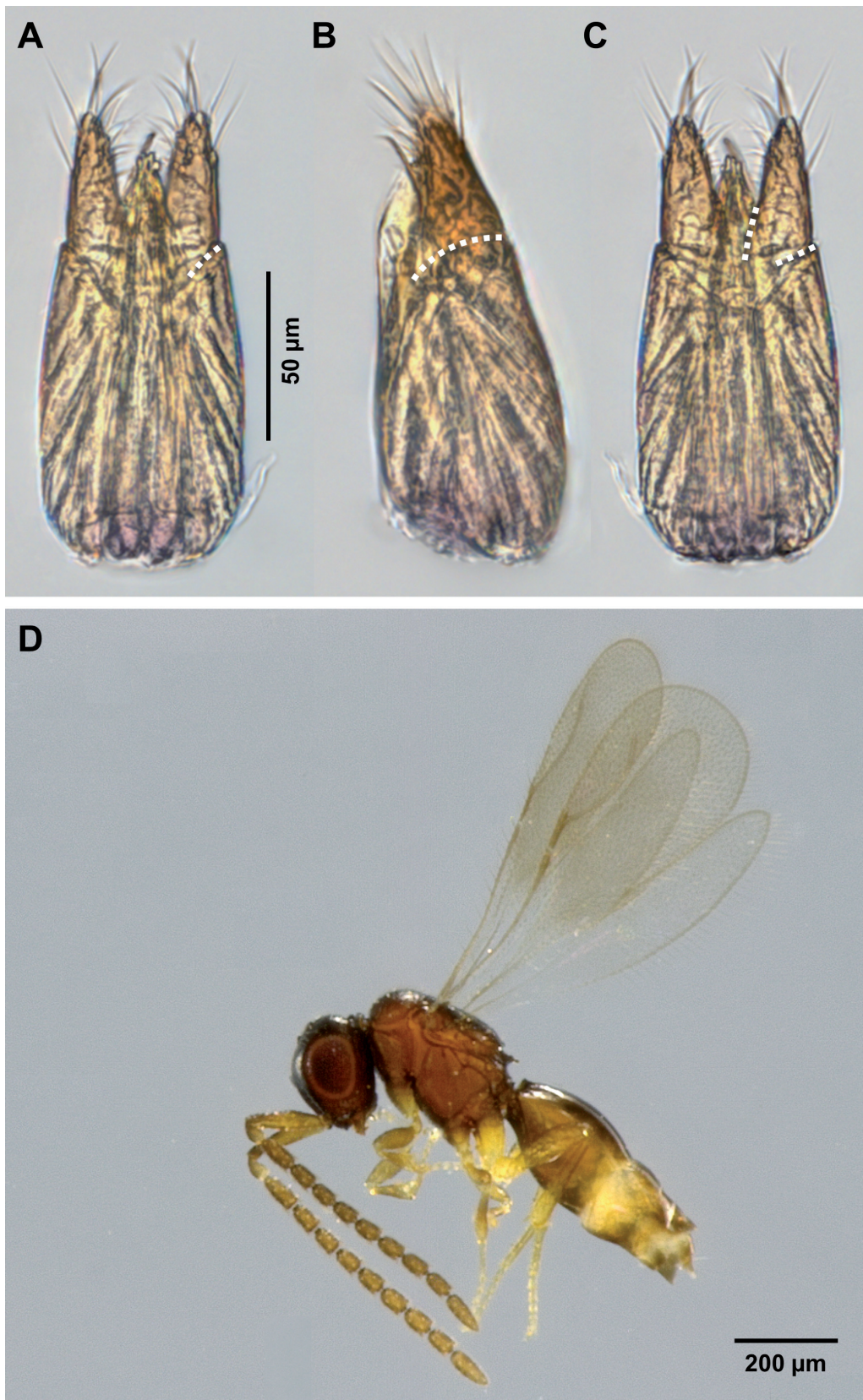


Fig. 90. Specimen of *Ceraphron* sp. 5 (ZFMK-HYM-00036911). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Genus *Cyoceraphron* Dessart, 1975

Cyoceraphron dhahabudorsalis sp. nov.

urn:lsid:zoobank.org:act:DC8B80CE-EB00-4DF7-9737-114BF66116E1

Fig. 91

Diagnosis

F1 $1.3\times$ as long as wide, F1 as long as pedicel, F1 distinctly shorter than F9; head width $1.07\text{--}1.23\times$ (1.07) head height; head width $1.96\text{--}2.09\times$ (1.96) interorbital space; head height $1.48\text{--}1.57\times$ (1.57) maximum eye diameter; mesosoma slightly compressed laterally; mesoscutellum length $1.30\text{--}1.55\times$ (1.30) mesoscutellum width; distinct pair of translucent patches on metasomal synsternum. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.60; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex, apex of harpe pointed; harpe with at least two lateral setae restricted to apical quarter, longest lateral setae one third as long as harpe; harpe with at least three median setae restricted to apical quarter.

Etymology

The species name is derived from the Swahili word ‘*dhahabu*’ which means ‘gold’, and the anatomical term ‘dorsal’, with reference to the dorsally golden-yellowish mesosoma.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}21'7.9$ N, $34^{\circ}52'2.6$ E; 1597 m a.s.l.; 9 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036977.

Paratypes

KENYA – **Western Province** • 1 ♂; same collection data as for holotype; 2 Jul. 2007; ZFMK-HYM-00036978 • 2 ♂♂; Kakamega Forest; $00^{\circ}14'52.3$ N, $34^{\circ}52'5.3$ E; 1607 m a.s.l.; 14 Aug. 2007; F. Hita Garcia leg.; Transect 18; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036979, ZFMK-HYM-00036985 • 1 ♂; same collection data as for preceding; 21 Aug. 2007; ZFMK-HYM-00036986.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.82–1.00 mm (1.00 mm).

COLOUR. Head dark brown, mesosoma dorsally golden-yellowish and ventrolaterally dark brown, metasoma light brown-yellowish; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except proximal half of mesocoxa light brown, proximal third of metacoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.5\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $1.3\times$ as long as wide, F1 as long as pedicel, F1 $1.1\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 distinctly shorter than F9, F6 $1.1\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.07\text{--}1.23 \times (1.07)$ head height; head width $1.96\text{--}2.09 \times (1.96)$ interorbital space; maximum eye diameter $1.24\text{--}1.47 \times (1.33)$ minimum eye diameter; head height $1.48\text{--}1.57 \times (1.57)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL $1.00:0.56\text{--}0.60:0.53\text{--}0.56$ ($1.00:0.56:0.56$); OOL $1.88\text{--}3.00 \times (3.00)$ lateral ocellus size. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma slightly compressed laterally. Head width $1.05\text{--}1.09 \times (1.09)$ mesosoma width; Weber length $294\text{--}306 \mu\text{m}$ ($306 \mu\text{m}$). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards. Mesoscutum width $1.74\text{--}1.91 \times (1.74)$ mesoscutellum width; posterior mesoscutal width $1.35\text{--}1.40 \times (1.35)$ mesoscutellum width; mesoscutellum length $1.30\text{--}1.55 \times (1.30)$ mesoscutellum width; mesoscutellum length $0.97\text{--}1.11 \times (0.97)$ posterior mesoscutal width; Weber length $1.07\text{--}1.27 \times (1.23)$ mesoscutum width; Weber length $1.47\text{--}1.63 \times (1.63)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metaplecto-mesopectal complex curved in lateral view with blunt and lighter end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection distinctly short and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least seven distinct, basal longitudinal carinae on syntergum; distinct pair of translucent patches on metasomal systernum.

FORE WING. Length $3.03\text{--}3.23 \times (3.10)$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $100\text{--}106 \mu\text{m}$ ($106 \mu\text{m}$); Weber length $2.88\text{--}2.94 \times (2.94)$ genital length; gvc width $44\text{--}50 \mu\text{m}$ ($50 \mu\text{m}$); genital length $2.00\text{--}2.29 \times (2.13)$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.18 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc slightly descending proximomedially (Fig. 91C); proximoventral margin of gvc slightly convex; distoventral margin of gvc descending proximomedially (Fig. 91A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 91B), indented distomedially; proximolateral margin of gvc emarginated ventrally; distolateral margin of gvc descending ventrally (Fig. 91B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.60; lateral articulation site of harpe with gvc not flush (Fig. 91A, C); ventral margin of harpe concave, dorsal margin convex (Fig. 91B), lateral margin convex, widest point of harpe at basal third (Fig. 91A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly diverging distolaterally from base to apex (Fig. 91C), apex of harpe pointed (Fig. 91A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae one third as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae one quarter as long as harpe, apical setae oriented distolaterally, distomedially and distoventrally; harpe with at least three median setae restricted to apical quarter, longest median setae less than one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus three quarters as long as harpe, apex of aedeagus + gonossiculus broad (Fig. 91A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized, almost transparent.

Female

Unknown.

Variation

Unknown.

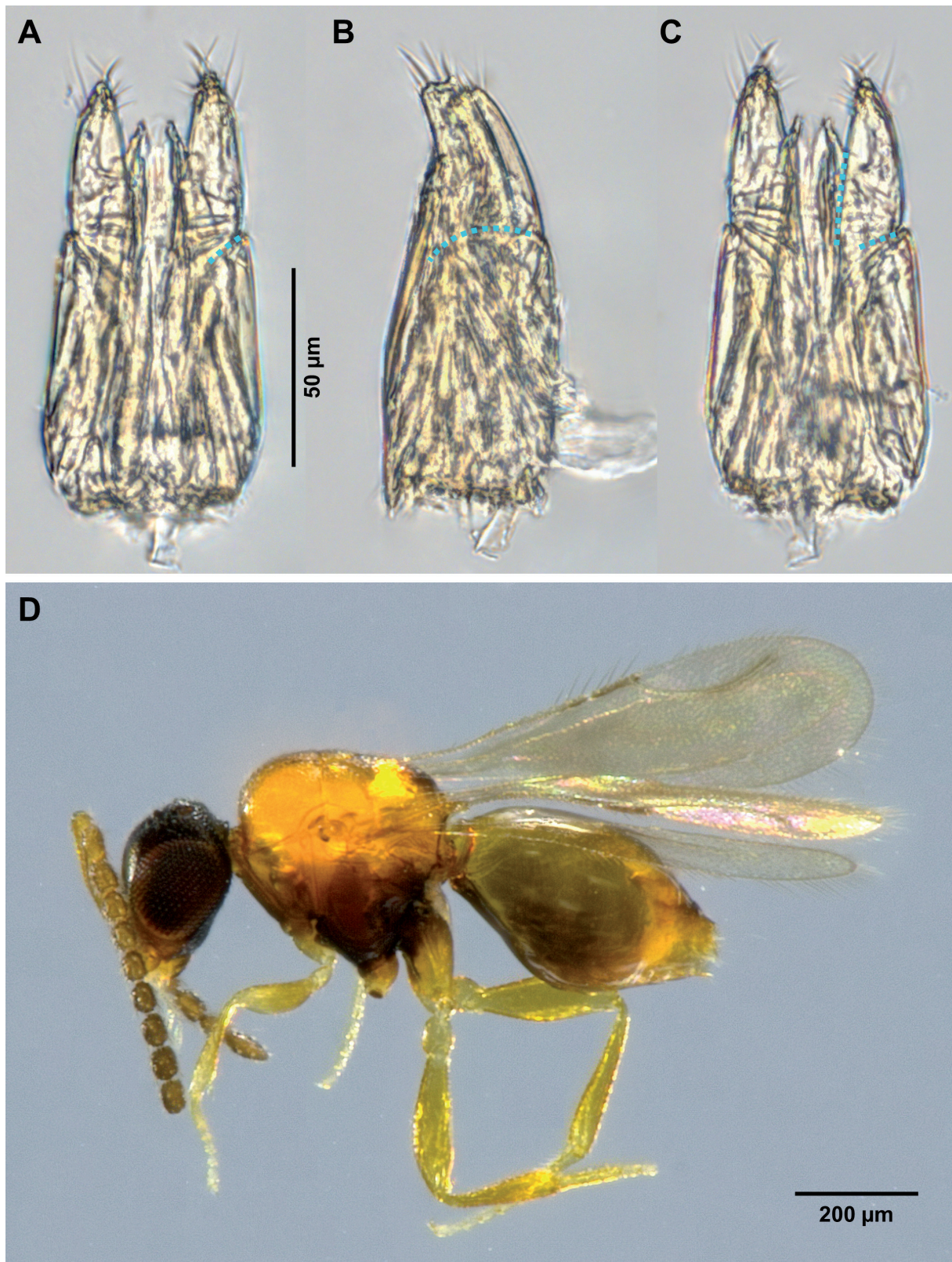


Fig. 91. Holotype of *Cyoceraphron dhahabudorsalis* sp. nov. (ZFMK-HYM-00036977). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Cyoceraphron dhahabudorsalis sp. nov. differs from the generally similarly coloured *C. fuscopleuralis* Dessart, 1978 by the reduced posterior mesosomal comb (distinct in *C. fuscopleuralis*), distinctly shorter antennal segments, and the laterally less compressed mesosoma.

For more comparisons with similar species, see remarks under *C. harpe* sp. nov.

Condition of type material

In the holotype, the left F9, the left middle leg, and the right fore leg are missing (except coxae).

Cyoceraphron harpe sp. nov.

urn:lsid:zoobank.org:act:D0012769-E769-44D5-8848-1C20AA66DC5F

Fig. 92

Diagnosis

Scape as long as F1 and F2 combined; OOL:POL 1.14; OOL:LOL 1.45; posterior mesosomal comb distinct; Weber length $1.76 \times$ mesoscutellum length; posterior mesoscutal width $1.35 \times$ mesoscutellum width. Male genitalia: harpe sickle-shaped in ventral and dorsal view; harpe/gvc index 0.82; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight in approximately basal quarter, concave in approximately apical three quarters, apex of harpe pointed, oriented distomedially; ventral margin of harpe straight and with emargination on apical third, lateral margin straight and slightly curved distomedially in apical third; Weber length $2.42 \times$ genital length.

Etymology

The species name is derived from the harpē weapon, a sword with a sickle protrusion with great importance in Greek mythology, and refers to the sickle-shaped harpe of the male genitalia.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'20.5 N, 34°51'52.8 E; 1634 m a.s.l.; 10 Aug. 2007; F. Hita Garcia leg.; Transect 17; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036992.

Description

Male

BODY LENGTH. 0.88 mm.

COLOUR. Head dark brown, mesosoma dorsally golden-yellowish and ventrolaterally dark brown, metasoma light brown-yellowish; scape and pedicel golden-yellowish, flagellum light brown-yellowish, gradually darkening from F1 to F9; legs yellowish except proximal third of meso- and metacoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $3.3 \times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $2.6 \times$ as long as wide, F1 $1.6 \times$ as long as pedicel, F1 $1.2 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.0 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.2 \times$ as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and slightly shorter than width of flagellomeres.

HEAD. Head width $0.93 \times$ head height; head width $1.91 \times$ interorbital space; maximum eye diameter $1.29 \times$ minimum eye diameter; head height $1.67 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.88:0.69; OOL $2.29 \times$ lateral ocellus size. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.13 \times$ mesosoma width; Weber length $363 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards. Mesoscutum width $1.95 \times$ mesoscutellum width; posterior mesoscutal width $1.35 \times$ mesoscutellum width; mesoscutellum length $1.65 \times$ mesoscutellum width; mesoscutellum length $1.22 \times$ posterior mesoscutal width; Weber length $1.49 \times$ mesoscutum width; Weber length $1.76 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with broad, blunt and lighter end, exceeding end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb distinct. Basal transverse carina of petiole (on syntergum) present; diffuse number of indistinct basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum, indistinct on syntergum.

FORE WING. Length $3.02 \times$ width; stigmal vein shorter than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $150 \mu\text{m}$; Weber length $2.42 \times$ genital length; gvc width $69 \mu\text{m}$; genital length $2.18 \times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.10 \times$ distal gvc width. Proximodorsal margin of gvc ascending proximomedially; distodorsal margin of gvc descending proximomedially (Fig. 92C); proximoventral margin of gvc ascending proximomedially; distoventral margin of gvc descending proximomedially (Fig. 92A); ventral area of gvc straight; dorsal area of gvc slightly convex (Fig. 92B); proximolateral margin of gvc ascending and slightly emarginated ventrally; distolateral margin of gvc convex (Fig. 92B). Harpe sickle-shaped in ventral and dorsal view; harpe/gvc index 0.82; lateral articulation site of harpe with gvc flush (Fig. 92A, C); ventral margin of harpe straight and with emargination on apical third, dorsal margin straight (Fig. 92B), lateral margin straight and slightly curved distomedially in apical third, widest point of harpe at lateral articulation site with gvc (Fig. 92A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight in approximately basal quarter, concave in approximately apical three quarters (Fig. 92C), apex of harpe pointed, oriented distomedially (Fig. 92A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae less than one quarter as long as harpe, lateral setae oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae less than one quarter as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least seven median setae, longest median setae less than one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus more than one third as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 92A, C) and dorsal to apex of harpe. Aedeagus + gonossiculus with at least one digital tooth, oriented dorsally. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus and all margins of harpe.

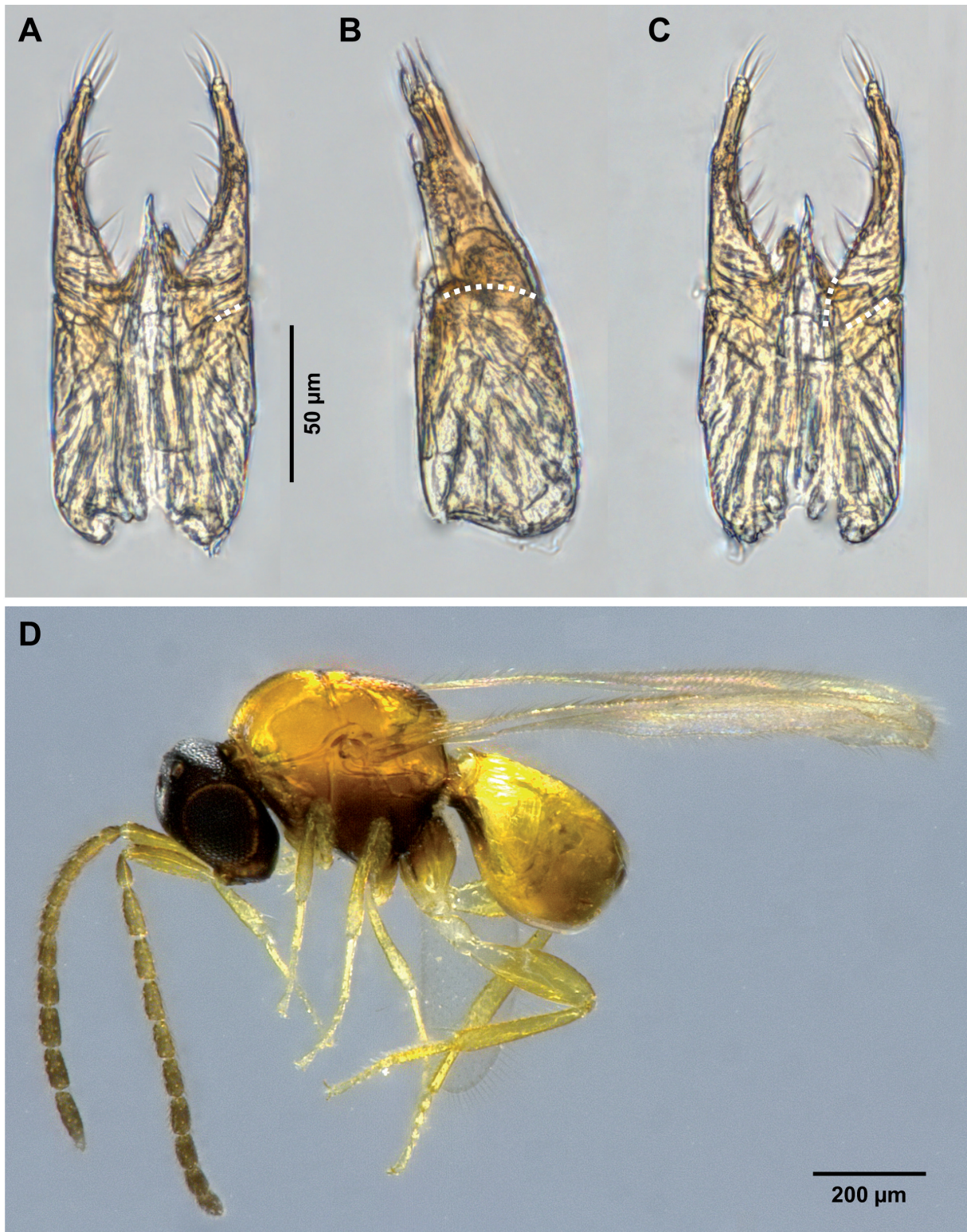


Fig. 92. Holotype of *Cyoceraphron harpe* sp. nov. (ZFMK-HYM-00036992). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Cyoceraphron harpe sp. nov. can be distinguished from all other treated species of *Cyoceraphron* by the sickle-shaped harpe. In body colouration, it is rather similar to *C. dhahabudorsalis* sp. nov., both species have a dark brown head, and a dorsally golden-yellowish and ventrolaterally dark brown mesosoma. However, *C. harpe* sp. nov. and *C. dhahabudorsalis* can be distinguished by the different harpe shape (see above), and by a more strongly laterally compressed mesosoma, longer flagellomeres, and a distinct posterior mesosomal comb in *C. harpe* (absent in *C. dhahabudorsalis*).

Cyoceraphron harpe sp. nov. might be conspecific with specimen ZFMK-HYM-00037093 from Gabon (deposited at ZFMK), in which the male genitalia were unfortunately lost. *Cyoceraphron harpe* is also similar to *C. fuscopleuralis* Dessart, 1978. We dissected the male genitalia from the examined male allotype of *C. fuscopleuralis*, which were damaged in this delicate procedure and became unidentifiable. The gvc is deformed, one harpe is lost and the second harpe is basally insufficiently recognisable. Thus, detailed comparison of male genitalia of *C. harpe* and *C. fuscopleuralis* was not possible. The drawing of parts of the genitalia in Dessart (1978: 279, fig. 14) is not sufficient. The holotype of *C. fuscopleuralis* is a female, and not useful in our mostly male genitalia-based species delimitation. With the identity of *C. fuscopleuralis* being dubious for the time being, we decided to describe *C. harpe* as new and provide a detailed description and diagnosis.

