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Research article

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New genera of stiletto flies endemic to Madagascar (Therevidae: Therevinae)

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Abstract. Two new endemic genera of Therevinae are described from Madagascar. *Rinhatiana* gen. nov. contains three new species (*R. arctifestuca* gen. et sp. nov., *R. cracentis* gen. et sp. nov. and *R. latifestuca* gen. et sp. nov.) as well as *R. distincta* (Lyneborg, 1976) comb. nov., which is transferred from *Stenopomyia* Lyneborg, 1976. *Tianarinha* gen. nov. is described containing two new species, *T. goodmani* gen. et sp. nov. and *T. micet* gen. et sp. nov. All species are diagnosed and figured along with distribution data.

Keywords. Asiloidea, Diptera, Madagascar, lower Brachycera.

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Introduction

Stiletto flies (Diptera Linnaeus, 1758: Therevidae Newman, 1834) are present in all major biogeographical regions with over 1250 species in ca 130 genera. The family is divided into four subfamilies, Phycusinae Lyneborg, 1976, Xestomyzinae Lyneborg, 1976, Agapophytinae Winterton, 2001 and Therevinae Newman, 1834. In the Ethiopian Region (sensu Morrone & Ebach 2022), Therevinae are the dominant subfamily with 67 species, followed by Phycusinae (57 spp.) and Xestomyzinae (40 spp.); Agapophytinae are absent from the region (Hauser *et al.* 2017; Winterton *et al.* 2023). Ethiopian Therevinae are placed in 10 genera, *Caenophthalmus* Kröber, 1931; *Hoplosathe* Lyneborg & Zaitzev, 1980; *Irwiniella* Lyneborg, 1976; *Neophycus* Kröber, 1931; *Neotherevella* Lyneborg, 1978; *Pseudothereva* Lyneborg, 1976; *Schoutedenomymia* Kröber, 1936; *Stenopomyia* Lyneborg, 1976; *Stenosathe* Lyneborg, 1976 and *Thereva* Latreille, 1796 (Lyneborg 1976, 1980). Winterton *et al.* (2023) recently revised the genus *Neotherevella*, including describing a new Ethiopian species from the Western Cape of South Africa.

Madagascar is well known for the high level of endemism of its macro fauna and flora (see Wilmé *et al.* 2006). In contrast, the Malagasy stiletto fly fauna displays relatively little endemism at the generic level and of the 26 genera in the family found throughout the Ethiopian Region, only one (i.e., *Stenopomyia*) is known only from Madagascar (Lyneborg 1972, 1976; Irwin 2003; Hauser & Irwin 2005). Other genera with representatives in Madagascar include *Irwiniella*, *Microgephyra* Lyneborg, 1972 (Xestomyzinae) and *Rueppellia* Wiedemann, 1830 (Phycusinae).

The Arthropod Survey of Madagascar's Protected Areas was a large faunal study of Diptera of the country initiated by the senior author and the late Evert I. Schlinger (Kirk-Spriggs 2017). This survey, while broad in coverage, focused on several families of flies including stiletto flies (Therevidae) and small-headed flies (Acroceridae Leach, 1815). In particular, large numbers of specimens of Therevidae were collected, dramatically increasing our knowledge of the Malagasy fauna. This paper is a product of that project to document the Therevidae of Madagascar, and, herein, we describe two new endemic genera. *Rinhariana* gen. nov. contains three newly described species (*R. arctifestuca* gen. et sp. nov., *R. cracentis* gen. et sp. nov. and *R. latifestuca* gen. et sp. nov.) while *R. distincta* (Lyneborg, 1976) comb. nov. is transferred from *Stenopomyia*. *Tianarinha* gen. nov. is described and contains two new species, *T. goodmani* gen. et sp. nov., and *T. micet* gen. et sp. nov. All species are diagnosed and figured, and a key to species is presented.

Material and methods

Terminology follows Cumming & Wood (2017) with additional therevid-specific genitalic morphology according to Winterton *et al.* (1999a, 1999b). Genitalia were macerated in lactic acid or potassium hydroxide to remove soft tissue, then rinsed in distilled water (neutralized with acetic acid as needed) and dissected in 80% ethanol. Genitalia preparations were placed in glycerin in genitalia vials and mounted on the pin beneath each specimen. Specimen images were taken at different focal points using a digital camera (Leica M170 mounted on a Leica M205C stereo microscope) and subsequently combined into a serial montage image using Helicon Focus (HeliconSoft Ltd. Kharkiv, Ukraine). Distribution maps were generated using SimpleMappr software (Shorthouse 2010).

Collection depositories from which specimens were examined or deposited:

- NHMUK = The Natural History Museum, London, UK
- CASC = California Academy of Sciences, San Francisco, USA
- CSCA = California State Collection of Arthropods, Sacramento, USA

Malaise trapping survey

A network of Malaise traps was placed, preferably in protected environments, to conduct a survey of Malagasy insects, including Therevidae. To capture flies that are uncommonly collected in nature and those that may have very short adult lifespans, traps were allowed to operate continuously and emptied approximately every ten days over the course of a survey year. Traps were placed in multiple sites in each major ecological region of Madagascar. Due to costs of equipment and difficulties in travel in remote areas only a few regions were surveyed over any given year. Thus, the survey was staggered such that trapping in all localities was not concurrent throughout the country. Moreover, almost all traps were operated for at least a year at each site, trapping dates may not have been continuous and could represent multiple years of intermittent trapping. The trapping program ran for approximately 22 years and was officially concluded in 2021, although sorting of Malaise trap material continued beyond that date.

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Diptera Linnaeus, 1758
Family Therevidae Newman, 1834
Subfamily Therevinae Newman, 1834
Thereva genus group (sensu Winterton *et al.* 2016)

Rinhatiana gen nov.

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Type species

Rinhatiana latifestuca gen. et sp. nov.

Diagnosis

Male and female with single row of postocular macrosetae (rarely more); prosternal setae absent medially; two pairs of scutellar macrosetae; setae absent on metanepisternum and posterior surface of mid coxa; wing vein R_1 with setulae along dorsal surface; wing cell m_3 open.

Differential diagnosis

Rinhatiana gen. nov. belongs to the subfamily Therevinae (characterized by the presence of adpressed, scale-like setae on the femora), but has setulae along wing vein R_1 , a character shared with *Tianarinha* gen. nov. and the New World therevine genus *Protothereva* Malloch, 1932. It can be separated from *Tianarinha* by the absence of prosternal setae and two pairs of scutellar setae (in *Tianarinha* prosternal setae are present medially and there is only one pair of scutellar setae). In addition, it is separated from *Schoutedenomyia* by the presence of regular sized macrosetae on the foretibia (relatively small in *Schoutedenomyia*). It is distinguished from *Stenopomyia* and *Stenosathe* by the wavy R_4 vein in the wing (straight or gradually curved in *Stenopomyia* and *Stenosathe*).

Etymology

'*Rinhatiana*' is a combination of the nicknames of two key personnel in Madagascar who contributed significantly to the project on the Diptera of Madagascar. We have the honor of naming this genus after Rasolondalao Harin'Hala Hasinjaka (also known as Rin'ha) and Razafindratsita Vololontiana (also known as Tiana). Rin'ha managed and coordinated the Malaise trapping and sample sorting for the project throughout Madagascar, while Tiana managed the administrative aspects of the project within the Madagascar Institut pour la Conservation des Ecosystemes Tropicaux (MICET). Gender is female.

Description

Relatively small individuals with sparse vestiture.

HEAD. Higher than long; frons flat, pubescent silver-tan dorsally, silver ventrally, matte black band medially; frons width strongly sexually dimorphic, male frons width at narrowest point narrower than ocellar tubercle width, nearly contiguous in some species, inner margin of female compound eyes subparallel; parafacial without setae; face flat; postocular ridge of male and female with single row of macrosetae along postocular ridge, rarely two distinct rows; occiput pubescence dull silver to gray or brown; gena rounded; antenna subequal to head length, positioned on lower half of head, directed anteriorly; scape relatively short, cylindrical, less than $3 \times$ pedicel length; flagellum tapered cone-shaped, subequal to combined length of scape and pedicel, style apical, elongate; palpus slender, mouthparts short.

THORAX. Central depression of prosternum bare, without setae; cervical sclerite lacking macrosetae; scutum covered with filiform setae, often of variable length; pleuron overlain with silver-tan pubescence; metanepisternum with postspiracular setae absent; metakatepisternum with setae absent; femora relatively short, hind femur and tibia distinctly longer and thicker than fore and mid legs; posterior surfaces of mid- and hind coxae without setae, hind coxal knob present; femoral vestiture includes filiform seta admixed with adpressed, lanceolate and scale-like setae; forefemur and midfemur macrosetae absent, hind femur with 0–3 subapical anteroventral macrosetae, posteroventral macrosetae present as subapical series; tibial macrosetae regular sized; scutal chaetotaxy (pairs of macrosetae): notopleural, 3; supra alar, 1 (rarely 2); post alar, 1; dorsocentral, 0–1; scutellar, 2; wing smoky (light infuscate), vein R_1 with setulae present on dorsal surface, R_4 slightly wavy, cell m_3 open, veins M_3 and M_4 separate to margin, wing membrane uniformly covered with microtrichia.

ABDOMEN. Relatively slender, slightly narrowed along length.

TERMINALIA. Epandrium slightly arched, posterolateral corners thickened and pointed; gonocoxites separate medially with posteromedial margins proximal; inner gonocoxal process (igp) present, not articulated; outer gonocoxal processes well-developed; ventral lobe large, elongate and narrow apically; phallus with dorsal apodeme of parameral sheath triangular, separate from gonocoxites laterally; ventral apodeme single lobe, narrow, single sub-triangular lobe; distiphallus narrow, short; female tergite 8 elongate with anteromedial process; sternite 8 posterior margin emarginate posteromedially; female acanthophorite setae as two sets (A1 & A2), A1 setae usually enlarged; spermathecal sac as single lobe with spermathecal ducts originating on main spermathecal sac duct; two spermathecae.

Remarks

Rinhatiana gen. nov. is a distinctive genus of diminutive flies likely the sister genus to *Tianarinha* gen. nov. The presence of setulae along the dorsal surface of wing vein R_1 is known in all Phycusinae (except for *Schlingeria* Irwin, 1977) and in only one genus of Xestomyzinae (*Henicomys* Coquillett, 1898). They are absent in all known Agapophytinae, while in Therevinae setulate along R_1 is only found in the South American genus *Protothereva* and some species of the Australian genus *Anabarhynchus* Macquart, 1848. *Protothereva* is placed in the predominantly New World *Cerocatus* genus group, likely close to *Brachylinga* Irwin & Lyneborg, 1981, while *Rinhatiana* and *Tianarinha* are placed in the largely Old World *Thereva* genus group, closely related to *Stenopomyia*, *Stenosathe*, *Megapalla* Lyneborg, 2001 and *Schoutedenomyia*. Webb & Metz (2003) mentioned that some undescribed species of *Stenopomyia* had R_1 setulae. Those species are described here in the genera *Rinhatiana* and *Tianarinha*. In addition, one previously described species, *Stenopomyia distincta* Lyneborg, 1976, also has R_1 setulae and is placed in *Rinhatiana*.

