

### Research article

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## New species of *Hercostomus* Loew, 1857 from Afrotropics (Diptera: Dolichopodidae) and key to Afrotropical fauna

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**Abstract.** Five new species of *Hercostomus* Loew, 1857 from Kenya, Namibia, Tanzania and South Africa are described and illustrated. They belong to the *Hercostomus longiventris* lineage, which also appears similar to the Palaearctic *H. chetifer* subgroup and the Oriental *H. takagii* and *H. absimilis* groups on the basis of the modified male fore tarsus. The male cercus of almost all Afrotropical species is remarkable in having ventral processes or projections and are conditionally divided into *H. nectarophagus* and *H. perturbus* subgroups on the basis of the presence of one or two ventral projections on the cercus, respectively. *Hercostomus brandbergensis* sp. nov. and *H. fedotovae* sp. nov. are associated with the *H. nectarophagus* subgroup; *H. koshelevae* sp. nov., *H. vikhrevi* sp. nov., and *H. sanipass* sp. nov. are associated with the *H. perturbus* subgroup. The new species differ by fine structures of the male fore tarsus, cercus and postgonite. An identification key to males of 23 Afrotropical species of *Hercostomus* is compiled for the first time. New records are given for some known species.

**Keywords.** *Hercostomus*, new species, Afrotropics, Africa, key.

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### Introduction

*Hercostomus* Loew, 1857 is a mega-diverse dolichopodid genus comprising about 500 species worldwide (Grichanov 2017). Grichanov (1999) divided the Afrotropical species of the genus into three groups, and Grichanov (2004) provided a key to the then known species. Later Grichanov (2010) separated one of those groups as a new genus, *Afrohercostomus* Grichanov, 2010, and another species group as a new genus, *Neohercostomus* Grichanov, 2011 (Grichanov, 2011a). *Hercostomus scharffi* Grichanov, 1999 was transferred to the genus *Setihercostomus* Zhang & Yang, 2005 (Grichanov *et al.*, 2014). Presently 23 (excluding three doubtful) species of *Hercostomus*, 14 species of *Afrohercostomus*, 21 species of *Neohercostomus* and one species of *Setihercostomus* are known from the Afrotropics (Grichanov 2018; this paper). A key to Afrotropical dolichopodid genera including all genera of the subfamily Dolichopodinae was recently published by Grichanov & Brooks (2017). Nevertheless, an identification key to Afrotropical species of *Hercostomus* does not exist.

Treatment of rich collections of the KwaZulu-Natal Museum (South Africa) and new material from other museums has yielded specimens of undescribed dolichopodine species, which can be associated with the nominotypical *Hercostomus longiventris* lineage (Brooks 2005). In this paper, five new species of *Hercostomus* from Kenya, Namibia, Tanzania and South Africa are described and illustrated, new records are given for some known species, and a key to 23 known species of the Afrotropical Region is provided for the first time.

## Material and methods

The new *Hercostomus* species discovered were photographed with a ZEISS Discovery V-12 stereo microscope and an AxioCam MRc5 camera. Genitalia preparations were photographed with a ZEISS AxioStar stereo microscope and an AxioCam ICc3 camera. Morphological terminology and abbreviations follow Cumming & Wood (2017) and Grichanov & Brooks (2017). Body length is measured from the base of the antenna to the posterior tip of epandrium. Wing length is measured from the base to the wing apex. The types of the new species and other material are housed at the KwaZulu-Natal Museum, Pietermaritzburg, South Africa (NMSA), the National Museum, Bloemfontein, South Africa (BMSA), the Namibian National Insect Collection, National Museum of Namibia, Windhoek, Namibia (NMNW), the Natural History Museum of Denmark, Zoological Museum, University of Copenhagen (ZMUC), and the Zoological Museum of Moscow State University, Moscow, Russia (ZMUM).

## Abbreviations (Figs 1–5)

cerc	=	cercus
dlpgt	=	distal lobe of postgonite
epand	=	epandrium
epand lb	=	epandrial lobe
hypd	=	hypandrium
hypd lb	=	hypandrial lobe
ph	=	phallus
st 8	=	sternite 8
sur	=	surstylus
tg 7	=	tergite 7
vlpgt	=	ventral lobe of postgonite

## Results

Class Insecta Linnaeus, 1758  
Order Diptera Linnaeus, 1758  
Superfamily Empidoidea Latreille, 1804  
Family Dolichopodidae Latreille, 1809  
Subfamily Dolichopodinae Latreille, 1809

Genus *Hercostomus* Loew, 1857

## Type species

*Sybistroma longiventris* Loew, 1857 (original designation).

## Remarks

See Grichanov & Brooks (2017) for diagnosis of the genus *Hercostomus*. Females of closely related species are probably indistinguishable.

***Hercostomus brandbergensis* sp. nov.**

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Fig. 1

**Diagnosis**

Having simple fore tarsus, the new species is close to *H. nectarophagus* Curran, 1924, differing distinctly in male mid and hind femora each with ventral row of erect cilia, about as long as diameter of femur. *Hercostomus nectarophagus* males have no long ventral cilia on femora (Grichanov 1999). The hypopygia are rather species-specific in the two species.

**Etymology**

The species is named after the type collection locality: the Brandberg Massif.

**Material examined**

**Holotype**

NAMIBIA • ♂; Brandberg, Mason Shelter; 21°04'39" S, 14°05'43" E; 1750 m a.s.l.; 5–14 Mar. 2002; A.H. Kirk-Spriggs and E. Marais leg.; Malaise trap, riverbed; NMNW.

**Paratype**

NAMIBIA • 1 ♂; same collection data as for the holotype; terminalia dissected, stored in glycerin in microvial pinned with source specimen; NMNW.

**Description**

**Male** (Fig. 1)

MEASUREMENTS (in mm). Body length 3.6; antenna length 0.8; wing length 2.9; wing width 1 (Fig. 1A).

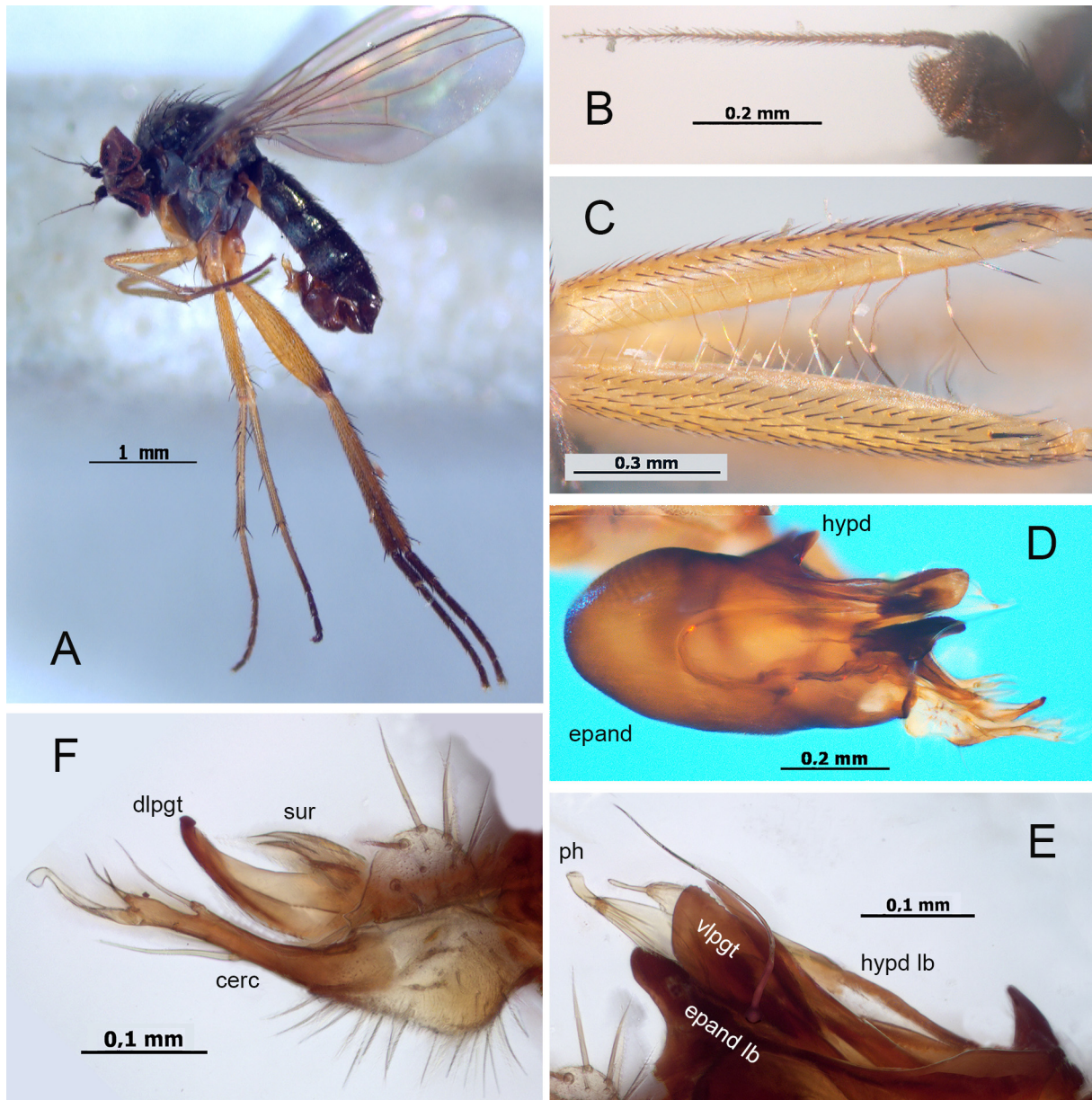
HEAD. Frons greenish black, densely white pollinose; face black, densely white pollinose. One long, strong, vertical pair of ocellar setae; 1 short, postvertical pair of ocellar setae. Upper postocular setae black; lateral, lower ones white. Eye with short hairs; face glabrous. Face gradually narrowed towards palpi,  $3.9 \times$  as high as wide in middle, under antennae about  $1.2 \times$  as wide as width of postpedicel, at clypeus  $0.7 \times$  as wide as width of postpedicel; clypeus not reaching lower margin of eyes. Antenna (Fig. 1B) slightly longer than height of head, entirely black; pedicel short, wide, internally convex anteriorly, with short distal setulae; postpedicel asymmetrical, elongate, narrowed, angular apicodorsally, shorter than high ( $\frac{7}{8}$ ), covered with short pubescence; arista mid-dorsal, black, with short hairs. Length ratio of scape to pedicel to postpedicel to stylus (1<sup>st</sup> – 2<sup>nd</sup> segments), 8/9/14/8/52. Palpus, proboscis moderately small, brown, with short black setae; palpus with 1 black bristle.

