First Description of the Male of Rothus vittatus Simon, 1898 (Araneae: Pisauridae), with a Review of the African Nursery Web Spider Genus Rothus Simon, 1898

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First description of the male of *Rothus vittatus* Simon, 1898 (Araneae: Pisauridae), with a review of the African nursery web spider genus *Rothus* Simon, 1898

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ABSTRACT

The male of *Rothus vittatus* Simon, 1898 is described and illustrated for the first time. The African genus *Rothus* Simon, 1898 is reviewed. Based on the examination of available type material and type illustrations, *R. purpurissatus* Simon, 1898 and *R. magnus* Caporiacco, 1940 are here considered junior subjective synonyms of *R. aethiopicus* Pavesi, 1883. The three currently accepted species (*R. auratus* Pocock, 1900, *R. aethiopicus* and *R. vittatus*) are illustrated and redescribed.

KEY WORDS: Afrotropical Region, *Rothus*, spiders, redescription, synonymy, taxonomy.

INTRODUCTION

The genus *Rothus* Simon, 1898 was first reviewed by Roewer (1955: 197–218), discussing all the 12 species known at the time, and adding four new species to the genus. Roewer's review did not include examination of type specimens for any of the already described species. Blandin (1977) revised the genus, recognising three species: *Rothus purpurissatus* Simon, 1898 (type species, based on male and female specimens), *R. vittatus* Simon, 1898 (female specimens only) and *R. auratus* Pocock, 1900 (female specimens only). Blandin (1977: 546–553), after examining the type material for most nominal species, synonymised six species under *R. purpurissatus* (here proposed as a synonym of *R. aethiopicus* Pavesi, 1883) Judging from our own examination of specimens and Blandin's figures of all type material, we consider Blandin's synonymies as justified. He considered eight species, described in or placed into the genus, as *nomina dubia* (Blandin 1977: 546, 552; see also World Spider Catalog 2014). Six of these *nomina dubia* are based on juvenile or destroyed type material, and we see no reason not to follow Blandin's designation. However, *R. aethiopicus* (Pavesi 1883: 71) and *R. magnus* (Caporiacco 1940: 784, fig. 7) are based on adult male and female type material. The syntypes of *R. aethiopicus* were available for examination.

In this work, the male of *R. vittatus* is described and illustrated for the first time. Furthermore, the known species of *Rothus* are newly illustrated using digital photography and SEM images, and additional details are provided.

MATERIAL AND METHODS

The nomenclature of the male palpus follows Sierwald (1990) and Blandin (1974, 1976, 1977). Specimens were examined using a LEICA MZ 7.5 stereomicroscope. For scanning electron microscopy (SEM), structures were excised, air-dried and mounted on stubs with double-sided adhesive copper tape. Specimens were sputter-coated with gold and examined using a ZEISS EVO 60 electron microscope. Photographs were made using a LEICA DFC450 camera system with associated z-stacking software. The

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final images were edited using the program Adobe Photoshop. All the measurements are in millimetres.

Abbreviations: ALE: diameter of anterior lateral eye; ALE–AME: interdistance between anterior lateral eye and anterior median eye; AME: diameter of anterior median eye; AME–AME: interdistances between anterior median eyes; OQA: anterior width of ocular quadrangle; OQH: height of ocular quadrangle; OQP:– posterior width of ocular quadrangle; PLE: diameter of posterior lateral eye; PLE–PME: interdistance between posterior lateral eye and posterior median eye; PME: diameter of posterior median eye; PME–PME: interdistance between posterior median eyes.

Museum collections (curators in parentheses):

AMNH – American Museum of Natural History, New York (N.I. Platnick);
BMNH – The Natural History Museum, London, United Kingdom (J. Beccaloni);
CAS – California Academy of Sciences, San Francisco, USA (C.E. Griswold);
NCA – The National Collection of Arachnida, ARC-Plant Protection Research Institute, Pretoria, South Africa (A.S. Dippenaar-Schoeman);
MSNG – Civic Museum of Natural History "G. Doria", Genoa, Italy (M. Tavano).

TAXONOMY

Family Pisauridae Simon, 1890

Genus *Rothus* Simon, 1898

Rothus Simon, 1898*a*: 294, 298, figs 293–294; Roewer 1955: 197, figs 79–83; Blandin 1977: 546, figs 10–27, 30, 31.

Type species: *Rothus purpurissatus* Simon, 1898, by original designation (=junior subjective synonym of *R. aethiopicus* Pavesi, 1883).

Diagnosis: Members of the genus *Rothus* can be unambiguously distinguished from all other non-pisaurine (*sensu* Sierwald 1997) African pisaurid genera by the following combination of characters: three cheliceral teeth on the retromargin, AER slightly procurved, PER recurved, wider than AER, and distinct features in the male and female copulatory organs. In males the tegulum is large, with a pronounced anterior projection; the large and pointed conductor; the sickle-shaped embolus, and the median apophysis aligned and pointing almost horizontally retrolaterad. Retrolateral tibial apophysis (RTA) elongated and with a divided tip. The female copulatory organs feature an anteriorly excavated middle field (Fig. 8, MF; Blandin 1977: 541, fig. 6) and prominent curved lateral lobes (Figs 8, 30) with correspondingly widely separated, curved copulatory ducts (Figs 9, 32).

Relationship: Members of the poorly known genus *Chiasmopes* Pavesi, 1883 (four species described, males known for a single species only) share similarities with *Rothus* with regards to the copulatory organs. In males (only known in *Chiasmopes lineatus* (Pocock, 1898)) the tegulum is equally enlarged, and conductor, embolus, median apophysis, and even the retrolateral tibial apophysis are very similar (Blandin 1977: 541, fig. 5). The female epigynum of the four known *Chiasmopes* species is very similar to *R. vittatus* (Blandin 1977: 541, figs 6–9). Only the vulva of *Chiasmopes lineatus* has been illustrated (Blandin 1977: fig. 29). In this illustration the posterior section of the copulatory ducts are distinctly wider than the more slender ducts in *Rothus*. In members of the genus *Chiasmopes* the AER is extremely procurved, with the ALE

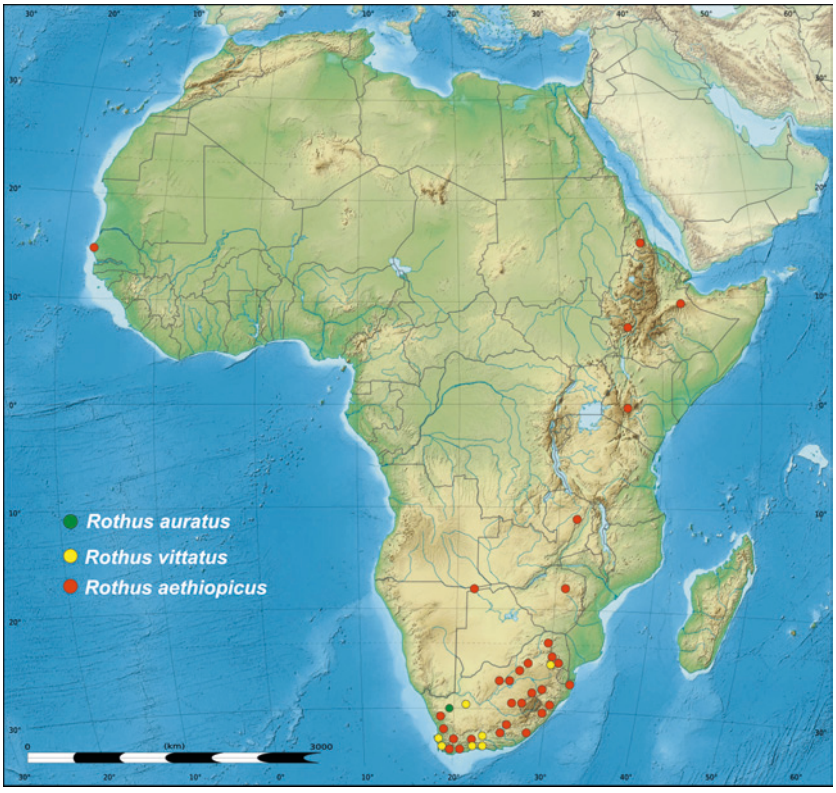


Fig. 1. Geographic distribution records of *Rothus* species in Africa.

positioned almost directly beneath the AME (Blandin 1974: 313, fig. 2), and prosoma and opisthosoma are distinctly longer than wide, whereas in *Rothus* the habitus is less elongated (Blandin 1977: 541, figs 1–4). Based on features of the copulatory organs, *Rothus* and *Chiasmopes* may be congeneric. In the absence of a complete revision of the species of the latter genus and a comprehensive phylogenetic analysis of the Pisauridae, a taxonomic change is premature.