Rinhatiana arctifestuca gen. et sp. nov.

urn:lsid:zoobank.org:act:4247C900-00F3-435E-B883-572A5925FDF5

Figs 1–2, 9A–B, 15A, 16A–B, L, 18

Diagnosis

Frons predominantly matte black and silver pubescent, tan pubescence dorsally (Fig. 9A–B); male eyes nearly contiguous; single row of postocular macrosetae in both sexes; dorsocentral macrosetae absent; one supra alar macroseta (Figs 1–2); male abdomen yellow with silver pubescence laterally, suffused with black distally and posterolaterally on some distal tergites (Fig. 1).

Differential diagnosis

Rinhatiana arctifestuca gen. et sp. nov. differs from all other members of the genus by a distinctive pattern of frontal pubescence (Fig. 9A–B), yellow abdomen with black distally and broad gonostylus in

the male genitalia. Amongst other characters, it differs from *R. cracentis* gen. et sp. nov. by the bright silver pubescence around the base of the antennae (silver-tan in *R. cracentis*), from *R. distincta* by the presence of a single pair of supra alar macrosetae (two pairs in *R. distincta*), and from *R. latifestuca* gen. et sp. nov. by the presence of tan pubescence dorsally on the frons (lacking in *R. latifestuca*).

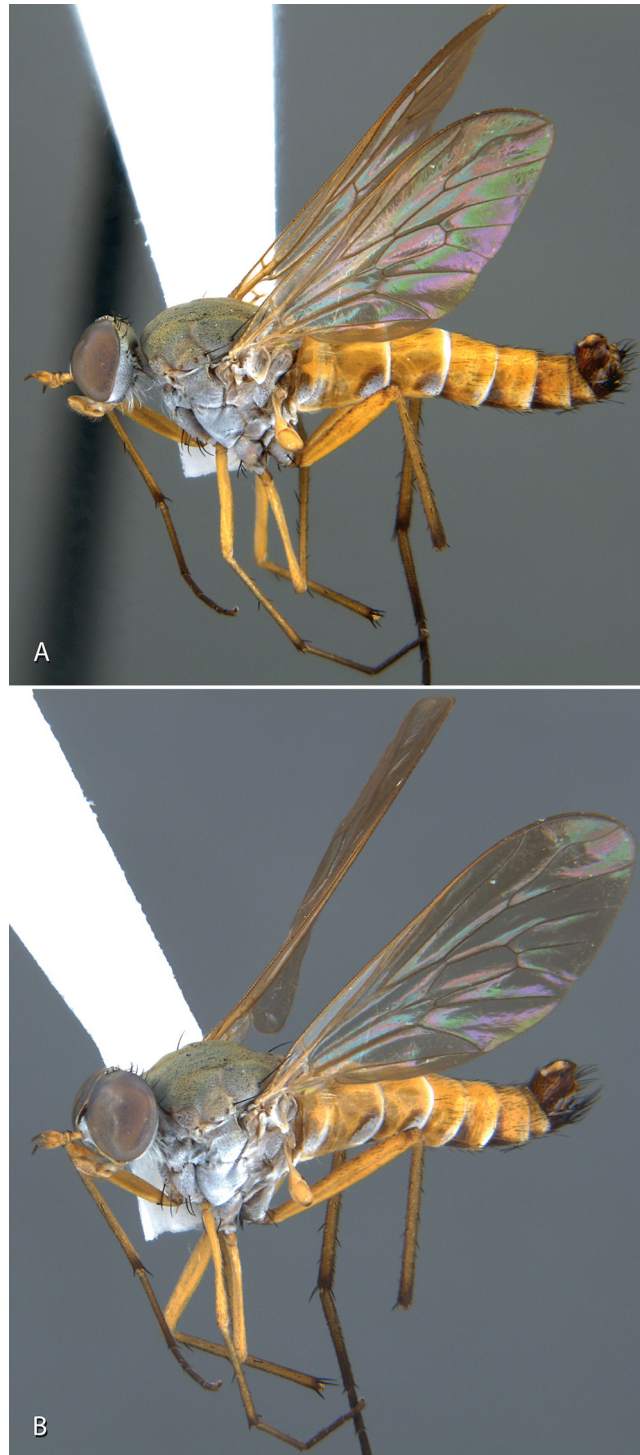


Fig. 1. *Rinhatiana arctifestuca* gen. et sp. nov., ♂, paratype (CASC). **A.** Lateral view. **B.** Oblique view.

Etymology

The specific epithet is derived from the Latin ‘*arcto*’ (‘narrow’) and ‘*festuca*’ (‘stalk’). Gender is female.

Material examined

Holotype

MADAGASCAR – Mahajanga Province (Sofia Region) • ♂; 5 km W of Anjiamangirana; 15.1571° S, 47.7341° E; 97 m a.s.l.; 4–11 Jul. 2013; M.E. Irwin and R. Harin’Hala leg.; Malaise in Analagnambe gallery forest; CASC.

Paratypes

MADAGASCAR – Mahajanga Province (Sofia Region) • 34 ♂♂, 10 ♀♀; same collection data as for holotype; various dates: 16 Aug.–6 Sep. 2012, 13–20 Sep. 2012, 28 Sep.–4 Oct. 2012, 27 Jun.–11 Jul. 2013, 18–25 Jul. 2013, 22–29 Aug. 2013, 12–19 Dec. 2013, 29 Sep.–5 Dec. 2013, 18–25 Sep. 2014;



Fig. 2. *Rinhatiana artifestuca* gen. et sp. nov., ♀ (CASC). **A.** Lateral view. **B.** Oblique view.

CASC. – **Antsiranana Province, Sava Region** • 6 ♀♀; Binara, 9 km SW of Daraina; 13.2489° S, 49.6174° E; 182 m a.s.l.; 3–16 Jul. 2011; M.E. Irwin and R. Harin’Hala leg.; Malaise in Antsahabelela degraded rainforest; CASC.

Other material

MADAGASCAR – **Mahajanga Province (Sofia Region)** • 31 ♂♂, 46 ♀♀; 5 km W of Anjiamangirana; 15.1571° S, 47.7341° E; 97 m a.s.l.; various dates: 26 Jul.–16 Aug. 2012, 6–28 Sep. 2012, 6–13 Jun. 2013, 20–27 Jun. 2013, 11–18 Jul. 2013, 25 Jul.–1 Aug. 2013, 8–15 Aug. 2013, 29 Aug.–5 Sep. 2013, 5–12 Dec. 2013, 7 Aug.–18 Sep. 2014, 25 Sep.–2 Oct. 2014; M.E. Irwin and R. Harin’Hala leg.; Malaise in Analagnambe gallery forest; CSCA. – **Antsiranana Province (Sava Region)** • 17 ♂♂, 35 ♀♀; Binara, 9 km SW of Daraina; 13.2489° S, 49.6174° E; 182 m a.s.l.; various dates: 3–10 Jul. 2011, 20–27 Jul. 2011, 12 Aug.–23 Sep. 2011; M.E. Irwin and R. Harin’Hala leg.; Malaise in Antsahabelela degraded rainforest; CASC.

Description

BODY LENGTH. 5.0–6.0 mm (male), 6.0–7.5 mm (female).

HEAD. Frontal pubescence silver ventrally, gray-tan dorsally, separated by matte black band medially, extending dorsally and ventrally (Fig. 9A–B); male frons width at narrowest point narrower than anterior ocellus but eyes not contiguous; frontal vestiture absent; ocellar tubercle gray pubescent, setae absent; black postocular macrosetae in single row immediately laterad of ocellar tubercle in both sexes; occiput pubescence tan-brown; genal setae pale; antennal scape short, cylindrical, dark yellow, sparsely covered with short, dark macrosetae; flagellum shape conical, tapered distally, orange-yellow, terminus dark.

THORAX. Scutum tan-brown to yellow with gray areas laterally and medially, scattered short dark setae; scutellum dark yellow (female) or brownish orange, dark brown anteromedially (male); pleuron with dense silver-gray pubescence; katatergite setae uniform pale; scutal and scutellar macrosetae black, relatively elongate; coxae yellow, overlain with silver-gray pubescence, minor setae white; black macrosetae few in number; femora yellow with sparse, short filiform setae admixed with sparse, black, adpressed scale-like setae distally (at least on hind femur); femoral macrosetae black, hind femur with subapical series of short posteroventral macrosetae, subapical anteroventral setae present; tibiae yellow, dark gray-brown apically; tarsi basitarsi yellow, dark distally, remaining tarsal segments brown; wing faint infusate, darker anteriorly; venation dark yellow basally along major veins, darker distally; haltere dark yellow; scutal chaetotaxy: notopleural, 3, supra alar, 1; post alar, 1; dorsocentral, 0; scutellar, 2.

ABDOMEN. Male abdomen dark yellow, darker brown posterolaterally on most tergites, silver velutum present on tergites 2–7; scattered dark setae, denser posteriorly and on terminalia, filiform setae admixed with adpressed setae; female abdomen similar to male; terminalia brown (male) or dark yellow (female).

MALE GENITALIA. Epandrium quadrangular, strongly arched around midline, posterolateral thickening relatively broad medially; gonocoxites with elongate macrosetae laterally on outer gonocoxal process, outer gonocoxal process well-developed, narrowly subtriangular; ventral lobe elongate, broadly rounded; gonostylus with broad lateral flange along most of length; distiphallus relatively broad; sternite 8 sub-quadrangular, few setae posterolaterally.

Remarks

Rinhatiana arctifestuca gen. et sp. nov. is very similar in appearance to *R. latifestuca* gen. et sp. nov., especially in the frontal pubescence pattern. Unlike other species in this genus, *R. arctifestuca* appears restricted to northern Madagascar where it has been collected in dry deciduous forest habitats.

Rinhatiana cracentis gen. et sp. nov.

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Figs 3–4, 9C–D, 15B, 16C–D, M, 18

Diagnosis

Frons grayish silver ventrally and light brown dorsally, separated by diffuse band of matte black pubescence (Fig. 9C–D); male eyes nearly contiguous; single row of postocular macrosetae in both sexes; dorsocentral macrosetae absent; one supra alar macroseta (Figs 3–4); abdomen predominantly dark brown, dark yellow dorsally (Figs 3–4); male genitalia with distiphallus with apical flanges (Fig. 16C–D).

Differential diagnosis

Rinhatiana cracentis gen. et sp. nov. differs from all other members of the genus by a distinctive pattern of frontal pubescence (Fig. 9C–D), predominantly dark brown and yellow abdomen and distiphallus with apical flanges in the male genitalia. Amongst other characters, it differs specifically from *R. arctifestuca*



Fig. 3. *Rinhatiana cracentis* gen. et sp. nov., ♂, paratype (CSCA). **A.** Lateral view. **B.** Oblique view.

gen. et sp. nov. and *R. latifestuca* gen. et sp. nov. by the silver-tan pubescence around the base of the antennae (bright silver in *R. arcifestuca* and *R. latifestuca*), and from *R. distincta* by the presence of a single pair of supra alar macroseta (two pairs in *R. distincta*).