Condition of type material

In the holotype, the posterior part of the metasoma is missing, thus the body length measurement is not precise. The proximal part of the gvc is slightly deformed, thus the descriptions of the proximal margins of the gvc are not precise. The aedeagus + gonossiculus has one visible digital tooth. However, since the digital teeth are, to our knowledge, paired in all known ceraphronoids, there might have been a second one which was broken.

Cyoceraphron invisibilis sp. nov.

urn:lsid:zoobank.org:act:6043FBF1-F4D9-40E2-BB46-DA340B1A71FC

Fig. 93

Diagnosis

Legs light yellow except metacoxa light yellow and transparent; head width $0.89\text{--}0.94 \times (0.94)$ head height; OOL:POL $2.27\text{--}2.78 (2.38)$; mesoscutellum length $1.85\text{--}2.09 \times (2.09)$ mesoscutellum width; Weber length $1.59\text{--}1.65 \times (1.65)$ mesoscutum width; mesoscutellum length $1.25\text{--}1.44 \times (1.44)$ posterior mesoscutal width; fore wing length $3.44\text{--}3.61 \times (3.61)$ width. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 1.00; dorsomedial margins of harpes not touching at distodorsal

margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in basal two thirds, slightly concave in apical third.

Etymology

The species name is derived from the Latin word '*invisibilis*' which means 'invisible', with reference to the weakly sclerotized, almost transparent male genitalia.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°14'22.9 N, 34°51'21 E; 1594 m a.s.l.; 17 Jul. 2007; F. Hita Garcia leg.; Transect 12; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036995.

Paratypes

KENYA – **Western Province** • 1 ♂; Kakamega Forest; 00°21'4.4 N, 34°51'41.1 E; 1602 m a.s.l.; 7 Jun. 2007; F. Hita Garcia leg.; Transect 2; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037006 • 1 ♂; Kakamega Forest; 00°18'13.4 N, 34°48'16 E; 1554 m a.s.l.; 20 Jun. 2007; F. Hita Garcia leg.; Transect 5; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037007 • 1 ♂; Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036996 • 1 ♂; Kakamega Forest; 00°23'6.2 N, 34°33'37.8 E; 1602 m a.s.l.; 13 Jul. 2007; F. Hita Garcia leg.; Transect 11; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00036997 • 1 ♂; Kakamega Forest; 00°19'49.9 N, 34°52'16.1 E; 1580 m a.s.l.; 1 Aug. 2007; F. Hita Garcia leg.; Transect 15; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037008.

Description

Male (N = 3 in morphometric measurements)

BODY LENGTH. 0.59–0.78 mm (0.59 mm).

COLOUR. Head light brown, mesosoma light brown-yellowish, metasoma light brown-yellowish except anterior third lighter; scape and pedicel light yellow, flagellum light brown and transparent; legs light yellow except metacoxa light yellow and transparent; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape 3.2 × as long as pedicel, scape longer than F1 and F2 combined, F1 1.9 × as long as wide, F1 1.4 × as long as pedicel, F1 1.2 × as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 1.7 × as long as wide, F6 shorter than F7 and F8 combined, F6 1.1 × as high as F9; few small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and slightly shorter than width of flagellomeres.

HEAD. Head width 0.89–0.94 × (0.94) head height; head width 1.81–1.88 × (1.81) interorbital space; maximum eye diameter 1.31–1.38 × (1.38) minimum eye diameter; head height 1.64–1.72 × (1.72) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina indistinct. OOL:POL:LOL 1.00:0.36–0.44:0.48–0.58 (1.00:0.42:0.58); OOL 2.25–2.80 × (2.66) lateral ocellus size. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina indistinct; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width 1.07–1.12 × (1.12) mesosoma width; Weber length 238–269 μm (238 μm). Mesoscutum densely setose, setae curved backwards;

median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards. Mesoscutum width $2.00\text{--}2.09 \times (2.09)$ mesoscutellum width; posterior mesoscutal width $1.41\text{--}1.48 \times (1.45)$ mesoscutellum width; mesoscutellum length $1.85\text{--}2.09 \times (2.09)$ mesoscutellum width; mesoscutellum length $1.25\text{--}1.44 \times (1.44)$ posterior mesoscutal width; Weber length $1.59\text{--}1.65 \times (1.65)$ mesoscutum width; Weber length $1.62\text{--}1.72 \times (1.65)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; diffuse number of indistinct basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $3.44\text{--}3.61 \times (3.61)$ width; stigmal vein longer than $3 \times$ pterostigma marginal length.

MALE GENITALIA. Genital length $69\text{--}75 \mu\text{m}$ ($69 \mu\text{m}$); Weber length $3.45\text{--}3.58 \times (3.45)$ genital length; gvc width $31\text{--}38 \mu\text{m}$ ($31 \mu\text{m}$); genital length $2.00\text{--}2.20 \times (2.20)$ gvc width; gvc width slightly less than gvc length; gvc width $1.10 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 93C); proximoventral margin of gvc straight; distoventral margin of gvc slightly descending proximomedially (Fig. 93A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 93B); proximolateral margin of gvc slightly descending and slightly emarginated ventrally; distolateral margin of gvc convex (Fig. 93B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 1.00; lateral articulation site of harpe with gvc not flush (Fig. 93A, C); ventral margin of harpe concave, dorsal margin convex (Fig. 93B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 93A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and parallel to other harpe in basal two thirds, slightly concave in apical third (Fig. 93C), apex of harpe pointed, oriented distomedially (Fig. 93A, C). Harpe with at least one lateral seta restricted to apical quarter, longest lateral seta one quarter as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae less than half as long as harpe, apical setae oriented distolaterally and distoventrally; harpe with at least four median setae, longest median setae less than one quarter as long as harpe, median setae oriented distomedially, distoventrally and medioventrally. Aedeagus + gonossiculus three quarters as long as harpe, apex of aedeagus + gonossiculus pointed (Fig. 93A, C) and dorsal to apex of harpe. Genitalia weakly sclerotized, almost transparent.

Female

Unknown.

Variation

The paratypes are slightly darker in general (except ZFMK-HYM-00037008). The anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex is more pronounced and more convex in the paratypes and in paratype ZFMK-HYM-00036997 even exceeding the end of the mesosoma. Furthermore, the posterior mesosomal comb is more distinct in the paratypes. The holotype was chosen because its male genitalia are best preserved.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

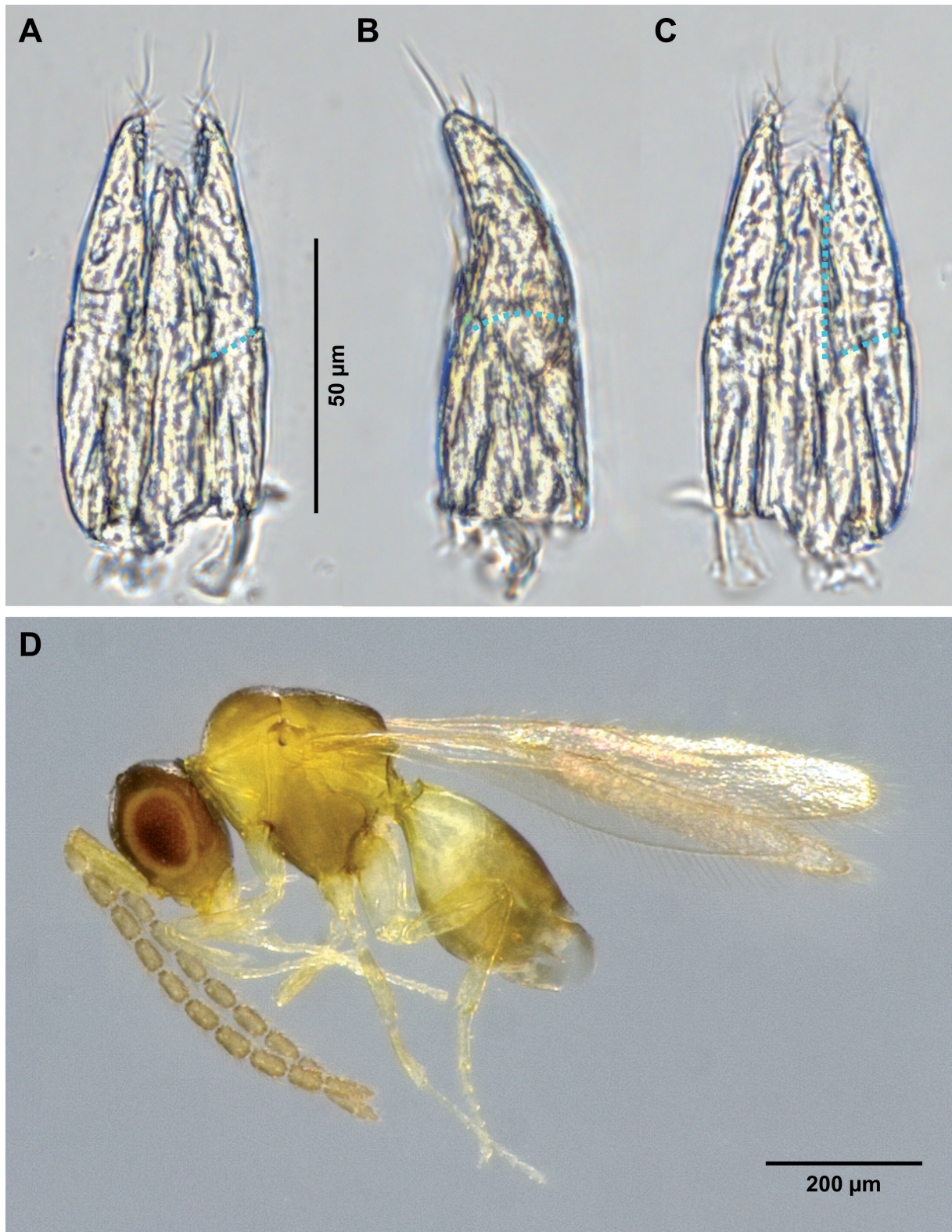


Fig. 93. Holotype of *Cyoceraphron invisibilis* sp. nov. (ZFMK-HYM-00036995). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Remarks

Comparison with similar species

Cyoceraphron invisibilis sp. nov. is similar to *C. njano* sp. nov. in having a light body colouration and very weakly sclerotized male genitalia. However, the two species can be distinguished by various body and male genitalia characters, i.e., different harpe/gvc indices (1.00 in *C. invisibilis*, 0.67 in *C. njano*), different setal arrangement of the genitalia, as well as lighter metacoxae, a mesocutellum comparatively longer than wide, fore wings comparatively longer than wide, less rounded compound eyes and slightly shorter flagellomeres in *C. invisibilis*.

For more comparisons with similar species, see remarks under *Ceraphron cingulum* sp. nov.

Condition of type material

In the holotype, the right metatibia and metatarsus are missing. The posterior part of the metasoma is slightly deformed, thus the body length measurement is not precise. The proximal margin of the gvc is slightly deformed, thus the descriptions of the proximal margins of the gvc are not precise.

Cyoceraphron kahawia sp. nov.

urn:lsid:zoobank.org:act:1D5F479C-55BC-4144-BCB7-D440F5D53EC8

Fig. 94

Diagnosis

Mesosoma brown, metasoma light brown; OOL 2.46–2.67 × (2.50) lateral ocellus size; mesoscutum width 1.82–1.88 × (1.83) mesocutellum width; Weber length 1.44–1.48 × (1.48) mesocutellum length. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.58; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly oriented distolaterally in basal half, straight in apical half; Weber length 3.67–4.00 × (3.67) genital length.

Etymology

The species name is derived from the Swahili word ‘*kahawia*’ which means ‘brown’, with reference to the brown body colouration.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°9'4.2 S, 37°17'23.6 E; 2220 m a.s.l.; 16 Feb. 2012; KiLi project leg.; “low ex”; FOD1, disturbed *Ocotea* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037084.

Paratype

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°12'6.7 S, 37°30'57.3 E; 2370 m a.s.l.; 26 Jan. 2012; KiLi project leg.; “high 3”; FOD5, disturbed *Ocotea* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037085.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. 1.05–1.23 mm (1.05 mm).

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except proximal half of pro- and

mesocoxa light brown, proximal third of metacoxa light brown; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part and distal part less melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.0\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.4\times$ as long as wide, F1 $1.8\times$ as long as pedicel, F1 $1.2\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.0\times$ as long as wide, F6 shorter than F7 and F8 combined; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and shorter than width of flagellomeres.

HEAD. Head width $1.13\text{--}1.15\times$ (1.15) head height; head width $1.71\text{--}1.90\times$ (1.77) interorbital space; maximum eye diameter $1.20\text{--}1.54\times$ (1.20) minimum eye diameter; head height $1.57\text{--}1.83\times$ (1.83) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina present. OOL:POL:LOL 1.00:0.50–0.67:0.53–0.67 (1.00:0.67:0.67); OOL $2.46\text{--}2.67\times$ (2.50) lateral ocellus size. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.03\text{--}1.09\times$ (1.06) mesosoma width; Weber length $225\text{--}250\ \mu\text{m}$ (250 μm). Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards. Mesoscutum width $1.82\text{--}1.88\times$ (1.83) mesoscutellum width; posterior mesoscutal width $1.35\text{--}1.49\times$ (1.49) mesoscutellum width; mesoscutellum length $1.47\text{--}1.64\times$ (1.54) mesoscutellum width; mesoscutellum length $1.04\text{--}1.13\times$ (1.04) posterior mesoscutal width; Weber length $1.16\text{--}1.29\times$ (1.25) mesoscutum width; Weber length $1.44\text{--}1.48\times$ (1.48) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with pointed and lighter end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb present. Basal transverse carina of petiole (on syntergum) present; at least five, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.86\text{--}3.16\times$ (3.09) width; stigmal vein longer than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length $88\text{--}94\ \mu\text{m}$ (94 μm); Weber length $3.67\text{--}4.00\times$ (3.67) genital length; gvc width $44\ \mu\text{m}$ (44 μm); genital length $2.14\times$ (2.14) gvc width; gvc width two thirds of gvc length; gvc width $1.23\times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc descending proximomedially (Fig. 94C); proximoventral margin of gvc convex; distoventral margin of gvc descending proximomedially (Fig. 94A); ventral area of gvc convex; dorsal area of gvc slightly convex (Fig. 94B), indented distomedially; proximolateral margin of gvc slightly descending ventrally; distolateral margin of gvc convex, more strongly descending ventrally (Fig. 94B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.58; lateral articulation site of harpe with gvc flush (Fig. 94A, C); ventral margin of harpe slightly concave, dorsal margin straight (Fig. 94B), lateral margin slightly convex, widest point of harpe at lateral articulation site with gvc (Fig. 94A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly oriented distolaterally in basal half, straight in apical half (Fig. 94C), apex of harpe rounded (Fig. 94A, C). Harpe with at least one lateral seta restricted to apical quarter, longest lateral seta less than one quarter as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae one third as long as harpe, apical setae oriented distolaterally and distoventrally; median setae indistinct. Aedeagus + gonossiculus slightly less than as long as harpe,

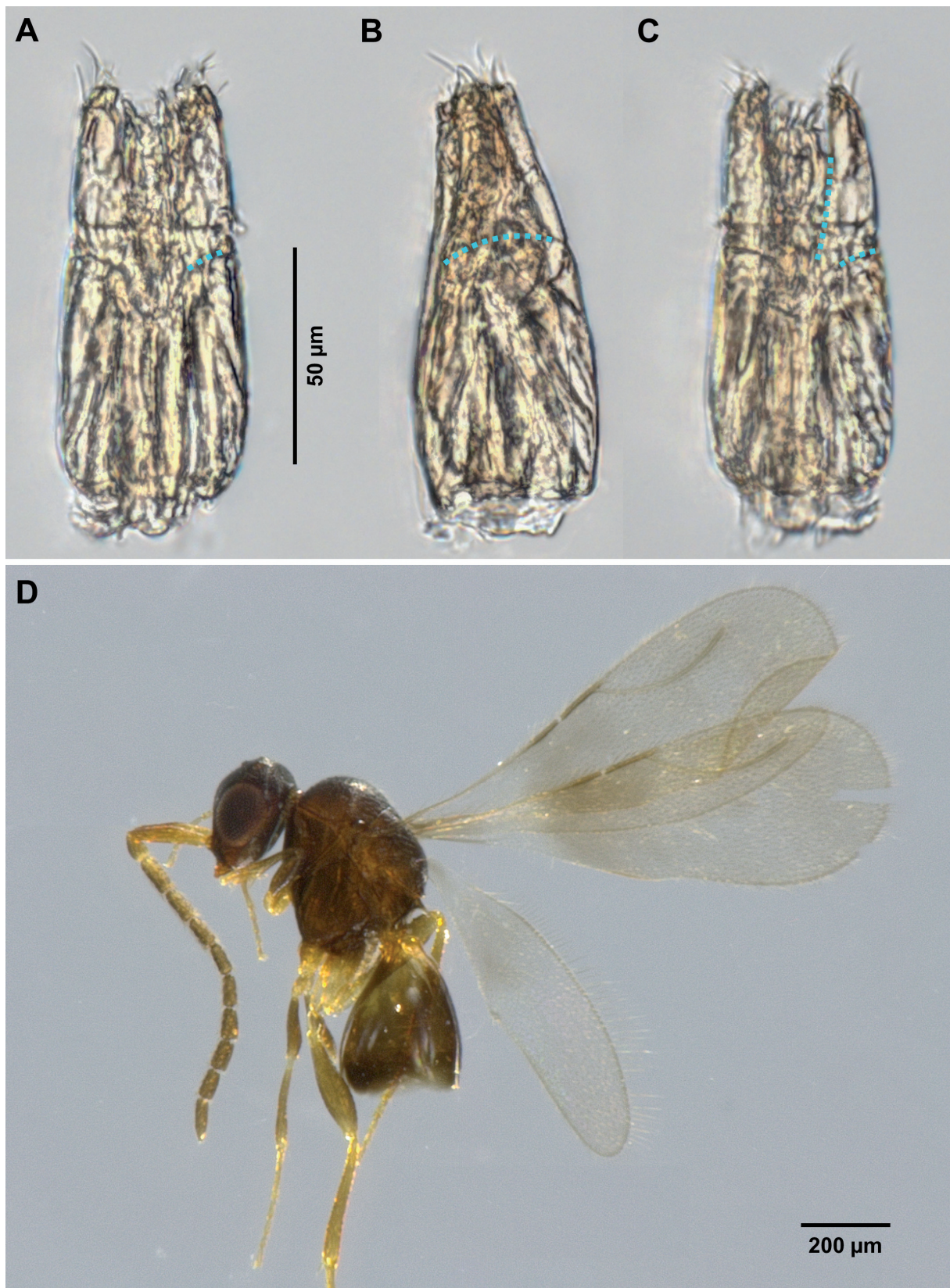


Fig. 94. Holotype of *Cyoceraphron kahawia* sp. nov. (ZFMK-HYM-00037084). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

apex of aedeagus + gonossiculus broad (Fig. 94A, C) and as ventral as apex of harpe. Genitalia weakly sclerotized.

Female

Unknown.

Variation

The paratype ZFMK-HYM-00037085 has a darker body colouration, and the male genitalia are slightly more sclerotized at the apex of the harpes and at the distal gvc.

Biology

Host unknown, specimens collected with coloured pan traps.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Cyoceraphron kahawia sp. nov. can be distinguished from all other species of *Cyoceraphron* by the distinct and unique overall brown body colouration (meso- and metasoma light brown-yellowish or partially golden-yellowish in other species of *Cyoceraphron*). Additionally, *C. kahawia* can be separated from *C. harpe* sp. nov. by a distinctly different harpe shape (cone-shaped in *C. kahawia* and sickle-shaped in *C. harpe*) and from *C. dhahabudorsalis* sp. nov. by distinctly longer flagellomeres (e.g., F1 2.4× as long as wide, F1 1.8× as long as pedicel, F6 2.0× as long as wide in *C. kahawia* and F1 1.3× as long as wide, F1 as long as pedicel, F6 1.1× as long as wide in *C. dhahabudorsalis*). Additionally, *C. kahawia* can be separated from *C. njano* sp. nov. by a higher genital length to gvc width ratio (2.14 in *C. kahawia* and 2.00 in *C. njano*), and by a gvc width of two thirds of gvc length in *C. kahawia* and a gvc width of more than three quarters of gvc length in *C. njano*. The ventral, lateral and dorsomedial margins of the harpe also differ in both species. Moreover, the dorsal and dorsomedial margins of the harpe distinctly differ between *C. kahawia* and *C. invisibilis* sp. nov. and the gvc width is two thirds of the gvc length in *C. kahawia* and almost equal in *C. invisibilis*. The harpe/gvc index of *C. kahawia* is distinctly lower with 0.58 than that of *C. invisibilis* with 1.00.

Condition of type material

In the holotype, the left F7 to F9, the left hind leg (except coxa), and the right fore and hind wings are missing. F9 of the right antenna is compressed. The metasoma is detached and deformed and the posterior part is missing, thus the body length measurement is not precise.

Cyoceraphron njano sp. nov.

urn:lsid:zoobank.org:act:A5F4A50B-232D-4BB2-9B70-F123DEAE1DEF

Fig. 95

Diagnosis

Legs yellowish except coxae darker; fore wing at proximal part and at proximal half of stigmal vein less melanized; F6 2.2× as long as wide; maximum eye diameter 1.19× minimum eye diameter. Male genitalia: harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.67; dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight from base to apex, apex of harpe rounded, slightly oriented distolaterally.

Etymology

The species name is derived from the Swahili word ‘*njano*’ which means ‘yellow’, with reference to the yellowish body colouration.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; 00°07'40.8 N, 34°50'24 E; 1656 m a.s.l.; 12 Aug. 2008; F. Hita Garcia leg.; Transect 30; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037000.

Description

Male

BODY LENGTH. 0.85 mm.

COLOUR. Head light brown-yellowish, mesosoma light brown-yellowish, metasoma yellowish; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except coxae darker; fore wing venation light brown, fore and hind wing disc slightly melanized, fore wing at proximal part and at proximal half of stigmal vein less melanized.

ANTENNA. 11-segmented, flagellomeres cylindric; scape $3.3\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.3\times$ as long as wide, F1 $1.5\times$ as long as pedicel, F1 $1.2\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $2.2\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1\times$ as high as F9; numerous small multiporous plates on flagellomeres, sensillae on flagellomeres sickle-shaped and slightly shorter than width of flagellomeres.