Natural history: Notations on collecting labels from South African specimens of *R. aethiopicus* indicate that several were found in vegetation and sometimes inside residences.

Distribution: Widely distributed across Africa, from Senegal in West Africa, Ethiopia in East Africa to South Africa (Fig. 1).

Rothus aethiopicus (Pavesi, 1883)

Figs 2–23

Ocyale aethiopicus Pavesi, 1883: 71 (♂ Lectotype and 2♀ paralectotypes, nearly adult and adult designated herein).

Rothus purpurissatus Simon, 1898*b*: 14; Blandin 1977: 546, figs 10–12, 15–27, 31; Levy 1999: 60, figs 34A–B, 35A–B. **Syn. n.**

Rothus magnus Caporiacco, 1940: 784, fig. 7 (figures of ♂ and ♀ copulatory organs). **Syn. n.**

Diagnosis: The males of *R. aethiopicus* resemble those of *R. vittatus* in the elongated bulbus and embolus (Figs 15, 39), but can be distinguished by the very short distal tegular projection (DTP) and by the presence of a small projection near the tip of the median apophysis (MA) (Figs 12, 15). Females can be distinguished from those of *R. vittatus* (Fig. 31) and *R. auratus* (Fig. 47) by the deep excavation on the middle field of the epigynum (Fig. 8), the almost circular trajectory of the lateral lobes, and by the elongated and curved copulatory ducts (Fig. 9). Specimens of *R. aethiopicus* are mostly larger than those of *R. vittatus* (see below under Variation).

Redescription:

Female.

Measurements: Female paralectotype (Ethiopia, Shoa). Total length: 11.0, Prosoma 4.2 long, 3.3 wide; subadult female paralectotype (Ethiopia, Keren). Total length 11.3, Prosoma 4.8 long, 3.7 wide.

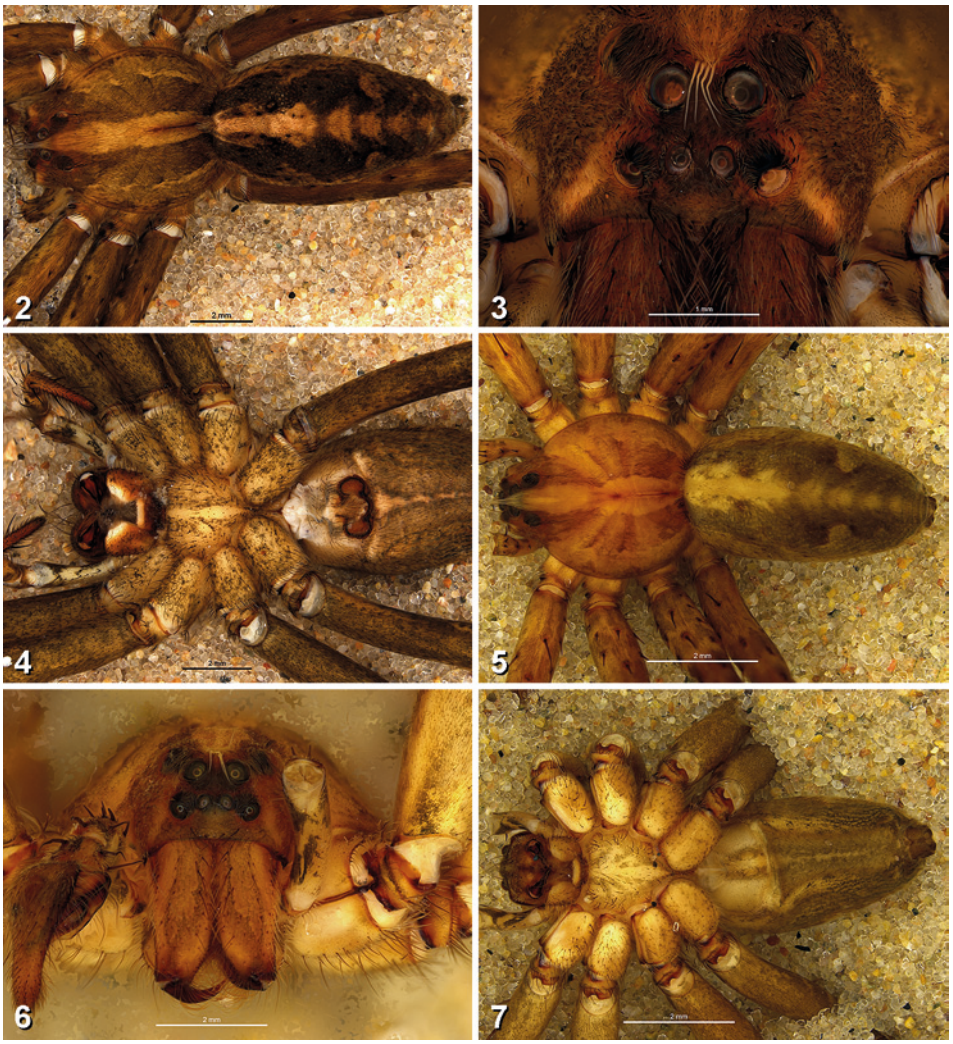
Female (South Africa, NCA 87/360). Total length 14.93. Prosoma 6.5 long, 5.4 wide, with two lateral light brown bands demarcated by narrow darker lines, and central light brown band (Fig. 2). Clypeus light brown, 0.48 high (Fig. 3). Anterior eye row straight, 1.80 wide (Fig. 3); posterior row recurved, 2.14 wide (Fig. 2). Eye measurements: AME 0.24, ALE 0.40, PME 0.42, PLE 0.46; AME–AME 0.20, AME–ALE 0.38, PME–PME 0.36, PME–PLE 0.50, OQA 0.66, OQP 1.20, OQH 1.12. Chelicerae light brown with white bristles (Fig. 3). Sternum with median yellow band, bristly; 3.1 long, 2.7 wide (Fig. 4). Labium dark brown, light brown distally, 0.7 long, 1.1 wide (Fig. 4). Legs light brown, femora and patellae ventrally dark greyish brown, relative length: IV-I-II-III, I – femur 7.00/ patella-tibia 9.80/ metatarsus 6.40/ tarsus 4.00/ total 27.20; II – 7.10/ 8.90/ 6.50/ 3.90/ 26.40; III – 6.00/ 7.20/ 5.60/ 3.00/ 21.80; IV – 7.90/ 9.10/ 7.70/ 3.40/ 28.10. Ventral pairs of macrosetae on tibiae: I-4; II-4; III-3; IV-3. Opisthosoma 7.3 long, dark brown, with median yellow-brown, sinuous band (Fig. 2). Venter light brown with two thin dark brown median lines from the epigastric furrow (Fig. 4). Spinnerets (Figs 18–23): Anterior lateral spinnerets (ALS) with several piriform (Pi) spigot glands (Fig. 19) and with pair of well-developed minor ampullate spigot glands (mAP) (Fig. 20). Posterior median spinnerets (PMS) with a developed minor ampullate spigot glands (mAP) (Figs 21, 22). Posterior lateral spinnerets (PLS): spigots not visible (Fig. 23). Epigynum with a wide and deeply excavated middle field (MF) (Fig. 8), excavation nearly reaching epigastric furrow. Copulatory ducts (CD) elongated and curved (Fig. 9). Head of the spermathecae short and rounded (Figs 9, 10).

