



A new apterous species of the genus *Ploiaria* (Hemiptera: Heteroptera: Reduviidae) from Maharashtra, India

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Abstract

A new species of thread-legged assassin bugs, *Ploiaria enigmatica* **sp. nov.** (Hemiptera: Heteroptera: Reduviidae: Emesinae: Leistarchini), is described from Western Ghats of Maharashtra, India. The new species has an interesting set of characters not found in any Indomalayan members of the genus *Ploiaria* Scopoli, 1786, and it appears to be morphologically similar to some Afrotropical congeners.

Key words: Taxonomy, true bugs, assassin bugs, new species, Indomalaya

Introduction

Thread-legged assassin bugs (Emesinae) is one of the largest subfamilies of Reduviidae (Hemiptera: Heteroptera), with well over a thousand described species (Standring *et al.* 2023). The bionomics of the emesines is diverse: many species live in litter, in the canopy of various trees, on herbaceous plants, and several species are cavernicolous or obligate inhabitants of spider webs (Wygodzinsky 1966, Schuh & Slater 1995). The tribe Leistarchini contains about 300 species in 33 genera (Chen *et al.* 2023). The leistarchine genus *Ploiaria* Scopoli, 1786 is the most species-rich genus of Emesinae, distributed in all zoogeographic regions (Wygodzinsky 1966). It currently includes over 130 described species worldwide, of which about 22 species occur in the Indomalaya, as stated in the latest paper that described a new species (Chen *et al.* 2023). Wygodzinsky (1966) stressed that the genus includes morphologically very disparate species forming a number of readily recognizable and probably monophyletic species groups, but he refrained from subdividing it into smaller taxa. The phylogenetic analysis of Standring *et al.* (2023) recovered *Ploiaria* as non-monophyletic.

Four very small (total length about 4 mm) males of a leistarchine species were collected from leaf litter, close to small spider webs (Figs. 1, 3), at Lonavala, Pune District, Maharashtra State, India, in June 2017. In November of the same year a highly similar and apparently conspecific female was found in leaf litter at Daund, also in Pune District, and was kept alive under laboratory conditions where it deposited three eggs. In June 2019 a male and a female were found at the same locality at Lonavala where the first four males were captured, and this pair survived in captivity for about a month (Fig. 2). Most recently, in October 2023, additional individuals were observed associated with small spider webs in the crevices of an old building in Daund.



FIGURES 1–3. *Ploiaria enigmatica* sp. nov. Fig. 1, habitat at Lonavala, inset showing spider webs in close up; Fig. 2, live pair in lab (left: male; right: female); Fig. 3, live female in its natural habitat at Lonavala (red arrow).

Lonavala is a hill station situated in the Western Ghats, around 70 km west of Pune, and receives about 4000–4500 mm of rainfall (annual average) per year. Daund, however, is located in the eastern, rain-shadow region of Maharashtra, about 70 km east of Pune, with rainfall around 400 mm per year.

The specimens from Lonavala and Daund were readily identified as belonging to *Ploiaria* based on the monograph by Wygodzinsky (1966), but they did not match any of the described species of the genus from India (Distant 1903, 1910, Wygodzinsky 1966, Ambrose 2006), and a survey of published literature on the described Indomalayan species remained unsuccessful as well. The species in concern exhibits an unusual combination of characters apparently unique among the Indomalayan members of *Ploiaria*: (1) conspicuously small body (total length about 4 mm); (2) aptery; (3) fore trochanter armed with single long seta set on a very prominent basal process; (4) posteroventral series of fore femur with five long spine-like setae, each set on a strongly prominent basal process, some of these setae combined with their basal processes approximately as long as or even slightly longer than the diameter of the fore femur, intermixed with a few short spiniferous processes; and (5) ventral side of fore tibia armed with four long spiniferous processes set on short bases.

A careful consideration of all described species of *Ploiaria* concluded that these specimens represent an undescribed species, and accordingly it is described as new in the present paper. This study is a continuation of our series of papers attempting to document and/or redescribe the diversity of emesine reduviids from India (Kulkarni & Ghate 2016a, b, Pansare *et al.* 2018, Ghate & Mathew 2018, Sarode *et al.* 2018a, b, Ghate & Sarode 2019, Ghate *et al.* 2019, Boyane & Ghate 2020, Ghate *et al.* 2021, Joshi *et al.* 2022, Hiremath *et al.* 2022).

Materials and methods

Specimens were preserved in 70% ethanol, studied under a Leica SMZ6 stereozoom microscope, and photographed using a Keyence VHX-6000 digital microscope. CombineZP software was used to stack images taken at different focal planes. Measurements were done with an Erma stage micrometer and an ocular micrometer. For scanning electron microscopy (SEM), dried specimens were mounted on a stub with carbon tape, coated with platinum at a thickness of about 12 nm, and scanned and photographed using a JEOL JSM-6360A analytical scanning electron microscope. Photographs were processed using Adobe Photoshop 2024.

To study male genitalia, the pygophore was detached after treating the last three abdominal segments with hot 10% KOH solution for five minutes. The phallic complex was dissected in distilled water and briefly stained with diluted methylene blue before cleaning the attached muscles. The parameres and phallus were then mounted in polyvinyl lactophenol (PVLVP) with lignin pink dye and photographed with a camera attached to an Olympus OM1 compound microscope. To study female genitalia, the entire abdomen was detached from the body and treated with hot 10% KOH solution for 30 minutes, then the genitalia were dissected under stereozoom microscope, mounted on slide in glycerin and photographed under a Magnus MLXi Plus microscope with an attached Magcam DC 5 camera.

Voucher specimens, including types, are deposited in Zoological Survey of India, Western Regional Centre, Akurdi, Pune (shortened as “ZSI Pune” below) and Department of Zoology, Modern College of Arts, Science and Commerce, Shivajinagar, Pune (shortened as “Modern College” below).

Terminology broadly follows Wygodzinsky (1966), except for some terms. Female genitalia terminology follows Castro-Huertas *et al.* (2018).