THORAX. Greenish black, greyish pollinose; mesonotum shiny. Six strong dorsocentral setae; 2 rows of acrostichals, nearly half as long as dorsocentrals; 2 strong notopleural, 1 strong humeral, 1 posthumeral setae. Propleura with 1 strong black seta above fore coxa, 2 groups of short light hairs. Scutellum with 2 strong setae, 2 lateral hairs.

LEGS. Including coxae mostly yellow; mid coxa with brown lateral strip; hind femur brown at extreme apex; hind tibia brownish distally; tarsi black from tip of basitarsus, hind basitarsus brown-black. Fore coxa with black hairs anteriorly, several setae in apical half; mid coxa with 1 strong lateral seta in addition to anterior hairs; hind coxa with 1 strong lateral seta. Fore femur without long hairs. Fore tibia with 2 short posterodorsal setae, fore tarsus simple. Length of fore femur to tibia and tarsomeres 1–5 = 0.93 mm, 0.89 mm, 0.49 mm, 0.21 mm, 0.15 mm, 0.14 mm, 0.11 mm. Mid femur with 1 anterior, 1 posteroventral subapical seta, with ventral row of 6–8 dark erect curved cilia, longer than diameter of femur (Fig. 1C). Mid tibia with 3 anterodorsal, 2 posterodorsal, 5 apical setae. Length of mid femur to

tibia and tarsomeres 1–5 = 1.12 mm, 1.25 mm, 1.16 mm, 0.58 mm, 0.47 mm, 0.26 mm, 0.14 mm. Hind femur with one subapical anterior seta, with ventral row of 5–6 dark erect cilia, about as long as diameter of femur. Hind tibia with 2 anterodorsal, 3 posterodorsal, 5 apical setae. Hind tarsomeres 1–2 with 1–2 short apical setae. Length of hind femur to tibia and tarsomeres 1–5 = 1.4 mm, 1.6 mm, 0.39 mm, 0.44 mm, 0.28 mm, 0.18 mm, 0.21 mm.

WING. Simple, greyish, almost hyaline, veins brown. Costa simple.  $R_1$  reaching to first third of wing length.  $R_{2+3}$ ,  $R_{4+5}$  weakly divergent. Ratio of part of costa between  $R_{2+3}$ ,  $R_{4+5}$  to between  $R_{4+5}$ ,  $M_{1+2}$ : 40/13.  $R_{4+5}$ ,  $M_{1+2}$  slightly convergent in distal part;  $M_{1+2}$  joining costa at wing apex. Crossvein dm-m straight, forming right angle with both  $M_{1+2}$  and  $M_4$  longitudinal veins. Ratio of dm-m to distal part of  $M_4$ : 27/49.



**Fig. 1.** *Hercostomus brandbergensis* sp. nov., ♂, paratype (NMNW). **A.** Habitus. **B.** Antenna. **C.** Mid femora, anterior view. **D.** Hypopygium, right lateral view. **E.** Distoventral appendages of epandrium. **F.** Cercus, surstylus and distal lobe of postgonite.

Posterior wing margin almost evenly convex. Anal vein distinct, almost reaching wing margin; anal lobe narrow; anal angle obtuse. Lower calypter yellow, with black setae. Halter yellow.

ABDOMEN. Greenish black, weakly pollinose, with black hairs, marginal setae. Segment 7:  $\frac{3}{4}$  length of epandrium. Segment 8 large, covering more than half lateral side of epandrium, with numerous fine dark setae. Genitalia (Fig. 1D) with epandrium brownish black, rounded-oval, nearly 2× longer than high. Foramen positioned before middle of left lateral side. Hypandrium mid-ventral, with short base projecting distoventrally, 4 long thin lobes of different lengths, 1 very broad lobe (Fig. 1E). Phallus thin, projected. Distoventral epandrial lobe fused to epandrium, projected, with 2 short, 1 very long apicoventral epandrial setae. Surstylus yellow, bilobate, with narrow lobes of different lengths. Distal lobe of postgonite as long as ventral lobe of surstylus, narrow, slightly curved ventrally at apex. Ventral lobe of postgonite strongly sclerotized, simple, directed distally, with serrate ventral margin. Cercus (Fig. 1F) yellow, with short light hairs, with large basolateral lobe bearing 3 long and several short setae and long narrow apex bearing 4 long pedunculate setae.

### Female

Unknown.

### Ecology

The Brandberg Massif is an isolated mountain range in western Namibia on the eastern edge of the Namib Desert, located in the Nama Karoo Biome. The type locality “Mason Shelter” (1800–1750 m a.s.l.) is a more or less flat open plain, dissected by some small riverbeds and fringed by rocky hills with huge boulders and rock slabs. It contains some single trees of *Acacia hereroensis* Engl., *Ficus sycomorus* L. and *Ozoroa crassinervia* (Engl.) R.Fern. & A.Fern., abundant small trees of *Commiphora saxicola* Engl. and scattered individuals of *Sterculia quinqueloba* (Garcke) K.Schum., *Galenia africana* L., *Eriocephalus dinteri* S.Moore and *Cyphostemma currorii* (Hook.f.) Desc. at the southern margin of the plain. In addition, low shrubs of *Salsola* sp. are evenly dispersed throughout (Koch 2006). The *Hercostomus brandbergensis* sp. nov. type specimens were collected by Malaise trap installed in one of the riverbeds.

### Distribution

Namibia.

### *Hercostomus fedotovae* sp. nov.

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Fig. 2

### Diagnosis

The new species belongs to the *Hercostomus nectarophagus* subgroup of species, differing distinctly by its small size, narrow face, fore tarsomere 3 simple, fore tarsomeres 4–5 flattened and widened, fore tarsomere 4 white and tarsomere 5 deep black. The hypopygium is similar to that in other species of the subgroup.

### Etymology

The species is named for the Russian entomologist, Dr. Zoya Fedotova (VIZR: All-Russian Institute of Plant Protection, St. Petersburg), who has described over 1000 new gall midge species.

## Material examined

### Holotype

TANZANIA • ♂; Morogoro environs; 6.85° S, 37.67° E; 2–3 Dec. 2015; N. Vikhrev leg.; terminalia dissected, stored in glycerin in microvial pinned with the specimen; ZMUM.

## Description

### Male (Fig. 2)

MEASUREMENTS (in mm). Body length 2.4; antenna length 0.7; wing length 2.5; wing width 0.8. (Fig. 2A)

HEAD. Frons greenish-black, whitly pollinose; face densely white pollinose. One long, strong, vertical pair of ocellar setae; 1 short postvertical, pair of ocellar setae. Upper postocular setae black; lateral, lower ones white. Eye with short hairs; face glabrous. Face gradually narrowed towards palpi,  $14 \times$  as high as wide in middle, under antennae  $\frac{3}{4}$  as wide as width of postpedicel, at clypeus  $\frac{1}{4}$  as wide as width of postpedicel; clypeus not reaching lower margin of eyes. Antenna (Fig. 2B) as long as height of head, entirely black; pedicel short and wide, convex anteriorly on inner side, with short distal setulae; postpedicel subtriangular, angular distodorsally, as long as high, covered with short pubescence; arista mid-dorsal, black, with short hairs. Length ratio of scape to pedicel to postpedicel to stylus (1<sup>st</sup> – 2<sup>nd</sup> segments), 14/6/12/7/47. Palpus and proboscis moderately small, brown, with short black setae; palpus with 1 black bristle.

THORAX. Greenish-black, greyish pollinose, with yellow metepimeron. Six strong dorsocentral setae; 2 rows of acrostichals, nearly half as long as dorsocentrals; 2 strong notopleural, 1 strong humeral, 1 posthumeral setae present. Propleura with 1 strong black seta above fore coxa and few short hairs. Scutellum with 2 strong setae and 2 lateral hairs.