HEAD. Head width $1.03\times$ head height; head width $1.95\times$ interorbital space; maximum eye diameter $1.19\times$ minimum eye diameter; head height $1.60\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL 1.00:0.71:0.68; OOL $1.75\times$ lateral ocellus size. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus raised; intertorular carina indistinct; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.08\times$ mesosoma width; Weber length $300\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus straight; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $1.94\times$ mesoscutellum width; posterior mesoscutal width $1.44\times$ mesoscutellum width; mesoscutellum length $1.78\times$ mesoscutellum width; mesoscutellum length $1.23\times$ posterior mesoscutal width; Weber length $1.37\times$ mesoscutum width; Weber length $1.50\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus absent; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb distinct. Basal transverse carina of petiole (on syntergum) present; at least six, basal longitudinal carinae on syntergum; translucent patches on metasoma absent.

FORE WING. Length $3.18\times$ width; stigmal vein longer than $3\times$ pterostigma marginal length.

MALE GENITALIA. Genital length $88\ \mu\text{m}$; Weber length $3.43\times$ genital length; gvc width $44\ \mu\text{m}$; genital length $2.00\times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.12\times$ distal

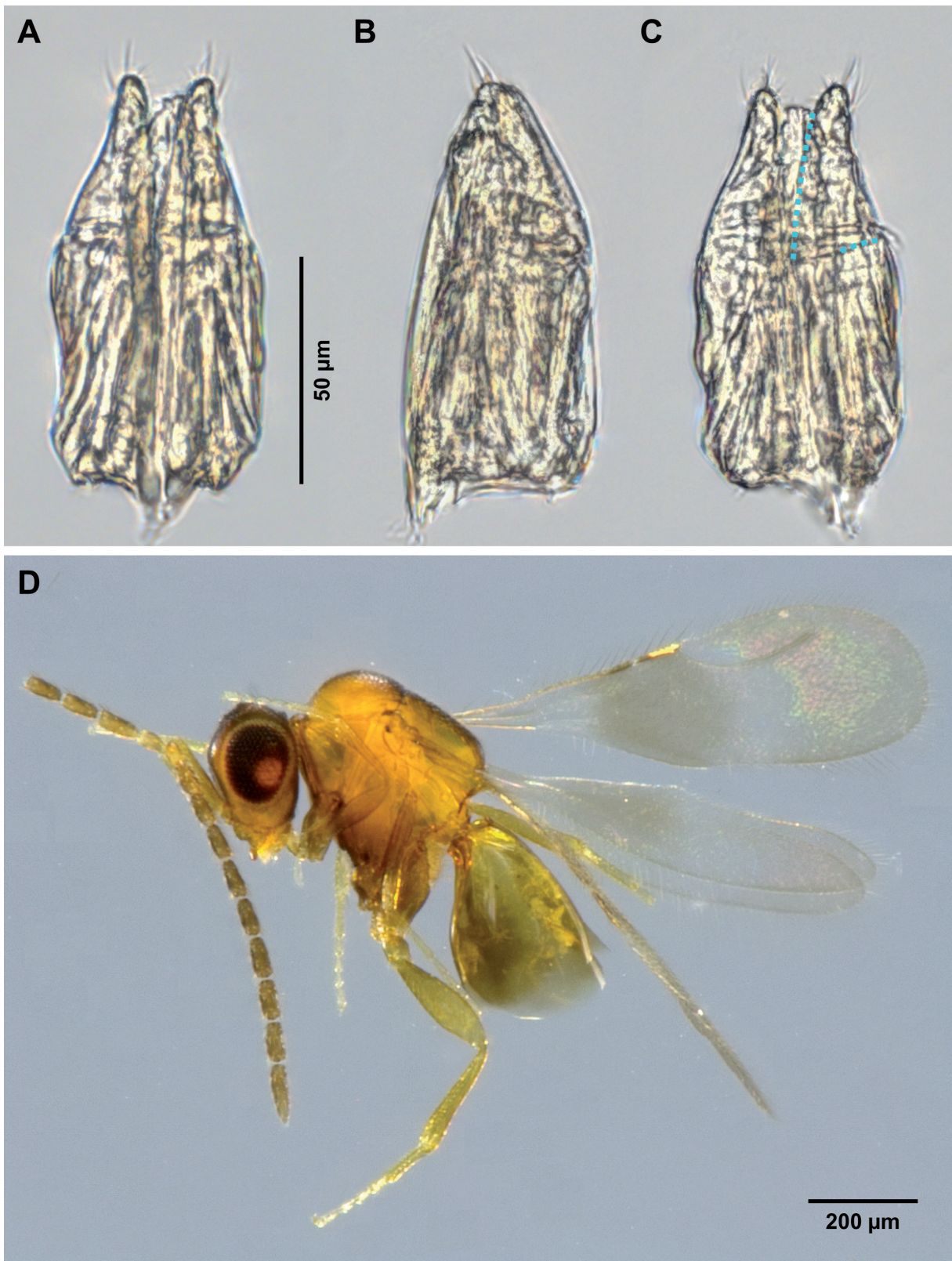


Fig. 95. Holotype of *Cyoceraphron njano* sp. nov. (ZFMK-HYM-00037000). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc slightly descending proximomedially (Fig. 95C); proximoventral margin of gvc convex; distoventral margin of gvc indistinct (Fig. 95A); ventral area of gvc slightly convex; dorsal area of gvc straight (Fig. 95B), slightly indented distomedially; proximolateral margin of gvc descending ventrally; distolateral margin of gvc indistinct (Fig. 95B). Harpe cone-shaped in ventral and dorsal view; harpe/gvc index 0.67; lateral articulation site of harpe with gvc virtually flush (Fig. 95A, C); ventral margin of harpe straight, dorsal margin straight (Fig. 95B), lateral margin slightly concave, widest point of harpe at lateral articulation site with gvc (Fig. 95A, C); dorsomedial margins of harpes almost touching at distodorsal margin of gvc, dorsomedial margin of harpe straight from base to apex (Fig. 95C), apex of harpe rounded, slightly oriented distolaterally (Fig. 95A, C). Harpe with at least one lateral seta restricted to apical quarter, longest lateral seta one quarter as long as harpe, lateral seta oriented distolaterally and distoventrally; harpe with at least two apical setae, longest apical setae more than one quarter as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least two median setae restricted to apical quarter, longest median setae less than one quarter as long as harpe, median setae oriented distomedially and distoventrally. Aedeagus + gonossiculus slightly less than as long as harpe, apex of aedeagus + gonossiculus indistinct (Fig. 95A, C) and ventral to apex of harpe. Genitalia weakly sclerotized, almost transparent.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

See remarks under *Cyoceraphron invisibilis* sp. nov. and *Ceraphron cingulum* sp. nov.

Condition of type material

In the holotype, the right F4 to F9 and the tarsal segments 3 to 5 of the right hind leg are missing. The posterior part of the metasoma is missing, thus the body length measurement is not precise.

Family Megaspilidae Ashmead, 1893
Subfamily Megaspilinae Masner & Dessart, 1967
Genus *Conostigmus* Dahlbom, 1858

***Conostigmus kijiko* sp. nov.**

urn:lsid:zoobank.org:act:A0828739-D966-4A7C-85BF-AC95A8F3996F

Fig. 96

Diagnosis

Metasoma light brown except anterior part yellowish; head height $1.71\text{--}1.83 \times (1.83)$ maximum eye diameter. Male genitalia: harpe spoon-shaped and curved distomedially and broadened at apex in

ventral and dorsal view, harpe distinctly curved in ventral direction in lateral view; harpe/gvc index 1.60; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave and converging distomedially in basal two thirds, straight and slightly diverging distolaterally with indentations between median setae in apical third; gvc width one and a half of gvc length; longest lateral setae two thirds as long as harpe, longest apical setae more than two thirds as long as harpe; Weber length $2.24\text{--}2.25 \times (2.24)$ genital length; genital length $1.71\text{--}1.83 \times (1.71)$ gvc width.

Etymology

The species name is derived from the Swahili word '*kijiko*' which means 'spoon', with reference to the spoon-shaped harpes.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}27'10.6$ N, $34^{\circ}51'48.7$ E; 1676 m a.s.l.; 19 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037003.

Paratype

KENYA • 1 ♂; Western Province, Kakamega Forest; $00^{\circ}19'36$ N, $34^{\circ}52'14.6$ E; 1570 m a.s.l.; 21 Jun. 2007; F. Hita Garcia leg.; Transect 6; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037004.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. $1.23\text{--}1.37$ mm (1.23 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma light brown except anterior part yellowish; scape yellowish and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except meso- and metacoxae lighter; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical; scape $4.9 \times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $3.3 \times$ as long as wide, F1 $2.6 \times$ as long as pedicel, F1 $1.4 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 as long as F9, F6 $1.9 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1 \times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and slightly shorter than width of flagellomeres.

HEAD. Head width $1.19\text{--}1.30 \times (1.19)$ head height; head width $1.70\text{--}1.73 \times (1.70)$ interorbital space; maximum eye diameter $1.24\text{--}1.26 \times (1.26)$ minimum eye diameter; head height $1.71\text{--}1.83 \times (1.83)$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.26\text{--}0.43:0.24\text{--}0.33$ ($1.00:0.26:0.24$); OOL $2.14\text{--}3.30 \times (3.30)$ lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus distinctly raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.01\text{--}1.02 \times (1.02)$ mesosoma width; Weber length $406\text{--}450$ μm (406 μm). Mesoscutum densely setose, setae curved backwards; notaulus present; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus slightly concave; dorsal axillar area setose, setae curved backwards; mesoscutellum

setose, setae curved backwards or straight. Mesoscutum width $2.21\text{--}2.24 \times (2.24)$ mesoscutellum width; posterior mesoscutal width $1.65\text{--}1.68 \times (1.68)$ mesoscutellum width; mesoscutellum length $1.28\text{--}1.33 \times (1.28)$ mesoscutellum width; mesoscutellum length $0.76\text{--}0.81 \times (0.76)$ posterior mesoscutal width; Weber length $1.14\text{--}1.16 \times (1.16)$ mesoscutum width; Weber length $1.89\text{--}2.03 \times (2.03)$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight in lateral view with pointed and lighter end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb present, slightly setose. At least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.42\text{--}2.65 \times (2.65)$ width; stigmal vein shorter than $2 \times$ pterostigma marginal length; pterostigma present.

MALE GENITALIA. Genital length $181\text{--}200 \mu\text{m}$ ($181 \mu\text{m}$); Weber length $2.24\text{--}2.25 \times (2.24)$ genital length; gvc width $106\text{--}109 \mu\text{m}$ ($106 \mu\text{m}$); genital length $1.71\text{--}1.83 \times (1.71)$ gvc width; gvc width one and a half of gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc indistinct in median part, lateral parts strongly descending proximomedially (Fig. 96C); proximoventral margin of gvc slightly concave; distoventral margin of gvc strongly descending proximomedially (Fig. 96A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 96B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 96B). Harpe spoon-shaped and curved distomedially and broadened at apex in ventral and dorsal view, harpe distinctly curved in ventral direction in lateral view; harpe/gvc index 1.60; lateral articulation site of harpe with gvc virtually flush (Fig. 96A, C); ventral margin of harpe slightly convex, dorsal margin straight (Fig. 96B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 96A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave and converging distomedially in basal two thirds, straight and slightly diverging distolaterally with indentations between median setae in apical third (Fig. 96C), apex of harpe pointed, oriented distomedially (Fig. 96A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae two thirds as long as harpe, lateral setae oriented distolaterally, ditomedially and distoventrally; harpe with at least two apical setae, longest apical setae more than two thirds as long as harpe, apical setae distinctly crossing and oriented distomedially and distoventrally; harpe with at least eight median setae restricted to slightly more than apical third, longest median setae one quarter as long as harpe, median setae distinctly crossing and oriented distomedially, distoventrally, medioventrally and proximoventrally. Aedeagus + gonossiculus one third as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 96A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at all margins of harpe and weakest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

The anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex of ZFMK-HYM-00037004 is less pointed.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

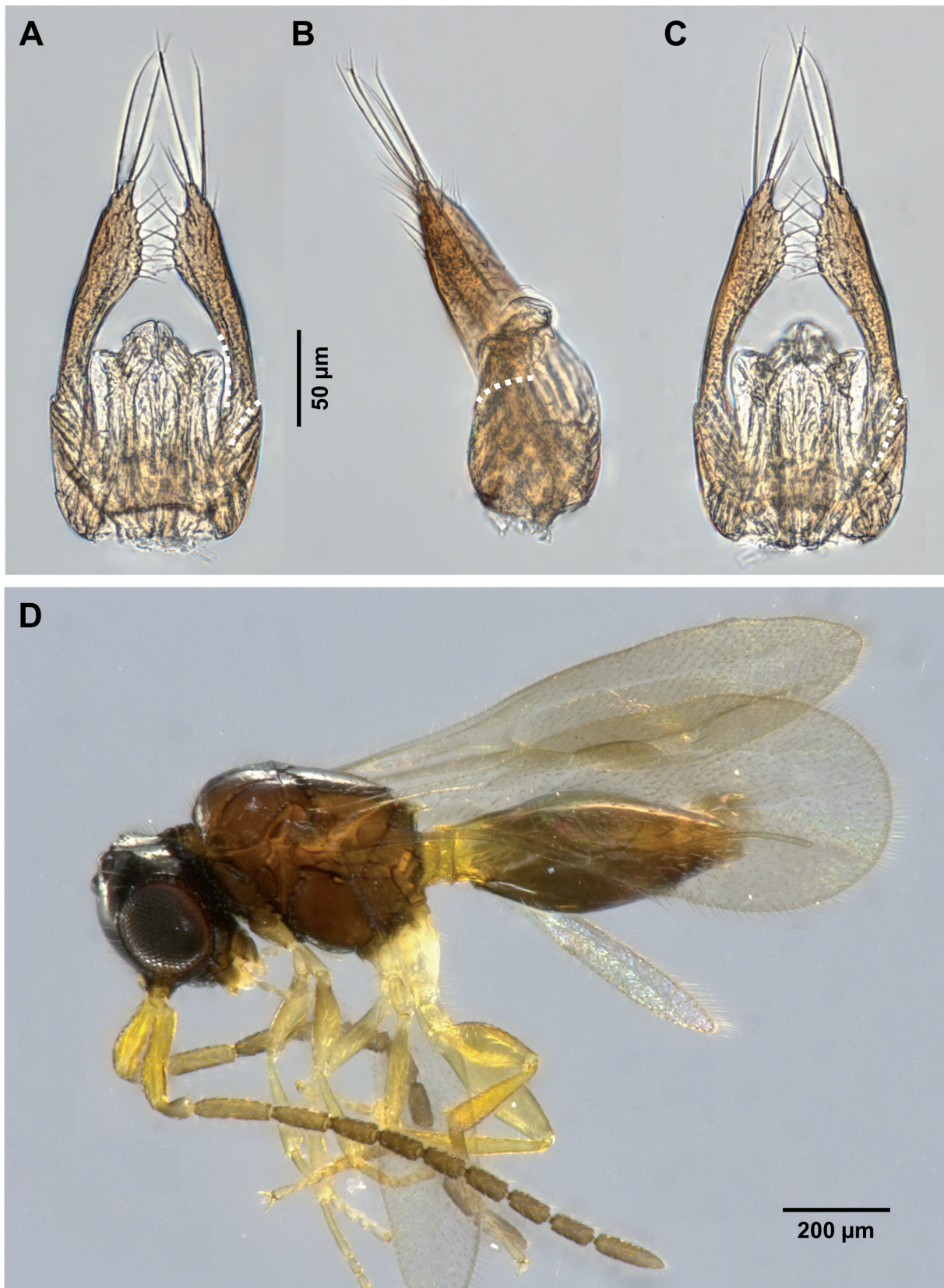


Fig. 96. Holotype of *Conostigmus kijiko* sp. nov. (ZFMK-HYM-00037003). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Remarks

Comparison with similar species

The male genitalia of *C. kijiko* sp. nov. are very similar to the male genitalia of the Nearctic species *C. pulchellus* Whittaker, 1930. However, in contrast to *C. pulchellus*, *C. kijiko* has no facial sulcus and no distinct or elongated sternaulus (intriguingly, these characters also distinguish *C. koleo* sp. nov. and *C. abdominalis* (Boheman, 1832)). In addition, there are indentations between the median setae of the ventromedial margin of the harpe in *C. kijiko* (absent in *C. pulchellus*), the apical and lateral setae of the harpe are distinctly longer, and the aedeagus + gonossiculus is wider in *C. kijiko* (Trietsch *et al.* 2020).

For more comparisons with similar species, see remarks under *C. koleo* sp. nov.

Condition of type material

Holotype is immaculate.

Conostigmus koleo sp. nov.

urn:lsid:zoobank.org:act:DA42A7C3-87BF-4A74-8775-274B8F32C7ED

Fig. 97

Diagnosis

Metasoma light brown except anterior part yellowish; head height $1.57\text{--}1.67 \times (1.67)$ maximum eye diameter. Male genitalia: harpe spatulate in ventral and dorsal view; harpe/gvc index 2.00; ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave in approximately basal third, straight and parallel to other harpe in approximately apical two thirds; gvc width one and a half of gvc length; harpe with at least twenty median setae restricted to slightly more than apical two thirds; Weber length $1.64\text{--}1.76 \times (1.76)$ genital length; genital length $2.14\text{--}2.16 \times (2.16)$ gvc width.

Etymology

The species name is derived from the Swahili word ‘*koleo*’ which means ‘tongs’, with reference to the spatulate harpes.

Material examined

Holotype

KENYA • ♂; Western Province, Kakamega Forest; $00^{\circ}27'10.6$ N, $34^{\circ}51'48.7$ E; 1676 m a.s.l.; 19 Jun. 2007; F. Hita Garcia leg.; Transect 4; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037001.

Paratype

KENYA • 1 ♂; same collection data as for holotype; ZFMK-HYM-00037002.

Description

Male (N = 2 in morphometric measurements)

BODY LENGTH. $1.16\text{--}1.48$ mm (1.48 mm).

COLOUR. Head dark brown, mesosoma brown, metasoma light brown except anterior part yellowish; scape yellowish and pedicel light brown, flagellum light brown, gradually darkening from F1 to F9; legs yellowish except meso- and metacoxa lighter; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. Flagellomeres cylindrical; scape $4.4\times$ as long as pedicel, scape longer than F1 and F2 combined, F1 $2.9\times$ as long as wide, F1 $2.2\times$ as long as pedicel, F1 $1.4\times$ as long as F2, F1 shorter than F7 and F8 combined (ZFMK-HYM-00037002), F1 as long as F9 (ZFMK-HYM-00037002), F6 $1.8\times$ as long as wide, F6 shorter than F7 and F8 combined (ZFMK-HYM-00037002), F6 $1.1\times$ as high as F9 (ZFMK-HYM-00037002); numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and sickle-shaped and slightly shorter than width of flagellomeres.

HEAD. Head width $1.22\text{--}1.30\times$ (1.22) head height; head width $1.61\text{--}1.69\times$ (1.61) interorbital space; maximum eye diameter $1.25\text{--}1.27\times$ (1.27) minimum eye diameter; head height $1.57\text{--}1.67\times$ (1.67) maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL $1.00:0.42\text{--}0.45:0.32\text{--}0.33$ (1.00:0.42:0.33); OOL $2.54\text{--}3.00\times$ (2.54) lateral ocellus diameter. White, thick setae on upper face distinct; supraclypeal depression present; lateral margin of torulus distinctly raised; intertorular carina present; posterolateral processes of gena present.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $0.96\text{--}1.00\times$ (0.96) mesosoma width; Weber length $394\text{--}450\ \mu\text{m}$ (450 μm). Mesoscutum densely setose, setae curved backwards; notaulus present; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus slightly concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.24\text{--}2.29\times$ (2.29) mesoscutellum width; posterior mesoscutal width $1.60\text{--}1.64\times$ (1.64) mesoscutellum width; mesoscutellum length $1.36\times$ (1.36) mesoscutellum width; mesoscutellum length $0.83\text{--}0.85\times$ (0.83) posterior mesoscutal width; Weber length $1.13\times$ (1.13) mesoscutum width; Weber length $1.85\text{--}1.89\times$ (1.89) mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex curved in lateral view with blunt and lighter end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection distinctly short in ventrolateral view; posterior mesosomal comb present, slightly setose. At least six distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.41\text{--}2.60\times$ (2.60) width; stigmal vein shorter than $2\times$ pterostigma marginal length; pterostigma present.

