



Redescription of *Micaria beaufortia* (Araneae, Gnaphosidae), with notes on Afrotropical *Micaria*

YURI M. MARUSIK^{1,2,3} & MIKHAIL M. OMELKO^{4,5}

¹Institute for Biological Problems of the North RAS, Portovaya Str. 18, 685000 Magadan, Russia. E-mail: yurmar@mail.ru

²Department of Zoology & Entomology, University of the Free State, Bloemfontein 9300, South Africa

³Zoological Museum, Biodiversity Unit, FI-20014 University of Turku, Finland

⁴Far Eastern Federal University, Sukhanova 8, Vladivostok 690950, Russia. Email: omelkom@gmail.com

⁵Federal Scientific Center of the East Asia Terrestrial Biodiversity FEB RAS, 690022 Vladivostok, Russia

Abstract

Three species of *Micaria* Westring, 1851 are known to occur in the Afrotropical Region, two from Namibia and one from South Africa. All three species are known from a single sex only, either from the male (*M. tersissima* Simon, 1910) or from the females in the case of *M. beaufortia* (Tucker, 1923) and *M. chrysis* (Simon, 1910). In this paper, we redescribe the female of *M. beaufortia* and describe the previously unknown male of this species. This species has pseudosegmented tarsi and complex scopula formed by two paired rows of setae; these characters are unknown in other *Micaria*. The setae covering the legs in *M. beaufortia* are briefly described and the scopula is compared with that of *M. fulgens* (Walckenaer, 1802). A paired mating plug, previously unknown in *Micaria*, is documented in *M. beaufortia*. It was found that *M. chrysis* and *M. tersissima*, considered in the World Spider Catalog (2017) as endemics of Namibia, were actually described from Northern Cape Province, South Africa. The taxonomic position of these two species is briefly commented on and distribution records of all three species are mapped.

Key words: Aranei, South Africa, Namibia, Cape Province, *Epikurtomma*, mating plug, scopula

Introduction

Micaria Westring, 1851 is a rather large genus considered in Gnaphosidae, with 101 named species (WSC 2017). Seventy additional names are considered as junior synonyms (58) or nomina dubia (12) (WSC 2017). Most *Micaria* species are known from the Holarctic, and only a few poorly known species are described from tropical areas in India (1), Australia (2, one described from a juvenile, another has 0.5 mm long carapace, too short for the genus), Philippines (1) and Southern Africa (3). So far, only three species are known from Sub-Saharan Africa. One species is known from Algeria, *M. belezma* Bosmans, 2000; another one, *M. beaufortia* (Tucker, 1923), from South Africa; and two from Namibia, *M. chrysis* (Simon, 1910) and *M. tersissima* Simon, 1910 (WSC 2017). In addition to four species endemic to Africa Bosmans & Blick (2000) reported six more species from Northern Africa. All Afrotropical species are known from a single sex: two by males and another two by females. While collecting spiders in South Africa the senior author caught two males and one female of *M. beaufortia*, a species known from the holotype female from the Western Cape. The goals of this paper are to make a detailed redescription of the female of *M. beaufortia*, provide the first description of the male, and to provide comments on the two other species known from the Afrotropical region.

Material and methods

Specimens were photographed using an Olympus Camedia E-520 camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum, University of Turku. Digital images were montaged using

CombineZP image stacking software. The epigyne was cleared in a KOH/water solution until the soft tissues were dissolved. Photographs were taken in dishes with cotton paraffin on the bottom to hold the specimens in position. All measurements are given in millimeters. Lengths of leg segments were measured on the dorsal side. Abbreviations used for spination and leg segments are as follows: d dorsal, fe femur, mt metatarsus, pa patella, p prolateral, r retrolateral, ta tarsus, ti tibia, v ventral.

Material treated here will be deposited in the Zoological Museum of the Moscow State University (ZMMU).

Taxonomic survey

Micaria chrysis (Simon, 1910)

Micariolepis chrysis Simon 1910: 203 (♀).