Etymology

The specific epithet is the Latin term for graceful, slender. Gender is female.

Material examined

Holotype

MADAGASCAR – Tulear Province (Atsimo-Andrefana Region) • ♂; Beza Mahafaly Reserve, Parcel I; 23.6565° S, 44.6291° E; 165 m a.s.l.; 9–16 Jan. 2002; R. Harin’Hala and M.E. Irwin leg.; Malaise in dry gallery forest; MEI151225; CASC.

Paratypes

MADAGASCAR – Tulear Province (Atsimo-Andrefana Region) • 4 ♀♀; same collection data as for holotype; various dates: 28 Nov.–4 Dec. 2001, 18–25 Dec. 2002, 2–9 Jan. 2002; MEI 138465, 151218, 151222, 151223; CSCA • 4 ♂♂, 2 ♀♀; Beza Mahafaly Reserve, Parcel II; 23.6865° S, 44.5908° E; 200 m a.s.l.; various dates: 28 Nov.–4 Dec. 2001, 4–11 Dec. 2001, 9–16 Jan. 2002; R. Harin’Hala and M.E. Irwin leg.; Malaise in spiny forest; MEI151220, 151221, 151226, 151227; CSCA • 11 ♂♂, 1 ♀; Sept Lacs; 23.5208° S, 44.1597° E; 120 m a.s.l.; 21–26 Aug. 2002; Frontier Wilderness Project leg.; Malaise trap MFGF038; CASLOT044923; CASC.



Fig. 4. *Rinhatiana cracentis* gen. et sp. nov., ♀, paratype (CASC). **A.** Lateral view. **B.** Dorsolateral view.

Other material

MADAGASCAR – **Tulear Province (Atsimo-Andrefana Region)** • 40 ♂♂, 4 ♀♀; Makay Mountains, Mahosoa; 21.1286° S, 45.4152° E; 537 m a.s.l.; 30 Jul.–3 Aug. 2017; B.L. Fisher leg.; Malaise in disturbed tropical dry forest on sand; CASC. – **Tulear Province (Anosy Region)** • 1 ♀; Mangosy Andohaëla National Park, Parcel I; 24.762° S, 46.767° E; 240 m a.s.l.; 10–15 Jun. 2003; M.E. Irwin and R. Harin’Hala leg.; Malaise in tropical rainforest; CASC.

Description

BODY LENGTH. 4.5–6.0 mm (male), 5.5–7.0 mm (female).

HEAD. Frontal pubescence light brown dorsally, grayish-silver ventrally, separated by irregular, diffuse dark band; male frons width at narrowest point narrower than anterior ocellus but eyes not contiguous; frontal vestiture absent; ocellar tubercle tan-gray pubescent, setae absent; black postocular macrosetae in single row immediately laterad of ocellar tubercle, similar in both sexes; occiput pubescence silver-gray with brown suffusion medially; genal setae pale; antennal scape short, cylindrical, dark yellow, sparsely covered with short, dark macrosetae; flagellum conical, tapered distally, brownish orange, darker distally.

THORAX. Scutum gray-tan with pair of dorsocentral stripes along length, darker laterally in female, sparse short pale setae; scutellum concolorous with scutum (paler in female); pleuron dark brown (male) to yellowish (female) with dense silver-gray pubescence; katatergite setae pale; scutal and scutellar macrosetae black; coxae in female yellow, darker in male, overlain with silver-gray pubescence, minor setae white and sparse, macrosetae black and few in number; legs dark yellow (female) to light brown (male), hind leg darker; short dark setae admixed with longer pale setae and black adpressed scale-like setae; hind femur typically with single subapical anteroventral macroseta and subapical series of short posteroventral macrosetae; basitarsi yellow, dark distally, remaining tarsal segments brown; wing uniform smoky infusate, venation yellow basally along major veins, darker distally; haltere dark yellow or brown; scutal chaetotaxy (pairs): notopleural, 3; supra alar, 1; post alar, 1; dorsocentral, 0; scutellar, 2.

ABDOMEN. Male abdomen dark brown, yellow posteriorly on tergites, intersegmental membranes white, scattered dark setae, denser posteriorly and on terminalia; female abdomen brown, tergites predominantly dark yellow, especially posteriorly and laterally, intersegmental membrane distinctly pale, well defined, terminalia brown to dark yellow.

MALE GENITALIA. Epandrium quadrangular, strongly arched along midline, thickened posterolaterally, corners acute; hypandrium small, band-like; outer gonocoxal process sub-triangular with elongate macrosetae; gonostylus relatively narrow with small lateral flanges; inner gonocoxal process elongate with few setae apically; ventral lobe elongate and narrow; phallus with distiphallus relatively broad with lateral flanges apically; sternite 8 bilobed posteriorly with setae laterally on each lobe.

Remarks

Rinhatiana cracentis gen. et sp. nov. is unlike all other species in the genus by the body color being predominantly dark brown and dark yellow. All other species are predominantly bright yellow. This species is known from spiny thicket and forest habitats in southern Madagascar.

Rinhatiana distincta (Lyneborg, 1976) comb. nov.
Figs 5–6, 9E–F, 15D, 16K, 18

Stenopomyia distincta Lyneborg, 1976: 237.

Stenopomyia distincta – Irwin (2003: 733).

Diagnosis

Frons predominantly matte black and silver pubescent, female with tan pubescence dorsally (Fig. 9E–F); male eyes separated at narrowest point by width slightly wider than anterior ocellus; two rows of postocular macrosetae in both sexes; dorsocentral macrosetae present; two pairs of supra alar macroseta (Figs 5–6); abdomen yellow terminal segments and genitalia black, male with silver pubescence on tergites 4–7; male ventral lobe with acute processes (Fig. 16K).

Differential diagnosis

Rinhatiana distincta differs from all other members of the genus by the relatively wide male frons (Fig. 9E), presence of dorsocentral macrosetae and two pairs of supra alar macrosetae. Amongst other characters, it differs from *R. arcifestuca* gen. et sp. nov. and *R. latifestuca* gen. et sp. nov. by two pairs of supra alar macrosetae (one pair in both) and presence of dorsocentral macrosetae (absent in both). It differs from *R. cracentis* gen. et sp. nov. also in the above characters, as well as the yellow abdomen with black terminal segments (dark brown and dark yellow in *R. cracentis*).



Fig. 5. *Rinhatiana distincta* (Lyneborg, 1976) comb. nov., ♂, (CSCA). **A.** Lateral view. **B.** Oblique view.

Material examined

Holotype

MADAGASCAR – Tulear Province (Atsimo-Andrefana Region) • ♂; Zombitse Forest [Zombitse-Vohibasia National Park]; [22.886° S, 44.686° E]; 300 m a.s.l.; 22 Mar. 1968; K.M. Guichard and P.D. leg.; NHMUK.

Paratype

MADAGASCAR – Tulear Province (Atsimo-Andrefana Region) • ♀; same collection data as for holotype; NHMUK.

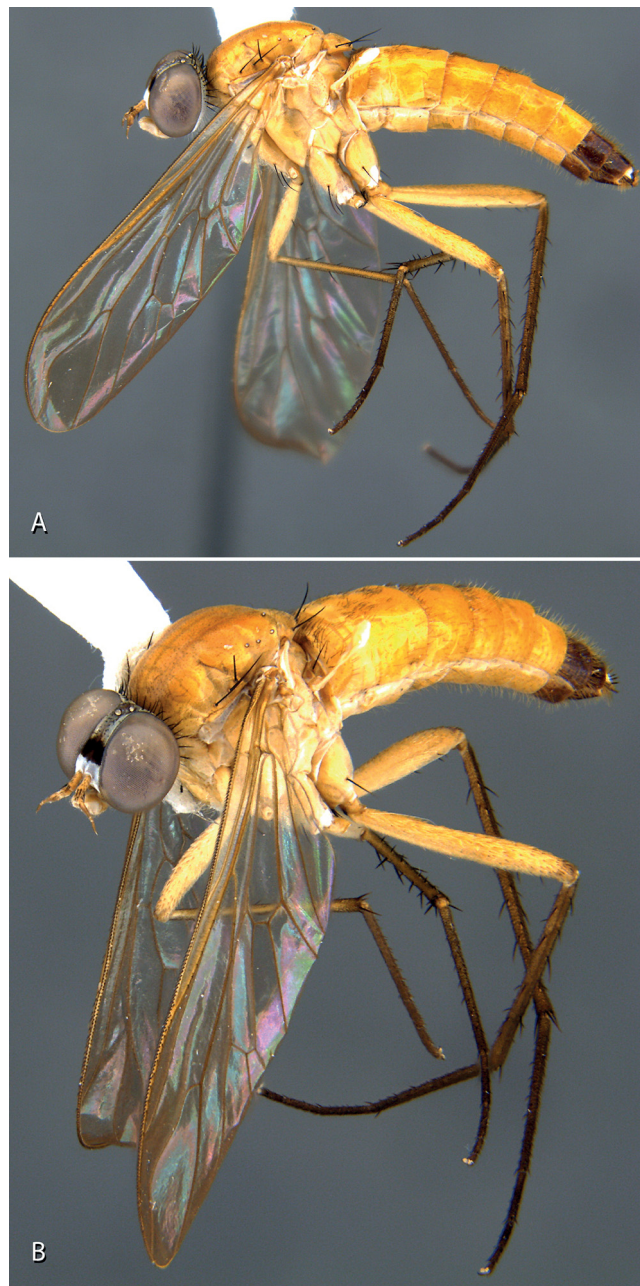


Fig. 6. *Rinhatiana distincta* (Lyneborg, 1976) comb. nov., ♀, (CSCA). **A.** Lateral view. **B.** Oblique view.

Other material

MADAGASCAR – Tulear Province (Atsimo-Andrefana Region) • 1 ♂, 1 ♀; Manombo; 22.8025° S, 43.7651° E; 227 m a.s.l.; 9–14 Apr. 2004; CAS leg.; MT in dry forest; MGF102; CASC.

Redescription

BODY LENGTH. 5.5–7.5 mm (male), 7.0–8.0 mm (female).

HEAD. Frontal pubescence silver ventrally, gray-tan dorsally, separated by broad matte black band; male frons width at narrowest point slightly wider than anterior ocellus, short black setae below ocellar tubercle, more extensive on frons in female; ocellar tubercle gray pubescent with short setae; postocular macrosetae black, in two well-defined rows in both sexes; occiput pubescence gray; genal setae pale; antennal scape shorter than flagellum, cylindrical, dark yellow, sparsely covered with short, dark macrosetae; flagellum conical, tapered distally, style greatly elongate, dark yellow with brown pubescence.