Taxonomy

Genus *Ploiaria* Scopoli, 1786

Ploiaria Scopoli, 1786: 60. Type species by monotypy: *P. domestica* Scopoli, 1786.

A complete list of the synonyms of the genus was provided by Maldonado (1990). A detailed discussion of the morphological characters of the genus was provided by Wygodzinsky (1966), and brief descriptions were given by Ishikawa *et al.* (2008) and Chen *et al.* (2023), hence they are not reiterated here.

Ploiaria enigmatica sp. nov.

(Figs. 2–30)

Type specimens. Holotype: ♂, India, Maharashtra, Pune Distr., Lonavala, vii.2019, leg. B. Sarode; to be deposited in ZSI Pune. Paratypes: same as holotype (2 ♀♀, deposited in Modern College).

Additional specimens. India, Maharashtra, Pune Distr., Lonavala, vii.2017, leg. B. Sarode (1 ♀ used for SEM; 1 ♂ 1 ♀, both incomplete therefore used for dissections, preserved as slide preparations; all deposited in Modern College). India, Maharashtra, Pune Distr., Daund, viii.2017, leg. P. Pansare (1 ♀, Modern College). Although their conspecificity with the type material is without question, these specimens were excluded from the type material because of their unsatisfactory condition.

Diagnosis. A very small species of *Ploiaria* (body length about 4 mm); only apterous morph known for both sexes. It is easily recognized among the Indomalayan species of the genus by the fore legs (Figs. 10, 11, 17, 21, 22) that possess a single long and strong spine-like seta set on a high basal process on ventral face of trochanter, five strong and long processes (some of which being longer than maximum width of femur) on femur, and four long spines with short base on tibia; furthermore abdominal tergites IV–VII each being provided with a median tubercle situated at posterior border of segment (Figs. 23, 24, 27–29); and pygophore being provided with a broad, truncate, shallowly emarginate superoposterior process (Fig. 31–33).

Description.

Colouration. Male and female similar in coloration but males somewhat darker (Fig. 2). Ground colour brown, some areas on dorsal and ventral sides brownish ochraceous; lateral parts of head, thoracic pleura and abdomen dark

brown (Figs. 4–15). One female examined, presumably freshly moulted, was much paler than rest of the examined specimens.

Head dorsally ochraceous or light brown, with a dark Y-shaped mark in front of transverse sulcus (Figs. 12, 13); lateral region anterior and posterior of eyes dark brown; ventral face brown except for a narrow median pale line. Antennae brown, apex of scape and base and apical half of pedicel dark brown to black, basi- and distiflagella entirely dark brown except pale tip of distiflagellum. First and second visible labiomeres brown, third pale (Figs. 4, 5, 10, 11).

Thorax dorsally brown (very pale in one, presumably teneral, examined female), dark brown laterally and ventrally (Figs. 10, 11, 14, 15), with some median pale markings; prothorax with oblique dark line in posterior half of anterior lobe (Figs. 12, 13). Fore legs with coxae uniformly brown, femora bearing two incomplete pale annuli dorsally in distal half, tibia and tarsus uniformly brown (Figs. 10, 11). Mid and hind legs brown, apices of femora dark brown, tibiae each with a very small dark brown annulus basally followed by a slightly broader ochraceous annulus, remaining portions of tibiae dark on proximal half and ochraceous in distal half; tarsi pale (Figs. 4–6, 8).

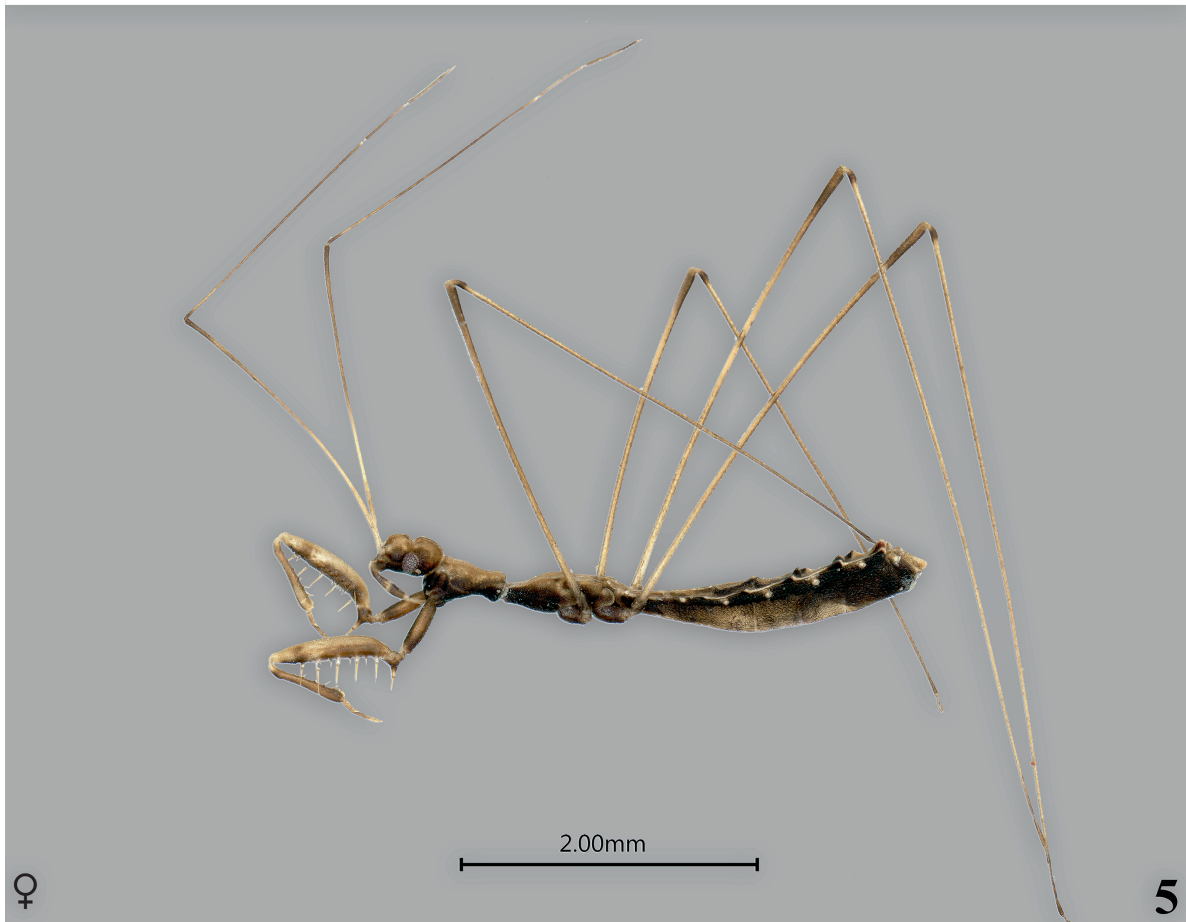
Abdomen dorsally brownish with a few transverse, symmetrical, dark brown segmental patches (more distinct in living individuals than in dried specimens); ventrally brown with a median pale region on second and third sternae; remaining parts of abdomen more or less dark (Figs. 23–27). Spiracles white, very clear on dark background. Tips of median tubercles on abdominal tergites pale.