Comments. The species was described based on a single female and lacks any illustrations; so far it is known from only one taxonomic entry. The species was transferred to *Micaria* from *Micariolepis* Simon, 1879, due to the synonymisation of the two genera by Wunderlich (1980). Simon (1910) compared *M. chrysis* with *M. dives* (Lucas, 1846), a trans-Palaearctic species that clearly differs from *M. beaufortia*, redescribed below. In addition, these two African species differ in size, *M. chrysis* females being 3 mm and *M. beaufortia* 5.25 mm.

The type locality of this species was indicated by Simon (1910) as "Petit Namaqualand: Port Nolloth"; the country was not indicated. There are two names Namaqualand: one is Great Namaqualand in southern Namibia, and another is Little Namaqualand in north-western Northern Cape Province, South Africa. The World Spider Catalog (2017) indicates its distribution as Namibia, although Little Namaqualand and Port Nolloth are located in South Africa (Fig. 30). It seems that Roewer (1955) assigned it to the wrong country, mentioning that the species was from "SW-Afrika" (currently Namibia).

Micaria tersissima Simon, 1910

Micaria tersissima Simon 1910: 203 (♂).

Comments. As in the previous species, *M. tersissima* is known only from the holotype and a single taxonomic entry. It was described based on the male from "Petit Namaqualand: Kamaggas" (Fig. 30). Similar to *M. chrysis*, it is currently listed in the World Spider Catalog (2017) as being known from Namibia, although it was described from South Africa. Simon (1910) mentioned that the species certainly belongs to *Micaria*, and indicated the presence of a small thoracic fovea (as an exceptional character). A small fovea is present in *M. beaufortia* (Fig. 6) and also documented in *M. formicaria* (Sundevall, 1831) (fig. 4a in Wunderlich 1980). It is unlikely that *M. tersissima* and *M. beaufortia* are conspecific; *M. tersissima* males are smaller, only 3.5 mm long vs. 4.35 mm long for *M. beaufortia*. Judging from their similar size and closely spaced type localities, these two species from the Northern Cape and known by different sexes might end up being synonyms.

Micaria beaufortia (Tucker, 1923)

Figs 1–20, 23–24, 26–29

Epikurtomma beaufortia Tucker 1923: 333, pl. 10, fig. 54 (♀).

Micaria beaufortia: Murphy 2007: 67, fig. 550–551 (♀).

Material examined. 4♀ 2juv. (ZMMU), SOUTH AFRICA, *Western Cape*, near Worcester, Karoo National Botanical Gardens, 33°36'43"S 19°26'58"E, litter under bushes, 25.01.2017 (Y.M. Marusik).

Note. Tucker (1923) created a genus for his species, because *Micaria* seems rare in South Africa and he possibly did not know this mainly Holarctic genus. Murphy (2007), revising the gnaphosid genera, studied *Epikurtomma beaufortia* and recognized that the species should be placed in *Micaria*. He listed *E. beaufortia* in a paragraph of "misplaced species", although it is a type species of the genus.



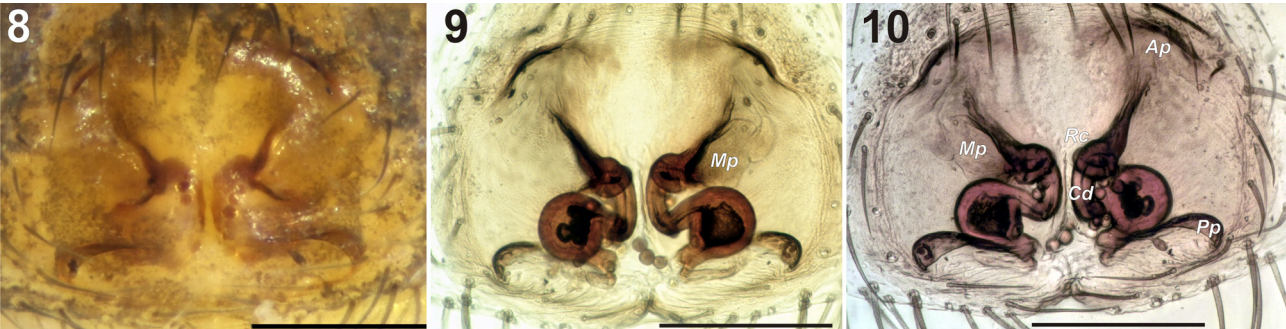
FIGURES 1–7. Habitus, legs and male palp of *Micaria beaufortia*.

