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ON THE COVER: *DYSDEROIDES SYNDRANG*, FEMALE HOLOTYPE
FROM JAINTIA HILLS, INDIA, ANTERIOR VIEW OF CEPHALOTHORAX.

GRISMADO ET AL.: *DYSDEROIDES*, *TRILACUNA*, AND *HIMALAYANA*

AMNH BULLETIN 387

2014

TAXONOMIC REVIEW OF THE GOBLIN SPIDERS
OF THE GENUS *DYSDEROIDES* FAGE AND THEIR
HIMALAYAN RELATIVES OF THE GENERA
TRILACUNA TONG AND LI AND *HIMALAYANA*,
NEW GENUS (ARANEAE: OONOPIDAE)

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BULLETIN OF THE AMERICAN MUSEUM OF NATURAL HISTORY

Number 387, 108 pp., 83 figures, 1 table

Issued April 21, 2014

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ABSTRACT

The study of many museum specimens of goblin spiders from the Himalayan range and neighboring countries allows for the description of new taxa of the family Oonopidae. The genus *Dysderoides* Fage is taxonomically reviewed. It comprises small, blind, loricated troglobitic spiders: the type species (*D. typhlos* Fage, from India) and at least five new species from northern India (*D. synrang* Grismado and Deeleman) and Thailand (*D. muang* Grismado and Deeleman, *D. kaew* Grismado and Deeleman, *D. kanoi* Grismado and Deeleman, and *D. lawa* Grismado and Deeleman). The genus *Trilacuna*, previously known from China, Thailand, Malaysia, and Sumatra, is newly diagnosed by the loss of the furrow connecting the posterior spiracles in males, and is represented in the Himalayan region by seven species: *T. aenobarba* (Brignoli), from Bhutan (here transferred from *Epectris* Simon), and six new: four from northern India (*T. meghalaya* Grismado and Piacentini, *T. besucheti* Grismado and Piacentini, *T. mahanadi* Grismado and Piacentini, and *T. loebli* Grismado and Piacentini), one from India and Nepal (*T. bangla* Grismado and Ramírez), and one from Pakistan (*T. hazara* Grismado and Ramírez). The new genus *Himalayana* Grismado comprises species very similar to those of *Trilacuna*, but differs in the characters of the postepigastric scuta and by having an additional acute dorso-prolateral projection on the male palpi. Six new species are assigned to *Himalayana*: *H. kathmandu* Grismado (type species), *H. castanopsis* Grismado, *H. parbat* Grismado, and *H. martensi* Grismado (all from Nepal); and *H. siliwalae* Grismado and *H. andreae* Grismado (from India). The study of the internal female genitalia of *T. meghalaya* and *T. bangla* revealed a complex copulatory system, and an entelegyne condition, apparently uniform for the entire genus and probably for *Dysderoides* and *Himalayana* as well. The males of the three genera have a complex set of paraembolic laminae with brushes of filiform structures, among which discharges a gland through a thin, tortuous cuticular tube. The genitalic and somatic morphology of the three genera suggest that they conform a monophyletic group, here named “*Dysderoides* complex,” and that their closer relatives can be found among *Prethopalpus* Baehr et al., and other genera related to *Silhouettella* Benoit. The loss of the membranous diagonal area on the base of the anterior lateral spinnerets is proposed as a synapomorphy of an advanced group of loricatae oonopids usually referred as gamasomorphines. Furthermore *Triaeris glenniei* Fage, described from a single female from a cave in Uttarakhand, is redescribed and transferred to *Camptoscaphiella* Caporiacco.

INTRODUCTION

The enigmatic genus *Dysderoides* was described by Fage (1946) for *D. typhlos*, a blind oonopid found in Moila Cave, in northern India, currently situated in Uttarakhand state. In the same work Fage transferred the South American species *Telchius micans* Simon, 1893, to this genus, mainly because of the shape of the carapace: “Cette espèce diffère d’ailleurs profondément à cet égard du type du genre, le *T. barbarus* E.S. d’Algérie, et du *T. transvaalicus* E.S. d’Afrique du Sud. Elle en diffère en outre, par la forme du céphalothorax qui, comme celui du *Dysderoides typhlos*, est graduellement rétréci en avant (fig. 1, e) et non fortement étranglé dans la partie céphalique, comme dans les espèces d’Afrique (fig. 1, f et g).”

The specimens of the type series of *Telchius micans* are very different from both *Dysderoides typhlos* and *Telchius barbarus*,

and belong to an undescribed circum-Caribbean genus (see below). In recent years, additional species apparently congeneric with *D. typhlos* were collected in caves from northern India and Thailand, including the first known males, which led us to prepare the taxonomic revision presented here.

Interestingly, in the same paper describing *Dysderoides*, Fage described another oonopid species from Moila Cave: *Triaeris glenniei*, represented only by the single female holotype. As it was found in Platnick et al. (2012d: 3) for many species listed incorrectly in that genus, this species differs greatly from the type species *T. stenaspis*, and is here transferred to *Camptoscaphiella* Caporiacco, 1934 (see below).

Dysderoides seems to be closely related to the Southeast Asian and Himalayan genus *Trilacuna* Tong and Li, 2007, as both have a deeply incised labium, and large chelicerae abruptly narrowed in the distal part. The

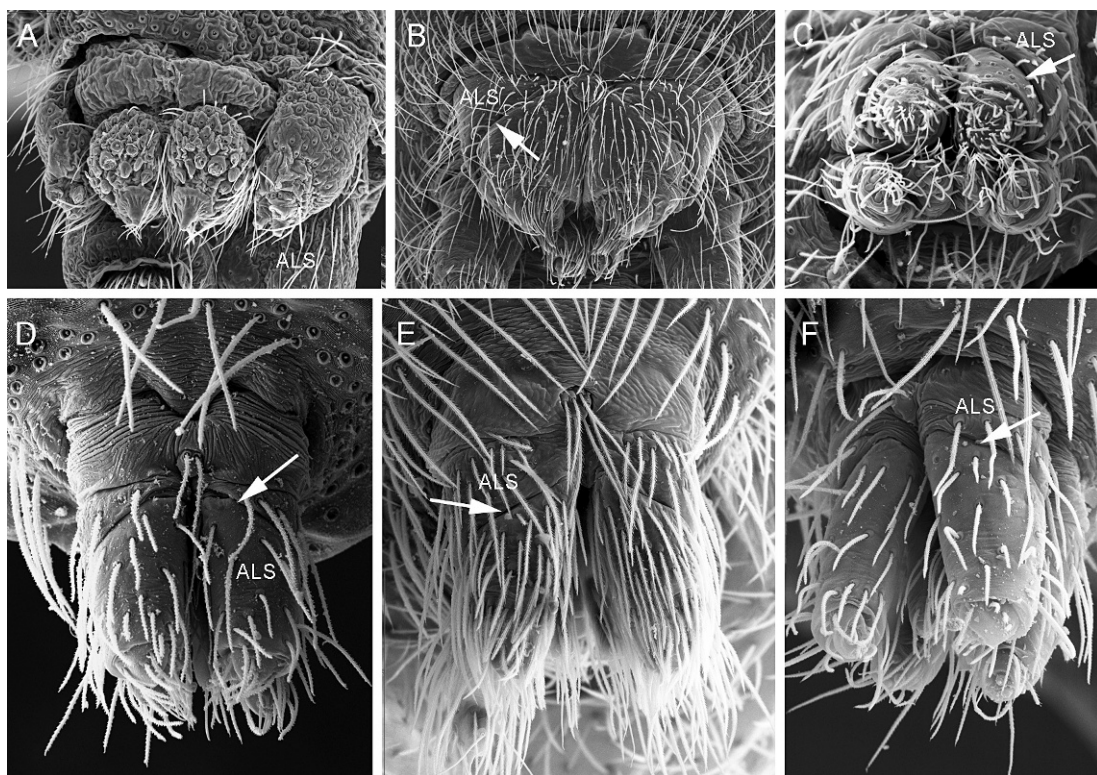


Fig. 1. Spinneret morphology in basal oonopids, dysderoids, and relatives. **A.** *Nops* sp. (Caponiidae). **B.** *Ariadna boesenbergi* Keyserling (Segestriidae). **C.** *Osornolobus* sp. (Orsolobidae). **D.** *Orchestina*, n. sp. Ecuador (Oonopidae, Orchestiniinae). **E.** *Puan chechehet* Izquierdo (Oonopidae, Sulsulinae). **F.** *Neotrops waorani* Grismado and Ramírez (Oonopidae, soft bodied Oonopinae), male PBI_OON 30600. Arrows = membranous diagonal on ALS.

newly discovered males of *Dysderoides* also have characteristically “hairy” paraembolic laminae in the copulatory bulb, similar to that in *Trilacuna*. The clarification of the copulatory bulbs revealed a remarkable tortuous internal tube, additional to the sperm duct, leading near the embolus area (fig. 14A, B), which we also found in *Trilacuna* species (i.e., fig. 48B, C; see also Eichenberger and Kranz-Baltensperger, 2011: figs. 6B, C, E, F, 17), thus reinforcing the hypothesis of relationships. The female genitalia are also similar in both genera, with two parallel, ventral, transverse sclerotized plates (between the epigastric and postepigastric scuta), an anterior sclerite without lumen (usually T-shaped), and a small posterior receptacle of variable shape, but rounded in most species. Besides the reduction of eyes obviously related with living in

caves, *Dysderoides* is probably a monophyletic genus, as all the species have long spines on legs III and IV, which are missing in *Trilacuna* and related taxa (see below).

While we were studying the large collections of oonopids from several expeditions to the Himalayan range deposited at the museums of Geneva and Frankfurt, we found an interesting assemblage of gamasomorphines that resemble *Dysderoides* in the mouthparts and genitalia, including the characteristic internal tube in the male copulatory bulb and the hairy paraembolic processes. Some of these species seem to belong to the genus *Trilacuna*, recently studied by Eichenberger and Kranz-Baltensperger (2011), but other species do not fit well in that genus. *Trilacuna* was originally diagnosed by the enlarged male palpal femora, the very complicated embolus-conductor complex, the branched

endites in males and the notched labium (Tong and Li, 2007). Some of the species subsequently added to the genus show variability in those characters (Eichenberger and Kranz-Baltensperger, 2011: figs. 3C–D, 6B–C, 20A–B; and see below), and the palpal and labial morphology are here shown to be characters of a more inclusive group. In light of the new taxa here considered, it seems that the loss of the furrow connecting the posterior tracheal spiracles in the males is a synapomorphy of *Trilacuna*. The four Indian species described here (*T. meghalaya*, *T. besucheti*, *T. mahanadi*, and *T. loebli*) share with the type species of the genus, *T. rastrum* (Tong and Li 2007, the sternal surface covered with numerous pits, the chelicerae with anterobasal processes made of enlarged setae bases, a conspicuous conical projection on the dorsum of the carapace (figs. 15C, 16G), and the posterior spiracles not united by a furrow in males; hence, we believe that these new species are closely related to the type species. Two species described by Eichenberger and Kranz-Baltensperger (2011), *T. werni* and *T. diabolica* have such a furrow, for which we believe their placement should be reconsidered.

Another group of species from Nepal and northern India, although sharing the general morphology of the genitalia, chelicerae, and labium, differ notably from the typical *Trilacuna* in having the sternum reticulated or smooth (rather than pitted), the male posterior tracheal spiracles connected by a conspicuous furrow, a short postepigastric scutum in females limited to the area around the epigastric furrow, and in lacking the conical projection on the carapace. A detailed examination of the male palps of those species shows that all have an additional, acute projection on the prolateral-dorsal part of the bulb, near the tip (fig. 62E–H). This character, unknown in other related oonopids, can be reasonably considered as a putative synapomorphy for this group, described below as the new genus *Himalayana*.

Three further species, clearly related to the ones mentioned above, show some intermediate morphology: *Epectris aenobarbus* Brignoli, 1978, known only by the male holotype from Bhutan, has the palp as the typical *Trilacuna*, although the tracheal spiracles are

connected by a shallow transverse depression, while the texture of its sternum is reticulated as in *Himalayana*. A new, very similar species (*T. bangla*) exhibits the same characters of *E. aenobarbus* (see fig. 47A–B), but in this case fortunately the females are known—they have the sternum as those of *Himalayana*, but the postepigastric scutum is long, almost reaching the spinnerets (fig. 49), as in the females of *Trilacuna*. The third species (*T. hazara*, from Pakistan) is known only from females, which have the same combination of characters like the females of *T. bangla*. We suspect that these species with a shallow transverse connection represent a first step to the loss of the furrow, and may be basal species relative to the remaining *Trilacuna*; we have therefore listed them in that genus.

From all of the above, there seems to be sufficient evidence in the morphology of the male copulatory bulb and the mouthparts for the existence of a complex of Asian genera that we call “*Dysderoides* complex,” distributed from Pakistan to Sumatra and containing *Dysderoides*, *Trilacuna*, and *Himalayana*.

INTERNAL STRUCTURE OF THE COPULATORY BULB

We dissected and digested the tissues in the copulatory bulbs of *Trilacuna bangla*, which revealed the cuticular structure of the internal gland, discharging at the base of the brush of “hairy” projections (fig. 47H–K). The combination of a gland and a brush suggests a mechanism to locally retain a pheromone secretion, and reminds one of the gustatorial courtship devices found in the prosoma of several linyphiid and theridiid males (see references in Huber, 2005: 367). Brushlike structures were also suggestive of mechanisms to remove sperm from a previous male (see Huber, 2005: 374). In this case, however, the diameter of the copulatory opening matches the size of the embolus, but the terminal brush is too large for intromission. The same dissections revealed an elongate cuticular structure running from the embolus base to the articulation with the tibia. The first, wider part seems to be the only cuticular remnant of the sperm duct, which has lost its

cuticular lining in Oonopinae (Platnick et al., 2012a: 32), and the long projection is likely the tendon of the M29 muscle, which has been shown to attach to the sperm duct in dysderoids (Huber, 2004: 366).

FEMALE GENITALIA MORPHOLOGY IN THE *DYSDEROIDES* COMPLEX AND RELATIVES

The female genitalia are quite homogeneous in the three genera here considered, and also quite unusual as well in lacking any voluminous structure that may act as a large sperm receptacle, as occurs in most oonopids and dysderoids (Forster and Platnick, 1985). The anterior sclerite is slender and solid, most often T-shaped, and the posterior receptacle is small, well sclerotized, and connected to the exterior by a ventral orifice, behind a transverse plate but still close to the epigastric furrow (figs. 22A, B, D, 45A). Although some *Dysderoides* species lack the anterior transverse plate, at least we found the copulatory opening separated from the epigastric furrow in the new species *D. kaew*, *Himalayana martensi*, and *H. kathmandu* (figs. 9H, 63H, 66H), which conforms to the groundplan of the female genitalia in the entire *Dysderoides* complex; it should be noted, however, that no SEM images were taken of either *Dysderoides* or *Himalayana*.

This conformation is very similar as in the Australasian genus *Prethopalpus*, recently described by Baehr et al. (2012), for which Burger et al. (2003) previously described the genital system of one species (*P. fosuma*, as a species of *Opopaea*), and to that of the Malagasy genus *Molotra* (Ubick and Griswold, 2011b). Burger et al. (2003) documented that in *P. fosuma* the ventral opening leading to the posterior elements in the female genitalia is in fact a copulatory opening (see their fig. 14, with an embolus locked inside), but it is unclear how the fertilization may occur, as that is the only opening of the receptacle and it is separated from the oviduct. Their figure 15 shows a narrow slit ("groove") on the "anterior wall of spermatheca," but Burger never found conclusive evidence that such a slit leads to the uterus; in some females the slit seems to be more prominent than in others (Burger, personal commun.). In the absence of a

communication between the sperm receptacle and the oviduct, the fertilization in *P. fosuma* is probably external.

Our scans of *Trilacuna* species (*T. meghalaya* and *T. bangla*) show, however, a main difference from *Prethopalpus*: while the copulatory opening is situated in the same place, a connection between the posterior receptacle and the uterus externus is evident (figs. 22D, E, 45D, E). If our interpretation is correct, the sperm must be transported forward to the uterus externus, and its passage would be regulated by the locking mechanism of the T-shaped sclerite into the anterior orifice (see figs. 22E, F, 45C). Then, given that the fertilization channel is different from the copulatory one, the females of the *Dysderoides* complex have an entelegyne condition, similar to those described for the African genus *Antoonops* (Fannes and Jocqué, 2008: 26).

The females of at least *Trilacuna* and *Himalayana* have a stripe, or line, of gland ducts on a transverse plate, posterior to the uterus externus (figs. 45E, F, 39A). Whereas in oonopids and dysderoids in general these vesiclelike gland ducts discharge on the posterior receptacle, in *Trilacuna bangla* they discharge on a furrow, closely connecting to the exterior (the exit pores are visible, at least in *T. bangla*, fig. 45G, I). This is the same conformation as found in *Molotra* Ubick and Griswold (2011b: figs. 8, 222), which lacks a conspicuous posterior receptacle, has genital glands that discharge on a shallow furrow, and has no posterior receptacle, but instead only the more anterior "globular appendix". In *Prethopalpus fosuma*, which has a reduced posterior receptacle, all the structures are tightly packed, and the vesiclelike gland ducts seem to discharge on genitalic structures, but still very close to the copulatory opening. In comparison with *Molotra* and *Prethopalpus*, it seems that the relatively small "posterior receptacle" in *Trilacuna* and relatives corresponds most closely with the anterior part of the posterior female genitalia, the "globular appendix." To our knowledge, the finding of vesiclelike gland ducts discharging directly to the exterior is the first report of this configuration in spiders, in this case behind the copulatory opening.

RELATIONSHIPS OF THE *DYSDEROIDES* COMPLEX

Given the similarity of their genitalia and somatic morphology, we believe that the closer relatives of the *Dysderoides* complex can be found among *Prethopalpus* and the “silhouettelloids” (Álvarez-Padilla et al., 2012; Ubick and Griswold, 2011b; also named the *Pelcinus* group, Platnick et al., 2012c). All those representatives have long female postepigastric scuta, male posterior spiracles united by a furrow, and legs III and IV lacking spines, which allows us to advance some hypotheses of relationships. First, as discussed above, the reduction of the furrow connecting the posterior spiracles in males is a synapomorphy of *Trilacuna*. Second, the short postepigastric scuta found in *Dysderoides* and *Himalayana* are a synapomorphy relating both genera. And third, the spinose legs III and IV is a synapomorphy for *Dysderoides*, which is also congruent with a monophyletic origin of their cave adaptations, such as the loss of eyes, long legs, and weakness and reduction of the scuta.

SPINNERET MORPHOLOGY AND A POTENTIAL SYNAPOMORPHY FOR HIGHER GAMASOMORPHINES

Goblin spiders are champions in the morphological variability of body regions that are otherwise quite constant in spiders, such as the sternum, the postepigastrium, and the male endites. In contrast, the morphology of the spinning organs is unremarkable, lacking sexual dimorphism, with little variation across groups, and even the different gland spigot types are difficult to distinguish from each other (Platnick et al., 1991). Our study of the spinnerets of *Trilacuna meghalaya* led us to pay attention to a further simplification of their spinnerets. In the families more closely related to oonopids (Dysderidae, Segestriidae, and Orsolobidae), the basal article of the ALS is crossed by a diagonal membranous area (fig. 1B, C; table 1). This character has been reported by Simon (1893: 310) and is seemingly a synapomorphy of Dysderoidea plus the recently erected Trogloraptoridae (Griswold et al., 2012). Caponiids, also a candidate

sister group of Dysderoidea (Ramírez, 2000), lack such a division (fig. 1A), but have a tracheal system very similar to that of dysderoids. The diagonal membranous area, which looks less sclerotized under a stereomicroscope, occurs in the basal members of Oonopidae (Orchestininae and Sulsulinae; fig. 1D, E), as well as in the soft-bodied goblin spiders usually referred as “oonopines” (fig. 1F). In contrast, *T. meghalaya* has an entire basal article (figs. 21A, 27A). The examination of published images and our own observations of oonopid spinnerets revealed that the entire basal article is widespread, but not universal, in the loricatae oonopids usually referred as gamasomorphines (table 1). While the Gamasomorphinae was recently subsumed into Oonopinae, there is evidence suggesting that they may still be a monophyletic group (Platnick et al., 2012b: 6); in the absence of a formal group name, we will informally refer to them as gamasomorphines. It turns out that the gamasomorphine genera retaining the membranous diagonal area are midway in the progression toward a complete body armature, with their females lacking a dorsal abdominal scutum. This finding fits well with the hypothesis of Platnick and Dupérré (2010b) of a gradual sclerotization from carapace to abdomen in the phylogeny of the group, leading to the syndrome of gamasomorphy.