Variation: Females (N=10) range from 5.0–6.9 mm in prosoma length, with an average of 5.78. The body coloration is variable; animals may be light coloured or much darker; bands and lines vary in intensity.

Male.

Measurements: Male lectotype (Ethiopia, Keren). Total length 11.2, Prosoma 5.0 long, 4.0 wide.

Male (South Africa, NCA 77/795). Total length 11.5, Prosoma 5.1 long, 4.3 wide, light brown with two wide lateral whitish bands (Fig. 5). Clypeus light brown, 0.34 high (Fig. 6). Anterior eye row straight, 1.22 wide (Fig. 6); posterior recurved, 1.60 wide (Fig. 5). Eye diameters, interdistances, and median ocular quadrangle: AME 0.20, ALE



Figs 2–7. *Rothus aethiopicus* Pavesi, 1883, female (2–4) and male (5–7) habitus: (2, 5) dorsal, (3, 6) frontal and (4, 7) ventral views.

0.28, PME 0.32, PLE 0.36; AME–AME 0.12, AME–ALE 0.14, PME–PME 0.22, PME–PLE 0.30, OQA 0.48, OQP 0.90, OQH 0.74. Chelicerae light brown with white bristles (Fig. 6). Sternum light brown, bristly; 2.1 long, 1.7 wide (Fig. 7). Labium dark brown, light brown distally, 0.33 long, 0.5 wide (Fig. 7). Legs light brown, relative length: IV-I-II-III, I – femur 6.90/ patella-tibia 8.70/ metatarsus 7.00/ tarsus 3.90/ total 26.50; II – 6.50/ 8.00/ 6.80/ 3.70/ 25.00; III – 5.50/ 6.50/ 6.00/ 2.50/ 20.50; IV – 7.00/ 7.90/ 7.40/ 3.10/ 25.40. Ventral pairs of macrosetae on tibiae: I-4; II-4; III-3; IV-3. Opisthosoma 6.9 long, light brown with a dark brown band at the anterior portion (Fig. 5). Venter light brown with thin dark brown median band (Fig. 7). Cymbium 2.4 long. Palpus with an elongated bulbus (Figs 12–15). Median apophysis short (Fig. 12), with small projection

near tip (Figs 14, 15). Embolus elongated (Fig. 16). Conductor elongated (Figs 12, 15). Retrolateral tibial apophysis (RTA) elongated and with divided tip (Fig. 17).

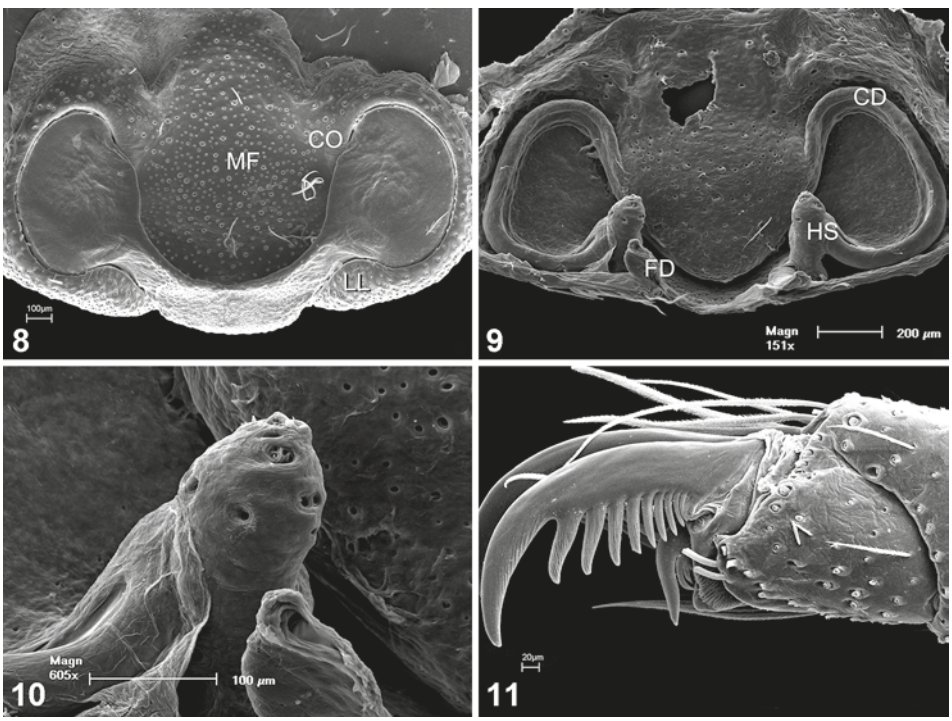
Variation: Males (N=11) range from 4.8 to 5.8 in prosoma length, with an average of 5.3.

Type material: the syntypes of *Ocyale aethiopicus* Pavesi, 1883 were examined, and subsequently designated as the following: Lectotype ♂: ERITREA: Anseba, Keren, Bogos [Keren coordinates: 15°46'N 38°27'E], leg. O. Beccari, vii.1870 (MSNG); Paralectotypes: nearly adult ♀: Same data as lectotype ♂ (MSNG); Adult ♀: ETHIOPIA: Shewa region, Shoa (previously Scioa), Daimbi (near Addis Ababa), leg. O. Antinori, v.1879 (MSNG).

Rothus purpurissatus Simon, 1898*b*: Holotype (not examined): ♀ ERITREA: Keren, coll. Schweinfurth [15°46'N, 38°27'E] (MNHN 3254).

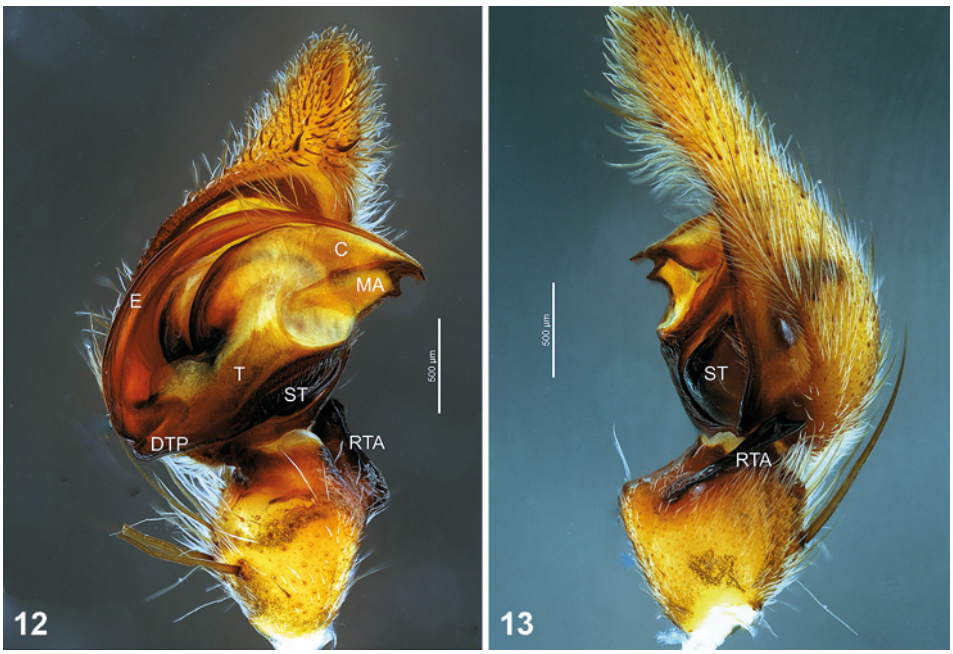
Rothus magnus Caporiacco, 1940 (not examined): Syntypes: ETHIOPIA: Southern Nations, Nationalities, and Peoples' Region (=SNNPR), Lago Abaya [previously Lago Regina Margherita] (♂ [Stazione 66, 5. i.1938], ♀ [Stazione 61b, 4.i.1938], and eight subadult syntypes).