LEGS. Including coxae yellow; fore tibia and segments 1–3 of fore tarsus brownish; segment 4 white with black apex, segment 5 black; mid and hind tarsi black from tip of basitarsus; fore coxa with black hairs anteriorly and several setae in apical half; mid coxa with 1 strong lateral setae in addition to anterior hairs; hind coxa with 1 strong lateral setae; femora without long hairs; fore tibia without distinct setae; segments 1–3 of fore tarsus with ventral row of sparse short curved hairs; segment 4 flattened laterally, slightly widened, covered with white hairs and several black setae, segment 5 flattened laterally, strongly widened, with dorsal row of black flattened setae (Fig. 2C). Length of fore femur, tibia and tarsomeres 1–5 = 0.93 mm, 0.99 mm, 0.51 mm, 0.46 mm, 0.34 mm, 0.16 mm, 0.17 mm. Mid femur with 1 anterior and 1 posteroventral subapical setae; mid tibia with 1 anterodorsal, 2 posterodorsal and 3–4 apical setae. Length of mid femur, tibia and tarsomeres 1–5 = 0.98 mm, 1.28 mm, 0.65 mm, 0.35 mm, 0.31 mm, 0.2 mm, 0.15 mm. Hind femur with one subapical anterior seta; hind tibia with 2–3 anterodorsal, 2–3 posterodorsal, 2–3 fine ventral, 3–4 apical setae, thick brown-black apical spine anteriorly; segment 1 of hind tarsus with basal excavation anteriorly. Length of hind femur, tibia and tarsomeres 1–5 = 1.12 mm, 1.48 mm, 0.42 mm, 0.53 mm, 0.29 mm, 0.2 mm, 0.16 mm.

WINGS. Simple, greyish, veins brown. Costa simple.  $R_1$  reaching to first third of wing length.  $R_{2+3}$ ,  $R_{4+5}$  weakly divergent. Ratio of part of costa between  $R_{2+3}$ ,  $R_{4+5}$  to between  $R_{4+5}$ ,  $M_{1+2}$ : 3/1.  $R_{4+5}$ ,  $M_{1+2}$  slightly convergent in distal part;  $M_{1+2}$  with weak bend in middle of distal part, joining costa just before wing apex. Crossvein dm-m straight, almost perpendicular to longitudinal wing axis, forming right angle with  $M_{1+2}$ ,  $M_4$  longitudinal veins. Ratio of dm-m to distal part of  $M_4$ , 19/46. Posterior wing margin almost evenly convex. Anal vein distinct, almost reaching wing margin; anal lobe reduced; anal angle absent. Lower calypter yellow, brown anteriorly, with brown setae. Halter yellow.

ABDOMEN. Greenish-black, weakly pollinose, with black hairs and marginal setae. Segment 7 short,  $\frac{4}{5}$  length of epandrium. Segment 8 large, covering more than half lateral side of epandrium, with numerous

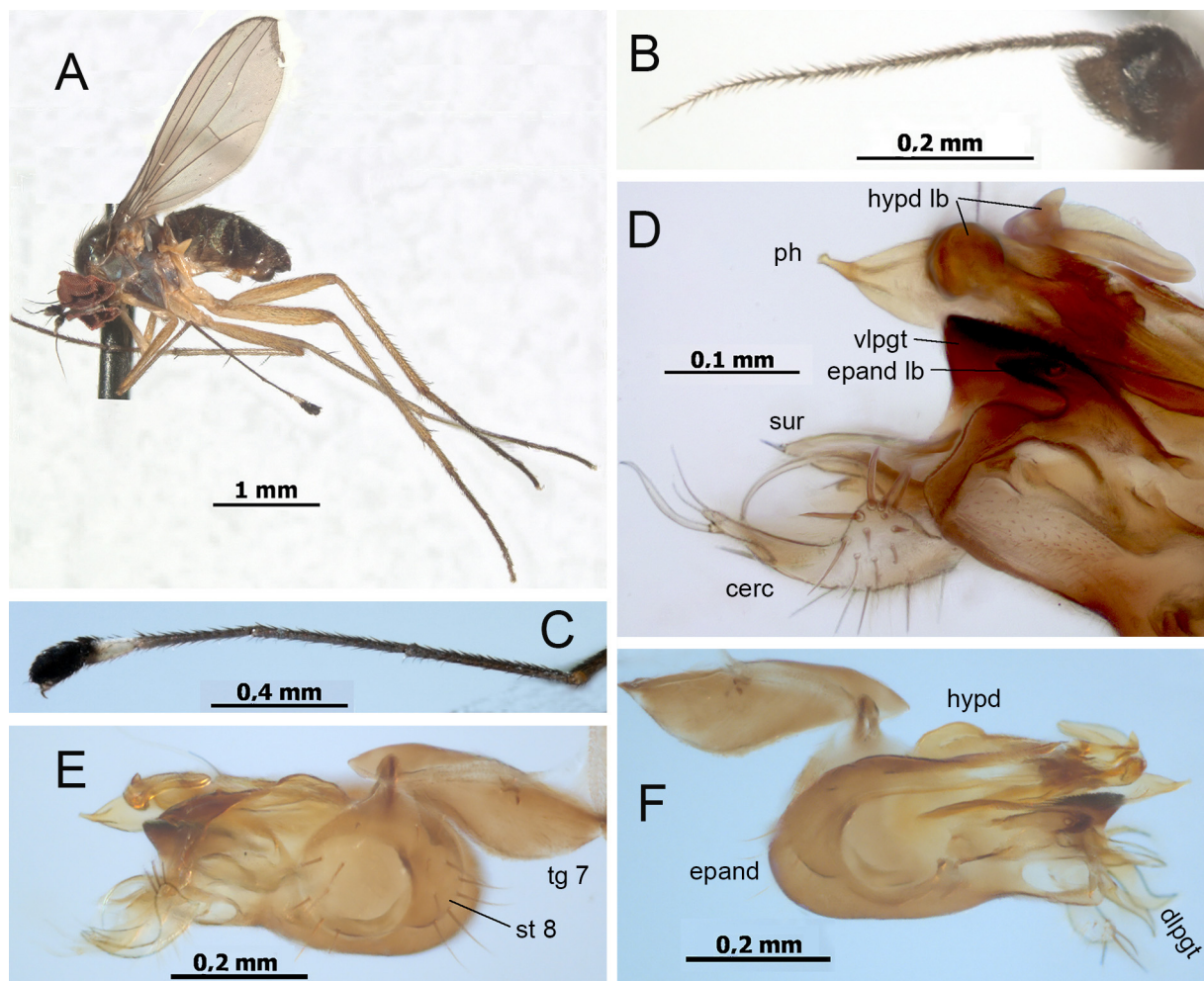
fine short dark cilia. Genitalia (Fig. 2D–F) with epandrium brown-black, rounded-oval, twice longer than high. Foramen positioned before middle of left lateral side. Hypandrium mid-ventral, with short base, 4 long thick lobes of different lengths and widths; longest lobe wide, flat, thin, with pointed apex; thickest lobe of hypandrium strongly curved proximally, U-shaped (ventral view). Phallus thin, concealed. Distoventral epandrial lobe fused to epandrium, projected, with 2 short and 1 very long ventral epandrial setae. Surstylus yellow, small, bilobate; each lobe thick at base, thin distally, with 1 long basal seta and 1 short apical seta. Distal lobe of postgonite as long as cercus, broad, curved ventrally, pointed at apex (Fig. 2F). Ventral lobe of postgonite broad, subtriangular, strongly sclerotized, with serrate ventral margin (Fig. 2D). Cercus yellow, covered with light hairs; large basolateral lobe bearing 3–4 strong, several short setae, long narrow apex bearing 4 long pedunculate setae (Fig. 2D).

### Female

Unknown.

### Distribution

Tanzania.



**Fig. 2.** *Hercostomus fedotovae* sp. nov., ♂, holotype (ZMUM). **A.** Habitus. **B.** Antenna. **C.** Fore tarsus. **D.** Distal appendages of epandrium. **E.** Hypopygium, left lateral view. **F.** Hypopygium, right lateral view.

*Hercostomus sanipass* sp. nov.

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Fig. 3

**Diagnosis**

The new species is a sister species to *H. koshelevae* sp. nov., differing distinctly by its larger size, wider face, darker legs, strongly expanded fore tarsomere 3. The hypopygia are rather similar in the two species. Nevertheless, the proximal arm at the apex of ventral lobe of the postgonite in *H. sanipass* sp. nov. is thicker than that in *H. koshelevae*. The long basolateral cercal lobe in males of both species is very peculiar, being much shorter in males of close species with modified fore tarsus.

**Etymology**

The species is named for the well-known Sani Pass, a mountain pass located on the road between Underberg, KwaZulu-Natal and Mokhotlong, Lesotho, type locality for the new species. The species epithet “sanipass” is a noun in apposition.

**Material examined**

**Holotype**

SOUTH AFRICA • ♂; KwaZulu-Natal, Sani Pass; 29°35'17.3" S, 29°17'33.8" E; 2050 m a.s.l.; 12 Dec. 1984; J. Manning leg.; NMSA.

**Paratypes**

SOUTH AFRICA – **KwaZulu-Natal** • 1 ♂; same collection data as for holotype; NMSA • 1 ♂; Sani Pass; 2100 m a.s.l.; 13 Dec. 1984; J. Manning leg.; stream gully; NMSA • 1 ♂; Sani Pass; 2000 m a.s.l.; 14 Dec. 1984; J. Manning leg.; rocks in mountain stream; NMSA • 1 ♂, 1 ♀; Sani Pass; [no date]; J. Manning leg.; damp mossy rock along road; male terminalia dissected and stored in glycerin in a microvial pinned with the source specimen; NMSA.

