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Descriptions of the two-eyed African spider genera *Chedimanops* gen. n. and *Hybosidella* gen. n. (Araneae, Palpimanidae, Chediminae)

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Abstract

Two new genera of chedimine palpimanids are described. *Chedimanops* **gen. n.** includes the type species, *C. eskovi* **sp. n.** (♂♀), and *C. rwenzorensis* **sp. n.** (♂♀), both from the far eastern part of the Democratic Republic of Congo (Rwenzori Mts.). The monotypic *Hybosidella* **gen. n.** is based on *H. etinde* **sp. n.** (♂) from Cameroon. The new genera differ from all other Palpimanidae by possessing only the anterior median eyes (all other eyes are lost). These new genera can be distinguished from one another by the shape of the thoracic fovea (a narrow bracket-shaped pit vs. a longitudinal groove, respectively), as well as by the structure of the abdominal scuta and the male copulatory organ, peculiarities of coloration, amongst other characters. The taxonomic position and relationships of the newly described taxa are briefly discussed. The distinctive characters and a key to both species of *Chedimanops* **gen. n.** are also provided.

Keywords

Aranei, brush-footed spiders, Cameroon, Congo, new genus, new species, taxonomy

Introduction

The majority of spiders have eight eyes, although there are several families and many genera with six eyes. Fewer spiders have four eyes or none (Jocqué and Dippenaar-Schoeman 2006). The two-eyed spiders are known only in four unrelated families belonging to mygalomorphs and haplogynes. Two eyes are present in the monotypic *Micromygale* Platnick & Forster, 1982 (Microstigmatidae), in most genera of Caponiidae (Platnick 1993, in several genera of Tetrablemmidae (Lehtinen 1981), and in two genera of the Oonopidae, *Coxapopha* Platnick, 2000 and *Diblemma* O.P.-Cambridge, 1908 (Platnick 2000). In two families, Microstigmatidae and Tetrablemmidae, the eyes that seem to be present are anterior laterals (Platnick and Forster 1982; Lehtinen 1981; respectively), while in the Caponiidae with two eyes, only the anterior medians are retained (Jocqué and Dippenaar-Schoeman 2006). Within the "entelegyne" families, two-eyed species have never been previously reported.

While studying material from the Royal Museum for Central Africa (Tervuren, Belgium), the senior author found several specimens of Palpimanidae from Africa that only have two eyes. Almost all the palpimanids known to date have eight eyes, while only *Hybosida* Simon, 1898 is six-eyed (Jocqué and Dippenaar-Schoeman 2006). As in the case of the Caponiidae, the remaining pair was found to be represented by the anterior median eyes. A study of the somatic characters and the copulatory organs of these two-eyed palpimanids has revealed that they belong to three undescribed species that can be placed in two new genera belonging judging from their minute size and structure of the male copulative organs (which is considered and discussed below) to the subfamily Chediminae. This paper describes the new taxa and discusses their newly discovered characters.

Material and methods

Depositories

MRAC Royal Museum for Central Africa, Tervuren, Belgium;
NCA National Collection of Arachnida, ARC-Plant Protection Research Institute, Pretoria, South Africa;
NHML Natural History Museum, London, UK;
NRS Naturhistoriska riksmuseet, Stockholm, Sweden;
SMF Senckenberg Museum, Frankfurt am Main, Germany;
TAU Steinhardt Museum of Natural History, Tel-Aviv University, Israel;
ZMUT Zoological Museum, University of Turku, Finland.

Comparative material examined

Boagrius incisus Tullgren, 1910: TANZANIA: 1♂ syntype Kibonoto (Kilimanjaro), viii–ix.1905, Y. Sjöstedt (NRS).

Boagrius pumilus Simon, 1893: MALAYSIA: *Pahang Province*: 1♂ Bukit Fraser, 18.xi.1984, P. Lehtinen (ZMUT).

Chedima purpurea Simon, 1873: MOROCCO: 1♂ Taza, 25.ii.2004, D.W. Wrase (SMF); 1♀ Had Msila, 21.ii.2004, D.W. Wrase (SMF).

Diaphorocellus biplagiatus Simon, 1893: SOUTH AFRICA: *Western Cape*: 1♂ Beaufort-West, Farm Katdoornkuil, 3–6.xii.2007, D.H. Jacobs (NCA 2008/4672); 1♀ Beaufort-West, Farm Kantkraal, 3–6.xii.2007, D.H. Jacobs (NCA 2008/2607).

Hybosida dauban Platnick, 1979: SEYCHELLES: 1♂ Silhouette Isl., Mon Plaisir, 20.xii.1993, J. Gerlach (ZMUT); 1♀ same island, Gratte Fesse, 12–24.i.1999, J. Gerlach and M. Saaristo (ZMUT).

Levymanus gershomi Zonstein & Marusik, 2013: ISRAEL: ♂ holotype, 3♂ 2♀ paratypes Qetura, 8.v.2003, E. Topel (TAU).

Palpimanus sogdianus Charitonov, 1946: TAJIKISTAN: 1♂ 1♀ Beshkent, 17.iv.1989, S. Zonstein (TAU).

Palpimanus transvaalicus Simon, 1893: SOUTH AFRICA: *Limpopo*: 4♂ 1♀ Tuinplaas, 17.ix.2002, M. van Jaarsveld (NCA 2003/379).

Sarascelis junquai Jézéquel, 1964: CÔTE D'IVOIRE: 2♂ 1♀ Titekro, 29.ii.1984, R. Schouten and J. Buysen (MRAC 166073).

Scelidocteus schoutedeni Benoit, 1974: D.R. CONGO: *Équateur Province*: ♂ holotype Kumungu, iv.1921, H. Schouteden (MRAC 15551).

Scelidomachus socotranus Pocock, 1899: YEMEN: *Socotra*: ♂ holotype Dahamis, xii.1898, W.R.O. Grant (NHML); 1♂ paratype Thluteen, xii.1898, W.R.O. Grant (NHML).

Photographs were taken in dishes of different sizes with a paraffin or cotton layer on the bottom. Specimens were photographed using a Canon EOS 7D camera attached to an Olympus SZX16 stereomicroscope and with a SEM JEOL JSM-5200 scanning electron microscope at the Zoological Museum, University of Turku. Digital images were processed using the "CombineZP" image stacking software (http://www.hadleyweb.pwp.blueyonder.co.uk/).

The width of the sternum was measured between the bases of the coxae of legs II. Illustrations of the female copulative organs were made after maceration in 20% potassium hydroxide aqueous solution and exposure for a few minutes in an alcohol/water solution of Chlorazol Black. Lengths of the leg segments were measured on the dorsal side. All measurements are given in millimetres.

Abbreviations (except encoded in the text):

ALE anterior lateral eyes
ALS anterior lateral spinnerets
AME anterior median eyes
CH carapace height
CL carapace length
CW carapace width
CyH clypeus height

PLE posterior lateral eyes
PLS posterior lateral spinnerets
PMS posterior median spinnerets
SL sternum length
SW sternum width
TL total length of body in dorsal view

Taxonomy

Family Palpimanidae Thorell, 1870

Genus *Chedimanops* gen. n.

http://zoobank.org/B316E08A-433B-4846-8078-95EBE87A33E0

Type species. *Chedimanops eskovi* sp. n.

Etymology. The generic name is combined from *Chedima*, the nominative genus of the Chediminae (Palpimanidae), resembling the studied genus habitually, and *Nops*, the well-known spider genus of the family Caponiidae, in which all members also have only two eyes. The gender is masculine.

Diagnosis. The new genus can be easily distinguished from all known genera of the Palpimanidae, except *Hybosidella* gen. n., by having only two eyes (all eyes except AME are lost, whereas other Palpimanidae have either 8 or 6 eyes). *Chedimanops* gen. n. can be distinguished from *Hybosidella* gen. n. by the shape of the thoracic fovea (a narrow bracket-shaped pit *vs*. a longitudinal groove), as well as by the structure of the abdominal scuta and the shape of male copulatory organ, and by possessing the characteristic mottled dorsal pattern of the abdomen (uniformly pale in *Hybosidella* gen. n.), etc. (*cf*. Figs 1–4, 6–10, 12, 32 and 41–43, 54, respectively). Male palp in *Chedimanops* gen. n. has a undivided claw-shaped process (*Cp*) of the embolic division (*vs*. a divided process with a different shape in *Hybosidella* gen. n. – *cf*. Figs 33–35, 49–52, 56–57 and 53, 64–66).

Description. Body length 3.0–3.2 in males and 3.1–4.0 in females.

Carapace: very finely granulated, broad-oval in dorsal view and covered with fine setae – very small and appressed anteriorly and laterally, and with longer and thicker ones near the fovea. Cephalic part noticeably raised behind eye area in both sexes. Thoracic fovea narrow, transverse, converging and sharp-angled anteriorly, opened posteriorly (Figs 3, 4, 6, 12, 15). Two eyes, only AME present, other eyes lost. AME minute-sized, spaced by 0.4–0.7 of diameter and located on low tubercle. Clypeus 1.9–2.2 times higher than AME diameter (Figs 11, 13). Chelicerae downward-directed, slightly flattened frontally, twice longer than clypeus; stridulatory ridges absent; cheliceral furrow with several peg teeth (Figs 26–29). Sternum with fine reticulation; labium triangular with very deep median suture (*Ms*, Fig. 14), nearly as broad at base as it is long.

