



Research article

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The new spider genus *Palindroma*, featuring a novel synapomorphy for the Zodariidae (Araneae)

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Abstract. The new genus *Palindroma* gen. nov. is described in the Cryptothelinae, Zodariidae. Apart from the type species, *P. morogorom* gen. et sp. nov. (♂♀), the genus contains *P. aleykyela* gen. et sp. nov. (♂), *P. avonova* gen. et sp. nov. (♂♀), *P. sinis* gen. et sp. nov. (♂) and the somewhat aberrant species *P. obmoimiombo* gen. et sp. nov. (♂). The four typical representatives of the genus are characterized by the profile of the carapace with a slight dip, the absence of precoxal sclerites and the characters of the male palp with enlarged tibia, large subtegulum and tegular retrolateral knob. The genus occurs in miombo-woodland and coastal forest in East and Central Africa and this peculiar distribution is discussed. A key to the males of the *Palindroma* species is provided. Specimens of *Palindroma* have a particularly well-developed tibial process fitting in a shallow metatarsal pouch on all legs in both sexes. Although less conspicuous in some derived taxa, the feature appears to be present in all representatives of the Zodariidae, but not in possible sister-group taxa and is thus an autapomorphy of the family.

Keywords. East Africa, Central Africa, Cryptothelinae, miombo, tibial process.

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Introduction

Probably the most confusing area in the systematics of the Zodariidae is the subfamily Cryptothelinae, which has been mentioned under the name Cydrelineae until the genus *Cryptothele* L. Koch, 1872 was eventually incorporated into it (Jocqué & Dippenaar-Schoeman 2007; Ramirez *et al.* 2014). Many species had been misplaced, mainly due to the poor definition of the genera before the revision of Jocqué (1991). As a consequence, several new genera were created to accommodate the many species that had either been misplaced or that remained to be described. The Cryptothelinae has its main distribution in southern Africa and appears to be far from completely inventoried. Some large genera (*Cydrela* Thorell, 1870; *Psammorygma* Jocqué, 1991) remain to be revised and many species have not yet been described, partly because they do not fit in one of the current genera. In the present article a new genus is created to accommodate five new species.

The family Zodariidae can be considered as well defined. However, it remains one of the most diversified spider families: it not only has a huge size range (see Jocqué *et al.* 2013; Russell-Smith & Jocqué 2015) but the variation of the habitus and of morphological characters is so vast that a superficial scan of a specimen does not always easily reveal its generic or even (sub-)familial identity. Mainly for the taxa at the base of the clade (see Jocqué 1991), there may be some doubt about their inclusion in the family. Some of them (e.g., *Cyrioctea* Simon, 1889) lack the typical lateral claw teeth and are incorporated in the Zodariidae solely on the base of the absence of the serrula on the endites. The new synapomorphy, a prolateral tibial process on all legs in both sexes discovered during the description of the new genus, is therefore most welcome since it corroborates the inclusion of basal taxa.

Material and methods

Specimens were observed, drawn and measured with a WILD M10 stereo microscope. Details of the female genitalia and male palps were observed with a Zeiss Stemi 2000 stereo microscope. Measurements and photographs of the habitus, details of mouthparts, detached male palps and female genitalia were taken with a Leica MZ16 using the LAS automontage software (ver. 3.8). The female genitalia were dissected and digested with pancreatin, and then immersed in 75% ethanol.

For SEM photos, specimens were dried in hexamethyldisilazane (36 h), gold coated and examined and photographed with a JEOL 6480 LV scanning electron microscope. Types are deposited in the Royal Museum for Central Africa, Tervuren, Belgium (MRAC) and the Zoological Museum, Natural History Museum of Denmark, University of Copenhagen (ZMUC).

All measurements are in mm. All palp illustrations are from right palps. Leg spination formulas follow Jocqué (2013).

Abbreviations

ALE	=	anterior lateral eyes
AME	=	anterior median eyes
ALS	=	anterior spinnerets
d	=	dorsal
disp	=	spines dispersed and not in clear rows
dw	=	distal whorl of spines
F	=	femur
MRAC	=	Musée Royal de l’Afrique Centrale (Tervuren, Belgium)
Mt	=	metatarsus
P	=	patella
pl	=	prolateral
PLE	=	posterior lateral eyes
PLS	=	posterior lateral spinnerets
PME	=	posterior median eyes
PMS	=	posterior median spinnerets
rl	=	retrolateral
RTA	=	retrolateral tibial apophysis
t	=	tarsus
T	=	tibia
v	=	ventral
ZMUC	=	Zoological Museum, Natural History Museum of Denmark, University of Copenhagen

Taxonomy

Class Arachnida Cuvier, 1812
Order Araneae Clerck, 1757
Family Zodariidae Thorell, 1881
Subfamily Cryptothelinae Simon, 1892

Palindroma gen. nov.

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Type species

Palindroma morogorom sp. nov.

Diagnosis

Representatives of *Palindroma* gen. nov. are typical sturdy Cryptothelinae with ALE in front of AME and slightly recurved to straight posterior eye row; sternum shield shaped with straight anterior margin and without precoxal sclerites; posterior legs with numerous short spines in combination with longer ventral spines; teguments of carapace, legs and abdomen often provided with patches of white or silvery setae. Male palp with large patella, large subtegulum and tegulum provided with retrolateral knob; median apophysis absent.

Palindroma gen. nov. is easily separated from *Capheris* Simon, 1893 and *Systemoplacis* Simon, 1907 by the absence of anterior concavities of the sternum. It deviates from *Caesetius* Simon, 1893, *Psammorygma* and *Rotundrela* Jocqué, 1999 by the absence of precoxal sclerites, from *Aschema* Jocqué, 1991 by the unmodified posterior legs and from *Psammoduon* Jocqué, 1991 by the absence of fans of supple spines on the legs; in *Cydrela* the sternum is slightly indented in front, the cephalic area in the carapace profile much higher and the posterior eye row more strongly recurved.

Etymology

The genus name is derived from the English term ‘palindrome’ originating from the Greek ‘παλινδρομος’, that refers to words or sentences that are identical whether they are read from front to back or the other way round. All species names of the new species described here are palindromes. The gender of the species name is feminine.

Description

Medium size spiders (7.5–10 mm) with reticulated to roughly granulate teguments. Carapace longer than wide ($L/W < 1.43-1.71$), slightly protruding anteriorly, with silvery hairs in male, almost hairless in females apart from a few longer hairs on clypeus; widest at level of coxae II–III, narrowed to about 0.48–0.62 times maximum width in males and 0.62–0.71 times maximum width in females (cephalic width measured on posterior tangent of PME). Cervical grooves poorly indicated. Profile flat or domed, highest at level of first coxae and with slight dip at level of fovea.

Colour: carapace medium to dark brown; chelicerae, legs, mouthparts and sternum medium to orange brown; abdomen dorsum grey with one to seven pale spots and four reddish apodemes, sides and venter white to pale grey; in males sclerotized in front of epigastric fold.

Eyes in three rows: ALE in front of AME and further apart, posterior row straight or slightly recurved and eyes far apart. All eyes subequal, AME dark, other eyes pale. Clypeus straight, slightly slanting back, height 2.5 to 4 times diameter of ALE, sometimes with some long dispersed setae.

Chilum double, about or slightly more than twice as wide as high, lateral margin poorly defined; without setae. Chelicerae slightly conical, inner margin almost straight, with many evenly dispersed setae; with distomesal membranous lamina (Fig. 1A–B); fangs shorter than wide at base. Labium inverted U-shaped, with slightly narrowed base. Endites roughly triangular, converging, with basolateral extension accommodating palpal coxae. Sternum shield-shaped, as wide as long, without triangular extensions or precoxal sclerites; anterior margin straight, lateral margins slightly sinuous.

Legs: robust. Formula 4123 or 4132. Spination reduced on legs I and II, well developed on III and IV. Most spines short and thick except dorsal ones on F and ventral ones on T and Mt. Patella III and IV with retrolateral boss at base of short spine. Anterior tarsi fusiform in male, usually longer than metatarsi, unmodified in female. One dorsal hinged hair on tibiae and metatarsi I and II (Fig. 1D). Trochanters with anterior concavity. Prolateral tibial process strongly developed on all legs in both sexes (see Fig. 17A–E). Three tarsal caws, paired ones with numerous teeth (Fig. 1C).

Female palp with numerous prolateral spines and some retrolateral ones (Fig. 1E); palpal claw with some small teeth at base (Fig. 1F); turned inward over less than 45°; without distal patch of chemosensitive setae.

Abdomen oval, with ventral row of small sclerotized apodemes; tracheal spiracle fairly small, somewhat advanced and provided with small rectangular scutellum. Both exes with six spinnerets. ALS large, conical, biarticulate. PLS and PMS provided with 1 and 3 cylindrical gland spigots, respectively. Colulus represented by haired field.

Male palp: complexity of palps very variable; patella larger than tibia (Fig. 2A), sometimes modified; RTA sometimes very small, in other species well developed. Cymbium with prolateral spines; without distal claw; sometimes with basal swelling(s); subtegulum strongly developed, sclerotized and visible in unexpanded palp; tegulum with retrolateral boss (Fig. 2B), variable in shape; embolus short, flat, distal part with flange.

Epigyne with central longitudinal depression. Spermathecae large, far apart; copulatory ducts with thick walls (Fig. 2C–F).

Note

The species *Palindroma obmoimiombo* gen. et sp. nov. is only tentatively and probably temporarily incorporated in the genus. It lacks several of the specific generic characters: the indented profile of the carapace, the membranous lamina of the chelicerae, the enlarged male palpal patella. On the other hand, it has a field with spinules on the flat mesal surface of the chelicerae. The latter character approaches conditions in *Caesetius* but that genus has a high domed carapace, precoxal sclerites and a much more strongly recurved posterior eye row. The species apparently belongs to an as yet undescribed genus but with only one species and in the absence of females we have refrained from creating a new genus for it.

Distribution

Palindroma is found in forest and miombo regions of central and eastern Africa in the Democratic Republic of the Congo, Malawi and Tanzania.

Key to males

1. Chelicerae almost rectangular as viewed in front, with distomesal extension well developed, without mesal field of spinules; carapace domed, with slight dip at level of fovea; palp with swollen patella, tibia with one RTA or RTA poorly developed2

- Chelicerae conical, with distomesal extension, inconspicuous, with mesal field of spinules; carapace profile flat, without dip; palp with unmodified patella, with two RTA *P. obmoimiombo* sp. nov.
- 2. Carapace profile with slight dip at level of fovea; anterior tarsi with same length as metatarsi or longer; palp with conspicuous RTA 3
- Carapace profile with marked dip at level of fovea; anterior tarsi shorter than metatarsi; palp with inconspicuous RTA *P. sinis* sp. nov.
- 3. Anterior tarsi clearly longer than metatarsi; tegulum with well-developed basal or retrolateral extension 4
- Anterior tarsi only slightly longer than metatarsi; tegulum with longitudinal ventral ridge ending medially in poorly developed knob *P. avonova* sp. nov.
- 4. RTA thin, long and strongly tapered apically; tegulum sub-apically with retrolateral knob *P. morogorom* sp. nov.
- RTA broad, short, with strongly sclerotized rounded extremity; tegulum basally with well-developed conical extension *P. aleykyela* sp. nov.

Palindroma morogorom gen. et sp. nov.

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Figs 1A–F, 2A–D, 3A–G, 4A–D, 5A–C, 16, 17A–E

Diagnosis

The male of *P. morogorom* gen. et sp. nov. can be recognized by the long, strongly tapered RTA. The female has a characteristic epigyne with central depression showing two dark areas, flanked by a kidney-shaped area on either side and the inverted funnel-shaped pattern in front.

Etymology

The species name is an arbitrary combination of letters forming a noun in apposition and containing ‘morogoro’, the region where the types were found.

Material examined

Holotype

TANZANIA: ♂, Uzungwa Mts, Morogoro Region, Mwanihana Forest, 7°44'29.2" S, 36°53'17.7" E, 1800–1850 m, 25–29 Sep. 1984, montane rain forest, pitfall trap, N. Scharff (ZMUC).

Paratypes

TANZANIA: 2 ♂♂, 1 ♀, together with holotype; 4 ♂♂, as previous; 1 ♂, as previous; 1 ♂, as previous; 4 ♂♂, as previous; 5 ♂♂, as previous (2 ♂♂ in MRAC 244094); 1 ♀, 28–29 Sep. 1984, further as previous; 1 ♂, 7°44'41.5" S, 36°53'12.9" E, 1650 m, further as previous; 1 ♂, as previous; 4 ♂♂, as previous; 1 ♂, 1650 m, 25–29 Sep. 1984, further as previous.

Other material

TANZANIA: 3 ♂♂, Uzungwa Mts, Iringa Region, Mufundi-Kigogo Forest Reserve, 8°40'00.5" S, 35°12'35.2" E, 1900 m, 7–15 Oct. 1984, montane rain forest, pitfall trap, N. Scharff (ZMUC); 2 ♂♂, as previous; 3 ♂♂, as previous; 1 ♀, 1700 m, 5–10 Oct. 1984, further as previous; 1 ♂, as previous; 1 ♂, 8°40'53.5" S, 35°14'59.1" E, 1700 m, 8–10 Oct. 1984, further as previous; 1 ♀, Uzungwa Mts, Iringa Region, Uzungwa Scarp Forest above Chita village, 8°40'53.5" S, 35°12'35.2" E, 750 m, 23 Oct.–14 Nov. 1984, lowland rain forest, N. Scharff (ZMUC); 1 ♂, 1600–1650 m, 8–13 Nov. 1984, montane rain forest, further as previous; 1 ♂, 1 ♀, Iringa district, Uzungwa scarp Forest Reserve, 11 km E of

Masisiwe village, Kihanga stream, 1800 m, 8°22'05.7" S, 35°58'41.6" E, 17–27 May 1997, ZMUC; 1 ♀, Uluguru Mts, Bunduki, Moy Mgeta, 7°20' S, 37°38' E, 30 Apr.–2 May 1957, P. Basilewsky & N. Leleup (MRAC 111892).

Note

Georeferences of the collections made in 1984 are approximations.