This progression can be roughly summarized as follows: The basal gamasomorphines such as *Stenoonops*, *Longoonops*, and *Australoonops* have a sclerotized carapace but lack abdominal scuta, and preserve the diagonal division on the ALS. Next in the series, the South American genus *Niarchos* has the exposed sperm pore characteristic of higher gamasomorphines (Platnick et al., 2012a: 6), and the males have a dorsal scutum, but still preserve the ALS diagonal area, while the females lack a dorsal scutum. In *Escaphiella*, *Scaphiella*, and *Scaphios* the ALS diagonal area is lost and, finally, in *Gamasomorpha* and all the typical hard-bodied gamasomorphines the females acquire a dorsal scutum. This scenario is, however, not free of homoplasy. The genus *Scaphioides*, for example, lacks both the diagonal area on the ALS and dorsal abdominal scuta in both sexes; in addition, the male sperm

TABLE 1
Characters of gamasomorphines

Distribution of the diagonal division on the basal article of the anterior lateral spinnerets, and other characters of gamasomorphines, scored in representative oonopids and outgroups.

Group	Genus	ALS basal article diagonal division	Male sperm pore exposed	Male dorsal scutum	Female dorsal scutum	Species examined
outgroup: Caponiidae	<i>Nops</i>	absent	not	absent	absent	<i>Nops</i> sp. (fig. 1A)
outgroup: Caponiidae	<i>Notnops</i>	absent	not	absent	absent	<i>N. calderoni</i>
outgroup: Troglooraptoridae	<i>Troglooraptor</i>	present	not	absent	absent	<i>T. marchingtoni</i> (Griswold et al., 2012: fig. 68)
outgroup: Segestriidae	<i>Ariadna</i>	present	not	absent	absent	<i>Ariadna boesenbergi</i> (Fig. 1B)
outgroup: Segestriidae	<i>Segestria</i>	present	not	absent	absent	<i>Segestria florentina</i>
outgroup: Dysderidae	<i>Dysdera</i>	present	not	absent	absent	<i>D. crocata</i>
outgroup: Orsolobidae	<i>Falklandia</i>	present	not	absent	absent	<i>F. rumbolli</i>
outgroup: Orsolobidae	<i>Mallecolobus</i>	present	not	absent	absent	<i>Mallecolobus</i> cf. <i>sanus</i>
outgroup: Orsolobidae	<i>Orsolobus</i>	present	not	absent	absent	<i>O. pucara</i>
outgroup: Orsolobidae	<i>Osornolobus</i>	present	not	absent	absent	<i>Osornolobus</i> sp. (Fig. 1C)
outgroup: Orsolobidae	<i>Subantarctia</i>	present	not	absent	absent	<i>S. turbotti</i>
outgroup: Orsolobidae	<i>Tasmanoonops</i>	present	not	absent	absent	<i>Tasmanoonops</i> sp.
Orchestininae	<i>Orchestina</i>	present	not	absent	absent	<i>Orchestina</i> sp.n. Ecuador (Fig. 1D)
Sulsulinae	<i>Cortestina</i>	present	not	absent	absent	<i>C. thaleri</i> (Knoflach et al., 2009: fig. 33)
Sulsulinae	<i>Dalmasula</i>	present	not	absent	absent	<i>D. lorelei</i> (Platnick et al., 2012a: fig. 188)
Sulsulinae	<i>Puan</i>	present	not	absent	absent	<i>P. chechehet</i> (Fig. 1E; Izquierdo et al., 2012: fig. 64)
Sulsulinae	<i>Sulsula</i>	present	not	absent	absent	<i>S. pauper</i> (Platnick et al., 2012a: fig. 158)
Sulsulinae	<i>Unicorn</i>	present	not	absent	absent	<i>U. sikus</i> (González Reyes et al., 2010: fig. 2d)
Sulsulinae	<i>Xiombarg</i>	present	not	absent	absent	<i>X. plaumanni</i>
Oonopinae: soft-bodied	<i>Heteroonops</i>	present	not	absent	absent	<i>H. spinimanus</i> (Platnick and Dupérré, 2009b: fig. 126)
Oonopinae: soft-bodied	<i>Neotrops</i>	present	not	absent	absent	<i>N. waorani</i> (Fig. 1F; Grismado and Ramírez, 2013: fig. 94g)
Oonopinae: soft-bodied	<i>Oonops</i>	present	not	absent	absent	<i>O. pulcher</i> (Platnick and Dupérré, 2009c: figs. 27, 67)
Oonopinae: soft-bodied	<i>Predatoroonops</i>	present	not	absent	absent	<i>P. peterhalli</i> (Brescovit et al., 2012: fig. 380)
Oonopinae: basal gamasomorphines	<i>Longoonops</i>	present	not	absent	absent	<i>L. bicolor</i> and <i>L. paidiscus</i> (Platnick and Dupérré, 2010b: figs. 585, 686)
Oonopinae: basal gamasomorphines	<i>Stenoonops</i>	present	not	absent	absent	<i>S. pretiosus</i> (Platnick and Dupérré, 2010b: fig. 421)
Oonopinae: basal gamasomorphines	<i>Scaphioides</i>	absent	not	absent	absent	<i>S. minuta</i> and <i>S. nitens</i> (Platnick and Dupérré, 2012: figs. 45, 256, 285)
Oonopinae: basal gamasomorphines	<i>Niarchos</i>	present	exposed	present	absent	<i>N. barragani</i> (Platnick and Dupérré, 2010c: figs. 69, 107).

TABLE 1
(Continued)

Group	Genus	ALS basal article diagonal division	Male sperm pore exposed	Male dorsal scutum	Female dorsal scutum	Species examined
Oonopinae: basal gamasomorphines	<i>Escaphiella</i>	absent	exposed	present	absent	<i>E. hespera</i> , <i>E. gigantea</i> , and <i>E. pocone</i> (Platnick and Dupérré, 2009b: figs. 36, 582, 763)
Oonopinae: basal gamasomorphines	<i>Scaphiella</i>	absent	exposed	present	absent	<i>S. hone</i> (Platnick and Dupérré, 2010a: fig. 379)
Oonopinae: basal gamasomorphines	<i>Scaphios</i>	absent	exposed	present	absent	<i>S. yanayacu</i> (Platnick and Dupérré, 2010c: figs. 735, 782)
Oonopinae: higher gamasomorphines	<i>Aschnaonops</i>	absent	exposed	present	present	<i>A. silvae</i> (Platnick et al., 2013: fig. 193)
Oonopinae: higher gamasomorphines	<i>Brignolia</i>	absent	exposed	present	present	<i>B. parumpunctata</i> (Platnick et al., 2011: figs. 37, 73)
Oonopinae: higher gamasomorphines	<i>Camptoscaphiella</i>	absent	exposed	present	present	<i>C. paquini</i> (Baehr and Ubick, 2010: fig. 63)
Oonopinae: higher gamasomorphines	<i>Ischnothyreus</i>	absent	exposed	present	present	<i>I. peltifer</i> (Platnick et al., 2012b: figs. 17, 68)
Oonopinae: higher gamasomorphines	<i>Malagiella</i>	absent	exposed	present	present	<i>M. ranomafana</i> and <i>M. vohiparara</i> (Ubick and Griswold, 2011a: figs. 40, 44, 149)
Oonopinae: higher gamasomorphines	<i>Molotra</i>	absent	exposed	present	present	<i>M. molotra</i> (Ubick and Griswold, 2012b: figs. 112–119)
Oonopinae: higher gamasomorphines	<i>Noideattella</i>	absent	exposed	present	present	<i>N. gamela</i> (image from PBI site, not published)
Oonopinae: higher gamasomorphines	<i>Opopaea</i>	absent	exposed	present	present	<i>O. deserticola</i> (Platnick and Dupérré, 2009a: fig. 70)
Oonopinae: higher gamasomorphines	<i>Pelycinus</i>	absent	exposed	present	present	<i>P. koghisi</i> (Platnick et al., 2012c: fig. 72)
Oonopinae: higher gamasomorphines	<i>Prethopalpus</i>	absent	exposed	present	present	<i>P. fosuma</i> (Baehr et al., 2012: figs. 24, 45)
Oonopinae: higher gamasomorphines	<i>Prodysderina</i>	absent	exposed	present	present	<i>P. megarmata</i> (Platnick et al., 2013: fig. 42)
Oonopinae: higher gamasomorphines	<i>Simonoonops</i>	absent	exposed	present	present	<i>S. craneae</i> (Platnick and Dupérré, 2011: fig. 44)
Oonopinae: higher gamasomorphines	<i>Triaeris</i>	absent	exposed	present	present	<i>T. stenaspis</i> and <i>T. ibadan</i> (Platnick et al., 2012d: figs. 12, 92, 122)
Oonopinae: higher gamasomorphines	<i>Trilacuna</i>	absent	exposed	present	present	<i>Trilacuna meghalaya</i> (Figs. 21A, 27A)

pore is not exposed. Just to name two of many possibilities, species of this genus might be basal gamasomorphines that independently lost the ALS diagonal area, or instead higher gamasomorphines that reverted to the unexposed male sperm pore and lost the male dorsal scutum.

MATERIAL AND METHODS

The descriptions were generated automatically from the species descriptive database of the Oonopid Planetary Biodiversity Inventory project, except for the spine notation, which follows Grismado (2008); only surfaces

bearing spines are listed. Each description mentions only those features relevant to its species, without repeating the common characters for the genus. Drawings were made with a camera lucida mounted on an Olympus BH-2 compound microscope. Photographs of the preserved specimens were taken with a Leica DFC 290 digital camera mounted on a Leica M165 C stereoscopic microscope, and the focal planes were aligned with Helicon Focus 4.62.2. Female genitalia were observed in clove oil. Scanning electron micrographs were taken under high vacuum with a FEI XL30 TMP after critical point drying and gold-palladium coating. Due to the scarcity of museum specimens, we avoided the use of irreversible techniques such as scanning electron microscope in fully documenting the anatomy of all the species described (possible only for *Trilacuna meghalaya*, *T. bangla*, *Himalayana kathmandu*, and, to a lesser extent, for females of *Dysderoides muang*). Male and female genitalia of *T. bangla* and female genitalia of *T. meghalaya* were dissected and digested with Ultrazyme® enzymatic cleaner for soft contact lenses. For this, one pill was dissolved in approximately 15 ml of distilled water and then aliquots of this solution were placed in microvials together with the dissected pieces. The dissected parts were left overnight at room temperature in this solution. The small pieces were cleaned with distilled water flushes of micropipettes until all the soft tissues were detached from the cuticle elements. In order to detect with some detail the internal structures of male and female genitalia (such as gland outlets, copulatory openings, and so on) longitudinal and sagittal sections were performed. In the case of copulatory bulbs, the sectioning was made before the digesting process. Some organs, such as the massive tracheal system, were removed from the female abdomen to better view other structures. The genitalia of one female of *T. bangla* (PBI_OON 15773) were only partially longitudinally sectioned and its ventral shields slightly separated (fig. 45B, C). For the serial ethanol drying process the pieces were slowly transferred, drop by drop, from the distilled water to 80% ethanol. All measurements are in millimeters.

COLLECTIONS EXAMINED

BMNH	Natural History Museum, London, United Kingdom
MACN-Ar	Museo Argentino de Ciencias Naturales "Bernardino Rivadavia," Buenos Aires, Argentina.
MHNG	Muséum d'Histoire Naturelle de la Ville de Genève, Geneva, Switzerland
MNHN	Muséum National d'Histoire Naturelle, Paris, France
NHMB	Natural History Museum, Bern, Switzerland
NMB	Naturhistorisches Museum, Basel, Switzerland
RMNH	Nationaal Natuurhistorische Museum, Leiden, the Netherlands
SGN	Naturmuseum Senckenberg, Frankfurt, Germany

VOUCHERS FOR COMPARATIVE STUDIES

The following specimens were examined for the comparative study of the diagonal membranous area of the anterior lateral spinnerets (table 1). **Caponiidae:** *Nops* sp., female, AMNH, preparation code MAI 183 (fig. 1A). *Notnops calderoni* Platnick 1994, 3 males, MACN-Ar 20133. **Dysderidae:** *Dysdera crocata* C.L. Koch, 1838, 1 female, MACN-Ar 2107. **Segestriidae:** *Ariadna boesenbergi* Keyserling, 1877, female, MACN-Ar 10201 (fig. 1B). *Segestria florentina* (Rossi, 1790), 1 female, 1 male, and 3 juveniles, MACN-Ar 21263. **Orsolobidae:** *Osornolobus* sp., female, MACN-Ar 20177, preparation code MAI 230 (fig. 1C). *Falklandia rumbolli* (Schiapelli and Gerschman, 1974), 1 male, 1 female, MACN-Ar 6659. *Mallecolobus* cf. *sanus*, 1 female, MACN-Ar 27942. *Orsolobus pucara* Forster and Platnick, 1985, 1 male, 1 female, MACN-Ar 16567. *Subantarctia turbotti* Forster, 1955, 1 male, 1 female, MACN-Ar 20184. *Tasmanoonops* sp., 1 male, 1 female, MACN-Ar 11835. **Oonopidae:** *Neotrops waorani* Gris-mado and Ramírez, 2013, male PBI_OON 30600 (fig. 1F). *Noideattella gamela* Álvarez-Padilla et al., 2012, female, PBI_OON 03923 (image from PBI site, not published). *Orches-*

tina sp., female, USNM, PBI_OON 37224, preparation code MAI 306 (fig. 1D). *Puan chechehet* Izquierdo, 2012, male, MACN-Ar 27626, PBI_OON 43350, preparation code MAI 569 (fig. 1E). *Xiombarg plaumanni* Brignoli, 1979, 1 male, FCE 2319, PBI_OON 42200.

TAXONOMY

Dysderoides Fage

Dysderoides Fage, 1946: 382 (type species by original designation *Dysderoides typhlos* Fage, 1946).

DIAGNOSIS: This genus resembles *Trilacuna* and *Himalayana* by the chelicerae abruptly narrowed distally, the deeply incised labium (fig. 3A–C), and the genitalic morphology (females with an anteriorly elongate, solid sclerite, small posterior receptacle, and transverse sclerotized plates posterior to the epigastric furrow, as in fig. 14C, D; and males with paraembolic laminae with filiform projections and internal thin, tortuous tube, see figs. 14A, B); it differs from both genera by lacking eyes and having well-developed macrosetae on legs III and IV.

DESCRIPTION: Male: **Cephalothorax:** Carapace yellow-brown, without any pattern, broadly oval in dorsal view, pars cephalica slightly elevated in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, with rounded posterolateral corners, posterolateral edge without pits, posterior margin not bulging below posterior rim, anterolateral corners without extension or projections, posterolateral surface without spikes, surface of elevated portion of pars cephalica smooth, sides smooth, thorax without depressions, fovea absent, without radiating rows of pits; lateral margin straight, smooth, without denticles; marginal setae probably present in most specimens, only the bases remain in preserved specimens. Clypeus margin unmodified, straight in front view, vertical in lateral view, median projection absent; setae light, needlelike. Chilum absent. Eyes absent (remnants still visible in *D. synrang*, fig. 13G). Sternum longer than wide, usually without radial furrows between coxae I–II, II–III, III–IV, uniform, not fused

to carapace, median concavity absent, surface smooth, without pits, microsculpture absent, anterior margin unmodified, posterior margin usually not extending posteriorly of coxae IV, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae approximately equal, precoxal triangles present, lateral margins unmodified, without posterior hump; setae sparse, dark, needlelike, evenly scattered, originating from surface, without hair tufts. Mouthparts: chelicerae straight, anterior face unmodified; without teeth on both promargin and retromargin; fangs without toothlike projections, directed medially, shape normal, without prominent basal process, tip unmodified (as in fig. 2D); setae light, needlelike, evenly scattered; paturon inner margin with pairs of enlarged setae, distal region abruptly narrowed, posterior surface unmodified, promargin unmodified. Labium triangular, anterior margin deeply incised (as in fig. 3C), same as sternum in sclerotization, not fused to sternum; with six or more setae on anterior margin, subdistal portion with unmodified setae. Endites distally not excavated, serrula present in single row (as in fig. 3H), antero-median tip unmodified, posteromedian part unmodified, same as sternum in sclerotization. **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly; dorsum soft portions usually white or pale whitish, without color pattern. Book lung covers large, elliptical, without setae, anterolateral edge unmodified. Posterior spiracles connected by groove. Scutopedicel region unmodified, scutum not extending far dorsal of pedicel, plumose hairs absent. Dorsal scutum covering almost whole dorsum, weakly sclerotized, without color pattern, middle surface smooth, sides smooth. Epigastric scutum weakly sclerotized, surrounding pedicel, not protruding. Postepigastric scutum weakly sclerotized, long, almost rectangular, covering nearly full length of abdomen length, anterior margin unmodified, without posteriorly directed lateral apodemes. Spinneret scutum present, incomplete ring. Dorsum setae light, needlelike. Epigastric area setae uniform, light, needlelike. Postepigastric area setae light. Spinneret scutum without fringe of setae. **Legs:** Pale, without color pattern; femur IV not thickened, same size as femora

I–III, patella plus tibia I longer than carapace, tibia I unmodified, tibia IV ventral scopula absent, metatarsi III and IV weak, ventral scopula absent. Leg spines present, usually with four ventral pairs on leg I and two ventral pairs on leg II. Spines on tibiae and metatarsi of legs III–IV more variable, but always present and well developed, at least on tibia III and tibia and metatarsus IV. Tarsi I–IV without inferior claw (as in fig. 5E–I). **Genitalia** (only males of *D. muang* and *D. kanoi* are known): Epigastric region with sperm pore large, oval, situated at level of anterior spiracles, unmodified; furrow without Ω -shaped insertions. Palp normal size, not strongly sclerotized, right and left palps symmetrical, proximal segments yellow-brown; embolus light, prolateral excavation absent; trochanter normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, setae unmodified; cymbium yellow-brown, narrow in dorsal view, not fused with bulb, not extending beyond distal tip of bulb; bulb 1 to 1.5 times as long as cymbium, tapering apically, middle part with a tortuous and thin internal tube that ends at the embolic division; distal part with several laminae that bear filiform projections surrounding the embolus.

Female: As in male except as noted. Palp without claw; spines absent; tarsus unmodified. **Abdomen:** Dorsal scutum small, covering less than half of dorsum (figs. 12D, 13A), or absent (fig. 11A). Epigastric scutum without lateral joints. Postepigastric scutum short, only around epigastric furrow, not fused to epigastric scutum. Supraanal scutum absent. Postepigastric area setae needlelike. Colulus represented only by setae. **Legs:** Trichobothria (examined only in *D. muang*) base rounded, aperture internal texture not grate-like, hood smooth (fig. 6A–G). Legs III and IV with long spines (figs. 4F–H, 12F–G). Tarsal organ (examined only in the female of *D. muang*) in legs I–II with three sensilla, III, IV and palp with two sensilla (fig. 6H–K). **Genitalia:** Between the epigastric and postepigastric scuta there are one (figs. 7H, 9H, 11H) or two (fig. 14C–D) transverse ventral plates present, adjacent to a pair of short

internal apodemes. In the small species from Thailand only one plate remains, presumably the posterior one, as it bears the apodemes. Internally, anterior sclerite narrow, apparently without lumen, with muscles attached (visible at least in the larger species), with or without a distal widening. Posterior receptacle rounded to ovoid. Copulatory opening detected only in *D. kaew* (fig. 9H), situated posteriorly to the epigastric furrow, suggesting an entelegyne condition (see below the detailed description of the genitalia of *Trilacuna* for comparison).

COMPOSITION: Six species, five of them here newly described.

DISTRIBUTION: Known from caves from Northern India and Thailand.

MISPLACED SPECIES: *Telchius micans* Simon, 1893, five female syntypes from Venezuela, deposited in MNHN (examined); transferred to *Dysderoides* by Fage (1946: 384, fig. 1d–e), rejected here. Beyond the superficial resemblance in the carapace shape, *T. micans* syntypes have normally developed eyes, and lack the characteristic cheliceral and labial features of *Dysderoides*. They seem to belong to a still undescribed circum-Caribbean genus currently under study in the PBI project by Angelo Bolzern (personal commun.).