Legs: formula 1423. Leg cuticle almost smooth. Femur I considerably swollen in proximal part; patella as long as tibia, metatarsus and tarsus short and dilated. Tibia I

subapically and metatarsus I with long (equal to width of these segments) and dense prolateral scopula. Leg tarsi straight and ascopulate. Claw tufts weakly developed. Leg tarsi with two narrow and dentate claws (Figs 23–25).

Abdomen: ovoidal, slightly extended anteriorly and obtuse posteriorly, with dorsal pattern of numerous small and dense light spots on darker background (Figs 1, 3, 4, 6–10). Abdominal scuta conforming a very short pedicel tube (*Pt*); posterior part of epigastral scutum in females with with strongly sclerotized margins, widely concave near epigastral furrow, without lateral extensions. In males, posterior lateral parts of epigastric scutum with extensions (*Ee*) longer than wide, posterior part near epigastrum with thin concavity. Ventral (postgastral) scutum (*Ps*) entire, strip-like in female. Males with 2 pairs of scuta, thin strip-like lateral scuta (*PsL*) and small median scuta (*PsM*). Spinneret group with weakly sclerotised ring encircling spinnerets. AMS small but well-developed; PMS and PLS reduced to a few sessile spigots in females, absent in males (see Fig. 22).

Male palp: short, femur slightly swollen, shorter or subequal in length to cymbium; patella small, as long as wide, thinner than femur; tibia wide, strongly widened, almost 2 times wider than femur, extended dorsally so that ventral side 2–4 times shorter than dorsal arch; cymbium 1.5–1.7 times longer than basal width, with basal 1/3 wide, and fingerlike distal 2/3; retrolateral-basal part with sparse scopula (Figs 49, 51, 56, 57, 59, 60). Bulb large, tegulum as long as wide and lacking any processes (Figs 33, 34, 50, 52, 56, 58). Embolic division (Figs 32, 35) imbedded into large tegular cavity (*Tc*, diameter almost equal to tegulum diameter); embolic division composed by large, heavily sclerotized claw-shaped process (*Cp*), with tip directed to the tip of cymbium, inner part of claw-shaped process with accompanying membrane (*Am*) fused at the base with large membranous process (*Mp*) slightly chitinized in prolateral part (*Em?*) possibly serving as embolus. Accompanying membrane with barbed tip (*Bl*) in *C. eskovi* sp. n. Sperm duct (spermophore) not evident.

Female copulatory organs: epigastral scuta concave near epigastral furrow, receptacles oval, clearly visible through integument (Figs 2, 5, 36, 39), and separated from one another shorter than their diamater. Vulva: receptacles large, closely spaced, inner part of receptacle (chamber, *Ch*) is half of size of entire receptacle; grape-shaped glands (*Gg*) large and numerous (8–12), each gland with at least 2 pores each bearing one cilium. Fine threads (*Ft*) long, in *C. rwenzorensis* sp. n., their tips with very fine glands (*Fg*).

Species included. *Chedimanops eskovi* sp. n. and *C. rwenzorensis* sp. n.

Distribution. The genus is currently known only from the far eastern part of the Democratic Republic of Congo (Rwenzori Mts.).

Key to species of *Chedimanops* gen. n.

1 Intensely coloured; carapace longer than 1.6 mm, claw-shaped process (*Cp*) bent once (Figs 49, 50, 56, 57); membranous process (*Mp*) faint, cymbium 1.7 longer than wide; receptacles spaced from epigastral fold by approx. one diameter (Figs 2, 36), number of grape-shaped glands more than ten (Figs 67–71) ..... ***C. eskovi* sp. n.**

– Pale coloured; carapace shorter than 1.4 mm; claw-shaped process (*Cp*) bent twice (Figs 51, 52), membranous process (*Mp*) large, distinct, cymbium 1.5 times longer than wide; receptacles spaced from epigastral fold by less than one diameter (Figs 5, 39), number of grape-shaped glands less than 10 (Figs 72–75).....***C. rwenzorensis* sp. n.**

***Chedimanops eskovi* sp. n.**
http://zoobank.org/20F7F9E9-9951-4E5E-ACC5-941362E10794
Figs 1–3, 7–11, 15–38, 49–50, 55–60, 67–71, 76

Etymology. The specific epithet is given in honour of our good friend and colleague Kirill Eskov (Paleontological Institute, Moscow), the author of many works devoted to the taxonomy of recent and fossil spiders.

Diagnosis. Differs from *C. rwenzorensis* sp. n. by a darker, more intense, and contrasted colouration, with presence of a weak ventral reticulate pattern on the abdomen, as well as by the shape of copulatory organs. Claw-shaped process of the embolic division has 1 bend (2 in *C. rwenzorensis* sp. n.), longer cymbium with length width ratio 1.7 (1.5 in the related species), swollen tibia and faint membranous process (distinct and large in sibling species). Females clearly differ by the position of receptacles (approximately one diameter from epigastral fold in *C. eskovi* sp. n. and by less than one radius in *C. rwenzorensis* sp. n.) and the number of grape-shaped glands (more than ten in C. *eskovi* sp. n. and fewer than ten in *C. rwenzorensis* sp. n).

Description. Male MRAC 154713 (holotype).

Habitus: as in Figs 3, 7, 38. *Measurements*: TL 3.15, CL 1.64, CW 1.11, CH 0.74, CyH 0.19, SL 0.93, SW 0.79. *Eyes*: AME 0.08, AME–AME 0.04. *Colour in alcohol*: carapace and chelicerae medium golden-red with light brownish tint, dorsal scutum darker brownish-red; sternum and labium light red, ventral scutum slightly paler yellowish-red; palps and leg I light yellowish-orange, II–IV pale reddish-yellow; abdomen dorsally medium chestnut with numerous, dense and uniformly spread small pale yellowish-brown spots; ventrally, including spinnerets, pale grayish-yellow. *Palp*: as shown in Figs 32–35, 49–50, 55–60. Femur swollen, 1.8 times longer than wide. Ventral length of tibia four times shorter than dorsal length; cymbium 1.3 times longer than femur; length width ratio *ca*. 1.7. Tegulum with large cavity almost equal to diameter. Claw-shaped process (*Cp*) with one bend in apical 1/3. Membrane accompanied process (*Am*) with barbed tip. Membranous process (*Mp*) weakly distinct in light microscope.

Leg measurements: male MRAC 154713 (female MRAC 154713 in parentheses):

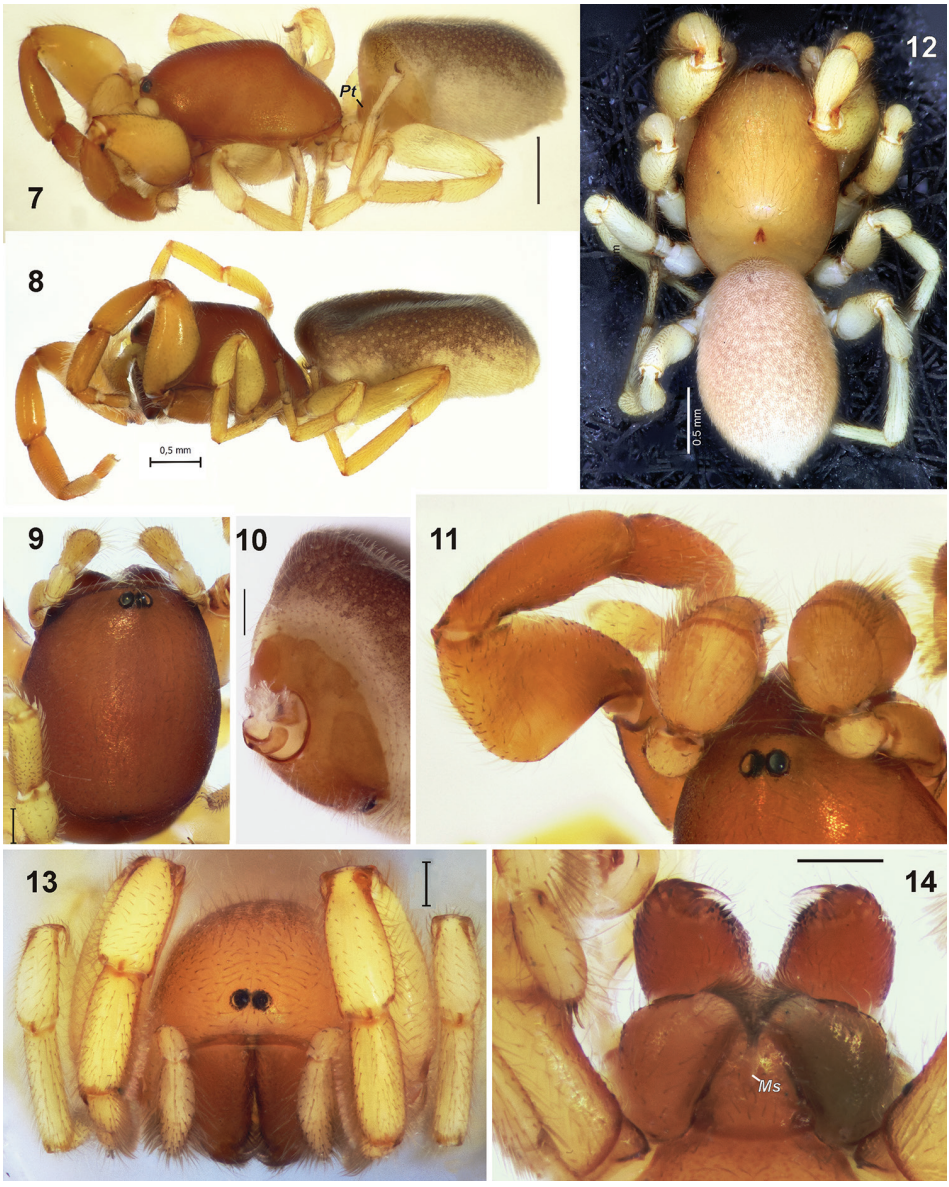
	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palp	0.39 (0.46)	0.23 (0.19)	0.43 (0.33)	–	0.57 (0.36)	1.62 (0.34)
I	1.00 (1.11)	0.81 (0.87)	0.57 (0.61)	0.29 (0.31)	0.29 (0.31)	2.96 (3.21)
II	0.81 (0.87)	0.51 (0.54)	0.54 (0.60)	0.43 (0.47)	0.34 (0.33)	2.63 (2.81)
III	0.66 (0.74)	0.43 (0.50)	0.51 (0.50)	0.49 (0.49)	0.31 (0.33)	2.40 (2.56)
IV	0.96 (1.10)	0.57 (0.66)	0.56 (0.86)	0.61 (0.69)	0.39 (0.39)	3.09 (3.70)