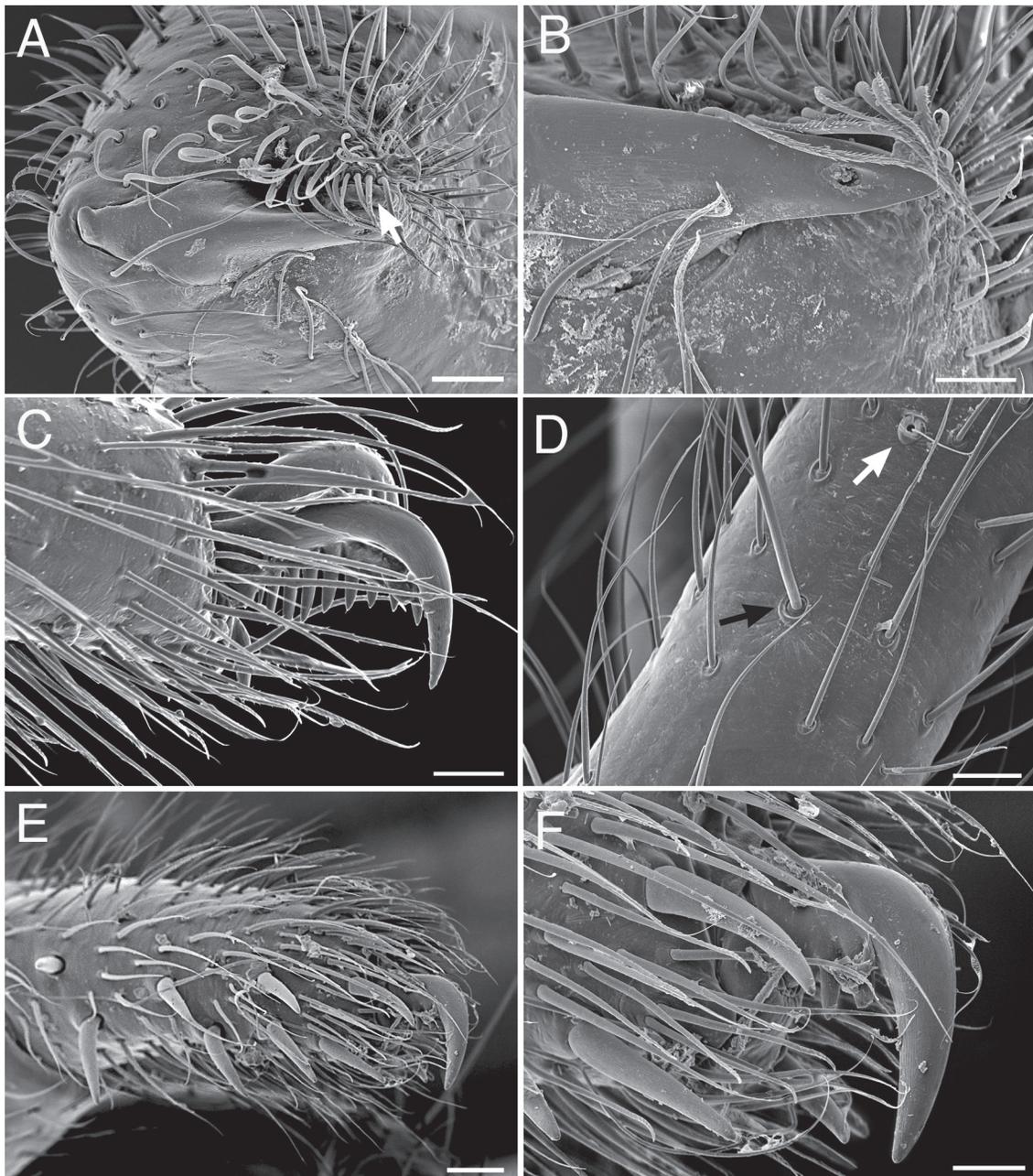


Fig. 1. *Palindroma morogorom* gen. et sp. nov. Scanning electron micrographs. A–D. ♂ from Kigogo Reserve. E–F. Paratype ♀. **A.** Right chelicera, ventral view, arrow shows membranous lamina. **B.** As previous, detail. **C.** Leg I, tarsal claws, lateral view. **D.** Tibia I, hinged hair (black arrow), trichobothrium (white arrow). **E.** ♀ right palp, lateral view. **F.** Detail of previous. Scale bars: A, E–F = 100 mm, B–D = 50 mm.

Description

Male (holotype)

Total length 8.02; carapace 4.05 long, 2.77 wide, narrowed to 1.35 in eye region.

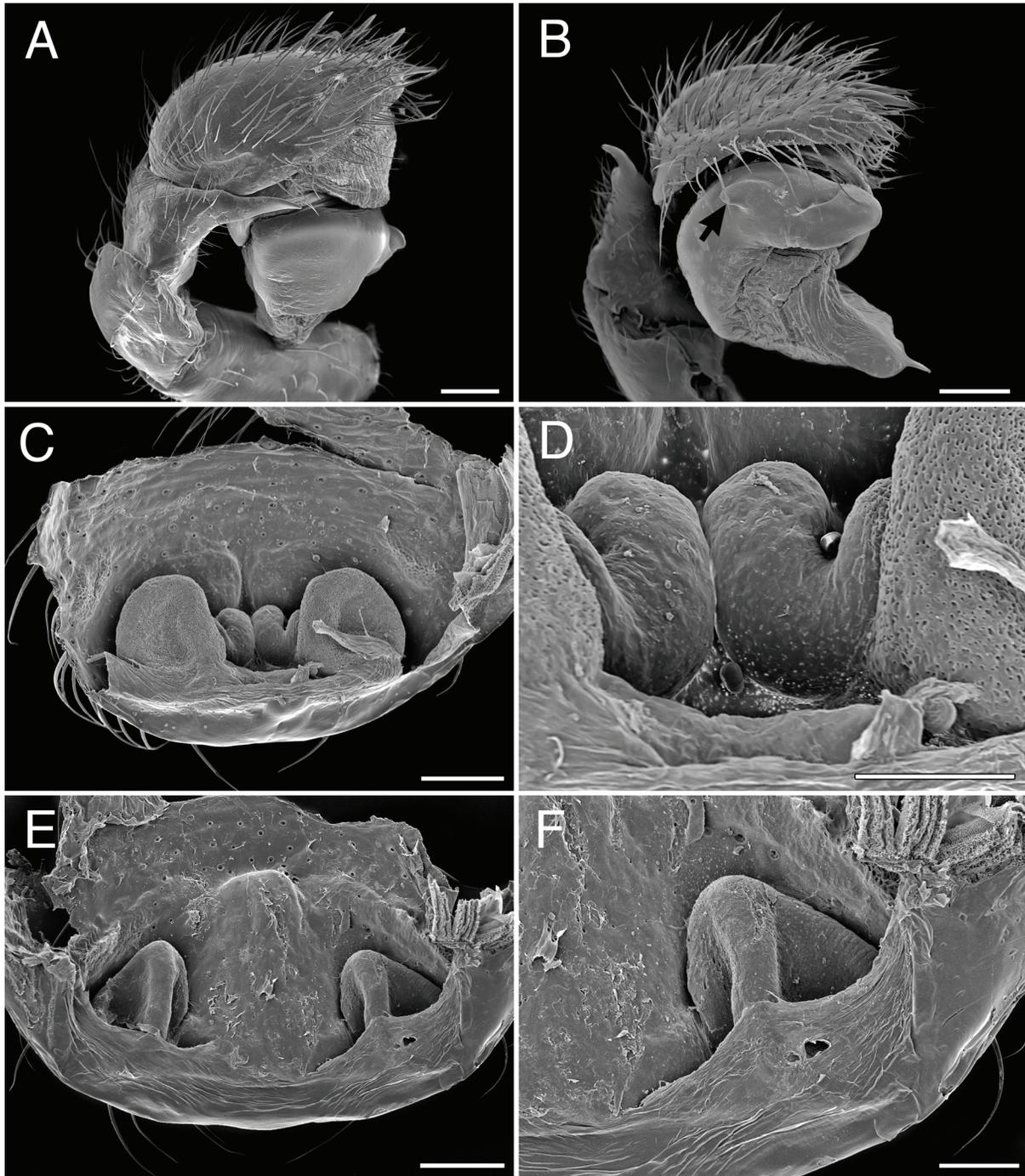


Fig. 2. — A–D. *Palindroma morogorom* gen. et sp. nov. Scanning electron micrographs. A–B. ♂ from Kigogo Reserve. C–D. ♀ from Uzungwa Scarp Forest Reserve, paratype. A. ♂ palp, expanded, retrolateral view. B. Idem, anterolateral view. Arrow shows tegular retrolateral boss. C. Epigyne, digested, dorsal view. D. Idem, detail. — E–F. *Palindroma avonova* gen. et sp. nov., paratype, ♀. E. Epigyne, digested, dorsal view. F. Idem, detail. Scale bars: A–C, E = 200 mm, D, F = 100 mm.

Colour: carapace and chelicerae medium brown without silvery setae (Fig. 3A, C–D); legs and sternum brownish orange (Fig. 3B); abdomen dorsum grey with pair of adjacent pale spots in front, a pair of pale spots in the middle followed by white bar and spot in front of spinnerets; four reddish apodemes in frontal half clearly delimited and two above the pedicel (Fig. 3A); sides grey with well delimited frontal apodemes; venter grey with lateral rows of apodemes and two rows of small apodemes behind well developed brownish epiandrum. Tracheal spiracle with small rectangular scutum followed by white membranous area in front of yellowish brown spinnerets.

Carapace granulated, cervical grooves slightly smoother (Fig. 3A). Clypeus with dispersed setae.

Eyes: AME: 0.12; ALE: 0.12; ALE-ALE: 0.21; AME-ALE: 0.16; PME: 0.12; PLE: 0.15; PME-PME: 0.13; PME-PLE: 0.31. Clypeus 0.54 or 4.5 times width of ALE.

Chilum double, each sclerite 0.10 high, 0.33 wide; no setae. Sternum shield-shaped, 1.42 long, 1.35 wide.

Legs: anterior tarsi longer than metatarsi.



Fig. 3. *Palindroma morogorom* gen. et sp. nov. A–D. Paratype, ♂. E–G. Paratype, ♀. A. ♂, habitus, dorsal view. B. Idem, ventral view. C. Idem, lateral view. D. Idem, frontal view. E. ♀, habitus, dorsal view. F. Idem, ventral view. G. Idem, lateral view. Scale bars = 1 mm.

Spination

	F	P	T	Mt
I	d3	-	pl1	dw3
II	d3	-	pl1	dw2
III	d3	pl3d2r1l1	pl2d45r1l1v3	d1dw5
IV	d1	pl3d3r1l1	pl2d5r1l2v2	5dispdw5

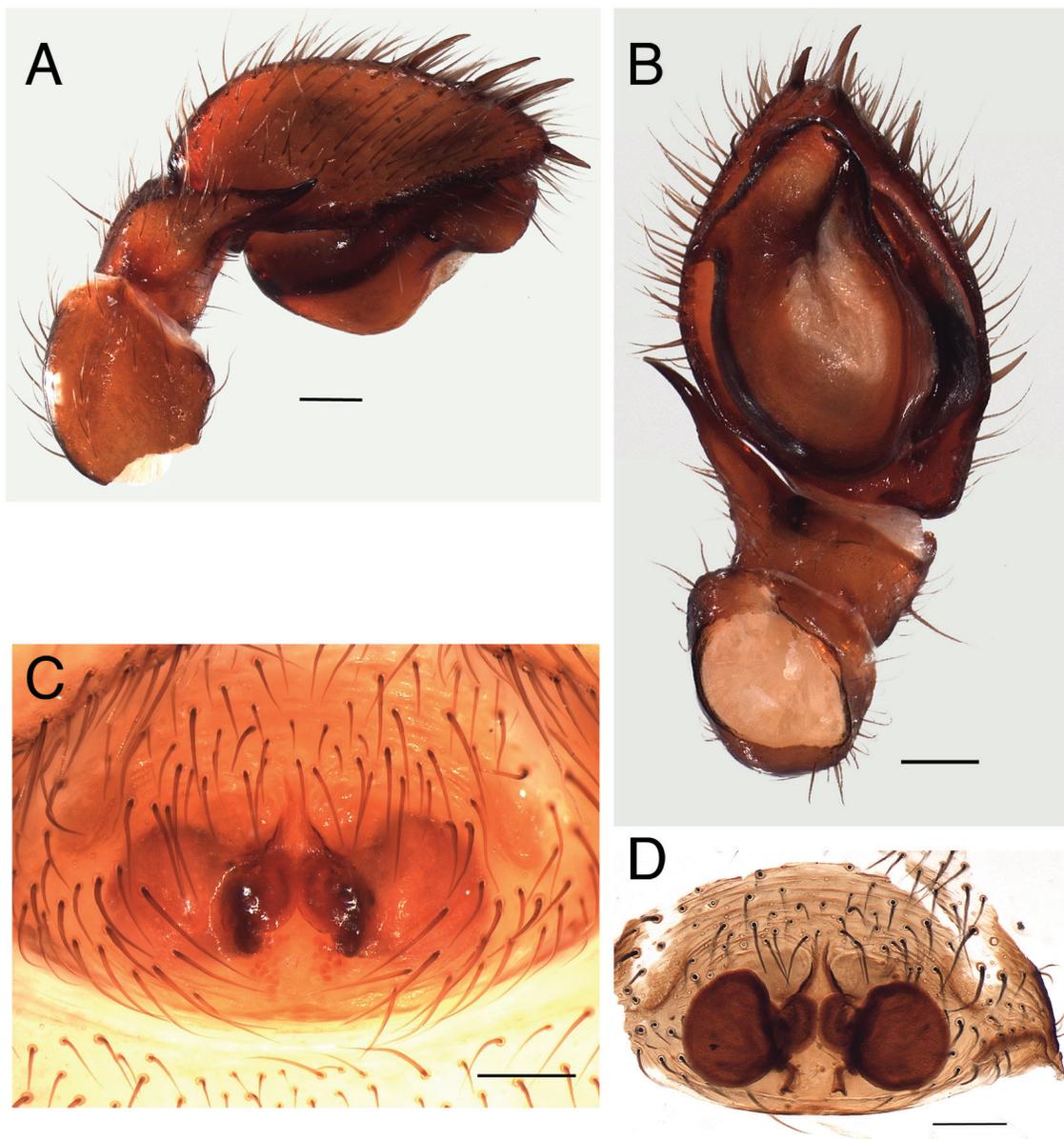


Fig. 4. *Palindroma morogorom* gen. et sp. nov. A–B. Paratype, ♂. C–D. Paratype, ♀. A. ♂, palp, retrolateral view. B. Idem, ventral view. C. ♀, epigyne, ventral view. D. Idem, cleared in methylsalicylate, dorsal view. Scale bars = 0.2 mm.

Leg measurements

	F	P	T	Mt	t	Total
I	2.10	0.91	1.61	1.33	1.40	7.35
II	1.82	0.91	1.26	1.19	0.98	6.16
III	1.89	1.05	1.26	1.26	0.91	6.37
IV	2.24	1.05	1.89	2.17	1.26	8.61

Male palp (Figs 2A–B, 4A–B, 5A–B): RTA with broad base strongly tapered to sharp extremity turned upward and outward; cymbium with several spines in distal half; subtegulum strongly sclerotized; tegulum with retrolateral knob; embolus originating on prolateral distal part of tegulum, broad at base, strongly tapered to sinuous sharp tip.

Female (paratype collected with holotype)

Total length 9.30; carapace 4.12 long, 2.41 wide, narrowed to 1.70 in eye region.

Colour: carapace chestnut brown with few silvery setae (Fig. 3E–G); chelicerae medium brown, sternum and legs orange brown; abdomen as in male but apodemes less well marked.

Carapace smooth. Clypeus with dispersed setae.

Eyes: AME: 0.13; ALE: 0.13; ALE-ALE: 0.31; AME-ALE: 0.23; PME: 0.15; PLE: 0.18; PME-PME: 0.14; PME-PL: 0.38. Clypeus 0.59 or 4.5 times width of ALE.