INTRAGENERIC RELATIONSHIPS: The two Indian species (*D. typhlos* and *D. synrang*) are larger and more heavily sclerotized than the Thai species (*D. muang*, *D. kanoi*, *D. kaew*, and *D. lawa*). The two former (known only by a single female each) have two transverse procurved ventral plates in the genitalia, while the remaining four seem to have lost the anterior one. Females of the Thai species lack the dorsal abdominal scutum, retained as a small oval shield in the Indian ones. Those differences suggest two groups of species, which could be tested after the discovery of males of the Indian species.

Dysderoides muang Grismado and Deeleman,
new species
Figures 2–8, 14A

TYPES: Male holotype and two female paratypes from Thailand: Chiang Mai Province, San Kamphaeng: Tham (= cave) Muang On near the village of Ban On Lhuoy, humus, July 20, 1985, P. Leclerc

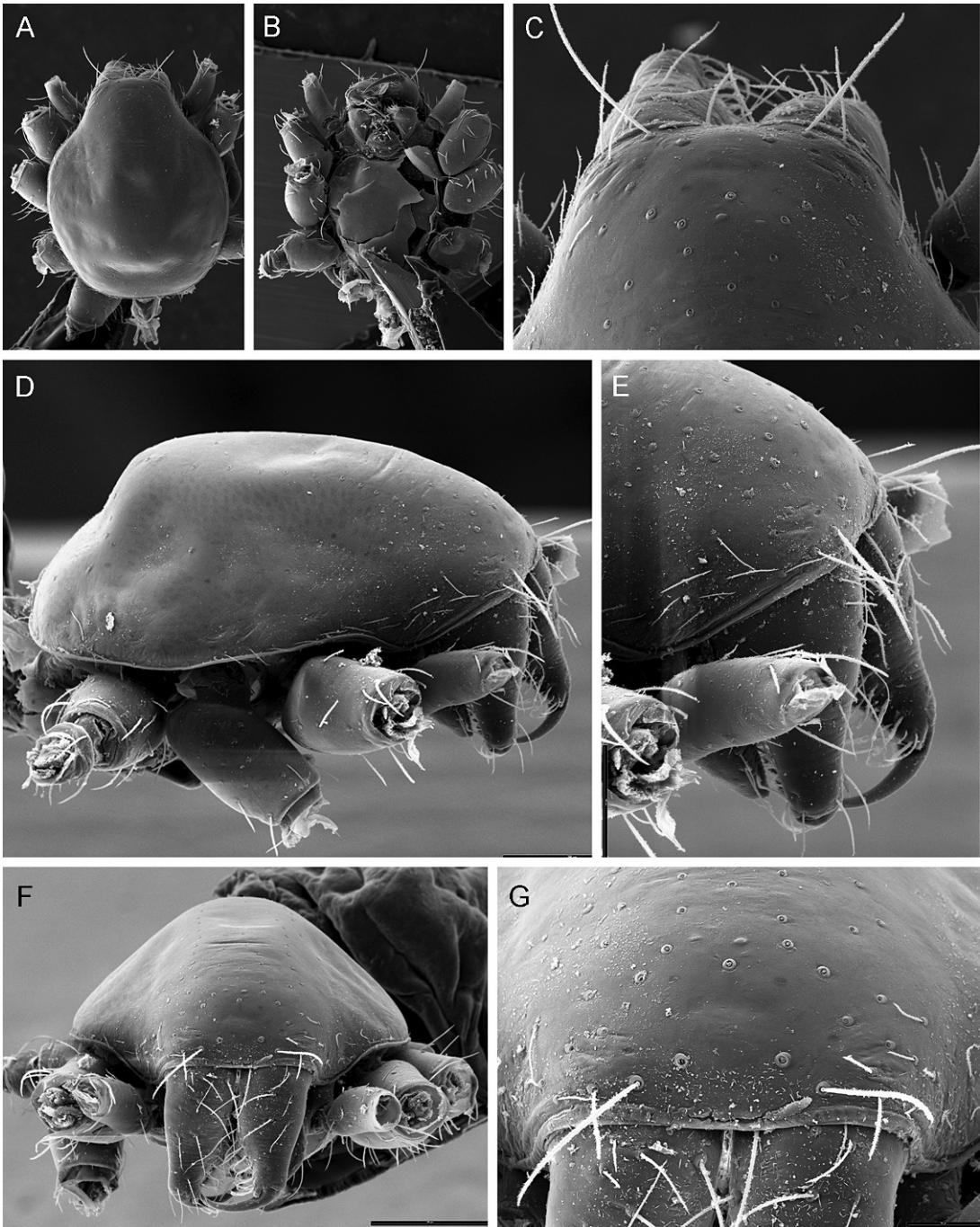


Fig. 2. *Dysderoides muang*, new species, female (PBI_OON 12917). A, B, D, F. Carapace, C, E, G. Detail of the ocular region. A, C. Dorsal view. B. Ventral view. D, E. Lateral view. F, G. Anterior view.

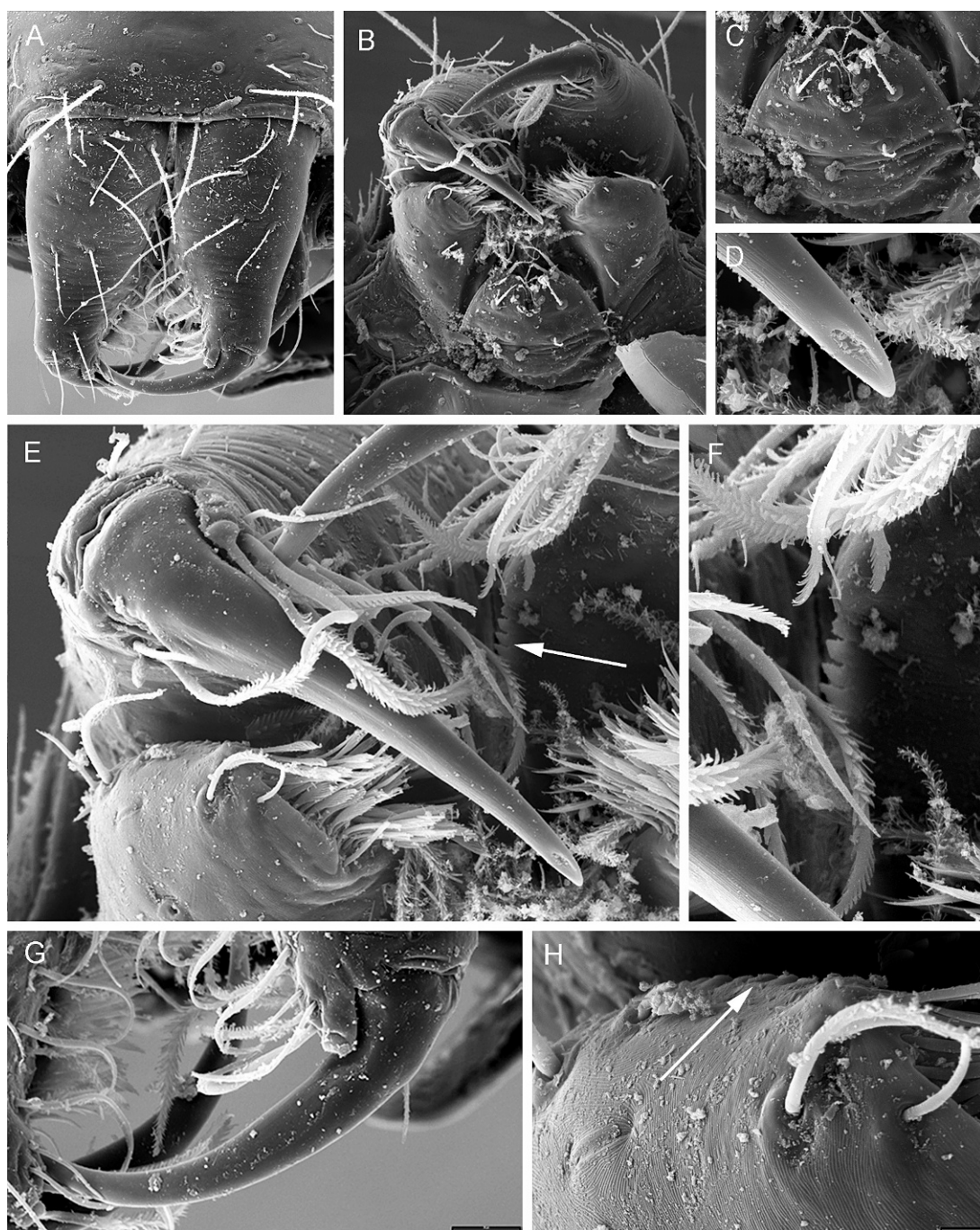


Fig. 3. *Dysderoides muang*, new species, female (PBI_OON 12917) mouthparts. A. Chelicerae, anterior view. B. Same, ventral view. C. Labium, ventral view. D. Right chelicera, venom outlet. E. Same as B, closer view, showing the intercheliceral "serrula" (arrow). F. Same, detail. G. Left cheliceral fang, anterior view. H. Right endite, serrula.

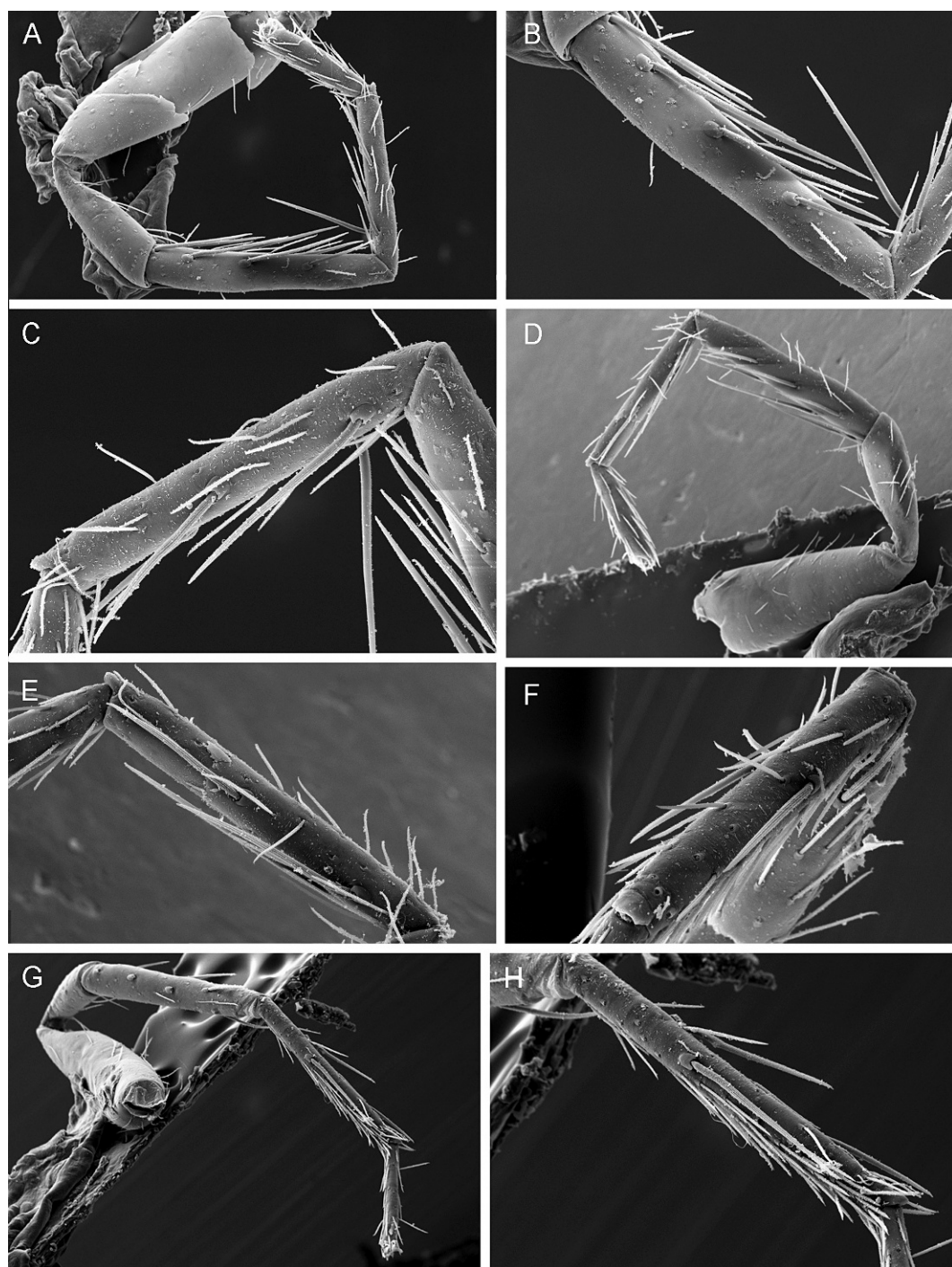


Fig. 4. *Dysderoides muang*, new species, female (PBI_OON 12917) leg morphology. **A.** Right leg I, prolateral view. **B.** Same, detail of tibia. **C.** Same, detail of metatarsus. **D.** Right leg II, prolateral view. **E.** Same, detail of metatarsus. **F.** Right metatarsus III, dorsal view. **G.** Right leg IV, retrolateral view. **H.** Same, detail of metatarsus.

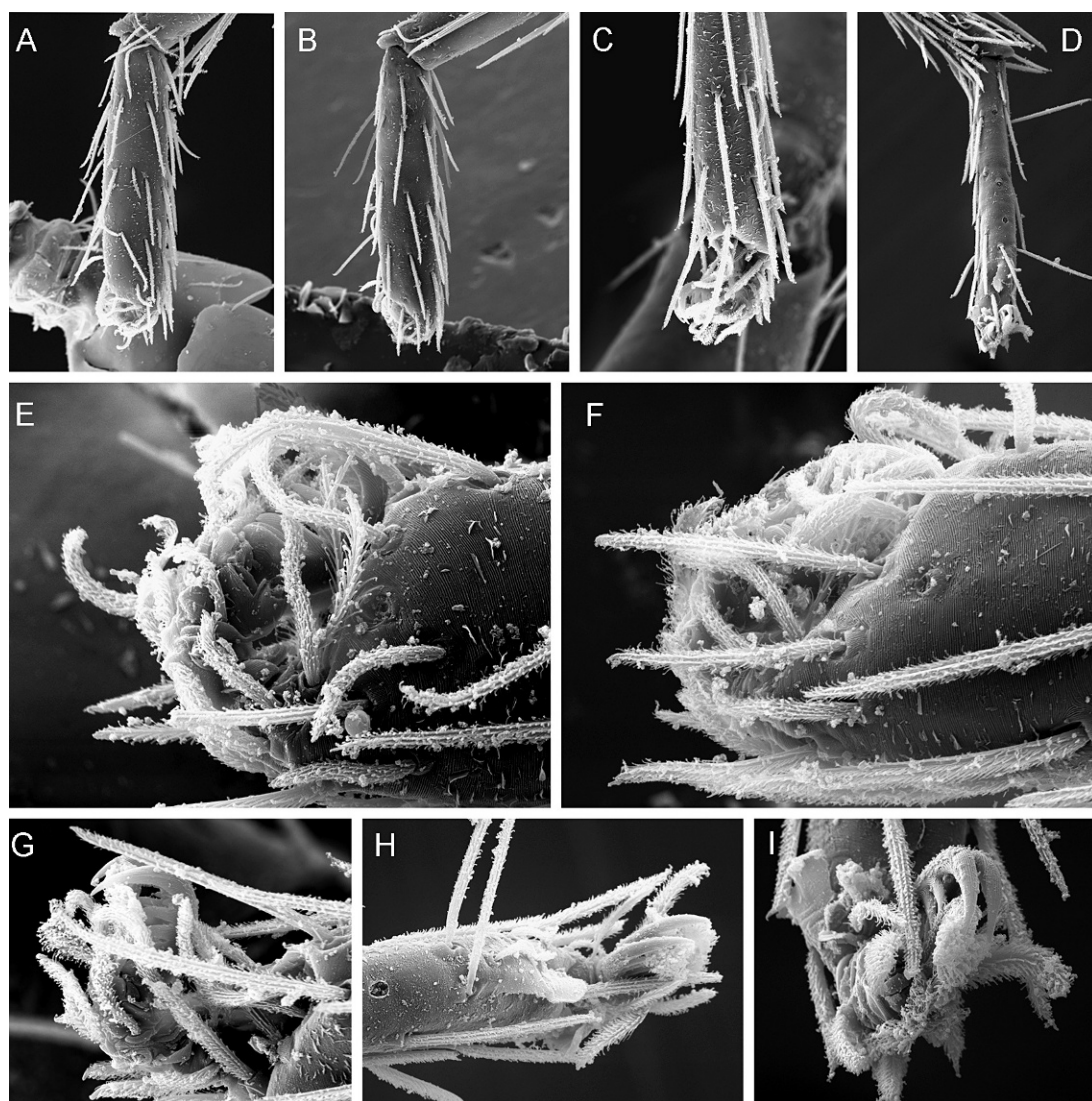


Fig. 5. *Dysderoides muang*, new species, female (PBI_OON 12917) tarsal morphology. A–D. Right tarsi, A. Leg I, prolateral view. B. Leg II, prolateral view. C. Leg III, prolateral view. D. Leg IV, retrolateral view. E–F. Right tarsal claws. E. Leg I, prolateral view. F. Leg II, prolateral view. G. Leg III, prolateral view. H. IV, dorsal view. I. Same, retrolateral-dorsal view.

(RMNH PBI_OON 12917); one additional female paratype with same data (RMNH PBI_OON 12916).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males of this species are very similar to those of *D. kanoi*, new species, but the bulb is less bulging dorsally, and the basal-ventral area is more angular. The embolus is gently sinuous (fig. 14A), not as

curved ventrally as in *D. kanoi*. Females resemble the other Thai species by having only one transverse plate in the genitalia, but the posterior receptacle is smaller (fig. 7H). This species is the only known species that has the serrulalike denticle series in the inner margin of the chelicerae, very conspicuous in the SEM images of the female (fig. 3E, F), but probably also present in males (see the suggestive darkened area in the fig. 8E).

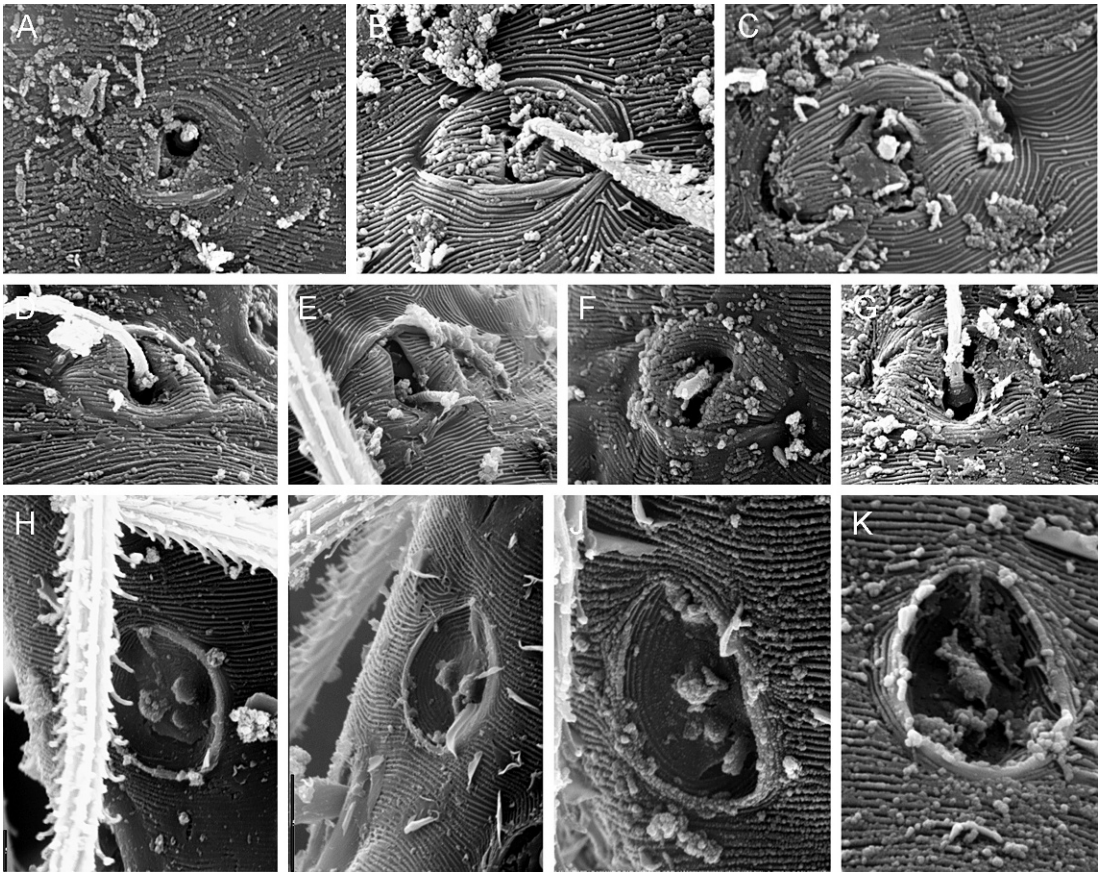


Fig. 6. *Dysderoides muang*, new species, female (PBI_OON 12917) trichobothria and tarsal organ morphology. A–G. Trichobothria. A. Tibia I. B. Tibia II. C. Tibia IV. D. Metatarsus I. E. Metatarsus II. F. Metatarsus III. G. Metatarsus IV. H–K. Tarsal organs. H. Leg I. I. Leg II. J. Leg III. K. Leg IV.