Figures 1–6. Habitus of *Chedimanops eskovi* sp. n. (**1–3**) and *C. rwenzorensis* sp. n. (**4–6**). **1, 4** female dorsal **2, 5** female ventral **3, 6** male dorsal.

Description female. Female MRAC 154713 (paratype).

Habitus: as in Figs 1, 2, 8. *Measurements*: TL 4.00, CL 1.76, CW 1.21, CH 0.83, CyH 0.19, SL 1.00, SW 0.86. *Eyes*: AME 0.09, AME–AME 0.04. Colouration and most somatic characters as in male. *Copulatory organs*: as in Figs 49, 67–71. Receptacles oval, clearly visible through integument, spaced from epigastral fold as well as from one another by approximately one diameter. Vulva with large receptacles, touching each other; receptacles with thick wall and relatively small chamber (*Ch*), with 12 visible grape-shaped glands (*Gg*), each gland bearing 2 pores.

Types. Holotype ♂, D.R. CONGO: *North Kivu Province*, Kikura (0°35'N, 29°57'E), 2000 m, vii–viii.1974, M. Lejeune (MRAC 154713). Paratypes: 1♀,



Figures 7–14. Somatic morphology of *Chedimanops eskovi* sp. n. (**7–11**) and *C. rwenzorensis* sp. n. (**12–14**). **7–8** male and female habitus, lateral **9** female prosoma, dorsal **10** anterior part of female abdomen showing epigastral scutum, antero-lateral **11** anterior part of male prosoma, antero-dorsal **12** female habitus, dorsal; **13** male prosoma, anterior **14** male mouth parts, ventral. Abbreviation: *Ms* median suture. Scale bars: 0.2 mm if not otherwise indicated.

2 juv. collected together with the holotype and placed into the same vial; 1♂, 1♀, same collecting data (MRAC 154148); 3♂, 11 juv., same collecting data (MRAC 154488).

Distribution. The species is known only from the type locality (Rwenzori Mts., Democratic Republic of Congo).

Natural history. Probably litter-dwelling spiders (all specimens were collected with pitfall traps).

***Chedimanops rwenzorensis* sp. n.**
http://zoobank.org/E68C752B-5F58-4452-B6CB-5E269AF71ADF
Figs 4–6, 12–14, 39, 51–52, 61–63, 72–75, 76

Etymology. Named after the distribution area, Rwenzori Mts.

Diagnosis. Differs from *C. eskovi* sp. n. by its smaller size (carapace less than 1.4 mm *vs*. more than 1.6 in *C. eskovi* sp. n.), paler and less contrasting coloration, with a uniformly pale-coloured ventral surface of the abdomen. In *C. rwenzorensis* sp. n., the claw-shaped process of the embolus division has one bend, and the receptacles spaced by a distance less than one their radius from the epigastral fold (vs. two bends and approximately one diameter in the other species). Other distinctive characters are listed in the diagnosis of *C. eskovi* sp. n.

Description male. Male MRAC 223336 (holotype).

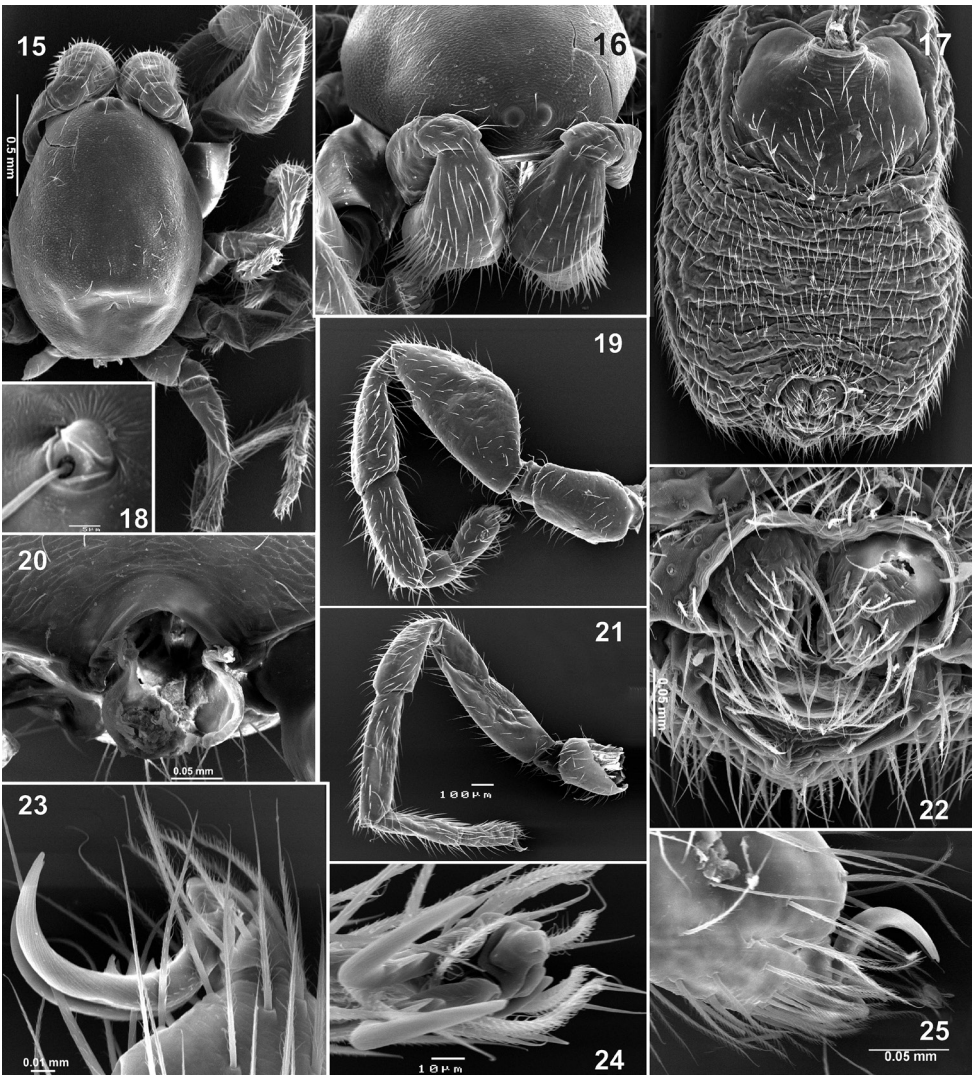
Habitus: as in Fig. 6. *Measurements*: TL 3.0, CL 1.36, CW 0.94, CH 0.51, CyH 0.16, SL 0.86, SW 0.66. *Eyes*: AME 0.07, AME–AME 0.05. *Colour in alcohol*: carapace and dorsal scutum light yellowish-orange, chelicerae bright reddish-orange; maxillae and labium light red, sternum slightly paler yellowish-red; palps, leg I and ventral scutum light yellowish-orange, II–IV and ventral abdomen including spinnerets pale pinkish-yellow; abdomen dorsally light chestnut with numerous, dense and uniformly spread small pale yellowish-brown spots, ventrally, including spinnerets, pale grayish-yellow. *Palp*: as in Figs 51–52, 61–63. Femur not swollen; tibial ventral length approximately three times shorter than dorsal length (Figs 51–52). Cymbium short, 1.5 times longer than wide. Claw-shaped process (*Cp*) of the embolic division with two bends. Membranous process (*Mp*) large, well distinct.