Other material examined: KENYA: Lake Nakuru National Park, campsite in yellow fever forest [00°59'S 36°05'E], 12–14.v.1975, A.J. Penniman, 1♀ (AMNH). NAMIBIA: Caprivi strip, Popa Falls [17°49'S 23°55'E], 17.xii.2006, R. Lyle, 1♀ (NCA 2010/2474). SENEGAL: Dakar peninsula, v.1945, 2 juv. ♀ (AMNH). SOUTH AFRICA: *Eastern Cape*: Cwebe Nature Reserve [32°17'S 26°25'E], 30.x.2006, C. Haddad & R. Lyle, 1♀ (NCA 2007/336); Mountain Zebra National Park [32°10'S 25°50'E], 23.iii.1976, A.S. Dippenaar-Schoeman, 1♀ (NCA 76/612); Wilgerskloof Farm, Bamboesberg, W Sterkstroom [31°49'S 26°11'E], 19.i.2007, M. Burger, 2♀ (NCA 2009/1236). *Free State*: Clocolan, Mpetsane Conservation Estate [28°26'S 28°27E], 8.iii.2007, C. Haddad, 5♂, 3♀ (NCA 2007/1664, 2007/1655, 2007/1656); same locality, 17.iii.2010, C. Haddad, 3♂ (NCA 2010/340); Harrismith, in house [28°16'S 29°08'E], 13.xii.2005, C. Haddad, 1♂ (NCA 2006/121). *Gauteng*: Bedfordview, Johannesburg [26°10'S 28°11'E], 9.ii.2009, R. Pienaar, 1♂ (NCA

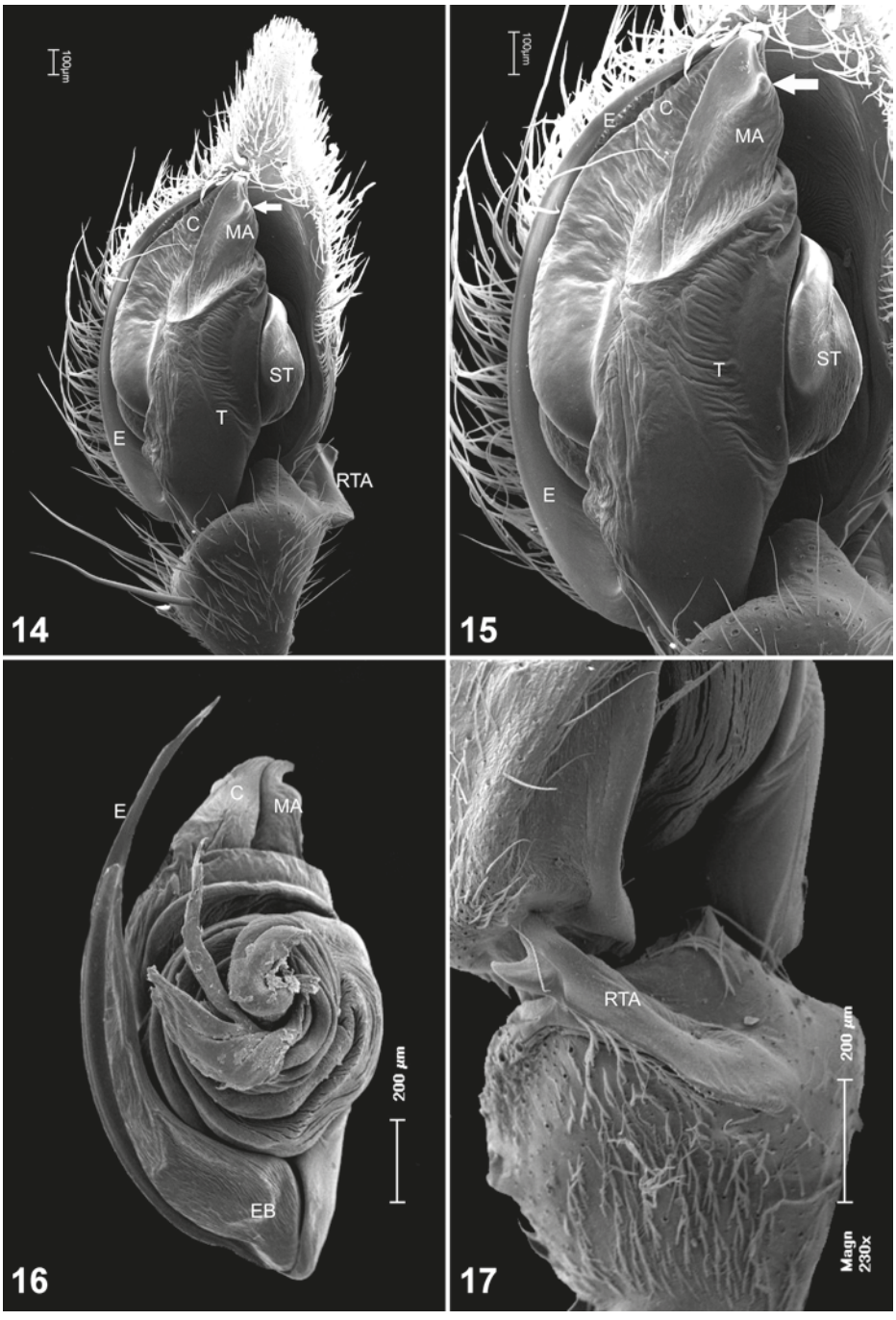


Figs 8–11. *Rothus aethiopicus* Pavesi, 1883: (8–10) female epigynum (8, ventral; 9, dorsal; 10, detail of the head of spermathecae (NCA 2007/1654)); (11) female tarsal claws, right leg IV. Abbreviations: CD = copulatory duct; CO = copulatory opening; FD = fertilisation duct; HS = head of spermathecae; LL = lateral lobes; MF = middle field.