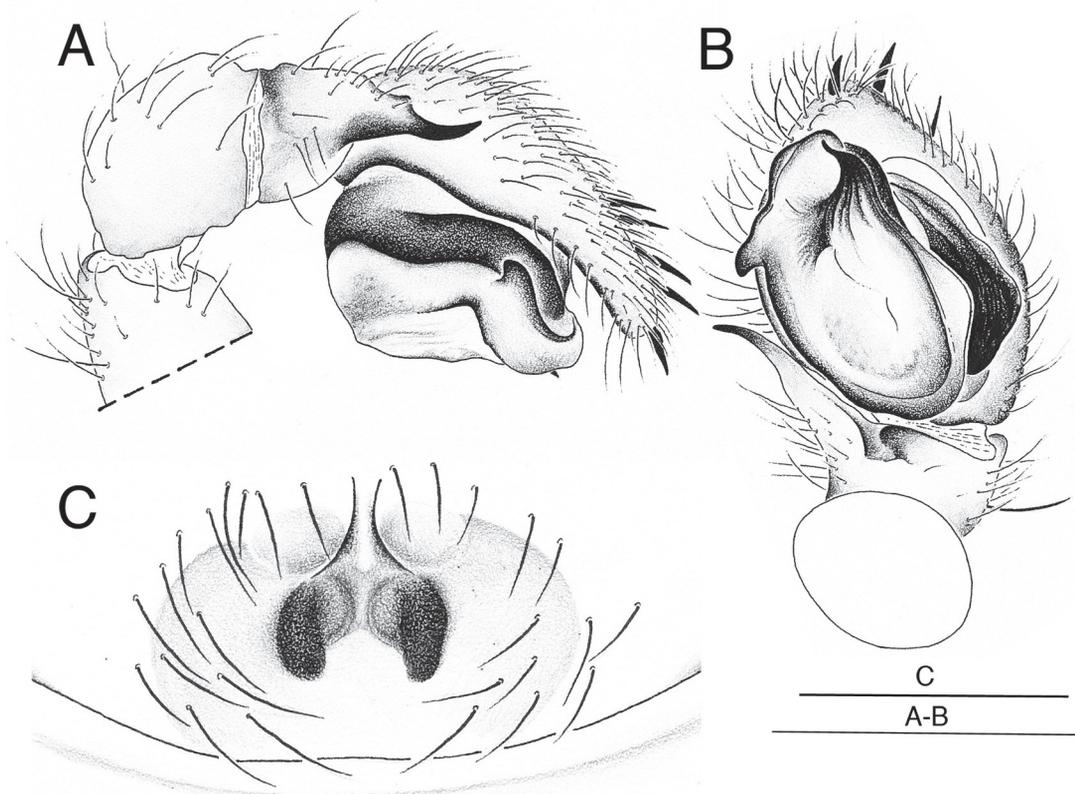


Fig. 5. *Palindroma morogorom* gen. et sp. nov. A–B. Holotype, ♂. C. Paratype, ♀. A. ♂, palp, retrolateral view. B. Idem, ventral view. C. ♀, epigyne, ventral view. Scale bars: A–B = 1mm, C = 0.5 mm.

Chilum double, each sclerite 0.10 high, 0.33 wide; no setae. Sternum shield-shaped, 1.42 long, 1.42 wide.

Legs: Anterior tarsi not modified, shorter than metatarsi.

Spination

	F	P	T	Mt
I	d3	-	pl1	pl1
II	d3	-	-	dw3
III	d3	pl3d3rl1	pl2d4rl1v2-2-1	d1r1ldw5
IV	d1	pl4d3rl1	pl2d5rl2v2-2-1	6disp dw5

Leg measurements

	F	P	T	Mt	t	Total
I	2.31	0.98	1.75	1.33	1.26	7.63
II	1.54	0.91	1.40	1.19	1.05	6.09
III	1.89	1.05	1.26	1.47	1.05	6.72
IV	2.31	1.19	1.96	2.31	1.26	9.03

Palp with pectinated claw turned inward over 45°. Tarsus provided with eight retrolateral spines.

Epigyne (Figs 2C–D, 4C–D, 5C): central depression with two dark areas; large kidney-shaped area on either side; inverted funnel-shaped pattern in front.

Distribution

Known from the Uzungwa and Uluguru Mts. in Tanzania (Fig. 16).

Palindroma aleykyela gen. et sp. nov.

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Figs 6A–D, 7A–B, 16

Diagnosis

The males of *P. aleykyela* gen. et sp. nov. are easily recognized by large palpal patella and the conspicuous basal extension of the tegulum.

Etymology

The species name is an arbitrary combination of letters forming a noun in apposition and containing ‘Kyela’, the name of the type locality.

Material examined

Holotype

TANZANIA: ♂, 8 km NE of Kyela, 9°35' S, 33°48' E, 19 Nov.–1 Dec. 1991, pitfalls in miombo relict, R. Jocqué (MRAC 173610).

Other material

MALAWI: 1 ♂, Chitheche, 11°50' S, 33°13' E, Feb. 1977, R. Jocqué R. (MRAC 152373); 2 ♂♂, Nkhata Bay, Nkwazi evergreen forest, 11°36' S, 34°18' E, 2–20 Jan. 1978, R. Jocqué (MRAC 153031); 2 ♂♂, Nkhata Bay, Nkwazi evergreen forest, 11°36' S, 34°18' E, 23 Nov.–13 Dec. 1977, R. Jocqué

(MRAC 153248); 1 ♂, Nyika Plateau, near entrance gate on the Chelinda-Rumphi road, 10°40' S, 33°50' E, 3–22 Dec. 1981, secondary *Brachystegia* woodland with *Uapaca*, pitfalls, R. Jocqué (MRAC 156005); 1 ♂, as previous (MRAC 156064).

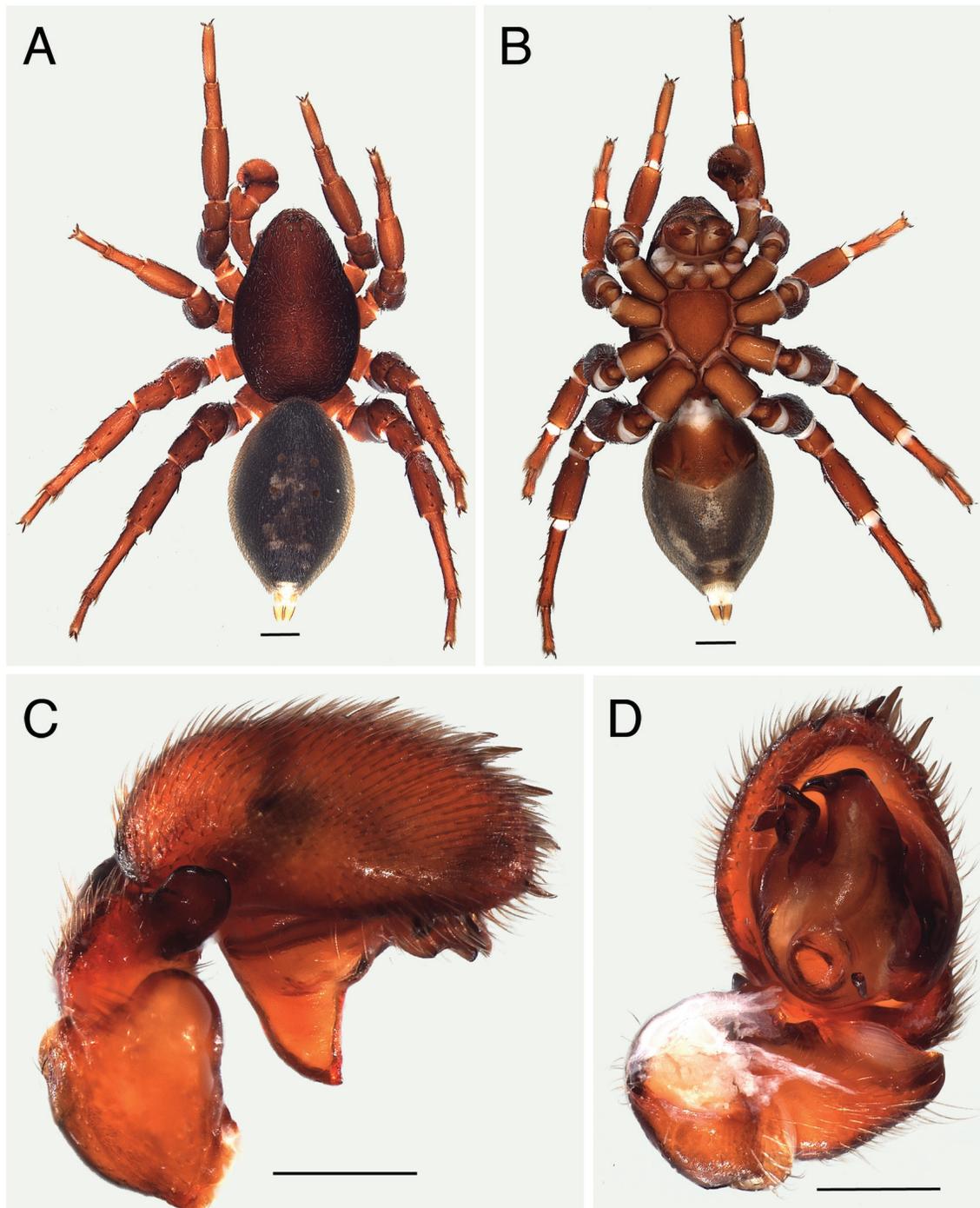


Fig. 6. *Palindroma aleykyela* gen. et sp. nov., holotype, ♂. **A.** Habitus, dorsal view. **B.** Idem, ventral view. **C.** Palp, retrolateral view. **D.** Idem, ventral view. Scale bars: A–B = 1 mm, C–D = 0.5 mm.

Description

Male (holotype)

Total length 9.87; carapace 4.97 long, 2.98 wide, narrowed to 1.42 in eye region.

Colour: carapace uniform dark brown with dispersed silvery hairs (Fig. 6A–B); chelicerae sternum and legs brownish orange; abdomen: dorsum grey with two pairs of reddish apodemes, white dispersed short setae, denser in posterior half, white spot in front of yellow spinnerets; sides grey with well delimited frontal reddish apodeme; venter pale grey, sclerotized and orange in front of epigastric fold.

Carapace coarsely granulate. Clypeus without erect setae.

Eyes: AME: 0.16; ALE: 0.20; ALE-ALE: 0.21; AME-ALE: 0.07; PME: 0.12; PLE: 0.18; PME-PME: 0.15; PME-PLE: 0.41. Clypeus 0.62 or 3.1 times width of ALE.

Chilum double, each sclerite 0.08 high, 0.16 wide; no setae. Sternum shield-shaped with sinuous sides, 2.00 long, 1.70 wide.

Chelicerae with mesodistal membranous extension. Endites swollen at base.

Legs: anterior tarsi fusiform, longer than metatarsi.

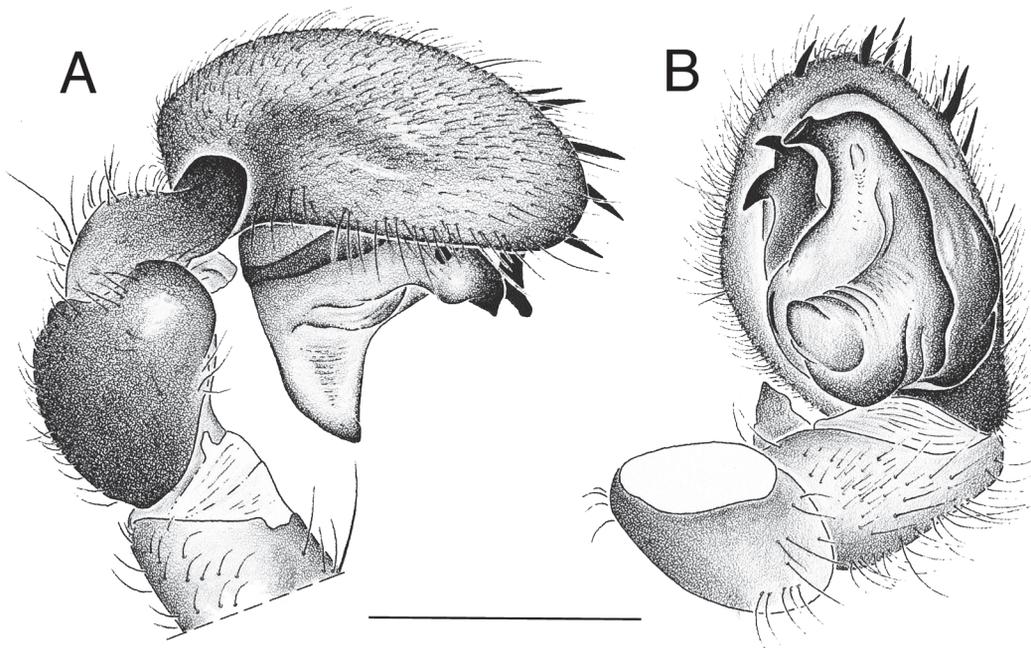


Fig. 7. *Palindroma aleykyela* gen. et sp. nov., ♂ (MRAC 153248). **A.** Palp, retrolateral view. **B.** Idem, ventral view. Scale bar = 1 mm.

Spination

	F	P	T	Mt
I	d2	-	pl1v1-1-2	dw3
II	d2	-	v1-1-2	dw2
III	d1-3	pl2d3r1l1	pl3d4r12v1-1-2	8dispdw6
IV	d1-3	pl2d3r1l1	pl3d5r12v1-1-2	10dispdw5

Leg measurements

	F	P	T	Mt	t	Total
I	2.38	1.19	1.96	1.26	1.40	8.19
II	2.17	1.19	1.68	1.12	1.05	7.21
III	2.31	1.33	1.47	1.47	1.05	7.63
IV	2.73	1.47	2.03	2.38	1.33	9.94

Epiandrum well developed, with two small, white, membranous spots.

Male palp (Figs 6C–D, 7A–B): patella large, with conspicuous mesolateral bulge; tibia with prolateral dorsal protrusion; RTA broad, short, with strongly sclerotized, rounded extremity; base strongly tapered to sharp extremity turned upward and outward; cymbium with seven prolateral spines in distal half; subtegulum strongly sclerotized; tegulum with large, pointed, basal extension, distally with short, dark, hooked process (HP); embolus short, curved, with rounded process at base.

Female

Unknown.

Distribution

Known from miombo woodland in northern Malawi and northern Tanzania (Fig. 16).

Palindroma avonova gen. et sp. nov.

urn:lsid:zoobank.org:act:E54283D6-495A-4859-B5D0-84887059EBA2

Figs 8A–D, 9A–C, 10A–D, 16

Diagnosis

The male of *P. avonova* gen. et sp. nov. is easily recognized by the characters of the palp: the swollen patella, the thick RTA, the ridged tegulum and the sickle shaped embolus. The female has a characteristic epigyne with longitudinal central depression separated from the posterior margin by a rectangular plate.

Etymology

The species name is an arbitrary combination of letters forming a noun in apposition and containing ‘nova’ (new) as the genus as well as the species are new.

Material examined

Holotype

TANZANIA: ♂, Muheza district, Manga Forest Reserve, 5°02' S, 38°47' E, Oct.–Dec.1994, Frontier Tanzania (ZMUC).