Leg measurements: male MRAC 223336 (female MRAC 223336 in parentheses):

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palp	0.36 (0.44)	0.17 (0.19)	0.34 (0.26)	–	0.36 (0.30)	1.23 (1.19)
I	0.87 (1.03)	0.67 (0.71)	0.53 (0.57)	0.29 (0.30)	0.33 (0.29)	2.69 (2.90)
II	0.71 (0.79)	0.43 (0.49)	0.49 (0.57)	0.34 (0.43)	0.33 (0.33)	2.30 (2.61)
III	0.63 (0.71)	0.36 (0.41)	0.41 (0.46)	0.36 (0.44)	0.33 (0.34)	2.09 (2.36)
IV	0.83 (0.96)	0.44 (0.57)	0.67 (0.73)	0.50 (0.66)	0.37 (0.36)	2.81 (3.28)

Description female. Female MRAC 223336 (paratype).

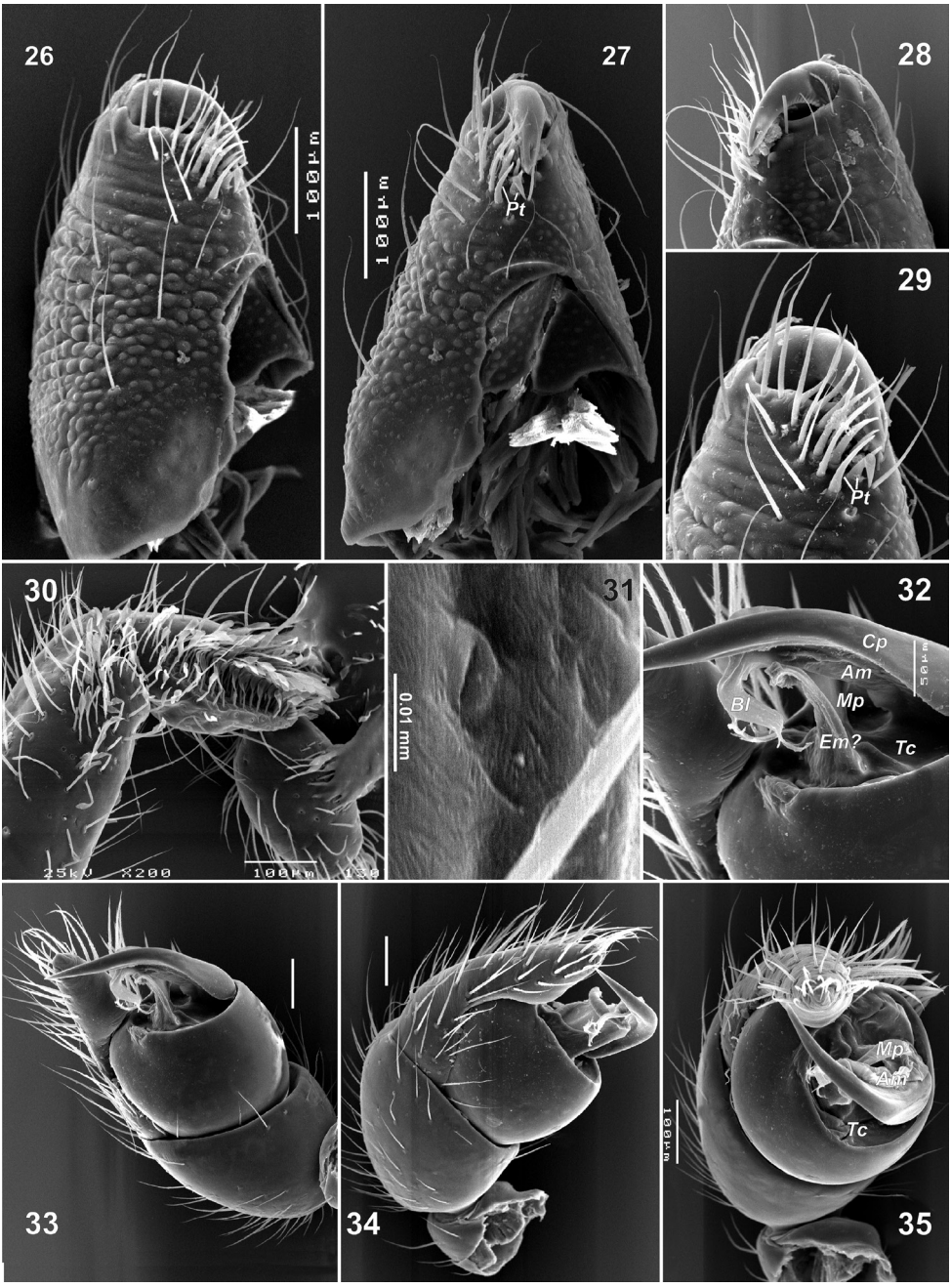
Habitus: as in Figs 4, 5, 12. *Measurements*: TL 3.10, CL 1.36, CW 1.11, CH 0.57, CyH 0.16, SL 0.93, SW 0.79. *Eyes*: AME 0.07, AME–AME 0.04. *Colour in alcohol*: as in male. *Copulatory organs*: as in Figs 5, 39, 72–75. Receptacles clearly visible through



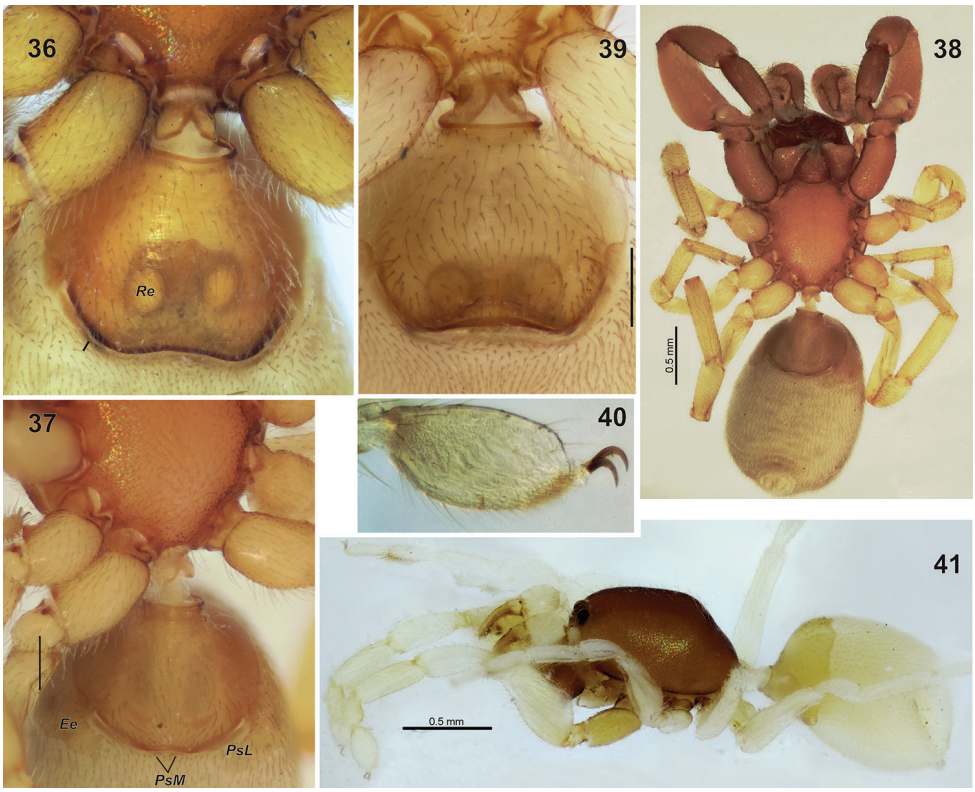
Figures 15–25. SEM micrographs of somatic morphology of subadult male of *Chedimanops eskovi* sp. n. **15** prosoma, dorsal **16** prosoma, frontal **17** abdomen, ventral **18** trichobothrium **19** leg I, retrolateral **20** posterior part of prosoma, caudal **21** leg, retrolateral **22** spinnerets, ventral **23–24** tarsal claws of leg IV, lateral and dorsal **25** claws of tarsus I, lateral.

integument, round, almost touching posterior edge of epigastral plate; spaced from each other by less than 1 diameter. Vulva with large receptacles, touching each other; receptacles with thick wall and relatively small chamber (*Ch*), with 8 visible grape-shaped glands (*Gg*); fine threads (*Ft*) with fine gland-like structures (*Fg*) on the tips.

Types. Holotype ♂, D.R. CONGO: *North Kivu Province*, "Migeri" (as labeled) = Kirivata (0°16'N, 29°46'E), 1700 m, 16.iv.1953, P. Vanschuytbroeck & J. Kekenbosch (MRAC 223336). Paratype ♀, collected together with the holotype and placed into the same vial.