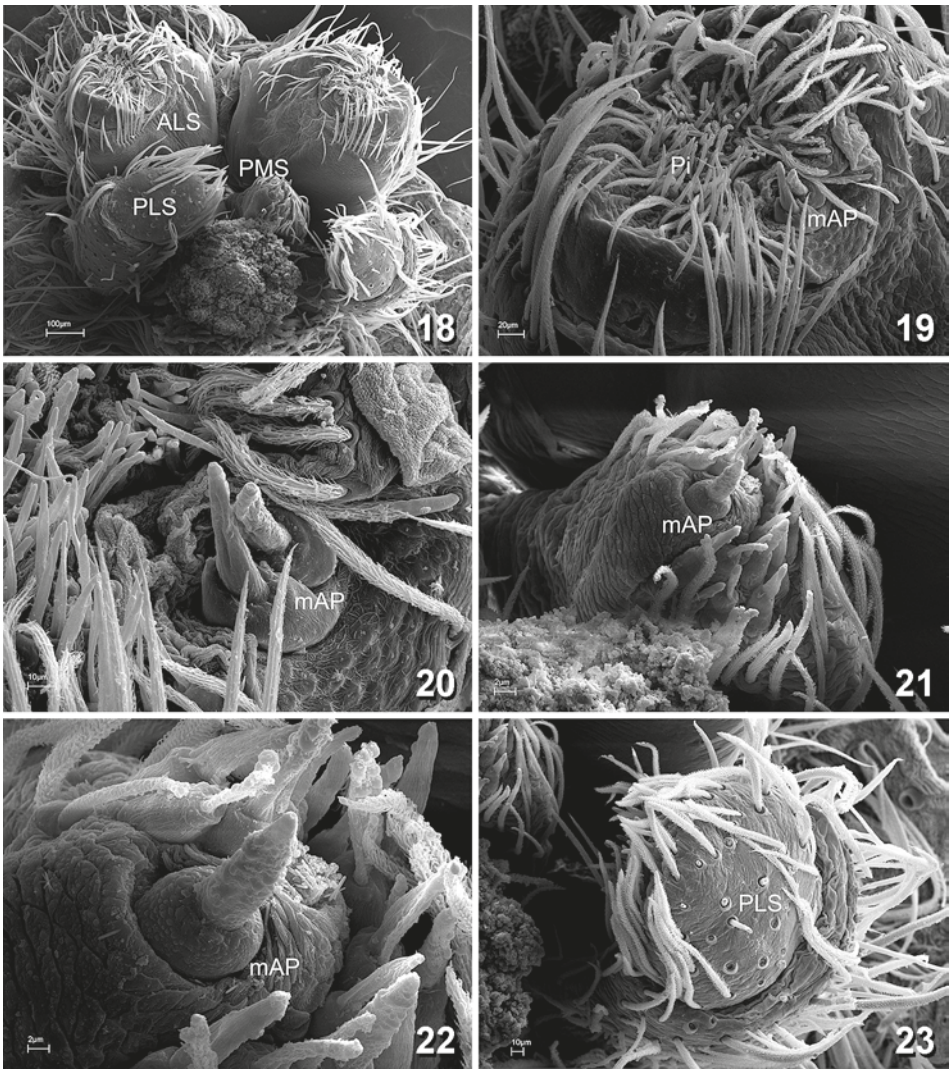
2010/1956); Brakpan [26°14'S 28°00'E], 5.xi.2008, V. Hamilton-Attwell, 1♂ (NCA 2010/1581); Bucchleau, Johannesburg [25°59'S 28°14'E], in house, 8.viii.1988, C. Cook, 1♂ (NCA 1988/801); Hatfield, Pretoria, compost pile [25.748°S 28.238°E], 14.iii.1987, L. van Heerden, 1♀ (NCA 1989/29); Johannesburg [26°10'S 27°58'E], in house, J. Evans, 1♂ (NCA 1987/76); Kempton Park, Johannesburg (Esther Park, Otter Street) [26°05'S 28°14'E], 15.ix.2007, W. Schmidt, 1♀ (NCA 2008/3324); Parktown North, Johannesburg [26°08'S 28°01'E], in house, 18.i.1987, M. Filmer, 1♂ (NCA 1987/186); Pretoria [25°44'S 28°11'E], 20.xii.1984, H. van Ark, 1♂ (NCA 1985/60); same locality, xii.1987, S. Neser, 1♀ (NCA 1987/964); Pretoria National Botanical Garden [25°44'S 28°17'E], 24.xi.2007, E. Kassimatis, 1♂, 2♀ (NCA 2010/2583); Roosevelt Park, Johannesburg [26°09'S 27°59'E], inside house, 20.iii.1989, L. Prendini, 1♀ (NCA 198/513); Roodepoort, Johannesburg [26°27'S 28°06'E], 17.xi.1996, J. Leroy, 1♀ (NCA 2007/2673); Rietondale Research Station [25°45'S 28°11'E], 2.iii.1996, A. Nel, 1♀ (NCA 2007/2712); same locality, 15.xi.1998, C. Otto, 1♀ (NCA 2007/2714); same locality, 9.i.1998, J. Nkwana, 1♀ (NCA 2007/2715); Tshwane/Pretoria [25°41'S 28°09'E], 19.v.2007, L. Eksteen, 1♀ (NCA 2008/152); same locality, 12.ii.1996, B. Sunkel, 1♀ (NCA 2010/1462). *KwaZulu-Natal*: KwaZulu-Natal [28°31'S 30°53'E], 1♂ (NCA 1983/389); Lake Midmar [29°30'S 30°10'E], 6.i.1991, V.D. & B. Roth, 3♀, 1♂ (CASENT 9046700); Ndumo Game Reserve [28°37'S 30°55'E], 5.i.2007, C. Haddad, 1♂ (NCA 2007/3032). *Limpopo*: Lajuma [23°29'S 29°23'E], 9.x.2002, N. Schonhofer, 1♂ (NCA 2007/2652). *Mpumalanga*: Delmas [27°06'S, 29°20'E], funnelweb in grass, E.T. Rossouw, 1♀, with egg sac (NCA 1991/210); Lowveld National Botanical Gardens [25°36'S 30°36'E], 25.i.2002, A. Leroy, 1♀ (NCA 2008/2668); Lydenburg, Provincial Fisheries Garden [25°10'S 30°29'E], 28.xii.1986, M. Filmer, 1♀ (NCA 1987/185); Nelspruit [25°30'S 30°58'E], xii.1986, Petersen, 1♀ (NCA 2001/488); Piet Retief, Grandopp [27°00'S 30°48'E], xii.1976, L. Klingenberg, 1♂, 1 sa ♀ (NCA 1977/795); Wakkerstroom [27°21'S 30°09'E], 14.xii.2003, E. Kassimatis, 1♀ (NCA 2010/2475); same locality, 14.xii.2003, E. Kassimatis, 4♀ (NCA 2009/1402, 2009/1403, 2009/1404). *Northern Cape*: Nieuwoudtville [29°02'S 21°51'E], 20.xii.2000, A. Leroy, 1♂ (NCA 2007/2675). *North West*: Halfweghuis [26°27'S 26°56'E], 29.x.1975, R. Swanepoel, 1♂, 1 juv. ♀ (NCA 1976/627); Makwassie [27°19'S 27°10'E], 16.iv.2009, P. Marais, 1♀ (NCA 2009/1479); Mooivalleipark, Potchefstroom [26°43'S 27°09'E], 22.x.2009, V. Hamilton-Attwell, 1♀ (NCA 2010/4909). *Western Cape*: Borrelfontein, 8 km W of Gouritz Mouth [34°22'S 22°30'E], 1.v.2008, H. Leibel, 1♂ (NCA 2010/455); Cederberg Wilderness Area 8.1, 1325 m, E. [32°24'S 19°14'E], 9.iii.2005, E. Nortje &



Figs 12, 13. *Rothus aethiopicus* Pavesi, 1883 (NCA 2007/1654), male palpus: (12) ventral and (13) retrolateral views. Abbreviations: C = conductor; DTP = distal tegular projection; E = embolus; MA = median apophysis; RTA = retrolateral tibial apophysis; ST = subtegulum; T = tegulum.



Figs 14–17. *Rothus aethiopicus* Pavesi, 1883, male palpus: (14) ventral view; (15) detail of bulbus; (16) bulbus in dorsal view; (17) retrolateral view. Abbreviations: C = conductor; E = embolus; EB = embolus base; MA = median apophysis; RTA = retrolateral tibial apophysis; ST = subtegulum; T = tegulum; arrow denotes small subterminal projection on MA.



Figs 18–23. *Rothus aethiopicus* Pavesi, 1883 (NCA 1988/916), female spinnerets: (18) general view; (19) anterior lateral spinneret; (20) detail of the minor ampullate gland spigot at ALS; (21) posterior median spinneret; (22) detail of the minor ampullate gland spigot at PMS; (23) posterior lateral spinneret. Abbreviations: ALS = anterior lateral spinneret; mAP = minor ampullate gland spigot; Pi = piriform gland spigot; PLS = posterior lateral spinneret; PMS = posterior median spinneret.

S. Kritzinger-Klopper, 1♀ (NCA 2011/2767); De Hoop Nature Reserve, Koppie Alleen cottage [33°12'S 21°51'E], 4.iv.2004, C. Haddad, 1♀ (NCA 2007/3435); Gamkaskloof [33°13'S, 22°09'E], 1.v.2004, Z. van der Walt, 1♀ (NCA 2009/4097); Gouritsmond [33°50'S 19°50'E], 4.iii.2007, H. Leibel, 1♂ (NCA 2008/18); Matjiesfontein [33°14'S 20°35'E], 9.ii.2007, M. Burger, 1♀ (NCA 2010/2484); Oudtshoorn [33°35'S 22°13'E], 15.XI.2008, Z. van der Walt, 1♂ (NCA 2009/5890). ZAMBIA: Luangwa Valley, 8 km north of Luambe Game Reserve [15°37'S 30°24'E], 1.viii.1978, M. Stiller, 1♂ (NCA 2000/299). ZIMBABWE: Harare [17°51'S 31°02'E], 8.xi.2004, M. Cumming, 1♀ (NCA 2010/4787).