Paratypes

TANZANIA: 1 ♂, together with holotype (MRAC 244092); 2 ♂♂, 1 ♀, together with holotype (ZMUC); 5 ♂♂, 1 ♀, Muheza district, Marimba Forest Reserve, 5°01' S, 38°41' E, no date, Frontier Tanzania (ZMUC).

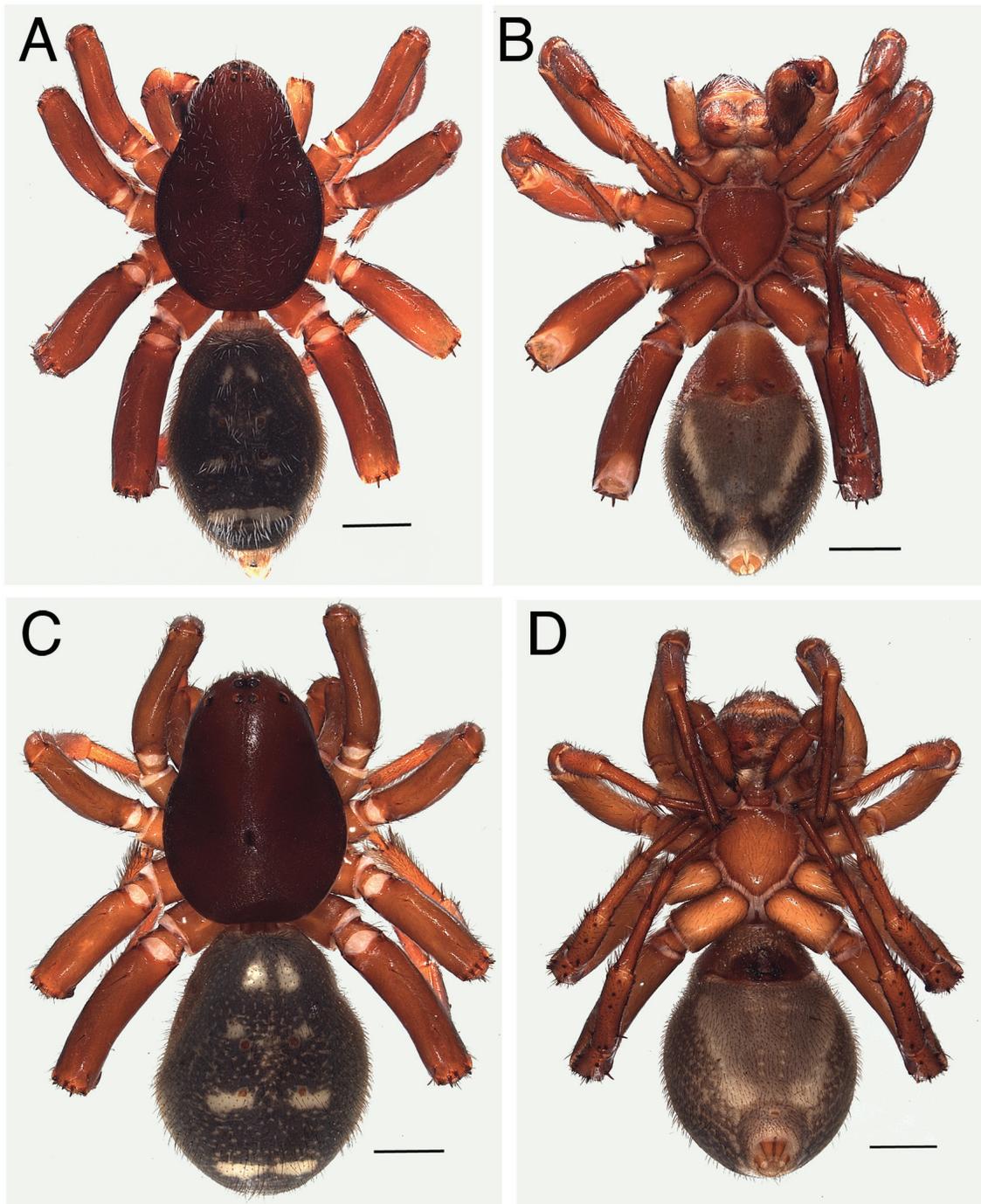


Fig. 8. *Palindroma avonova* gen. et sp. nov. A–B. Holotype, ♂. C–D. ♀ from Maringa Forest. A. ♂, habitus, dorsal view. B. Idem, ventral view. C. ♀, habitus, dorsal view. D. Idem, ventral view. Scale bars = 1 mm.

Other material

TANZANIA: 1 ♀, Coastal Region, Kazimzumbwi Forest Reserve, 6°57' S, 39°3' E, Jan.–Feb. 1991, Frontier Tanzania (ZMUC); 2 ♀♀, as previous; 1 ♂, as previous; 1 ♀, Pugu Forest Reserve, 9°59' S, 39°7' E, 25 Apr. 1981, leaf litter, K.M. Howell (MRAC 159097).

Description

Male (holotype)

Total length 7.60; carapace 3.83 long, 2.63 wide, narrowed to 1.28 in eye region.

Colour: Carapace dark brown with few silvery setae (Fig. 8A–B); chelicerae, sternum and legs medium brown; Mt I, II with white hairs. Abdomen: dorsum with white setae, denser in front and on posterior white bar; three pairs of white spots, one pair of adjacent white bars and a white bar in front of spinnerets; four apodemes well developed; sides dark grey; venter pale grey, well separated from sides by oblique white band on either side; sclerotized in front of epigastric fold; four rows of apodemes; spinnerets yellowish brown.

Carapace granulated.

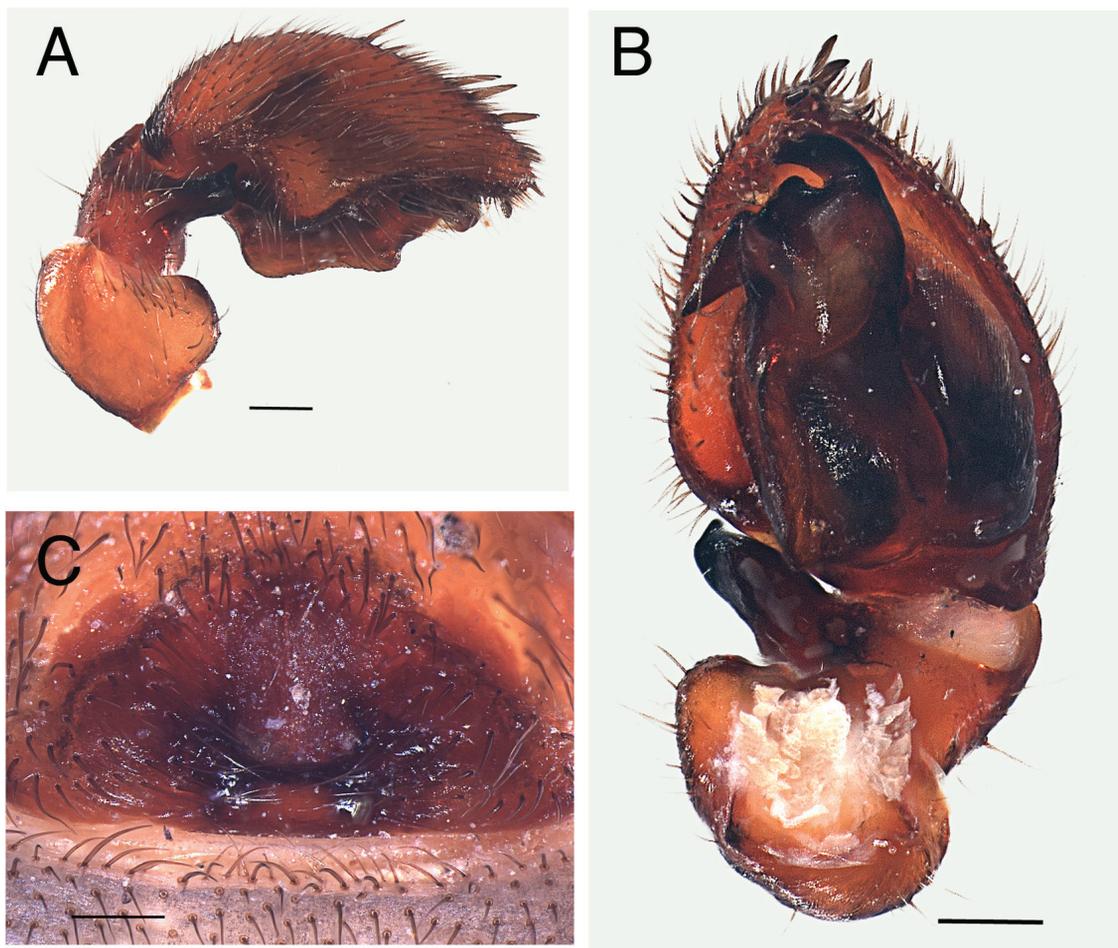


Fig. 9. *Palindroma avonova* gen. et sp. nov. A–B. Holotype, ♂. C. ♀ from Maringa Forest. A. ♂, palp, retrolateral view. B. Idem, ventral view. C. ♀, epigyne, ventral view. Scale bars = 0.2 mm.

Eyes: AME: 0.10; ALE: 0.14; ALE-ALE: 0.15; AME-ALE: 0.13; PME: 0.08; PLE: 0.13; PME-PME: 0.12; PME-PLE: 0.30. Clypeus 0.39 or 2.8 times width of ALE.

Chilum double, each sclerite 0.13 high, 0.20 wide; no setae. Chelicerae with distomesal membranous swelling. Sternum shield-shaped, 1.42 long, 1.28 wide.

Legs: anterior tarsi slightly longer than metatarsi.

Spination

	F	P	T	Mt
I	d3	-	-	dw2
II	d3	-	v3	dw2
III	d3+2*	pl3d1-2r1l	pl2d3r1l v2-2-2	d1dw5
IV	d3+3*	pl3d1-2r1l	pl3d5r12v1-1-2	4dispdw5

* 3 long, slender setae + 2 or 3 short, thick, distal setae

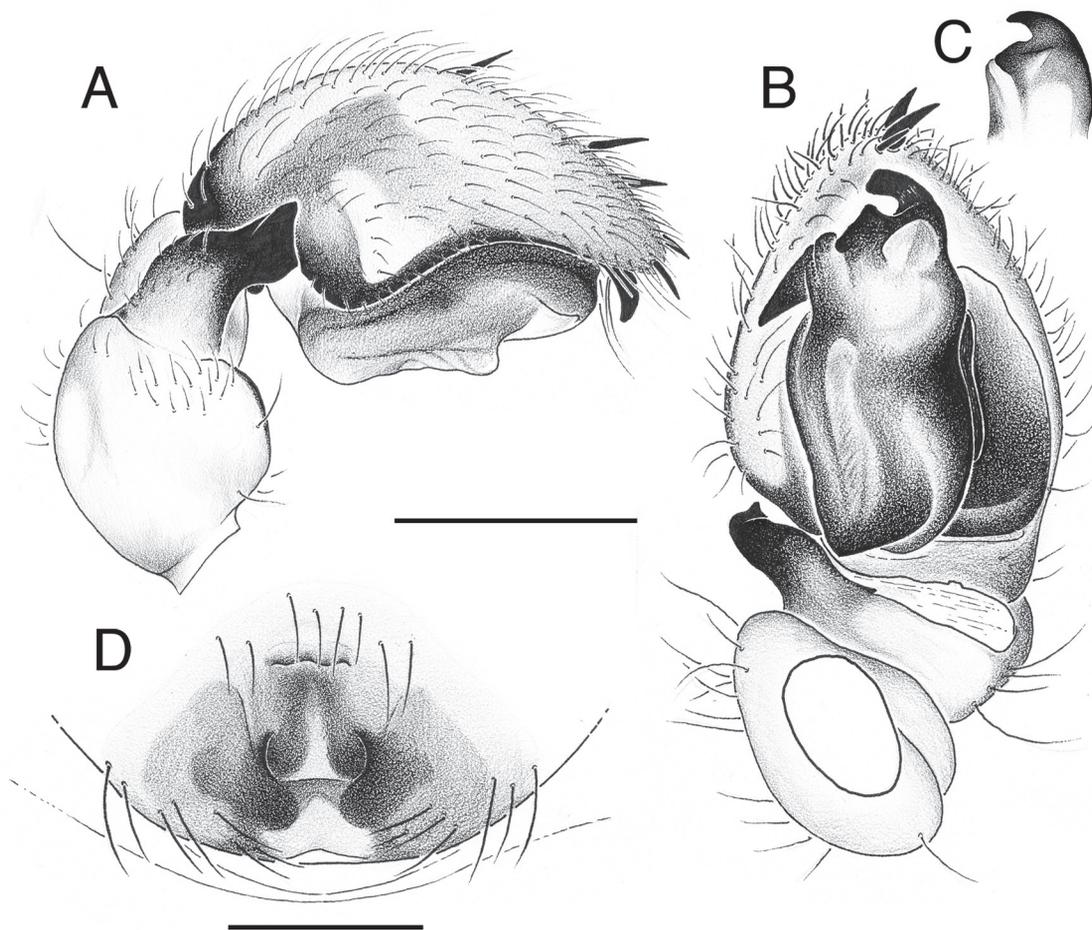


Fig. 10. *Palindroma avonova* gen. et sp. nov. A–B. Holotype, ♂. C. Paratype, ♂, from Marimba Forest. D. ♀ from Maringa forest. A. ♂, palp, retrolateral view. B. Idem, ventral view. C. Palp detail of paratype, embolus, ventral view. D. ♀, epigyne, ventral view. Scale bars = 0.5 mm.

Leg measurements

	F	P	T	Mt	t	Total
I	1.68	0.84	1.54	0.98	1.05	6.09
II	1.61	0.84	1.26	0.98	0.70	5.39
III	1.75	0.84	1.33	1.12	0.70	5.74
IV	2.24	1.12	1.75	2.03	0.98	8.12

Male palp (Figs 9A–B, 10A–C): patella large, swollen; tibia with short, rounded dorsal process; RTA strongly sclerotized, short, thick, with truncated tip; cymbium with several spines in distal half; with basal swellings near dorsal tibial process and RTA; tegulum with longitudinal ventral ridge ending medially in poorly developed knob; embolus short, sickle shaped; MA strongly sclerotized, conical, pointing backward; subtegulum large, strongly sclerotized.

Female (paratype from Marimba Forest)

Total length 8.02; carapace 3.76 long, 2.63 wide, narrowed to 1.63 in eye region.

Colour: carapace dark brown without silvery setae (Fig. 8C–D); chelicerae, sternum and legs medium brown without white setae; abdomen: pattern as in male but without white setae and not sclerotized in front of epigastric fold but for epigyne. Further as in male.

Carapace: finely reticulated. Clypeus with dispersed setae.

Eyes: AME: 0.18; ALE: 0.20; ALE-ALE: 0.18; AME-ALE: 0.20; PME: 0.13; PLE: 0.16; PME-PME: 0.10; PME-PL: 0.31. Clypeus 0.43 or 2.2 times width of ALE.

Chilum double, each sclerite 0.10 high, 0.26 wide; no setae. Sternum shield-shaped, 1.42 times as long as wide.