DESCRIPTION: Male (holotype, PBI_OON 12917). Total length 1.64. **Cephalothorax:** Sternum without radial furrows between coxae I–II, II–III, III–IV. Mouthparts: chelicerae, endites, and labium yellowish white. Paturon inner margin with medial series of denticles (“serrulalike”). **Abdomen:** Pedicel tube short, unmodified. Dorsal scutum covering more than 3/4 of abdomen, more than 1/2 to most of abdomen width, not fused to epigastric scutum, yellowish white, slightly sclerotized, hard to discern. Postepigastric scutum fused to epigastric scutum, yellowish white. Interscutal membrane with setae. **Legs:** Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg III: tibiae p1, v1ap, dp2-

0, metatarsi r1; leg IV: tibiae p1-1-1, v0-0-1, r1-1-1, metatarsi p1-1-0, r0-1-1. **Genitalia:** Epigastric furrow without setae. Copulatory bulb yellowish white, embolus slightly curved ventrally at its end (fig. 14A).

Female (paratype, PBI_OON 12917). Total length 1.78. As in male except as noted. **Cephalothorax:** Carapace yellow-brown; non-marginal pars cephalica setae absent; non-marginal pars thoracica setae absent. Sternum yellowish white, posterior margin not extending posteriorly of coxae IV; setae dark, evenly scattered. **Abdomen:** Dorsal scutum absent, dorsum soft portions white. Book lung covers elliptical. Epigastric scutum slightly sclerotized, hard to discern. Postepigastric scutum yellowish white, slightly sclerotized, hard to discern. Spinneret scutum

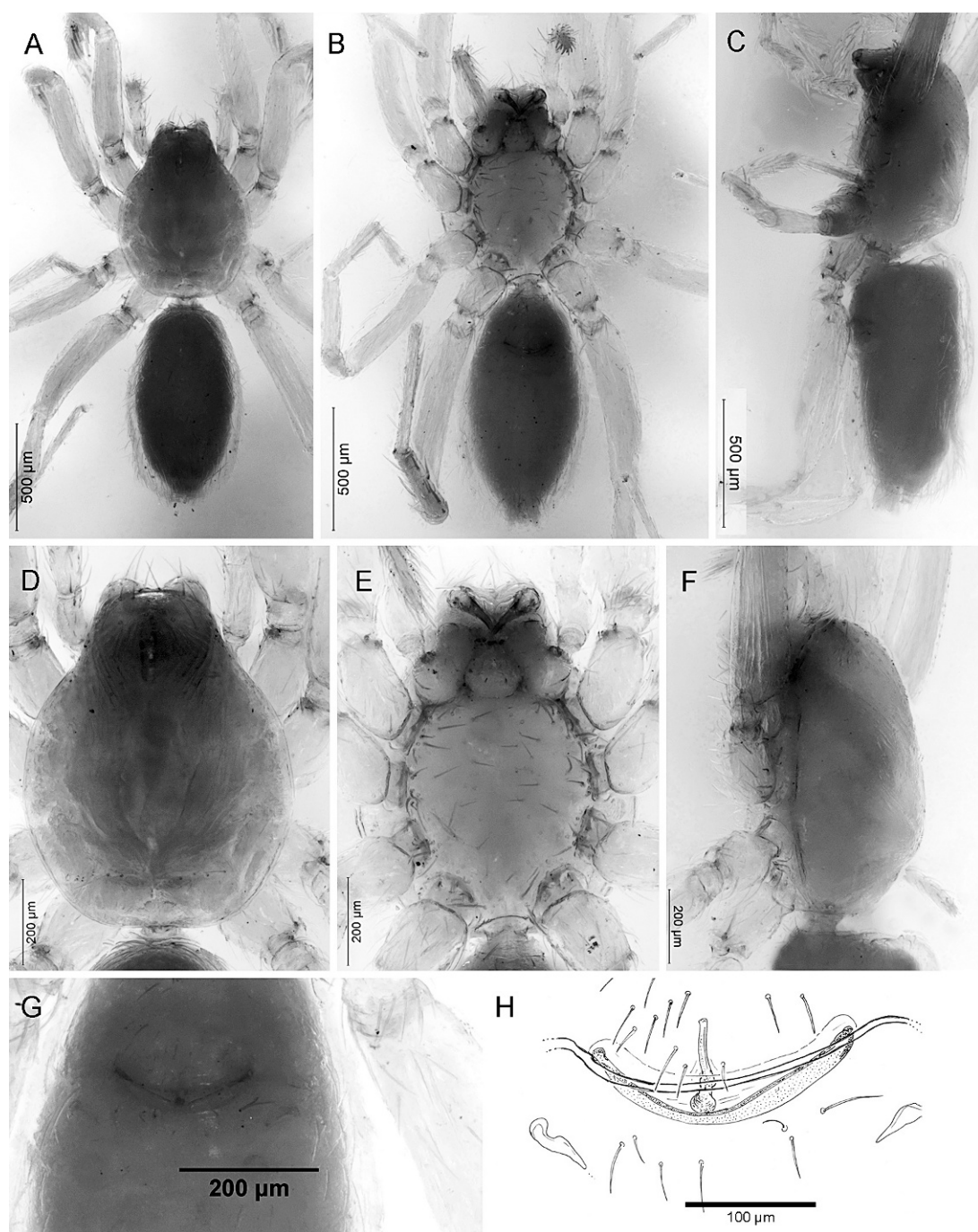


Fig. 7. *Dysderoides muang*, new species, female (PBI_OON 12917). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Epigastric area, ventral view. **H.** Vulva, cleared, ventral view.

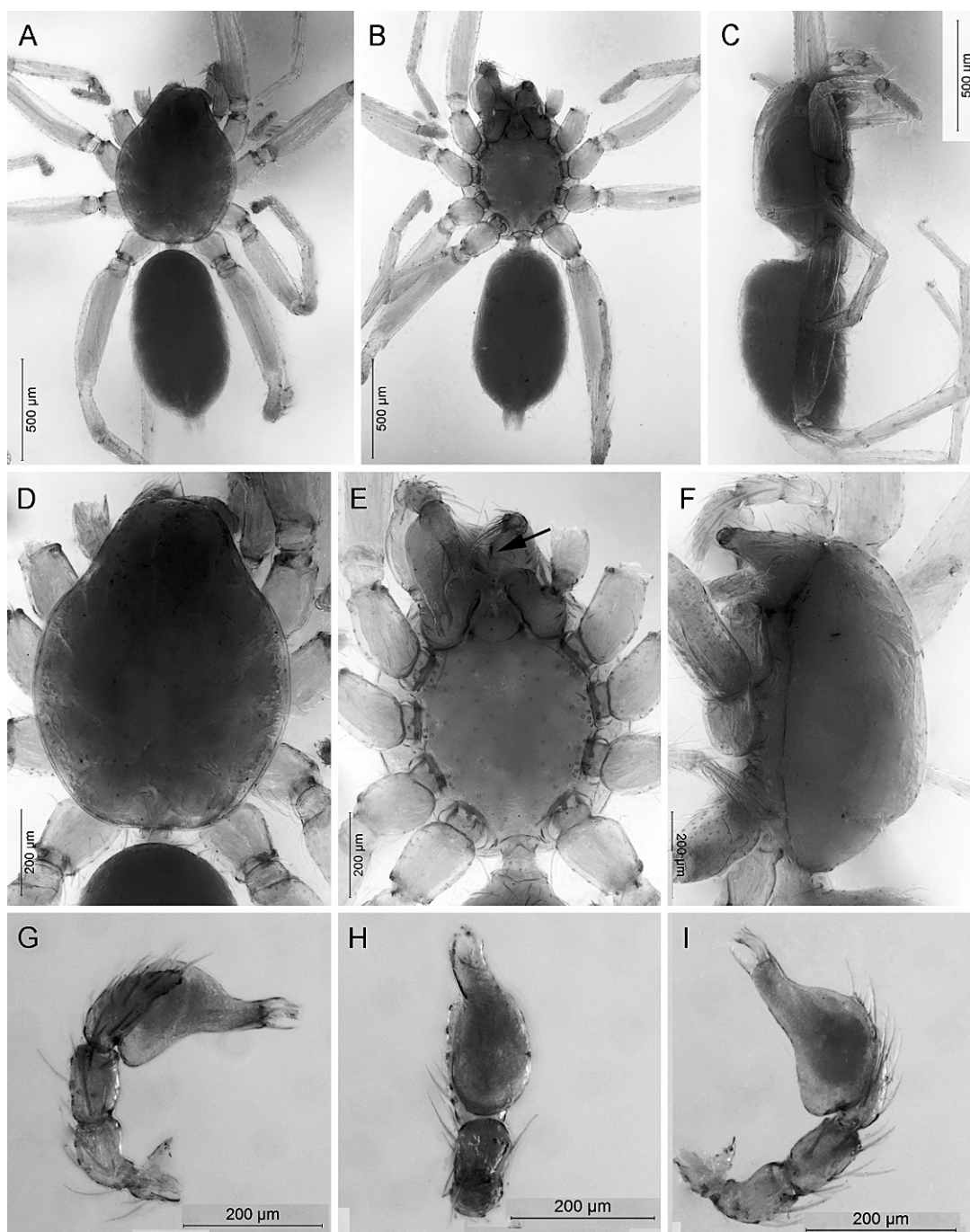


Fig. 8. *Dysderoides muang*, new species, male (PBI_OON 12917). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view (arrow = darkened cheliceral area with presumably serrulalike denticles). **F.** Same, lateral view. **G.** Left palp, prolateral view. **H.** Same, ventral view. **I.** Same, retrolateral view.

absent. Dorsum setae light. Epigastric and postepigastric setae light. **Legs:** White. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg III: tibiae v1ap, dp2-0, metatarsi r1, dp2-0; leg IV: tibiae p1, dp2-2, metatarsi r1, dp2-2. Trichobothria base shape rounded (fig. 6A–G). **Genitalia:** Anterior sclerite elongated, posterior receptacle small, rounded; posterior transverse plate present, narrow, slightly procurved, with an anterior thickened border (fig. 7H).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from a single cave in the type locality.

Dysderoides kaew Grismado and Deeleman,
new species
Figure 9

TYPES: Female holotype from Thailand: Kanchanaburi Province: Amphoe Sai Yok: Sai Yok National Park: Tham (= cave) Kaew, cave, 14.43333°N, 98.86666°E, F. Stone coll., Aug. 1, 1981 (RMNH PBI_OON 43180), same locality and collector, one female paratype, Aug. 7, 1986 (RMNH PBI_OON 43182).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: The female of *Dysderoides kaew* are similar to the other known Thai species by having a single transverse plate on the female genitalia, but can be distinguished by the ovoid, apparently bipartite posterior receptacle, by the widened, bilobed tip of the anterior sclerite, and by the anteriorly directed lateral extensions of the posterior transverse plate (fig. 9G–H).

DESCRIPTION: Female (holotype, PBI_OON 43180). Total length 1.62. **Cephalothorax:** Carapace yellow-brown. Clypeus sloping forward in lateral view; setae absent. Sternum yellow-brown, posterior margin extending posteriorly beyond anterior edges of coxae IV as single extension, all setae seem to be lost, but their bases remain, mostly at base of coxae. Mouthparts: chelicerae, endites, and labium yellow-brown, cheliceral setae light. **Abdomen:** Dorsal scutum absent, dorsum soft portions pale white. Book lung covers round. Pedicel tube short, unmodified. Epigastric

and postepigastric scuta very weakly sclerotized, pale yellow. Spinneret scutum present, incomplete ring, very narrow, without fringe of setae. Dorsum setae light. Epigastric area setae light. Postepigastric area setae light. **Legs:** Yellow-brown (legs III–IV paler, almost white). Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg III: tibiae dp2-2, v2subap; leg IV: tibiae dp2-2, v2subap, metatarsi dp2-2, v1-0-2subap. Tarsi I–IV superior claws tooth not examined in detail. Trichobothria not examined. **Genitalia:** Anterior sclerite narrow, with small, bilobed anterior tip. Posterior receptacle ovoid, with an apparent posterodorsal lobe. Copulatory opening visible, posterior to the epigastric furrow. Only the posterior transverse epigastric plate is present, with lateral endings forwardly directed (fig. 9G, H).

Male: Unknown.

OTHER MATERIAL EXAMINED: THAILAND: **Kanchanaburi Province:** Amphoe Sai Yok: Sai Yok National Park: Tham Khang Khao (= Bat Cave), Cave, 14.41666°N, 98.88333°E, Aug. 5, 1981, F. Stone coll., 1♀ (RMNH PBI_OON 43181).

DISTRIBUTION: Known only from two caves in the type locality.

Dysderoides kanoi Grismado and Deeleman,
new species
Figures 10, 14B

TYPES: Male holotype from Thailand: Mae Hong Son Province: Khun Yuam: Tham (= cave) Mae La Ka Noi, 18.63333°N, 97.95000°E, July 26, 1986, F. Stone (RMNH PBI_OON 43175); one male paratype (RMNH PBI_OON 43176), together one juvenile with same data.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males of this species are very similar to those of *D. muang*, but the bulb is more bulging dorsally, and the basal-ventral area is less angular. The embolus is more curved ventrally (fig. 14B).

DESCRIPTION: Male (holotype, PBI_OON 43175). Total length 1.60. **Cephalothorax:** Sternum with radial furrows between coxae I–II, II–III, III–IV, sternal furrows shallow,

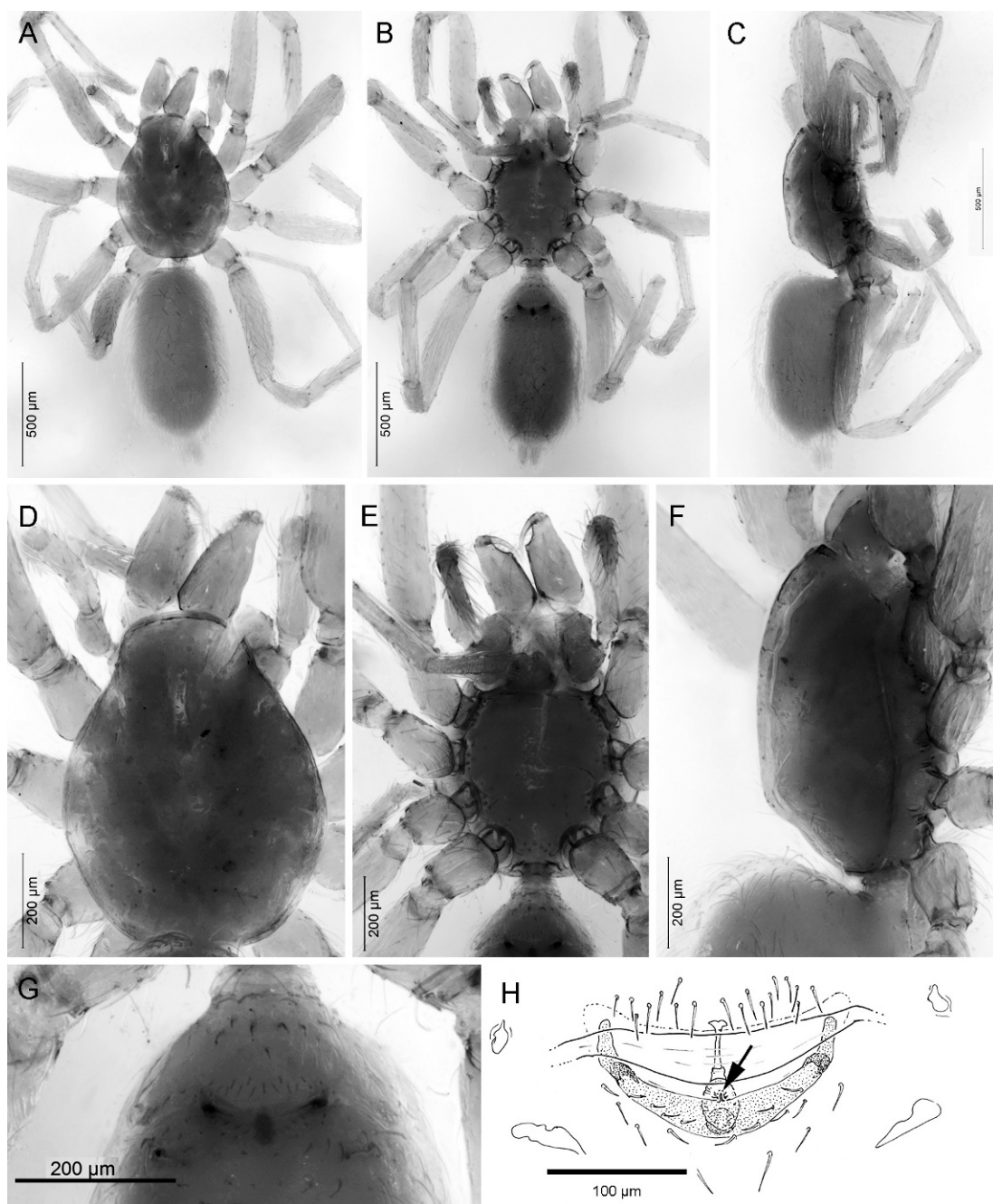


Fig. 9. *Dysderoides kaew*, new species, female (A–G, PBL_OON 43180; H, PBL_OON 43182). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Epigastric area, ventral view. **H.** Vulva, cleared, ventral view (arrow = copulatory opening).