Remarks: In his revision of *Rothus*, Blandin (1977: 552) examined all type specimens available to him and synonymised the following species under *R. purpurissatus*:

R. catenulatus Simon, 1898*b*: 15, *R. lineatus* Pocock, 1902: 16, plate 3, fig. 2, *R. upembanus* Roewer, 1955: 209, figs 80a–b, *R. pictus* Roewer, 1955: 210, figs 81a–e, *R. mossamedesus* Roewer, 1955: 214, figs 82a–b, and *R. vestitus* Roewer, 1955: 217, figs 83a–b. Blandin also provided figures for the male (Blandin 1977: figs 15, 17) and female (Blandin 1977: figs 16, 19, 21, 23, 25, 27) copulatory organs of all examined type specimens. The identity of the female type specimen of *R. purpurissatus* is unmistakable based on Blandin's illustrations. After examining the lectotype and paralectotypes of *R. aethiopicus*, we determine that these are conspecific with *R. purpurissatus*. Although the deposition of the syntypes of *R. magnus* could not be determined and the type specimens were not examined, Caporiacco's figures of the male palp and the female epigynum allow unequivocal identification of his syntypes. Therefore, *R. purpurissatus* and *R. magnus* are considered junior subjective synonyms of *R. aethiopicus*. Citation and synonymy lists for all *Rothus* species are provided in the World Spider Catalog (2014).

Distribution: Apparently widely distributed in Africa south of the Sahara: Senegal to Kenya, southwards including Zambia, Zimbabwe, Namibia and South Africa (Limpopo, Free State, Gauteng, Eastern Cape, Mpumalanga, KwaZulu-Natal, North West, Northern Cape, Western Cape) (Fig. 1).

Rothus vittatus Simon, 1898

Figs 24–42

Rothus vittatus Simon, 1898*b*: 15; Blandin 1977: 554, figs 13, 30.

Diagnosis: Specimens of *R. vittatus*, even subadults, can be distinguished from *R. aethiopicus* by the presence of rows of short, dark, stiff bristles ventrally on the metatarsi and tarsi, mainly on legs I and II (Fig. 42). Adult specimens of *R. vittatus* are generally smaller than those of *R. aethiopicus*. The females of *R. vittatus* (Fig. 30) resemble those of *R. aethiopicus* in the prominent lateral lobes (Fig. 8) and by the excavated middle field of the epigynum. In *R. vittatus* females the excavation of the middle field extends posteriorly less than half the length of the epigynum; the trajectory of the lateral lobes is almost straight in the posterior half of the epigynum (Figs 30, 31). The head of the spermathecae is elongated (Figs 32, 33). Males can be distinguished from *R. aethiopicus* by the acute apex of the median apophysis (Figs 36, 38, 39) and by the acute tips of the divided apex of the retrolateral tibial apophysis (Figs 37, 40, 41).

Redescription:

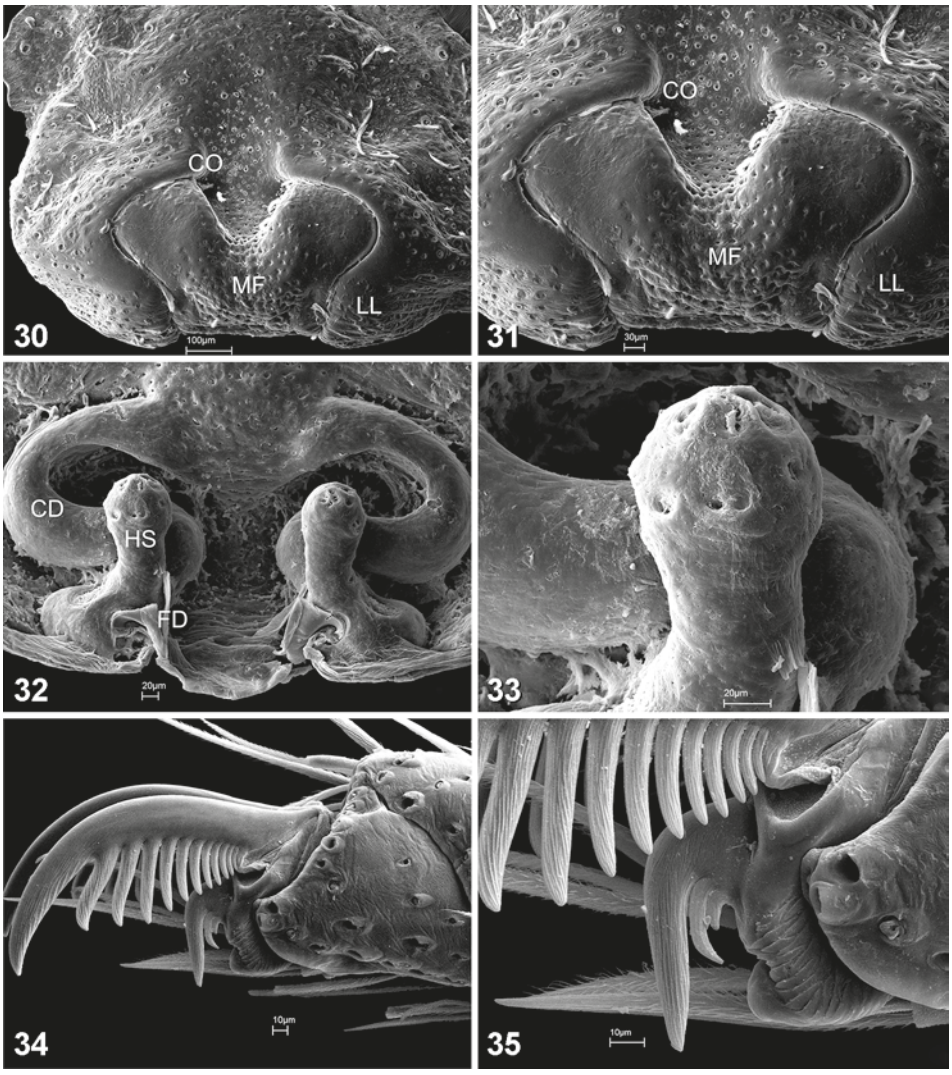
Female (South Africa, NCA 2002/989).

Total length 12.11. Prosoma 4.6 long, 3.7 wide, light brown with two wide lateral whitish bands (Fig. 24). Clypeus light brown, 0.38 high (Fig. 26). Anterior eye row straight, 1.24 wide (Fig. 26); posterior recurved, 1.52 wide (Fig. 24). Eye measurements: AME 0.15, ALE 0.26, PME 0.28, PLE 0.30; AME–AME 0.14, AME–ALE 0.20, PME–PME 0.27, PME–PLE 0.22, OQA 0.46, OQP 0.82, OQH 0.74. Chelicerae light brown with white bristles (Fig. 26). Sternum light brown, bristly; 1.91 long, 1.95 wide (Fig. 25). Labium dark brown, light brown distally, 0.24 long, 0.54 wide (Fig. 25). Legs light brown, relative length: IV-I-II-III, I – femur 8.37/ patella-tibia 11.25/ metatarsus 7.50/ tarsus 4.62/ total 31.74; II – 9.35/ 11.75/ 7.87/ 4.87/ 33.84; III – 8.35/ 10.01/ 7.62/ 3.63/ 29.61; IV – 10.12/ 12.50/ 10.50/ 4.75/ 37.87. Ventral pairs of macrosetae on tibiae: I-4;

Figs 24–29. *Rothus vittatus* Simon, 1898, female (24–26) [NCA 2008/427] and male habitus (27–29) [NCA 2009/5599]: (24, 27) dorsal, (25, 28) ventral and (26, 29) frontal views.