MALE GENITALIA. Genital length $241\text{--}256\ \mu\text{m}$ (256 μm); Weber length $1.64\text{--}1.76\times$ (1.76) genital length; gvc width $113\text{--}119\ \mu\text{m}$ (119 μm); genital length $2.14\text{--}2.16\times$ (2.16) gvc width; gvc width one and a half of gvc length; gvc width equal to distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc indistinct in median part, lateral parts strongly descending proximomedially (Fig. 97C); proximoventral margin of gvc slightly concave; distoventral margin of gvc strongly descending proximomedially (Fig. 97A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 97B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 97B). Harpe spatulate in ventral and dorsal view; harpe/gvc index 2.00; lateral articulation site of harpe with gvc flush (Fig. 97A, C); ventral margin of harpe slightly convex, dorsal margin slightly concave (Fig. 97B), lateral margin straight and slightly curved distomedially in apical part, widest point of harpe at lateral articulation site with gvc (Fig. 97A, C); ventromedial margins of harpes not touching at distoventral margin of gvc, ventromedial margin of harpe concave in approximately basal third, straight and parallel to other harpe in approximately apical two thirds (Fig. 97C), apex of harpe pointed (Fig. 97A, C). Harpe with at least two lateral setae restricted to apical quarter, longest lateral setae less than half as long as harpe, lateral setae oriented distomedially and distoventrally; harpe with at least two apical setae, longest apical setae less than one third as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least twenty median setae restricted to slightly more than apical two

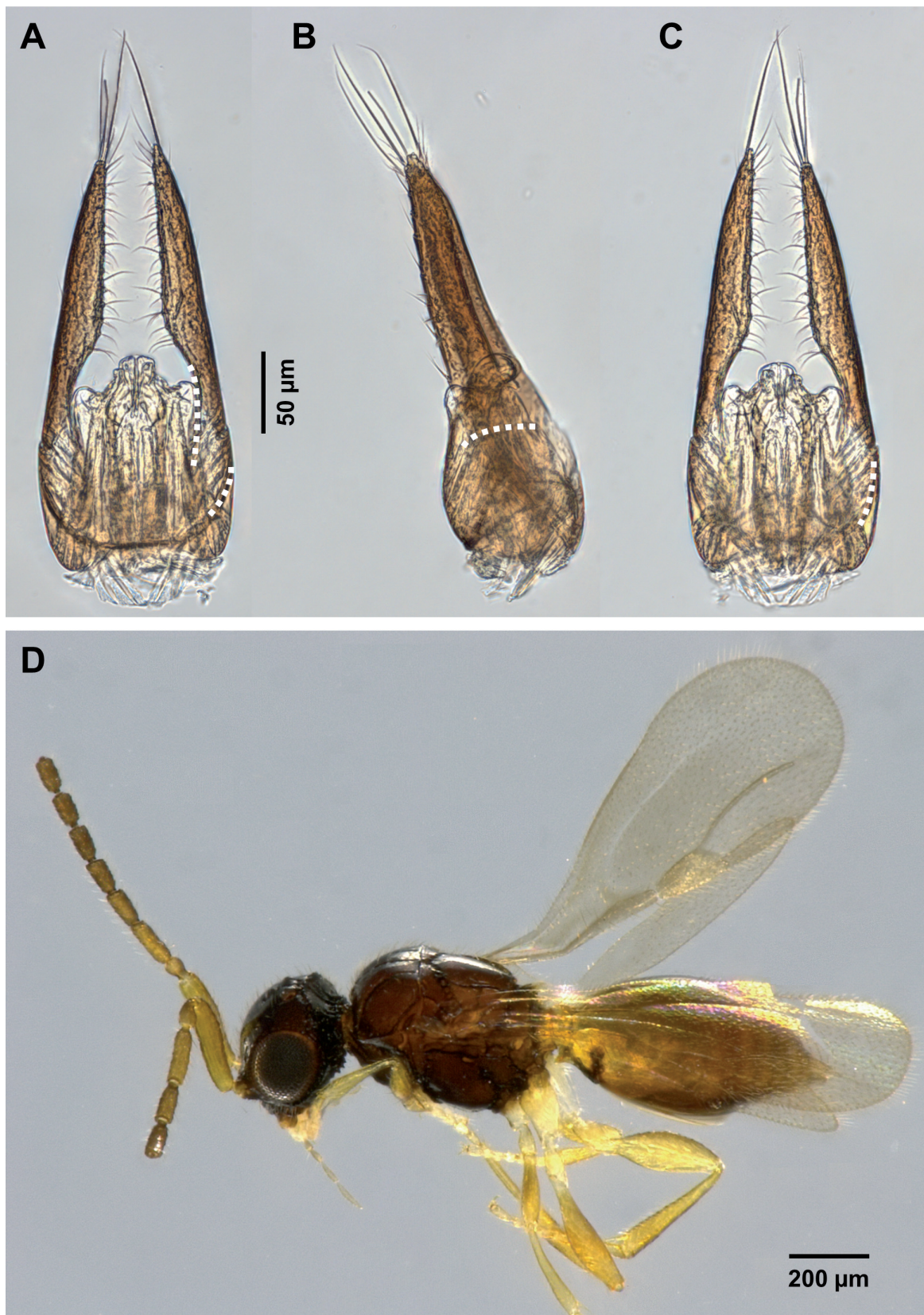


Fig. 97. Holotype of *Conostigmus koleo* sp. nov. (ZFMK-HYM-00037001). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

thirds, longest median setae less than one quarter as long as harpe, median setae oriented distomedially, distoventrally, medioventrally and proximoventrally. Aedeagus + gonossiculus more than one quarter as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 97A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at all margins of harpe and distal margin of gvc and weakest sclerotization at aedeagus + gonossiculus.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimens collected from leaf litter.

Distribution

Afrotropical: Kenya.

Remarks

Comparison with similar species

Conostigmus koleo sp. nov. is very similar to *C. kijiko* sp. nov. in habitus and body colouration but the male genitalia of the two species distinctly differ in the shape of the harpe (spatulate in *C. koleo* and spoon-shaped in *C. kijiko*), their setal arrangement, and the harpe/gvc index (2.00 in *C. koleo* and 1.60 in *C. kijiko*). The male genitalia of *C. koleo* are very similar to those of the Holarctic species *C. abdominalis* (Boheman, 1832). Trietsch *et al.* (2020) redescribed *C. abdominalis* and illustrated intraspecific variations of the male genitalia. The specimen PSUC_FEM 50143 in Fig. 10, E (Trietsch *et al.* 2020) has a very similar spatulate harpe. However, the gvc of *C. koleo* is less broad in ventral and dorsal view. In addition, *C. koleo* is lacking a distinct facial sulcus and a distinct sternaulus which are present in *C. abdominalis*. However, future studies, ideally integrating results from analyses of molecular sequence, should further target *C. abdominalis*, which is currently considered as a single valid species with high intraspecific variance and a wide geographic distribution range.

For more comparisons with similar species, see remarks under *C. kijiko* sp. nov.

Condition of type material

In the holotype, the left F4 to F9 and the right F7 to F9 are missing. The antenna of the paratype is 11-segmented.

Genus *Dendrocerus* Ratzeburg, 1852

***Dendrocerus wachagga* sp. nov.**

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Fig. 98

Diagnosis

Sensillae on flagellomeres erect and distinctly longer than width of flagellomeres; supraclypeal depression slightly present; head width $1.25 \times$ head height; maximum eye diameter $1.29 \times$ minimum eye diameter. Male genitalia: harpe cloven hoof-shaped in ventral and dorsal view; harpe/gvc index 0.40; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe

straight and slightly converging distomedially from base to apex; ventral margin of harpe convex, dorsal margin straight, lateral margin convex; Weber length $4.00 \times$ genital length.

Etymology

The species is named after the indigenous WaChagga, which live at the southern and eastern slopes of Mount Kilimanjaro.

Material examined

Holotype

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; $3^{\circ}16'10.4$ S, $37^{\circ}25'11.3$ E; 1788 m a.s.l.; 5 Apr. 2011; KiLi project leg.; “tree 2”; HOM3, homegarden; Coloured pan trap; ZFMK; ZFMK-HYM-00037088.

Description

Male

BODY LENGTH. 1.43 mm.

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel brown, flagellum brown; legs brown; fore wing venation light brown, fore and hind wing disc hyaline and weakly melanized.

ANTENNA. 11-segmented, flagellomeres cylindrical and F1 to F6 serrated, serration gradually weakening from F1 to F6; scape $5.2 \times$ as long as pedicel, scape slightly longer than F1 and F2 combined, F1 $1.7 \times$ as long as wide, F1 $2.5 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.9 \times$ as long as wide, F6 shorter than F7 and F8 combined; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and distinctly longer than width of flagellomeres.

HEAD. Head width $1.25 \times$ head height; head width $1.67 \times$ interorbital space; maximum eye diameter $1.29 \times$ minimum eye diameter; head height $1.81 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina present. OOL:POL:LOL 1.00:1.70:0.65; OOL $2.00 \times$ lateral ocellus diameter. White, thick setae on upper face absent; supraclypeal depression slightly present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.08 \times$ mesosoma width; Weber length $450 \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; notaulus weak; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus convex; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width $2.14 \times$ mesoscutellum width; posterior mesoscutal width $1.48 \times$ mesoscutellum width; mesoscutellum length $1.38 \times$ mesoscutellum width; mesoscutellum length $0.93 \times$ posterior mesoscutal width; Weber length $1.16 \times$ mesoscutum width; Weber length $1.80 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus present; posterior propodeal projection absent; posterior mesosomal comb absent. At least six distinctly short, basal longitudinal carinae on syntergum; pair of translucent patches on metasomal syntergum.

FORE WING. Length $2.35 \times$ width; stigmal vein slightly longer than pterostigma marginal length; pterostigma present.

MALE GENITALIA. Genital length 113 μm ; Weber length $4.00 \times$ genital length; gvc width 75 μm ; genital length $1.50 \times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.22 \times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc concave in median part, lateral parts convex (Fig. 98C); proximoventral margin of gvc straight; distoventral margin of gvc strongly descending proximally and strongly ascending distomedially (at lateral volsella margin) (Fig. 98A); ventral area of gvc convex; dorsal area of gvc convex (Fig. 98B); proximolateral margin of gvc slightly concave; distolateral margin of gvc strongly descending ventrally (Fig. 98B). Harpe cloven hoof-shaped in ventral and dorsal view; harpe/gvc index 0.40; lateral articulation site of harpe with gvc not flush (Fig. 98A, C); ventral margin of harpe convex, dorsal margin straight (Fig. 98B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 98A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe straight and slightly converging distomedially from base to apex (Fig. 98C), apex of harpe rounded, oriented distomedially (Fig. 98A, C). Harpe with at least six lateral setae, longest lateral setae two thirds as long as harpe, lateral setae oriented distolaterally, distoventrally and medioventrally; harpe with at least two apical setae, longest apical setae more than half as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least six median setae, longest median setae more than one third as long as harpe, median setae oriented distomedially, distoventrally, medioventrally and proximoventrally; volsella with at least one distal seta, oriented distomedially (Fig. 98A). Aedeagus + gonossiculus more than one quarter as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 98A, C) and dorsal to apex of harpe. Genitalia strongly sclerotized.

Female

Unknown.

Variation

Unknown.

Biology

Host unknown, specimen collected with coloured pan trap.

Distribution

Afrotropical: Tanzania.

Remarks

Comparison with similar species

Dendrocerus wachagga sp. nov. can be distinguished from all other Afrotropical species of Megaspilidae by the combination of serrated F1 to F6 with distinctly long sensillae, a characteristic shape of the male genitalia with a cloven hoof-shaped harpe, a convex and slightly protruding ventral margin of the harpe, and a bulbous gvc in lateral view. In contrast to the somewhat similar *Dendrocerus aliberti* (Risbec, 1950), *D. wachagga* has darker legs and antennae with comparatively shorter and more strongly serrated flagellomeres (Dessart 1985). The male genitalia of both species show major differences in the ventral margins of the harpes, and the dorsal, the ventral, and the lateral margins of the gvc: The lateral margins of the gvc of *D. wachagga* are straight and that of *D. aliberti* are more convex, which results in a more bulbous gvc in ventral view in *D. aliberti* (Dessart 1985: 417, fig. 7), all other margins of *D. wachagga* are more convex than those of *D. aliberti*, which results in a more bulbous gvc in lateral view in *D. wachagga* than in *D. aliberti* (Dessart 1985: 417, fig. 8). The dorsomedial margin of *D. wachagga* is straight and slightly converging distomedially from base to apex; the dorsomedial margin of *D. aliberti* is straight and diverging distolaterally in approximately apical quarter (Dessart 1985: 417, fig. 7).

Condition of type material

In the holotype, the left F9, the left hind wing and the left four distal protarsal segments are missing. The head is detached. The right F9 is deformed. Also, the metasoma is deformed, thus the body length measurement is not precise.

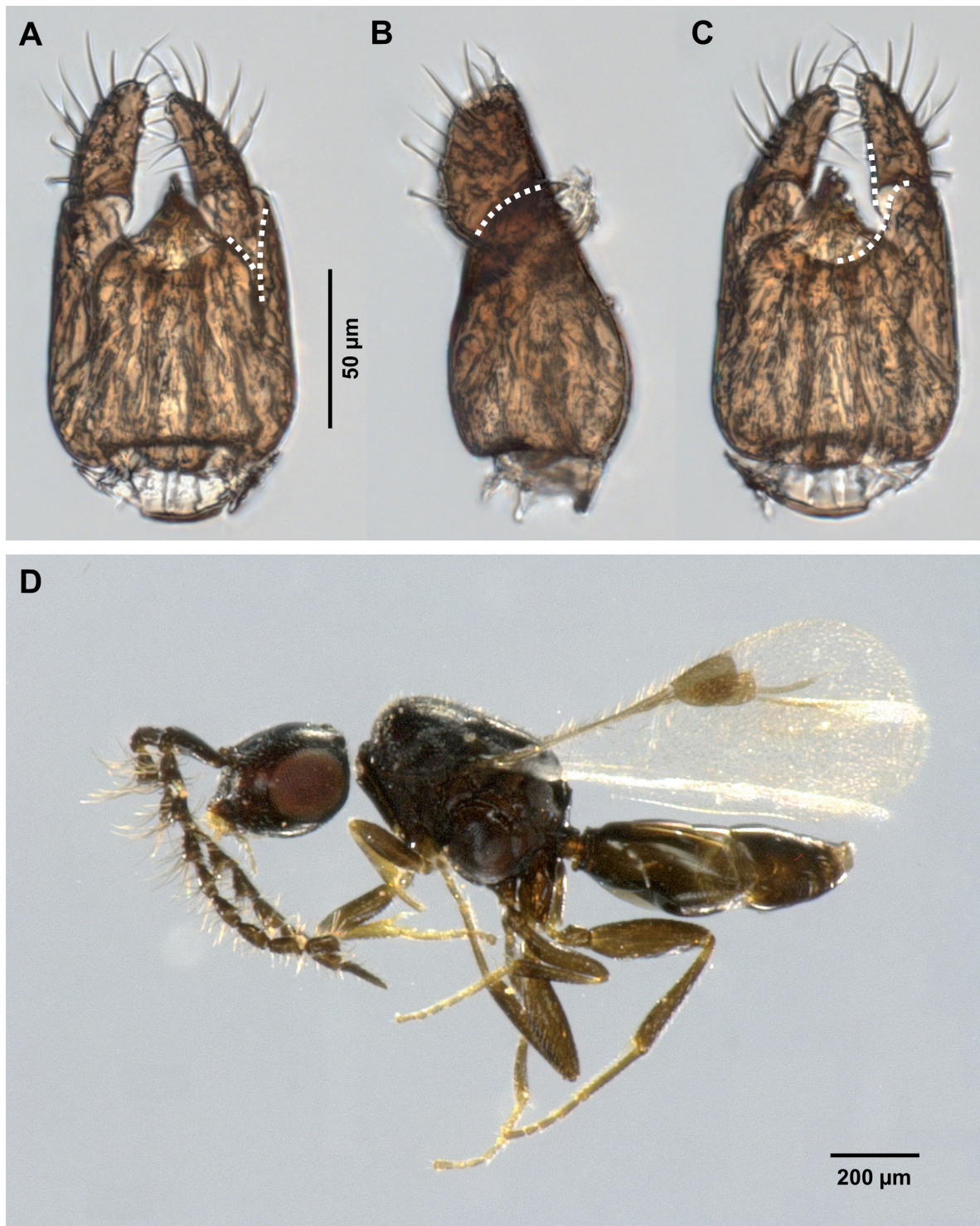


Fig. 98. Holotype of *Dendrocerus wachagga* sp. nov. (ZFMK-HYM-00037088). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Comments on previously described species of Ceraphronidae from the Afrotropical mainland (including those known only from females or from males without information on their male genitalia)

Comprehensive information on the world Ceraphronoidea status up to 2004 is given in Johnson & Musetti (2004). In our comments, we accordingly only provide the exact reference to the respective species in that catalogue, and add references not included in Johnson & Musetti (2004) or published after 2004.

For fast capture of the most decisive information, we start each Remarks section under each species with “Male unknown”, “Male known but male genitalia unknown”, or “Male and male genitalia known”.

Aphanogmus reticulatus (Fouts, 1934) was the only previously described species that was also found in the present study. For this species, we complement the current knowledge with additional information on somatic and male genitalia characters, analogous to the treatments of newly described species.

Species of *Aphanogmus* for which the male genitalia are known and which are included in the key in this study, are assigned to three different species groups proposed by Evans *et al.* (2005).

Family Ceraphronidae Haliday, 1833
Genus *Aphanogmus* Thomson, 1858

***Aphanogmus dictynna* (Waterston, 1923)**

Johnson & Musetti 2004: 14.

Aphanogmus dictynna – Buffington & Polaszek 2009: 65, fig. 6 (description, male genitalia, biology).
— Mikó 2012a, 2012b (male genitalia dorsal and ventral view).

Remarks

Male and male genitalia known. Species delimitations (see *A. robustus* sp. nov. and *A. kisiwa* sp. nov.) were done on the basis of the illustrated description by Waterston (1923: 114–118, figs 7–8) and later detailed images of the male genitalia by Buffington & Polaszek (2009) and Mikó (2012a, 2012b). Polaszek (in Buffington & Polaszek 2009) assigned the species to the *Aphanogmus hakonensis* species complex (described in Polaszek & Dessart 1996) which is – considering the published diagnostic characters – part of the *A. fumipennis* species group.

Biology

Hyperparasitoid, parasitizes *Cephalonomia stephanoderis* Betrem, 1961 and *Prorops nasuta* Waterston, 1923 (Hymenoptera: Bethyridae), primary parasitoids of the coffee berry borer *Hypothenemus hampei* (Ferrari, 1867) (Coleoptera: Curculionidae) (Buffington & Polaszek 2009).

Distribution

Afrotropical: Kenya and Uganda.

Type depositories

The female holotype is deposited at NHMUK. Further specimens, at least 30 females and 27 males, are deposited at ICIPE, NHMUK and USNM.

***Aphanogmus fijiensis* (Ferrière, 1933)**

Johnson & Musetti 2004: 15.

Aphanogmus fijiensis – Polaszek & LaSalle 1995: 133–134 (keyed, diagnosis), 139, fig. 20 (male genitalia).

Remarks

Male and male genitalia known. *Aphanogmus fijiensis* can be distinguished from the newly described species (see remarks under *A. kisiwa* sp. nov.) based on the descriptions by Ferrière (1933: 106), and the additional descriptions and illustrations of the male genitalia of a non-type specimen from Madagascar by Dessart (1971: 97, figs 13–14) and Polaszek & LaSalle (1995). Based on the information given by Risbec (1950: 554) and Dessart (1971: 95), the species is assigned here to the *A. fumipennis* species group. Considering the very broad geographic distribution, the estimated proportion of undescribed species of Ceraphronidae, and the insufficient characterization of the male, including unclear assignment of the described male to the holotype female, the identity of *A. fijiensis* is dubious.

Biology

Parasitizes, for example, *Apanteles tirathabae* Wilkinson, 1928, *A. taragamae* Viereck, 1912, *Cotesia flavipes* Cameron, 1891 (Hymenoptera: Braconidae) and *Syzeuctus* sp. (Hymenoptera: Ichneumonidae) through Crambidae, Noctuidae and Pyralidae (Lepidoptera) (Polaszek & LaSalle 1995).

Distribution

Afrotropical, Australasian, Neotropical and Indomalayan (Polaszek & LaSalle 1995).

Type depository

Female holotype deposited at NHMUK. Additional material at various institutions (see Polaszek & LaSalle 1995: 134 for a full list).

Aphanogmus fumipennis Thomson, 1858

Johnson & Musetti 2004: 15–17.

Aphanogmus fumipennis – Mikó 2012c, 2012d (male genitalia dorsal and median view). — Trietsch *et al.* 2019: 11–14.

Remarks

Male and male genitalia known. The original description (Thomson 1858) is short and only insufficiently characterizes the species. Dessart (1963a: 394, figs 12–13) provided a description of a female and a male specimen, including a drawing of the male genitalia. Mikó (2012c, 2012d) provided CLSM volume rendered media files of male genitalia. With this detailed information at hand, robust species delimitations based on the male genitalia are possible (see remarks under *A. pilosicoxa* sp. nov., *A. fraterculus* sp. nov., and *A. simbai* sp. nov.). However, the identity of *A. fumipennis* is uncertain as it might subsume several species (Mikó I., pers. com.).

Biology

Parasitoid, parasitizes larvae of gall midges (Diptera: Cecidomyiidae) which prey on Coccoidea (Hemiptera) (Dessart 1975c: 25). Dessart & Bourmier (1971) reported that *A. fumipennis* parasitizes the pronymphal stages of *Thrips tabaci* Lindemann, 1889. This is considered as an accidental host by Dessart (1975c). In the same paper, Dessart (1975c) mentioned that *A. fumipennis* is often considered as a species associated with ants, but these statements are not reliable given the unclear identity of the species.

Distribution

Afrotropical (including Kenya), Nearctic, Neotropical and Palaeartic.

Type depositories

Female holotype deposited in MNHN and the male allotype is deposited in RBINS.

Aphanogmus incredibilis Dessart, 1978

Johnson & Musetti 2004: 18.

Remarks

Male known but male genitalia unknown. Described from a single male specimen (Dessart 1978: 277–280). In a second publication (Dessart 1996: 54–58), a detailed diagnosis including female characters was published, but the male genitalia remained undescribed. For similarities and differences between *A. incredibilis* and *A. rafikii* sp. nov., see remarks under *A. rafikii*.

Biology

Parasitizes presumably *Psyllaephagus pulvinatus* (Waterston, 1922), *Syrphophagus cassatus* (Anneck, 1969) (Hymenoptera: Encyrtidae) or *Tamarixia radiata* (Waterston, 1922) (Hymenoptera: Eulophidae) through the African citrus psyllid *Trioza erythrae* Del Guercio, 1918 (Hemiptera: Triozidae) (Dessart 1978, 1996).

Distribution

Afrotropical: Zimbabwe.

Type depositories

The male holotype is deposited in the PPRI (Dessart 1978: 280). Dessart (1996: 56) used two female specimens deposited at USNM.

Aphanogmus limbocellatus Dessart, 1980

Johnson & Musetti 2004: 19.

Remarks

Male unknown. Described from a single female (Dessart 1980: 196–198).

Biology

Unknown.

Distribution

Afrotropical: Somalia.

Type depository

The female holotype is deposited in the RBINS.

Aphanogmus manihoti Dessart, 1989

Johnson & Musetti 2004: 19.

Remarks

Male known but male genitalia unknown. Described from females and males (Dessart 1989a) without any information on the male genitalia.

Biology

Reared from the cocoon of the predatory gall midge *Coccodiplosis citri* Barnes, 1935 (Diptera: Cecidomyiidae) (Dessart 1989a).

Distribution

Afrotropical: Democratic Republic of the Congo and Gabon.

Type depositories

The female holotype, 11 female paratypes and one male allotype are deposited in the RBINS and 13 female paratypes are presumably deposited in the NHMUK, originally mentioned as C.A.B. International Institute of Entomology, London (Dessart 1989a).

Aphanogmus megacephalus (Risbec, 1958)

Johnson & Musetti 2004: 19.

Remarks

Male unknown. Described from a single female (Risbec 1958).

Biology

Unknown.

Distribution

Afrotropical: Democratic Republic of the Congo.

Type depository

The female holotype is deposited in the RMCA.

Aphanogmus origenus (Kieffer, 1913)

Johnson & Musetti 2004: 21.

Aphanogmus origenus – Trietsch *et al.* 2019: 14–17.

Remarks

Male unknown. According to Dessart (1966), only three female syntypes of *A. origenus* are known. The syntypes were, like many of our species, collected at Mt. Kilimanjaro (Tanzania). As the male is unknown, we cannot compare this species to ours but we list here some characters of *A. origenus* that might help in future revisions of Afrotropical species of *Aphanogmus*: *A. origenus* has comparatively bright joints and tarsi, a distinct preoccipital carina, a median mesoscutal sulcus, a short anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex and quite indistinct basal longitudinal carinae on the syntergum.