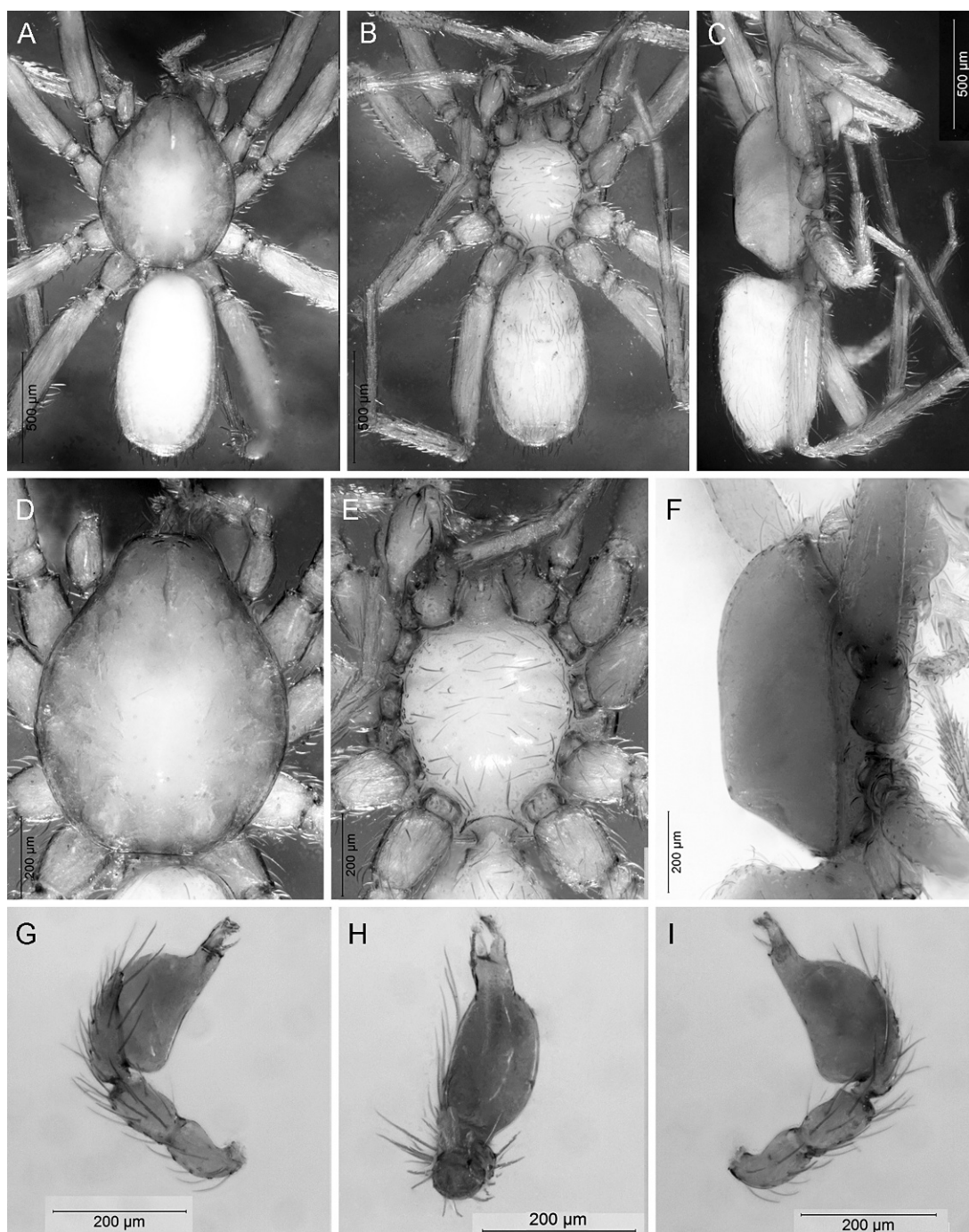


Fig. 10. *Dysderoides kanoi*, new species, male (PBI_OON 43176). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** left palp, prolateral view. **H.** Same, ventral view. **I.** Same, retrolateral view.

hardly detectable. Mouthparts: chelicerae, endites, and labium yellow-brown. **Abdomen:** Pedicel tube medium sized, ribbed. Dorsal scutum covering full length of abdomen, no soft tissue visible from above, not fused to epigastric scutum, yellowish white. Postepigastric scutum fused to epigastric scutum, yellowish white. Postepigastric area setae needlelike. Interscutal membrane with setae. Colulus not visible (hidden by a fold in the cuticle, beneath the postepigastric scutum). **Legs:** Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0 (plus one additional proximal spine on left tibia), metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg III: tibiae pd2-0, v2subap, metatarsi d2-0; leg IV: tibiae p1-0, dp1-1-1, dr1-1-1, r0-1/0, v2subap, metatarsi p1, d1/2-2. Tarsi I–IV superior claws tooth not examined in detail. **Genitalia:** Epigastric furrow with two bunches of small setae. Copulatory bulb yellowish white, embolus tip ventrally curved (fig. 14B).

Female: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from a cave in the type locality.

Dysderoides lawa Grismado and Deeleman,
new species
Figure 11

TYPES: Female holotype from Thailand: Kanchanaburi Province: Tham Lawa, Ban Nam, near Tok, June 16, 1986, P. Leclerc (RMNH PBI_OON 43183).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Female are similar to the other known Thai species by having a single transverse plate on the female genitalia, but can be distinguished by the smaller and thinner posterior receptacle (fig. 11H).

DESCRIPTION: Female (holotype, PBI_OON 43183). Total length 1.52. **Cephalothorax:** Carapace yellow-brown. Sternum yellow-brown, posterior margin not extending posteriorly of coxae IV; setae light, densest laterally. Mouthparts: chelicerae, endites, and labium yellow-brown. Cheliceral setae light. **Abdomen:** Dorsal scutum absent, dorsum soft portions pale white. Book lung covers round. Pedicel tube short, unmodified.

Postepigastric scutum yellow-brown. Spinneret scutum absent. Dorsum setae light. Epigastric area setae light. Postepigastric area setae light. **Legs:** Yellow-brown (legs III–IV paler, almost white). Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg III: tibiae p1-0, v2subap; leg IV: tibiae v1-1-2subap, metatarsi p1, r1. Tarsi I–IV superior claws tooth not examined in detail. **Genitalia** (fig. 11H): Anterior sclerite narrow, slightly sinuous; connection with the posterior receptacle without visible structures, receptacle elongated, nearly piriform. Copulatory opening not visible, only the posterior transverse epigastric plate is present, with lateral endings at same level as semicircular-outlined apodemes, not directed forwardly.

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from a single cave in the type locality.

Dysderoides typhlos Fage
Figures 12, 14C

Dysderoides typhlos Fage, 1946: 383, fig. 1a–c (female holotype from India: Uttarakhand: Dehra Dun: Chakrata Taksil: Moila cave, 8830 ft. alt., 30°46'37"N, 77°47'14"E, Brig. E. Glennie, deposited in BMNH, PBI_OON 00012911; examined).

DIAGNOSIS: The female of *D. typhlos* resembles that of *D. synrang* by its large size, well-sclerotized teguments and by having a small dorsal abdominal scutum and two transverse genital plates (figs. 12D, H, 14C), but differs by the T-shaped anterior genital sclerite wider anteriorly, and by the rounded tracheal spiracles (fig. 12E, H). Further, the median incision of the labium is shallower than in other *Dysderoides* (fig. 12B).

REDESCRIPTION: Female (holotype, PBI_OON 12911): Total length 2.25. **Cephalothorax:** Carapace pale orange, pars cephalica almost flat in lateral view; no eye remnants visible. Sternum pale orange, posterior margin not extending posteriorly of coxae IV; setae light, densest laterally. Mouthparts: chelicerae, endites, and labium pale orange. Cheliceral setae dark; paturon inner margin unmodified. Labium anterior margin indent-

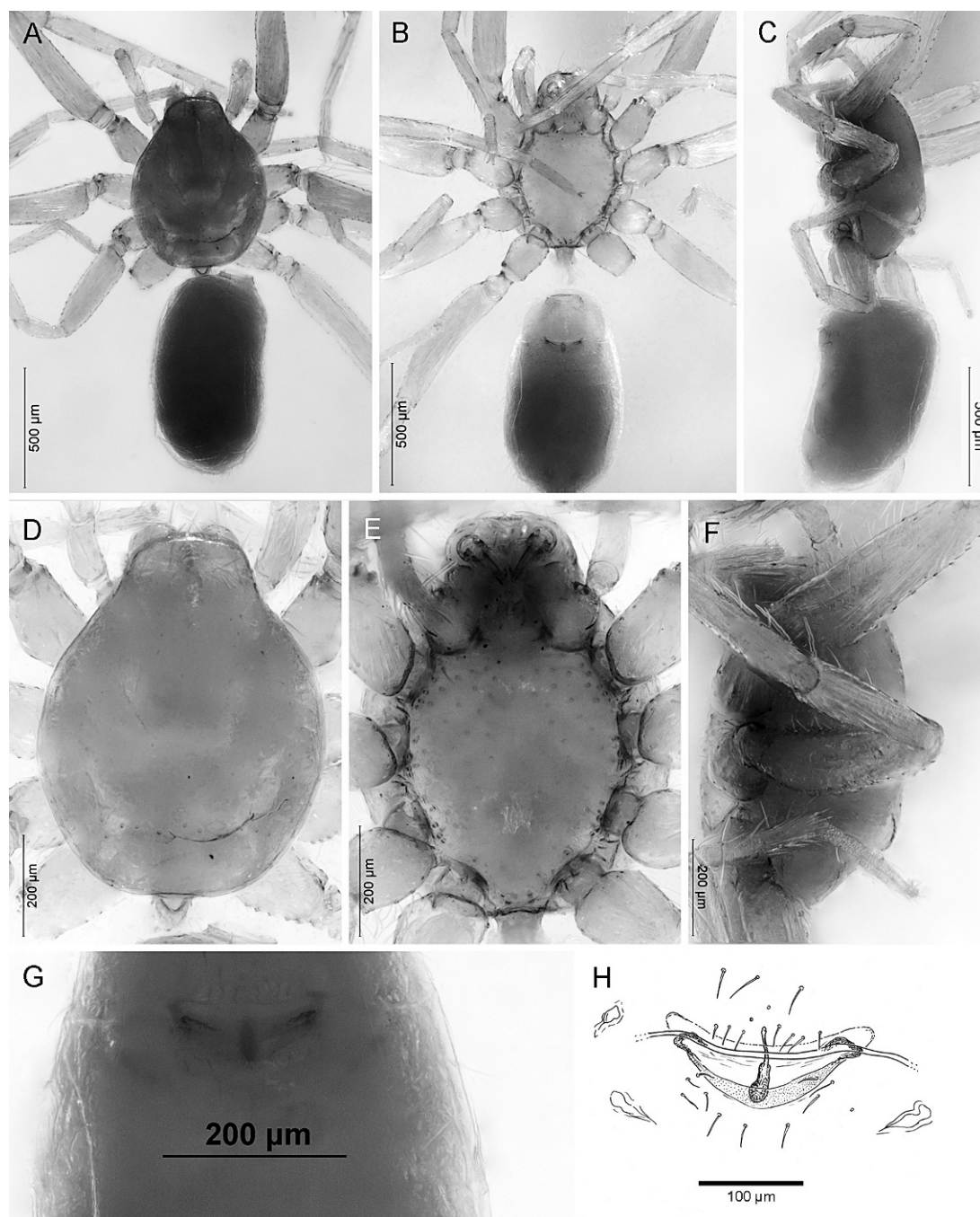


Fig. 11. *Dysderoides lawa*, new species, female (PBI_OON 43183). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Epigastric area, ventral view. **H.** Vulva, cleared, ventral view.

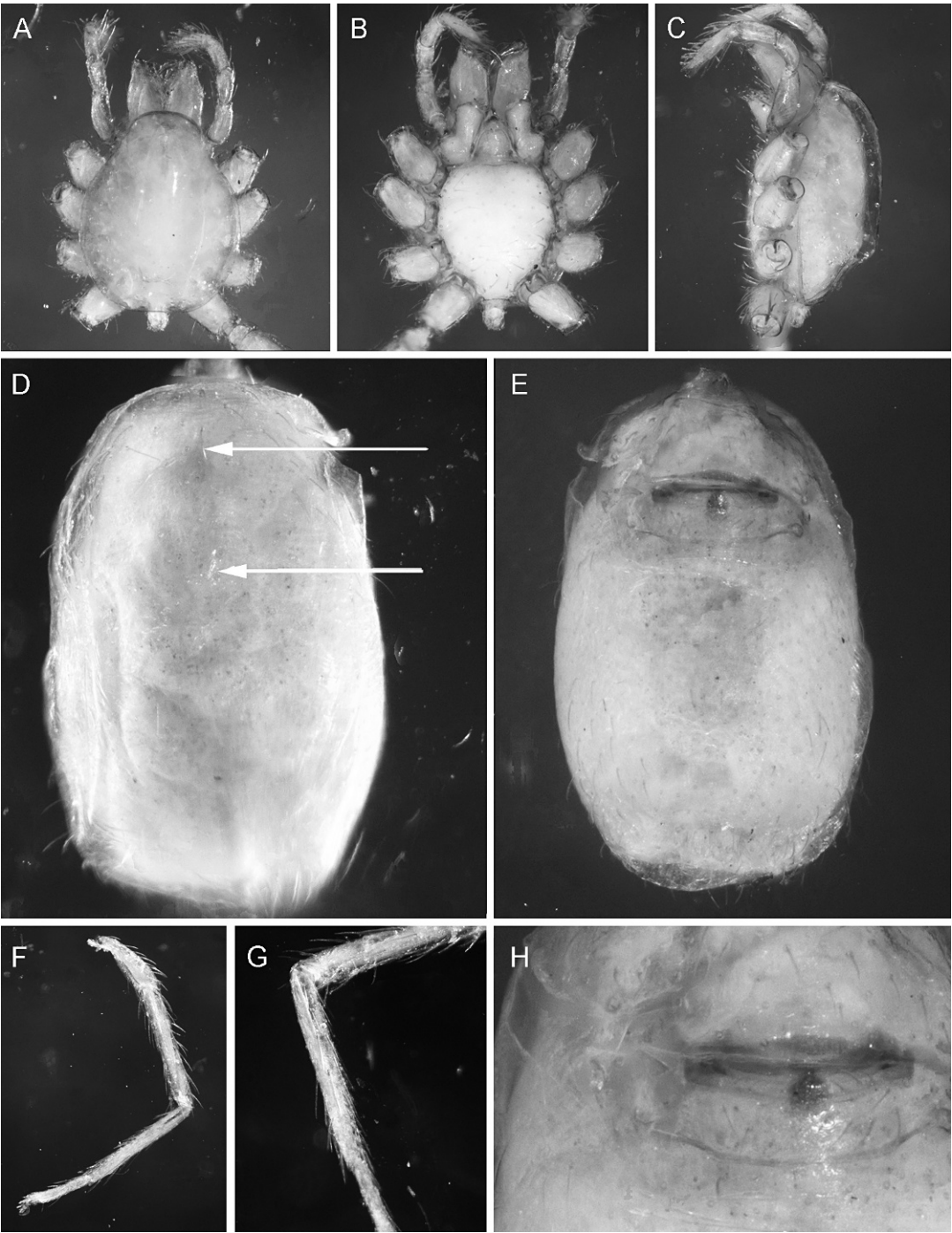


Fig. 12. *Dysderoides typhlos* Fage, female holotype. A. Carapace, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Abdomen, dorsal view (arrows show extent of dorsal scutum). E. Same, ventral view. F. Leg IV, prolateral view. G. Same, detail of metatarsus. H. Epigastric area, ventral view.

ed at middle (fig. 12B), the incision of the labium is shallower than in other congeners. Palpal tibia with at least one prodorsal trichobothrium in proximal half. **Abdomen:** Dorsum soft portions pale white. Book lung covers elliptical. Pedicel tube short, unmodified. Dorsal scutum weakly sclerotized, yellow-brown, without color pattern, covering less than 1/2 of abdomen, less than 1/4 abdomen width, not fused to epigastric scutum, with very narrow median strip covering one third of abdomen length. Postepigastric scutum yellow-brown. Spinneret scutum present, incomplete ring. Dorsum setae dark. Epigastric area dark. Postepigastric area setae dark. Spinneret scutum without fringe of setae. Colulus and spinnerets sunk, barely visible. **Legs:** Yellow (legs I–III missing). Leg spination (all spines longer than segment width): tibiae IV d0-1-0, p0-0-1, v0-0-1, metatarsi IV d0-1-0, p1-1-0. Tarsi IV superior claws tooth not examined in detail. Trichobothria not examined. **Genitalia:** Two procurved transverse well sclerotized plates, the posterior one with lateral, transversely elongated apodemes; anterior sclerite T-shaped; posterior receptacle round; copulatory opening inconspicuous (fig. 14C).

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from a cave in the type locality.

Dysderoides synrang Grismado and
Deeleman, new species
Figures 13, 14D

TYPES: Female holotype from India: Meghalaya: Jaintia Hills, near Musianglamare, cave Synrang Pamiang, cave, 25.21333°N, 92.36333°E, Feb. 16, 1999, Christian Fischer (NMB Ar 2548 PBI_OON 30637); deposited in NMB.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: The female of *D. synrang* resembles those of *D. typhlos* by its large size and well-sclerotized teguments and by having a small dorsal abdominal scutum and two transverse genital plates (figs. 13A, H, 14D), but differs by the T-shaped anterior genital sclerite narrower anteriorly and by the elongated tracheal spiracles (figs. 13H, 14D).

DESCRIPTION: Female (holotype, PBI_OON 30637). Total length 2.26. **Cephalothorax:** Carapace pale orange, nonmarginal pars cephalica setae light, needlelike, in three rows; nonmarginal pars thoracica setae light, needlelike. Clypeus vertical in lateral view; setae absent. Remnants of eyes visible beneath the cuticle (fig. 13G). Sternum pale orange, posterior margin extending posteriorly beyond anterior edges of coxae IV as single extension; setae dark, evenly scattered. Mouthparts: chelicerae, endites, and labium pale orange. Cheliceral setae light; paturon inner margin unmodified. Labium anterior margin deeply incised (fig. 13E). **Abdomen:** Dorsum soft portions pale orange. Book lung covers round. Pedicel tube medium sized, ribbed. Dorsal scutum weakly sclerotized, pale orange, without color pattern, covering less than 1/2 of abdomen, between 1/4 and 1/2 of abdomen width. Postepigastric scutum pale orange. Spinneret scutum present, incomplete ring. Dorsum setae light. Epigastric area setae dark. Postepigastric area setae dark. Spinneret scutum with fringe of stout setae. **Legs:** Pale orange. Leg spination (all spines longer than segment width): leg I: femora pv0-1-0, tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg III: tibiae p1-1, v2ap, metatarsi p1-1; leg IV: tibiae p1-1, v2ap, metatarsi p1-1. Tarsi I–IV superior claws tooth not examined in detail. Trichobothria not examined. **Genitalia:** Two procurved, transverse, well-sclerotized plates, posterior one with short lateral apodemes; anterior sclerite long, less widened anteriorly than in *D. typhlos*; posterior receptacle small, round; copulatory opening inconspicuous (figs. 13H, 14D).

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from a single cave in the type locality.

Trilacuna Tong and Li

Trilacuna Tong and Li, 2007: 333 (type species by original designation *Trilacuna rastrum* Tong and Li, 2007).

DIAGNOSIS: This genus resembles *Dysderoides* and *Himalayana* by the chelicerae abruptly narrowed in the distal part, the deeply incised labium, and the genitalic morphology; it differs from *Dysderoides* in

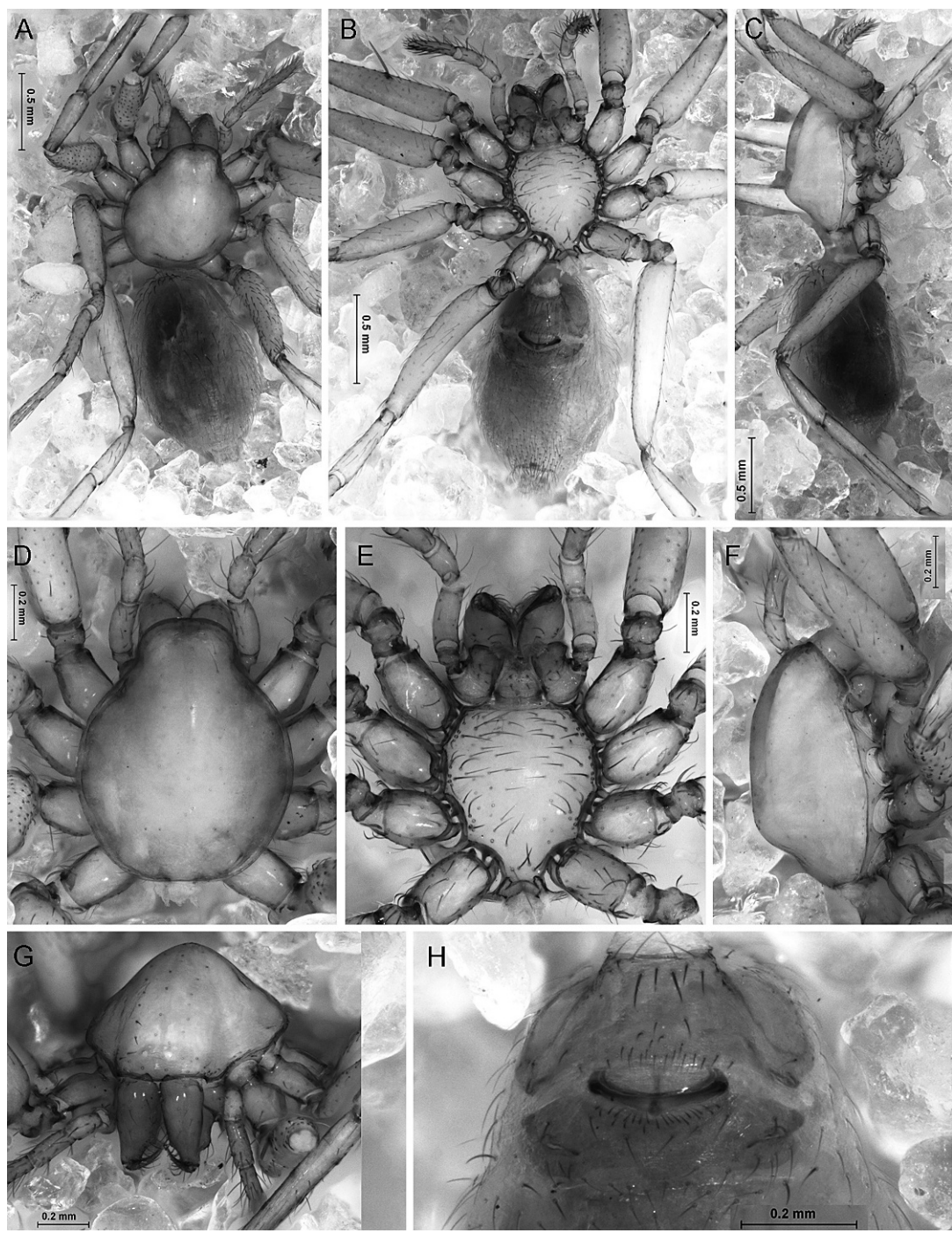


Fig. 13. *Dysderoides synrang*, new species, female (PBI_OON 30673). A. Habitus, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Carapace, dorsal view. E. Same, ventral view. F. Same, lateral view. G. Same, anterior view. H. Epigastric area, ventral view.