Legs:

Spination

	F	P	T	Mt
I	d3	-	-	dw2
II	d3	-	-	dw2
III	d2+1*	pl3d3	pl2d3rl1v1-1-1	d1dw5
IV	d2+3*	pl3d3rl1	pl5d2rl2v1-1-1	4dispdw5

* 2 long, slender setae + 1 or 3 short, thick, distal setae

Leg measurements

	F	P	T	Mt	t	Total
I	1.26	0.91	1.68	1.12	1.05	6.02
II	1.82	0.77	1.33	0.98	0.91	5.81
III	1.82	0.98	1.12	1.40	1.05	6.37
IV	2.45	1.05	1.96	2.10	1.19	8.75

Palp: claw with three teeth, turned inward over 45°. Tarsus provided with strong retrolateral spines.

Epigyne (Figs 9C, 10D): dark, fairly large central depression longitudinal, separated from posterior margin by transverse rectangular plate.

Distribution

Known from forest in Muheza District in Tanzania (Fig. 16).

Palindroma obmoimiombo gen. et sp. nov.

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Figs 11A–E, 12A–D, 13A–B, 16

Diagnosis

The male of *P. obmoimiombo* gen. et sp. nov. is easily recognized by its colour, the inconspicuous cheliceral lamina and the characters of the palp: the unmodified patella, the presence of a dorsolateral tibial apophysis

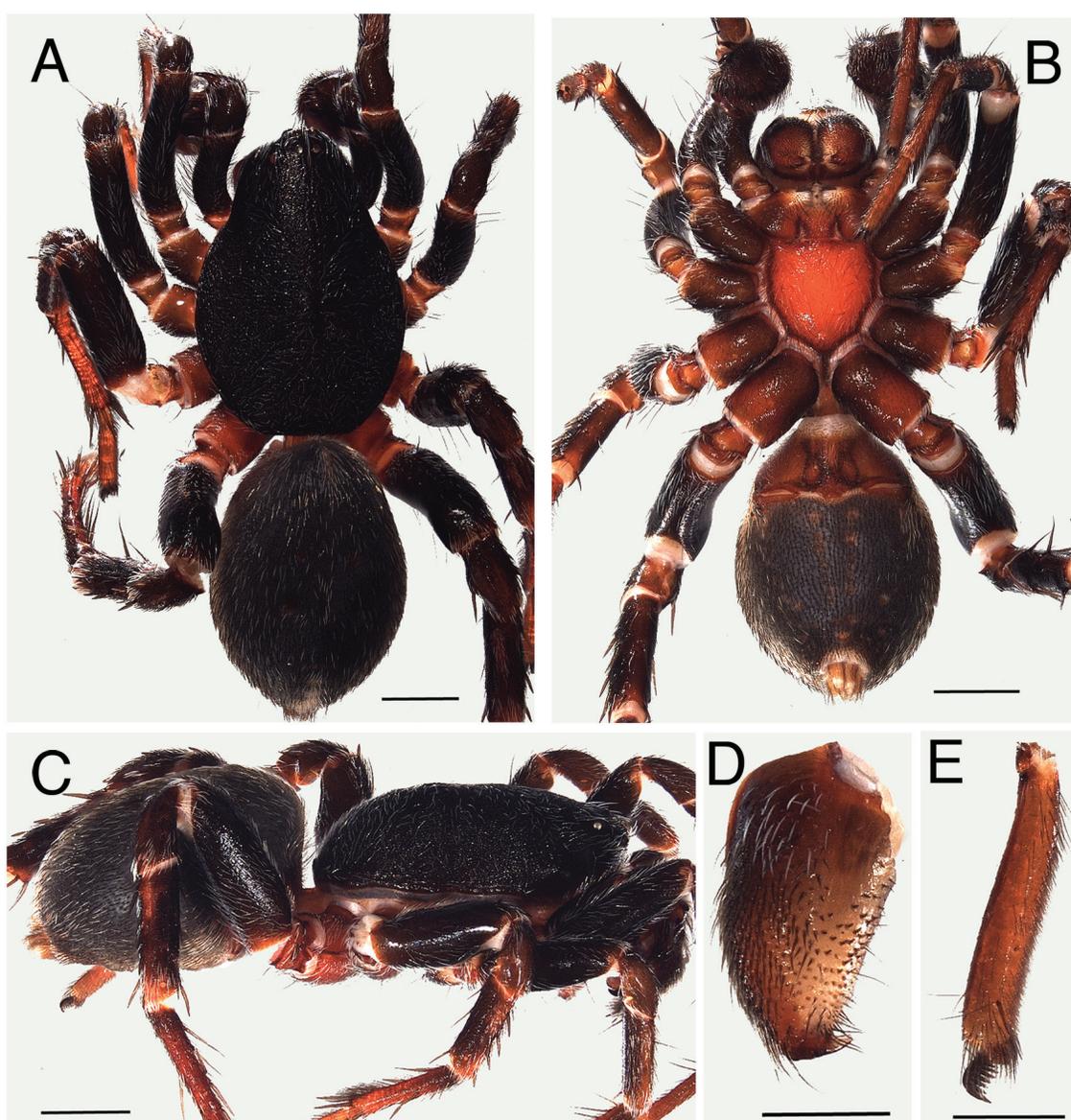


Fig. 11. *Palindroma obmoimiombo* gen. et sp. nov., paratype, ♂ (MRAC 241634). **A.** Habitus, dorsal view. **B.** Idem, ventral view. **C.** Idem, lateral view. **D.** Left chelicera, ventral view, showing mesal field of spinules. **E.** Tarsus 4, retrolateral view. Scale bars: A–C = 1 mm, D–E = 0.5 mm).

and a bifid RTA, the large subtegulum with ridges and posterior swelling and the thin embolus lying in a groove of the tegulum.

Etymology

The species name is an arbitrary combination of letters forming a noun in apposition and containing ‘miombo’, the type of woodland in which the type material was collected.

Material examined

Holotype

DEMOCRATIC REPUBLIC OF THE CONGO: ♂, Mikembo Sanctuary near Lubumbashi, 11°28' S, 27°39' E, 8 Nov. 2010, 1180 m, miombo woodland, by hand, R. Jocqué (MRAC 241633).

Paratype

DEMOCRATIC REPUBLIC OF THE CONGO: 1 ♂, Mikembo Sanctuary near Lubumbashi, 11°28' S, 27°39' E, 1–31 Oct. 2010, 1180 m, miombo woodland, by hand, Cemdika & Jenny (MRAC 241634).

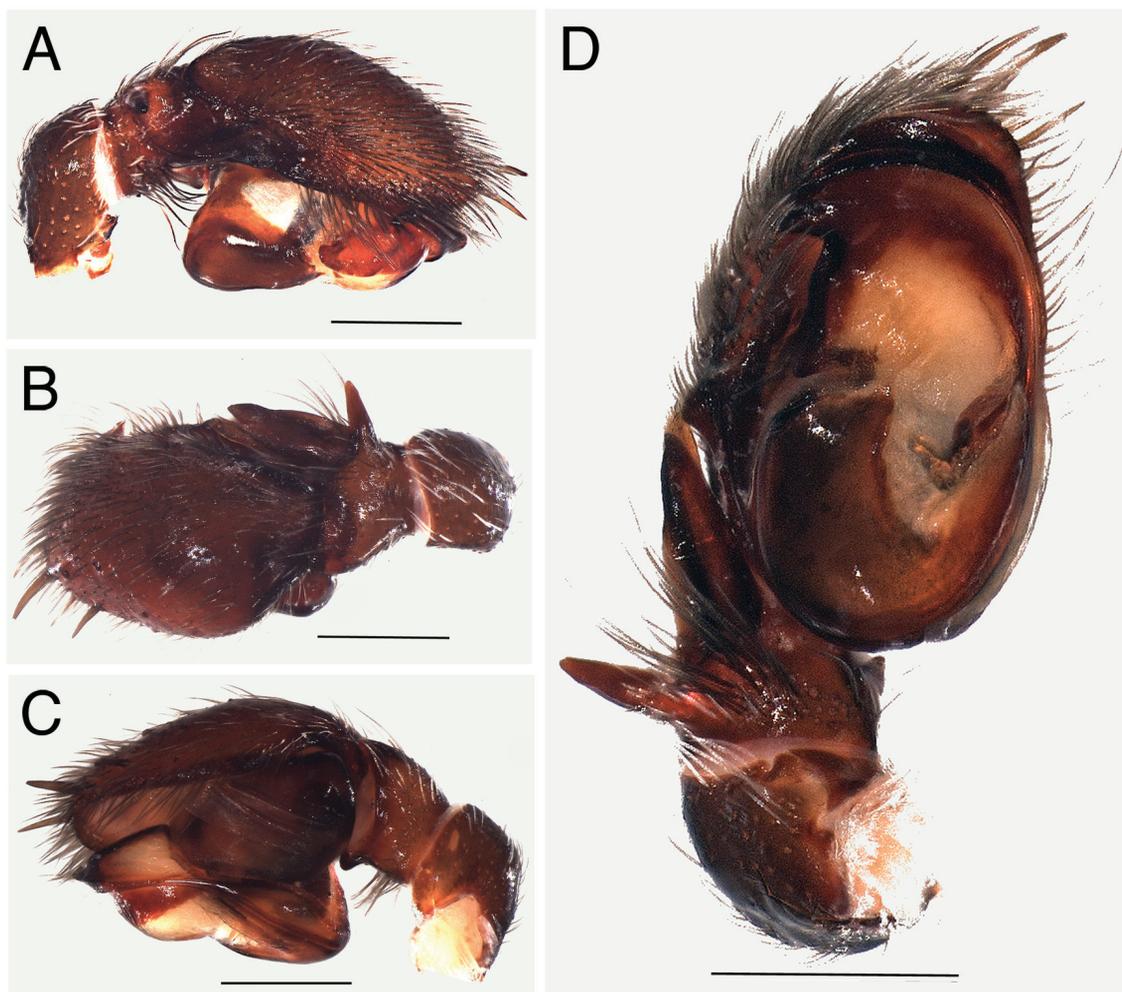


Fig. 12. *Palindroma obmoimiombo* gen. et sp. nov., holotype, ♂ (MRAC 241633). **A.** Palp, retrolateral view. **B.** Idem, dorsal view. **C.** Idem, prolateral view. **D.** Idem, ventral view. Scale bars = 0.5 mm.

Other material

None.

Description

Male (holotype)

Total length 7.46; carapace 3.91 long, 2.84 wide, narrowed to 1.56 in eye region.

Colour: carapace black with numerous silvery hairs (Fig. 11A–C); chelicerae dark brown with white setae in proximal half, medium brown with dark setae in distal half and white distomesal part (Fig. 11D); sternum orange; coxae and trochanters brownish orange, femora dark brown to black with numerous white setae; patellae and tibiae dark brown with few white setae; metatarsi and tarsi medium brown (Fig. 11E); abdomen dark grey with silvery setae, four reddish apodemes, three anastomosing pale spots in front of brownish spinnerets; sides dark grey with few silvery setae and reddish frontal apodeme; venter dark grey with two rows of small apodemes and a few near sides; orange in front of epigastric fold.

Carapace granulated, profile almost flat.

Eyes: AME: 0.13; ALE: 0.15; ALE-ALE: 0.31; AME-ALE: 0.08; PME: 0.13; PLE: 0.12; PME-PME: 0.10; PME-PLE: 0.25. Clypeus 0.64 or 4.3 times width of ALE.

Chilum double, each sclerite 0.10 high, 0.20 wide; no setae. Chelicerae with mesal side flat, with short spines; distomesal membranous swelling, absent. Sternum shield-shaped, 1.49 long, 1.42 wide, produced between posterior coxae.

Legs: anterior tarsi shorter than metatarsi.

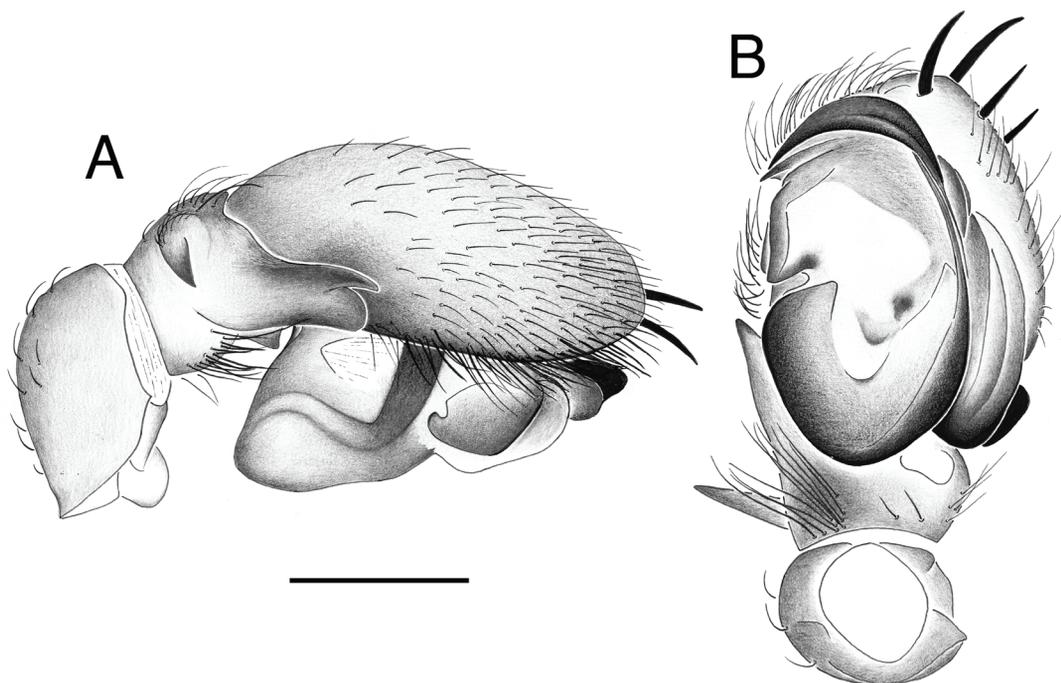


Fig. 13. *Palindroma obmoimiombo* gen. et sp. nov., holotype, ♂ (MRAC 241633). A. Palp, retrolateral view. B. Idem, dorsal view. Scale bars = 0.5 mm.

Spination

	F	P	T	Mt
I	d1	-	pl2	v2-2
II	d1	-	pl2	v2dw3
III	pl1d3	pl3d1r1l	pl3d3r12v1-2-2	8disp dw5
IV	pl1d3	pl1d1r1l	pl3d3r12v1-1-2	11disp dw5

Leg measurements

	F	P	T	Mt	t	Total
I	2.17	0.98	1.96	1.47	1.26	7.84
II	1.89	0.91	1.33	1.40	1.12	6.65
III	1.68	1.05	1.26	1.61	1.26	6.86
IV	2.24	1.19	1.75	2.31	1.40	8.89

Epiandrum well developed but without membranous patches.

Male palp (Figs 12A–D, 13A–B): patella not modified or enlarged; tibia with ventral bunch of long setae, sharp dorsolateral apophysis pointing outward, and RTA, concavity between the two; RTA distally bifid with pointed inferior part and lamellar, truncated superior part; cymbium with basolateral flange and seven prolateral spines; subtegulum large and prominent, with three longitudinal ridges, posterior part swollen; tegulum with two parts, centre membranous; distal part with transverse groove and knob pointing back; embolus thin and whip-shaped; distal extremity in tegular groove.

Female

Unknown.