Figures 26–35. SEM micrographs of somatic morphology of subadult male and male palp of *Chedimanops eskovi* sp. n. **26–27** chelicera, anterior and mesal **28–29** tip of chelicera, posterior and anterior **30** leg I, prolateral **30** tarsal organ of leg IV **31** terminal part of palp showing embolic division **33–34** palp, ventro-prolateral, prolateral and anterior. Abbreviations: *Am* accompanying membrane; *Bl* barbed tip of accompanying membrane; *Cp* claw-shaped process; *Em?* possible functional embolus; *Mp* membranous process; *Tc* tegular cavity. Scale bar: 0.1 mm if not otherwise indicated.



Figures 36–41. Somatic morphology of *Chedimanops eskovi* sp. n. (**36–38**), *C. rwenzorensis* sp. n. (**39**) and *Hybosidella etinde* sp. n. (**40–41**). **36, 39** female epigastral scutum, ventral; **37** male epigastral scutum, ventral; **38** male habitus, ventral; **40** tarsus I, prolateral; **41** male habitus, lateral. Abbreviations: *Ee* extention of epigastric scutum; *PsL* paired lateral scutum; *PsM* paired median scutum; *Re* receptacle. Scale bar: 0.2 mm if not otherwise indicated.

Distribution. The species is known only from the type locality (Rwenzori Mts., Democratic Republic of Congo).

Natural history. Probably litter-dwelling spiders (both male and female were obtained using a Berlese funnel trap).

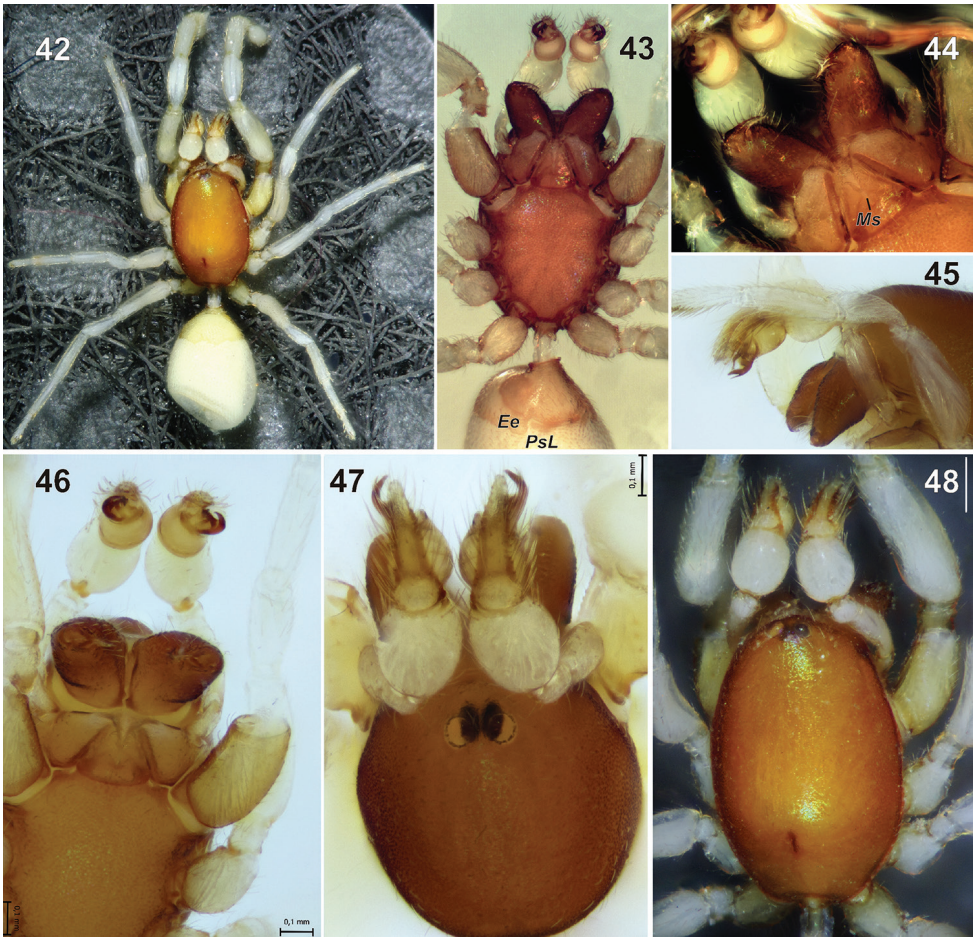
Genus *Hybosidella* gen. n.

http://zoobank.org/7914854F-9D47-4CFA-B271-147F748A0980

Type species. *Hybosidella etinde* sp. n.

Etymology. The generic name is a diminutive of *Hybosida*, the palpimanid genus, similar in appearance. The gender is feminine.

Diagnosis. The new genus can be easily distinguished from all other known palpimanids, except *Chedimanops* gen. n., by having only two eyes. *Hybosidella* gen. n. can be distinguished from *Chedimanops* gen. n. by the much narrower slit-like thoracic



Figures 42–48. Somatic morphology of *Hybosidella etinde* sp. n. **42** habitus, dorsal **43** prosoma and anterior part of abdomen, ventral **44** mouth parts, ventral **45** prosoma, lateral **46–48** prosoma, ventral, antero-dorsal and dorsal. Abbreviations: *Ee* extention of epigastric scutum; *Ms* median suture; *PsL* paired lateral scutum. Scale bar: 0.2 mm if not otherwise indicated.

fovea, smaller size (carapace less than 1.1 long, *vs.* more than 1.3 in the latter), lack of lateral extensions (*Ee*) of epigastric scutum (present in *Chedimanops* gen. n.), wide and short lateral postgastral scuta (thin and long in the latter, *cf.* Figs 36–39, 43), bifurcated claw-shaped process (undivided in *Chedimanops* gen. n., *cf.* Figs 49–52, 64–66) and well sclerotized embolus (*Em*) lacking in related genus (*cf.* Figs 32, 53).

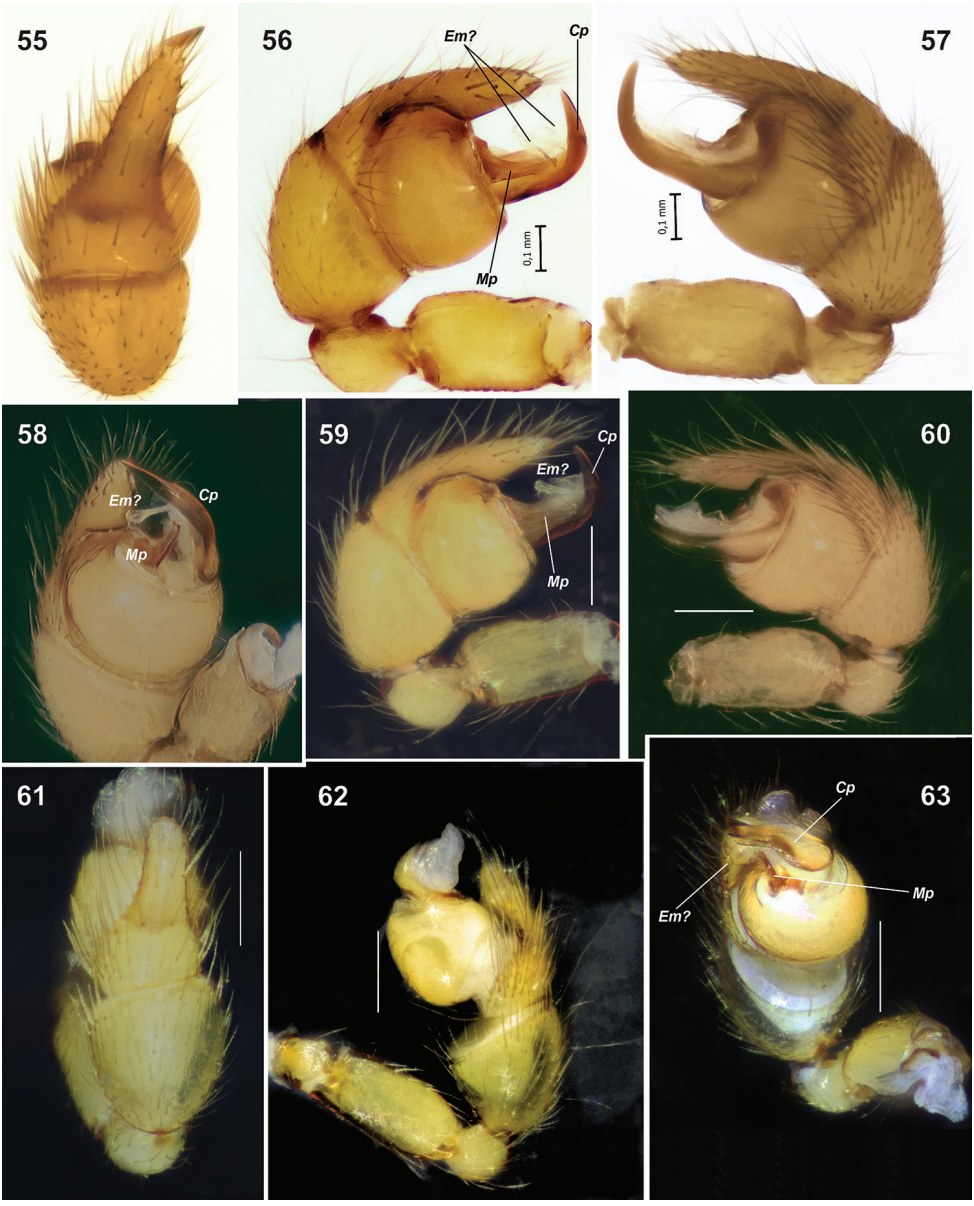
Description. Body length less than 2.5 mm. Carapace finely granulated, oval in dorsal view and covered with fine setae. Cephalic part distinctly raised behind eye area. Thoracic fovea transverse, very narrow and slit-shaped. Two eyes, only AME present, other eyes lost. Eyes moderately large, spaced by *ca*. 0.4 of their diameter. Clypeus nearly 1.5 times higher than AME diameter. Chelicerae downward-directed, without stridulatory ridges. Sternum with fine reticulation, more coarsely granulated anteriorly. Labium triangular with deep median suture (*Ms*), slightly longer than wide at base.