THORAX. Scutum dark yellow, markings with faint pair of dorsocentral stripes along length, scattered dark setae, denser anteriorly; scutellum dark yellow; pleuron yellow with sparse silver pubescence; katatergite setae pale; scutal and scutellar macrosetae black, relatively elongate; coxae yellow, overlain with silver-gray pubescence, minor setae white and sparse, macrosetae black and few in number; femora yellow with short dark setae admixed with longer pale setae and black adpressed scale-like setae; hind femur with 1–2 subapical anteroventral macrosetae, subapical series of short posteroventral macrosetae; tibiae dark yellow, suffused with brown, darker on hind leg; tarsi dark brown; wing hyaline, smoky infuscate apically; venation yellow basally along major veins, darker distally; haltere stem yellow, knob white; scutal chaetotaxy (pairs): notopleural, 3; supra alar, 2; post alar, 1; dorsocentral, 1; scutellar, 2.

ABDOMEN. Male abdomen dark yellow suffused with black on posterior segments, silver velutum present on tergites 4–7, elongate adpressed black setae on segments 1–3, white on segments 4–7; female abdomen dark yellow, segments 7–8 black, intersegmental membrane usually not distinct from tergite; terminalia black in both sexes.

MALE GENITALIA. Epandrium quadrangular, strongly arched along midline, posterolateral corners sharply pointed; gonocoxite rounded, with extensive large black macrosetae, longer posterolaterally; hypandrium separate from gonocoxites, band-like; outer gonocoxal process very short with elongate setae; inner gonocoxal process elongate, pointed with hemispherical dorsal ridge; gonostylus narrow, elongate and much longer than outer gonocoxal process; phallus with dorsal apodeme of parameral sheath triangular and well developed, ejaculatory apodeme narrow, lateral ejaculatory apodeme relatively small, distiphallus narrow, reflexed ventrally; ventral lobe elongate, with multiple acute branches.

Remarks

Rinhatiana distincta was originally described in the genus *Stenopomyia* by Lyneborg (1976). The presence of setulae on the dorsal surface of wing vein R_1 , a character apparently overlooked by Lyneborg, is notable in not being known in the subfamily at the time. Amongst other characters the presence of these setulae clearly places it within this new genus *Rinhatiana* gen. nov. Even here though, it has a rather isolated position, displaying several exceptional characters in the genus, including the relatively wide male frons, presence of dorsocentral macrosetae, two pairs of supra alar macrosetae, and two rows of postocular macrosetae in both sexes. This species has only been rarely collected, with all specimens known from southern Madagascar in spiny thicket habitat. Also notable is that the description and figures of the male phallus by Lyneborg (1976: figs 135, 136) appear to be incomplete and the structure was likely damaged during dissection. The dorsal apodeme of the phallus is larger and subtriangular in shape in an undamaged specimen, and typical of the genus.

Rinhatiana latifestuca gen. et sp. nov.

urn:lsid:zoobank.org:act:43F805DB-3FBE-4E56-B935-A4995BD93673

Figs 7–8, 9G–H, 15C, 16E–F, O, 18

Diagnosis

Frons entirely matte black and silver pubescent, without tan pubescence dorsally (Fig. 9G–H); male eyes nearly contiguous; single row of postocular macrosetae in both sexes; dorsocentral macrosetae absent; one pair of supra alar macrosetae (Figs 7–8); abdomen yellow with silver pubescence laterally.

Differential diagnosis

Rinhatiana latifestuca gen. et sp. nov. differs from all other members of the genus by a distinctive pattern of frontal pubescence (Fig. 9G–H) and predominantly yellow abdomen. Amongst other characters, it differs from *R. cracentis* gen. et sp. nov. by the bright silver pubescence around the base of the antennae (silver-tan in *R. cracentis*), from *R. distincta* by the presence of a single pair of supra alar macrosetae (two pairs in *R. distincta*), and from *R. arctifestuca* gen. et sp. nov. by the absence of tan pubescence dorsally on the frons (present in *R. arctifestuca*). In addition, the matte black pubescence on the dorsal portion of the female frons is wider in this species than in that of *R. arctifestuca*.

Etymology

The specific epithet is derived from the Latin ‘*latus*’ (‘broad’) and ‘*festuca*’ (‘stalk’). Gender is female.

Material examined

Holotype

MADAGASCAR – Tulear Province (Atsimo-Andrefana Region) • ♂; Ambohimahavelona; 23.4408° S, 43.8996° E; 45 m a.s.l.; 27 Dec. 2008–2 Jan. 2009; M.E. Irwin and R. Harin’Hala leg.; Malaise in spiny forest dry wash; CASC.



Fig. 7. *Rinhatiana latifestuca* gen. et sp. nov., ♂, paratype (CASC). **A.** Lateral view. **B.** Oblique view.

Paratypes

MADAGASCAR – **Tulear Province (Atsimo-Andrefana Region)** • 4 ♂♂, 3 ♀♀; same collection data as for holotype; various dates: 27 Dec. 2008–2 Jan. 2009, 17–24 Nov. 2015, 27 Dec. 2015–6 Jan. 2016; Malaise traps in hillside wash and deciduous dry forest; CASC • 13 ♂♂, 10 ♀♀; 4 km N of Manombo; 22.9036° S, 43.4755° E; 30 m a.s.l.; various dates: 12–27 Nov. 2001, 3–13 Oct. 2002, 8–19 Feb. 2002, 6–17 Mar. 2003, 2–12 Oct. 2003, 14–28 Nov. 2002; M.E. Irwin and R. Harin’Hala leg.; Malaise in Mikea deciduous dry forest; CSCA • 2 ♂♂, 2 ♀♀; 4 km NNW of Manombo; -22.9133, 43.4821; 37 m a.s.l.; 6–17 Jan. 2002; M.E. Irwin and R. Harin’Hala leg.; Malaise in spiny forest; CASC • 1 ♂; 5 km SE of Manombo; 22.9863° S, 43.5022° E; 17 m a.s.l.; 20–30 Oct. 2008; M.E. Irwin and R. Harin’Hala leg.; Malaise on path in dense forest; • 1 ♀; 3 km E of Itampolo; 24.6578° S, 43.9562° E; 45 m a.s.l.; 18–27 Mar. 2010; M.E. Irwin and R. Harin’Hala leg.; Malaise across path in Androimpano dry forest; CASC • 1 ♂, 1 ♀; 27 km N of Tongobory; 23.3461° S, 44.3581° E; 289 m a.s.l.; 22–30 Oct. 2008; M.E. Irwin and R. Harin’Hala leg.; Malaise in damp wash with spiny scrubland; CASC. – **Tulear Province (Androy Region)** • 2 ♂♂, 1 ♀; 5 km N of Ampotaka; 25.0303° S, 44.6915° E; 86 m a.s.l.; 27 Oct.–5 Nov. 2008; Malaise on trail on Vitambany gallery forest; CASC.

Other material

MADAGASCAR – **Tulear Province (Atsimo-Andrefana Region)** • 27 ♂♂, 19 ♀♀; Ambohimahavelona; 23.4408° S, 43.8996° E; 45 m a.s.l.; various dates: 27 Dec. 2008–2 Jan. 2009, 17–24 Nov. 2015, 27 Dec. 2015–6 Jan. 2016; M.E. Irwin and R. Harin’Hala leg.; Malaise traps in hillside wash and deciduous dry forest; CASC.

Description

BODY LENGTH. 5.5–7.0 mm (male), 6.5–8.0 mm (female).

HEAD. Frontal pubescence with matte black band medially, extending dorsally and ventrally (female), matte black dorsally (male), silver ventrally; male frons width at narrowest point with eyes nearly contiguous; frontal vestiture absent; ocellar tubercle gray pubescent, without setae; black postocular



Fig. 8. *Rinhatiana latifestuca* gen. et sp. nov., ♀, paratype (CASC), lateral view.

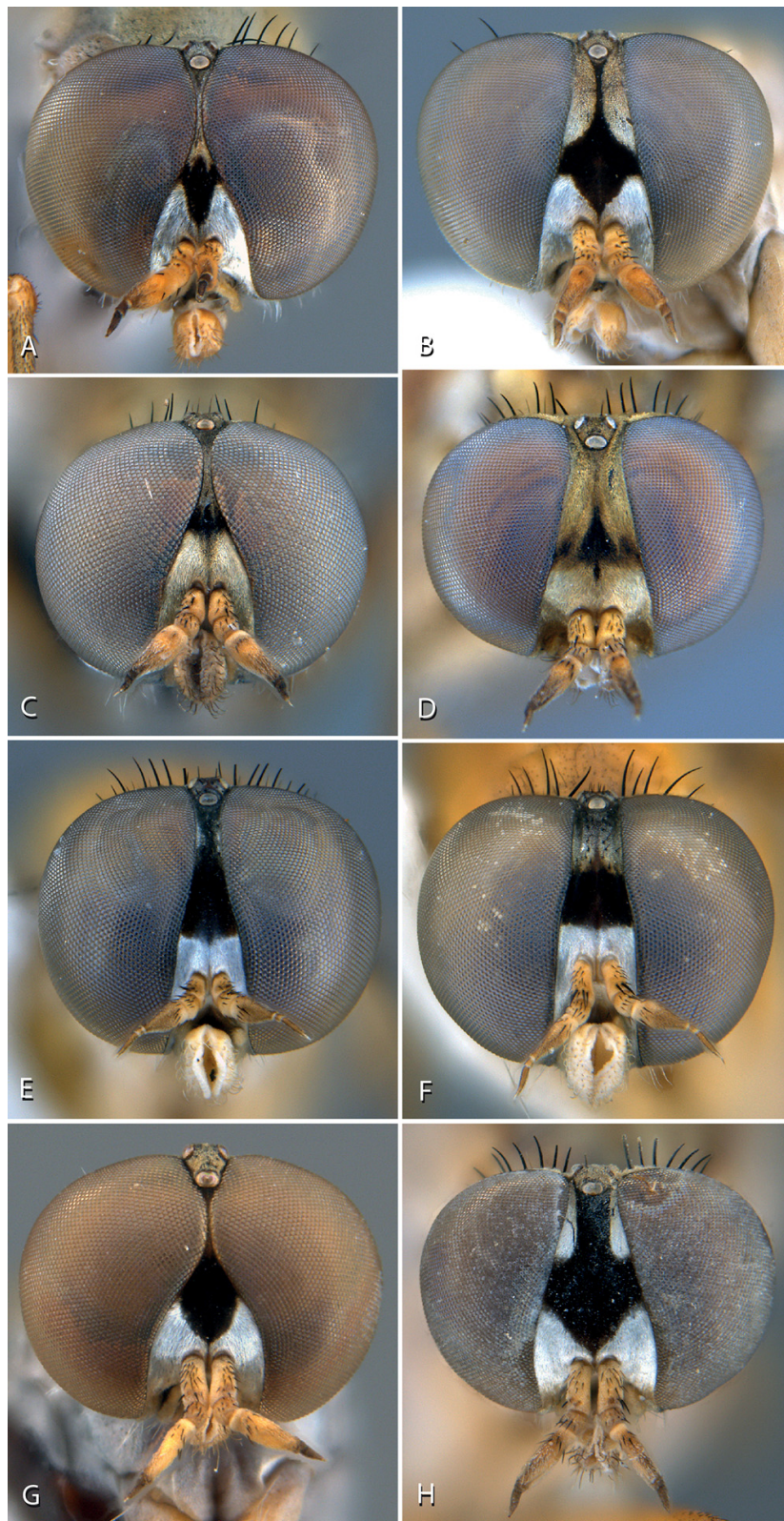


Fig. 9. *Rinhatiana* spp., heads, anterior view. **A.** *Rinhatiana artificestuca* gen. et sp. nov., ♂ (CSCA). **B.** Same, ♀ (CSCA). **C.** *Rinhatiana cracentis* gen. et sp. nov., ♂ (CSCA). **D.** Same, ♀ (CSCA). **E.** *Rinhatiana distincta* (Lyneborg, 1976) comb. nov., ♂ (CSCA). **F.** Same, ♀ (CSCA). **G.** *Rinhatiana latifestuca* gen. et sp. nov., ♂ (CSCA). **H.** Same, ♀ (CSCA).

macrosetae in single row immediately laterad of ocellar tubercle in both sexes; occiput pubescence silver-gray, brown suffusion medially; genal setae pale; antennal scape shorter than flagellum, cylindrical, dark yellow-orange, overlain with gray pubescence, sparsely covered with short, dark macrosetae; flagellum conical, tapered distally, style elongate, orange-yellow, terminus dark.