**Description**

**Male** (Fig. 3)

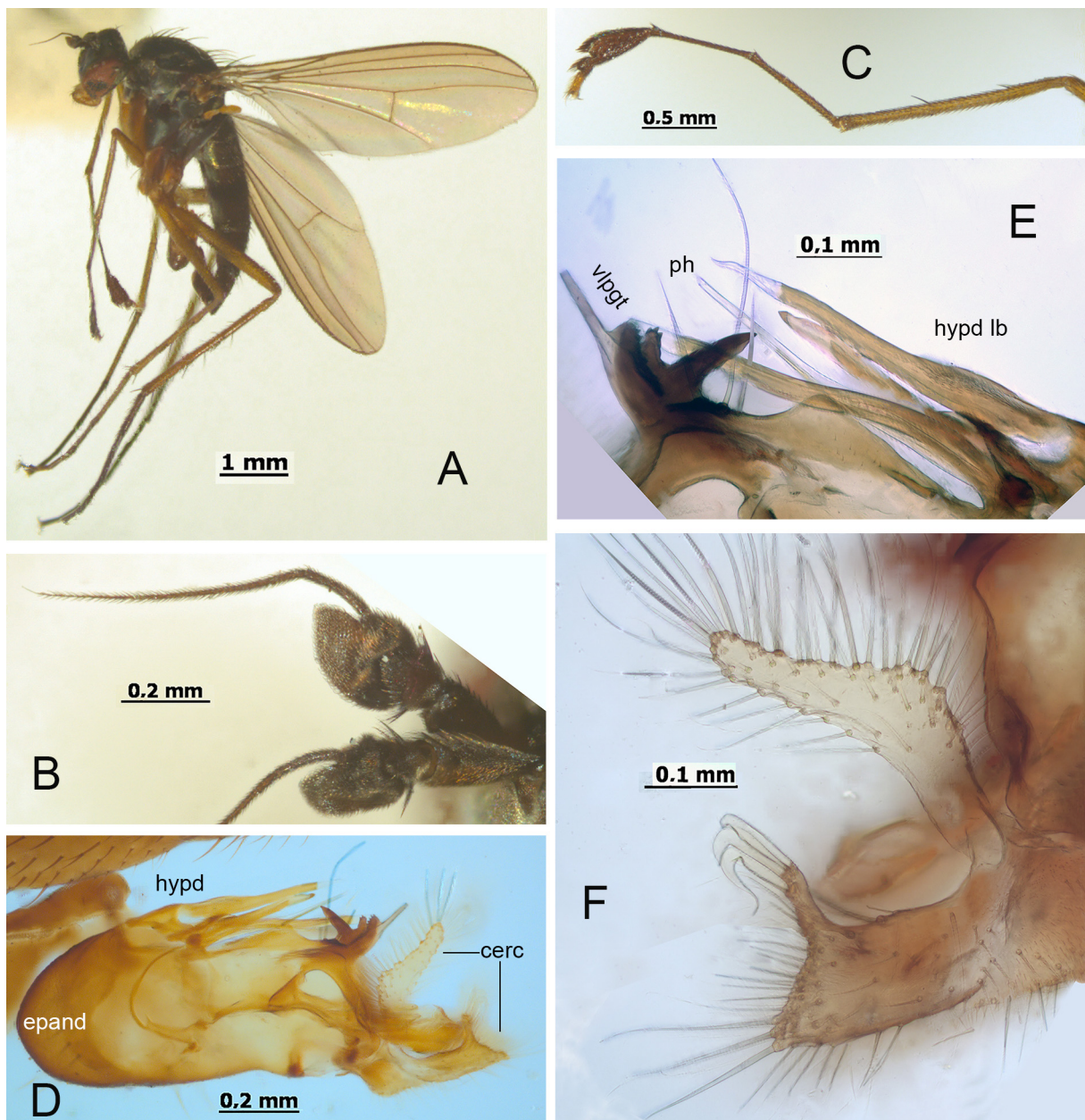
MEASUREMENTS (in mm). Body length 4.9–5.5; antenna length 1.2; wing length 5; wing width 1.6 (Fig. 3A).

HEAD. Frons greenish-black, whitish pollinose; face black, densely white pollinose. One long, strong, vertical pair of ocellar setae, 1 short postvertical, pair of ocellar setae. Upper postocular setae black; lateral, lower ones white. Eye with short hairs; face glabrous. Face gradually narrowed towards palpus, 2.7 × as high as wide in middle, under antennae about 2 × as wide as width of postpedicel, at clypeus approximately as wide as width of postpedicel; clypeus not reaching lower margin of eyes. Antenna (Fig. 3B) slightly longer than height of head, entirely black; pedicel short and wide, internally convex anteriorly, with short distal setulae; postpedicel asymmetrical, elongate, narrowed and angular apicodorsally, nearly 1.5 × longer than wide, covered with short pubescence; arista mid-dorsal, black, with short hairs. Length ratio of scape to pedicel to postpedicel to stylus (1<sup>st</sup> – 2<sup>nd</sup> segments), 27/14/28/18/63. Palpus and proboscis moderately small, yellow, with short black setae; palpus with 1 black bristle.

THORAX. Greenish-black, greyish pollinose. Five strong dorsocentral setae; 2 rows of acrostichals, nearly half as long as dorsocentrals; 2 strong notopleural, 1 strong humeral, 1 posthumeral setae present. Propleura with 1 strong black seta above fore coxa and 2 groups of short light hairs. Scutellum with 2 strong setae and 2 lateral hairs.



LEGS. including coxae dirty yellow; mid and hind coxae blackish laterally; hind femur brown at extreme apex; hind tibia reddish yellow; tarsi black from tip of basitarsus, fore tarsomere 5 yellow, hind basitarsus brown. Fore coxa with black hairs anteriorly and several setae in apical half; mid coxa with 1 strong lateral seta in addition to anterior hairs; hind coxa with 1 strong lateral seta. Femora without long hairs. Fore tibia with 2 short posterodorsal setae. Fore tarsomere 3 flattened and strongly widened, 2 × longer than wide, with dorsal comb of short black setulae; tarsomeres 4–5 with semi-accumbent dorsal hairs, tarsomere 4 with black and white or with only black hairs and tarsomere 5 with white hairs, as long as width of tarsomeres (Fig. 3C). Length of fore femur, tibia and tarsomeres 1–5 = 1.5 mm, 1.59 mm, 0.76 mm, 0.71 mm, 0.49 mm, 0.13 mm, 0.16 mm. Mid femur with 1 anterior and 1 posteroventral subapical seta. Mid tibia with 3 anterodorsal, 2 posterodorsal and 5 apical setae. Length of mid femur,



**Fig. 3.** *Hercostomus sanipass* sp. nov., ♂, paratype, no date (NMSA). **A.** Habitus. **B.** Antenna. **C.** Fore tibia and tarsus. **D.** Hypopygium, right lateral view. **E.** Distoventral appendages of epandrium. **F.** Cercus.

tibia and tarsomeres 1–5 = 1.83 mm, 2.32 mm, 1.16 mm, 0.58 mm, 0.47 mm, 0.26 mm, 0.14 mm. Hind femur with one subapical anterior seta. Hind tibia with 3 anterodorsal, 3 posterodorsal, 4–5 fine ventral, 5 apical setae. Hind tarsomeres 1–2 with 1–2 short apical setae. Length of hind femur, tibia and tarsomeres 1–5 = 2.03 mm, 2.74 mm, 0.75 mm, 0.92 mm, 0.47 mm, 0.25 mm, 0.15 mm.

WINGS. Simple, greyish, veins brown. Costa simple.  $R_1$  reaching to first third of wing length.  $R_{2+3}$  and  $R_{4+5}$  weakly divergent. Ratio of part of costa between  $R_{2+3}$  and  $R_{4+5}$  to between  $R_{4+5}$  and  $M_{1+2}$ ,  $7/3$ .  $R_{4+5}$  and  $M_{1+2}$  slightly convergent in distal part;  $M_{1+2}$  joining costa before wing apex. Crossvein dm-m straight, almost perpendicular to longitudinal wing axis, forming right angle with  $M_{1+2}$  and acute angle with  $M_4$  longitudinal veins. Ratio of dm-m to distal part of  $M_4$ ,  $45/82$ . Posterior wing margin almost evenly convex. Anal vein distinct, almost reaching wing margin; anal lobe pronounced; anal angle obtuse. Lower calypter yellow, brown anteriorly, with black setae. Halter yellow.

ABDOMEN. Greenish-black, weakly pollinose, with black hairs and long marginal setae. Segment 7 about as long as epandrium. Segment 8 large, covering more than half lateral side of epandrium, with numerous fine short dark cilia. Genitalia (Fig. 3D) with epandrium brownish black in proximal part and dirty yellow in distal part, rounded-oval, twice longer than high. Foramen positioned before middle of left lateral side. Hypandrium mid-ventral, with short base, 4 long thin lobes of different lengths and widths. Phallus thin, projected. Distoventral epandrial lobe as short rounded prominence, fused to epandrium, with 2 short and 1 long setae. Surstylus yellow, bilobate; ventral lobe broad, simple,  $2/3$  length of dorsal lobe, with 1 subapical seta; dorsal lobe of surstylus expanded in distal half, with short narrow process at apex, several subapical setulae and 1 strong mid-dorsal seta. Distal lobe of postgonite as long as ventral lobe of surstylus, narrow, broad and pointed at apex. Ventral lobe of postgonite (Fig. 3E) strongly sclerotized, with 2 long arms (anterior and posterior) at apex forming letter V, 2 short symmetrical processes between them, covered with denticles on ventral side. Cercus (Fig. 3F) broad, yellow, densely covered with short light hairs, longer at apex; cercus with basolateral lobe, longer than cercus, densely covered with long setae, and with distolateral narrow process bearing 3 thick hook-tipped setae at apex; 1 strong seta proximal to process, 3 strong setae at apex of cercus.

### Female

Similar to male except lacking male secondary sexual characters.