Figures 49–54. Male palp of *Chedimanops eskovi* sp. n. (**49–50**), *C. rwenzorensis* sp. n. (**51–52**) and *Hybosidella etinde* sp. n. (**53–54**). **49, 51, 53** retrolateral **50, 52, 54** prolateral. Abbreviations: *Am* accompanying membrane; *Bl* barbed tip of accompanying membrane; *Cp* claw-shaped process; *Em* embolus; *Mp* membranous process.

Legs: formula 1423. Leg cuticle smooth. Femur I moderately swollen; patella shorter than tibia, metatarsus short, tarsus short and dilated (Fig. 40). Tibia I subapically and metatarsus I with dense prolateral scopula. Leg tarsi straight and ascopulate. Claw tufts weakly developed. Leg tarsi with two narrow and weakly dentate claws.

Abdomen: ovoidal, slightly extended anteriorly and obtuse posteriorly. Abdominal scuta conforming a very short pedicel tube; dorsal portion of scutum with well-developed posterior margin. Epigastral scutum without lateral extensions. Postgastral lateral scuta (*PsL*) short and wide, median scuta indistinct (if present). AMS small, PMS and PLS not evident.

Male palp: as in Figs 53–54, 64–66. Femur 2.5 times longer than wide; patella almost round, slightly thinner than femur. Tibia strongly swollen, almost as wide as long, approximately 2 times wider than femur, ventral length subequal to dorsal. Cymbium thin and long, ca 2.7 longer than wide. Tegulum longer than wide, more than 1.5 times thinner than patella and lacking processes. Sperm duct not evident. Embolic division embedded into tegular cavity and bears strong, heavily sclerotized claw-shaped process (*Cp*) bifurcated in the terminal 1/3, with both arms sharply pointed, and retro-



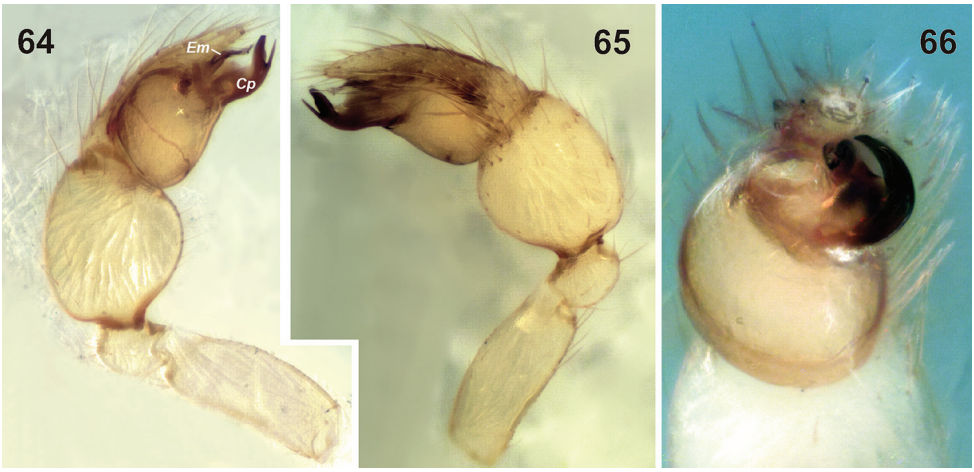
Figures 55–63. Male palp of *Chedimanops eskovi* sp. n. (**55–60**) and *C. rwenzorensis* sp. n. (**61–63**). **55, 61** dorsal **56, 59** prolateral **57, 60, 62** retrolateral **63** antero-ventral. Abbreviations: *Cp* claw-shaped process; *Em?* possible functional embolus; *Mp* membranous process.

lateral arm thicker than prolateral. Embolus (*Em*) noticeably smaller and shorter than neighbouring outgrowth, wider at base, and bent apically.

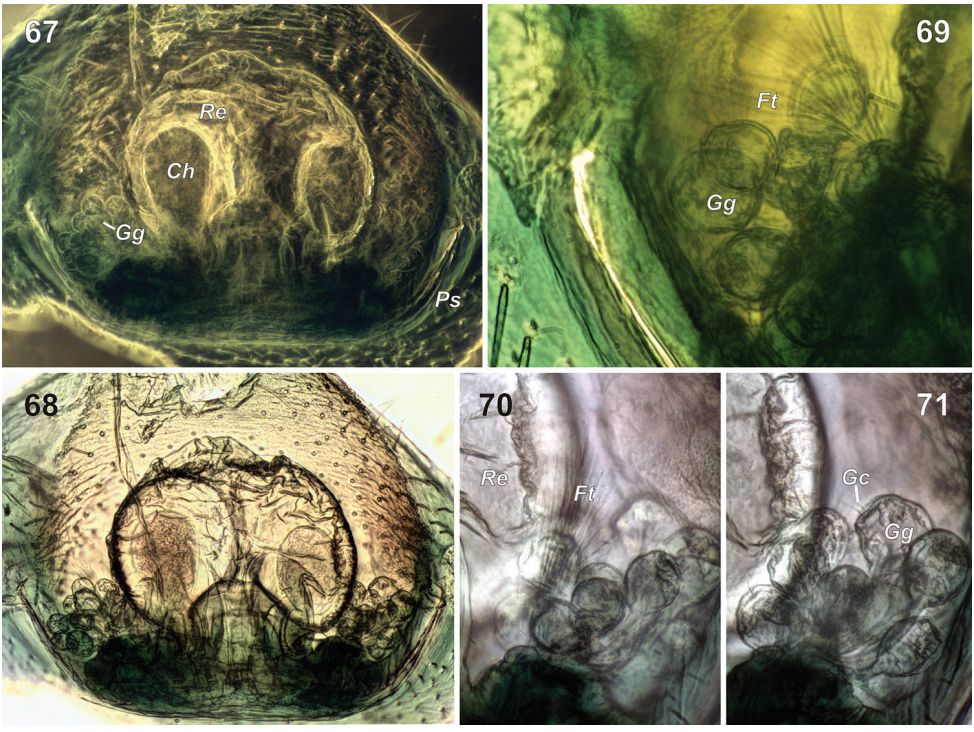
Female copulatory organ: unknown.

Species included. The type species only.

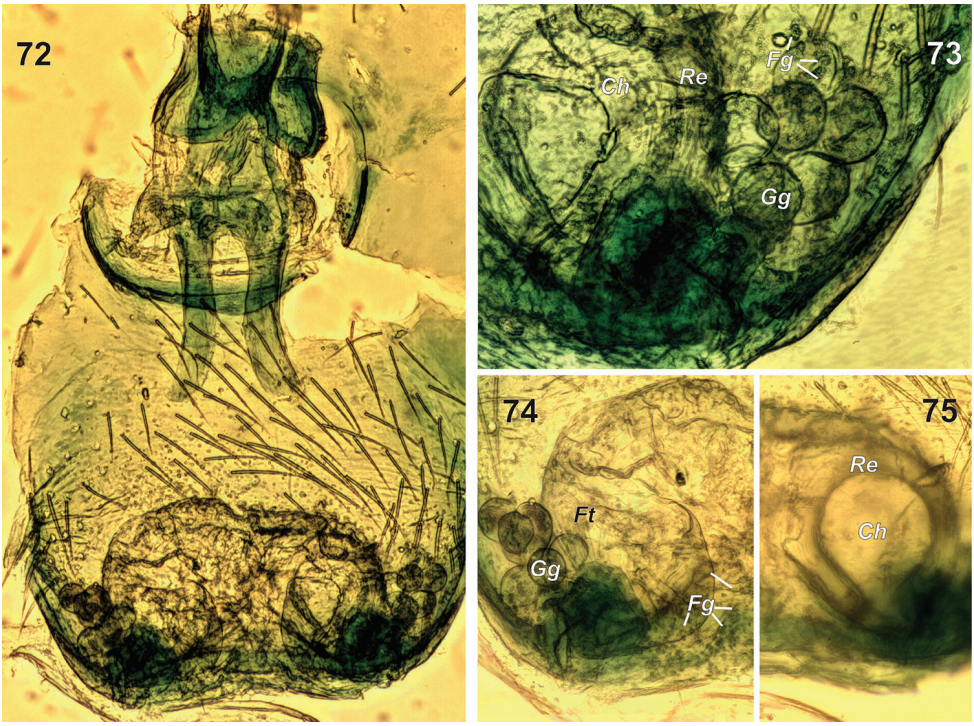
Distribution. The genus is currently known only from the southwestern part of Cameroon.