1 female, dorsal; 2 female leg I, retrolateral; 3 metatarsus and tarsus I showing scopula and bent tarsus; 4, 7 terminal part of male part, prolateral and ventral; 5 male, dorsal; 6 male palp, retrolateral. Scale = 0.2 mm if not otherwise indicated.

Abbreviations: *Em* embolus, *Sd* sperm duct, *Ta* tibial apophysis, *Te* tegular apophysis.

Diagnosis. *Micaria beaufortia* differs from other congeners by having tarsi with pseudosegmentation and a white median stripe on the posterior part of the abdomen. The male palp of *M. beaufortia* is most similar to that of the trans-Palaeartic *M. lenzi* Bösenberg, 1899, by having a similarly shaped embolus and same size and position of the tegular apophysis, but differs from it by having only 2 ventral cymbial spines (*vs.* 3), a longer tip of cymbium and straighter course of the sperm duct. The epigyne of *M. beaufortia* is most similar to that of *M. lenzi* and *M. silesiaca* L. Koch, 1875, by having 2 anterior pockets, widely spaced posterior pockets and similar course of the copulatory ducts. The epigyne in the African species differs from the Palaeartic species by having a longitudinal

furrow (*Lf*) of the septum, thinner posterior pockets (which are much thinner than high) and globular receptacles (vs. lack of septum and septal furrow and broad posterior pockets about 1.4 wider than high and not globular receptacles).



FIGURES 8–10. Epigyne of *Micaria beaufortia*. 8 intact, ventral; 9–10 macerated, dorsal and ventral. Scale = 0.2 mm. Abbreviations: *Ap* anterior pockets, *Cd* copulatory ducts, *Mp* mating plug, *Pp* posterior pockets, *Rc* round chamber.

Description. Male. Total length 4.35. Carapace 2.0 long, 1.2 wide. Carapace dark brown with blackish radial stripes, fovea short, almost indistinct, covered with short white hairs. Chelicerae, labium, maxillae and sternum light brown. All leg segments light brown. Abdomen dorsally dark grey with two white stripes, one transversal in middle part and another longitudinal behind it. Tarsi in all legs curved due to pseudosegmentation (*Ps*). Metatarsus, tarsus of leg I, tarsi of leg II–IV with scopula.

Leg segments length in ♂.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.63	0.55	1.45	1.13	1.00	5.75
II	1.38	0.63	1.25	1.03	1.00	5.28
III	1.28	0.53	1.15	1.13	0.88	4.95
IV	1.88	0.65	1.55	1.55	1.13	6.75