II-4; III-3; IV-4. Superior tarsal claw with 11 teeth (Fig. 34). Inferior tarsal claw with two teeth (Fig. 35). Rows of dark, robust short bristles present ventrally on metatarsus and tarsus, mainly on legs I and II. Opisthosoma 7.10 long, light brown, with a dark brown band at the anterior portion (Fig. 24). Venter light brown, with thin dark brown median band (Fig. 25). Middle field with short anterior excavation (Fig. 31). Lateral lobes prominent (Fig. 30), anteriorly with wide lateral curve, almost straight in posterior section. Copulatory ducts strongly curved (Fig. 32). Head of spermathecae elongated and with conspicuous pores (Fig. 33).

Variation: Females (N=9) range in size from 3.5 to 5.0 in prosoma length, average 4.18. Coloration varying from light yellow-brown to dark grey-brown. The female epigyna



Figs 30–35. *Rothus vittatus* Simon, 1898: (30–33) female epigynum (30, ventral; 31, detail of middle field [NCA 2002/989]; 32, dorsal; 33, detail of head of spermathecae [NCA 2004/182]); (34, 35) female tarsal claws (34, detail of superior tarsal claw; 35, detail of inferior tarsal claw [NCA]). Abbreviations: CD = copulatory duct; CO = copulatory opening; FD = fertilisation duct; HS = head of spermathecae; LL = lateral lobes; MF = middle field.

are rather variable, with several of them being very similar to that of the single type specimen of *R. auratus*, indicating possibly synonymy (discussed below).

Male (South Africa, NCA 2008/427).

Total length 6.6. Prosoma 3.7 long, 6.6 wide, light brown with two wide lateral whitish bands (Fig. 27). Clypeus light brown, 0.16 high (Fig. 29). Anterior eye row straight, 0.86 wide (Fig. 29); posterior recurved, 1.02 wide (Fig. 27). Eye measurements: AME 0.12, ALE 0.18, PME 0.20, PLE 0.26; AME–AME 0.08, AME–ALE 0.12, PME–PME

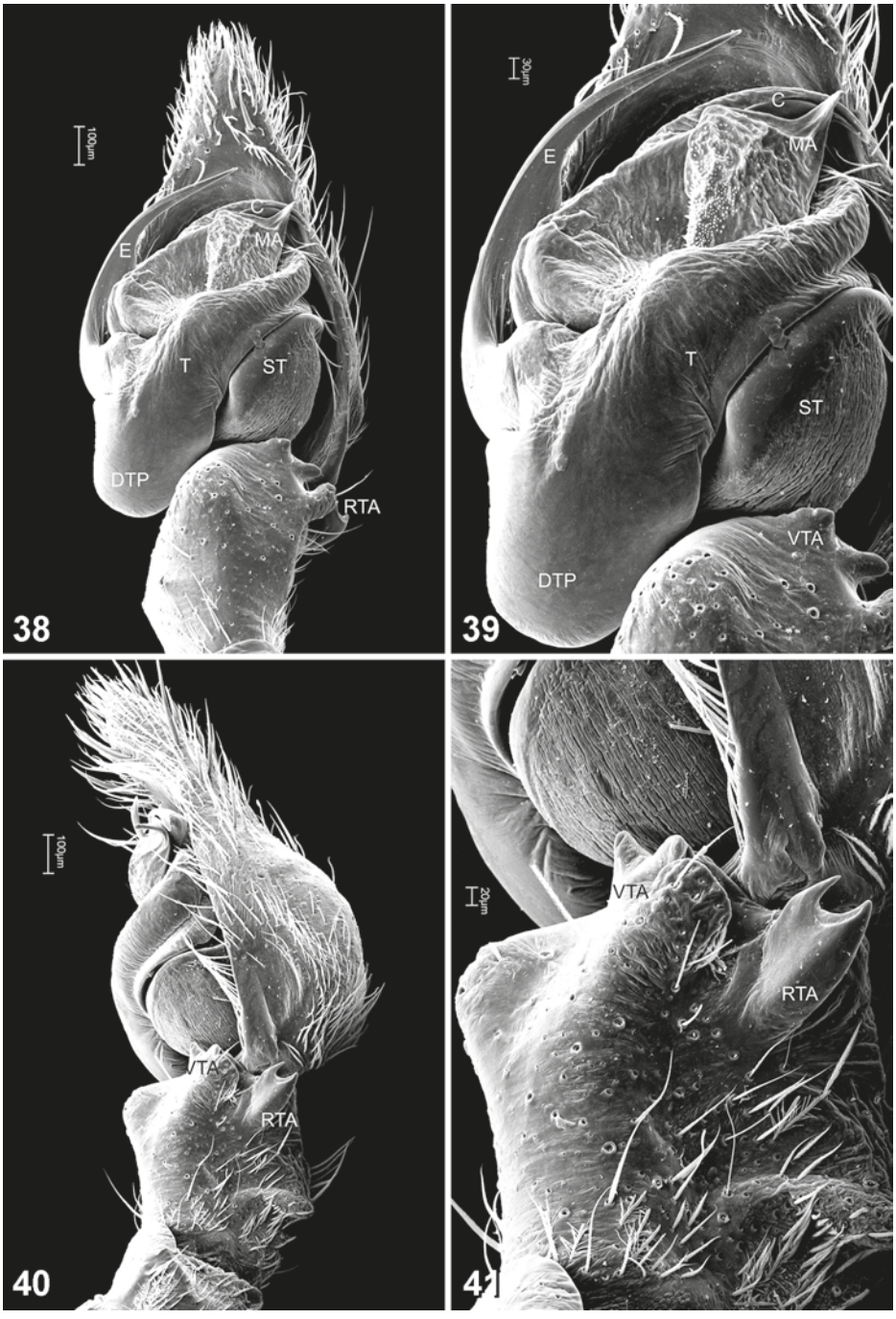
Figs 36, 37. *Rothus vittatus* Simon, 1898, male palpus: (36) ventral and (37) retrolateral views. Abbreviations: C = conductor; DTP = distal tegular projection; E = embolus; MA = median apophysis; RTA = retrolateral tibial apophysis; ST = subtegulum; T = tegulum; VTA = ventral tibial apophysis.

0.20, PME–PLE 0.24, OQA 0.32, OQP 0.58, OQH 0.56. Chelicerae light brown, with white bristles (Fig. 29). Sternum light brown, bristly; 1.28 long, 1.24 wide (Fig. 28). Labium dark brown, light brown distally, 0.31 long, 0.46 wide (Fig. 28). Legs light brown, relative length: I-II-IV-III, I – femur 3.10/ patella-tibia 4.10/ metatarsus 3.20/ tarsus 2.20/ total 12.60; II – 3.30/ 3.90/ 3.10/ 1.90/ 12.20; III – 2.80/ 3.10/ 2.90/ 1.20/ 10.00; IV – 3.50/ 4.00/ 3.20/ 1.50/ 12.20. Ventral pairs of macrosetae on tibiae: I-4; II-4; III-3; IV-4. Rows of dark, robust, short and almost bladelike bristles present ventrally on metatarsi and tarsi, mainly on legs I and II (Fig. 42). Opisthosoma 3.7 long, light brown, with dark brown band at anterior portion (Fig. 27). Venter light brown, with thin dark brown median band (Fig. 28). Cymbium 1.3 long (Figs 36, 37). Palpus with elongated bulbus. Distal tegular projection prominent (Figs 36, 38, 39). Median apophysis with acute apex (Fig. 39). Conductor short and translucent (Fig. 36). Ventral tibial apophysis prominent (Figs 39, 41). Retrolateral tibial apophysis short and divided (Figs 40, 41).

Variation: Males (N=10) vary in size from 2.75 to 4.2 in prosoma length, average 3.52. Male mostly lighter in colour than females and colour pattern less pronounced.