### Ecology

According to type specimen labels, imagos inhabit rocks in mountain streams and damp mossy rocks along roads.

### Distribution

South Africa.

### *Hercostomus koshelevae* sp. nov.

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Fig. 4

### Diagnosis

The new species is sister species to *H. sanipass* sp. nov., differing distinctly in its smaller size, narrower face, lighter colored legs, weakly widened fore tarsomere 3. The hypopygia are rather similar in the two species. Nevertheless, the proximal arm at apex of ventral lobe of postgonite in *H. koshelevae* sp. nov. is always thinner than that in *H. sanipass*. The long basolateral cercal lobe in males of both species is very peculiar, being much shorter in males of close species with modified fore tarsus.

### Etymology

The species is named for the Russian entomologist, Dr. Oksana Kosheleva (VIZR, St. Petersburg).

### Material examined

#### Holotype

SOUTH AFRICA • ♂; KwaZulu-Natal, Balgowan, “Yellowwoods”; 29°24′ S, 30°03′ E; 1300 m a.s.l.; 31 Dec. 1982; J. Manning leg.; high forest, deeply shaded stream herbs; NMSA.

#### Paratypes

SOUTH AFRICA – **KwaZulu-Natal** • 4 ♂♂, 1 ♀; same data as for the holotype • 1 ♂; Pietermaritzburg, Town Bush, 2930Cb; Nov. 1971; M.E. Irwin leg.; terminalia dissected and stored in glycerin in microvials pinned with the specimen; NMSA • 1 ♀; Richmond District, Pateni, 2930Cc; 30°09′ S, 29°56′ E; 18 Nov. 1971; B. and P. Stuckenberg leg.; temp. forest; NMSA • 1 ♂; Deepdale, Umkomaas Valley; 29°48′ S, 29°58′ E; May 1959; B. and P. Stuckenberg leg.; terminalia dissected and stored in glycerin in microvials pinned with the specimen; NMSA • 1 ♂, 1 ♀; Royal Natal National Park, Forest stream rocks; 1828.8 m a.s.l. [alt. 6000′]; 19 Jan. 1987; J. Manning leg.; terminalia dissected and stored in glycerin in microvials pinned with the specimen; NMSA • 1 ♂; Cathedral Peak Natural Reserve, Rainbow Gorge; 1480 m a.s.l.; 28°57.6′ S, 29°13.61′ E; 29 May – 21 Sep. 2006; Mostovski leg.; malaise trap; NMSA. – **Eastern Cape** • 1 ♂, 1 ♀; Storms River Pass, Tsitsikama Range; 33°59′ S, 23°55′ E; 12–13 Oct. 1959; B. and P. Stuckenberg leg.; indigenous forest; terminalia dissected and stored in glycerin in microvials pinned with the specimen; NMSA • 1 ♀; Hogsback, 3226Db; 32°35′ S, 26°57′ E; 13–16 Dec. 1985; J. and B. Londt leg.; forest and forest margins; NMSA. – **Western Cape** • 1 ♂; Groeneweide Forest, Saasveld Forest margin; 33°57′ S, 22°32′ E; ca 150 m a.s.l.; 9 Sep. 1993; D. and C. Barraclough leg.; terminalia dissected and stored in glycerin in microvials pinned with the specimen; NMSA. – **Mpumalanga** • 1 ♂; E. Transvaal, Marieskop [Forest Reserve]; Oct. 1956; B. Stuckenberg leg.; terminalia dissected and stored in glycerin in microvials pinned with the specimen; NMSA.

### Description

#### Male (Fig. 4)

Similar to *H. sanipass* sp. nov. in all respects except as noted.

MEASUREMENTS (in mm). Body length 3.6–4.1; antenna length 1; wing length 3.9; wing width 1.4 (Fig. 4A).

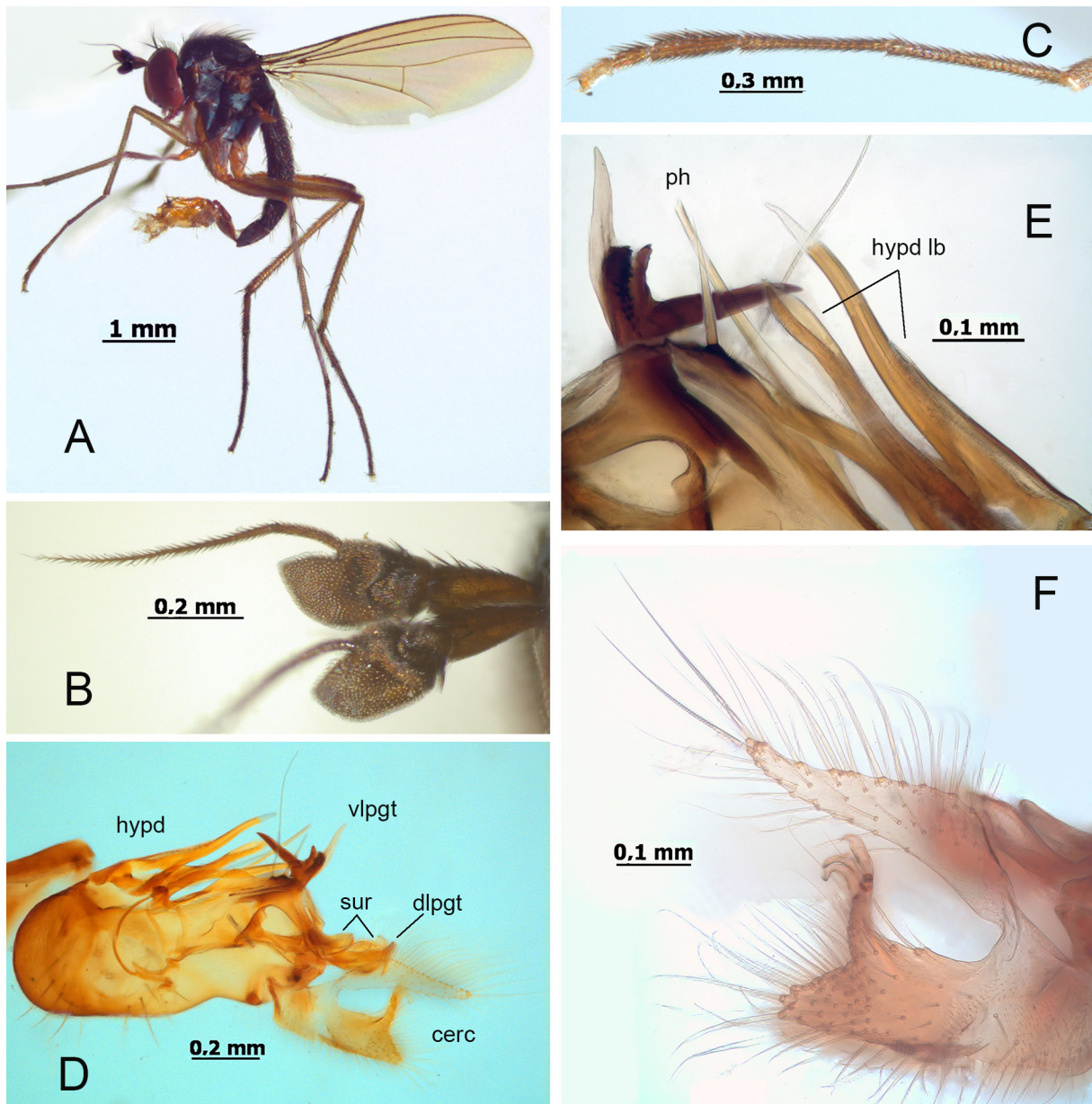
HEAD. Face gradually narrowed towards palpi,  $4.9 \times$  as high as wide in middle, under antennae  $1.5 \times$  as wide as width of postpedicel, at clypeus half as wide as width of postpedicel. Antennal postpedicel  $1.3 \times$  longer than high (Fig. 4B). Length ratio of scape to pedicel to postpedicel to stylus (1<sup>st</sup> – 2<sup>nd</sup> segments), 23/10/23/15/50. Palpus, proboscis moderately small, yellow, with short black setae; palpus with 1 black bristle.

THORAX. Mostly greenish-black, greyish pollinose; metepimeron dirty yellow.

LEGS. including coxae mostly light yellow; mid coxa brownish laterally; hind femur brownish at extreme apex; tarsi black from tip of basitarsus, fore tarsomere 5 yellow. Fore tarsomere 3 flattened and slightly widened, with dorsal comb of short black setulae; tarsomeres 4–5 with semi-accumbent dorsal hairs, tarsomere 4 with black hairs, tarsomere 5 with white hairs (Fig. 4C). Length of fore femur, tibia and tarsomeres 1–5 = 1.15 mm, 1.29 mm, 0.65 mm, 0.53 mm, 0.33 mm, 0.14 mm, 0.16 mm. Length of mid femur, tibia and tarsomeres 1–5 = 1.38 mm, 1.8 mm, 1.01 mm, 0.49 mm, 0.4 mm, 0.22 mm, 0.16 mm. Length of hind femur, tibia and tarsomeres 1–5 = 1.75 mm, 2.16 mm, 0.58 mm, 0.74 mm, 0.5 mm, 0.26 mm, 0.2 mm.

WINGS. simple, greyish, almost hyaline, veins brown. Ratio of part of costa between  $R_{2+3}$  and  $R_{4+5}$  to between  $R_{4+5}$  and  $M_{1+2}$ , 24/7. Ratio of dm-m to distal part of  $M_4$ , 39/60.