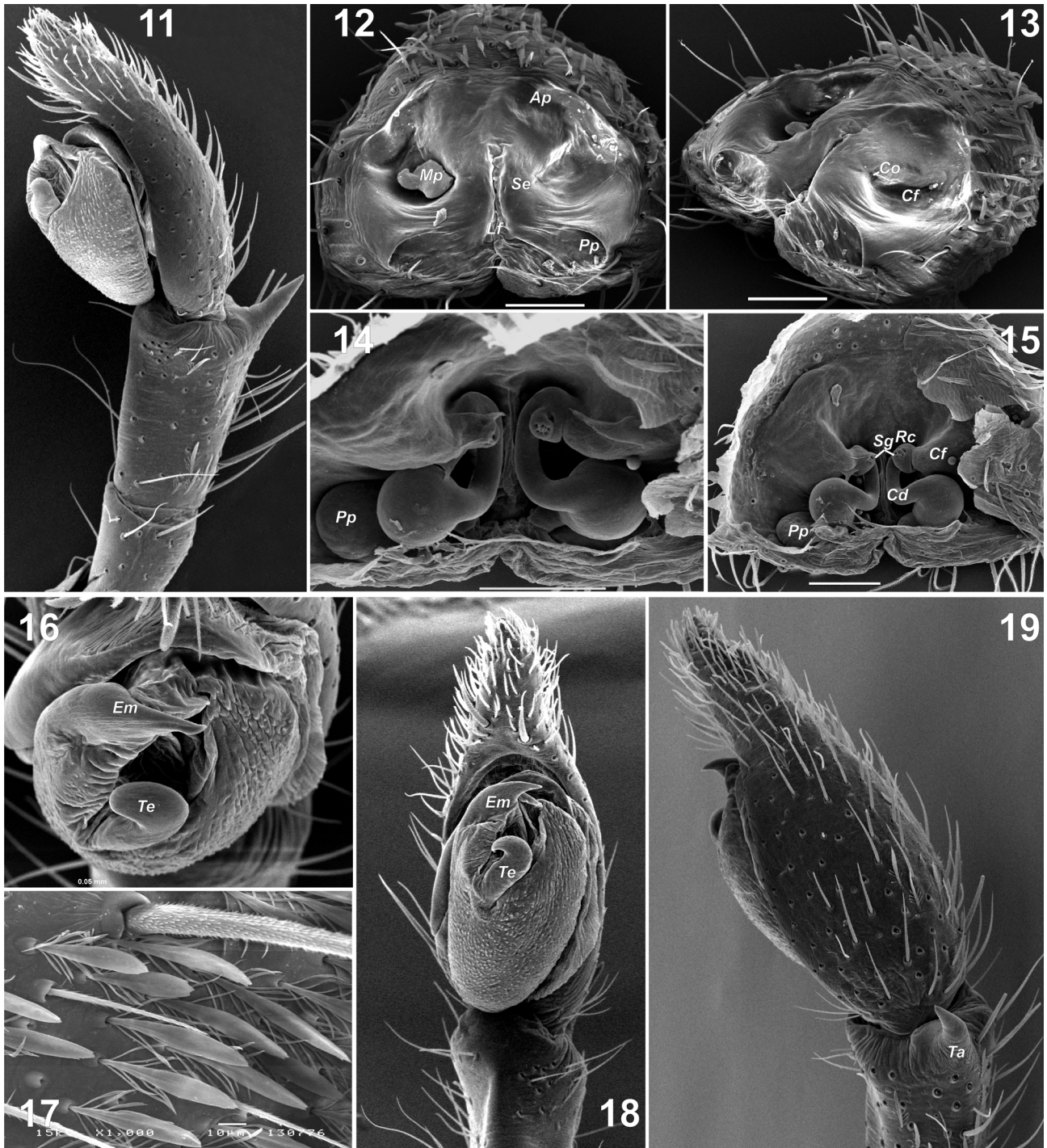
Spination of legs in ♂.

	Femur	Tibia	Metatarsus
I	1d1p	-	-
II	1d	3v	-
III	1d 1p(2p)	4p 2r 2-2-1v	1p 1r 2-2v
IV	1d	2p 2r 2-2v	1p 1r 2-2v