THORAX. Scutum uniform gray-tan or with brown markings, sparse short pale setae; scutellum concolorous with scutum; pleuron with dense silver-gray pubescence, darker in male; katatergite setae pale; scutal and scutellar macrosetae black; coxae yellow, overlain with silver-gray pubescence, minor setae white, macrosetae black, few in number; femora yellow, short dark setae admixed with longer pale setae and white adpressed scale-like setae, especially on hind leg; hind femur with single subapical anteroventral macroseta, subapical series of short posteroventral macrosetae; tibiae yellow, dark gray-brown suffusion apically, darker on hind leg; tarsi brown; wing smoky infusate; venation yellow basally along major veins, darker distally; scutal chaetotaxy (pairs): notopleural, 3; supra alar, 1; post alar, 1; dorsocentral, 1; scutellar, 2.

ABDOMEN. Male dark yellow, silver velutum present posterolaterally on tergites 1–5 in both sexes, pale elongate setae, darker on posterior segments and terminalia in male, female abdomen dark yellow, intersegmental membrane distinctly pale, especially on tergite 2; terminalia dark yellow in both sexes.

MALE GENITALIA. Epandrium quadrangular, strongly arched along midline; gonocoxites with elongate macrosetae laterally; outer gonocoxal process well developed and narrowly subtriangular; ventral lobe elongate, membranous apically; gonostylus narrow; distiphallus very narrow and recurved; sternite 8 sub-quadrangular, emarginate medially, setae along posterior margin.

Remarks

Rinhatiana latifestuca gen. et sp. nov. is very similar in appearance to *R. arctifestuca* gen. et sp. nov., especially in the frontal pubescence pattern. This species appears restricted to southern Madagascar where it has been collected in spiny thicket habitats (Fig. 18; inset).

Tianarinha gen. nov.

urn:lsid:zoobank.org:act:78C1EE66-7B0E-4F0F-8CE7-741BB69D1E90

Type species

Tianarinha micet gen. et sp. nov.

Diagnosis

Male and female with single row of postocular macrosetae and additional macrosetae scattered on occiput; prosternal setae present medially; one pair of scutellar macrosetae; setae absent on metanepisternum and posterior surface of mid coxa; wing vein R_1 with setulae along dorsal surface; wing cell m_3 open; radial and medial veins irregularly wavy towards wing margin.

Differential diagnosis

Tianarinha gen. nov. is distinguished from *Rinhatiana* gen. nov. by the presence of a single pair of scutellar macrosetae (two pairs in *Rinhatiana*) and prosternal setal present medially (absent in *Rinhatiana*). *Tianarinha* is separated from all other genera of Therevinae in the region by the presence of setulae on the R_1 vein. In addition, it is separated from *Schoutedenumyia* by the presence of regular sized macrosetae on the foretibia (relatively small in *Schoutedenumyia*). It is additionally distinguished from *Stenopomyia* and *Stenosathe* by the wavy radial and medial veins in the wing (straight or gradually curved in *Stenopomyia* and *Stenosathe*).

Etymology

'*Tianarinha*' is a combination of the nicknames of two key personnel in Madagascar who contributed significantly to the project on the Diptera of Madagascar. We have the honor naming this genus after Razafindratsita Vololontiana (also known as Tiana) and her spouse, Rasolondalao Harin'Hala Hasinjaka (also known as Rin'ha). Gender is female. See additional comments under *Rinhatiana* gen. nov.

Description

Relatively small individuals with glaucous pubescence and sparse vestiture.

HEAD. Length and height subequal; frons flat, gray and brown pubescent with dark band from inner eye margin to base of antenna; male frons width at narrowest point equal to ocellar tubercle width, frons width somewhat sexually dimorphic; inner margins of female eyes subparallel; parafacial without setae; postocular ridge of male and female in single row, additional scattered macrosetae on occiput; occiput pubescence gray or brown; gena rounded; antenna shorter than head, positioned on lower half of head, directed anteriorly; scape short, less than $3 \times$ pedicel length, cylindrical; flagellum turbinate, abruptly conical tapered, subequal to combined length of scape and pedicel, style apical, elongate; palpus slender; mouthparts short.

THORAX. Central depression of prosternum setose; cervical sclerite lacking macroseta; scutum covered with filiform setae, often of variable length; pleuron overlain with brown pubescence; metanepisternum with postspiracular setae absent; metakatepisternum setae absent; hind femur and tibia relatively short, approximately equal length in all legs; posterior surface of midcoxa without setae; posterior surface of hind coxa sometimes setose, hind coxal knob present; midfemur vestiture as filiform setae admixed with adpressed, lanceolate and scale-like setae; forefemur and midfemur with macrosetae absent; hind femur with single subapical anteroventral macroseta, posteroventral macrosetae absent; tibial macrosetae regular sized; scutal chaetotaxy (pairs): notopleural, 3; supra alar, 2; post alar, 1; dorsocentral, 1; scutellar, 1; wing smoky infuscate, mottled and darkened along wing veins; vein R_1 with setulae present; R_4 and R_5 irregularly wavy; medial veins with M_1 distinctly irregularly wavy; cell m_3 open, veins M_3 and M_4 separate to margin; wing membrane uniformly covered with microtrichia.

ABDOMEN. Relatively slender, slightly narrowed along length (male) or short, broad, slightly tapered (female).

TERMINALIA. Epandrium flat; gonocoxites separate medially with posteromedial margins proximal; inner gonocoxal process (igp) present, not articulated; outer gonocoxal process poorly developed as raised ridge; ventral lobe elongate, half length of gonostylus; dorsal apodeme of parameral sheath not fused laterally to gonocoxites; ventral apodeme as a single lobe, broad and sub-triangular; distiphallus narrow, directed ventrally; female tergite 8 elongate with anteromedial process; sternite 8 posterior margin emarginate posteromedially; acanthophorite setae as two sets (A1 & A2), A1 setae enlarged; spermathecal sac as a single lobe with spermathecal ducts originating on main spermathecal sac duct; two spermathecae.

Remarks

See remarks under *Rinhatiana* gen. nov.

Tianarinha goodmani gen. et sp. nov.

urn:lsid:zoobank.org:act:BCDC4CC4-BF3E-40DE-AB63-37548A5B0C0D

Figs 10–11, 14A–B, 15F, 16G–H, 19

Diagnosis

Frons with a few small dark setae above antenna; male frons approximately equal to width of ocellar tubercle, diffuse black chevron across middle of frons (Fig. 14A–B); setae present on posterior surface of hind coxa (Fig. 11B).

Differential diagnosis

See Diagnosis.

Etymology

We are pleased to name this species after Steven M. Goodman, who did much to target areas where Malaise traps could be placed to expand the habitats where specimens could be sampled.

Material examined

Holotype

MADAGASCAR – Tulear Province (Androy Region) • ♂; Cape St Marie Special Reserve, 74 km S of Tsihomb; 25.5876° S, 45.1631° E; 5 m a.s.l.; 31 Aug.–10 Sep. 2003; M.E. Irwin and R. Harin’Hala leg.; Malaise in coastal dunes; CASC.



Fig. 10. *Tianarinha goodmani* gen. et sp. nov., ♂, holotype (CASC). **A.** Lateral view. **B.** Oblique view.

Paratypes

MADAGASCAR – **Tulear Province (Androy Region)** • 41 ♂♂, 11 ♀♀; same collection data as for holotype: various dates between 23 Dec. 2002 and 23 Nov. 2003; CSCA • 19 ♂♂, 3 ♀♀; same collection data as for holotype; 13–31 Jul. 2003, 10–20 Aug. 2003; Malaise trap on bluff above wash among stunted trees on sand; CASC.

Other material

MADAGASCAR – **Tulear Province (Atsimo-Andrefana Region)** • 1 ♂♂; Zombitse-Vohibasia National Park; 22.8865° S, 44.6923° E; 840 m a.s.l.; 27 May–4 Jun. 2002; M.E. Irwin and R. Harin’Hala leg.; Malaise in dry deciduous forest [it is possible this is a mislabelled specimen because after several years of Malaise trapping no other specimens were collected]; CSCA • 11 ♂♂; 5 km N of Ampotaka; 25.0303° S, 44.6915° E; 86 m a.s.l.; 24 May–2 Aug. 2009; M.E. Irwin and R. Harin’Hala leg.; Malaise on trail in Vitambany gallery forest; CSCA. – **Tulear Province (Anosy Region)** • 3 ♂♂; Berenty Special Reserve, 8 km NW of Amboasary, 58 km SW Fort Dauphine; 25.0066° S, 46.3201° S; 85 m a.s.l.; 20 Oct.–2 Nov. 2002; M.E. Irwin and R. Harin’Hala leg.; Malaise in forest; [MEI169448, 169453, 169465]; CSCA • 26 ♂♂; same collection data as for preceding; various dates: 2–9 Nov. 2002, 7–27 Dec. 2002, 26 Jan.–5 Feb. 2003, 25 Feb.–7 Mar. 2003, 14–21 Dec. 2003; CSCA.

Description

BODY LENGTH. 5.5–6.0 mm (male), 5.5–6.5 mm (female).



Fig. 11. *Tianarinha goodmani* gen. et sp. nov., ♀, paratype (CASC). **A.** Lateral view. **B.** Oblique view.

HEAD. Frontal profile slightly raised above antennal bases with medial furrow ventrally, pubescence silver with dark yellow-brown suffusion, frons with brown band from antennal base to eye margin, black-brown along eye margin in middle of frons, male frons with diffuse black chevron midway, width at narrowest point approximately equal to width of anterior ocellus, frontal vestiture as patch of short, black setae above antenna (fewer in female), setae more numerous dorsally; ocellar tubercle flat (female) or raised, black pubescent (male), with short macrosetae; black postocular macrosetae elongate, strongly curved anteriorly and in a single row with additional setae irregularly arranged dorsomedially on occiput in both sexes; occiput pubescence silver-gray, brown suffusion medially; genal setae dark; antennal scape cylindrical, shorter than flagellum, brown overlain with gray pubescence admixed with dark macrosetae; flagellum conical, tapered distally, style elongate, brown with gray pubescence.