GENITALIA. (Fig. 4D) with epandrium mostly yellow, brown at base. Hypandrium mid-ventral, with short base, 4 long thin lobes of different lengths, widths. Phallus thin, projected. Distoventral epandrial lobe as short rounded prominence, fused to epandrium, with 1 short and 1 long seta. Surstylus yellow, bilobate; ventral lobe broad, simple,  $\frac{2}{3}$  length of dorsal lobe, with 1 subapical seta; dorsal lobe of surstylus widened in distal half, with short narrow process at apex, several subapical setulae, 1 strong mid-dorsal seta. Distal lobe of postgonite as long as ventral lobe of surstylus, narrow, broad and pointed at apex. Ventral lobe of postgonite (Fig. 4E) strongly sclerotized, with 2 long arms (anterior, posterior) at apex



**Fig. 4.** *Hercostomus koshelevae* sp. nov., ♂, holotype (MNSA; A–C); ♂, paratype, Town Bush (MNSA; D–F). A. Habitus. B. Antenna. C. Fore tarsus. D. Hypopygium, right lateral view. E. Distoventral appendages of epandrium. F. Cercus.

forming letter V, 2 short symmetrical processes between them, covered with denticles on ventral side. Cercus (Fig. 4F) broad, light yellow, densely covered with short light hairs, longer at apex; cercus with basolateral lobe, longer than cercus, densely covered with long setae, with distolateral narrow process bearing 3 thick hook-tipped setae at apex; 2 strong setae proximal to process, 3 strong setae at apex of cercus.

#### **Female**

Similar to male except lacking male secondary sexual characters.

#### **Ecology**

According to type specimen labels, imagos inhabit rocks in mountain streams, being common in forests.

#### **Distribution**

South Africa.

#### ***Hercostomus vikhrevi* sp. nov.**

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Fig. 5

#### **Diagnosis**

The new species is close to *H. balensis* Grichanov, 2004, and *H. kefaensis* Grichanov, 2004, both known from Ethiopia, differing distinctly in its larger size, in morphology of the male fore tarsus, antenna, wing and hypopygium. In *H. balensis*, male fore tarsomeres 4–5 dark, with fringe of white erect hairs, 1.5–2 × longer than diameter of tarsomeres; wing with less deep postero-proximal emargination; basoventral lobe of cercus distinctly shorter than mid-ventral lobe; the latter lobe bearing three strong simple setae, half as long as the lobe. In *H. kefaensis*, the male postpedicel is 2.5–3 × longer than high; fore tarsomere 4–5 dark, with short semi-accumbent dorsal hairs, tarsomere 4 with black hairs and tarsomere 5 with black and white hairs; wing with less deep postero-proximal emargination; mid-ventral lobe of cercus with three strong simple setae, slightly longer than the lobe.

#### **Etymology**

The species is named for the collector of the holotype, Dr. Nikita Vikhrev (ZMUM, Moscow).

#### **Type material**

##### **Holotype**

KENYA • ♂; Laikipia County, Thomson's Falls; 0.05° S, 36.38° E; 2350 m a.s.l.; 21–23 Dec. 2013; N. Vikhrev leg.; terminalia dissected and stored in glycerin in a microvial pinned with the specimen; ZMUM.

#### **Description**

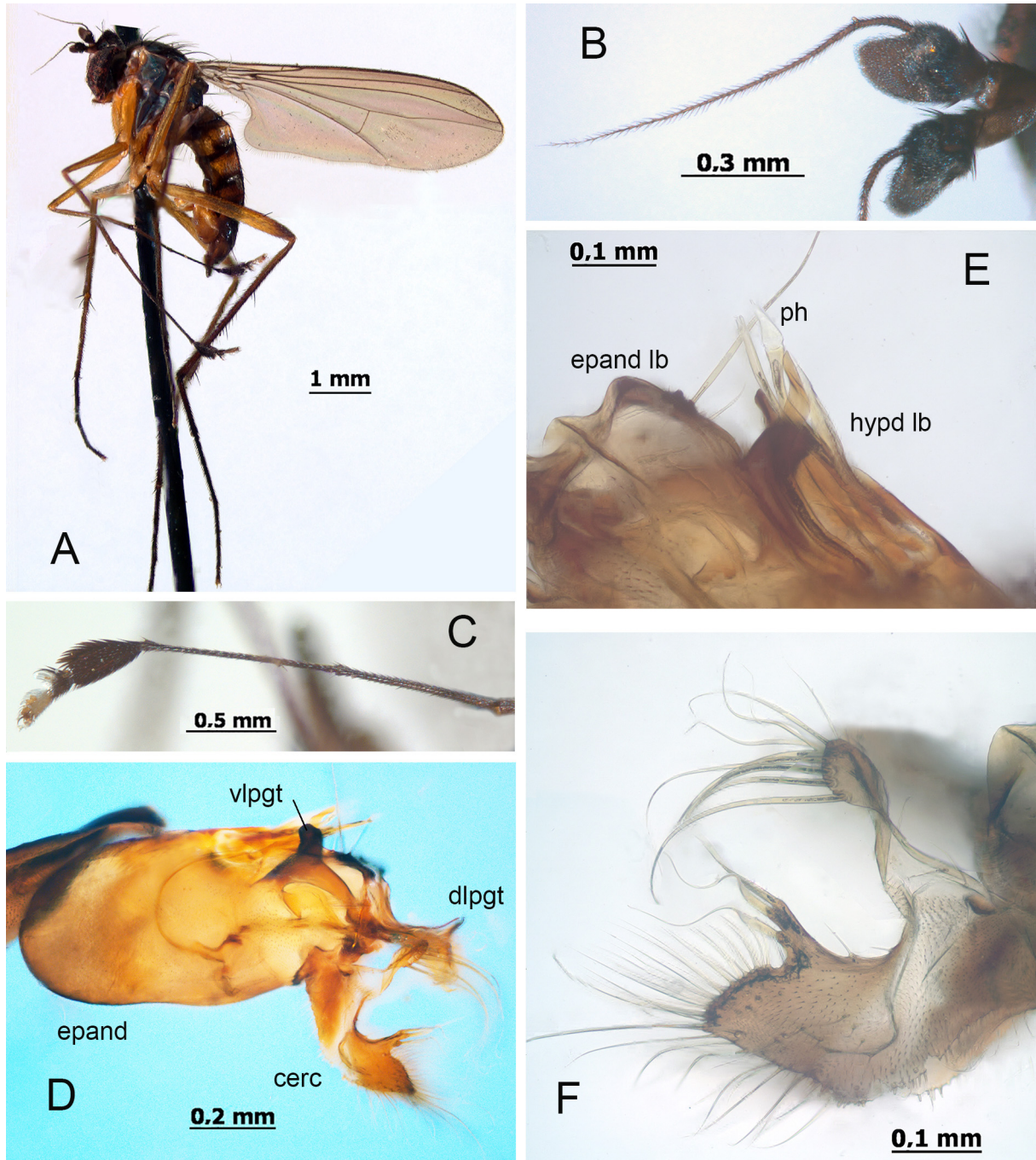
##### **Male** (Fig. 5)

MEASUREMENTS (in mm). Body length 4.9; antenna length 1.3; wing length 5.2; wing width 1.5 (Fig. 5A).

HEAD. Frons greenish black, whitish pollinose; face black, densely white pollinose. One long, strong vertical pair of ocellar setae, 1 short postvertical, pair of ocellar setae. Upper postocular setae black; lateral, lower ones white. Eye with short hairs; face glabrous. Face gradually narrowed towards palpi, 5.1 × as high as wide in middle, under antennae about 1.3 × as wide as width of postpedicel, at clypeus approximately half as wide as width of postpedicel; clypeus not reaching lower margin of eyes. Antenna (Fig. 5B) slightly longer than height of head, entirely black; pedicel short, wide, internally convex

anteriad, with short distal setulae; postpedicel asymmetrical, elongate, narrowed, angular apicodorsally,  $1.4 \times$  longer than high, covered with short pubescence; arista mid-dorsal, black, with short hairs. Length ratio of scape to pedicel to postpedicel to stylus (1<sup>st</sup> – 2<sup>nd</sup> segments), 21/15/26/14/81. Palpus, proboscis moderately small, yellow, with short black setae; palpus with 1 black bristle.

THORAX. Greenish black, greyish pollinose. Six strong dorsocentral setae; 2 rows of acrostichals, nearly half as long as dorsocentrals; 2 strong notopleural, 1 strong humeral, 1 posthumeral setae. Propleura



**Fig. 5.** *Hercostomus vikhrevi* sp. nov., ♂, holotype (ZMUM). A. Habitus. B. Antenna. C. Fore tarsus. D. Hypopygium, right lateral view. E. Distoventral appendages of epandrium. F. Cercus.

with 1 strong black seta above fore coxa, 2 groups of short light hairs. Scutellum with 2 strong setae, 2 lateral hairs.