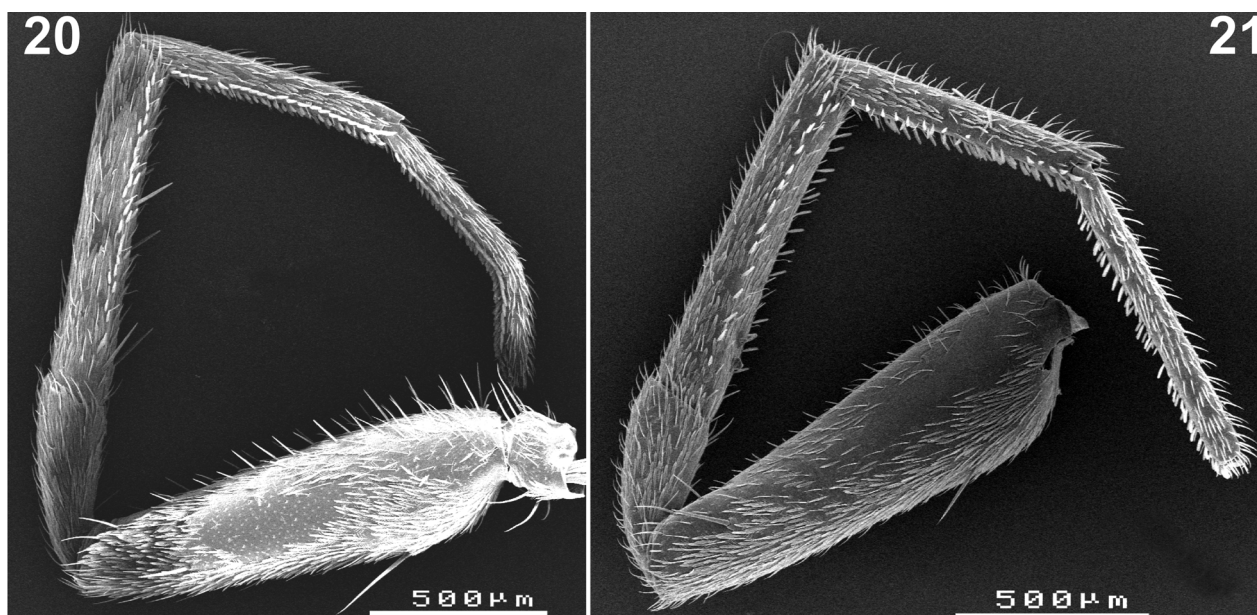
Palp as in Figs 4, 6–7, 11, 16, 18–19: long, femur equal in length to patella+tibia; patella as long as tibia; tibial apophysis (*Ta*) distinct, sharply pointed, relatively large (about radius of tibia); cymbium 1.4 times longer than tibia; tip of cymbium long, about 2/3 of tegulum length, tip with 2 ventral spines; bulb oval, without ventral extension; sperm duct (*Sd*) without meanders; tegular apophysis (*Te*) well developed, hook-shaped, broad, located at anterior 1/3 of tegulum; embolus (*Em*) claw-like.

Female. Total length 5.25. Carapace 1.90 long, 1.10 wide. Carapace light brown with blackish radial stripes, without fovea. Chelicerae, maxillae, sternum, labium as in males. Leg joints light brown except for femora, which are somewhat darker. Ventral parts of femora covered with short white hairs. Tarsi in all legs curved. Metatarsus-tarsus of legs I and II, tarsi of legs III and IV with scopula (the scopula more strongly developed than in males). Scopula formed by 2 pairs of rows of modified setae (*Sc*, Fig. 23); upper row of setae directed subparallel to axis of segment and setae of lower row directed subventrally (Fig. 24); tarsus and metatarsus with 4 types of setae, dorsal subdecumbent simple (= minutely plumose *sensu* Murphy 2007) setae (*SI*), appressed complex lanceolate setae

with feathery bases (= squamose with brachia *sensu* Murphy 2007) (S2), scopular setae, and erect setae with smooth base and plumose distal parts (chemosensory, S3). Abdomen lighter than in male, grayish in anterior 1/3, with 2 transversal whitish stripes, posterior 2/3 blackish with median white stripe.



FIGURES 11–19. SEM photographs of *Micaria beaufortia*. 11 male palp, retrolateral; 12–13 epigyne, ventral and ventro-lateral; 14–15 pigyne, dorsal and antero-dorsal; 16 bulb, anterior; 17 setae of femur I; 18–19 male palp, ventral and dorso-retrolateral. Scale = 0.1 mm if indicated. Abbreviations: *Ap* anterior pockets, *Cd* copulatory ducts, *Cf* conical furrow, *Co* copulatory opening, *Em* embolus, *Lf* longitudinal furrow, *Mp* mating plug, *Pp* posterior pockets, *Se* septum, *Rc* round chamber, *Sg* small gland, *Te* tegular apophysis, *Ta* tibial apophysis.