THORAX. Scutum gray with brown tessellate pattern, narrow stripe medially with interrupted stripes laterally, sparse short pale setae; scutellum concolorous with scutum; pleuron tan, overlain with sparse grayish pubescence; katatergite with admixed pale and dark setae; scutal and scutellar macrosetae black, relatively elongate; coxae brown pubescent, abundant minor setae black admixed with some yellow; macrosetae numerous, black; hind coxa with pale setae on posterior surface; femora dark brown (male) to dark yellow, suffused with dark brown, lighter apically (female), short dark setae admixed with longer pale setae, sparse covering of white scale-like adpressed setae; hind femur with single subapical anteroventral macroseta; tibiae dark yellow, suffused with brown; tarsi with basitarsi yellow, dark distally, remaining tarsal segments brown; wing irregularly smoky infuscate, darker anteriorly (especially in male); venation dark; haltere dark yellow, knob white; scutal chaetotaxy (pairs): notopleural, 3; supra alar, 2; post alar, 1; dorsocentral, 1; scutellar, 1.

ABDOMEN. Male abdomen dark brown dorsally, gray pubescent laterally, long pale setae, darker on posterior segments and terminalia; female abdomen brown, tergites yellow posteriorly and laterally, broader on posterior tergites; terminalia dark yellow.

Remarks

Tianarinha goodmani gen. et sp. nov. is known from several localities in sandy and spiny thicket habitats in southern Madagascar, sometimes trapped in large numbers.

Tianarinha micet gen. et sp. nov.

urn:lsid:zoobank.org:act:255759B6-BAFF-4386-84B7-8A4B38A44CD3

Figs 12–13, 14C–D, 15E, 16I–J, P, 19

Diagnosis

Frons with short setae dorsally only, lacking setae just above antenna; male frons wider than width of ocellar tubercle, lacking dark marking across middle of frons (Fig. 14C–D); setae absent on posterior surface of hind coxa (Fig. 12A).

Differential diagnosis

See Diagnosis.

Etymology

We are pleased to name this species after the Malagasy Non-Governmental Organisation, Madagascar Institut pour la Conservation des Ecosystemes Tropicaux (MICET), which acted as in our behalf to secure collecting permits and other legal documents from the Government of Madagascar before Malaise traps could be placed in nationally protected areas.

Material examined

Holotype

MADAGASCAR – **Tulear Province (Atsimo-Andrefana Region)** • ♂; Ambohimahavelona, Andoharano dry forest; 23.4408° S, 43.8997° E; 45 m a.s.l.; 19–28 Jun. 2010; M.E. Irwin and R. Harin’Hala leg.; Malaise at hillside wash; CASC.

Paratypes

MADAGASCAR – **Tulear Province (Atsimo-Andrefana Region)** • 5 ♂♂; same collection data as for holotype; various dates: 29 Jun.–10 Aug. 2009, 10 Jun.–30 Aug. 2010, 7 Jun.–10 Jul. 2011; CSCA • 36 ♂♂, 2 ♀♀; Tsimanapetsotsa National Park; 24.0486° S, 43.7522° E; 45 m a.s.l.; various dates: 2 Jun.–2 Sep. 2012; M.E. Irwin and R. Harin’Hala leg.; Malaise across path in Mitoho dry forest; CSCA.

Other material

MADAGASCAR – **Tulear Province (Atsimo-Andrefana Region)** • 97 ♂♂; 3 km E of Itampolo; Androimpano Plateau; 24.6578° S, 43.9562° E; 45 m a.s.l.; various dates: 26 Mar.–12 Apr. 2009; 28 May–11 Jun. 2009, 11 Jun.–6 Aug. 2009, 4–11 Feb. 2010, 27 May–3 Jun. 2010, 17 Jun.–14 Aug. 2010; M.E. Irwin and R. Harin’Hala leg.; Malaise across path in dry forest; CSCA.

Description

BODY LENGTH. 4.0–5.5 mm (male), 5.0–6.0 mm (female).

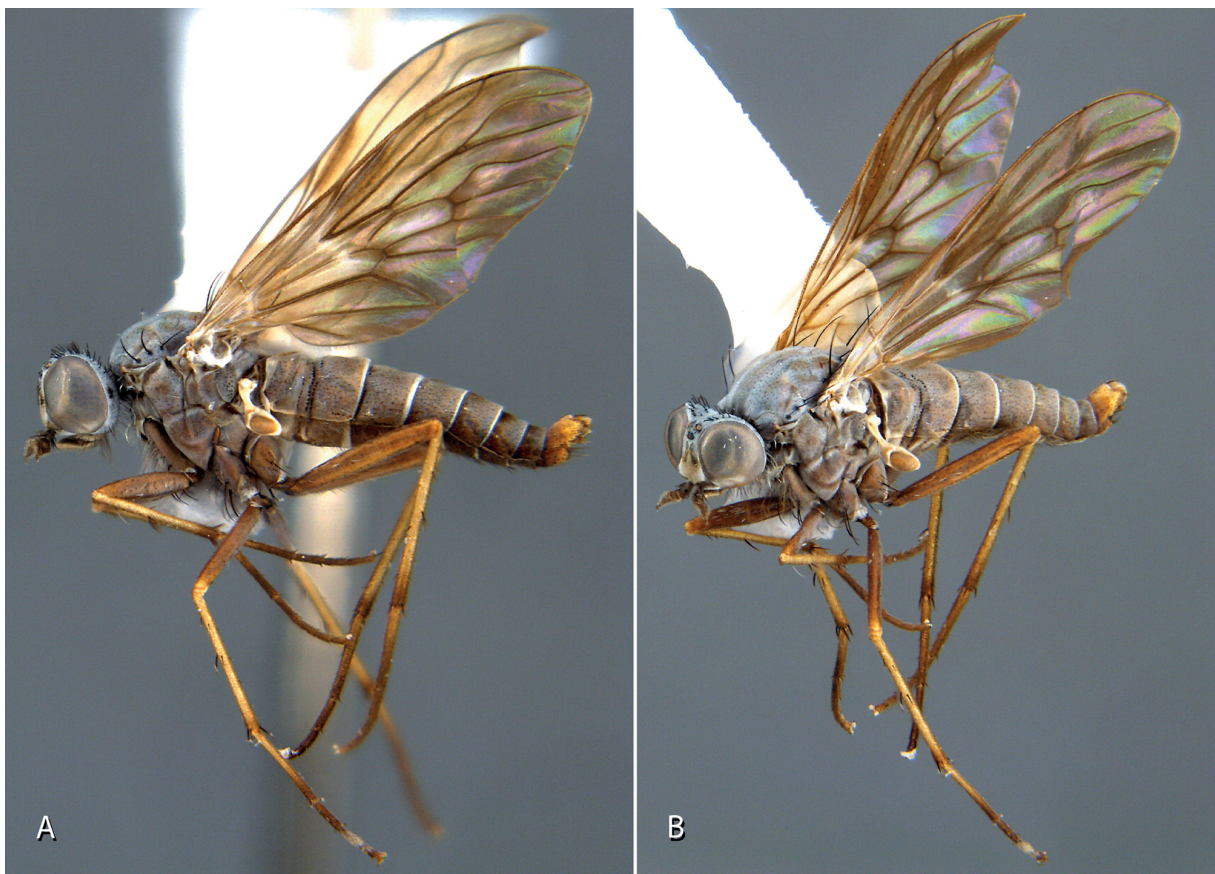


Fig. 12. *Tianarinha micet* gen. et sp. nov., ♂, paratype (CASC). **A.** Lateral view. **B.** Oblique view.

HEAD. Frontal profile flat, slightly raised above antennal bases with medial furrow, pubescence silver-gray with light brown suffusion (male), silver with dark yellow-brown suffusion (female), both with brown pubescent band from antennal base to eye margin; male frons width at narrowest point wider than



Fig. 13. *Tianarinha micet* gen. et sp. nov., ♀, paratype (CASC). **A.** Lateral view. **B.** Oblique view.

ocellar tubercle; frons with diverging rows of short, black setae below ocellar tubercle; ocellar tubercle flat, gray pubescent with short macrosetae; erect, black postocular macrosetae in a single row, additional setae irregularly arranged dorsomedially on occiput in both sexes; occiput pubescence silver-gray, brown suffusion medially; genal setae dark; antennal scape shorter than flagellum, cylindrical, black, overlain with gray pubescence admixed with short, dark macrosetae; flagellum conical, tapered distally, brown with gray pubescence.

THORAX. Scutum gray-tan with brown markings, broad medial stripe with narrower dark medial stripe, lateral stripes broken to tessellate, scattered short dark setae; scutellum concolorous with scutum; pleuron dark with sparse gray pubescence; katatergite with admixed pale and dark setae; scutal and scutellar macrosetae black, relatively elongate; coxae brown pubescent, minor setae mostly dark, macrosetae few