Integument and vestiture. Cuticle finely granular all over, readily visible in SEM micrographs (Figs. 16–22) but not apparent under binocular microscope. Antennae more or less smooth with few spine-like microchaetae on scape and pedicel, basiflagellum with some fine setae, tip of distiflagellum densely setose. Setigerous as well as smooth granules of 2–3 different sizes present on dorsal and lateral parts of head and thorax and on dorsal surface of fore coxa and femur (Figs. 18, 19, 21, 22); fore femur with dense, moderately long setae ventrally in between processes while fore tibia with tuft of setae on anterior face ventrally and dorsal fine spinules in apical region (Figs. 21, 22). Thoracic sternae finely granular. Mid and hind coxae with few granules. Abdomen minutely rugulose but not granular except dorsomedially. Femora and tibiae of mid and hind legs with fine sharp microchaetae, apical region of tibiae more setose; tarsi setose. Non-granular and non-rugulose parts of body smooth and subshining, other areas dull.

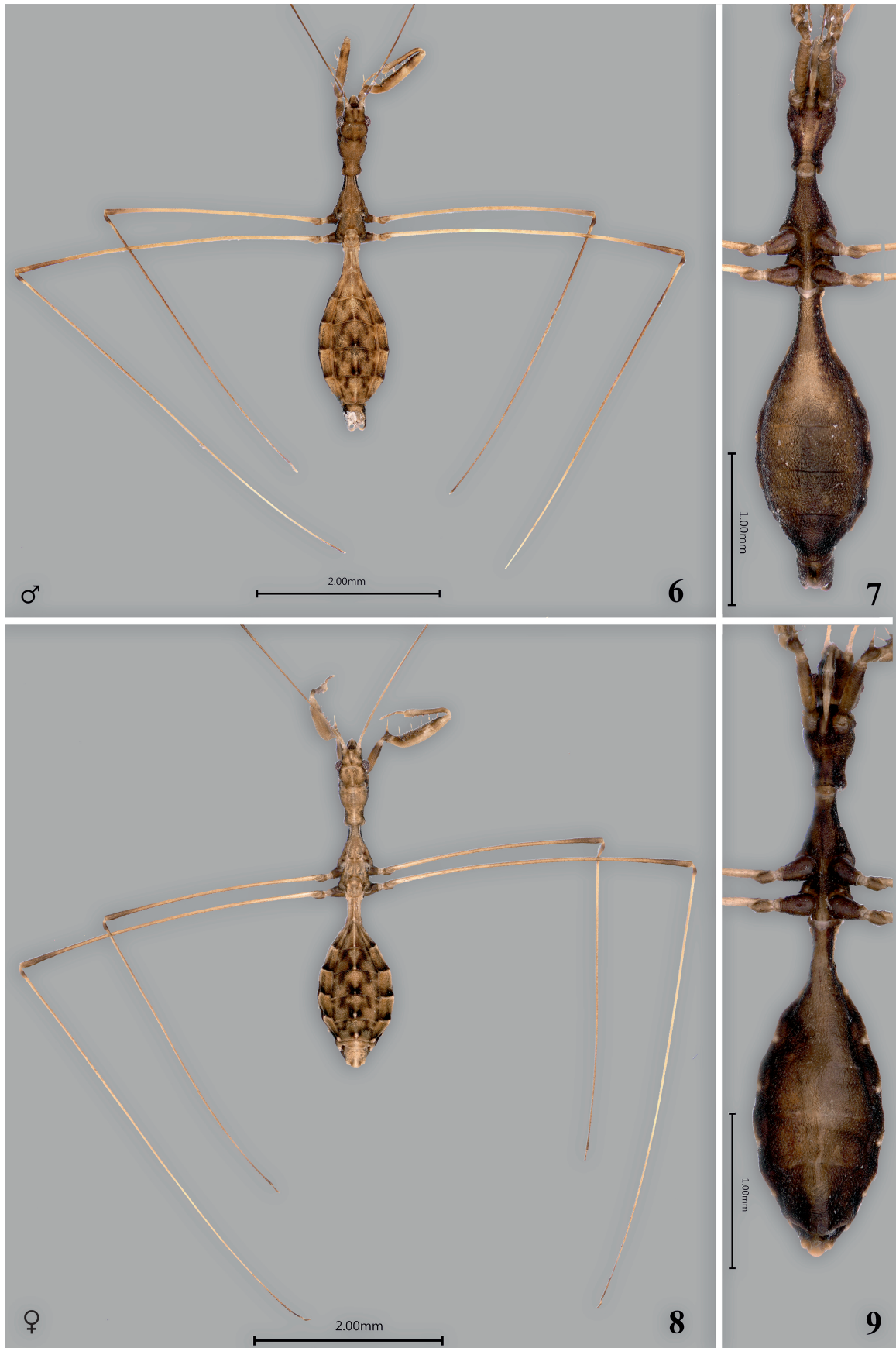
Structure. *Head* relatively short oval, interocular sulcus deep, almost straight; anterior lobe (anterior of interocular sulcus) somewhat flattened dorsally, posterior lobe (posterior of interocular sulcus) globular, with very narrow smooth median line. Eyes small, not reaching dorsal and ventral outlines of head in lateral view, but placed much closer to ventral outline than to dorsal outline (Figs. 10–13, 17, 18). Antennae long and slender, antenniferous tubercles situated midway between eye and apex of head. Scape long, pedicel slightly shorter than scape, basiflagellum shortest, distiflagellum only slightly longer than basiflagellum. Labium straight, reaching fore coxae, visible labiomere II distinctly shorter than the other two labiomeres, visible labiomere III dorsoventrally compressed beyond its basal portion (Figs. 10, 11, 17).