Figures 64–66. Male palp of *Hybosidella etinde* sp. n. **64** prolateral **65** retrolateral **66** antero-ventral. Abbreviations: *Am* accompanying membrane; *Bl* barbed tip of accompanying membrane; *Cp* claw-shaped process; *Em* embolus.



Figures 67–71. Female copulatory organs of *Chedimanops eskovi* sp. n. **67–68** vulva, dorsal **69** details of vulval structures, dorsal **70–71** details of vulval structures same spot but focused on fine threads (*Ft*) and glandular cilia (*Gc*) respectively. Other abbreviations: *Ch* receptacular chamber; *Gg* grape-shaped glands; *Ps* postgastral scutum; *Re* receptacle.



Figures 72–75. Female copulatory organs of *Chedimanops rwenzorensis* sp. n. **72** epigastral scutum and petiolar sclerites, ventral **73** details of vulval structures, dorsal **74** vulva, focused on grape-shaped glands, dorsal **75** right of vulva, focused on receptacle, dorsal. Abbreviations: *Ch* receptacular chamber; *Fg* fine glands; *Ft* fine threads; *Gg* grape-shaped glands; *Re* receptacle.

Hybosidella etinde sp. n.

http://zoobank.org/AF19CA29-CF10-4EFE-B5FF-12EC85BC6E65
Figs 40–48, 53–54, 64–66, 76

Diagnosis. As for the genus.

Etymology. Named after the distribution area: Mt Etinde in the Cameroon Volcano Massive.

Description. Male MRAC 162531(holotype).

Habitus: as in Figs 41, 42. *Measurements*: TL 2.43, CL 1.07, CW 0.71, CH 0.47; CyH 0.13, SL 0.67, CW 0.53. *Eyes*: AME 0.09, AME–AME 0.04. *Colour in alcohol*: carapace and chelicerae bright yellowish-orange, sternum, labium and basal part of maxillae light yellowish-pink; leg coxae I–IV, cymbium, bulb, dorsal and ventral abdominal scuta pale pinkish-yellow, palps, legs and most part of abdomen including spinnerets uniformly pale milky-white. *Palp*: as in Figs 53–54, 64–66. Description same as for the genus.

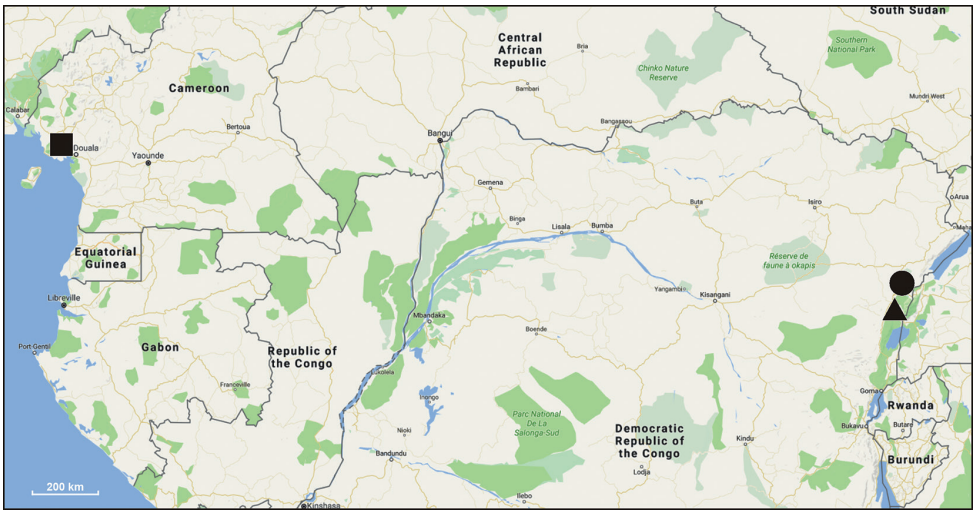


Figure 76. Distribution of *Chedimanops* gen. n. and *Hybosidella* gen. n. *C. eskovi* sp. n. (circle), *C. rwenzorensis* sp. n. (triangle) and *H. etinde* sp. n. (square).

Leg measurements:

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palp	0.29	0.11	0.27	–	0.33	1.00
I	0.64	0.51	0.39	0.26	0.26	2.06
II	0.50	0.33	0.36	0.26	0.26	1.71
III	0.51	0.26	0.33	0.29	0.24	1.63
IV	0.71	0.31	0.5	0.46	0.29	2.27

Female. Unknown.

Types. Holotype ♂, CAMEROON: *Southwest Region*, south foothills of the Cameroon Volcano Massive, Etinde (4°06'N, 9°09'E), 500 m, 18.iii.1981, R. Bosmans & J. Van Stalle (MRAC 162531).

Distribution. The species is known only from the type locality.

Natural history. According to the label data, the holotype male was collected with pitfall traps in lowland rain forest near a stream.

Discussion

General notes

Simon (1893) divided all the palpimanids known to him into two tribes, according to the eye pattern. The tribe Chedimeae was established for the spiders with anterior and posterior lateral eyes almost touching each other. Simon assigned the rest of the palpimanids (with widely spaced lateral eyes) into the nominative tribe Palpimaneae.

Platnick (1975) elevated both the above-mentioned groups to subfamily rank. He also separated these taxa from another subfamily concurrently described in his work, the Otiothopinae, by possessing accessory terminal sclerites in the male bulb (present in the former groups, but absent in the latter). Additionally, the Otiothopinae have been found to be an exclusively Neotropical group (Platnick et al. 1999), while the subfamily Chediminae is a chiefly Paleotropical taxon, with only some representatives distributed also in a few adjoining far southern Palearctic areas (Simon 1873; Hu and Li 1987; Zonstein and Marusik 2013; El-Hennawy 2014; Zonstein et al. in press). The subfamily Palpimaninae is widely distributed in Africa, the Mediterranean Region, Middle East and Central Asia, but is very poorly represented in the Oriental Region (WSC 2016). The puzzling occurrence of *Palpimanus argentinus* Mello-Leitão, 1927 in South America is still based exclusively on the old collection data, and since description has not been confirmed by field studies. The only representative, collected by F. Silvestri, is kept in the Simon's collection in Paris. Conforming to Mello-Leitão (1927), it originates from Salta (Argentina). However, on the labels (even those based on the received material), E. Simon rarely noted the collection country name, but mostly only locality. Thus, the specimen interpreted as South American could actually have been collected by F. Silvestri from Salto (Italy). In view of the complete absence of later records, this suggestion seems to be more reasonable than assuming that the species was occasionally introduced (see Platnick 1975).

For the above-mentioned reasons (structure of the male palp and the geographical confinement), the following discussion will deal with only two Old World subfamilies, Palpimaninae and Chediminae.

The nominative subfamily Palpimaninae currently comprises 2 genera and 37 very uniformly looking species: the widespread *Palpimanus* Dufour, 1820 (35) and South African *Ikuma* Lawrence, 1938 (2). Prior to this study, the more diverse subfamily Chediminae was considered to include 9 genera and 31 species: *Boagrius* Simon, 1893 (2), *Chedima* Simon, 1873 (1), *Hybosida* Simon, 1898 (4), *Diaphorocellus* Simon, 1893 (4), *Levymanus* Zonstein & Marusik, 2013 (1), *Sarascelis* Simon, 1887 (7), *Scelidocteus* Simon, 1907 (7), *Scelidomachus* Pocock, 1899 (1) and *Steriphopus* Simon, 1887 (4). The distribution of almost two-thirds of these species (23) is confined to tropical Africa (counted from WSC 2016). Most probably, the monotypic *Badia* Roewer, 1962 was misplaced in the Palpimanidae, and in any case it should be certainly excluded from the chedimine genera because, unlike the Chediminae, *B. rugosa* Roewer, 1962 was shown to have widely spaced lateral eyes (see Zonstein and Marusik 2013).

A survey of characters

Since the representatives of *Chedimanops* gen. n. and *Hybosidella* gen. n. completely lack the lateral eyes, they cannot be assigned to any of the two Old World subfamilies by using such a simple and traditional criterion as the distance between ALE and PLE. Therefore, any reliable suggestion concerning the taxonomic position of the two

newly-described genera should be based on the available characters. These potentially diagnostic features are surveyed below.