Biology

Unknown.

Distribution

Afrotropical: Tanzania (Mount Kilimanjaro).

Type depository

The types are deposited in the MNHN.

Aphanogmus reticulatus (Fouts, 1934)

Fig. 99

Johnson & Musetti 2004: 22.

Aphanogmus reticulatus – Polaszek & LaSalle 1995: 133 –135 (keyed, diagnosis), 139, fig. 22 (male genitalia).

Diagnosis (based on ZFMK-HYM-00037038)

Scape longer than F1 to F3 combined; OOL:LOL 2.00; metapleuron with longitudinal striations; fore wing length $3.28 \times$ width. Male genitalia: harpe bilobed; ventral and dorsolateral lobe finger-shaped in ventral, lateral and dorsal view; harpe/gvc index 0.48; dorsolateral lobe/ventral lobe index 0.49; dorsolateral length of harpe/harpe index 0.81; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex from base to apex; lateral setae on dorsolateral lobe oriented distodorsally and distolaterally.

Material examined

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°11'43.5 N, 34°56'58 E; 1682 m a.s.l.; 3 Jun. 2008; F. Hita Garcia leg.; Transect 29; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037038.

Description (based on ZFMK-HYM-00037038)

Male

BODY LENGTH. 0.98 mm.

COLOUR. Head brown, mesosoma brown, metasoma light brown; scape and pedicel yellowish, flagellum light brown, gradually darkening from F1 to F9; legs yellowish-transparent; fore wing venation light brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres trapezoidal; scape $4.1 \times$ as long as pedicel, scape longer than F1 to F3 combined, F1 $2.3 \times$ as long as wide, F1 $1.3 \times$ as long as pedicel, F1 $1.3 \times$ as long as F2, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $1.6 \times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $1.1 \times$ as high as F9; few distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of F1 to F4.

HEAD. Head width $1.11 \times$ head height; head width $1.75 \times$ interorbital space; maximum eye diameter $1.26 \times$ minimum eye diameter; head height $1.58 \times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow present; preoccipital carina distinct. OOL:POL:LOL 1.00:0.75:0.50; OOL $2.00 \times$ lateral ocellus size. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma compressed laterally. Head width $1.17 \times$ mesosoma width; Weber length 263 μ m. Mesoscutum densely setose, setae curved backwards; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus present (= scutoscutellar sulcus not adjacent to transscutal articulation), scutoscutellar sulcus concave; dorsal axillar area setose, setae curved backwards; mesoscutellum setose, setae curved backwards or straight. Mesoscutum width

2.00 × mesoscutellum width; posterior mesoscutal width 1.53 × mesoscutellum width; mesoscutellum length 1.82 × mesoscutellum width; mesoscutellum length 1.19 × posterior mesoscutal width; Weber length 1.24 × mesoscutum width; Weber length 1.35 × mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight and transparent in lateral view with pointed end, extending to end of mesosoma; mesometapleural sulcus absent, metapleuron with longitudinal striations; posterior propodeal projection straight and light in ventrolateral view; posterior mesosomal comb absent. Basal transverse carina of petiole (on syntergum) present; at least five, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length 3.28 × width; stigmal vein shorter than 2 × pterostigma marginal length.

MALE GENITALIA. Genital length 138 μm; Weber length 1.91 × genital length; gvc width 56 μm; genital length 2.44 × gvc width; gvc width more than half of gvc length; gvc width 1.41 × distal gvc width. Proximodorsal margin of gvc slightly concave; distodorsal margin of gvc descending proximomedially (Fig. 99C); proximoventral margin of gvc slightly concave; distoventral margin of gvc descending proximomedially (Fig. 99A); ventral area of gvc slightly convex; dorsal area of gvc convex (Fig. 99B), indented distomedially; proximolateral margin of gvc slightly ascending ventrally; distolateral margin of gvc convex more strongly descending dorsally (Fig. 99B). Harpe bilobed; ventral and dorsolateral lobe finger-shaped in ventral, lateral and dorsal view; harpe/gvc index 0.48; dorsolateral lobe/ventral lobe index 0.49; dorsolateral length of harpe/harpe index 0.81; lateral articulation site of harpe with gvc flush (Fig. 99A, C); ventral margin of harpe straight and curved in ventral direction in basal third, dorsal margin convex in basal third and straight in apical two thirds (Fig. 99B), lateral margin concave, widest point of harpe at lateral articulation site with gvc and apex of dorsolateral lobe (Fig. 99A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly convex from base to apex (Fig. 99C), apices of ventral and dorsolateral lobe pointed, oriented distolaterally (Fig. 99A, C). Harpe with at least two lateral setae on dorsolateral lobe restricted to apical half, longest lateral setae more than one third as long as harpe, lateral setae oriented distodorsally and distolaterally; harpe with at least one apical seta on dorsolateral lobe, longest apical seta on dorsolateral lobe less than half as long as harpe, apical seta on dorsolateral lobe oriented distolaterally and distoventrally; harpe with at least two apical setae on ventral lobe, longest apical setae on ventral lobe less than one quarter as long as harpe, apical setae on ventral lobe oriented distodorsally, distolaterally and distoventrally; indistinct number of median setae on ventral lobe, longest median setae less than one quarter as long as harpe, median setae oriented medioventrally and with indistinct orientation. Aedeagus + gonossiculus more than one third as long as harpe, apex of aedeagus + gonossiculus divided (Fig. 99A, C) and dorsal to apex of dorsolateral lobe of harpe. Genitalia weakly sclerotized with strongest sclerotization at aedeagus + gonossiculus.

Female

See Fouts (1934: 101), Benoit (1949: 36–38) and Dessart (1971).

Variation

The male ZFMK-HYM-00037038 is very similar to the described female holotype, except for its legs being yellowish-transparent [compared to the female holotype in which the legs are “reddish-brown; the coxae and femora darker” (Fouts 1934)].

Biology

Hyperparasitoid, “doubtfully... reared from a Braconid *Apanteles aethiopicus* Wilkinson, 1931” (Fouts 1934: 102) and from cocoons of *A. syleptae* Ferriere, 1925 (Benoit 1949: 39). Polaszek & LaSalle (1995: 135) listed braconid wasps, for example “*Apanteles* sp., *Cotesia flavipes* (Cameron) (?), *C. sesaminae* (Cameron), [...] *Glyptapanteles africanus* Wilkinson”, *Stenobracon* sp. and ichneumonid wasps from

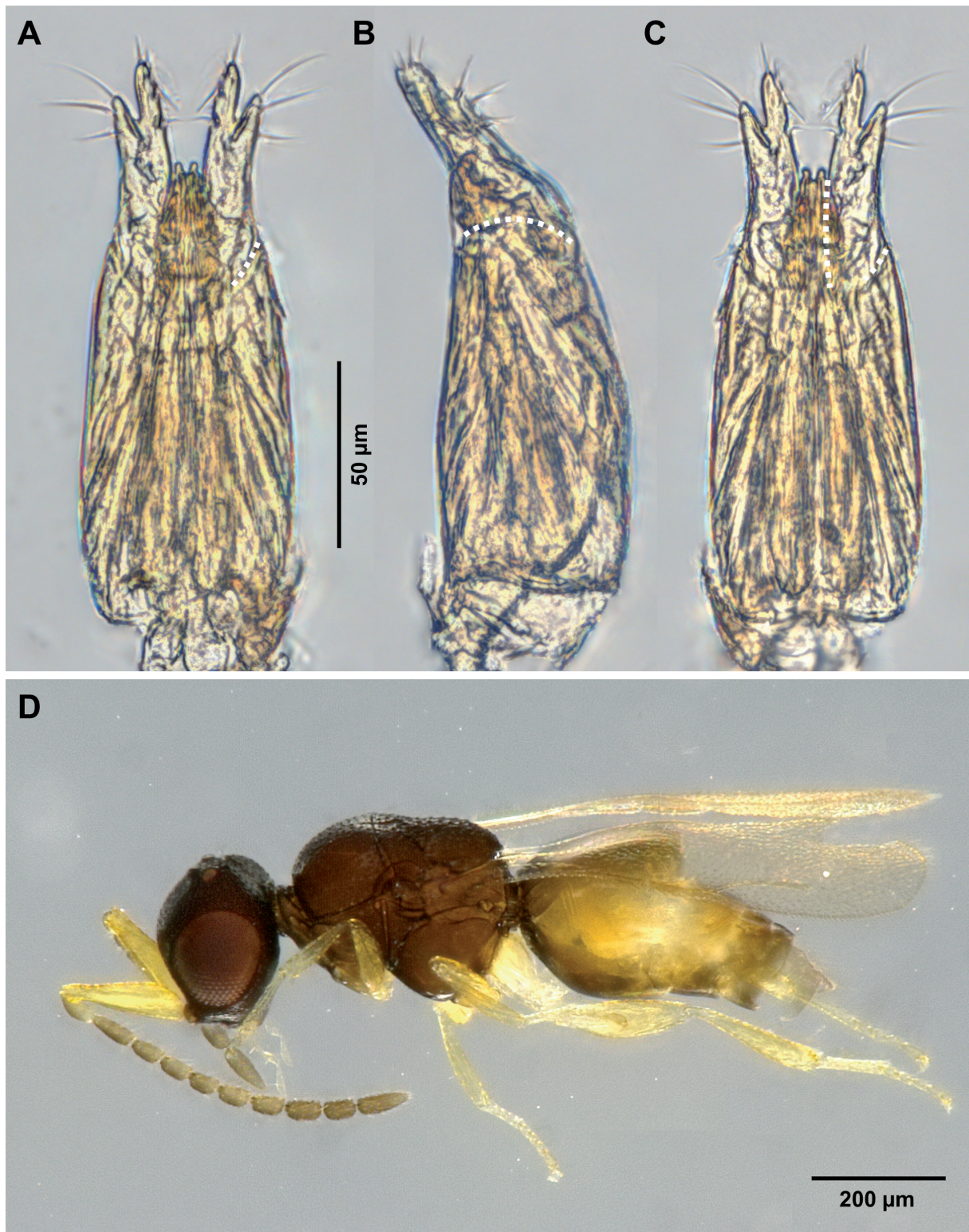


Fig. 99. Specimen of *Aphanogmus reticulatus* (Fouts, 1934) (ZFMK-HYM-00037038). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

the genus *Syzeuctus* as hosts which were reared from Crambidae, Noctuidae and Pyralidae (Lepidoptera). ZFMK-HYM-00037038 was collected from leaf litter.

Distribution

Afrotropical: Chad, Democratic Republic of the Congo, Ivory Coast, Kenya, Malawi, São Tomé and Príncipe and Somalia.

Type depositories

The female holotype and five paratypes are deposited in the MCSN and “six paratypes in the author’s collection” (Fouts 1934: 102). Polaszek & LaSalle (1995: 135) and Benoit (1949: 39) did mention further depositories, of at least 35 female specimens and at least 6 male specimens, like CIRAD, NHMUK, PPRI, RBINS, RMCA and WUR (formerly WAU).

Remarks

Male and male genitalia known. Fouts (1934) and Benoit (1949) described *A. reticulatus* (as *Calliceras reticulata* Fouts, 1934 and *Ceraphron vandenbrandei* Benoit, 1949) with, for example, a reticulated (= sculptured) mesoscutellum, similar to *A. robustus* sp. nov. and *A. kisiwa* sp. nov. The detailed drawing of the male genitalia by Dessart (1971: 97, figs 11–12) allowed us to clearly recognise the specimen ZFMK-HYM-00037038 as *A. reticulatus*. The shape of the harpe, the finger-shaped lobes and the setal arrangement are very distinctive and different to those of *A. robustus* and *A. kisiwa* sp. nov. (see also *A. robustus* and *A. kisiwa* for species delimitations based on body and male genitalia characters).

Based on the information given by Benoit (1949: 37–38), Dessart (1971: 95) and the specimen treated herein, the species is assigned here to the *A. fumipennis* species group.

In the specimen ZFMK-HYM-00037038, the left hind wing is missing and the posterior half of the metasoma is deformed, thus the body length measurement is not precise.

Aphanogmus sigras Dessart, 1981

Johnson & Musetti 2004: 22.

Remarks

Male known but male genitalia unknown. The description by Dessart (1981: 12–14) shows a remarkably supraclypeal depression similar to that of *Gnathoceraphron* Dessart & Bin, 1980 but with normal sized mandibles in the female (not present in the male allotype). In addition, this species has – like some of the species described as new in the present study – relatively light leg joints and tarsi, the mesometapleuron lacking a sulcus and longitudinal striations.

Biology

Unknown.

Distribution

Afrotropical: Somalia.

Type depository

The female holotype, 11 female paratypes and one male allotype are deposited in the RBINS.

Aphanogmus trasides Polaszek, 1995

Aphanogmus trasides – Polaszek & LaSalle 1995: 133, 135–136 (keyed, diagnosis), 139, fig. 24 (male genitalia).

Remarks

Male and male genitalia known. *Aphanogmus trasides* is not listed in Johnson & Musetti (2004). It was rather superficially described by Polaszek & LaSalle (1995) with three images of the female head and mesosoma and a rough drawing of the male genitalia. The harpe is not bilobed and equipped with at least one long lateral seta and at least five median setae. The digital teeth are pointed and distinct. According to the drawing of the genitalia by Polaszek & LaSalle (1995), *A. trasides* can be distinguished from all other described species of *Aphanogmus* by the distinctive high harpe/gvc index: 1.27. Based on the information given by Polaszek & LaSalle (1995: 136, fig. 12), the species is assigned here to the *A. fumipennis* species group.

Biology

Parasitizes presumably Braconidae or Ichneumonidae through *Eldana saccharina* Walker, 1865 (Lepidoptera: Pyralidae) (Polaszek & LaSalle 1995).

Distribution

Afrotropical: Ivory Coast.

Type depositories

The male holotype is deposited in the PPRI and the male paratype and 21 female paratypes are deposited in the NHMUK, RBINS, PPRI and the WUR (formerly WAU) (Polaszek & LaSalle 1995: 136).

Aphanogmus triozae Dessart, 1978

Johnson & Musetti 2004: 23.

Remarks

Male unknown. Described from female specimens (Dessart 1978: 275–277).

Biology

Reared from the African citrus psyllid *Trioza erythrae* Del Guercio, 1918 (Hemiptera: Triozidae) (Dessart 1978).

Distribution

Afrotropical: Zimbabwe.

Type depositories

The female holotype and nine paratypes are deposited in the PPRI and five paratypes are deposited in the RBINS.

Genus *Ceraphron* Jurine, 1807

Ceraphron alticola Kieffer, 1913

Johnson & Musetti 2004: 27.

Ceraphron alticola – Trietsch *et al.* 2019: 19–20.

Remarks

Male unknown. Described from at least one female specimen (Kieffer 1913b: 13). For more details see Trietsch *et al.* (2019: 19–20).

Biology

Unknown.

Distribution

Afrotropical: Kenya.

Type depository

The female holotype is deposited in the MNHN.

Ceraphron cavifrons Risbec, 1950

Johnson & Musetti 2004: 30.

Ceraphron cavifrons – Trietsch *et al.* 2019: 22.

Remarks

Male known but male genitalia unknown. Described from a single male specimen (Risbec 1950: 552–553). Trietsch *et al.* (2019: 22, fig. 11) show an image of the holotype. The male genitalia have not been dissected but Trietsch *et al.* (2019) mentioned that, based on the partially exerted genitalia, “...the specimen appears to have harpes that are pointed and longer than the gonostipes, with distal tufts of setae”. This information suggests a similarity with, for example, *C. semira* sp. nov. or *C. longiharpis* sp. nov., but does not allow an exact species delimitation.

Biology

Unknown.

Distribution

Afrotropical: Kenya.

Type depository

The male holotype is deposited in the MNHN.

Ceraphron cephalotes Sundholm, 1970

Fig. 100

Johnson & Musetti 2004: 30.

Remarks

Male and male genitalia known. Described from a single male specimen (Sundholm 1970: 359–361), including a drawing of the male genitalia (Sundholm 1970: 361, fig. 135). The MZLU imaged the species, the male genitalia and the corresponding label (Fig. 100). It is similar to but still well distinguishable from *C. kaharabu* sp. nov. (see remarks under *C. kaharabu*).

Biology

Unknown.

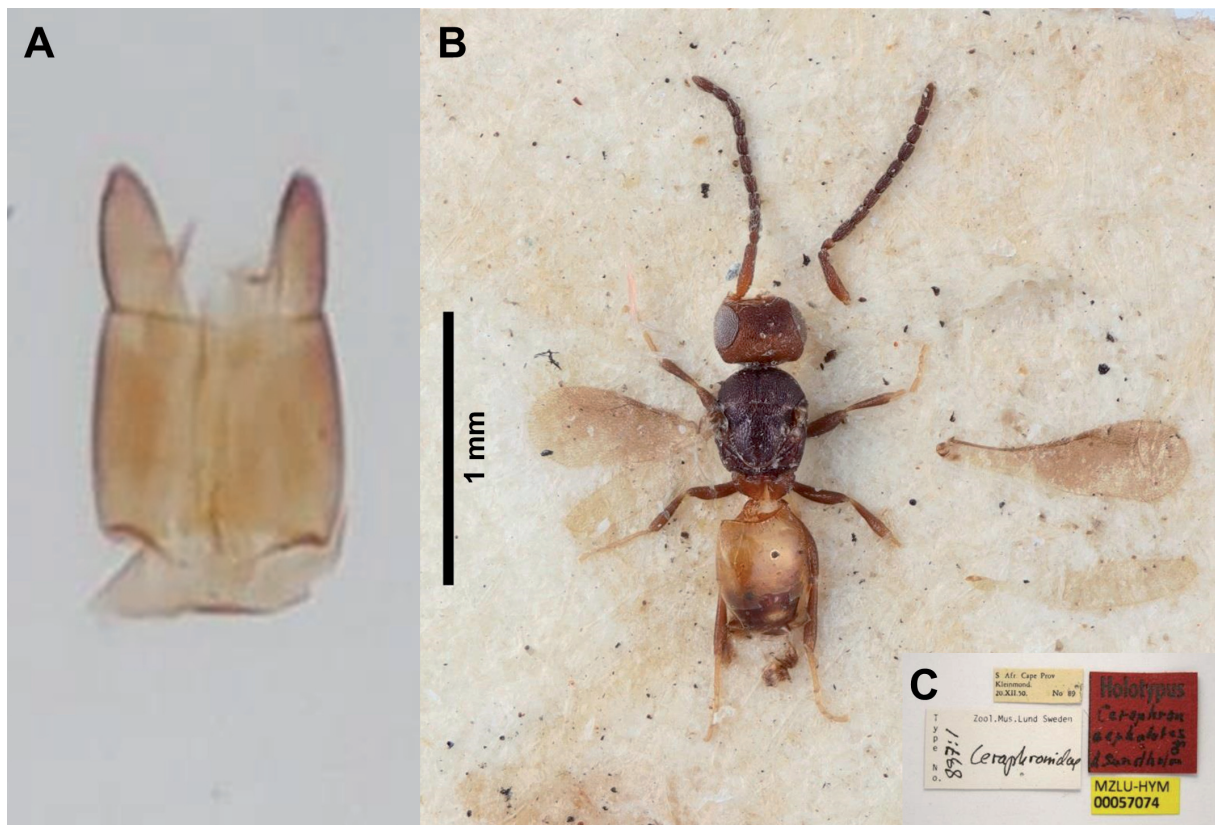


Fig. 100. Holotype of *Ceraphron cephalotes* Sundholm, 1970 (MZLU-HYM-00057074). **A.** Male genitalia. **B.** Habitus in dorsal view. **C.** Type labels. Imaged by Christoffer Fägerström at the MZLU (<https://www.flickr.com/photos/tags/mzluhy00057074>, last accessed 13/05/2022).

Distribution

Afrotropical: South Africa.

Type depository

The male holotype is deposited in the MZLU.

Ceraphron confusus Sundholm, 1970

Fig. 101

Johnson & Musetti 2004: 31.

Remarks

Male and male genitalia known. Described from females and males (Sundholm 1970: 357–359), including a drawing of male genitalia (p. 358, fig. 127). The MZLU imaged the allotype, its male genitalia and the corresponding label (Fig. 101). The species is very similar to *C. reinholdi* sp. nov. (see remarks under *C. reinholdi*). Additionally, Sundholm (1970: 359) described the form *C. confusus* f. *brachypterus* from a short winged female and a presumably fully winged male. The genitalia of the *C. confusus* f. *brachypterus* male differ from those of the *C. confusus* male. They are similar to those of *C. mamamutere* sp. nov. in shape and harpe/gvc index (Sundholm 1970: 360, fig. 130). However, the form *brachypterus* and *C. mamamutere* can be distinguished by a stronger colour contrast between flagellum and scape + pedicel and a longer scape and a distinct broader F9 in *C. confusus* f. *brachypterus*

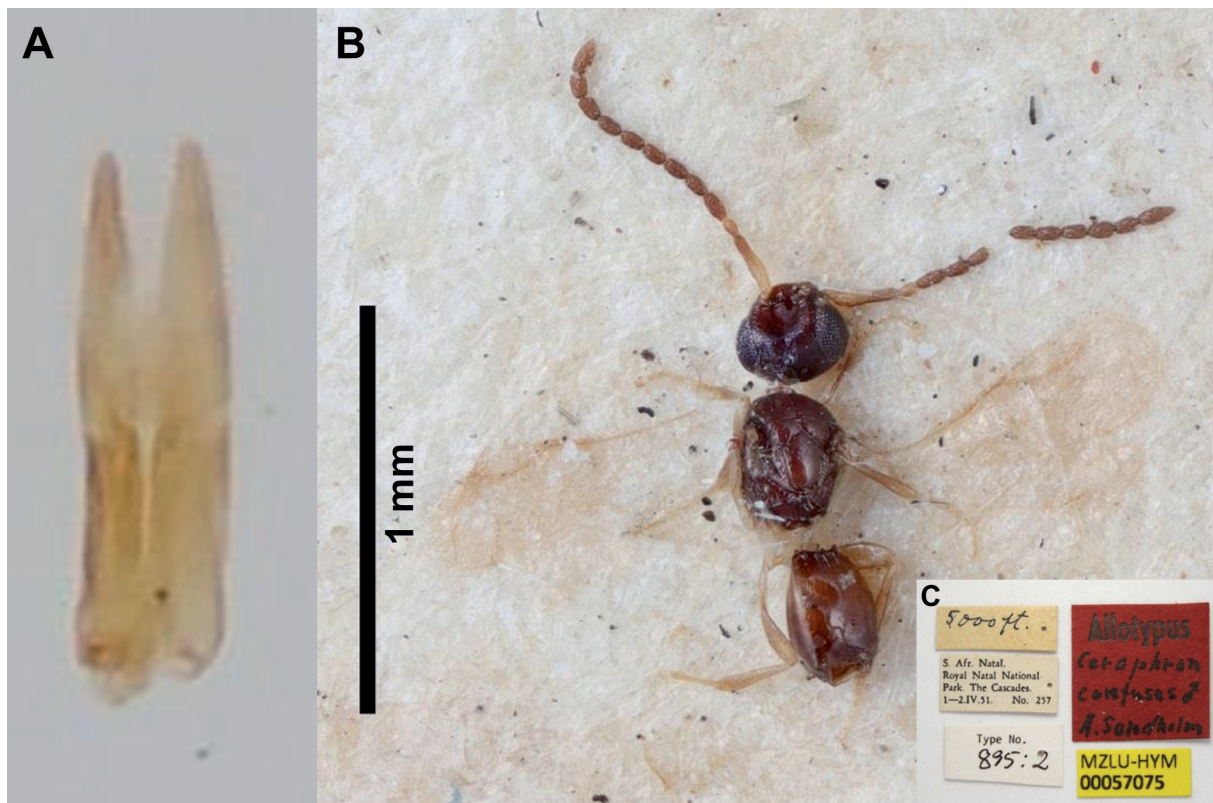


Fig. 101. Allotype of *Ceraphron confusus* Sundholm, 1970 (MZLU-HYM-00057075). **A.** Male genitalia. **B.** Habitus in dorsal view. **C.** Type labels. Imaged by Christoffer Fägerström at the MZLU (<https://www.flickr.com/photos/tags/mzluhym00057075>, last accessed 13/05/2022).