Thorax: pronotum conspicuously short (somewhat shorter than head), anterior lobe broad, strongly rounded laterally, posterior lobe about one third of length of anterior lobe, collar-like, with a short, narrowed connection between the two lobes. Mesonotum about as long as pronotum, narrowed anteriorly, with a pair of prominent lateral carinae and depressed median part with a very thin median carina in posterior half. Metanotum shorter than pro- and mesonota, with a pair of lateral carinae in anterior part (Figs. 12, 13). Metasternum with median carina in posterior third (Figs. 14, 15). Fore legs (Figs. 10, 11, 17, 21, 22) large and robust in comparison of body, coxa about four times longer than broad, about half as long as femur; trochanter with a long ventral projection bearing a long spine-like seta and additionally a minute seta set on a minute basal process anterodorsally; femur distinctly broadened basally, gradually tapering towards apex, with two series of spiniferous processes ventrally, posteroventral series with five long spine-like setae, fourth (from base) of these longest and distinctly (about 1.3 times) longer than maximum width of femur, intermixed with a few (3–4) shorter spiniferous processes with short apical spines; anteroventral series composed of short spine-like setae set on indistinct, minute bases; combined length of tibia and tarsus slightly longer than femur; tibia with four long ventral spines set on small, tubercle-like basal processes; tarsus trimerous, first tarsomere long, ventrally with four or five short, anteriorly directed spines; second and third tarsomeres subequal in length. Mid and hind legs long, slender; hind femora passing beyond apex of abdomen; tibiae slenderer than femora; claws equal in size and shape, with small tooth at base.

Pregenital abdomen with segment I represented by a small, oval tergum bearing a pair of spiracles, lacking a sclerotized sternum; segment II narrow, peduncle-like, remaining segments (III–VII) conspicuously expanded,



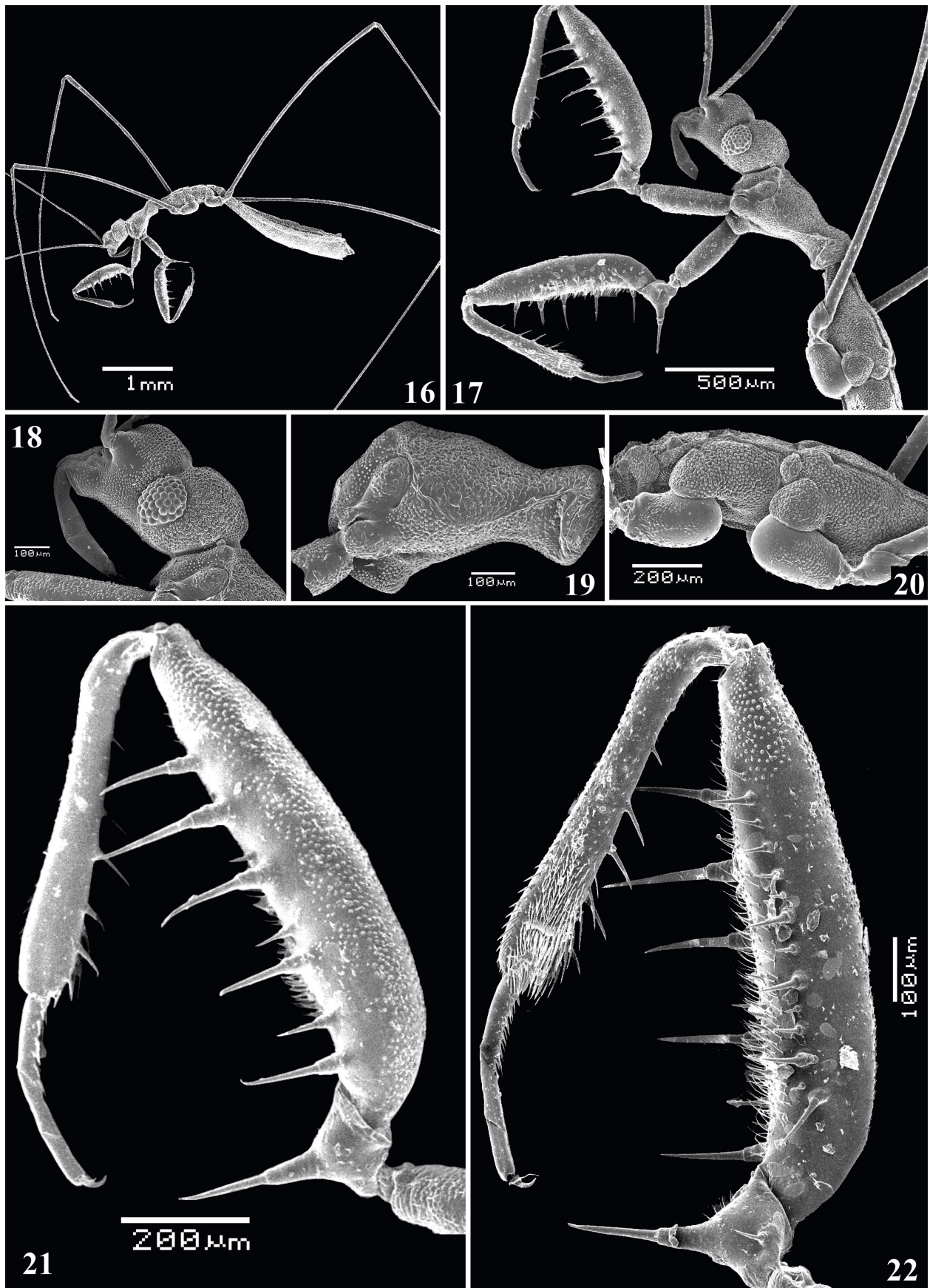
FIGURES 4–5. *Ploiaria enigmatica* sp. nov. Habitus in lateral view. Fig. 4, male; Fig. 5, female.