**LEGS.** Including coxae dirty yellow; mid coxa brownish laterally; hind femur brown at extreme apex; hind tibia yellow-brown; tarsi black from tip of basitarsus, fore tarsomere 5 yellow, hind basitarsus brownish black. Fore coxa with black hairs anteriorly and several setae in apical half; mid coxa with 1 strong lateral seta in addition to anterior hairs; hind coxa with 1 strong lateral seta. Femora without long hairs. Fore tibia with 2 short posterodorsal setae. Fore tarsomere 3 flattened, strongly widened,  $2.3 \times$  longer than wide, with dorsal comb of short black setulae; tarsomere 4 with strong basodorsal black spine formed of 3 mostly fused bristles, with brush of white erect hairs; tarsomere 5 clear white, with dorsal fringe of white erect hairs, not longer than diameter of tarsomere (Fig. 5C). Length of fore femur, tibia and tarsomeres 1–5 = 1.54 mm, 1.64 mm, 0.91 mm, 1.08 mm, 0.42 mm, 0.13 mm, 0.2 mm. Mid femur with 1 anterior and 1 posteroventral subapical seta. Mid tibia with 3 anterodorsal, 2 posterodorsal and 5 apical setae. Length of mid femur, tibia and tarsomeres 1–5 = 1.91 mm, 2.75 mm, 1.62 mm, 0.9 mm, 0.69 mm, 0.33 mm, 0.21 mm. Hind femur with one subapical anterior seta. Hind tibia with 3 anterodorsal, 3 posterodorsal, 4–5 fine ventral, 5 apical setae. Hind tarsomeres 1–2 with 1–2 short apical setae. Length of hind femur, tibia and tarsomeres 1–5 = 2.45 mm, 3.06 mm, 0.95 mm, 1.19 mm, 0.69 mm, 0.37 mm, 0.26 mm.

**WINGS.** Simple, greyish, veins brown. Costa simple.  $R_1$  reaching to first third of wing length.  $R_{2+3}$  and  $R_{4+5}$  weakly divergent. Ratio of part of costa between  $R_{2+3}$  and  $R_{4+5}$  to between  $R_{4+5}$  and  $M_{1+2}$ , 61/16.  $R_{4+5}$  and  $M_{1+2}$  slightly convergent in distal part;  $M_{1+2}$  joining costa at wing apex. Crossvein dm-m straight, forming right angle with both  $M_{1+2}$  and  $M_4$  longitudinal veins. Ratio of dm-m to distal part of  $M_4$ , 46/75. Wing anal lobe with broad and deep postero-proximal emargination. Anal vein fold-like; anal lobe pronounced. Lower calypter yellow, with black setae. Halter yellow.

**ABDOMEN.** Mostly greenish black, weakly pollinose, with segments 2–3 broadly reddish yellow laterally, segments 4–5 with brown lateral spots, with black hairs and long marginal setae. Segment 7 slightly longer than epandrium (93/84). Segment 8 large, covering more than half lateral side of epandrium, with fine short dark cilia. Genitalia (Fig. 5D) with epandrium orange yellow, rounded-oval, twice longer than high. Foramen positioned before middle of left lateral side. Hypandrium mid-ventral, with short base, 4 long thin lobes of different lengths and widths. Phallus thin, projected. Distoventral epandrial lobe as short rounded prominence, fused to epandrium, with 2 short, 1 very long setae. Surstylus yellow, bilobate; ventral lobe broad, simple,  $\frac{2}{3}$  length of dorsal lobe, with 1 subapical seta; dorsal lobe of surstylus widened in distal half, with short narrow process at apex, several subapical setulae, 1 strong mid-dorsal seta. Distal lobe of postgonite as long as ventral lobe of surstylus, narrow, broad, pointed at apex. Ventral lobe of postgonite (Fig. 5E) strongly sclerotized, simple, covered with microscopic denticles on proximal side. Cercus (Fig. 5F) broad, yellow, densely covered with short light hairs, longer at apex, long strong setae at apex of cercus; cercus with 2 ventral lobes; basolateral lobe of cercus nearly as long as cercus, with bunch of about 9 long, curved at apex apical setae; mid-ventral narrow lobe with 3 pedunculate setae, thick on basal half, filiform on distal half, 2 times longer than lobe; 1 short strong seta between ventral lobes.

#### **Female**

Unknown.

#### **Distribution**

Kenya.

### New locality records

#### *Hercostomus perturbus* Curran, 1924

*Hercostomus perturbus* Curran, 1924: 225. Type locality: South Africa, Gauteng, Pretoria, Fountains.

### Material examined

SOUTH AFRICA • 1 ♂; KwaZulu-Natal, Royal Natal National Park, Mahai River; 28°41.364' S, 28°56.335' E; 1449 m a.s.l.; 17–18 Feb. 2010; A.H. Kirk-Spriggs leg.; Malaise trap (2), straddling Mahai River indigenous forest; BMSA • 1 ♂, 1 ♀; Western Cape, Tsitsikamma National Park, Bloukrans Pass; 33°56.558' S, 23°37.566' E; 22–25 Jan. 2009; A.H. Kirk-Spriggs and S. Otto leg.; sweeping, forest paths, indigenous forest; BMSA • 4 ♂♂; Eastern Cape, Tsitsikamma National Park, Storms River mouth; 34°01.239' S, 23°53.744' E; 20 Jan. 2009; A.H. Kirk-Spriggs leg.; sweeping, indigenous forest, stream margins; BMSA.

### Ecology

According to the label data of the above specimens, imagos inhabit forest paths and stream margins in indigenous forests.

### Distribution

South Africa.

#### *Hercostomus selikhovkini* Grichanov, 1999

*Hercostomus selikhovkini* Grichanov, 1999: 17. Type locality: Tanzania, Uzungwe Mts., Mwanihana Forest above Sanje.

### Material examined

TANZANIA • 1 ♂; Morogoro Region, Udzungwa Mt. National Park, Mito Mitatu; 7°50'14.3" S, 36°50'46.8" E; 1207 m a.s.l.; 23 Nov. 2013; T. Pape and N. Scharff leg.; Malaise trap; specimen in ethanol; ZMUC • 51 ♂♂; Morogoro Region, Udzungwa Mt. National Park, Mizimu Camp; 7°48'23.40" S, 36°51'7.29" E; 769 m a.s.l.; 1–4 Nov. 2015; T. Pape and N. Scharff leg.; Malaise trap; specimens in ethanol; ZMUC.

### Distribution

Tanzania.

#### *Hercostomus wittei* Grichanov, 1999

*Hercostomus wittei* Grichanov, 1999: 23. Type locality: Kenya, Aberdare Range, Kilembe.

### Material examined

KENYA • 5 ♂♂; Nakuru County, Hell's Gate National Park; 0.895° S, 36.32° E; 1860 m a.s.l.; 19 Dec. 2013; N. Vikhrev leg.; ZMUM.

TANZANIA • 2 ♂♂, 1 ♀; Morogoro environs, Uluguru Mts., Majiyanak Wendo waterfall; 6.87717° S, 37.68242° E; 1081 m a.s.l.; 21 Nov. 2012; leg. D. Gavryushin; ZMUM • 1 ♂; Morogoro environs; 6.85° S, 37.67° E; 2–3 Dec. 2015; N. Vikhrev leg.; ZMUM.



### Distribution

DR Congo, Kenya. First record from Tanzania.

### Key to Afrotropical species of *Hercostomus* (males)

1. R4+5 and M1+2 inconspicuously or slightly convergent; fore tarsomere 3 neither flattened nor widened; fore tarsomeres 4–5 simple ..... 2
  - R4+5 and M1+2 distinctly convergent; fore tarsomere 3 compressed and widened, rarely simple; if fore tarsomere 3 simple, then fore tarsomeres 4–5 flattened and widened ..... 4
2. Lower postocular setae black; cercus regularly subtriangular, black (Grichanov 2004: fig. 24); body 2.3–2.6 mm [Republic of the Congo, Equatorial Guinea] ..... *H. intercedens* Grichanov, 2004
  - Lower postocular setae white; cercus elongate, narrow, with basoventral lobe yellow (Fig. 1A; Grichanov 1999: fig. 19) ..... 3
3. Mid and hind femora each with ventral row of erect cilia, about as long as diameter of femur (Fig. 1C); body 3.6 mm [Namibia] ..... *H. brandbergensis* sp. nov.
  - Mid and hind femora without long ventral cilia; body 3.0–4.5 mm [Cameroon, DR Congo, South Africa, Tanzania, Uganda] ..... *H. nectarophagus* Curran, 1924
4. Fore tarsomere 3 simple, fore tarsomeres 4–5 flattened and widened, fore tarsomere 4 white and fore tarsomere 5 deep black (Fig. 2C); body 2.4 mm [Tanzania] ..... *H. fedotovae* sp. nov.
  - Fore tarsomere 3 compressed and widened, fore tarsomere 4 usually black and fore tarsomere 5 usually white ..... 5
5. Fore tarsomere 2 as long as fore tibia; fore tarsomere 3 equal to tarsomere 5 (Grichanov 2004: fig. 22); body 4.3 mm [Tanzania] ..... *H. heinrichi* Grichanov, 2004
  - Fore tarsomere 2 much shorter than fore tibia; fore tarsomere 3 usually not equal to tarsomere 5 ... ..... 6
6. Fore tarsomeres 3–4 shortened; tarsomere 3 not longer than tarsomere 5; cercus with large basolateral lobe bearing several short setae; cercus with long narrow apex bearing several long setae ..... 7
  - Fore tarsomeres 4–5 shortened; tarsomere 3 longer than tarsomere 5; cercus various, rarely with drawn-out apex ..... 10
7. Fore tarsomere 4 with short dorsal lobe; tarsomere 3 nearly equal to tarsomere 5 (Grichanov 1999: fig. 39); body 5.0 mm [Tanzania, Zimbabwe] ..... *H. patellitarsis* (Parent, 1934)
  - Fore tarsomere 4 without lobe; tarsomere 5 at least twice longer than tarsomere 3 ..... 8
8. Fore tibia mostly brown, white and swollen in distal 1/3; fore tarsomere 2 white (Grichanov 2004: fig. 18); body 5.1 mm [Tanzania] ..... *H. freidbergi* Grichanov, 2004
  - Fore tibia yellow; fore tarsomere 2 mostly black [Tanzania] ..... 9
9. Fore tarsomere 2 with row of hooked cilia; tarsomere 5 3 times longer than tarsomere 3 (Grichanov 1999: fig. 40); body 3.8 mm ..... *H. enghoffi* Grichanov, 1999
  - Fore tarsomere 2 with simple setulae; tarsomere 5 2 times longer than tarsomere 3 (Grichanov 1999: fig. 41); body 3.7 mm ..... *H. selikhovkini* Grichanov, 1999
10. Cercus with long basolateral lobe, longer than cercus (Figs 3F, 4F) [South Africa] ..... 11
  - Cercus with short basolateral lobe, shorter than cercus ..... 12