(Sundholm 1970: 360, fig. 129). The description of a form with distinctly different male genitalia does not seem particularly useful, and the form might well represent a distinct species.

Biology

Unknown.

Distribution

Afrotropical: South Africa.

Type depository

The female holotypes and male allotypes of *C. confusus* and *C. confusus* f. *brachypterus* are deposited in the MZLU.

Ceraphron crenulatus Kieffer, 1913

Johnson & Musetti 2004: 31.

Ceraphron crenulatus – Trietsch *et al.* 2019: 23–25.

Remarks

Male unknown. Described from a single female specimen (Kieffer 1913: 11). Trietsch *et al.* (2019: 24, fig. 12) imaged the holotype.

Biology

Unknown.

Distribution

Afrotropical: Kenya.

Type depository

The female holotype is deposited in the MNHN.

Ceraphron fulvus Alekseev, 1983

Johnson & Musetti 2004: 33.

Remarks

Male known but male genitalia unknown. Described from a single male specimen (Alekseev 1983: 642). Dessart (1989b: 216, 228) stated that *C. fulvus* might be a synonym of *C. saxatilis* Kieffer, 1912.

Biology

Unknown.

Distribution

Afrotropical: Ethiopia.

Type depository

The male holotype is probably deposited in the ZMMU (Alekseev 1983).

Ceraphron irokoi Risbec, 1953

Johnson & Musetti 2004: 34.

Remarks

Male known but male genitalia unknown. Described from male (Risbec 1953: 555–557). Keyed by Risbec (1955: 216) and Dessart (1989b: 233). The RMCA imaged a (probably non-type) male specimen (BE_RMCA_INV_ENT.Hym.000017970; stable CETAF identifier: <https://darwinweb.africamuseum.be/object/>) in dorsal, frontal and lateral view and provided an image of the label (<https://virtualcol.africamuseum.be/>).

Biology

Unknown, collected on galls of the iroko gall fly *Phytolyma lata* (Walker, 1851) (Hemiptera: Psyllidae) (Risbec 1953).

Distribution

Afrotropical: Democratic Republic of the Congo and Ivory Coast.

Type depository

Type depository unknown. Some specimens are deposited at RMCA (Dessart 1962: 301).

Ceraphron ivorensis Risbec, 1953

Johnson & Musetti 2004: 34.

Remarks

Male known but male genitalia unknown. Described from male (Risbec 1953: 557–560). Keyed by Risbec (1955: 216) and Dessart (1989b: 230).

Biology

Unknown, collected on galls of the iroko gall fly *Phytolyma lata* (Walker, 1851) (Hemiptera: Psyllidae) (Risbec 1953).

Distribution

Afrotropical: Ivory Coast.

Type depository

Type depository unknown.

Ceraphron longulus Sundholm, 1970

Fig. 102

Johnson & Musetti 2004: 35.

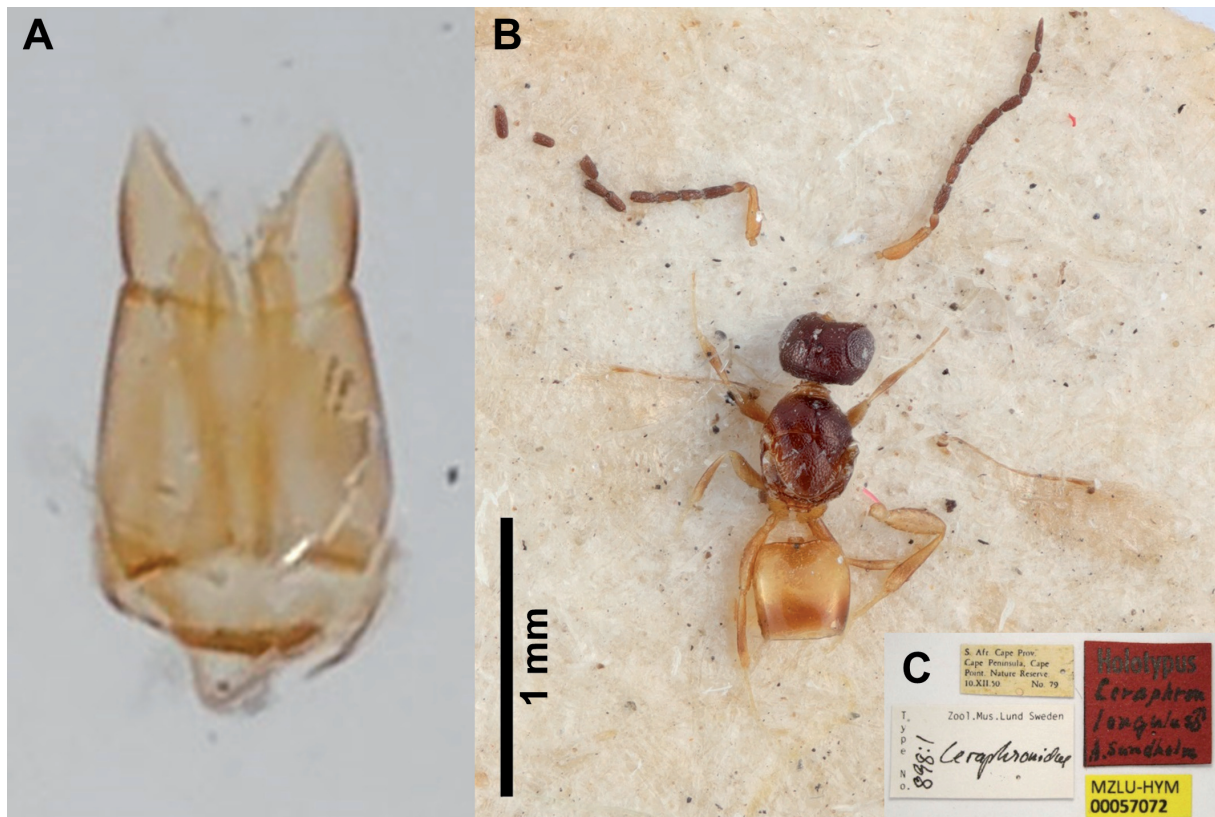


Fig. 102. Holotype of *Ceraphron longulus* Sundholm, 1970 (MZLU-HYM-00057072). **A.** Male genitalia. **B.** Habitus in dorsal view. **C.** Type labels. Imaged by Christoffer Fägerström at the MZLU (<https://www.flickr.com/photos/tags/mzluhym00057072>, last accessed 13/05/2022).

Remarks

Male and male genitalia known. Sundholm (1970: 361–362) described *C. longulus* from one male specimen, which is very similar to *C. cephalotes* Sundholm, 1970 “but differs in the dissimilar antennae and in the shape of propodeum”. Sundholm (1970: 363, fig. 139) provided a drawing of the male genitalia and the MZLU imaged the holotype, its male genitalia and the label (Fig. 102). For comparison with similar species, see remarks under *C. kaharabu* sp. nov. and *C. pilosiharpis* sp. nov.

Biology

Unknown.

Distribution

Afrotropical: South Africa.

Type depository

The male holotype is deposited in the MZLU.

Ceraphron masneri Dessart, 1963

Fig. 103

Johnson & Musetti 2004: 35.

Material examined

Holotype

DEMOCRATIC REPUBLIC OF THE CONGO • ♂; “Congo belge Musosa”; Oct. 1939; H.-J. Brédo; “R. Mus. Hist. Nat. Belg. I. G. 13.212”; “Prép. microscopiques n° 6203/071A–E”; RBINS PSUC_FEM000147261.



Fig. 103. Holotype of *Ceraphron masneri* Dessart, 1963 (PSUC_FEM000147261) in dorsolateral view. Image provided by István Mikó.

Allotype

DEMOCRATIC REPUBLIC OF THE CONGO • ♀; same collection data as for holotype; “Prép. microscopique n° 6203/072 A.B”; RBINS.

Paratype

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♂; same collection data as for holotype; “Prép. microscopique n° 6306/171”; RBINS.

Remarks

Male and male genitalia known. In the card mounted male holotype of *C. masneri*, the head is missing (damaged during shipment from RBINS). The metasoma of the male paratype is deposited in a vial. Male genitalia of the holotype (“Prép. n° 6203/071.E”) and paratype (“Prép. n° 6306/171”) are slide mounted. Dessart (1963b: 533, fig. 6B–E) published a detailed drawing of the male genitalia. The species can be distinguished from all other treated species by the different shape of the male genitalia (e.g., dorsal and lateral margin of harpe with indentation), very elongated flagellomeres (i.e., scape being shorter than F1 and F2 combined), and the mesometapleuron having distinct longitudinal striations with a mesometapleural sulcus (Fig. 103).

Biology

Unknown.

Distribution

Afrotropical: Democratic Republic of the Congo.

Type depository

The male holotype, female allotype and male paratype are deposited in the RBINS.

Ceraphron modicus Sundholm, 1970

Johnson & Musetti 2004: 36.

Remarks

Male unknown. Described from a single female specimen (Sundholm 1970: 356–357). Keyed by Dessart (1989b: 228).

Biology

Unknown.

Distribution

Afrotropical: South Africa.

Type depository

The female holotype is deposited in the MZLU.

Ceraphron naivashae Kieffer, 1913

Johnson & Musetti 2004: 36.

Ceraphron naivashae – Trietsch *et al.* 2019: 25–27.

Remarks

Male unknown. Described from a single female specimen (Kieffer 1913: 13). Holotype imaged by Trietsch *et al.* (2019: 26, fig. 13).

Biology

Unknown.

Distribution

Afrotropical: Kenya.

Type depository

The female holotype is deposited in the MNHN.

Ceraphron parvalatus Dessart, 1966

Johnson & Musetti 2004: 37–38.

Ceraphron parvalatus – Trietsch *et al.* 2019: 27, 29–30.

Remarks

Male known but male genitalia unknown. See comprehensive treatment of this species in Trietsch *et al.* (2019). The species is described from a short-winged male and a short-winged female from Mt. Kilimanjaro (Tanzania), i.e., they are distinguished from all species described as new in the present study, all of which are long-winged.

Biology

Unknown.

Distribution

Afrotropical: Tanzania (Mount Kilimanjaro).

Type depository

The female lectotype and male allolectotype are deposited in the MNHN.

Ceraphron punctatellus Dessart, 1990

Johnson & Musetti 2004: 39.

Remarks

Male unknown. Described from a single female specimen (Dessart 1990: 72–73).

Biology

Unknown.

Distribution

Afrotropical: Zimbabwe.

Type depository

The female holotype is deposited in the RBINS.

Ceraphron saxatilis Kieffer, 1912

Johnson & Musetti 2004: 40.

Ceraphron saxatilis – Bijoy *et al.* 2019: 145.

Remarks

Male known but male genitalia unknown. Described from a single male specimen (Kieffer 1912: 50). Dessart & Cancemi (1987: 327–328) added the description of female specimens.

Biology

Unknown.

Distribution

Afrotropical: Cameroon, Canary Islands, and Republic of Seychelles. Indomalayan: India (Bijoy *et al.* 2019, record unverified).

Type depositories

The male holotype and one paratype are deposited in the NHMUK. Additional paratypes and one apallotype are deposited in the RBINS (type terminology taken from Dessart & Cancemi 1987).

Ceraphron somali Dessart, 1979

Johnson & Musetti 2004: 40.

Remarks

Male unknown. Described from a single female specimen (Dessart 1979a: 134–136).

Biology

Unknown.

Distribution

Afrotropical: Somalia.

Type depository

The female holotype is deposited in the MZUF.

Ceraphron striolatus Dessart, 1989

Johnson & Musetti 2004: 41.

Remarks

Male unknown. Described from a single female specimen (Dessart 1989b: 220–223).

Biology

Unknown.

Distribution

Afrotropical: Zimbabwe.

Type depository

The female holotype is deposited in the RBINS.

Ceraphron testaceus (Risbec, 1953)

Johnson & Musetti 2004: 42.

Ceraphron testaceus – Trietsch *et al.* 2019: 48–49.

Remarks

Male known but male genitalia unknown. Described from a single male specimen (Risbec 1953: 560–563). Trietsch *et al.* (2019: 49, fig. 27) imaged the holotype.

Biology

Unknown, collected on galls of the iroko gall fly *Phytolyma lata* (Walker, 1851) (Hemiptera: Psyllidae) (Risbec 1953).

Distribution

Afrotropical: Ivory Coast.

Type depository

The male holotype and an additional specimen (Trietsch *et al.* 2019: 48, MNHN EY22458) are deposited in the MNHN.

Ceraphron tetraochros Dessart, 1978

Johnson & Musetti 2004: 42.

Remarks

Male known but male genitalia unknown. Described from three female specimens (Dessart 1978: 283–284). Dessart (1994b: 71) added the description of the male but without any information on the male genitalia.

Biology

Unknown.

Distribution

Afrotropical: Democratic Republic of the Congo and Uganda.

Type depositories

The female holotype and paratypes are deposited in the RBINS and the male allotype is deposited in the RMCA [type terminology taken from Dessart (1994b)].

Ceraphron triochochros Dessart, 1975

Johnson & Musetti 2004: 44.

Remarks

Male unknown. Described from a single female specimen (Dessart 1975b: 115–118).

Biology

Unknown.

Distribution

Afrotropical: Democratic Republic of the Congo.

Type depository

The female holotype is deposited in the RMCA.

Ceraphron troglodytes Kieffer, 1913

Johnson & Musetti 2004: 45.

Remarks

Male unknown. Described from at least one female specimen (Kieffer 1913a: 108–109). Dessart (1989b: 216, 227) was unable to locate and examine the type specimens, and stated – based on the original description – that it is very likely a synonym of *C. trioehros*.

Biology

Unknown.

Distribution

Afrotropical: Nigeria.

Type depository

Type depository unknown.

Ceraphron variolosus Dessart, 1975

Johnson & Musetti 2004: 45.

Remarks

Male known but male genitalia unknown. Described from two females and one male specimen (Dessart 1975b: 112–115). Keyed by Dessart (1989b: 227).

Biology

Unknown.

Distribution

Afrotropical: Burundi, Democratic Republic of the Congo and Rwanda.

Type depository

The female holotype, paratype and male allotype are deposited in the RMCA.

Ceraphron vegrandis Dessart, 1990

Johnson & Musetti 2004: 45.

Remarks

Male unknown. Described from a single female specimen (Dessart 1990: 73, 74).

Biology

Unknown.

Distribution

Afrotropical: South Africa.

Type depository

The female holotype is deposited in the RBINS.

Genus *Cyoceraphron* Dessart, 1975

Cyoceraphron africanus Dessart, 1975

Johnson & Musetti 2004: 46.

Material examined

Holotype

DEMOCRATIC REPUBLIC OF THE CONGO • ♀; “Yangambi Observations”; 19 Nov. 1946; “R. I. Sc. N. B. /I. G. 24.778”; “Prép. microscopique n° 7308/131”; RBINS; PSUC_FEM000147266.

Non-type specimens

DEMOCRATIC REPUBLIC OF THE CONGO • 3 ♀♀; “Yalokombe B41”; 3 Nov. 1951; “Coll. Debauche”; “R. I. Sc. N. B. /I. G. 24.778”; RBINS (probably the three females mentioned in Dessart 1978: 282, collected together with *Cyoceraphron fuscopeuralis* types).

Remarks

Male known but male genitalia unknown. The card mounted female holotype of *C. africanus* was heavily damaged during shipment from RBINS. Only the mesosoma with the right legs, the left coxae and the left F8 and F9 are attached to the card. The right antenna, right metatibia and metatarsus and a fore wing are slide mounted. The colour pattern of the mesosoma as described by Dessart (1975b) is hardly visible and oddly seems to flake off. The additional examined females were also heavily damaged during shipment from RBINS: the first female is completely missing, from the second female only one hind wing is left attached to the card but the rest is missing and the third female is attached to the card without its head, its left legs (except coxae) and its right metatarsus. Dessart (1994a: 28) described a male specimen but without any information on the male genitalia.

Biology

Unknown.

Distribution

Afrotropical: Democratic Republic of the Congo, Gabon and Guinea.

Type depositories

The female holotype and four additional females are deposited in the RBINS. One female and one male allotype are deposited in the CNC [type terminology taken from Dessart (1994a)].

Cyoceraphron funicularis Dessart, 1994

Johnson & Musetti 2004: 46.

Material examined

Holotype

DEMOCRATIC REPUBLIC OF THE CONGO • ♀; “Yalokombe B41”; 3 Nov. 1951; “Coll. Debauche”; “R. I. Sc. N. B. /I. G. 24.778”; “Prép. microscopique n° 9312/091”; RBINS; PSUC_FEM000147215.

Allotype

DEMOCRATIC REPUBLIC OF THE CONGO • ♂; same collection data as for holotype; “Prép. microscopique n° 9312/213”; RBINS.

Remarks

Male known but male genitalia unknown. Described from female and male specimens, and keyed in Dessart (1994a: 42–43, 48–52). The female holotype was detached from the card and was lost during shipment from RBINS, except for the right antenna which is slide mounted. The male allotype is also lost, except for one hind wing which is left attached to the card and one slide mounted antenna.

Biology

Unknown.

Distribution

Afrotropical: Democratic Republic of the Congo.

Type depository

Female holotype and male allotype are deposited in the RBINS.

Cyoceraphron fuscopleuralis Dessart, 1978

Johnson & Musetti 2004: 46.

Material examined

Holotype

DEMOCRATIC REPUBLIC OF THE CONGO • ♀; “Yalokombe B41”; 3 Nov. 1951; “Coll. Debauche”; “R. I. Sc. N. B. /I. G. 24.778”; “Prép. microscopique n° 7707/291”; RBINS; PSUC_FEM000147267.

Allotype

DEMOCRATIC REPUBLIC OF THE CONGO • ♂; same collection data as for holotype; “Prép. microscopique n° 7707/292”; RBINS.

Paratype

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♂; same collection data as for holotype; “Prép. microscopique n° 7708/221”; RBINS.

Remarks

Male known but male genitalia unknown. Described from a series of 38 specimens (males and females) (Dessart 1978: 280–282). Keyed in Dessart (1994a). Only one coxa and one femur of the female holotype are left attached to the card and the right antenna is slide mounted. The rest is lost. The left middle and hind legs, except coxae, and the left fore and hind wings of the male allotype are missing. The metasoma and both fore wings of the male paratype are missing. The damage occurred during shipment from RBINS. Dessart (1994a) described four subspecies (*C. fuscopleuralis fuscopleuralis*, *C. fuscopleuralis longiscapus*, *C. fuscopleuralis perfuscus*, *C. fuscopleuralis taiwanensis*) which slightly differ in colour patterns, antennal segment ratios, the arrangement of the posterior mesosomal comb, and geographical range. Detailed comparisons of male genitalia of the subspecies might reveal true species limits (see also Dessart 1994a: 33). For comparisons with similar species, see remarks under *Cyoceraphron harpe* sp. nov. and *C. dhahabudosalis* sp. nov.

Biology

Unknown.

Distribution

Afrotropical (including Kenya), and Indomalayan.

Type depositories

The female holotype, 26 female paratypes, one male allotype and 10 male paratypes are deposited in the RBINS. Two females and one male paratype are deposited in the PPRI (Dessart 1978: 282). Further specimens of subspecies are deposited in the CNC, NHMUK and RBINS (Dessart 1994a).

Cyoceraphron radula Dessart, 1994

Johnson & Musetti 2004: 46.

Remarks

Male unknown. Described from three females (Dessart 1994a: 38–42).

Biology

Unknown.

Distribution

Afrotropical: Gabon and Nigeria.

Type depositories

The female holotype is deposited in the NHMUK, one female paratype is deposited in the CNC and one female paratype is deposited in the RBINS.

Cyoceraphron variipictus Dessart, 1994

Johnson & Musetti 2004: 46.

Remarks

Male known but male genitalia unknown. Described from 13 females and 8 males (Dessart 1994a: 44–48).

Biology

Unknown.

Distribution

Afrotropical: Gabon.

Type depositories

The female holotype, one female paratype and one male allotype are deposited in the NHMUK. Remaining specimens are deposited in the CNC and the RBINS.

Comments on previously described species of *Megaspilidae*

The focus of the present study is on the family Ceraphronidae because overwhelmingly more material of this family was available for study compared to Megaspilidae. Accordingly, also the number of newly described and treated species is higher in Ceraphronidae. We refrained from commenting on all previously described Afrotropical species of Megaspilidae (for current status of knowledge, see Johnson & Musetti 2004).

Three previously described species of Megaspilidae were also found in the present study. For these species, we complement the current knowledge with additional information on body and male genitalia characters, analogous to the treatments of newly described species.

Family Megaspilidae Ashmead, 1893
Subfamily Megaspilinae Masner & Dessart, 1967
Genus *Dendrocerus* Ratzeburg, 1852

Dendrocerus africanus (Risbec, 1958)
Fig. 104

Johnson & Musetti 2004: 86.

Dendrocerus africanus – Mikó 2012e, 2012f, 2012g (male genitalia external and internal and ventral and dorsal view).