Distribution

Known from Mikembo Sanctuary near Lubumbashi in the Democratic Republic of the Congo (Fig. 16).

Palindroma sinis gen. et sp. nov.

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Figs 14A–E, 15A–C, 16

Diagnosis

The male of *P. sinis* gen. et sp. nov. is easily recognized by the characters of the palp: the very simple RTA, which is a tiny protrusion, the short sharp, embolus and whitish setae on legs and abdomen.

Etymology

The species name is an arbitrary combination of letters forming a noun in apposition and containing ‘sin’ (Spanish for ‘without’) referring to the virtual absence of an RTA.

Material examined

Holotype

TANZANIA: ♂, Morogoro Region, Kimboza Forest Reserve, 7°01' S, 37°44' E, Jan.–Mar. 1994, Frontier Tanzania (ZMUC).

Paratypes

TANZANIA: 2 ♂♂, together with holotype (ZMUC); 2 ♂♂, together with holotype (MRAC 244093).

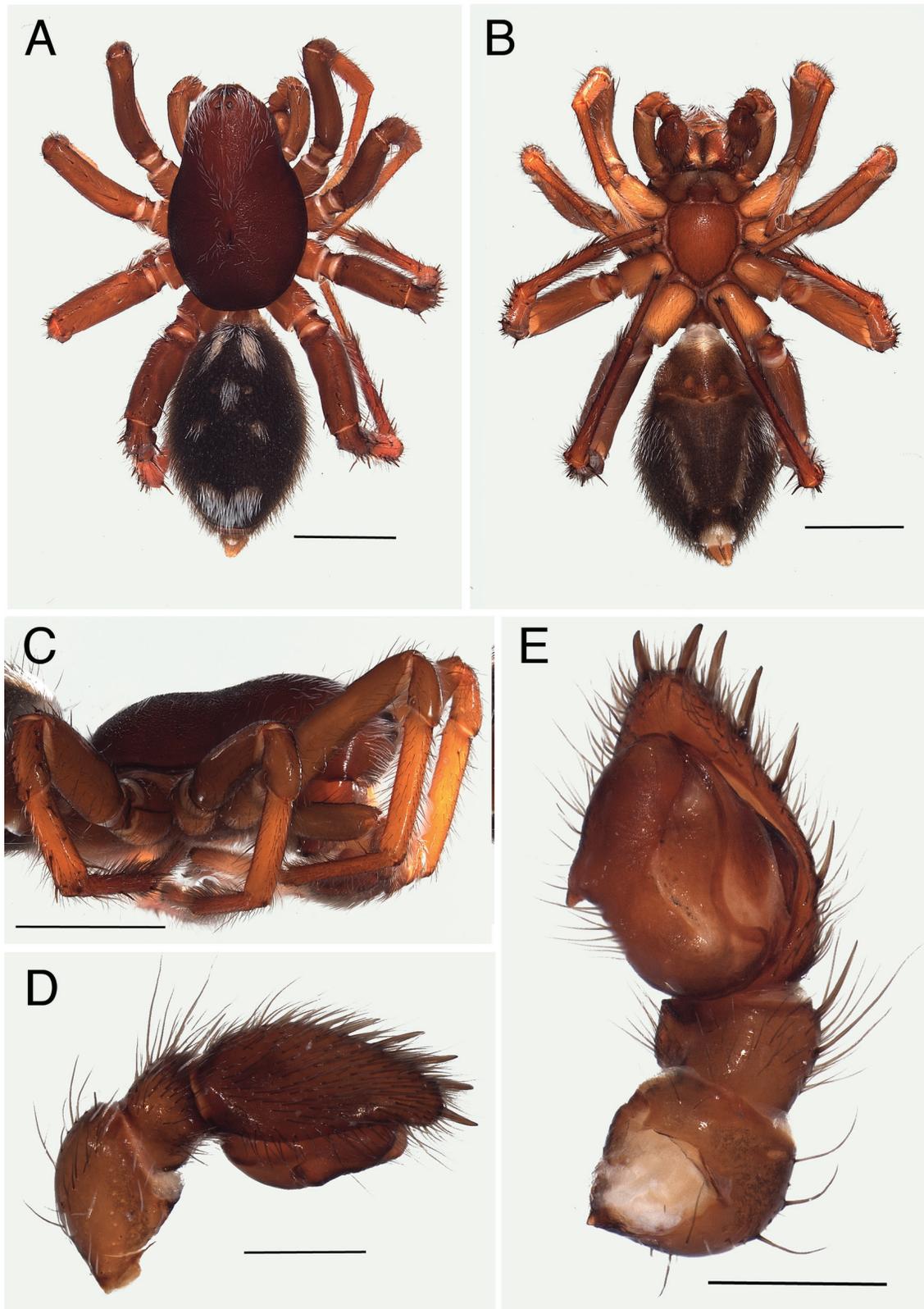


Fig. 14. *Palindroma sinis* gen. et sp. nov., holotype, ♂. **A.** Habitus, dorsal view. **B.** Idem, ventral view. **C.** Idem, lateral view. **D.** Palp, retrolateral view. **E.** Idem, ventral view. Scale bars: A–C = 2 mm, D–E = 0.5 mm.

Other material

TANZANIA: 1 ♂, Mandeni District, Genda-Genda South Forest, 5°33' S, 38°38' E, 29 Jun.–28 Sep. 1991, Frontier Tanzania (ZMUC); 2 ♂♂, Tanga District, Muneza Region, Magrotto Hill, 5°07' S, 38°45' E, Jul.–Sep. 1994, Frontier Tanzania (ZMUC).

Description

Male (holotype)

Total length 8.38; carapace 4.19 long, 2.56 wide, narrowed to 1.49 in eye region.

Colour: carapace dark chestnut brown with silvery setae in eye region and around fovea (Fig. 14A–C); chelicerae, sternum and legs medium orange-brown; anterior tarsi yellow; sparse dorsal white hairs on all T and Mt and on t II, dense on t I. Abdomen: dorsum dark grey with five small pale spots in anterior half, and large one in posterior half, all covered with white setae; four apodemes well developed; sides dark grey with sparse white hairs in anterior half; venter pale grey, well separated from sides by oblique pale band on either side; with two rows of apodemes; spinnerets yellowish brown.

Carapace finely reticulated, with conspicuous dip at level of fovea.

Eyes: AME: 0.13; ALE: 0.16; ALE-ALE: 0.20; AME-ALE: 0.15; PME: 0.13; PLE: 0.15; PME-PME: 0.10; PME-PL: 0.30. Clypeus 0.46 or 2.4 times width of ALE.

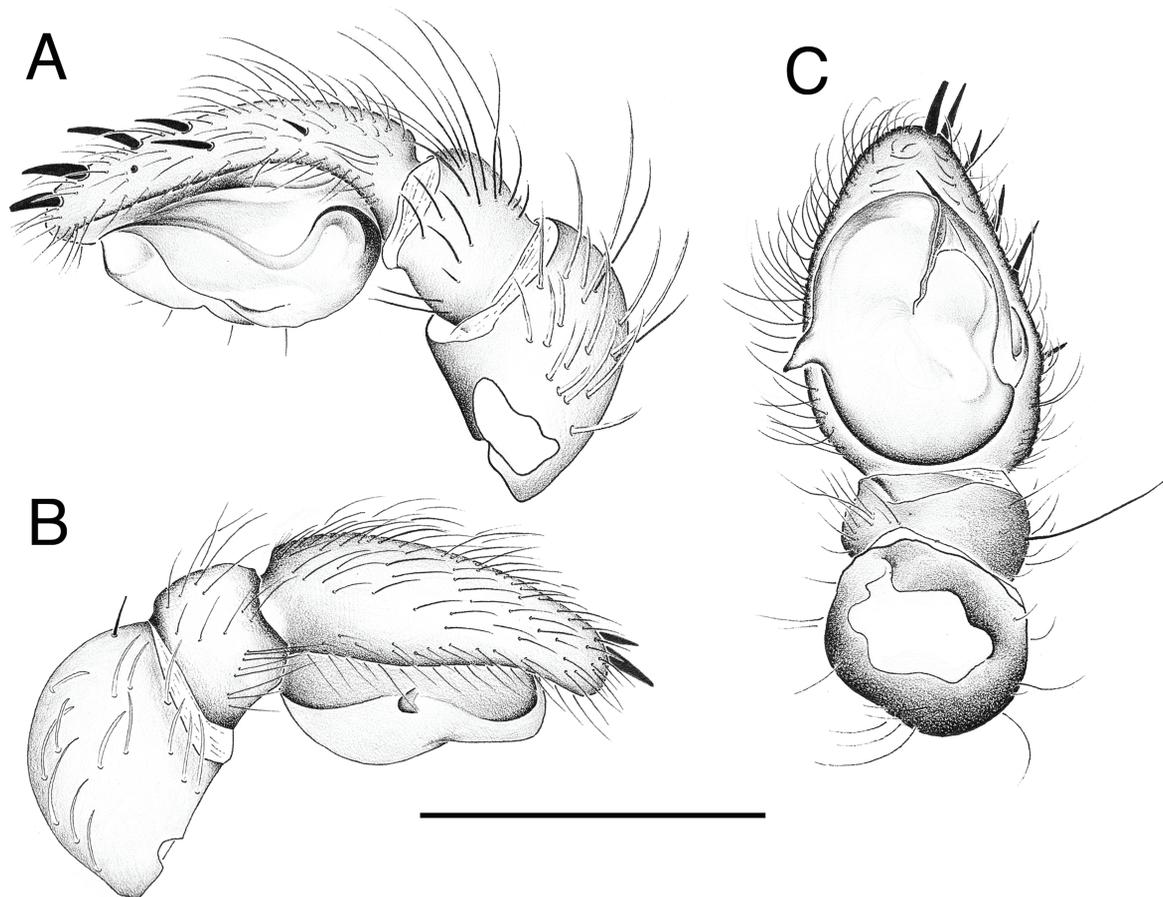


Fig. 15. *Palindroma sinis* gen. et sp. nov., holotype, ♂. **A.** Palp, prolateral view. **B.** Idem, retrolateral view. **C.** Idem, ventral view. Scale bar = 1 mm.

Chilum double, each sclerite 0.10 high, 0.25 wide; no setae. Chelicerae with distomesal membranous swelling. Sternum shield-shaped, 1.56 long, 1.35 wide.

Legs: anterior tarsi shorter than metatarsi.

Spination

	F	P	T	Mt
I	pl1d2	-	v1-1-1	dw2
II	pl1d2	-	v1-1-1	dw3
III	d2r1	pl2d3r1	pl3d3r1v2-2-2	4dispdw5
IV	d2r1	pl2d3r1	pl3d5r1v2-2-2	9dispdw5

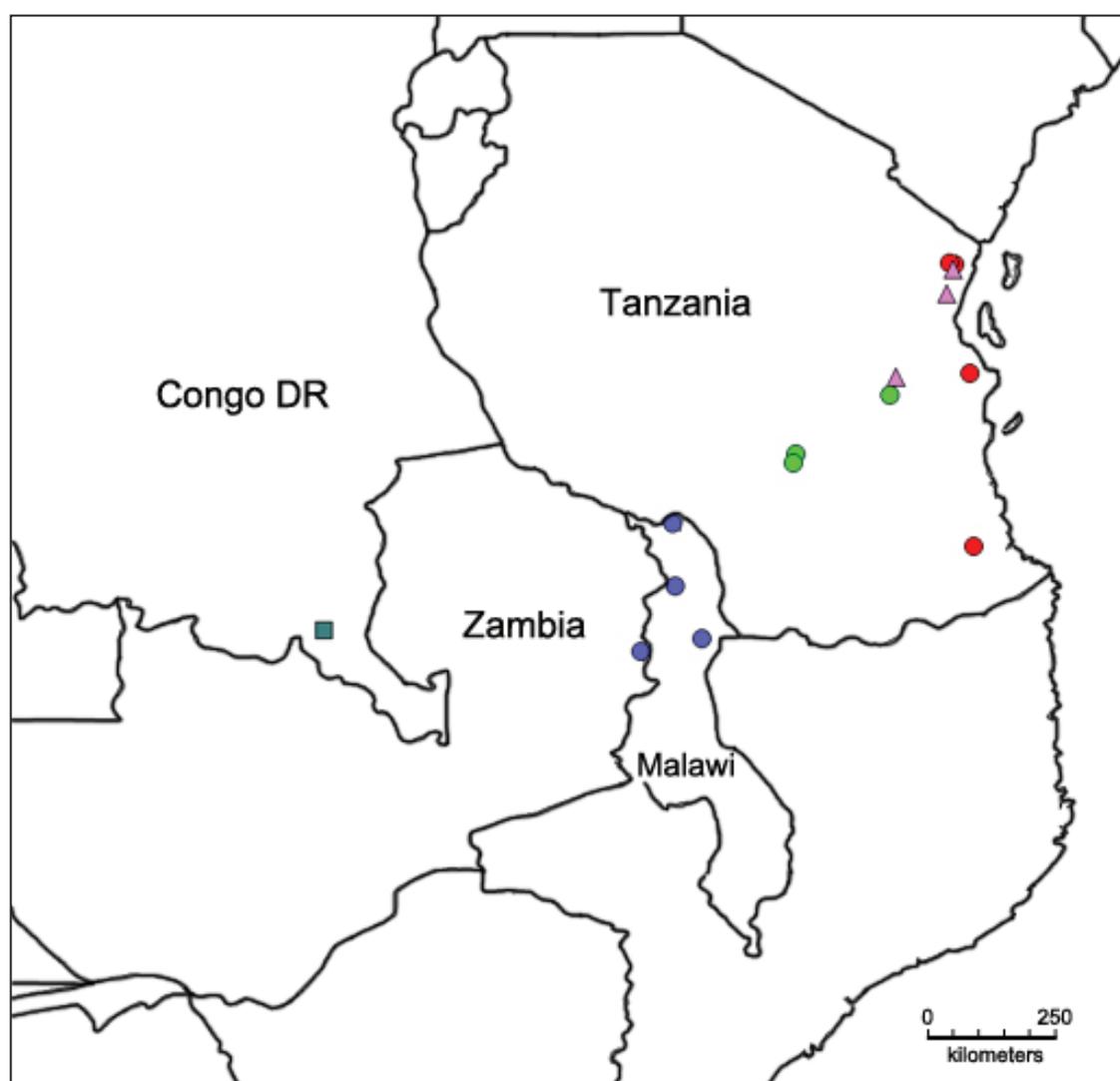


Fig. 16. Distribution map of *P. avonova* gen. et sp. nov. (●), *P. aleykyela* gen. et sp. nov. (●), *P. morogorom* gen. et sp. nov. (●), *P. obmoimiombo* gen. et sp. nov. (■) and *P. sinis* gen. et sp. nov. (▲).