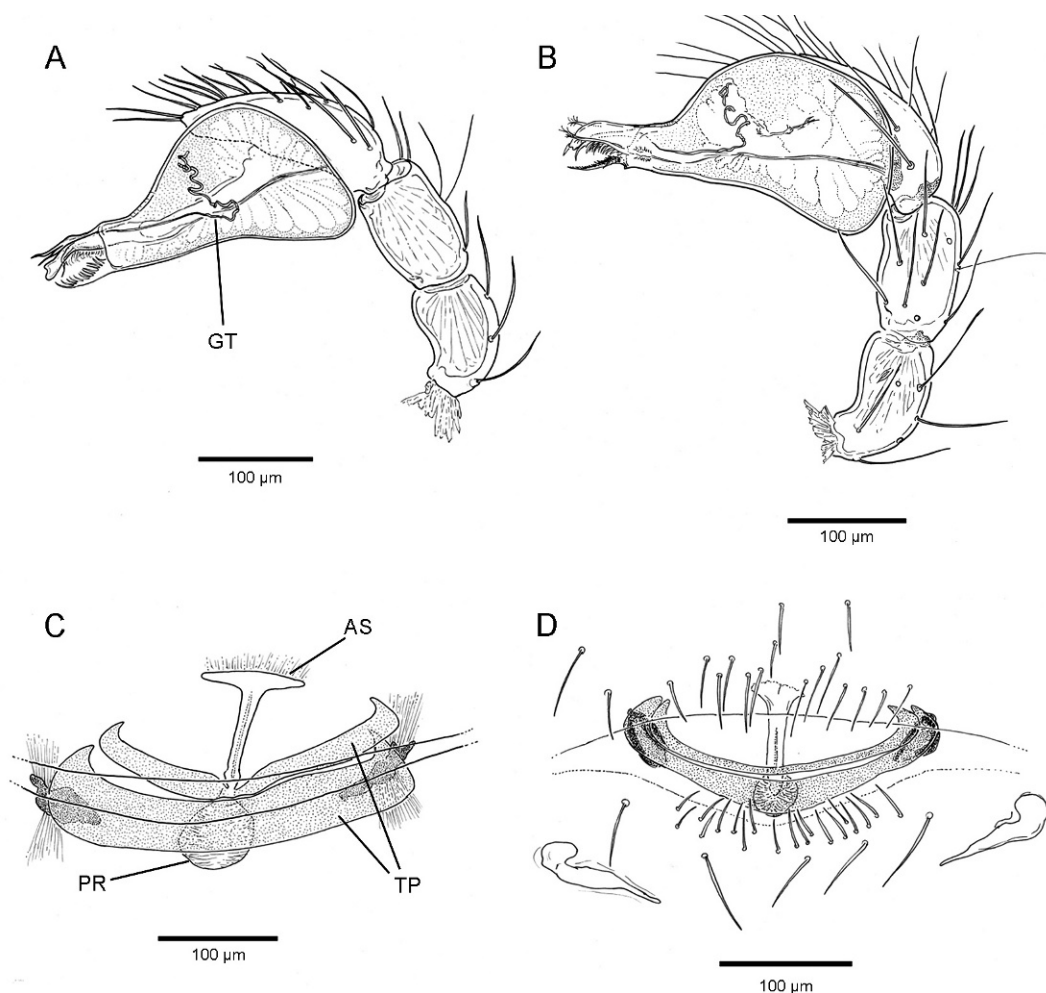


Fig. 14. *Dysderoides* spp. Genital morphology. **A.** *D. muang*, new species (PBI_OON 12917). **B.** *D. kanoi*, new species (PBI_OON 43176). **C.** *D. typhlos* Fage (holotype). **D.** *D. synrang*, new species (PBI_OON 30673). **A, B.** Male palp, retrolateral view. **C, D.** Vulva, cleared, ventral view. AS = anterior sclerite; GT = glandular tube; PR = posterior receptacle; TP = transverse plates.

having normally developed eyes and in lacking macrosetae on legs III and IV, and from both by the long female postepigastric scutum, covering almost the whole ventral abdomen (as in figs. 29B, 32B, 49B). Males of *Trilacuna* also can be separated from those of *Himalayana* by lacking the prolateral dorsal acute projection in the copulatory bulb characteristic of that genus, and also by lacking the furrow connecting the posterior tracheal spiracles.

DESCRIPTION: Male: **Cephalothorax:** Carapace orange, without any pattern, anteriorly

narrowed to 0.49 times its maximum width or less, with rounded posterolateral corners, posterolateral edge without pits, posterior margin not bulging below posterior rim, anterolateral corners without extension or projections, surface of elevated portion of pars cephalica smooth, sides smooth or granulated, thorax without depressions, fovea absent, without radiating rows of pits; lateral margin straight, rebordered; posterior margin of pars thoracica with stout setae with enlarged bases, without plumose setae; nonmarginal pars cephalica setae needlelike,

in U-shaped row. Clypeus margin unmodified, sinuous in front view, vertical in lateral view, high, ALE separated from edge of carapace by their radius or more. Chilum absent. Eyes six, well developed. Sternum uniform, not fused to carapace, usually covered with numerous rounded pits (except in *T. aenobarba*, *T. bangla*, and *T. hazara*; see below); at least in *T. meghalaya*, these pits have a central pore (fig. 24H); median concavity absent, radial furrow opposite coxae III absent, sickle-shaped structures absent, anterior margin unmodified, anterior corner unmodified, distance between coxae approximately equal, precoxal triangles absent, without posterior hump; setae dark, needlelike, originating from surface, usually without hair tufts (although *T. mahanadi* have a more dense patch on the central area, fig. 37E; see also *T. kropfi*, Eichenberger and Kranz-Baltensperger, 2011: fig. 15D, F). Mouthparts: chelicerae straight, anterior face usually with prominent basal processes (fig. 23G); fangs without toothlike projections, directed medially, shape normal, tip unmodified; retromargin with one tooth (as in *T. meghalaya*, fig. 17C) or a patch with small teeth (*T. bangla*, as in fig. 42E); setae needlelike, evenly scattered; paturon inner margin with pairs of enlarged setae, distal region abruptly narrowed, promargin unmodified, inner margin unmodified, laminate groove absent. Labium triangular, usually not fused to sternum, anterior margin deeply incised (fig. 30E), same as sternum in sclerotization; with six or more setae on anterior margin, subdistal portion with unmodified setae. Endites mesodistally excavated, serrula as a single row, posteromedian part unmodified, same as sternum in sclerotization. **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly, interscutal membrane without rows of small sclerotized platelets; dorsum soft portions white, without color pattern. Book lung covers large, without setae, anterolateral edge unmodified. Posterior spiracles usually not connected by a groove (see figs. 23B, 31B), but a shallow groove is present in *T. aenobarba* and *T. bangla* (figs. 41B, 47B, 51B). Pedicel tube medium sized, usually ribbed, scutopedicel region unmodified, scutum extending far dorsal of pedicel, matted setae on anterior

ventral abdomen in pedicel area absent, cuticular outgrowths near pedicel absent. Dorsal scutum strongly sclerotized, without color pattern, covering full length of abdomen, not fused to epigastric scutum, middle surface smooth, sides smooth, anterior half without projecting denticles. Epigastric scutum strongly sclerotized, surrounding pedicel, small lateral sclerites absent. Post-epigastric scutum strongly sclerotized, long, semicircular, fused to epigastric scutum, anterior margin unmodified. Supraanal scutum absent. Setae of dorsal, epigastric, and postepigastric areas needlelike. Males of some species (such as *T. mahanadi*, *T. aenobarba*, and *T. bangla*) have a conspicuous set of enlarged and stout setae behind the epigastric furrow (figs. 38B, 41B, 47A–C, 51B). Dense patch of setae anterior to spinnerets absent. Interscutal membrane with setae. Colulus represented only by setae. **Legs:** Orange or pale orange (in some species the legs III–IV are paler, almost white); without color pattern; femur IV not thickened, same size as femora I–III, tibia I unmodified, tibia IV specialized hairs on ventral apex absent, tibia IV ventral scopula absent, metatarsi I and II mesoapical comb absent, metatarsi III and IV weak ventral scopula absent. Leg spines: legs I–II with four ventral pairs of spines on tibiae and two on metatarsi; legs III–IV without spines, except an occasional ventral apical spine on tibiae IV. Tarsi I–IV without inferior claw. Trichobothria examined with SEM only in *T. meghalaya* and *T. bangla*; tibiae: each with three; metatarsi: each with one; base longitudinally narrowed, hood covered by numerous low, closely spaced ridges (figs. 26C–G, 46G–O). Tarsal organ with three sensilla visible on legs I–II, two on legs III–IV and palp (as in fig. 46P–T); distal sensilla on legs I and II very small. **Genitalia:** Epigastric region with sperm pore small; furrow without Ω -shaped insertions. Palp normal size, not strongly sclerotized, right and left palps symmetrical, proximal segments pale orange; embolus light, prolateral excavation absent; trochanter normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged,

setae unmodified; tibial trichobothria (at least in *T. meghalaya* and *T. bangla*) with structure similar to those of the legs; cymbium pale orange, ovoid in dorsal view, not fused with bulb, not extending beyond distal tip of bulb; bulb pale orange; embolus flanked with at least three laminar structures bearing filiform projections; internally (fig. 47J–L) there is a tortuous, thin tube, presumably the duct of a gland, discharging in the area of the filiform projections.

Female: As in male except as noted.

Cephalothorax: Sternum setae sparse, evenly scattered. Endites anteromedian tip unmodified. Palp without claw, spines absent, tarsus unmodified. Claws of legs IV with a notably enlarged distal tooth on the internal row, appearing as bifid (at least in *T. meghalaya* and *T. bangla*, figs. 19C–D, 44D). **Abdomen:** Epigastric scutum not protruding, without lateral joints. Postepigastric scutum long, not fused to epigastric scutum. Spinneret scutum present, incomplete ring. Epigastric area setae uniform. **Genitalia:** The copulatory opening is a small slit situated posteriorly and separated from the epigastric furrow, in the middle of the transverse plates (figs. 22A, B, D, 45C, G, H; Eichenberger and Kranz-Baltensperger, 2011: fig. 18B, E); between the plates lies a field of papillae (as in fig. 45E, F). The opening leads to a posterior receptacle of variable shape (rounded to worm shaped), which extends to the vicinity of the epigastric furrow. It reaches the final part of the uterus externus through a rounded orifice (figs. 22E, F; 45C–E). The T-shaped anterior structure (here called “anterior sclerite”; figs. 22C, 45B, C) apparently lacks a lumen, and has conspicuous anterolateral bars for muscle attachments; these muscles are connected with the ventral transverse plates, and presumably serve as a locking mechanism. The transverse plates have two long lateral apodemes projecting posteriorly, which serve as attachment for other muscles.

NOTE: The Himalayan species described in this paper have a relatively simpler set of paraembolic elements than those of the Chinese and Southeast Asian species (see Tong and Li, 2007; Eichenberger and Kranz-Baltensperger, 2011).

COMPOSITION: Sixteen species, six of them here described.

DISTRIBUTION: Members of this genus are known from the Himalayan range in Pakistan, Nepal, Bhutan, and northern India, to China, Thailand, Sumatra, and Malaysia (Tong and Li, 2007; Eichenberger and Kranz-Baltensperger, 2011).

MONOPHYLY AND INTRAGENERIC RELATIONSHIPS: So far the only clear synapomorphy for *Trilacuna* seems to be the loss of the furrow connecting the posterior tracheal spiracles in males. The remaining characters that have been used to define the genus are variable through the species now included (e.g., pitted sternum, modified endites in males, thickness of male palpal femur), or define more inclusive groups (incised labium, cheliceral, and genitalic characters). Three species from Nepal, northern India, and Pakistan (*aenobarba*, *bangla*, and *hazara*) are probably basal in the genus, as they have a shallow groove connecting the spiracles in males, and lack the pitted texture on the sternum, widespread in other congeners. Two species described by Eichenberger and Kranz-Baltensperger (2011), *T. werni* and *T. diabolica*, have a well-developed furrow, and their placement should be reconsidered.

Trilacuna meghalaya Grismado and
Piacentini, new species
Figures 15–31, 39A–B

TYPES: Male holotype and five paratype males from India: Meghalaya: Garo-Hills: above Tura, 700 m, 25.56000°N, 89.49000°E, Nov. 1, 1978, C. Besuchet, I. Löbl (MHNG PBI_OON 15401); 10 paratype females with same data (MHNG PBI_OON 15404).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males of this species are similar to those of *T. mahanadi* by their relatively simple paraembolic projections, but the copulatory bulb has a more truncate shape in the distal part, from where the embolus and accompanying elements arise (figs. 28A–B, 31C–E, 39B), and lack stout epigastric setae. Females are easily recognized by their internal genitalia, with a medium-sized, cylindrical (sinuous in lateral view) posterior receptacle, and curved lateral projections of the anterior sclerite (figs. 22C, D, 39A).

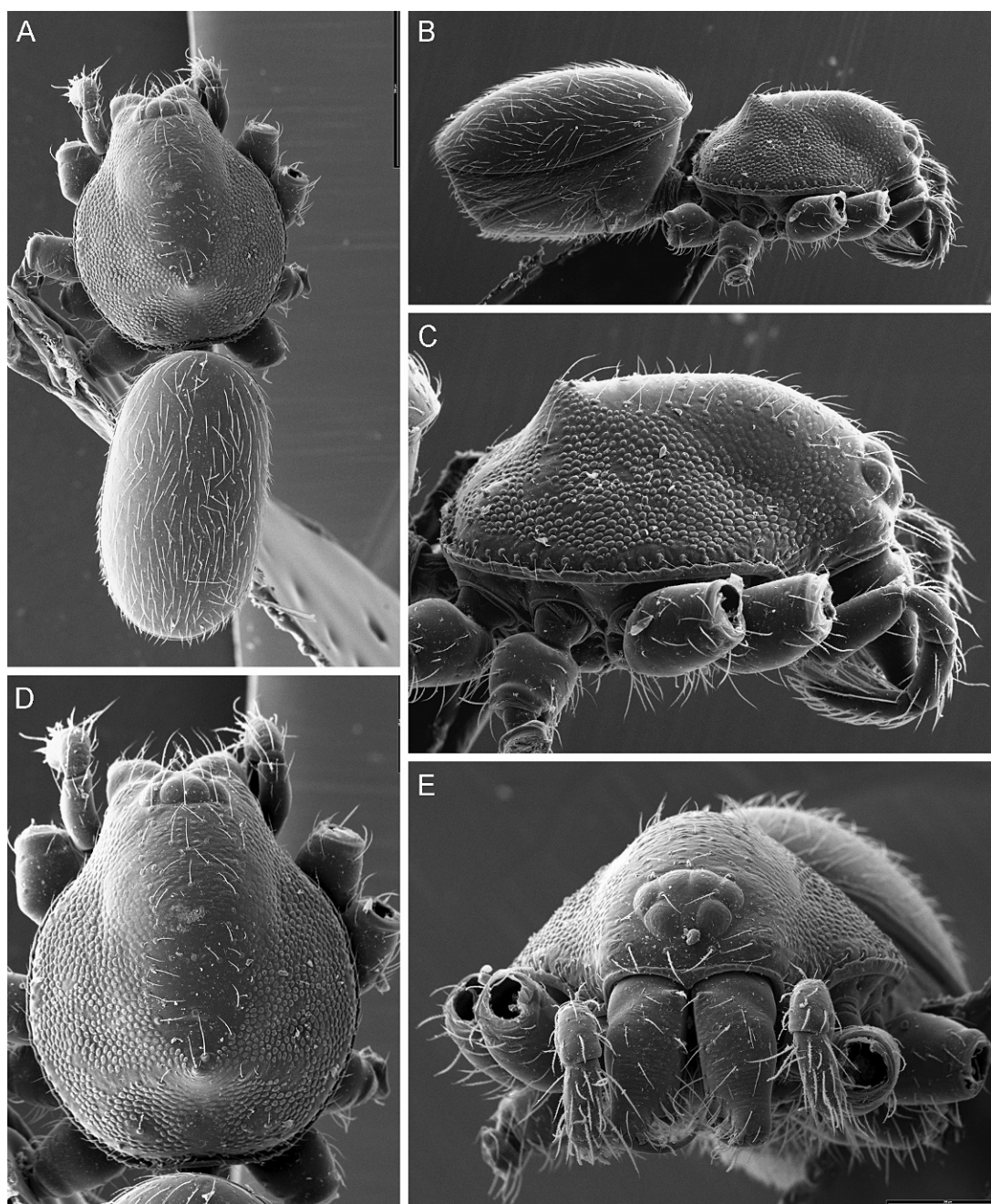


Fig. 15. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). **A.** Habitus, dorsal view. **B.** Same, lateral view. **C.** Carapace, lateral view. **D.** Same, dorsal view. **E.** Same, anterior view.