Diagnosis

Proximal quarter of metatibia transparent; flagellomeres cylindrical and F1 to F6 branched; scape longer than F1 to F3 combined; head width $1.92 \times$ interorbital space; OOL $1.78 \times$ lateral ocellus size; OOL:LOL 1.23; mesoscutum width $1.75 \times$ mesoscutellum width; mesoscutellum length $1.02 \times$ mesoscutellum width. Male genitalia: harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.25; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and distolaterally oriented with small protrusions in approximately basal quarter, slightly concave and converging distomedially in approximately apical three quarters; volsella with four distal setae, oriented distomedially and distoventrally; distolateral margin of gvc strongly descending in ventral quarter; genital length $2.12 \times$ gvc width.

Material examined

KENYA • 1 ♂; Western Province, Kakamega Forest; 00°21'7.9 N, 34°52'2.6 E; 1597 m a.s.l.; 2 Jul. 2007; F. Hita Garcia leg.; Transect 7; primary rain forest; Winkler leaf litter extraction; ZFMK; ZFMK-HYM-00037005.

Description (based on ZFMK-HYM-00037005)

Male

BODY LENGTH. 2.44 mm.

COLOUR. Head black, mesosoma black, metasoma dark brown; scape and pedicel light brown, flagellum dark brown; fore and middle leg yellowish except pro- and mesocoxa dark brown, hind leg brown except metacoxa black and proximal quarter of metatibia transparent; fore wing venation brown, fore and hind wing disc slightly melanized.

ANTENNA. 11-segmented, flagellomeres cylindric and F1 to F6 branched; scape $4.7\times$ as long as pedicel, scape longer than F1 to F3 combined, F1 $0.2\times$ as long as F1 branch, F1 $1.2\times$ as long as pedicel, F1 branch $0.7\times$ as long as F2 branch, F2 branch $0.9\times$ as long as F3 branch, F1 shorter than F7 and F8 combined, F1 shorter than F9, F6 $0.6\times$ as long as F6 branch, F6 $4.6\times$ as long as wide, F6 shorter than F7 and F8 combined, F6 $0.7\times$ as high as F9; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of F1 to F7.

HEAD. Head width $1.33\times$ head height; head width $1.92\times$ interorbital space; maximum eye diameter $1.14\times$ minimum eye diameter; head height $1.80\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina distinct. OOL:POL:LOL 1.00:1.86:0.81; OOL $1.78\times$ lateral ocellus size. White, thick setae on upper face absent; supraclypeal depression present; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.03\times$ mesosoma width; Weber length $950\ \mu\text{m}$. Mesoscutum densely setose, setae curved backwards; notaulus present; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus slightly concave; dorsal axillar area densely setose, setae curved backwards; mesoscutellum densely setose, setae curved backwards or straight. Mesoscutum width $1.75\times$ mesoscutellum width; posterior mesoscutal width $1.20\times$ mesoscutellum width; mesoscutellum length $1.02\times$ mesoscutellum width; mesoscutellum length $0.85\times$ posterior mesoscutal width; Weber length $1.09\times$ mesoscutum width; Weber length $1.86\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex straight and oriented posterodorsally in lateral view with pointed and bifurcated end, extending to end of mesosoma; mesometapleural sulcus present; posterior propodeal projection conspicuously short in ventrolateral view; posterior mesosomal comb absent. At least ten distinct, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and synsternum.

FORE WING. Length $2.31\times$ width; stigmal vein slightly longer than pterostigma marginal length; pterostigma present.

MALE GENITALIA. Genital length $344\ \mu\text{m}$; Weber length $2.76\times$ genital length; gvc width $163\ \mu\text{m}$; genital length $2.12\times$ gvc width; gvc width more than half of gvc length; gvc width $1.31\times$ distal gvc width. Proximodorsal margin of gvc straight; distodorsal margin of gvc strongly descending proximomedially in median part, lateral part convex (Fig. 104C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximally and at lateral volsella margin strongly ascending distomedially (Fig. 104A); ventral area of gvc convex; dorsal area of gvc slightly convex (Fig. 104B); proximolateral margin of gvc strongly ascending ventrally; distolateral margin of gvc strongly descending in ventral quarter (Fig. 104B). Harpe finger-shaped in ventral and dorsal view; harpe/gvc index 0.25; lateral articulation site of harpe with gvc not flush (Fig. 104A, C); ventral margin of harpe straight and slightly curved distodorsally at its middle, dorsal margin concave with distinct setae-bearing protrusions (Fig. 104B), lateral margin slightly convex, widest point of harpe at lateral articulation site

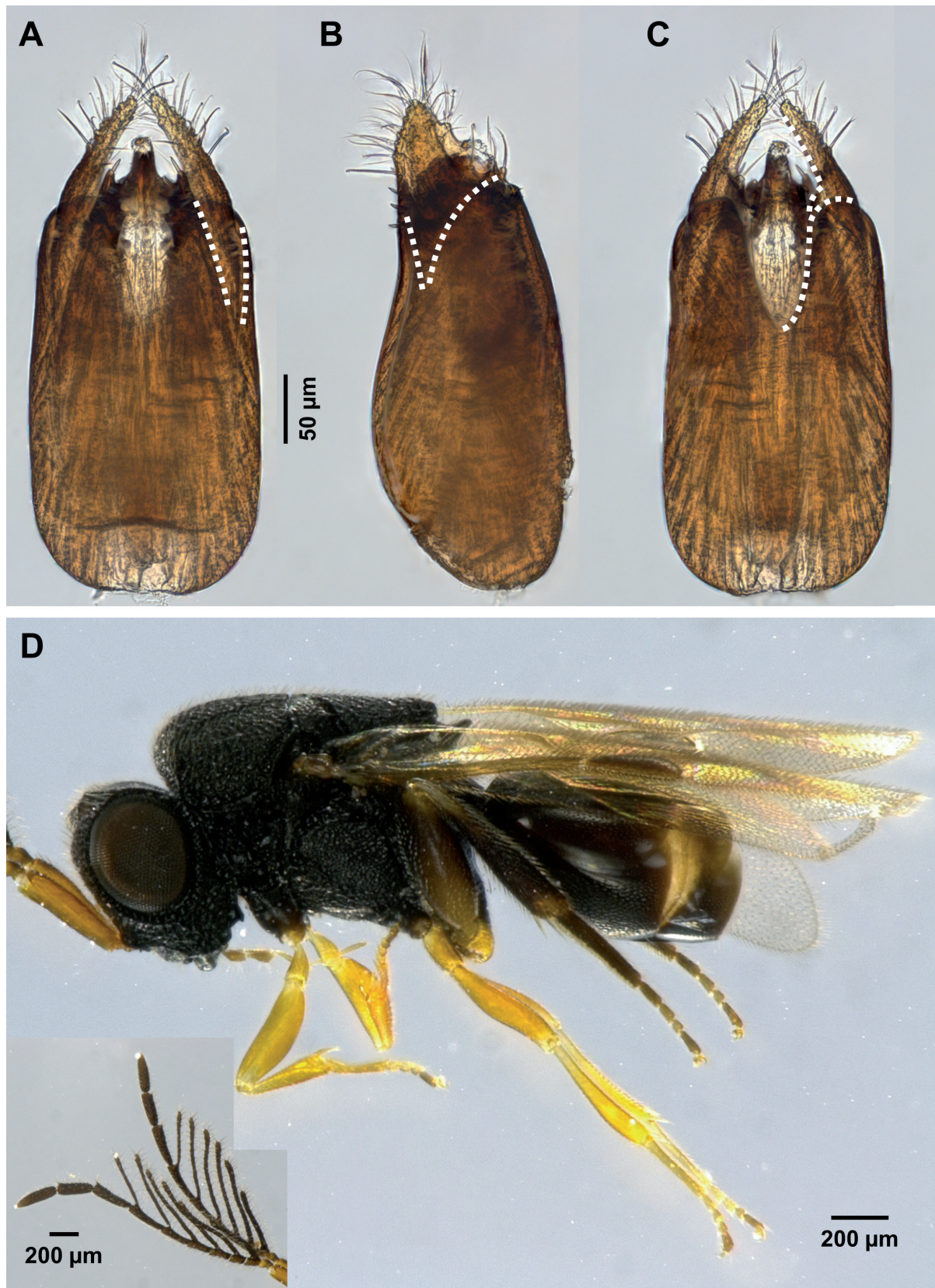


Fig. 104. Specimen of *Dendrocerus africanus* (Risbec, 1958) (ZFMK-HYM-00037005). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view; inset: antennae.

with gvc (Fig. 104A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe convex and distolaterally oriented with small protrusions in approximately basal quarter, slightly concave and converging distomedially in approximately apical three quarters (Fig. 104C), apex of harpe pointed, oriented distomedially (Fig. 104A, C). Harpe with at least eight lateral setae, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally, distoventrally and medioventrally; harpe with at least two apical setae, longest apical setae two thirds as long as harpe, apical setae distinctly crossing and oriented distomedially and distoventrally; harpe with at least seven median setae, longest median setae half as long as harpe, median setae distinctly crossing and oriented distomedially, distoventrally and medioventrally; volsella with four distal setae, oriented distomedially and distoventrally (Fig. 104A). Aedeagus + gonossiculus more than two thirds as long as harpe, apex of aedeagus + gonossiculus rounded (Fig. 104A, C) and dorsal to apex of harpe. Genitalia strongly sclerotized with strongest sclerotization at distal volsella and aedeagus + gonossiculus and weakest sclerotization at apical half of harpe and basal part of aedeagus + gonossiculus.

Female

See measurements of apallotype by Dessart (1999: 198) [type terminology taken from Dessart (1999)].

Variation

The male genitalia of the specimen (7209/291), which is illustrated by Dessart (1999: 199, fig. 48), show asymmetrical setae at the volsella (three on the right and four on the left side; ZFMK-HYM-00037005 has four setae on both sides).

Biology

Host unknown, ZFMK-HYM-00037005 collected from leaf litter.

Distribution

Afrotropical: Democratic Republic of the Congo, Ivory Coast, Kenya and Uganda.

Type depository

The male holotype, and at least three male specimens and one female apallotype are deposited in the RMCA. For more details see Dessart (1999: 200).

Remarks

Male and male genitalia known. The specimen ZFMK-HYM-00037005 is recognised as *Dendrocercus africanus* (Risbec, 1958), based on the distinct character combination described and illustrated by Risbec (1958), Dessart (1962) and Dessart (1999). The most obvious character is the sixfoldedly branched antenna. However, Dessart (1999) already mentioned intraspecific variability in the number of branches of the antenna. Thus, this character alone might not be sufficient for species delimitation. Dessart (1999) also described the bifurcated shape of the anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex and the colouration of the hind leg, and added a detailed drawing of the male genitalia. In addition, Mikó (2012e, 2012f, 2012g) provided CLSM volume rendered media files of the male genitalia. All examined body and male genitalia characters of *D. africanus* match with ZFMK-HYM-00037005.

The posterior part of the metasoma of ZFMK-HYM-00037005 is detached, thus the body length measurement is not precise.

Dendrocerus anneckeii Dessart, 1985

Fig. 105

Johnson & Musetti 2004: 87.

Mikó *et al.* 2011: 356, 359, 363–364, 366.

Diagnosis

Flagellum brown, gradually lightening from F1 to F9; OOL $2.52 \times$ lateral ocellus size; supraclypeal depression absent; OOL:POL 0.71; mesoscutum width $2.21 \times$ mesoscutellum width; fore wing length $2.63 \times$ width. Male genitalia: harpe triangular in apical half in ventral and dorsal view and rounded in lateral view; harpe/gvc index 0.31; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and converging and touching distomedially in approximately basal third, straight and oriented laterally at approximately basal third, straight and diverging distolaterally in approximately apical two thirds; ventral margin of harpe convex in basal third, slightly concave in middle-third and convex in apical third.

Material examined

Neotype (hereby designated)

TANZANIA • ♂; Kilimanjaro Region, Mount Kilimanjaro; $3^{\circ}4'50.5$ S, $37^{\circ}17'33.4$ E; 3880 m a.s.l.; 26 Sep. 2012; KiLi project leg.; “high 3”; FER0, *Erica trimera* forest; Coloured pan trap; ZFMK; ZFMK-HYM-00037087.

Holotype

SOUTH AFRICA • ♀; Pietermaritzburg, Thornveld; 20 Nov. 1963; E. Haeselbarth leg.; RBINS; PSUC_FEM000147268.

Condition: completely detached from card and missing.

Allotype

SOUTH AFRICA • ♂; Giants Castle Reserve, forest; 1800 m a.s.l.; 11 Nov. 1963; E. Haeselbarth leg.; RBINS.

Condition: mesosoma with legs attached to card, left protibia and protarsus missing, left middle and hind legs missing except meso- and metacoxae and mesotrochanter, and right metatibia and metatarsus missing. Rest missing.

Paratypes

SOUTH AFRICA • 1 ♀; Rustenburg “Tul.”; Mar. 1981; reared by S. Kamburov, ex *Conwentzia capensis* Tjeder, 1969; “Prép. microscopique n° 8104/081”; RBINS.

Condition: only one hind wing attached to card and right antenna and one fore wing on slides. Rest missing.

SOUTH AFRICA • 1 ♀; Rustenburg “Tul.”; Mar. 1981; reared by S. Kamburov, ex *Conwentzia capensis* Tjeder, 1969; “C 360”; RBINS.

Condition: completely detached from card and missing.

ZIMBABWE • 1 ♀; Harare; May–Jul.; A. Watsham leg.; “Prép. microscopique n° 8104/087”; RBINS.

Condition: only one leg attached to card. Rest missing.

ZIMBABWE • 1 ♀; Harare; May–Jul.; A. Watsham leg.; RBINS.

Condition: completely detached from card and missing.

Description

Male

BODY LENGTH. 2.75 mm.

COLOUR. Head dark brown, mesosoma dark brown, metasoma brown; scape and pedicel light brown, flagellum brown, gradually lightening from F1 to F9; legs brown; fore wing venation brown, fore and hind wing disc slightly melanized.

ANTENNA. 11 segmented, flagellomeres cylindric and F1 to F5 serrated, serration gradually weakening from F1 to F6; scape $6.0\times$ as long as pedicel, scape as long as F1 and F2 combined, F1 $1.8\times$ as long as wide, F1 $3.2\times$ as long as pedicel, F1 $1.1\times$ as long as F2, F1 shorter than F7 and F8 combined, F1 longer than F9, F6 $2.3\times$ as long as wide, F6 shorter than F7 and F8 combined; numerous distinctly small multiporous plates on flagellomeres, sensillae on flagellomeres erect and longer than width of F1 to F7.

HEAD. Head width $1.30\times$ head height; head width $1.57\times$ interorbital space; maximum eye diameter $1.18\times$ minimum eye diameter; head height $2.03\times$ maximum eye diameter. Dorsal margin of occipital carina ventral to dorsal margin of lateral ocellus in lateral view; preoccipital furrow indistinct; preoccipital carina distinct. OOL:POL:LOL 1.00:1.41:0.62; OOL $2.52\times$ lateral ocellus size. White, thick setae on upper face absent; supraclypeal depression absent; lateral margin of torulus slightly raised; intertorular carina present; posterolateral processes of gena absent.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Head width $1.06\times$ mesosoma width; Weber length $840\ \mu\text{m}$. Mesoscutum setose, setae curved backwards; notaulus incomplete, only in anterior part; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus convex; dorsal axillar area sparsely setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width $2.21\times$ mesoscutellum width; posterior mesoscutal width $1.48\times$ mesoscutellum width; mesoscutellum length $1.49\times$ mesoscutellum width; mesoscutellum length $1.00\times$ posterior mesoscutal width; Weber length $1.41\times$ mesoscutum width; Weber length $2.10\times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus present; posterior propodeal projection absent; posterior mesosomal comb absent. At least six distinctly short, basal longitudinal carinae on syntergum; pairs of translucent patches on metasomal syntergum and systernum.

FORE WING. Length $2.63\times$ width; stigmal vein slightly longer than pterostigma marginal length; pterostigma present.

MALE GENITALIA. Genital length $275\ \mu\text{m}$; Weber length $3.05\times$ genital length; gvc width $169\ \mu\text{m}$; genital length $1.63\times$ gvc width; gvc width three quarters of gvc length; gvc width $1.22\times$ distal gvc width. Proximodorsal margin of gvc convex with median part slightly concave; distodorsal margin of gvc indistinct in median part, lateral parts slightly convex (Fig. 105C); proximoventral margin of gvc strongly concave; distoventral margin of gvc descending proximomedially and at lateral volsella margin ascending distomedially (Fig. 105A); ventral area of gvc slightly convex; dorsal area of gvc slightly convex (Fig. 105B), strongly indented distomedially; proximolateral margin of gvc ascending ventrally; distolateral margin of gvc descending ventrally (Fig. 105B). Harpe triangular in apical half in ventral and dorsal view and rounded in lateral view; harpe/gvc index 0.31; lateral articulation site of harpe with gvc not flush (Fig. 105A, C); ventral margin of harpe convex in basal third, slightly concave in

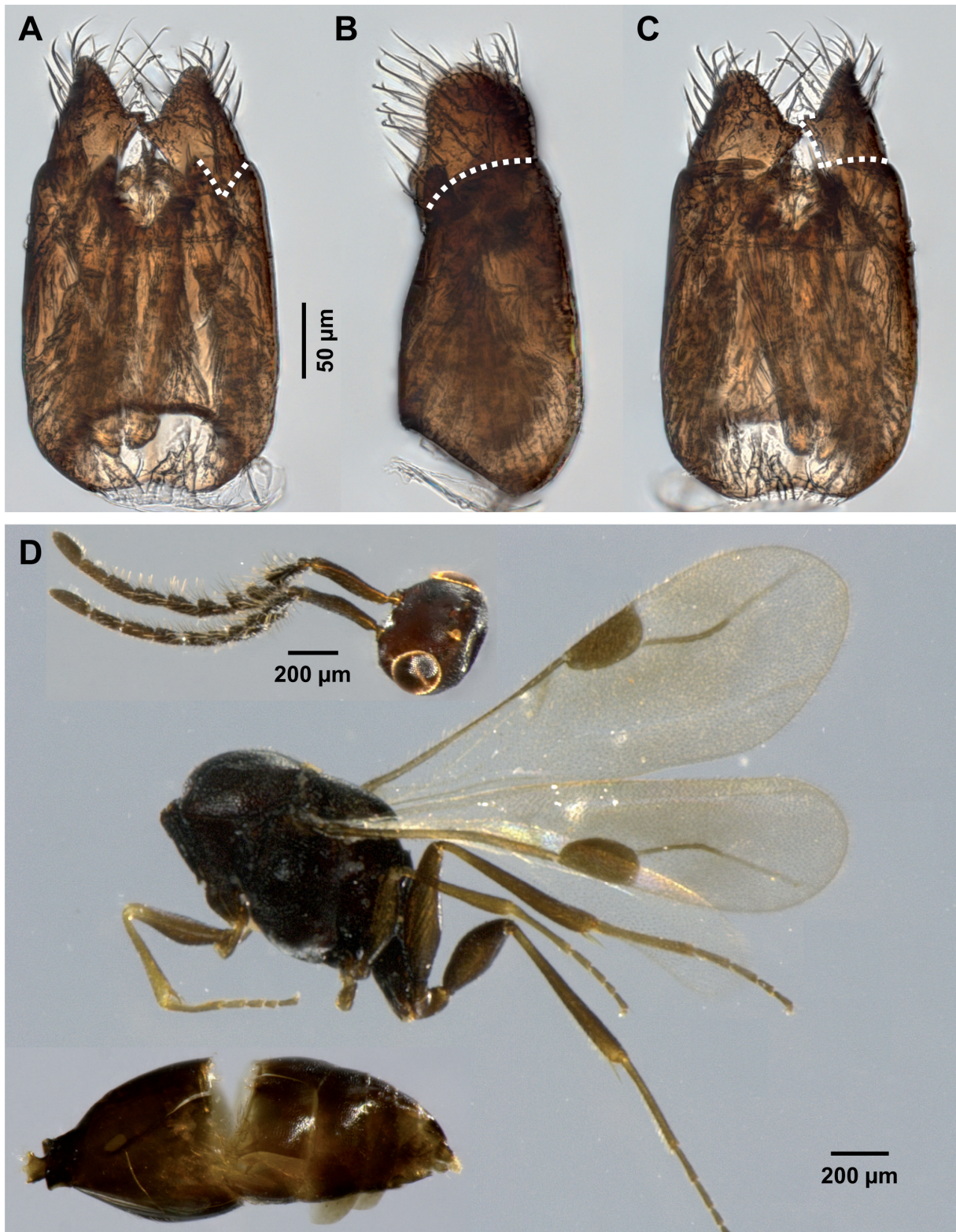


Fig. 105. Neotype of *Dendrocerus anneckei* Dessart, 1985 (ZFMK-HYM-00037087). A–C. Male genitalia in ventral (A), lateral (B) and dorsal (C) views. D. Habitus in lateral view.

middle-third and convex in apical third, dorsal margin convex (Fig. 105B), lateral margin straight and slightly concave apical third, widest point of harpe at lateral articulation site with gvc (Fig. 105A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe slightly concave and converging and touching distomedially in approximately basal third, straight and oriented laterally at approximately basal third, straight and diverging distolaterally in approximately apical two thirds (Fig. 105C), apex of harpe pointed, oriented distolaterally (Fig. 105A, C). Harpe with at least 13 lateral setae, longest lateral setae two thirds as long as harpe, lateral setae oriented distolaterally, distoventrally and medioventrally; harpe with at least two apical setae, longest apical setae two thirds as long as harpe, apical setae oriented distomedially and distoventrally; harpe with at least eight median setae, longest median setae slightly less than as long as harpe, median setae distinctly crossing and oriented distomedially and distoventrally; volsella with at least one distal seta, oriented distomedially (Fig. 105A). Aedeagus + gonossiculus less than one quarter as long as harpe, apex of aedeagus + gonossiculus acute (Fig. 105A, C) and dorsal to apex of harpe. Genitalia strongly sclerotized.

Female

See Dessart (1985: 418–424).

Variation

In the male genitalia of the paratype (8104/087), which is illustrated in ventral view by Dessart (1985: 420, fig. 17), a straight and laterally oriented part in the basal third of the dorsomedial margin of the harpe is only indicated and not as distinct as in Fig. 105A, C.

Biology

Reared from pupae of *Conwentzia capensis* Tjeder, 1969 (Neuroptera: Coniopterygidae) (Dessart 1985). ZFMK-HYM-00037087 was collected with coloured pan trap.

Distribution

Afrotropical: Democratic Republic of the Congo, Somalia, South Africa, Tanzania, Yemen and Zimbabwe.