Body size: The Palpimanidae of the Old World can be divided into two informal groups. The first includes the tiny palpimanids 2–4 mm long, belonging to the genera *Hybosida*, *Levymanus* and *Steriphopus* (see Platnick 1979; Hu 2001; Zonstein and Marusik 2013). Small (approximately 3 mm) south Asian *Boagrius pumilus* Simon, 1893 also belongs to the latter group. The considerably larger African *B. incisus* Tullgren, 1910, with body length 7–8 mm (♂♀ syntypes in NRS, examined) is in our opinion misplaced in this genus. The latter group includes the rest of the chedimine genera and all representatives of the Palpimaninae. In members of *Chedima*, *Diaphorocellus*, *Sarascelis*, *Scelidocteus*, and *Scelidomachus* the body is 4.5–8.5 mm long (Simon 1873, 1907; Pocock 1899; Jézéquel 1964; Benoit 1974; Zonstein et al. 2016). In some smaller members of *Scelidocteus* it varies from 4 to 5 mm long (Simon 1907). According to Nentwig et al. (2016), in the Mediterranean species of *Palpimanus*, occurring in southern Europe, body length ranges from 4.4 to 7.6 mm. African representatives of *Palpimanus* and adult members of *Ikuma* are 4.5–13.0 mm long (see Pocock 1898, Simon 1907, 1910; Lawrence 1927, 1937, 1938, 1947, 1952, 1962; Lessert 1936; Benoit 1974).

Thoracic fovea: In most chedimine genera and in all representatives of the Palpimaninae, the fovea is represented by a narrow, short and deep, and bilaterally constricted longitudinal groove (as shown in Marusik and Zonstein 2013: figs 3–5, 7). In *Scelidocteus*, the fovea is anchor-like and widened posteriorly (Forster and Platnick 1984: fig. 283). A modified variant of this type can be observed in *Hybosida* and *Steriphopus*, possessing the angular and opened posteriorly triangular or Λ-shaped (lambda-shaped) foveal groove (Platnick 1979: fig. 1; Saaristo 2010: fig. 24.1). The posteriorly opening fovea is also characteristic for *Boagrius pumilus* (see Murphy and Murphy 2000: fam. 45: fig. 1). In *Diaphorocellus*, the right and left parts of the fovea show a certain tendency for further separation from one another (Zonstein et al. 2016: fig. 6). Finally, in *Levymanus* the thoracic fovea is represented by two separate sulci located side by side (Zonstein and Marusik 2013: figs. 10, 12; Zonstein et al. in press). It should be noted that all the mentioned modifications are characteristic for genera of the subfamily Chediminae, but not for those of the Palpimaninae (see Cerveira and Jackson 2005: fig. 1).

Abdominal scuta: Within the Palpimaninae, the anterior part of the abdomen overhangs the posterior part of the carapace, making a dorsal portion of the scutum *de facto* frontal and thus invisible from above in both males and females (see Cerveira and Jackson 2005: figs 1–3; Lecigne 2016: fig. 9G). In contrast, in the Chediminae the abdomen is more evenly expanded by the middle, and the dorsal portion of the scutum in a dorsal view becomes visible, almost always in males and very often in females (Platnick 1979: figs 1, 3; Hu 2001: figs 8–15; Deeleman-Reinhold 2001: fig. 76; Zonstein and Marusik 2013: figs 1–9, 12, 14, 15; Zonstein et al. 2016: figs 1, 3, 5).

Male copulatory organs: In the nominative subfamily, the embolus is represented with a fairly robust and rigid heavy-sclerotised process which seems to be quite com-

mensurable with the "conductor" (or the tegular appendage, *sensu* Jocqué and Dippenaar-Schoeman 2006: fig. 75i– j). This is true at least for those representatives of the Palpimaninae in which construction of the palpal organ has been examined and illustrated – in some Mediterranean species of *Palpimanus* Dufour, 1820 (Platnick 1981: figs 1–9), African *P. crudeni* Lessert, 1936, *P. giltayi* Lessert, 1936, *P. pseudarmatus* Lawrence, 1952, *P. tuberculatus* Lawrence, 1952, *P. stridulator* Lawrence, 1962, and *P. lualabanus* Benoit, 1974 (Lessert 1936: figs 15–18; Lawrence 1952: figs 19, 20; 1962: fig. 1e–f; Benoit 1974: figs 16–17), and Asian *P. sogdianus* Charitonov, 1946 (Marusik and Guseinov 2003: figs 29–32). Within the Chediminae, the embolus is thinner, weaker and more fragile and it is certainly smaller than the surrounding outgrowths. Most often, this difference may be very sharply expressed, e.g. in *Hybosida* (Simon and Fage 1922: fig. V2; Platnick 1979: figs 5–7, 10–12), *Sarascelis* (Jézéquel 1964: figs 7b, 9a–b, 11a), *Steriphopus* (Hu 2001: figs 8–15), *Levymanus* (Zonstein and Marusik 2013: figs 41–46), and *Diaphorocellus* (Zonstein et al. 2016: figs 11–15, 17, 18). The same holds true for *Chedima* and *Scelidomachus* (Zonstein and Marusik, in prep.). In some species of *Scelidocteus* the embolus appears stronger; however, even in this case it conforms to the general trend, being noticeably thinner than the "conductor" (Lessert 1930: fig. 4; Jézéquel 1964: fig. 2a–b; Benoit 1974: figs 8, 9, 12, 13; Dippenaar-Schoeman 2006: fig. 75i–j).

Female copulatory organs: The ventral surface of the epigastric scutum in females, carrying a pair of the fairly well expressed transversal S-shaped or V-shaped sclerotized marks, is very characteristic for the Palpimaninae (Lawrence 1927: fig. 53; 1938: fig. 3; 1962: fig. 1d; Kritscher 1996: fig. 1; Marusik and Guseinov 2003: figs 33, 35, marked as *cl*), but is rarely observed within the Chediminae (e.g. in *Diaphorocellus* – Lawrence 1927: fig. 54; Zonstein et al. 2016: fig. 2). Most chedimine genera lack such marks (see Platnick 1979: figs 8, 14; Saaristo 2010: fig. 3; Zonstein and Marusik 2013: fig. 13). In those species of *Palpimanus* in which the structure of the endogyne has been studied (the Mediterranean congeners, Asian *P. sogdianus*, African *P. transvalicus*), the receptacles are fairly large, extended and weakly sclerotized (as shown in Platnick 1981: figs 10–18; Marusik and Guseinov 2003: fig. 35). In contrast, in representatives of the Chediminae subjected to a special examination, the endogyne is shown to be more compact, with mostly round or oval, and more sclerotized receptacles (Jézéquel 1964: figs 1, 3, 6, 8, 10; Platnick 1979: figs 9, 15; Zonstein and Marusik 2013: fig. 49–50; Zonstein et al. 2016: figs. 20–26).

Relationships

As has been shown above, *Chedimanops* gen. n. and *Hybosidella* gen. n. include very minute spiders, with males having the upper part of the abdominal scutum well-visible in the dorsal projection (Figs 3, 6, 7, 41, 42), and a fragile embolus surrounded by stouter conducting outgrowths (Figs 49–54, 56–60, 62–66). All these features are fairly characteristic for taxa within the Chediminae, while none of them have been found

in the Palpimaninae (see above). Thus, regardless of the full absence of the lateral eyes, there is nothing to prevent these genera from being placed in the Chediminae.

Despite the fact that, unlike all other palpimanids, *Chedimanops* gen. n. and *Hybosidella* gen. n. comprise only two-eyed species, these two genera cannot be considered as closely related. Strictly speaking, there is nothing else in common, other than their similar diminutiveness, similar eye reduction, and the characters shared within the entire subfamily Chediminae (see above). In both species of *Chedimanops* gen. n., the carapace with a Λ-shaped and posteriorly opened thoracic fovea is combined with a spotted dorsal abdominal pattern (Figs 1, 3, 4, 6, 12, 15). The similar shape of the thoracic fovea is documented for *Hybosida* and *Steriphopus* (*cf.* Platnick 1979: fig. 1; Saaristo 2010: fig. 24.1), whereas a spotted abdominal pattern is characteristic for *Chedima* (see the corresponding description by Simon 1873). In contrast, like the majority of the chedimine palpimanids, *Hybosidella etinde* gen. et sp. n. has the carapace with a narrowly-closed thoracic groove and a uniformly pale-coloured abdomen behind the sclerotised shields (Figs 41, 42, 48). Within the Chediminae, the male palpal organ provided with a long and bent claw-shaped outgrowth, like that in *Chedimanops* gen. n., is characteristic for *Chedima* (Zonstein and Marusik, in prep.). The structure of the palpal organ in *Hybosidella etinde* gen. et sp. n. resembles that in *Scelidomachus socotranus* Pocock, 1899, with the amendment that the apically dilated conductor is bifurcate in the former, but tridentate in the latter taxon (*cf.* Figs 53, 54, 64–66 and Pocock 1903: p. 194, text-figure).

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