11. Male face 2.7 times as high as wide in middle; fore tarsomere 3 strongly widened, 2 times longer than wide (Fig. 3C); body 4.9–5.5 mm ..... *H. sanipass* sp. nov.  
 – Male face 4.9 times as high as wide in middle; fore tarsomere 3 weakly widened, at least 4 times longer than wide (Fig. 4C); body 3.6–4.1 mm ..... *H. koshelevae* sp. nov.
12. Cercus with large mushroom-like process bearing fan of at least 5 long strong setae; setae at least as long as cercus ..... 13  
 – Cercus with short narrow process or low prominence at base, bearing at most 3 strong setae ..... 18
13. Anal lobe of wing with broad and deep postero-proximal emargination (e.g., Fig. 5A; Grichanov 2004: fig. 15) ..... 14  
 – Posterior wing margin evenly convex ..... 16
14. Postpedicel 2.5–3 times longer than high; fore tarsomeres 4–5 with mostly black accumbent setulae; body 3.4–3.5 mm [Ethiopia] ..... *H. kefaensis* Grichanov, 2004  
 – Postpedicel slightly longer than high ..... 15
15. Fore tarsomeres 4 and 5 dark, with fringe of white erect hairs, 1.5–2 times longer than diameter of tarsomeres (Grichanov 2004: fig. 14); body 3.6 mm [Ethiopia] ..... *H. balensis* Grichanov, 2004  
 – Fore tarsomere 4 with strong basodorsal black spine formed of 3 mostly fused bristles, with brush of white erect hairs; fore tarsomere 5 clear white, with dorsal fringe of white erect hairs, not longer than diameter of tarsomere (Fig. 5 C); body 4.9 mm [Kenya] ..... *H. vikhrevi* sp. nov.
16. Fore tarsomere 3  $\frac{1}{3}$  or  $\frac{2}{5}$  length of tarsomere 2 (Grichanov 1999: Fig. 42); cercus with only several long cilia in distal part; basolateral process of cercus comparatively small,  $\frac{1}{3}$  length of cercus, with 5–6 long setae (Grichanov 1999: fig. 13); body 4.3 mm [Kenya] ..... *H. yakovlevi* Grichanov, 1999  
 – Fore tarsomere 3  $\frac{3}{5}$  –  $\frac{3}{4}$  length of tarsomere 2; cercus densely covered with long hairs in distal part; basolateral process of cercus large, with at least 10 long setae ..... 17
17. Fore tarsomere 3 strongly widened, about 3 times longer than wide (Grichanov 1999: fig. 44); basolateral process of cercus with about 20 long setae (Grichanov 1999: fig. 12); body 4.6 mm [Yemen] ..... *H. scotti* Grichanov, 1999  
 – Fore tarsomere 3 weakly widened, at least 4 times longer than wide (Grichanov 1999: fig. 46); basolateral process of cercus with about 10 long setae (Grichanov 1999: fig. 11); body 3.5–4.1 mm [Ethiopia, Kenya, Uganda] ..... *H. ozerovi* Grichanov, 1999
18. Cercus with 2 lateroventral processes; fore tarsomere 3 strongly widened; segment 7 of abdomen at least  $\frac{1}{3}$  longer than epandrium ..... 19  
 – Cercus with one basolateral prominence; fore tarsomere 3 usually weakly widened; segment 7 of abdomen equal to or shorter than epandrium ..... 20
19. Fore tarsomere 3 nearly equal in length to tarsomere 2 (Grichanov 1999: fig. 45); distoventral process of cercus narrow, as wide as basoventral process (Grichanov 2011b: fig. 72); body 3.0 mm [South Africa] ..... *H. perturbus* Curran, 1924  
 – Fore tarsomere 3 approximately half as long as tarsomere 2 (Grichanov 1999: fig. 48); mid-ventral process of cercus wide, 2 times wider than basoventral process (Grichanov 1999: fig. 15); body 3.5 mm [DR Congo, Kenya, Tanzania] ..... *H. wittei* Grichanov, 1999

20. Fore tarsomere 3 half as long as tarsomere 2 or shorter; fore tarsomere 1 shorter than tarsomere 2; epandrium slightly projected apicoventrally; cercus with long and narrow distal part ..... 21  
– Fore tarsomere 3  $\frac{2}{3}$  length of tarsomere 2; fore tarsomere 1 longer than tarsomere 2; epandrium strongly projected apicoventrally; cercus relatively broad ..... 22
21. Fore tarsomere 2 slightly longer than tarsomere 1 and 2 times longer than tarsomere 3 (Grichanov 1999: fig. 43); mid tibia without ventral seta; body 4.6 mm [Cameroon] .....  
..... *H. tobiasi* Grichanov, 1999  
– Fore tarsomere 2: 2 times longer than tarsomere 1 and 4 times longer than tarsomere 3 (Grichanov 2004: fig. 30); mid tibia with ventral seta at  $\frac{2}{3}$ ; body 4.5 mm [Tanzania] .....  
..... *H. ngozi* Grichanov, 2004
22. Cercus truncated at apex, with distinct basolateral prominence bearing 2–3 strong setae (Grichanov 1999: fig. 17); body 3.4 mm [Uganda] ..... *H. mostovskii* Grichanov, 1999  
– Cercus somewhat projected apicoventrally, with dorsal subapical tubercle and indistinct basolateral prominence (Grichanov 1999: fig. 16); body 3.4 mm [Cameroon, Uganda] ..... *H. krivosheinae* Grichanov, 1999

## Discussion

Most species of Afrotropical *Hercostomus* are distinct, with modified male fore tarsus, often with thin tarsomeres 1–2, with at least fore tarsomere 3 compressed and widened, often with tarsomere 5 white or bearing fringe of white hairs. The male cercus of these species is remarkable in having one or two ventral processes or projections. They belong to the *Hercostomus longiventris* lineage (Brooks 2005). The *H. perturbus* species subgroup with two ventral processes or projections on cercus includes *H. balensis*, *H. koshelevae*, *H. freidbergi*, *H. kefaensis*, *H. vikhrevi*, *H. ozerovi*, *H. perturbus*, *H. sanipass*, *H. scotti*, *H. wittei*, and *H. yakovlevi*. The *H. nectarophagus* species subgroup with only the basoventral or basolateral lobe bearing a few or several setae and with a long narrow apex bearing long setae, includes *H. enghoffi*, *H. fedotovae*, *H. freidbergi*, *H. heinrichi*, *H. mostovskii*, *H. brandbergensis*, *H. nectarophagus*, *H. ngozi*, *H. selikhovkini*, and *H. tobiasi*.

In the Palaearctic Region, only a few species of *Hercostomus* share with Afrotropical species the taxonomically significant apomorphic characters, such as the modified male fore tarsus. The widely distributed *H. chetifer* (Walker, 1849) inhabits many countries of the Holarctic Realm, reaching southwards to northern India (Uttar Pradesh). Its sibling species, *H. separatus* d'Assis Fonseca, 1976, is reported from Croatia and Romania. Another similar species, *H. dilatitarsis* Stackelberg, 1949, was described from Tajikistan and found in China. One more sibling species, *H. sinicus* Stackelberg, 1934, was described from the northern China. The Palaearctic *H. chetifer* species subgroup (or *H. takagii* group sensu Yang *et al.* 2011) is most probably related with the *H. nectarophagus* subgroup. *Hercostomus chetifer* was included in a molecular cladistic analysis of the subfamily Dolichopodinae (Pollet *et al.* 2010), and was resolved as sister to *H. longiventris* (Loew, 1857), both strongly differing from other *Hercostomus* species groups. Nevertheless, *H. longiventris* males have simple fore tarsus, sessile hypopygium, reduced hypandrial arms, and simple obovoid cercus in contrast to major characters of *H. chetifer*, *H. perturbus* and *H. nectarophagus* subgroups.

In the Nearctic Region, four (except for Holarctic *H. chetifer*) among 20 known *Hercostomus* species have slightly modified male fore tarsus, but their hypopygia are rather different from those in Palaearctic and Afrotropical species groups (Corpus 1989).

The modified fore tarsus is rare in the very diverse and species-numerous Oriental fauna (Yang *et al.* 2011). The males of some species of the *H. absimilis* group have modified fore tarsomeres, but their

cerci lacks processes, being subtriangular or subquadrate in shape. Species of the *H. takagii* group have modified fore tarsomeres, but their cerci are usually very small, with an apical incision. The Afrotropical species, *H. krivosheinae* Grichanov, 1999, is probably related to this Oriental group.

There are some Afrotropical species of *Hercostomus* with practically unmodified fore tarsomeres. Nevertheless, males of *H. nectarophagus* have inconspicuously modified fore tarsomeres, but their cerci are similar in shape with those of other members of the *H. nectarophagus* subgroup (Grichanov 1999, 2004). The male cercus of *H. brandbergensis* is also similar in shape with that of males of the *H. nectarophagus* subgroup. *Hercostomus intercedens* is an unassigned species, having simple legs and simple subtriangular cerci.

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