Type depositories

The female holotype, four female paratypes and the male allotype were deposited at RBINS but were severely damaged (allotype, two female paratypes) or completely destroyed and lost (holotype, two female paratypes) during shipment to ZFMK for examination (for details on the material and the damage see Material Examined section above). Two male paratypes are still at the RBINS. A couple of paratypes of unknown sex are deposited at the CNC (Dessart 1985: 423) and five female paratypes are deposited in “Pretoria” (presumably PPRI). For more details see Dessart (1985). A neotype is designated herein.

Remarks

Male and female genitalia known. Beside the slight variation of the dorsomedial margin of the harpe (see above), body and female genitalia characters of ZFMK-HYM-00037087 perfectly match *D. aneckei*.

We here designate this specimen as neotype of *D. aneckei*. We refrain from choosing one of the male paratypes still present at the RBINS as neotype because the male genitalia are not visible and the paratypes were not collected at the type locality.

The head and metasoma of ZFMK-HYM-00037087 are detached, thus the body length measurement is not precise. Both F9 are deformed, thus some descriptions of F9 were not possible. The left fore leg and the right middle leg are missing (except coxae).

Dendrocerus perlucidus Alekseev, 1983

Fig. 106

Johnson & Musetti 2004: 99.

Mikó *et al.* 2011: 356, 361, 365–366, 368, 370.

Diagnosis

Harpe claw-shaped in ventral and dorsal view and rounded in lateral view; harpe/gvc index 0.38; dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe concave and converging and not touching distomedially from base to apex with apical third strongly concave; apex of harpe pointed, oriented medioventrally; apical setae oriented distomedially, distoventrally and medioventrally; legs light brown except joints and tarsi transparent; fore wing venation slightly melanized, fore and hind wing disc hyaline.

Material examined

Plesiotype

SOMALIA • ♂; Afgooye, Shabelle Valley; 16–28 Apr. 1980; M. Olmi leg.; “R. I. Sc. N. B.”; “Prép. microscopique n° 8105/261”; RBINS.

Condition: right antenna, one fore wing, metasoma on slides; male genitalia on slide according to label but we were unable to find it. Rest attached to card.

Non-type specimens

TANZANIA • 1 ♂; Kilimanjaro Region, Mount Kilimanjaro; 3°19'49.2 S, 37°38'35.2 E; 1153 m a.s.l.; 5 Nov 2012; KiLi project leg.; “high ex”; SAV3, savanna; Coloured pan trap; ZFMK; ZFMK-HYM-00037089.

SPAIN • 1 ♂; Zaragoza, Los Monegros, Pina de Ebro, “Retuerta de Pina”, *Juniperus thurifera*; 20 Jun. 1991; J. Blasco Zumeta leg.; “n° 3546”; “Prép. microscopique n° 9112/202”; RBINS.

Condition: right antenna, right fore and hind wings and metasoma missing.

SPAIN • 1 ♂; Zaragoza, Los Monegros, Pina de Ebro, “Retuerta de Pina”, *Juniperus thurifera*; 21 Jul. 1991; J. Blasco Zumeta leg.; “n° 3613”; “26–91 platos sabinar-lastonar”; RBINS.

Condition: right hind leg and left F9 missing.

Description (based on ZFMK-HYM-00037089)

Male

BODY LENGTH. 0.98 mm.

COLOUR. Mesosoma brown, metasoma light brown; legs light brown except joints and tarsi transparent; fore wing venation slightly melanized, fore and hind wing disc hyaline.

MESOSOMA, METASOMA. Mesosoma not compressed laterally. Weber length 425 µm. Mesoscutum setose, setae curved backwards; notaulus incomplete, only in anterior part; median mesoscutal sulcus present; median mesoscutal sulcus adjacent to transscutal articulation; interaxillar sulcus absent (= scutoscutellar sulcus adjacent to transscutal articulation), scutoscutellar sulcus slightly convex; dorsal axillar area sparsely setose, setae curved backwards; mesoscutellum sparsely setose, setae curved backwards or straight. Mesoscutum width 2.00× mesoscutellum width; posterior mesoscutal width 1.40×

mesoscutellum width; mesoscutellum length $1.36 \times$ mesoscutellum width; mesoscutellum length $0.97 \times$ posterior mesoscutal width; Weber length $1.36 \times$ mesoscutum width; Weber length $2.00 \times$ mesoscutellum length. Anteromedian projection of the metanoto-propodeo-metapecto-mesopectal complex absent; mesometapleural sulcus present; posterior propodeal projection absent; posterior mesosomal comb absent. At least six distinctly short, basal longitudinal carinae on syntergum; pair of translucent patches on metasomal syntergum.

FORE WING. Length $2.50 \times$ width; stigmal vein slightly longer than pterostigma marginal length.

MALE GENITALIA. Genital length $181 \mu\text{m}$; Weber length $2.34 \times$ genital length; gvc width $100 \mu\text{m}$; genital length $1.81 \times$ gvc width; gvc width more than three quarters of gvc length; gvc width $1.36 \times$ distal gvc width. Proximodorsal margin of gvc slightly convex; distodorsal margin of gvc concave in median part, lateral part convex (Fig. 106C); proximoventral margin of gvc concave; distoventral margin of gvc strongly descending proximally and at lateral volsella margin strongly ascending distomedially (Fig. 106A); ventral area of gvc straight; dorsal area of gvc convex (Fig. 106B); proximolateral margin of gvc ascending ventrally; distolateral margin of gvc strongly descending ventrally (Fig. 106B). Harpe claw-shaped in ventral and dorsal view and rounded in lateral view; harpe/gvc index 0.38; lateral articulation site of harpe with gvc not flush (Fig. 106A, C); ventral margin of harpe convex, dorsal margin convex (Fig. 106B), lateral margin convex, widest point of harpe at lateral articulation site with gvc (Fig. 106A, C); dorsomedial margins of harpes not touching at distodorsal margin of gvc, dorsomedial margin of harpe concave and converging and not touching distomedially from base to apex with apical third strongly concave (Fig. 106C), apex of harpe pointed, oriented medioventrally (Fig. 106A, C). Harpe with at least seven lateral setae, longest lateral setae more than half as long as harpe, lateral setae oriented distolaterally, distoventrally and medioventrally; harpe with at least two apical setae, longest apical setae one third as long as harpe, apical setae distinctly crossing and oriented distomedially, distoventrally and medioventrally; harpe with at least three median setae, longest median setae one third as long as harpe, median setae oriented distomedially, distoventrally and proximoventrally; volsella with at least one distal seta, oriented distomedially and distoventrally (Fig. 106A). Aedeagus + gonossiculus more than half as long as harpe, apex of aedeagus + gonossiculus broad (Fig. 106A, C) and dorsal to apex of harpe. Genitalia moderately sclerotized with strongest sclerotization at distal volsella and aedeagus + gonossiculus.

Female

Unknown (Dessart 1985).

Variation

Unknown.

Biology

Host unknown, ZFMK-HYM-00037089 collected with coloured pan trap.

Distribution

Afrotropical: Ethiopia, Saudi Arabia, Somalia and Tanzania. Palearctic: Spain

Type depositories

The male holotype is deposited at the ZMMU and ten males are deposited in the RBINS.

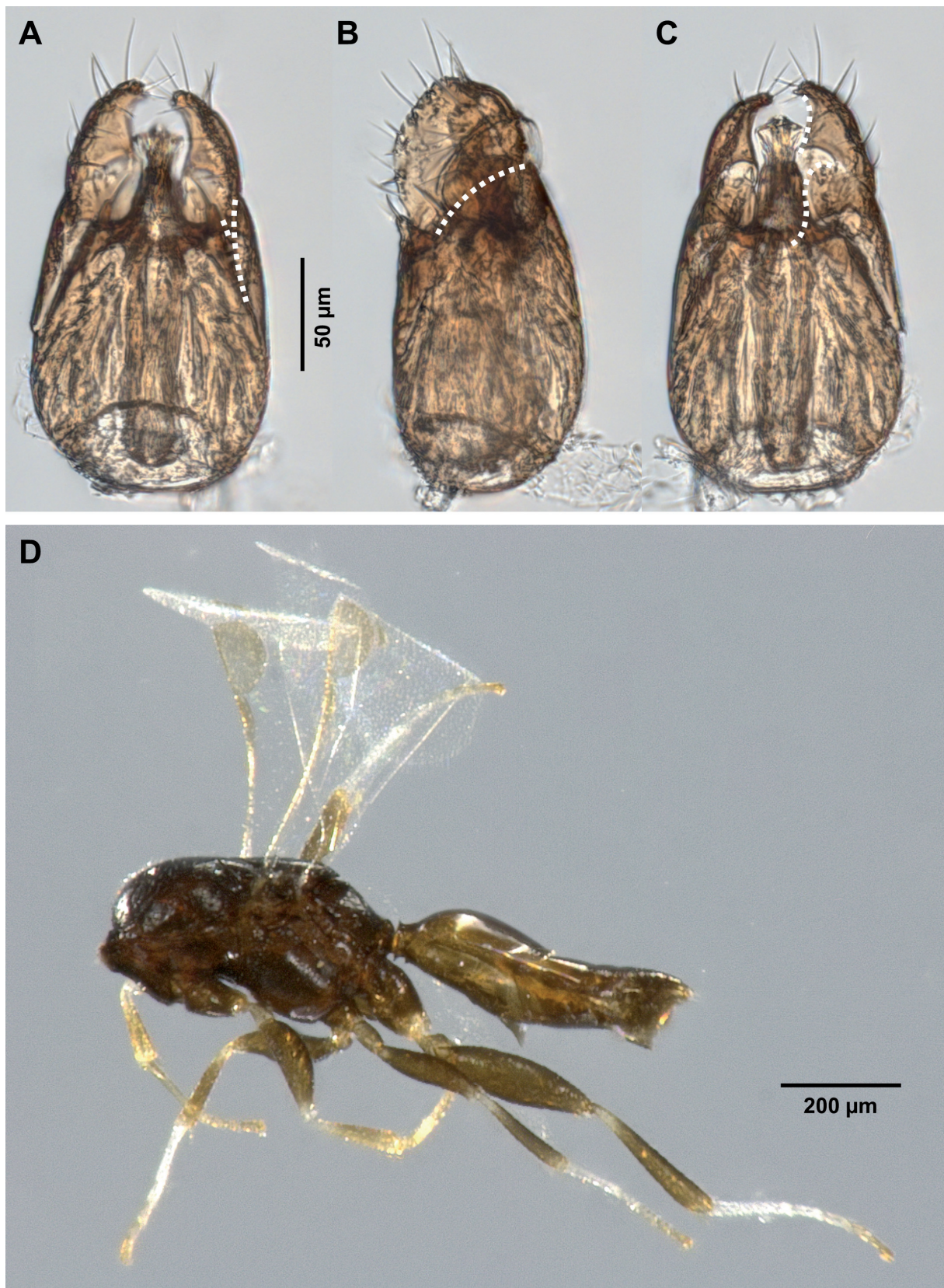


Fig. 106. Specimen of *Dendrocerus perlucidus* Alekseev, 1983 (ZFMK-HYM-00037089). **A–C.** Male genitalia in ventral (A), lateral (B) and dorsal (C) views. **D.** Habitus in lateral view.

Remarks

Alekseev (1983: 641, fig. 3) provided a drawing of the male genitalia of *D. perlucidus*, which was also used by Dessart (1985: 445, fig. 89). The male genitalia perfectly match with those of ZFMK-HYM-00037089. The male genitalia are very distinct and can be easily recognised by their claw-shaped harpe, medioventrally oriented apex of the harpe and the distal seta at the volsella. Furthermore, the hyaline fore and hind wing discs with the weakly melanized veins and the transparent tarsi are distinct diagnostic characters of *D. perlucidus*. Therefore, specimen ZFMK-HYM-00037089 can clearly be assigned to *D. perlucidus* even without examining the head and antennae (see below).

In ZFMK-HYM-00037089, the head and antennae are missing, thus the complementing description of these body parts was not possible. The metasoma is deformed, thus the body length measurement is not precise.

Discussion

This is the first taxonomic monograph on Afrotropical mainland Ceraphronoidea. Furthermore, it is the first taxonomic study on this group and region since 1999 when the last five species of Megaspilidae were described, which totals 65 described Afrotropical mainland species of Ceraphronoidea (Dessart 1999). Considering that Ceraphronoidea is a superfamily separated from its closest relatives presumably for more than 200 Ma (Peters *et al.* 2017), it is one of the most abundant hymenopteran lineages in the understorey of tropical forests (Querino *et al.* 2011; Silva & Feitosa 2017) and the fourth most commonly collected hymenopteran superfamily (Martínez de Murgía *et al.* 2001; Schmitt 2004) this is highly astonishing, if not disturbing. Even without any further insights into Ceraphronoidea diversity this already directly implies that they are grotesquely understudied and that the currently described diversity will not reflect true species diversity. It is time to put them back on the map.

This study is not intended to be a taxonomic revision but rather a contribution highlighting the necessity and also the possibility of targeting the ceraphronoid fauna of the Afrotropics, despite the seemingly endless obstacles. We describe almost 90 species, but realize that this is just a small fraction of Afrotropical ceraphronoid diversity.

For species delimitation, we mainly use male genitalia. This has been suggested before and done in selected single species and in the megaspilid genus *Conostigmus* (majority of Paul Dessart's publications since 1963; Mikó *et al.* 2013, 2016; Ulmer *et al.* 2018; Trietsch *et al.* 2020) but has never been explored over a larger diversity with larger series. These larger series, however, allowed for some necessary insights into intra- and interspecific variation in this trait. Sharkey (1988), for example, demonstrated in his revision of *Alabagrus* Enderlein, 1920 (Braconidae) on the basis of large series, that even the same character can show different degrees of intraspecific variation in species of the same genus. Furthermore, ceraphronoid wasps also tend to show allometric variations in certain morphological characters which might complicate species delimitations (Mikó *et al.* 2013). Ideally, all taxonomic work should be based on series not singletons; for Ceraphronoidea, focusing on Ceraphronidae, this is the first study to do this.

Using male genitalia comes with a challenge, though. Not only is there limited information on the function of the different parts of the genitalia which might help in interpreting differences (Schulmeister 2001; Mikó *et al.* 2013), but they are also very small, often soft and transparent, and accordingly very hard to properly preserve and curate. We developed a best practice standard for preserving the genitalia, based on experience and discussions with colleagues (Mikó I., Trietsch C., Schweizer T., pers. com.). This topic is of particular importance because if the delicate genitalia are lost or damaged, species recognition and future delimitations will in many cases be impossible. With the methods chosen, we think that the name-bearing material will be accessible and examinable, even in the long term.

We did not include any molecular sequence data. This is certainly not ideal because we strongly support the concept of integrative taxonomy to allow for better and easier species delimitations. Further, molecular sequence data might allow for matching females and males. However, in pre-study experiments, we consistently failed to extract and sequence suitable DNA from our specimens (unpublished). The material had not been adequately stored to facilitate DNA extraction and sequencing. Further, it has been difficult to retrieve DNA and, for example, DNA barcode data from ceraphronoids; a problem that might be solved or improved upon by a very recently published protocol that was not available to us (Vasilita *et al.* 2022). Other techniques, such as target DNA enrichment or whole genome sequencing, allow for generating sequence data even from small, poor-quality DNA, however, for specimens as small as ceraphronoids they are expensive and still in their infancy. Accordingly, we made a decision to study the unique material at hand based on morphology only. Recently, Ulmer *et al.* (2021) showed that the Waterston's evaporatorium (present only in Ceraphronidae) has the potential to hold species-specific characteristics and to contribute to species delimitations using both sexes. This will be necessary to explore further in any future taxonomic study on ceraphronoids.

Not only can species delimitation be challenging, but also genus-level classification in Ceraphronoidea requires revision. In this study, we assign all species to established genera, but cannot help but notice that this assignment is not easy and unambiguous in all cases. Dessart (1965) already mentioned doubts about *Aphanogmus* Thomson, 1858 being a monophyletic genus. Furthermore, the family Ceraphronidae contains a high number of monotypic genera, 9 out of 16 (Dessart & Cancemi 1987). These monotypic genera usually show only one odd morphological aberration compared to species commonly assigned to *Aphanogmus* or *Ceraphron* and should therefore be treated with caution. This uncertainty was also pointed out by Dessart (1975b) in his description of the genus *Cyoceraphron*. Another recent example for challenging genus-level classification in Ceraphronoidea is shown by Ulmer *et al.* (2021) in their phylogenetic analysis, based on morphological characters from the Waterston's evaporatorium. Difficulties in distinguishing genera are also known from *Conostigmus* Dahlbom, 1858 and *Dendrocerus* Ratzeburg, 1852 (Bijoy *et al.* 2014). Accordingly, genus-level reclassification is necessary; however, it was clearly outside of the scope of our study.

When looking at species numbers described here, there is a clear bias towards Ceraphronidae compared to Megaspilidae (85 vs 3), although the number of previously described species in both families was almost equal. This bias is likely due to the fact that most of our material is from leaf litter in which Ceraphronidae are abundant and Megaspilidae are not (pers. obs.; see also Silva & Feitosa 2017). Also, the coloured pan traps at Mt. Kilimanjaro yielded more new Ceraphronidae species than Megaspilidae species. This limited set of collection sites and collecting methods, however, does not allow the conclusion that Ceraphronidae are in fact much more species diverse than Megaspilidae in the Afrotropics.

The species numbers found in this study allow an educated estimate of the real total worldwide species number of Ceraphronoidea. Our estimate is based on a comparison of the data on Kakamega Ceraphronidae with the data on better studied taxa at Kakamega Forest. Applying the Chao 2 estimator (Chao 1987), 122 species of Ceraphronidae can be expected at Kakamega Forest, with 72 actually recorded herein (for underlying data see Supp. file 4: Table S3). Odonata (Clausnitzer 2005) and bees (Gikungu 2006) have been extensively studied at the Kakamega Forest, with both studies likely approaching a complete inventory for the respective taxon. When using the numbers in odonates (72 species at Kakamega Forest (Clausnitzer 2005) of 6322 described worldwide (Sandall *et al.* 2022)) and bees (243 species found at Kakamega Forest (Gikungu 2006) of 19 944 described worldwide (Aguiar *et al.* 2013)) along with the Ceraphronidae species number estimated with the Chao estimator (122 species), 10 712 or 10 013 species of Ceraphronidae can be expected worldwide, respectively. When using the actually recorded 72 Ceraphronidae species, the estimated world species numbers for Ceraphronidae are 6322 or 5909, respectively. Assuming that the sister family Megaspilidae is approximately equally species-rich,

taking the number of currently described species and recent studies indicating a very high number of undescribed species in Megaspilidae (Mikó *et al.* 2016; Trietsch *et al.* 2020) into account, we estimate 12 000–21 000 species of Ceraphronoidea worldwide (with ~730 described species so far). This estimate roughly matches the numbers in Chalcidoidea, with 23 000 described and 500 000 estimated species (Munro *et al.* 2011), indicating a similar issue among parasitoid wasp superfamilies. The estimated high undescribed diversity of Ceraphronoidea is tentatively corroborated by the available DNA barcode sequence data in BOLD (Barcode of Life database) and the number of BINs when these are interpreted as putative species: In Ceraphronidae plus Megaspilidae, less than 10 000 sequences already form almost 1300 BINs (www.boldsystems.org, accessed 21/11/2022).

While this study significantly increases the taxonomic knowledge of Afrotropical Ceraphronoidea, it cannot comprehensively contribute to our knowledge on the biology of the group. Ceraphronoidea are frequently collected in leaf litter and harbour some few species of agricultural and economic relevance which are comparatively well studied (Boenisch *et al.* 1997; Mikó *et al.* 2013; Ortiz-Martínez & Lavandero 2017; Silva & Feitosa 2017), but generally the biology of ceraphronoid wasps is barely known; only few publications mention host associations, already reporting a wide range of life histories (Parnell 1963; Dessart & Bournier 1971; Cooper & Dessart 1975; Fergusson 1980; Kamarudin *et al.* 1996; Luhmann *et al.* 1999; Hayat *et al.* 2003). We can confirm that leaf litter is a habitat in which many ceraphronoid (especially ceraphronid) specimens and species can be found but cannot give any additional information.

In conclusion, both the number of newly described and estimated species impressively demonstrate that there is much diversity yet to be discovered. This pursuit of discovery is also in a race against habitat destruction and degradation. Habitat loss is particularly severe in tropical rainforests and this also includes Kakamega Forest, despite it being officially protected since 1933 (KIFCON 1994). An increased rate of human impact by settlement, logging, and agricultural activities has intensified the isolation of the rainforest which is now only a small fragment; the easternmost remnant of the Guineo-Congolian rainforest belt (Onyango *et al.* 2004; Mitchell *et al.* 2009; Müller & Mburu 2009). Also, habitats and biodiversity along the slopes of Mt. Kilimanjaro are under severe anthropogenic pressure (Hemp & Hemp 2018; Peters *et al.* 2019). Some of the species we here make available to science and conservation may have already gone extinct or have experienced drastic population loss. This taxonomic study is just the first step, a crucial one, though. All aspects of biodiversity research and conservation must be intensified to prevent habitat loss, species loss, and loss of genetic diversity. Especially in Ceraphronoidea and other parasitoid wasps there is a mountain to climb, higher than the Kilimanjaro, without even a long and winding road laid on the gravel. Here, we show that despite this, it is necessary and also possible to set out and walk. This hopefully will serve as an impetus for future studies on ceraphronoids and parasitoid wasps of the Afrotropics and the world.

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Supplementary material

Supp. file 1. Fig. S1. Maps with sampling locations of the taxonomically studied specimens. **A.** A map of Africa with the three sampling locations in Gabon, Ivindo National Park (yellow square), in Kenya, Kakamega Forest (orange square) and in Tanzania, Mt. Kilimanjaro (blue square). The dashed line represents the equator. **B.** A map of the detailed transect locations in and near the Kakamega Forest (Kenya). **C.** A map of the detailed sampling locations on and near Mt Kilimanjaro (Tanzania). Corresponding transects and codes are listed in the Material Examined section of each species description. <https://doi.org/10.5852/ejt.2023.884.2181.9337>

Supp. file 2. Table S1. Full list of measurements (in μm , holotypes highlighted in red). <https://doi.org/10.5852/ejt.2023.884.2181.9339>

Supp. file 3. Table S2. Full list of ratios (holotypes highlighted in red). <https://doi.org/10.5852/ejt.2023.884.2181.9341>

Supp. file 4. Table S3. List of specimens from Kakamega Forest, including detailed locality information (holotypes highlighted in red, measured specimens highlighted in orange) and Chao 2 estimator calculation. <https://doi.org/10.5852/ejt.2023.884.2181.9343>