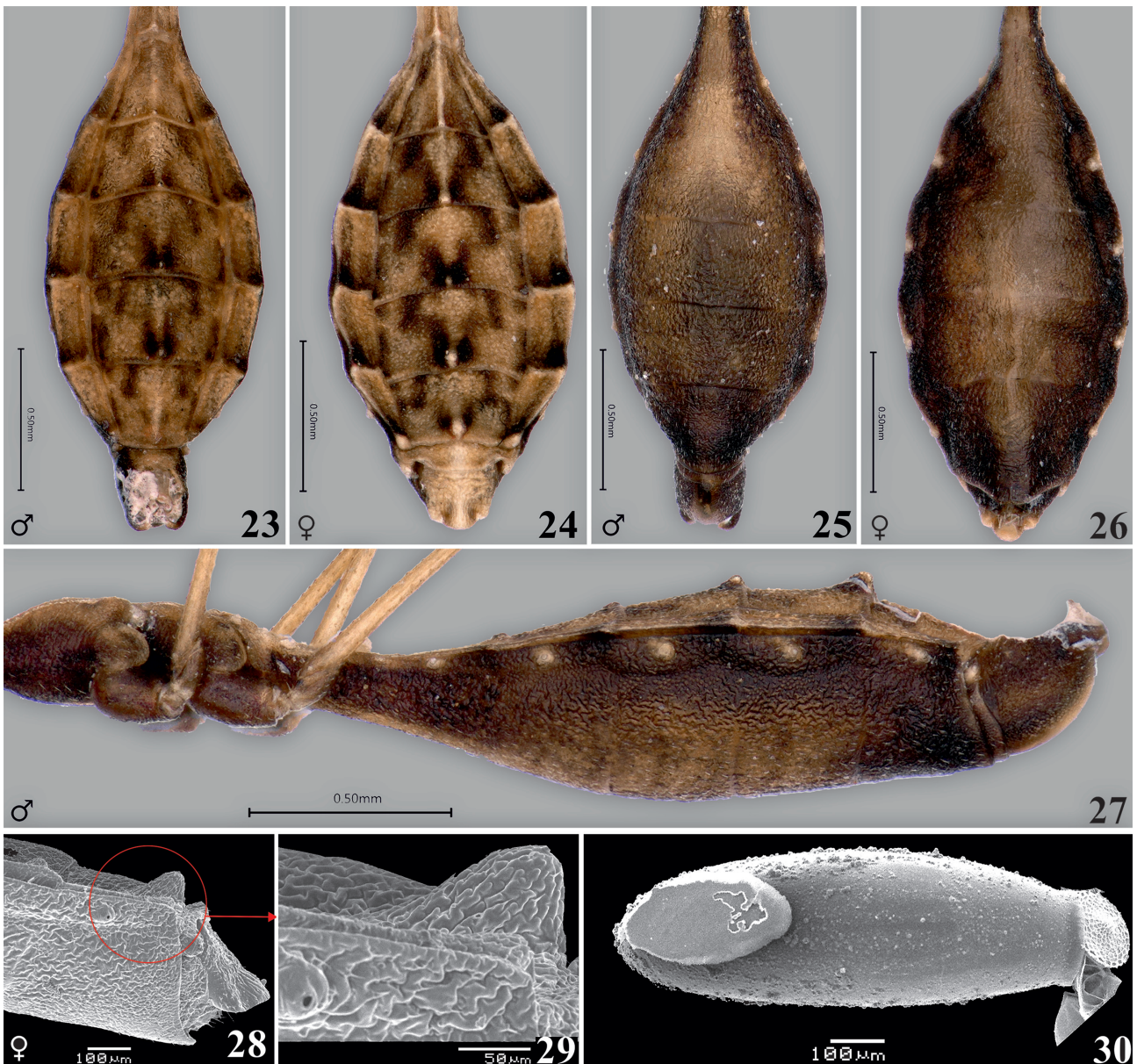
FIGURES 6–9. *Ploiaria enigmatica* sp. nov. Fig. 6, male, dorsal view; Fig. 7, same, ventral view; Fig. 8, female, dorsal view; Fig. 9, same, ventral view.



FIGURES 10–15. *Ploiaria enigmatica* sp. nov. Fig. 10, male, head and prothorax in lateral view; Fig. 11, female, ditto; Fig. 12, male, head and thorax in dorsal view; Fig. 13, female, ditto; Fig. 14, male, pro-, meso- and metasterna in ventral view; Fig. 15, female, ditto.



FIGURES 16–22. *Ploiaria enigmatica* sp. nov. Female, SEM details. Fig. 16, body in lateral view; Fig. 17, anterior part of body in lateral view; Fig. 18, head in lateral view; Fig. 19, prothorax in lateral view; Fig. 20; meso- and metathorax in lateral view; Fig. 21, fore leg in posterior view; Fig. 22, fore leg in anterior view.



FIGURES 23–30. *Ploiaria enigmatica* sp. nov. Fig. 23, abdomen of male, dorsal view; Fig. 24, abdomen of female, dorsal view; Fig. 25, abdomen of male, ventral view; Fig. 26, abdomen of female, ventral view; Fig. 27, abdomen of male, lateral view; Fig. 28, posterior part of abdomen of female, lateral view; Fig. 29, dorsal portion of abdominal segment VII of female, lateral view; Fig. 30, egg.

broadly elliptical, slightly broader in female than male; connexivum prominent, some segmental margins rather indistinct (Figs. 23–27); spiracles slightly elevated; segments III–VII each with a thick, blunt median tubercle posteriorly, those on segments V–VI (♂) / V–VII (♀) particularly prominent, directed slightly posteriad (Figs. 23, 24, 27–29); tergite and sternite of segment VIII of male narrowly exposed.