FIGURES 20–21. Prolateral view of female leg I of *Micaria beaufortia* (20) and *M. fulgens* (21). Bent tarsus arrowed.

Leg segments length in ♀.

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.38	0.60	1.13	0.83	0.88	4.80
II	1.33	0.50	1.05	0.80	0.88	4.55
III	1.25	0.53	1.03	0.95	0.83	4.58
IV	1.88	0.70	1.60	1.58	1.00	6.75

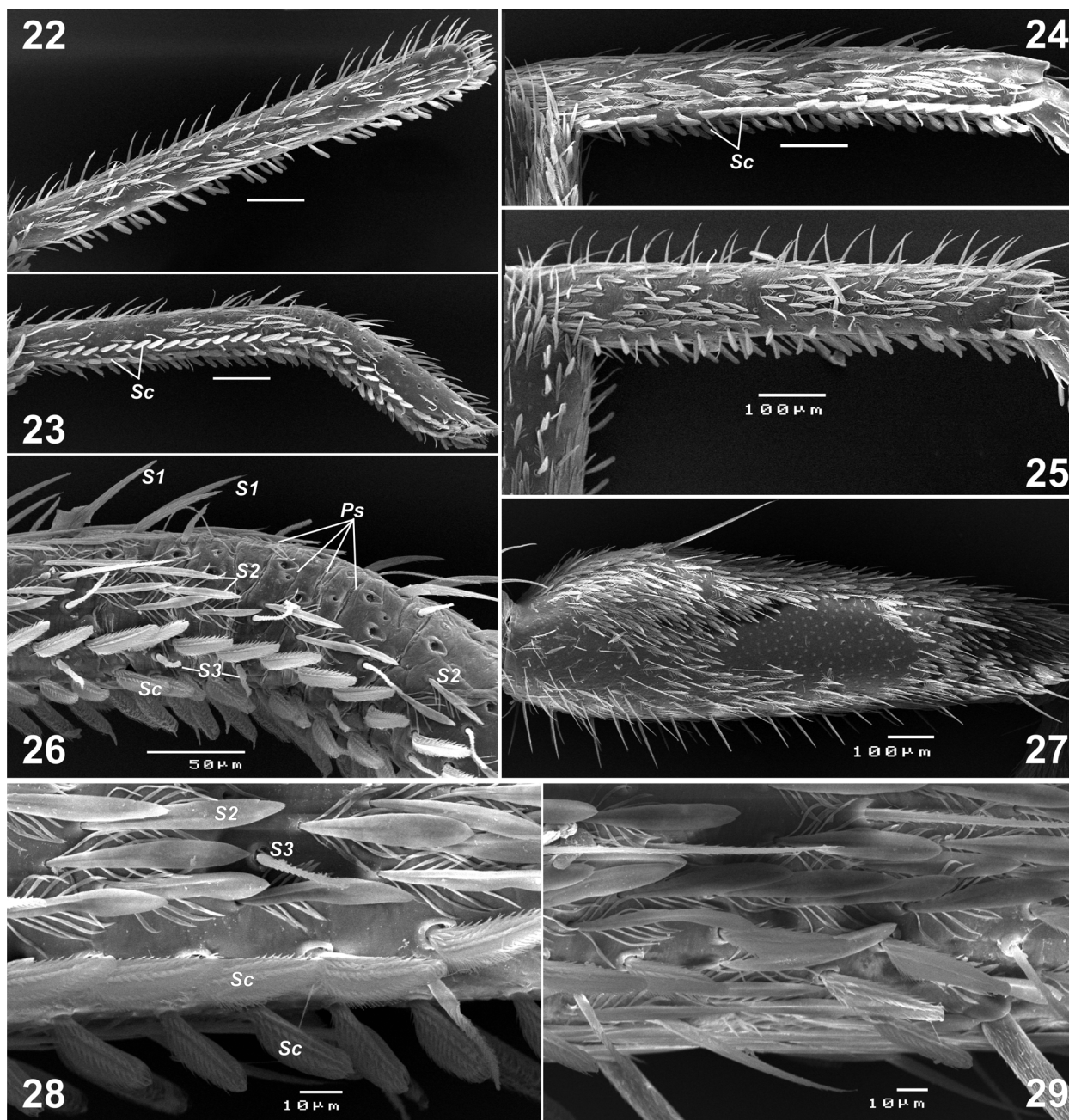
Spination of legs in ♀.