DESCRIPTION: Male (holotype, PBI_OON 15401). Total length 1.66. **Cephalothorax:** Carapace sides granulate; nonmarginal pars cephalica setae light; marginal setae light,

needlelike. Clypeus setae light, needlelike. Eyes ALE, PME subequal, larger than PLE, ALE circular, PLE oval; ALE–PLE separated by less than ALE radius, PME touching

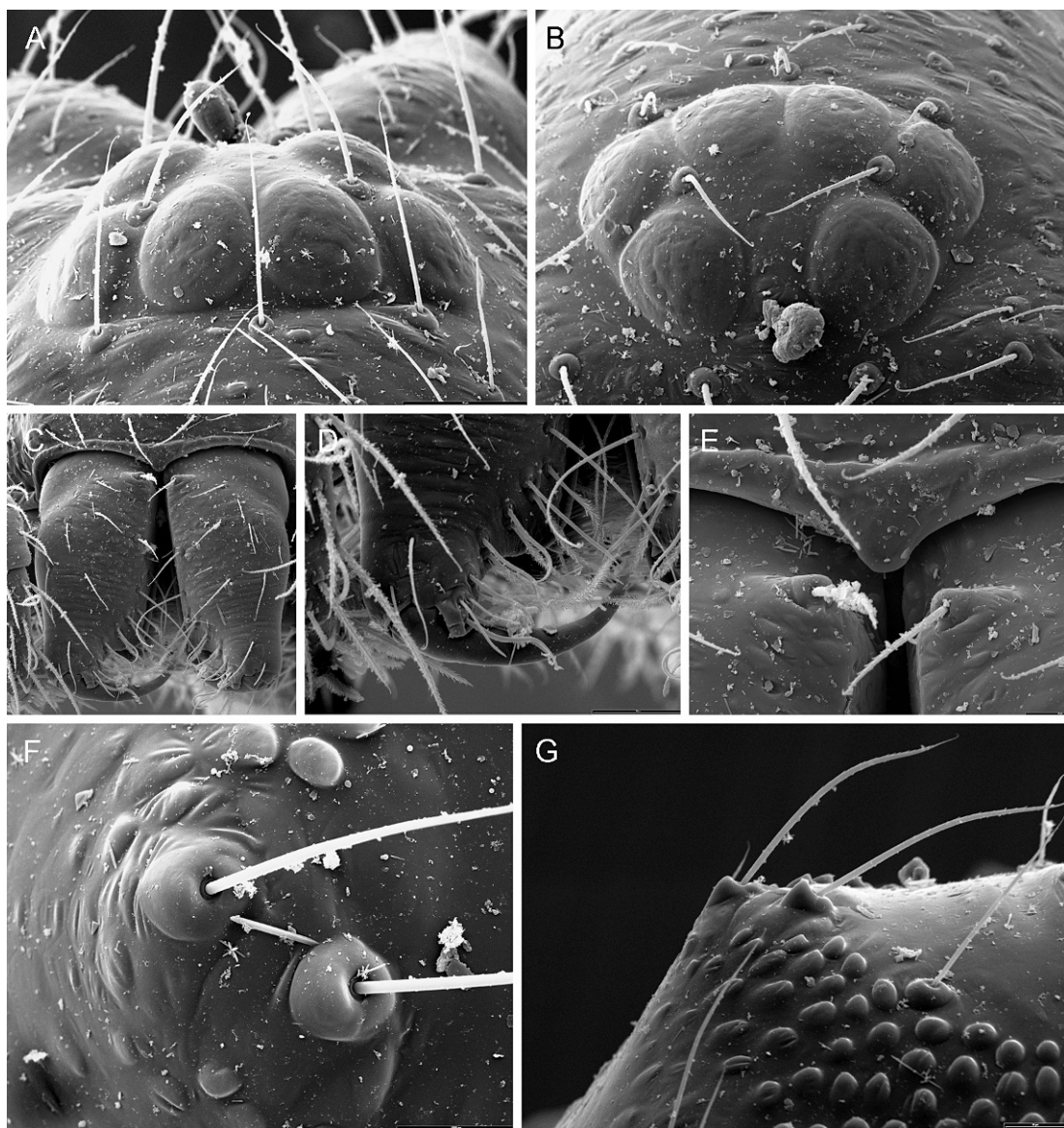


Fig. 16. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). A. Ocular area dorsal view. B. Same, anterior view. C. Chelicerae, anterior view. D. Right chelical fang, anterior view. E. Chelicerae, detail of the basal processes. F. Setae with enlarged bases on the carapace, dorsal view. G. Same, lateral view.

for less than half their length. Sternum without radial furrows between coxae I–II, II–III, III–IV, microsculpture covering entire surface, lateral margins unmodified, orange; setae sparse, but densest medially. Mouthparts: chelicerae orange; setae light. Labium with two short, laterally directed ridges. Endites orange, with a set of black, flattened,

enlarged setae pointing medially (figs. 24C–D, 30 E). **Abdomen:** Book lung covers round. Dorsal scutum orange. Epigastric scutum not protruding. Postepigastric scutum covering about 3/4 of abdominal length, orange. Spinneret scutum absent. Dorsum setae light. Epigastric area setae uniform, light. Postepigastric area setae light. **Legs:** Patella plus

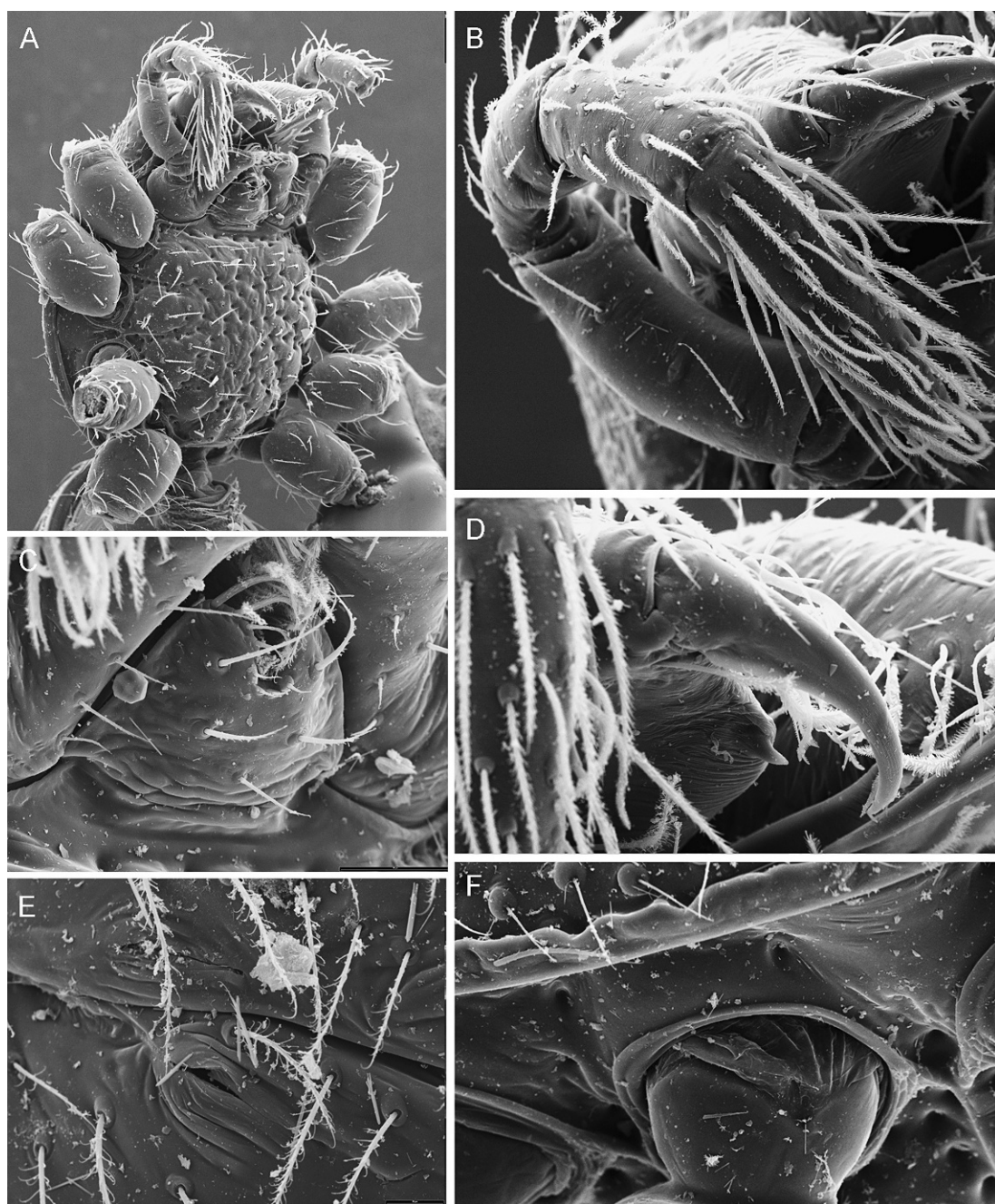


Fig. 17. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). A. Carapace, ventral view. B. Right palp, retrolateral view. C. Labium, ventral view. D. Right chelicerae, retromargin, showing fang and tooth. E. Right spiracles. F. Pleural area, showing pores.

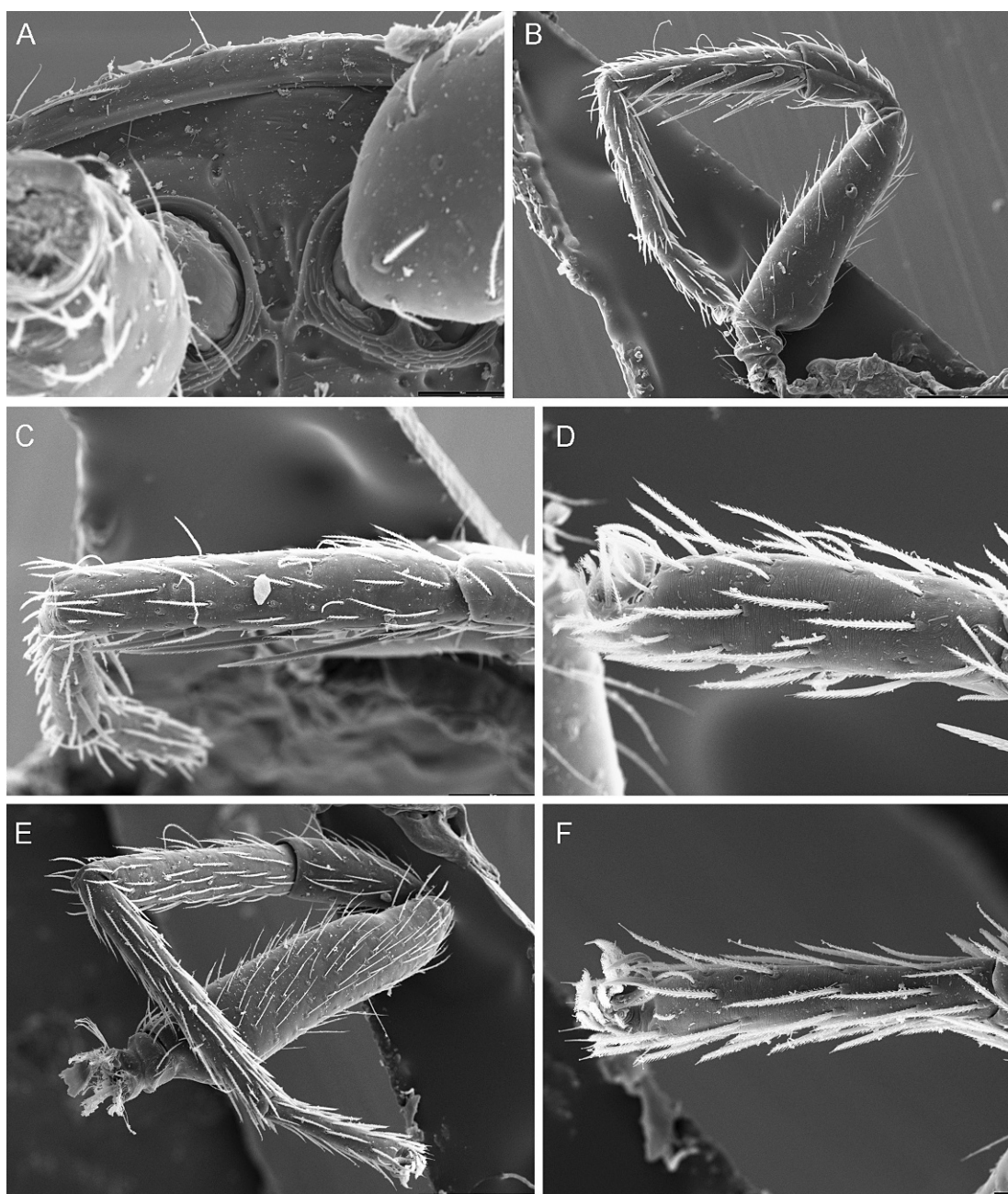


Fig. 18. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). **A.** Pleural and sternal area between coxae II–III, ventral view. **B.** Right leg I, prolateral view. **C.** Tibia I, dorsal view. **D.** Tarsus I, prolateral view. **E.** Right leg IV, prolateral view. **F.** Right tarsus IV, prolateral view.

tibia I shorter than carapace. Leg spination (all spines longer than segment width): leg I: femora: pv0-0-1-0, tibiae: v2-2-2-2-0, metatarsi: v2-2-0, leg II: tibiae: v2-2-2-2-0, meta-

tarsi: v2-2-0. Trichobothria: tibia: each with three; metatarsus: each with one; opening longitudinally narrowed; hood covered by numerous low, closely spaced transverse

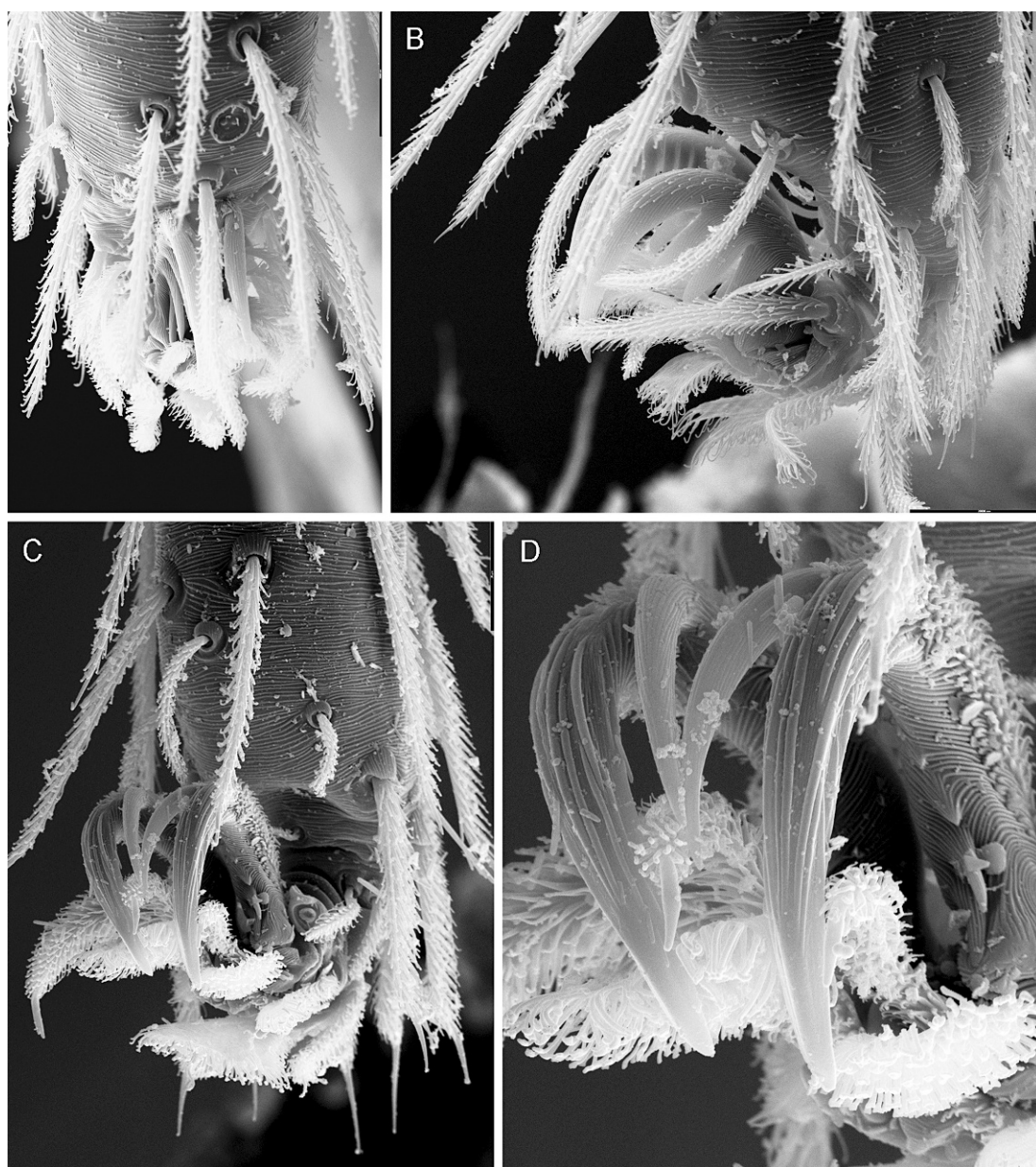


Fig. 19. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). **A.** Claws of tarsus I, dorsal view. **B.** Same, prolateral view. **C.** Claws of tarsus IV, oblique prolateral view. **D.** Same, detail of large teeth on claws.

ridges; basal expansion of trichobothrial setae with annular ridges (fig. 26C–G). Tarsal organ with two sensilla visible in the palp (fig. 26H), three in the leg I, one of them very small (fig. 26I). **Genitalia:** Epigastric region with sperm pore oval, situated at level of

anterior spiracles, unmodified. Palp: distal part of the bulb with a truncate shape, with an indentation on the prolateral side, covered with setiform structures, some of them bifid (fig. 28D). Two elongated projections run parallel to the embolus at its prolateral side

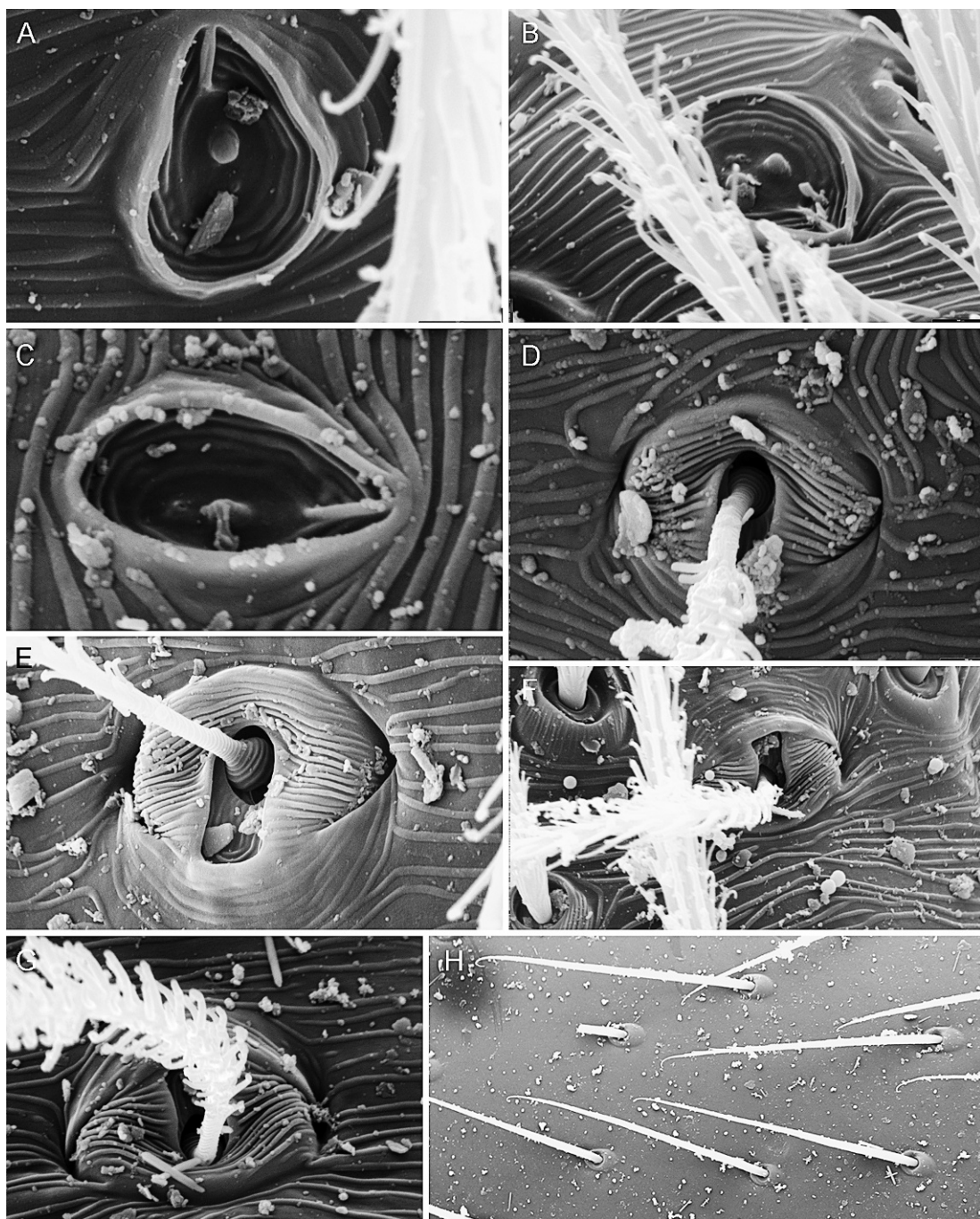


Fig. 20. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). **A.** Tarsal organ, palp, dorsal view. **B.** Same, leg I. **C.** Same, leg IV. **D.** Trichobothrial bases, tibia of palp, dorsal view. **E.** Same, tibia I. **F.** Same, metatarsus I. **G.** Same, metatarsus IV. **H.** Setae on the dorsum of abdomen.