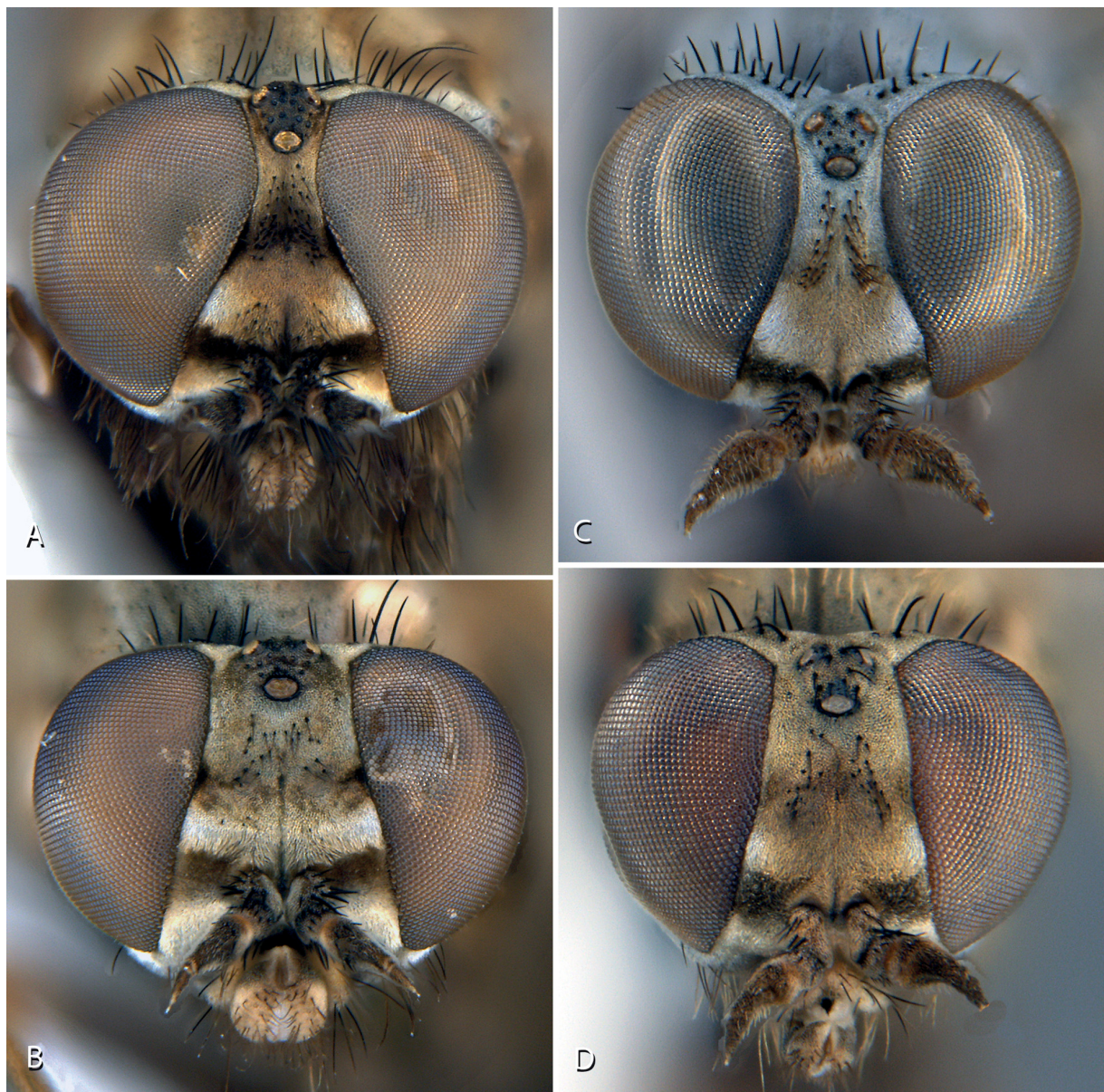


Fig. 14. *Tianarinha* spp., heads, anterior view. **A.** *Tianarinha goodmani* gen. et sp. nov., ♂, paratype (CASC). **B.** Same, ♀, paratype (CASC). **C.** *Tianarinha micet* gen. et sp. nov., ♂, paratype (CASC). **D.** Same, ♀, paratype (CASC).

in number, black; hind coxa without setae on posterior surface; femora dark yellow, suffused with dark brown, lighter apically, short dark setae admixed with longer pale setae and sparse covering of white scale-like adpressed setae; hind femur with single subapical anteroventral macroseta; tibiae yellow, dark gray-brown apically; tarsi dark yellow with apices brown; wing uniform smoky infusate, darker along veins and in some cells; venation dark; haltere stem pale with knob mostly brown; scutal chaetotaxy (pairs): notopleural, 3; supra alar, 1–2; post alar, 1; dorsocentral, 1; scutellar, 1.

ABDOMEN. Male abdomen mostly dark brown with sparse glaucous pubescence admixed with long pale setae, darker on posterior segments and terminalia; female abdomen mostly dark brown, posterior margins pale cream, broader medially; terminalia dark yellow.

Remarks

Tianarinha micet gen. et sp. nov. is known from three coastal localities with spiny thicket habitat in southern Madagascar.



Fig. 15. *Rinhatiana* gen. nov. and *Tianarinha* gen. nov., epandrium. **A.** *Rinhatiana arctifestuca* gen. et sp. nov. (CSCA). **B.** *Rinhatiana cracentis* gen. et sp. nov. (CSCA). **C.** *Rinhatiana latifestuca* gen. et sp. nov. (CSCA). **D.** *Rinhatiana distincta* (Lyneborg, 1976) comb. nov. (CSCA). **E.** *Tianarinha micet* gen. et sp. nov., epandrium and tergite 8. (CSCA). **F.** *Tianarinha goodmani* gen. et sp. nov. (CSCA). Scale bar = 0.2 mm.

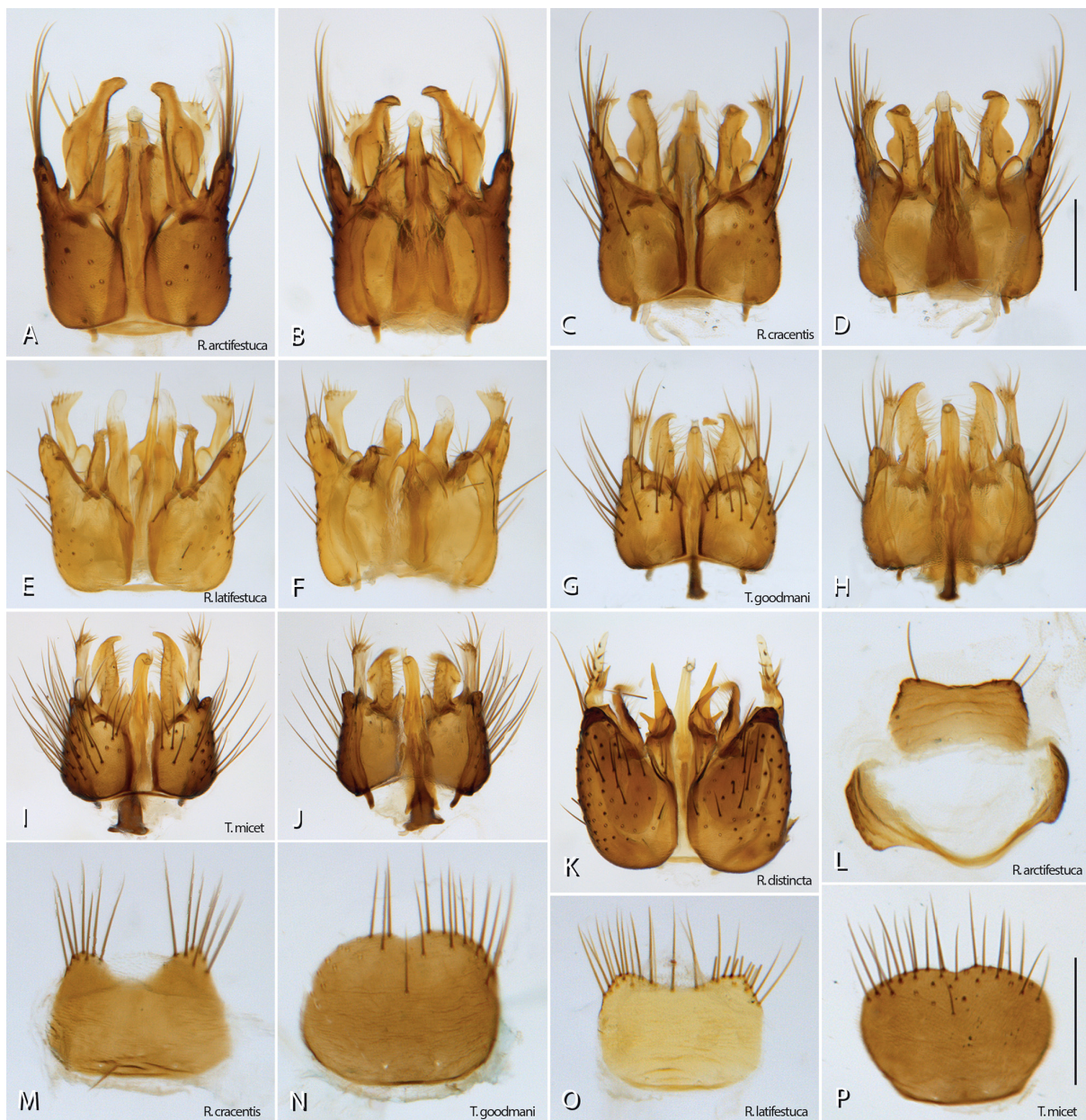


Fig. 16. *Rinhatiana* gen. nov. and *Tianarinha* gen. nov. **A–K.** Male gonocoxites and phallus with epandrium removed. **A.** *R. arctifestuca* gen. et sp. nov. (CSCA), ventral view. **B.** Same, dorsal view. **C.** *R. cracentis* gen. et sp. nov. (CSCA), ventral view. **D.** Same, dorsal view. **E.** *R. latifestuca* gen. et sp. nov. (CSCA), ventral view. **F.** Same, dorsal view. **G.** *T. goodmani* gen. et sp. nov. (CSCA), ventral view. **H.** Same, dorsal view. **I.** *T. micet* gen. et sp. nov. (CSCA), ventral view. **J.** Same, dorsal view. **K.** *R. distincta* (Lyneborg, 1976) comb. nov. (CSCA), ventral view. **L–P.** Sternite 8. **L.** *R. arctifestuca* gen. et sp. nov. (CSCA) (with tergite 8). **M.** *R. cracentis* gen. et sp. nov. **N.** *T. goodmani* gen. et sp. nov. (CSCA). **O.** *R. latifestuca* gen. et sp. nov. (CSCA). **P.** *T. micet* gen. et sp. nov. (CSCA). Scale bars = 0.2 mm.



Fig. 17. Collecting localities in Madagascar. **A.** Ambohimahavelona, Andoharano stunted spiny forest. **B.** Coastal dune, Toliara (photograph copyright: M. Hauser). **C.** Andohaëla National Park, Parcel II – Tsimela spiny forest. **D.** Anja Community Reserve, dry evergreen forest. **E.** Andohaëla National Park, Parcel III – Ihazofotsy, transitional forest. **F.** Tsimanampetsotsa National Park, Mitoho dry deciduous forest (habitat of *T. goodmani* gen. et sp. nov.). **G.** Monambo, Mikea spiny forest (habitat of *R. latifestuca* gen. et sp. nov.). **H.** Cape St Marie Special Reserve, coastal spiny bush (habitat of *T. goodmani*).