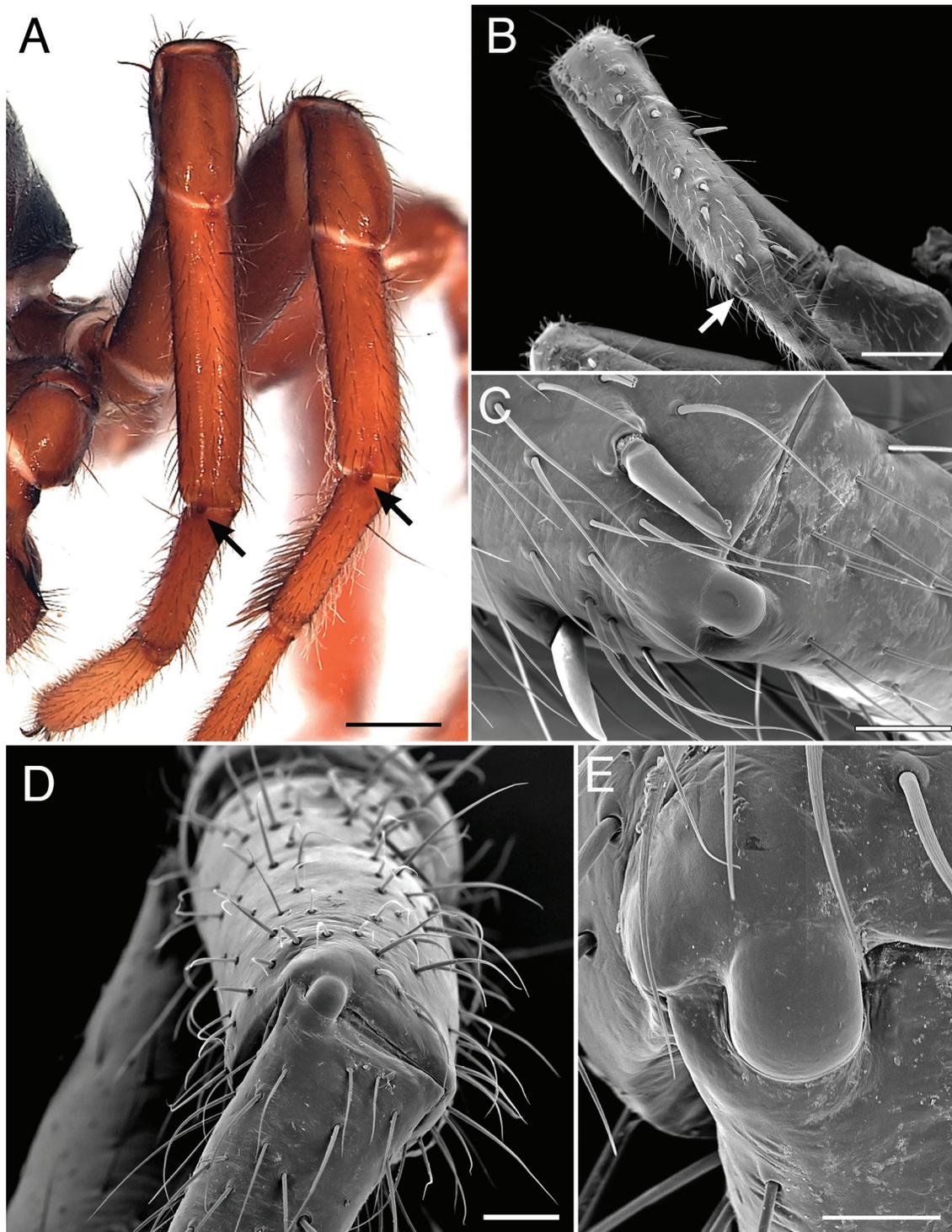


Fig. 17. *Palindroma morogorom* gen. et sp. nov. **A.** Left legs I and II, frontal view; arrows indicate tibial process. **B.** Left leg III, tibia and metatarsus, dorsal view. **C.** Detail of previous. **D.** Left leg II, tibia and metatarsus, dorsal view. **E.** Detail of previous. Scale bars: A–B = 0.5 mm, C–D = 100 mm, E = 50 mm.

Leg measurements

	F	P	T	Mt	t	Total
I	2.10	0.91	1.75	1.68	1.47	7.91
II	1.96	0.91	1.33	1.54	1.26	7.00
III	1.96	1.05	1.40	1.89	0.98	7.28
IV	2.38	1.12	1.96	2.73	1.33	9.52

Abdomen with well developed epiandrum; posterior margin with two semi-circular extensions, each preceded by tiny pit with membranous bottom.

Male palp (Figs 14D–E, 15A–C): RTA a tiny protrusion; tegulum with longitudinal cleft; prolateral part with sinuous sperm duct visible in transparency, retrolateral part with sharp, back-pointing knob; embolus short, straight, with sharp tip pointing forward. Without MA and conductor.

Female

Unknown.

Distribution

Known from Morogoro Region, Tanga District and Muheza District in Tanzania (Fig. 16).

Discussion

The tibial process

All representatives of *Palindroma* gen. nov. were found to have a characteristic tibial process (Fig. 17A–D) on all legs of both sexes. It consists of a rounded lip-shaped extension of the distal, dorsolateral margin of the tibia, fitting in a shallow pouch on the proximal dorsal margin of the metatarsus. Scanning of other zodariids showed that the character appears to be present in all representatives of the family. It is obvious in almost all species, except in some taxa provided with a single femoral organ. In all observed species (see appendix) the process is situated near the prolateral side of the dorsal margin of the tibia (Fig. 17A). The relative size of the structure varies. It is particularly well developed in *Palindroma* gen. nov., but fairly small although still obvious in *Cryptothele* L. Koch, 1872 (Fig. 18C–D) as can be observed in fig. 2A of Ramirez *et al.* (2014). It is clearly visible in the other basal genera, for instance in *Cyrioctea* (Fig. 18E), *Lachesana* Strand, 1932 (Fig. 19A) and *Cybaeodamus* Mello-Leitão, 1938 (see Ramirez 2014: fig. 52e). It is conspicuous in representatives of the Storeninae: *Amphiledorus* Jocqué & Bosmans, 2001 (Fig. 18A), *Mallinella* Strand, 1906 (Fig. 19B), *Holasteron* Baehr, 2004 (Fig. 18F). It is present and distinct in genera with a dual femoral organ: *Asceua* Thorell, 1887 (Fig. 18B), *Suffasia* Jocqué, 1991 and *Suffrica* Henrard & Jocqué, 2015 (Fig. 19C), but has been overlooked by Henrard & Jocque (2015). However, it is less conspicuous in the other taxa with a femoral organ where it is situated under the rim of the tibia and not on it as in the other taxa: *Diores* Simon, 1893 (Fig. 20E–F), *Zodarion* Walckenaer, 1826 (Fig. 19D), *Ranops* Jocqué, 1991 (Fig. 19F). In some of the Zodariinae it is partly hidden and difficult to discern when the leg is not bent at the tibia-metatarsus joint: *Microdiores* Jocqué, 1987 (Fig. 19E), *Parazodarion* Ovtchinnikov, Ahmad & Gurko, 2009 (Fig. 20C–D), *Trygetus* Simon, 1882 (Fig. 20A–B). The structure is absent in those taxa that have been regarded as putative sister-groups like Amaurobiidae (Fig. 21A), Agelenidae (Fig. 21B), Penestomidae (Fig. 21D), Corinnidae (*Procopius* sp., *Cambalida* sp.) Gnaphosidae (*Haplodrassus* sp.) or even in Titanoecidae (Fig. 21C). Another kind of tibial processes occurs in a few other families where a small process on both sides of the dorsal tibial rim is present. These have been called ‘condyles’ by Ramirez (2014: fig. 44b). However, they are obviously not homologous with the tibial process described here, since a tibial process and condyles may occur together on the rim of the tibia as in *Cryptothele* (Fig. 18C–D). The structure as found in Zodariidae appears to be a unique synapomorphy and its presence in basal zodariid taxa,

e.g., *Cyrioctea* (Fig. 18E) and *Lachesana* (Fig. 19A), thus confirms the position of these genera in that family. This remarkable feature may be of great help for the identification of zodariid fossils or of spider leftovers containing a single intact leg, in vertebrate stomach contents for instance.

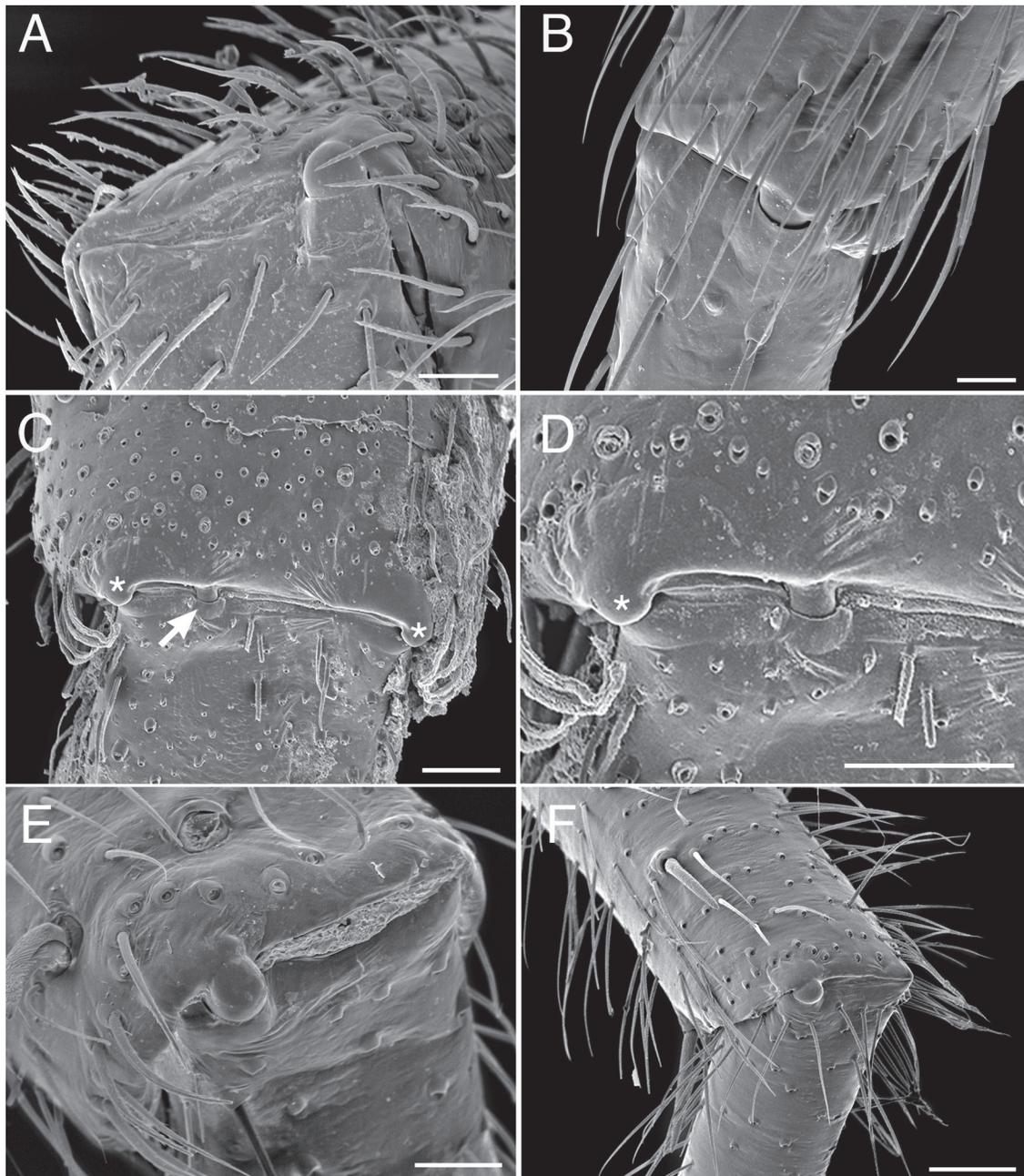


Fig. 18. A. *Amphiledorus* sp., juvenile, right tibia I. B. *Asceua* sp., ♂, right tibia and metatarsus IV. C. *Cryptothele doreyana* Simon, 1890, ♀, left tibia and metatarsus II. D. *Idem*, detail. E. *Cyrioctea marken* Platnick & Jocqué, 1992, ♂, left tibia and metatarsus III. F. *Holasteron aciculare* Baehr, 2004, ♂, left tibia and metatarsus III. Scale bars: A, E = 50 µm, B = 20 µm, C–D, F = 100 µm. Arrow shows tibial process, asterisk indicates condyle.

Distribution

In Jocqué (2009) and Jocqué *et al.* (2013) it was argued that the spider fauna of miombo woodlands has a character of its own and hardly overlaps with that of montane or coastal forests. The presently known distribution of the genus *Palindroma* gen. nov. is therefore somewhat puzzling. It is the first cryptotheline genus that is found in miombo woodland but it also occurs in coastal forest, even if

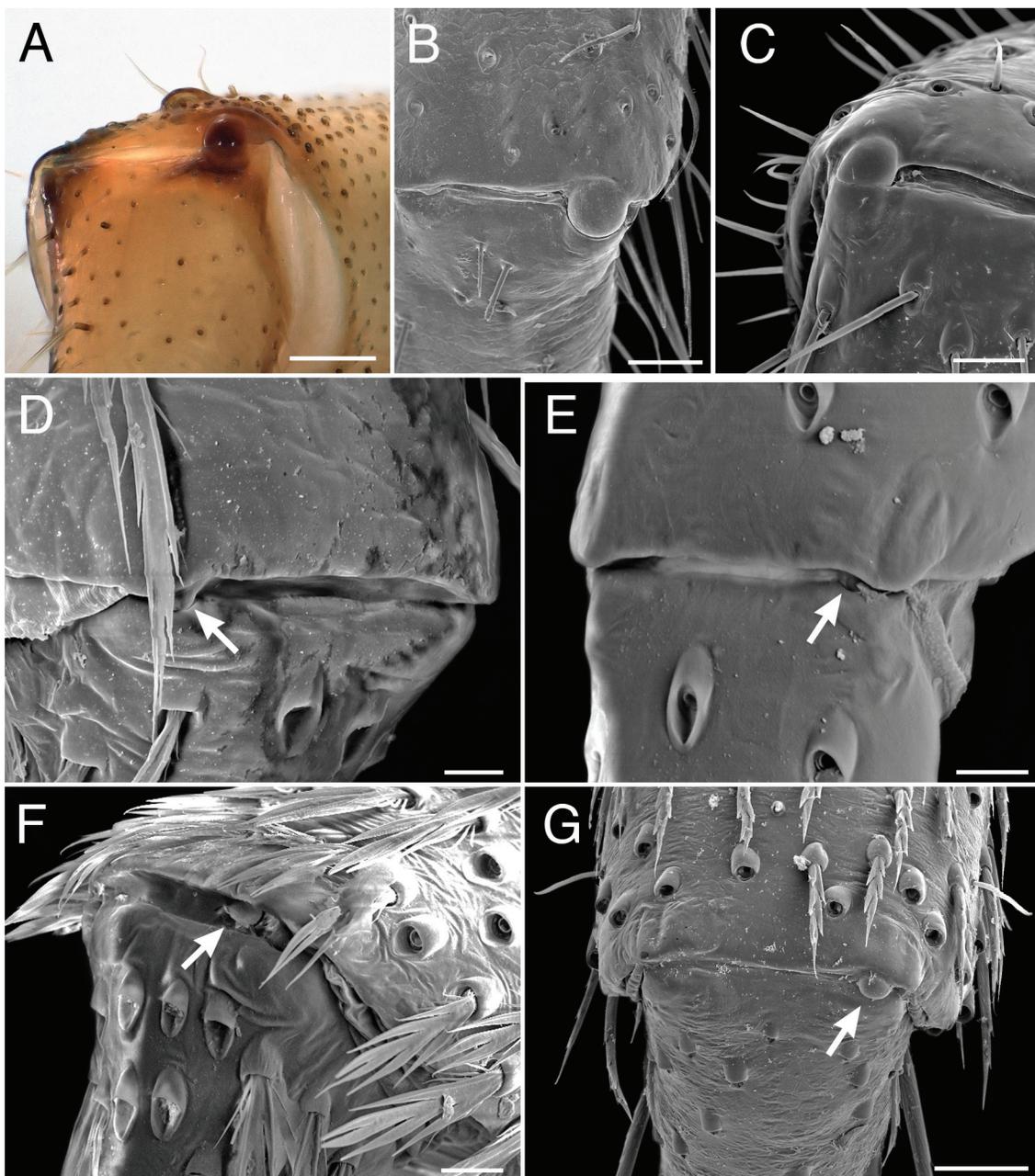


Fig. 19. A. *Lachesana blackwalli* (O. Pickard-Cambridge, 1872), ♂, right tibia and metatarsus III, dorsal view. B. *Mallinella* sp., ♂, right tibia and metatarsus II. C. *Suffrica gus* Henrard & Jocqué, 2015, ♂, left tibia and metatarsus I. D. *Zodarion nesiotetes* Denis, 1965, ♀, right tibia and metatarsus I. E. *Microdiores* sp., ♂, right tibia and metatarsus I. F. *Ranops caprivi* Jocqué, 1991, ♂, right tibia and metatarsus II. G. *Diores milloti* Jocqué, 1990, ♀, right tibia and metatarsus I. Scale bars: A = 100 mm, B, G = 50 mm, C, F = 20 mm, D–E = 10 mm. Arrow shows tibial process, asterisks indicate condyles.