Type material (not examined): Syntypes: 1♂ 7♀ SOUTH AFRICA: Cape Province (MNHN 9921)

Material examined: SOUTH AFRICA: *Mpumalanga*: Ohrigstad, 14 km south of Belfast [25°31'S 30°30'E], 27–29.xii.1990, V.D. Roth & B. Roth, 1♂, 1♀ (CASENT 9046708). *Northern Cape*: Prieska [29°38'S 22°57'E], 15.i.2001, C. Haddad, 2♂, 1♀ (NCA 2004/182). *Western Cape*: Borrelfontein, 8 km W of Gouritz Mouth [33°59'S 22°16'E], 15.v.2008, H. Leibel, 1♂, 1♀ (NCA 2009/5599); Jacobsbaai, Saldanha Bay district [33°00'S 18°04'E], 2.x.2007, R. Lyle & C. Haddad, 3♂, 3♀ (NCA 2008/427); Sedgefield [34°01'S 22°48'E], 30.xii.1986, A. Le Roy, 1♂ (NCA 1988/778); Swartberg Nature Reserve [32°59'S 22°55'E], 15.x.2001, Z. van der Walt, 3♂, 5♀ (NCA 2002/989); same locality, 15.iii.2003, Z. van der Walt, 2♂ (NCA 2003/1092).



Figs 38–41. *Rothus vittatus* Simon, 1898, S.E.M. of male palpus: (38) ventral view; (39) detail of bulbus; (40) retrolateral view; (41) detail of RTA [NCA 2009/5599]. Abbreviations: C = conductor; DTP = distal tegular projection; E = embolus; MA = median apophysis; RTA = retrolateral tibial apophysis; ST = subtegulum; T = tegulum; VTA = ventral tibial apophysis.

Fig. 42. *Rothus vittatus* Simon, 1898: legs I and II of male, metatarsus and tarsus (NCA 2002/989).

Remark: Males and females were found together at several localities in South Africa (NCA collection).

Distribution: South Africa (Mpumalanga, Western Cape and Northern Cape) (Fig. 1).

Rothus auratus Pocock, 1900

Figs 43–48

Rothus auratus Pocock, 1900: 326; Pocock 1902: 16, pl. 3, fig. 3; Blandin 1977: 554, fig. 14.

Diagnosis: The female of *R. auratus* can be distinguished from those of *R. aethiopicus* (Fig. 8) and *R. vittatus* (Fig. 30) by the slightly elongated lateral lobes and by the wider middle field of the epigynum (Fig. 48). Male unknown.

Redescription:

Female (South Africa, BMNH 1901.3.9.37).
Total length 12.2. Prosoma 5.5 long, 4.6 wide, light brown, with two wide lateral whitish bands (Figs 43, 44). Clypeus light brown, 0.38 high (Fig. 47). Anterior eye row straight, 1.48 wide (Fig. 47); posterior recurved, 1.86 wide (Fig. 44). Eye measurements: AME 0.24, ALE 0.32, PME 0.36, PLE 0.30; AME–AME 0.18, AME–ALE 0.18, PME–PME 0.28, PME–PLE 0.42, OQA 0.62, OQP 1.01, OQH 0.94. Chelicerae light brown, with white bristles (Fig. 47). Sternum light brown, bristly; (estimated, sternum damaged) 2.5 long, 2.4 wide (Figs 45, 46). Labium (damaged, no measurements) dark brown, light brown distally (Fig. 46). Legs light brown, relative length: I-II-IV-III, I – femur 6.30/ patella-tibia 7.96/ metatarsus 5.14/ tarsus 2.98/ total 22.38; II – 6.14/ 7.80/ 5.31/ 2.65/ 21.90; III – 5.31/ 7.47/ 3.48/ 2.32/ 18.58; IV – 5.81/ 6.64/ 6.47/ 2.86/ 21.78. Ventral pairs of macrosetae on tibiae: I-4; II-4; III-3; IV-3. Opisthosoma 7.1 long, light brown, with dark brown band at anterior portion (Fig. 43). Venter light brown, with thin dark brown median band (Fig. 45). Epigynum with deep excavation of middle field, lateral lobes with wide oval curve, anteriorly reaching epigastric furrow, with significant distance to each other (Fig. 48).

Type material examined: Holotype: ♀ SOUTH AFRICA: *Northern Cape*: Namaqualand, Garies [30°13'S 19°12'E] (BMNH 1901.3.9.37).

Remarks: Unfortunately the internal structures of the female genitalia could not be examined, since we did not want to dissect the only available specimen, the holotype.

Figs 43–48. *Rothus auratus* Pocock, 1900, (43–47) female habitus and (48) epigynum of holotype, from Namaqualand, South Africa (BMNH 1901.3.9.37): (43) dorsal view; (44) detail of prosoma; (45, 48) ventral view; (46) detail of sternum; (47) frontal view.

Rothus auratus and *R. vittatus* may be conspecific. The paucity of material of *R. vittatus* prohibits an evaluation of the intraspecific variability of the female copulatory organs. Furthermore, the single specimen of *R. auratus* is significantly larger than all of the specimens of *R. vittatus* that we examined. Therefore, we opt for maintaining both as separate species at this point.

Distribution: South Africa (Northern Cape) (Fig. 1).

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REFERENCES

Blandin, P. 1974. Etudes sur les Pisauridae africaines I. Le problème de la définition des genres *Perenethis* L. Koch, 1878, *Tetragonophthalma* Karsch, 1878, *Chiasmopes* Pavesi, 1883 et *Maypacius* Simon, 1898 (Araneae-Pisauridae-Pisaurinae). *Revue Suisse de Zoologie* **81**: 305–318.

———1976. Etudes sur les Pisauridae africaines VI. Définition des genres *Pisaura* Simon, 1885, *Pisaurellus* Roewer, 1951, *Afropisaura* n. gen. et mise au point sur les espèces des genres *Afropisaura* and *Pisaurellus* (Araneae - Pisauridae - Pisaurinae). *Revue Zoologique Africaine* **90**: 917–939.

———1977. Etudes sur les Pisauridae africaines VIII. Les genres *Chiasmopes* Pavesi, 1883 et *Rothus* Simon, 1898 (Araneae - Pisauridae - Pisaurinae). *Revue Zoologique Africaine* **91**: 538–557.

Caporiacco, L. di 1940. Aracnidi raccolte nella Reg. dei Laghi Etiopici della Fossa Galla. *Atti della Reale Accademia d'Italia* **11**: 767–873.

Levy, G. 1999. The lynx and nursery-web spider families in Israel (Araneae, Oxyopidae and Pisauridae). *Zoosystema* **21**: 29–64.

Pavesi, P. 1883. Studi sugli aracnidi africani. III. Aracnidi del regno di Scioa e considerazioni sull'aracnofauna d'Abissinia. *Annali del Museo Civico di Storia Naturale di Genova* **20**: 1–105.

Pocock, R.I. 1900. Some new Arachnida from Cape Colony. *Annals and Magazine of Natural History* (7), **6**: 316–333.

———1902. Descriptions of some new species of African Solifugae and Araneae. *Annals and Magazine of Natural History* **10**: 6–27.

Roewer, C.F. 1955. Araneae Lycosaeformia I. (Agelenidae, Hahniidae, Pisauridae) mit Berücksichtigung aller Arten der äthiopischen Region. *Exploration du Parc National de l'Upemba, Mission G. F. de Witte* **30**: 1–420.

Sierwald, P. 1990. Morphology and homologous features in the male palpal organ in Pisauridae and other spider families, with notes on the taxonomy of Pisauridae (Arachnida: Araneae). *Nemouria, Occasional Papers of the Delaware Museum of Natural History* **35**: 1–59.

———1997. Phylogenetic analysis of pisaurine nursery web spiders, with revisions of *Tetragonophthalma* and *Perenethis* (Araneae, Lycosoidea, Pisauridae). *Journal of Arachnology* **25**: 361–407.

Simon, E. 1898*a*. *Histoire naturelle des araignées*. Tomé 2. Paris: Librairie Encyclopédique de Roret, 193–380.

———1898*b*. Descriptions d'arachnides nouveaux des familles des Agelenidae, Pisauridae, Lycosidae et Oxyopidae. *Annales de la Société Entomologique de Belgique* **42**: 1–34.

World Spider Catalog. 2014. *World Spider Catalog, version 15.5*. Bern: Natural History Museum Bern (http://wsc.nmbe.ch; accessed 13/05/2015).