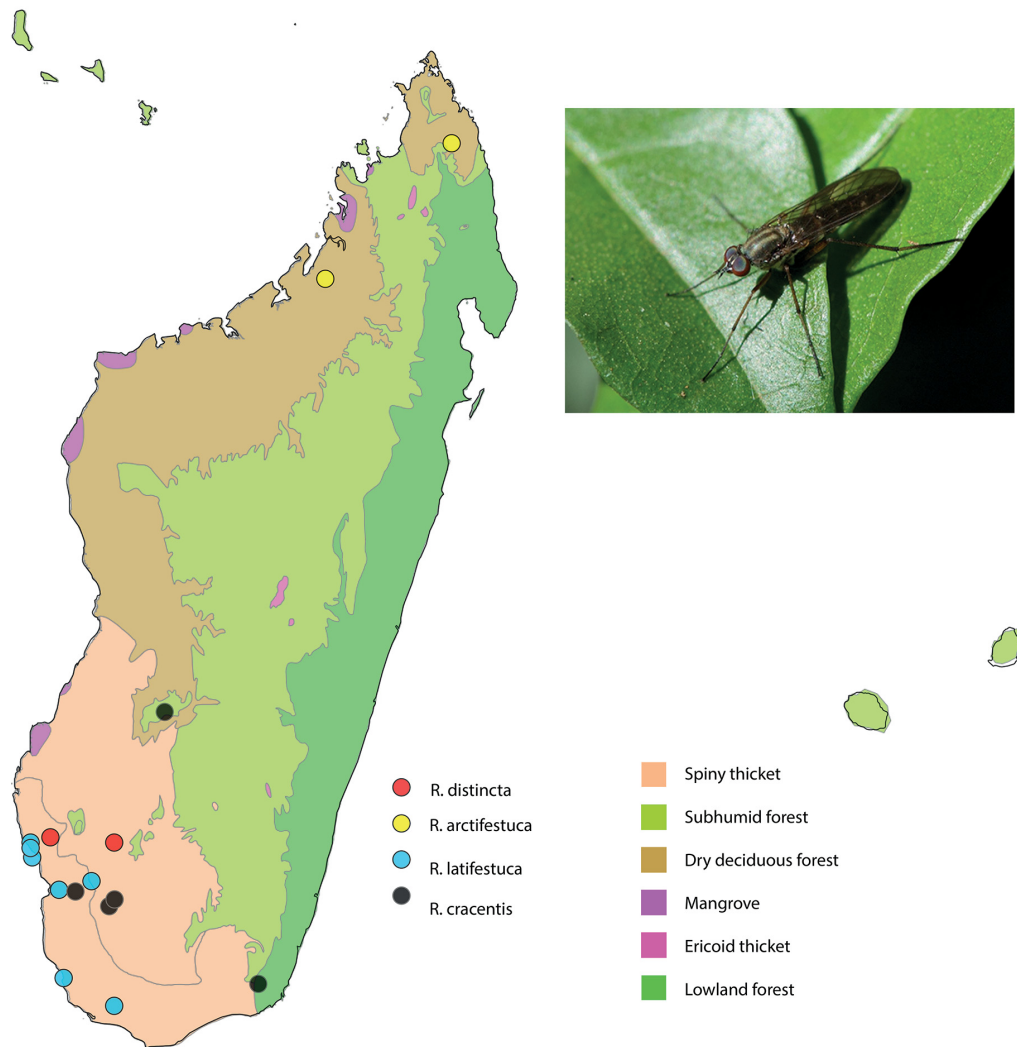


Fig. 18. Distribution of species of *Rinhatiana* gen. nov. with eco-regions indicated. Inset image of adult ♀ of *R. latifestuca* gen. et sp. nov. (photograph copyright: Len de Beer).

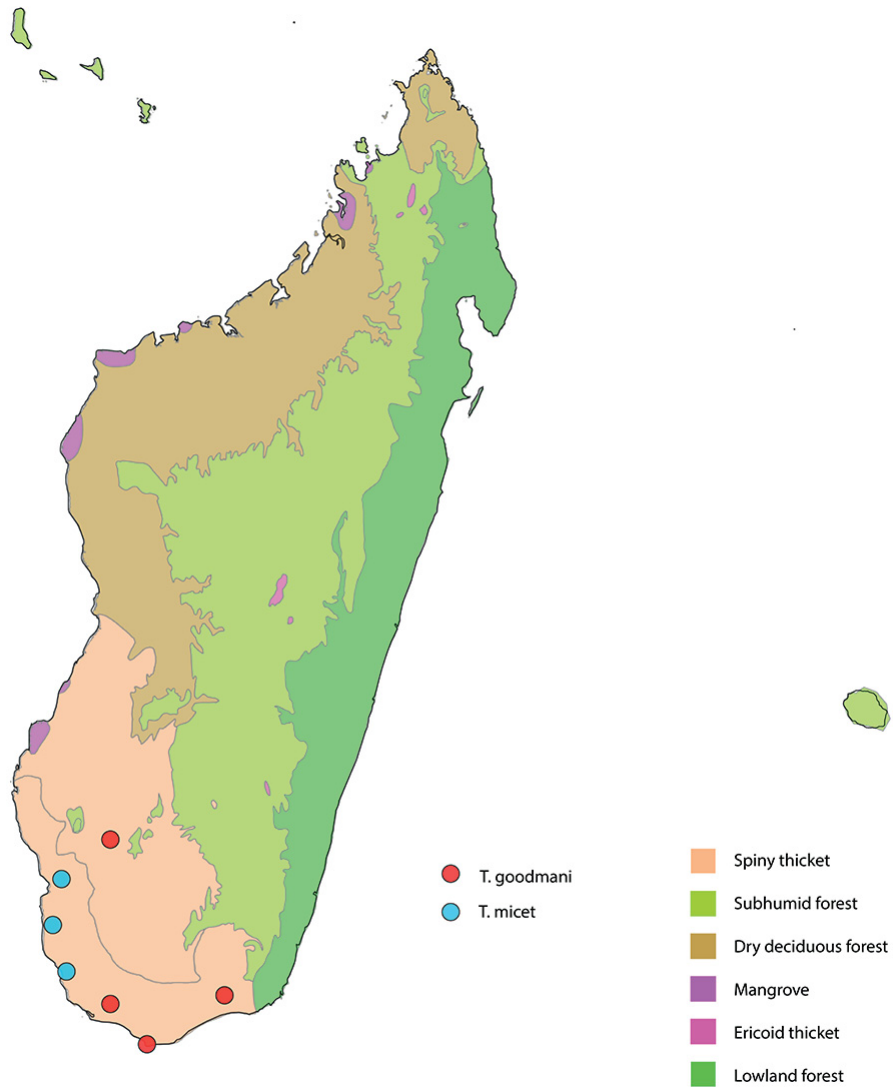


Fig. 19. Distribution of species of *Tianarinha* gen. nov. with eco-regions indicated.

Key to genera of Malagasy Therevidae and species of Rinhatiana gen. nov. and Tianarinha gen. nov.

1. Femora with regular filiform setae of varying lengths, lacking adpressed scale-like setae; costal vein ending between veins R_4 and $CuA+CuP$, never circumambient around wing; female terminalia with, at most, a single set of acanthophorite spines2 (Therevinae)
 - Femora with regular filiform setae of varying lengths, admixed with adpressed scale-like setae, especially on mid and hind legs; costal vein circumambient around wing; female terminalia with two distinct sets of acanthophorite spines on each side ($A1$ and $A2$) 3
2. Dorsal surface of wing vein R_1 with setulae; palpus with apical pit; female sternite 8 without strong macrosetae; genitalia with three spermathecae and no spermathecal sac*Rueppellia* Wiedemann, 1830 (Phycusinae)
 - Wing vein R_1 without setulae; palpus without an apical pit; female sternite 8 with strong macrosetae; genitalia with two spermathecae and spermathecal sac is present*Microgephyra* Lyneborg, 1972 (Xestomyzinae)
3. Wing vein R_1 without setulae 4
 - Dorsal surface of wing vein R_1 with setulae 5
4. Sternum with setae present medially in furrow; mid coxae with setae on posterior surface*Irwiniella* Lyneborg, 1976
 - Sternum with setae present laterally only, rarely in medial furrow; mid coxae without setae on posterior surface*Stenopomyia* Lyneborg, 1976
5. Prosternum with setae medially; one pair of scutellar macrosetae; frons with dark setae, pubescence grayish-brown with a dark band from base of antenna to eye margin (Fig. 14); gena with dark setae ventrally; abdomen predominantly brown*Tianarinha* gen. nov. ...6
 - Prosternum without setae; two pairs of scutellar macrosetae; frons usually lacking setae, pubescence silver or metallic tan around antennal bases, matte black above this and frequently grayish-silver dorsally to ocellar tubercle (e.g., Fig. 9); gena with pale setae; abdomen predominantly bright yellow, sometimes brown laterally along tergites*Rinhatiana* gen. nov. ...7
6. Extensive dark setae on the lower part of occiput, gena (Figs 10; 14A–B) and coxae; flagellum style relatively elongate; few dark setae on frons just above antennae; setae on posterior surface of hind coxae (Fig. 11B)*T. goodmani* gen. et sp. nov.
 - Setae on the lower head and coxae fewer in number and shorter (Fig. 12A, 13A); flagellum style relatively short; frons only with setae dorsally, no setae just above antennae; setae absent on posterior surface of hind coxae (Fig. 13A)*T. micet* gen. et sp. nov.
7. Two pairs of supra alar macrosetae; dorsocentral macrosetae present (Figs 5–6); Male frons width at narrowest point slightly wider than anterior ocellus (Fig. 9E); short, dark setae present dorsally on frons*R. distincta* (Lyneborg, 1976) comb. nov.
 - One pair of supra alar macrosetae; dorsocentral macrosetae absent; male frons width at narrowest point narrower than anterior ocellus, eyes almost contiguous (Fig. 9A, C, G); frons lacking setae 8
8. Frons with metallic-tan pubescence around base of antennae (Fig. 9C, D); abdomen dark brown (yellow dorsally in female), cream-white posteriorly on each segment, silver pubescence absent (Figs 3–4)*R. cracentis* gen. et sp. nov.

- Frons with silver pubescence around base of antennae and matte black area medially (Fig. 9A, G); abdomen predominantly yellow, sometimes brown laterally along tergites, triangular patches of silver pubescence laterally on at least tergites 2 and 3 9
- 9. Male frons with matte-black pubescence relatively narrow, brown pubescence dorsally (Fig. 9A); female frons with dorsomedial stripe of matte-black pubescence relatively narrow, suffused with brown pubescence laterally (Fig. 9B); male terminalia black (Figs 1–2)*R. arctifestuca* gen. et sp. nov.
- Male frons with matte-black pubescence broader, lacking brown pubescence dorsally (Fig. 9G); female with dorsomedial stripe of matte-black pubescence broader, mostly lacking brown pubescence in upper portion (Fig. 9H); male terminalia yellow (Figs 7–8)*R. latifestuca* gen. et sp. nov.

Discussion

Rinhatiana gen. nov. and *Tianarinha* gen. nov. are placed systematically in the largely Old World distributed *Thereva* genus group, closely related to *Stenopomyia*, *Stenosathe*, *Schoutedenomyia* and *Megapalla* (see Winterton *et al.* 2016). These five genera form a clade of distinctive genera sister to the rest of the genus group, distinguished by the sparse setal pile on the head and body, frequent extensive silver pubescence and narrow and frequently elongate antennae. The presence of setulae on the dorsal surface of the wing R1 vein is unique characteristic shared by *Rinhatiana* and *Tianarinha* and easily distinguishes them from the other four genera. *Stenosathe* is presently known from three species, two from southeastern Africa and one from Turkmenistan (Lyneborg 1976, 1986). This genus is morphologically heterogeneous and the two species from southeastern Africa appear closely related to several undescribed species from Madagascar. The third species sits uneasily in *Stenosathe* and likely represents a separate genus closer to *Hoplosathe* (see discussion by Lyneborg 1986). *Stenosathe* is clearly related to *Stenopomyia*, a species-rich genus endemic to Madagascar. *Schoutedenomyia* is likely the sister taxon to all genera in this clade, and contains at least 16 species widely distributed throughout the Ethiopian, Oriental and southern Palearctic regions. It is defined based on several characteristics associated with the size of the foretibial macrosetae and segmentation of the labial palps (Lyneborg 1976). These characters are also found in Oriental genus *Megapalla* and the distinction between these two genera is questionable.

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