	Femur	Tibia	Metatarsus
I	1d 1p	2-2v	
II	1d 1p	2-2v	
III	1d 1p1r	1p 1r 2-2v	1p 1r 2-2v
IV	1d		1p 1r 2-2v

Epigyne as in Figs 8–10, 12–15: with pair of anterior (*Ap*) and posterior pockets (*Pp*); posterior pockets widely spaced; fovea divided into 2 parts by kind of septum (*Se*) divided into 2 parts by longitudinal furrow (*Lf*); each copulatory opening (*Co*) located in kind of conical furrow (*Cf*) that seems guiding embolus. Copulatory opening can be covered by secretory mating plug (*Mp*) occupying part of the conical furrow. Copulatory opening leads to round chamber (*Rc*) bearing small gland (*Sg*); short copulatory ducts (*Cd*) originate from chambers and almost touching medially; receptacles round, relatively small, spaced by about 1.5 diameters.

Comments. *Micaria beaufortia* has several features unknown in other *Micaria* and related *Arboricaria* Bosmans, 2000, like tarsi with pseudosegmentation, and scopula composed of two rows on each side of leg, not one like in *M. fulgens* (cf. Figs 20 and 21, 22 and 23, and also fig. 93G in Ramírez, 2014). Mating plugs in female epigynes are documented only in species having an undivided fovea, like *M. aenea* Thorell, 1871 (Mikhailov & Marusik 1996: fig. 39) or *M. albovitatta* (Lucas, 1846) (Wunderlich 1980: fig. 42e). In these two species one plug covers both copulatory openings, while in *M. beaufortia* each opening has its own plug.

Distribution. *Micaria beaufortia* currently is known only from two localities in Western Cape, in Beaufort West (the type locality) and from environs of Worcester (present record) (Fig. 30).



FIGURES 22–29. Morphology of female leg I of *Micaria fulgens* (22, 25) and *M. beaufortia* (23–24, 26–29). 22–23 tarsus, lateral; 24–25 metatarsus; 26 part of tarsus showing pseudosegments; 27 femur; 28 lower part of metatarsus showing different types of setae; 29 subventral part of tibia showing different types of setae. Abbreviations: *Sc* scopula setae, *Ps* pseudosegmentation.

Discussion

Although *Micaria beaufortia* has several characters not known in other species mentioned in "Comments", its copulatory organs have the same conformation as in other *Micaria* related to the generotype, *M. fulgens* (Walckenaer, 1802). There are at least two more genera in Gnaphosidae, with pseudosegmented tarsi: *Pterotricha* Kulczyński, 1903 and *Megamyrmaekion* Reuss, 1834. *Pterotricha loeffleri* (Roewer, 1955) has pseudosegmented tarsi (Marusik et al. 2013), while all other congeners are lacking such character. Pseudosegmented tarsi are documented also in *Megamyrmaekion algericum* Simon, 1885 (Murphy 2007: 362). As for *Micaria*, it is possible that other researches overlooked this modification of the tarsi and the complex scopula.

All three Afrotropical *Micaria* are known from Western and North Cape Provinces of South Africa.



FIGURE 30. Distribution records of Afrotropical *Micaria*: *M. beaufortia* (circle), *M. chrysis* (square) and *M. tersissima* (diamond).

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