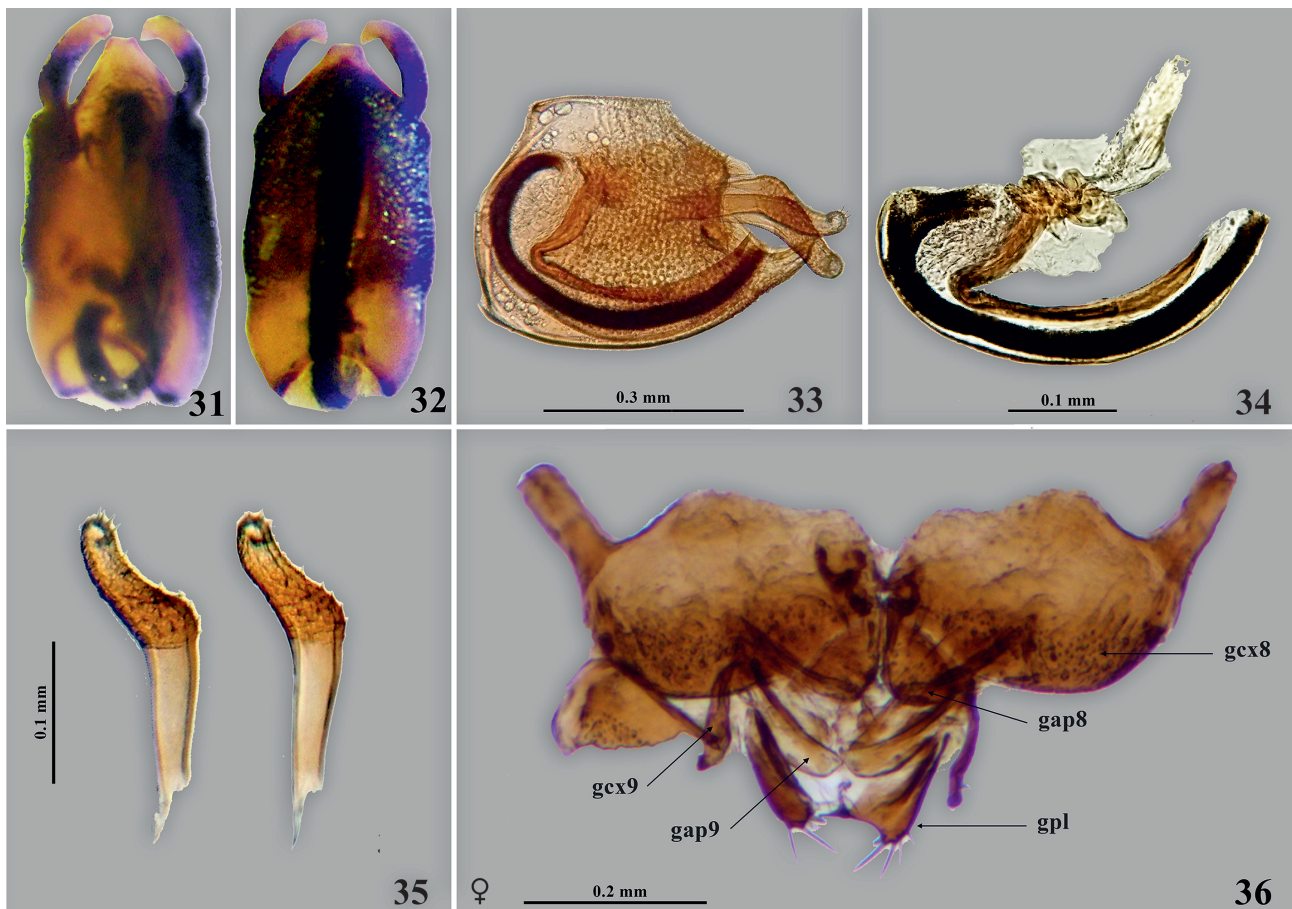
Male genitalia: pygophore parallel-sided, rounded ventrally and flat dorsally, slightly compressed laterally, well sclerotised; superoposterior process broad at base, gradually tapering, truncate and shallowly emarginated at tip, flanked on either side by parameres hence not visible in lateral view (Figs. 31–33). Parameres (Fig. 35) symmetrical, small, moderately bent beyond middle from base, and again slightly bent near apex, not crossing over each other or superoposterior process in rest, with scattered setae in distal half. Phallus large, occupying major portion of cavity of pygophore (Fig. 33), basal portion visible from dorsal side through anterior aperture of pygophore; articular apparatus situated forward from base; struts long, well sclerotised, separate only at base, fused in remaining three

fourth of length; phallosoma moderately sclerotized, endosoma apparently made of only single row of folded plates without any spiny structures, very dark brown, not revealing internal details (Fig. 34).

Female terminalia: tergite VIII short, transverse, subhorizontal; tergite IX much longer than tergite VIII, obliquely sloping posteriad and rugose dorsally; large gonocoxae 8 are visible in lateral view (Fig. 28); in ventral view most of gonocoxae concealed by sternite VII therefore only terminal portion of well-sclerotised syngonapophysis visible (Figs. 24, 26). Female genitalia dissected and slide mounted show large gonocoxae 8 (gcx 8) with their inner margin slightly rounded while outer margin broadly rounded with a backwardly directed blunt apodeme. Gonapophysis 8 (gap 8) small, triangular with blunt posterior tip bearing few long setae. Gonocoxae 9 (gcx 9) slightly curved, rod-like, while gonapophyses 9 (gap 9) also curved, flat plate-like. Syngonapophysis or gonoplac (gpl) sclerotised, with long terminal setae (Fig. 36).

Egg elongate, about 0.8 mm long, with finely punctured smooth chorion and with distinct rim near opercular end; operculum round, flat, with reticulate design and a small central prominence (Fig. 30).