abstraction is made of *P. obmoimiombo*, which may belong to another genus as explained above. The vast miombo biome, 3.6 million km² (against 2.3 million km² for rainforest), is spread across eleven

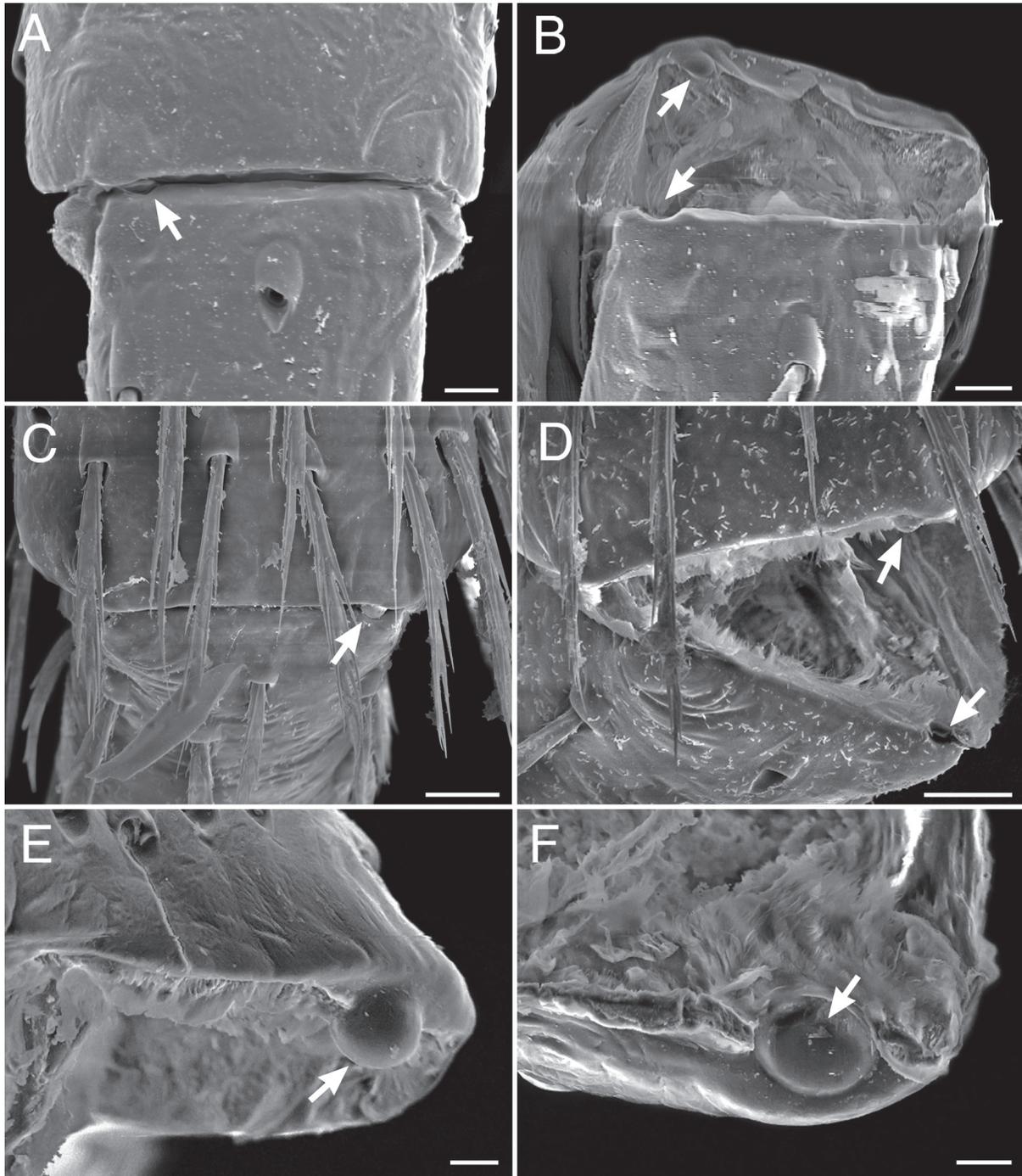


Fig. 20. A. *Trypetus sexoculatus* (O. Pickard-Cambridge, 1872), ♂, left tibia-metatarsus joint III. B. As previous, left tibia-metatarsus joint II; arrows indicate tibial process and metatarsal concavity. C. *Parazodarion raddei* (Simon, 1889), ♂, right tibia-metatarsus joint III; arrow indicates tibial process. D. As previous, right tibia-metatarsus joint II; arrows indicate tibial process and metatarsal concavity. E. *Diores poweri* Tucker, 1920, ♀, right tibia-metatarsus joint IV; arrow indicates tibial process. F. *Idem*, detail; arrow indicates metatarsal concavity. Scale bars: A–B, E–F = 10 mm, C–D = 20 mm.

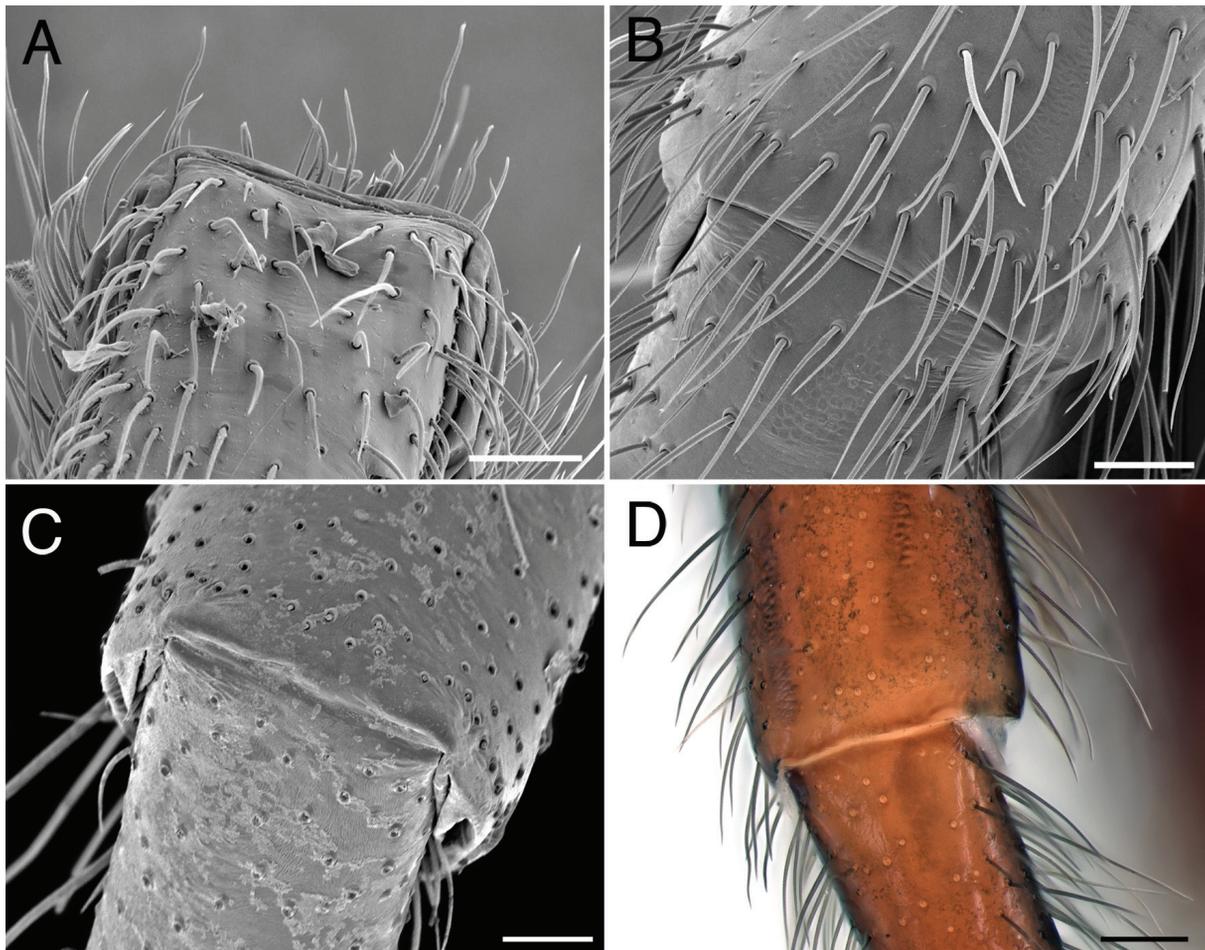


Fig. 21. **A.** *Amaurobius fenestralis* (Ström, 1768), ♀, base of right metatarsus 3. **B.** *Coelotes terrestris* (Wider, 1834), ♂, right tibia-metatarsus joint III. **C.** *Nurscia albomaculata* (Lucas, 1846), ♂, right tibia-metatarsus joint III. **D.** *Penestomus montanus* Miller, Griswold & Haddad, 2010, ♀, right tibia-metatarsus joint I. Scale bars: A–B, D = 100 μ m, C = 50 μ m.

countries in southern Africa and is probably the least studied ecoregion of the continent. More detailed studies of the ecoregion will doubtlessly discover more species of the genus and most likely species that are closely related to *P. obmoimiombo* gen. et sp. nov.

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Appendix

Comparative material studied

Amaurobius fenestralis (Ström, 1768) (Fig. 21A), ♀, Belgium, Tervuren, under bark of tree, 1 Feb. 2011, hand catch, A. Henrard rec.

Amphiledorus sp. (Fig. 18A), sub adult ♂, Portugal, Alentejo, 1 Apr. 2005, hand catch, M. Rézác leg.

Asceua sp. (Fig. 18B), ♂, Phillipines, Luzon Island, Quezon Province, Mt. Banahaw de Luchan, 5.25 km WSW of Luchan, elev. 1279 m, 14°05.217' N, 121°31.036' E, forest, 17–22 May 2011, propylene glycol pitfall traps, H. Wood, M. Yngente, N. Choussou Poloudouri, C. Griswold & V. Knutson rec., PH0029, CASENT-9042498.

Coelotes terrestris (Wider, 1834) (Fig. 21B), ♂, Belgium, Marchin, Porche de Roiseux, on litter near cliffs, 13 Sep. 2014, hand catch, A. Henrard rec.

Cryptothele doreyana Simon, 1890 (Fig. 18C–D), ♀, New Caledonia, Aoupinie top camp, 21°11' S, 165°18' E, 2–3 Nov. 2001, 850 m, sieved litter, berlesate 1060, G.B. Montheit (Queensland Museum QM90506).

Cyrioctea marken Platnick & Jocqué, 1992 (Fig. 18E), ♂, South Africa, Limpopo prov., 10 Jun. 2009, pitfall traps, S. Foord rec., 12N/B4.

Diores milloti Jocqué, 1990 (Fig. 19G), ♀, Madagascar, 17–20 Jan. 2009, general collecting day and night, CASENT 9031122.

Diores poweri Tucker, 1920 (Fig. 20E–F), ♀, South Africa, Free State Province, Bloemfontein, National Botanic Gardens, grassland, 29°02' S, 26°12' E, 28 Nov. 2012, Pitfall tarps, C. Haddad rec.

Holasteron aciculare Baehr, 2004 (Fig. 18F) (QM).

Lachesana blackwalli (O. Pickard-Cambridge, 1872) (Fig. 19A), ♂, Israel, Dead Sea, MRAC 169819.

Mallinella sp. Thailand (Fig. 19B) (ZMUC).

Microdiores sp. (Fig. 19E), ♂, Democratic Republic of the Congo, Mikembo, miombo woodland, Uapaca forest, 11°28' S, 027°39' E, 26 Oct. 2010, pitfall traps, R. Jocqué & M. Hasson rec., MRAC 234392.

Nurscia albomaculata (Lucas, 1846) (Fig. 21C), ♂, France, Adrets de l'Estérel, under stone, 17 Jul. 2013, hand catch, A. Henrard rec.

Parazodarion raddei (Simon, 1889) (Figs 20C–D), ♂, United Arab Emirates, Wadi Wurayah farm, 25°24' N, 56°17' E, 13 Jan.–2 Mar. 2009, Malaise trap, A. Van Harten rec., MRAC 233874.

Penestomus montanus Miller, Griswold & Haddad, 2010 (Fig. 21D), ♀ paratype, Lesotho, Qachas Nek district, near Ha Mphahama, stone ridge, under rocks, 1820 m, 30°05.520' S, 28°35.746' E, active search, C. Haddad rec., SNCAP-2006/1535.

Ranops caprivi Jocqué, 1991 (Fig. 19F), ♂, South Africa, Free State Province, Bloemfontein, National Botanical Gardens, 29°02' S, 26°12' E, 12 Oct. 2012, C. Haddad leg.

Suffrica gus Henrard & Jocqué, 2015 (Fig. 19C), ♂, Tanzania, Tanga, East Usambara Mts, Amani, 5°5.7' S, 38°38' E, 950 m, 28 Oct.–9 Nov. 1995, pitfalls, C. Griswold, N. Scharff & D. Ubick leg., MRAC.

Trygetus sexoculatus (O. Pickard-Cambridge, 1872) (Fig. 20A–B), ♀, Egypt, Sinai, 50 km E of Suez, 31 Mar. 2000, M. Alderweireldt rec., MRAC 209667.

Zodarion nesiotetes Denis, 1965 (Fig. 19D), ♀, Fuerteventura, near “La Pared”, under stones, 9 Apr. 2011, hand catch, A. Henrard leg.