Measurements in mm (♂, *N* = 1 / ♀, *N* = 1): total body length from apex of head to tip of abdomen 3.75 / 3.85; total head length 0.50 / 0.52, length of anteocular region 0.21 / 0.21, of postocular region 0.15 / 0.12, eye diameter 0.10 / 0.10, interocular distance 0.21 / 0.21, dorsomedian length of pronotum 0.46 / 0.46; length of scape 2.12 / 2.12, pedicel 1.75 / 1.75, basiflagellum 0.37 / 0.35, distiflagellum 0.47 / 0.45; total labium length 0.46 / 0.46, length of visible labiomere I 0.18 / 0.18, of visible labiomere II 0.10 / 0.10, of visible labiomere III 0.18 / 0.18; fore leg: length of coxa 0.50 / 0.50, of femur 0.75 / 0.87, of tibia 0.50 / 0.50, of tarsus with claw 0.15 / 0.15; mid leg: length of coxa 0.25 / 0.25, of femur 2.50 / 2.50, of tibia 3.50 / 3.50, of tarsus with claw 0.12 / 0.12; hind leg: length of coxa 0.25 / 0.25, of femur 3.25 / 3.37, of tibia 4.75 / 4.75, of tarsus with claw 0.12 / 0.12; combined length of pro-, meso- and metasterna 1.30 / 1.30, length of prosternum 0.37 / 0.37, of mesosternum 0.50 / 0.50, of metasternum 0.43 / 0.43; length of abdomen 2.43 / 2.43, minimum width of abdomen at base 0.56 / 0.56, maximum width of abdomen around middle 0.12 / 0.12; length of pygophore 0.43 (♂).



FIGURES 31–36. *Ploiaria enigmatica* sp. nov. Figs. 31–35, male genitalia: Figs. 31–33, pygophore in dorsal, ventral and lateral views, respectively; Fig. 34, phallus in lateral view; Fig. 35, parameres. Fig. 36, female genitalia (abbreviations: gcx—gonocoxae, gap—gonapophyses, gpl—gonoplac; 8 and 9 are segment numbers).

Etymology. The species name is the Latin adjective *enigmaticus*, -a, -um (a spelling variant of *aenigmaticus*, -a, -um, frequently used in scientific Latin), meaning “enigmatic, puzzling”, referring to the unusual morphology of this new species as well as its enigmatic similarity to certain African species rather than any Indomalayan members of *Ploiaria*.

Comparison with other congeners. Three species of *Ploiaria* have been listed from India so far (Ambrose 2006): (1) *P. anak* Distant, 1909; (2) *P. soudanica* Dispons, 1960; and (3) *P. raviaspinosa* Pansare, Ghate & Webb, 2018 (the last one being a replacement name for the preoccupied *P. nuda* Ravichandran & Livingstone, 1989). Specimens of *P. soudanica* collected in India and type specimens of *P. raviaspinosa* are not traceable and hence not available for actual comparison (Pansare *et al.* 2018). However, evidently none of the above three *Ploiaria* species are identical with *P. enigmatica* sp. nov. *Ploiaria anak*, the male of which was illustrated by Distant (1911: 180, fig. 99), is distinctly larger (about 10 mm) and of different general habitus, with a distinctly longer pronotum and a much more elongate and gracile abdomen; its fore femur also lacks long spiniferous processes. *Ploiaria soudanica*, an Afrotropical species reported from Thamparai, Tamil Nadu, by Ravichandran (1988), has a similar armature of the fore trochanter as seen in the new species, but it is larger (body length 6 mm), and according to the original description and accompanying illustrations it has a distinct median tubercle on the ventral side of the posterior lobe of the head (absent in *P. enigmatica* sp. nov.), and a markedly longer prothorax with a broader posterior lobe, shorter fore femora with sharply different armature (composed of numerous short spiniferous processes, the single longest process about the diameter of femur) (Dispons 1960: 1313, figs. 1, 3). The inadequate original description of *Ploiaria nuda* (current valid name: *Ploiaria raviaspinosa*) does not allow a detailed comparison with *P. enigmatica* sp. nov. Similarly to the new species, it is a minute (body length: 5 mm), apterous species, but its fore trochanter is “almost smooth” (this wording of the original description suggests that it entirely lacks spiniferous processes or perhaps it has an insignificant one, but in no case a large one like in the new species) and its femur is armed with a large number of short spines set on minute basal tubercles, a situation fairly dissimilar to the condition seen in the new species.

The only species reported from the Indomalaya that is comparable to *P. enigmatica* sp. nov. in bearing a similarly large spiniferous process on the fore trochanter is apparently *P. vandoesburgi* Rédei, 2008, which was described based on a macropterous male from Pahang, Peninsular Malaysia. The latter species, however, is much larger (body length above 8 mm) than *P. enigmatica* sp. nov. and possesses a much more elongate femur armed with numerous short spiniferous processes (Rédei 2008: 12, figs. 1, 4), thus being highly dissimilar to our new species. The other two Indomalayan *Ploiaria* species mentioned by Rédei (2008), namely *P. macrophthalma* (Dohrn, 1860) and *P. insolida* (White, 1877), are both larger (body length about 6 mm) and known only from macropterous forms; among others, at least the shape of the head and the armature of the fore femur in both species are markedly different from the condition found in *P. enigmatica* sp. nov. (cf. Wygodzinsky 1966). Thus, no species of *Ploiaria* occurring in South and Southeast Asia has a set of characters seen in *P. enigmatica* sp. nov. and all of them can be very easily differentiated from the new species.

A further species of *Ploiaria* only known from the macropterous morph, *P. assimulata* Van Duzee, 1935 (described with an erroneous gender agreement of the specific epithet as *P. “assimulatus”*; cited as *P. “assimilata”* by Wygodzinsky (1966: 78, 165, 169) and Maldonado (1990: 109), representing an incorrect subsequent spelling) was reported from Malumichampatti, Tamil Nadu, by Ravichandran (1988) in an unpublished PhD thesis. This record was certainly based on a misidentification; the species is much larger (length of male holotype 8.5 mm) and it was originally described from the Marquesan Islands in the South Pacific (Van Duzee 1935).

According to the well-illustrated review by Villiers (1943), many Palaearctic species of *Ploiaria* possess a long spiniferous process on the fore trochanter, but almost all have markedly different processes on the fore femur. The only exception is *P. berlandi* Villiers, 1943 (described based on a male from Morocco), which is of slightly larger size (body length 5 mm), with highly similar dorsal coloration, and a basally strongly bent fore femur similar to the condition found in *P. enigmatica* sp. nov., armed with a comparable ventral armature (Villiers 1943: 93, fig. 16). It, however, has a different meso- and metathorax, and particularly the superoposterior process of its pygophore is markedly different (slender and apically strongly bifid, while broad, truncate, and shallowly emarginated apically in the new species).

Some other African species of the genus *Ploiaria* also show certain similarity with *P. enigmatica* sp. nov. *Ploiaria capensis* Villiers, 1949, described from South Africa, is a similar but larger species (body length 8 mm), lacking spines on fore tibia, and possessing a much longer pronotum more shallowly narrowed between its two

lobes. *Ploiaria basilewskyi* Villiers, 1961, described based on a single individual from the territory of the current Democratic Republic of the Congo, with no indication of the sex of the holotype in the original description, also has a similarly armed fore trochanter, but it is much larger (body length 8 mm), possesses a much elongate head and prothorax, its fore femur has only 3–4 moderately long spiniferous processes, its abdominal tergites lack median tubercles, and its fore tibia lacks long spiniferous processes (Villiers 1961). In spite of their superficial similarity in general habitus, these two species can therefore be readily differentiated from *P. enigmatica* sp. nov.

Two Afrotropical species of *Ploiaria* are apparently morphologically most similar to *P. enigmatica* sp. nov. *Ploiaria tuberculata* Villiers, 1949, described from the territory of the current Democratic Republic of the Congo, shares the small size (body length of female holotype 4 mm), short prothorax, and superficially similar fore legs, but differs from the new species in its shorter prothorax with the anterior lobe being nearly globose in dorsal view, possessing a pair of prominent tubercles on the posterior lobe of pronotum dorsally (entirely lacking in the new species), the postocular part of the head being more globular, the eyes being much smaller and far remote from ventral outline of head in lateral view, and in having markedly shorter spiniferous processes on the fore femur (Villiers 1949). Another small-sized species (body length of male holotype 3.75 mm), *P. decorata* Villiers, 1950, described based on four males and a doubtfully associated female collected in forest leaf litter in Angola, is also similar to the new species morphologically, but the latter species differs in having a shorter pronotum with strongly rounded anterior lobe in dorsal view, a more elongate and gracile fore coxa, femur and tibia, and the spiniferous processes of the posteroventral series of the fore femur being longer, at least two of the five long processes are much longer than the width of femur, and fore tibia lacking spine-like setae (Villiers 1950: 106, fig. 13); in *P. enigmatica* sp. nov. the processes of the femur are relatively shorter and fore tibia has many spine-like setae ventrally. Additional differences are the lack of median tubercles on abdominal tergites in males of *P. decorata* (present in the doubtfully associated female), while these tubercles are present in both sexes of *P. enigmatica* sp. nov. Thus, there is no species in this assemblage that is completely similar to *P. enigmatica* sp. nov.

Pansare *et al.* (2018) had mentioned the presence of an unidentified apterous *Ploiaria* species that possesses a strong spiniferous process on fore trochanter, and a winged *Ploiaria* species of larger size (body length about 12 mm), in their collection. The former is the same apterous species which is described here as *P. enigmatica* sp. nov., while the second one was identified as *Ploiaria mellea* McAtee & Malloch, 1926 and published as a first record from India by Boyane and Ghate (2020).

Discussion

It is remarkable that *P. enigmatica* sp. nov. is morphologically highly different from all Indomalayan members of *Ploiaria*, but it closely resembles certain African congeners, particularly the Afrotropical *P. tuberculata*, *P. decorata*, and the North African *P. berlandi*. It is unclear whether the morphological similarity of these species indicates a phylogenetic relationship or it is a result of parallel evolution. The presence of a clade of *Ploiaria* of shared Oriental-Afrotropical distribution would not be unparalleled, as the genus *Bagauda* Bergroth, 1903 exhibits a similar distribution pattern (Wygodzinsky 1966).

Ploiaria enigmatica sp. nov. is another apterous species of *Ploiaria* in India. Other apterous species include *P. anak*, redescribed in detail by Pansare *et al.* (2018); *P. raviaspinosa*, a species of doubtful identity and in need of a proper redescription; and *P. soudanica*. The latter species is of Afrotropical distribution, therefore its record from India (Ambrose 2006) is very likely based on a misidentification and it might possibly pertain to *P. enigmatica* sp. nov., but the unavailability of voucher specimens makes it impossible to confirm or reject this hypothesis. The recent record of *P. mellea*, a species described from the Philippines, from India (Boyane & Ghate 2020), nevertheless indicates that some species of this genus have very broad distribution area.

The number of apterous *Ploiaria* species recorded from India is hereby increased from three (Ambrose *et al.* 2006, Mukherjee *et al.* 2020) to four, albeit one of them (*P. soudanica*) is highly doubtful, and another (*P. nuda*) is of uncertain identity. Including *P. mellea*, there are five species of *Ploiaria* known to occur in India. It is certain that the exploration of this genus in the Indian Subcontinent, and in the Western Ghats, is far from satisfactory and the discovery of unrecorded and undescribed species is expected.

It is interesting to note that our new species is found in two climatically highly different localities, a semi-arid and another very humid area. A pair of *P. enigmatica* sp. nov. was successfully kept under laboratory conditions

on small spiders for about a month, but mating or oviposition could not be observed. A single female collected at Daund in November laid eggs in captivity, suggesting that the breeding season of this species spans from August to October, although further surveys are necessary to confirm this. Active males and females were observed by one of us (Pansare) recently in Daund again, during October 2023, but mating or oviposition could not be observed. More efforts are underway to study the bionomics of this interesting species.

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