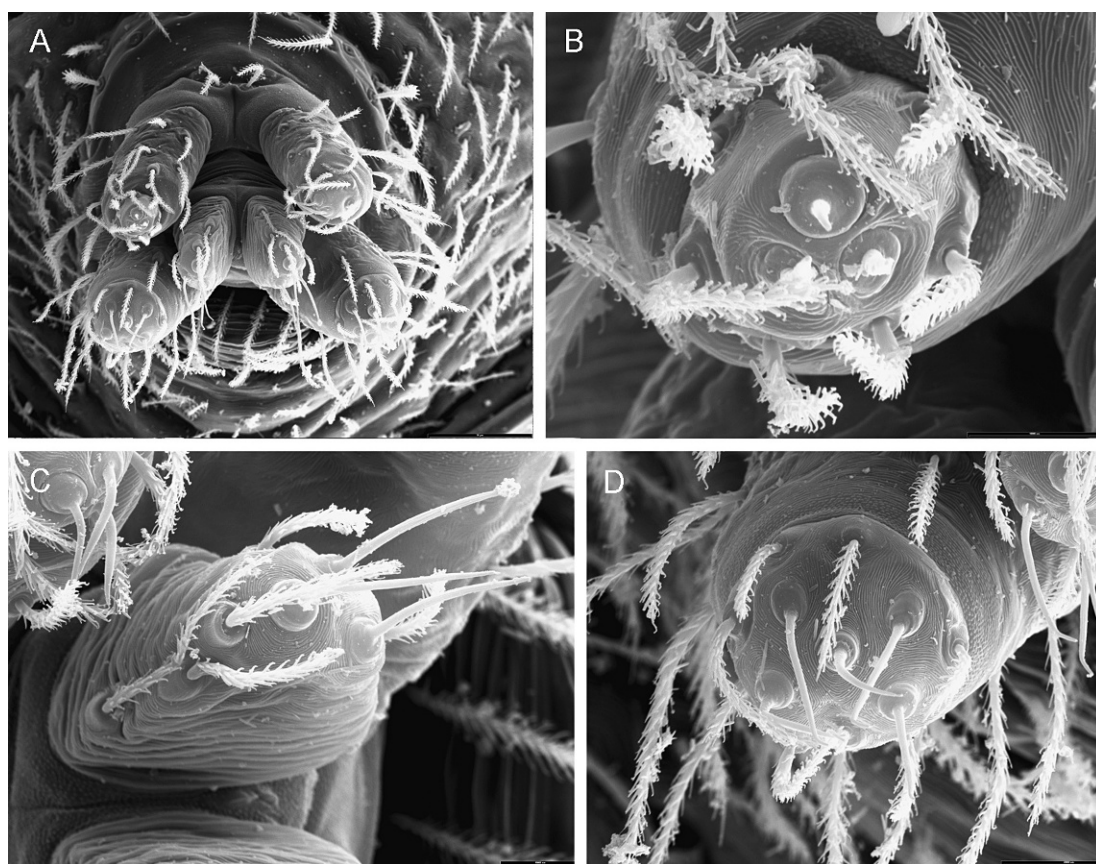


Fig. 21. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). Spinneret morphology. **A.** Spinnerets, posteroventral view. **B.** Detail of right anterior lateral spinneret. **C.** Detail of left posterior median spinneret. **D.** Detail of right posterior lateral spinneret.

(fig. 28D), retrolateral surface of embolus bearing numerous spinules (fig. 28H). Two other similarly “haired” projection flank the embolus dorsally and retrolaterally (fig. 28E–F).

Female (paratype, PBI_OON 15404). Total length 1.78. As in male except as noted. **Cephalothorax:** Carapace nonmarginal pars cephalica setae in U-shaped row. PME circular. Sternum orange. Mouthparts: chelicerae orange; paturon distal region abruptly narrowed. Labium with 3–5 setae on anterior margin. Palp without spines. **Abdomen:** Dorsal scutum covering full length of abdomen, orange. Spinneret scutum slightly sclerotized. **Legs:** Femora darker than the subsequent articles. Leg spination as in male. Tarsal organ with two sensilla visible on palp and leg IV (fig. 20A, C), three on leg I, one

of them very small (fig. 20B). Spinnerets (fig. 21): ALS and PMS with three spigots, PLS with five spigots. **Genitalia:** Copulatory opening a small slit posteriorly situated and separated from the epigastric furrow, in the middle of the transverse plates, between them lies a field of presumably glandular tissue (figs. 22E, 39A, we cannot find the external openings). The copulatory opening leads to a more or less cylindrical, medium-sized, posterior receptacle that extends anteriorly (after a short posteriorly directed part) to the vicinity of the epigastric furrow, leading to the uterus externus. The T-shaped anterior sclerite (figs. 22C, 39A), apparently without lumen, has conspicuously curved lateral bars for the attachment of muscles connecting to the lateral parts of one of the transverse

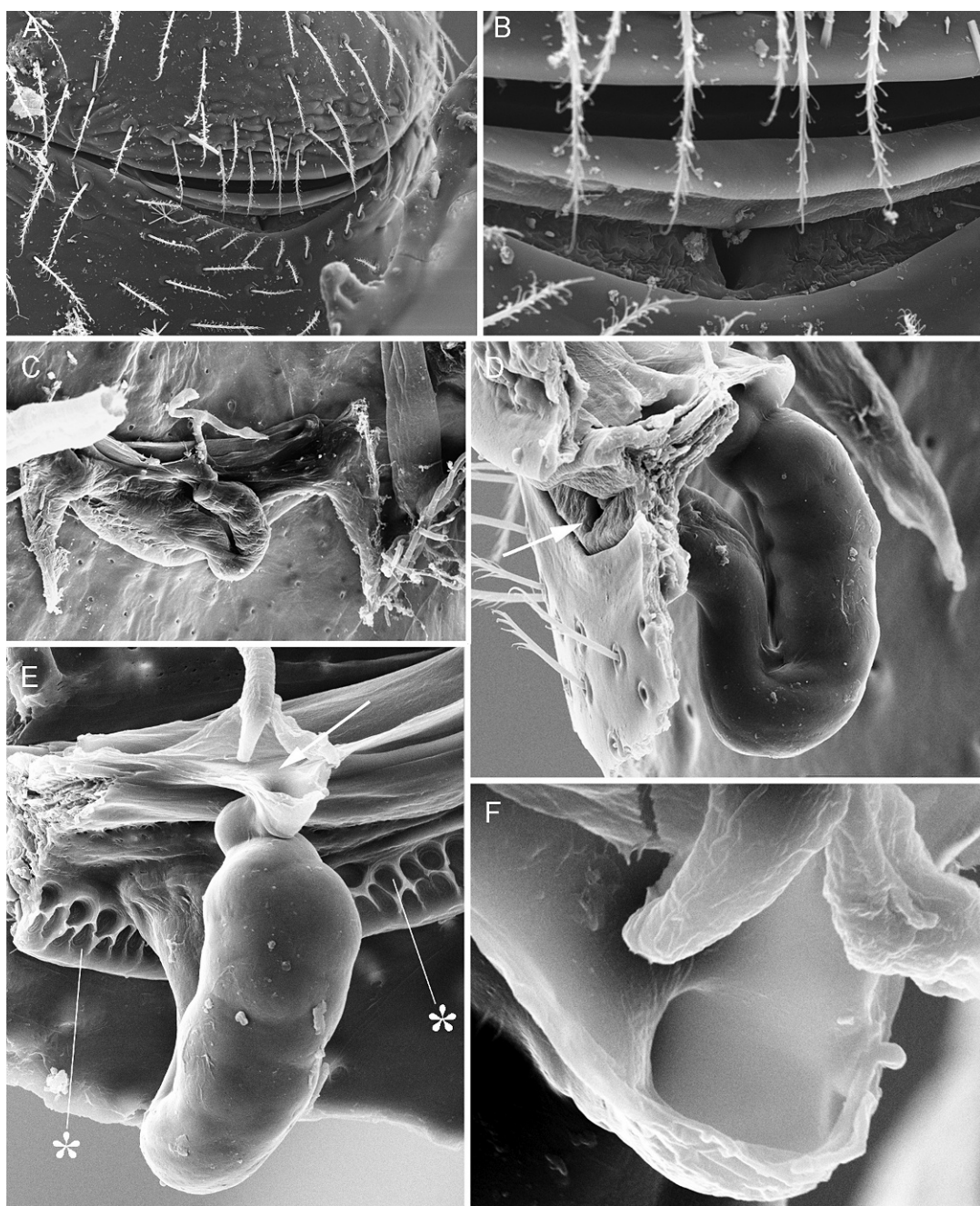


Fig. 22. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). Genitalic morphology. **A.** Epigastric region, ventral view. **B.** Detail of the copulatory opening. **C.** Internal female genital organs, dorsal view. **D.** Longitudinal section, lateral view (arrow = copulatory opening). **E.** Same, dorsal view (arrow = anterior orifice of the posterior receptacle; asterisks: transverse lateral areas with presumably glandular tissue). **F.** Same, detail of the anterior part of the posterior receptacle, showing the orifice of the fertilization duct, and the basal part of the anterior sclerite that locks in it.

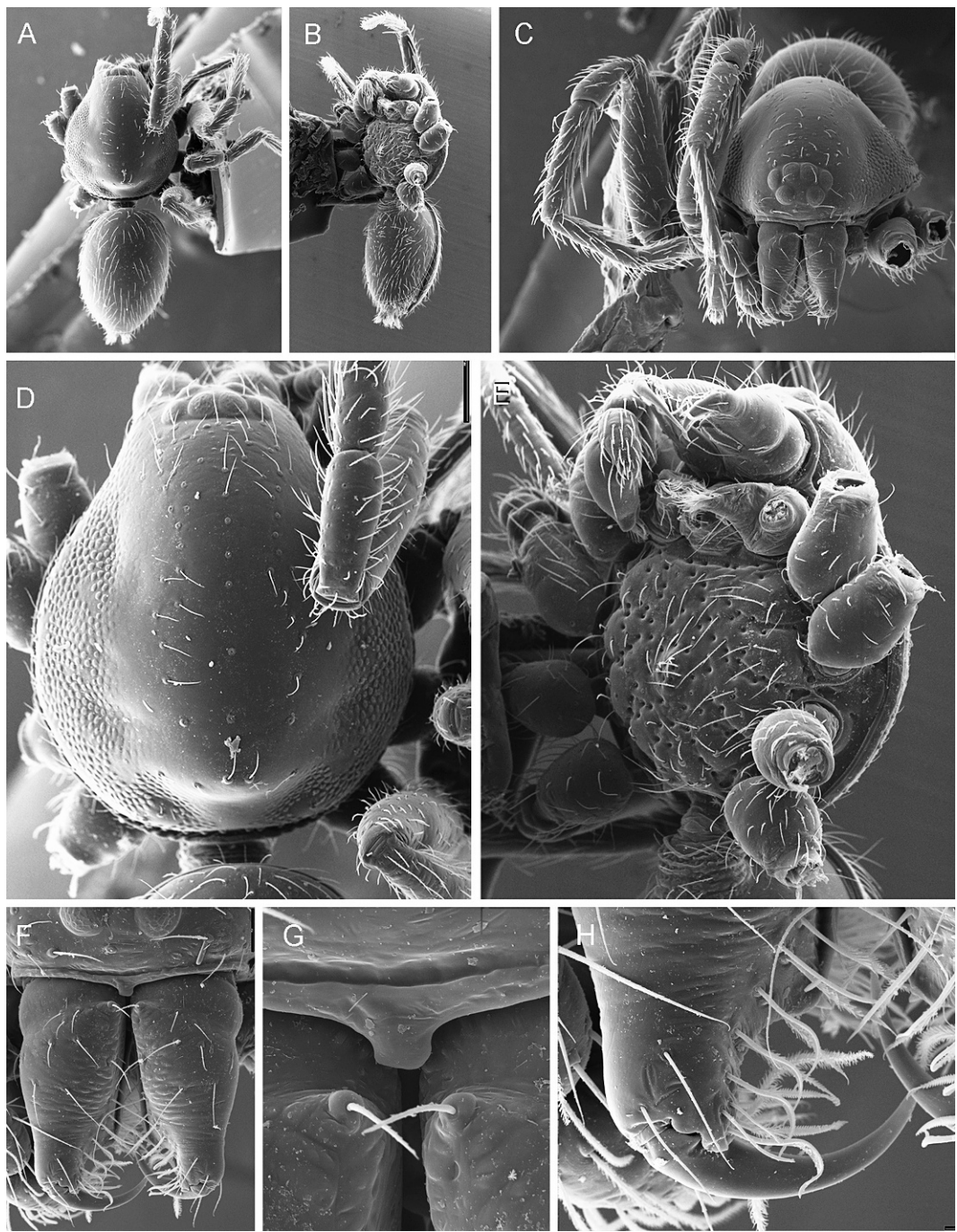


Fig. 23. *Trilacuna meghalaya*, new species, male (PBI_OON 15401). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, anterior view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Chelicerae, anterior view. **G.** Same, detail of the basal processes. **H.** Right cheliceral fang.

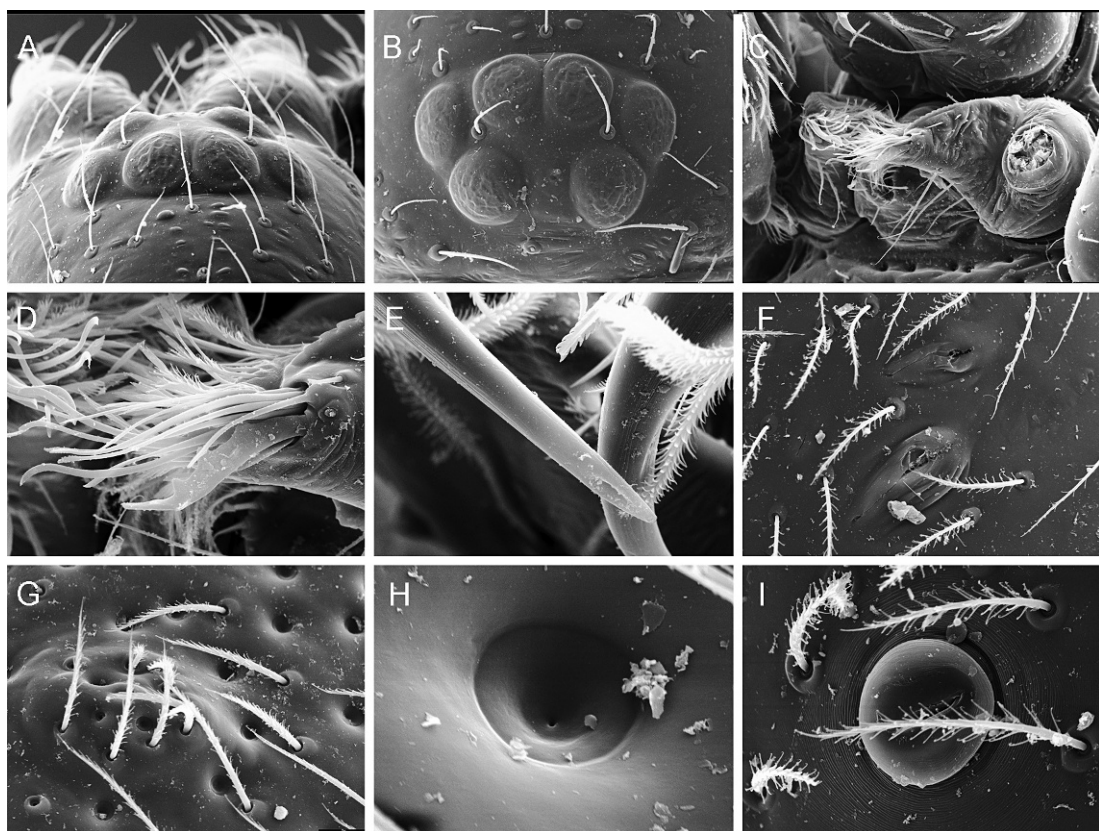


Fig. 24. *Trilacuna meghalaya*, new species, male (PBI_OON 15401). A–B. Ocular area (A, dorsal, B, anterior views). C. Endites and labium, ventral view. D. Left endite, detail of apical setae. E. Right cheliceral venom outlet. F. Left spiracles. G. Sternal tuft. H. Sternal pit, showing a central pore. I. Gonopore.

plates. Transverse bars with two relatively long, lateral apodemes serve as attachment for other muscles.

OTHER MATERIAL EXAMINED: INDIA:
Meghalaya: Khasi Hills: Mawphlang, 1800 m, Oct. 28, 1978, C. Besuchet, I. Löbl, 1♂ (MACN-Ar 28839, PBI_OON 15502); Khasi Hills; below Cherrapunjee, 1200 m, Oct. 26, 1978, C. Besuchet and I. Löbl, 1♀ (MHNG PBI_OON 15392), 1♀ (MACN-Ar 28838, PBI_OON 42097); Khasi-Hills: Nongpoh, 700 m, Nov. 5, 1978, C. Besuchet and I. Löbl, 3♂ (MHNG PBI_OON 12808), 1♂ (MHNG PBI_OON 12876), 2♀ (MHNG PBI_OON 15324), 1♂ (MHNG PBI_OON 16158); Garo-Hills: Songsak, forest floor, bamboo litter, 400m, Nov. 02, 1978, C. Besuchet and I. Löbl, 1♀ (MHNG PBI_OON 15411). **Assam:** Manas, Manas

Wildlife Sanctuary, 200 m, 26.72500°N, 91.03600°E, Oct. 21, 1978, to Oct. 22, 1978, C. Besuchet, I. Löbl, 1♂ (MHNG PBI_OON 15338).

DISTRIBUTION: Known only from Meghalaya and Assam, northeastern India.

Trilacuna besucheti Grismado and Piacentini,
 new species

Figures 32–34, 39C–D

TYPES: Male holotype from India: Meghalaya: Khasi Hills: 10 km north of Cherrapunjee, leaf litter, 1700 m, Oct. 26, 1978, C. Besuchet and I. Löbl (MHNG PBI_OON 12742); three paratype females from Khasi Hills: Mawphlang, leaf litter, 1800 m, Oct. 28, 1978, C. Besuchet, I. Löbl (MHNG PBI_OON 15393).

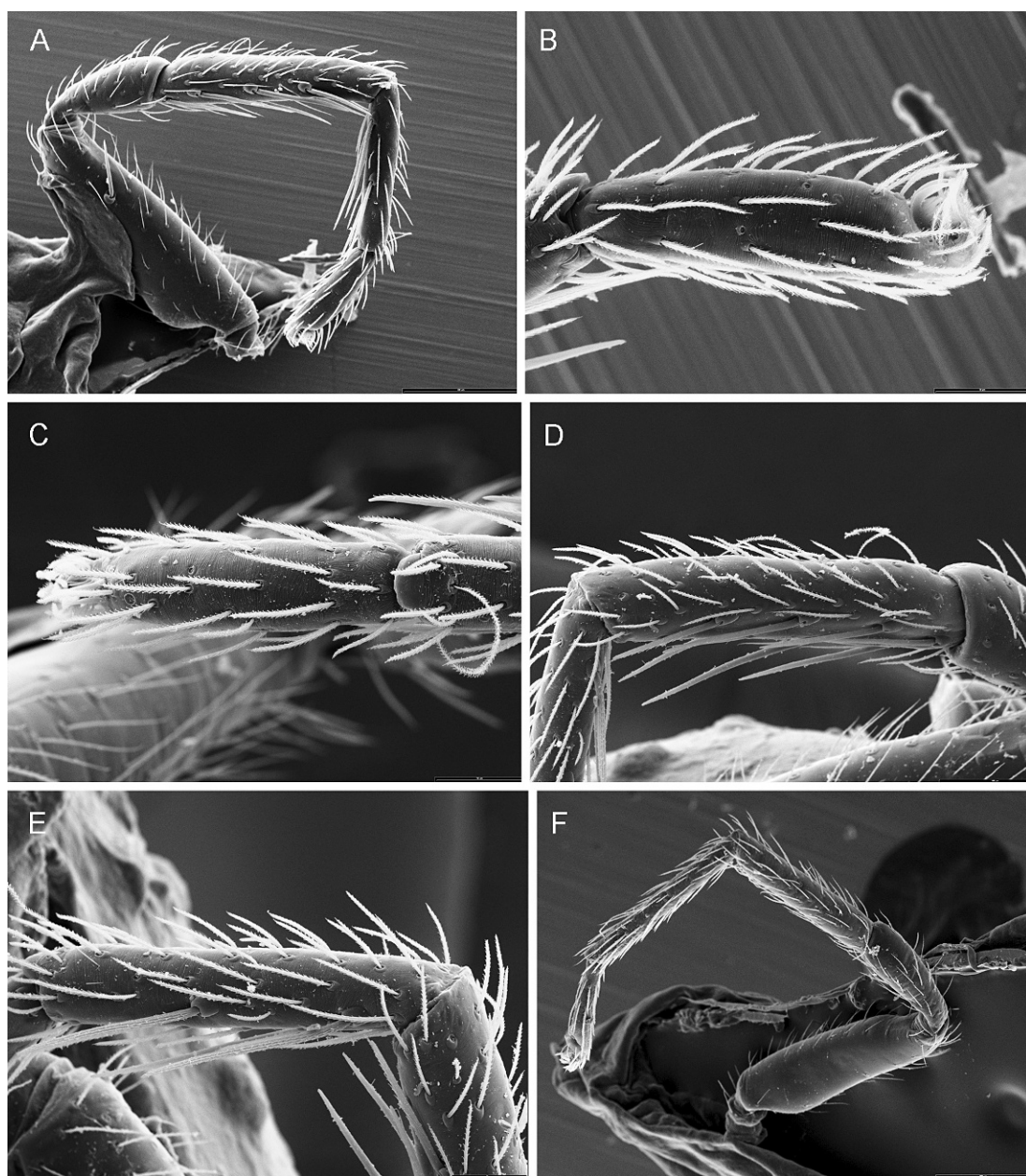


Fig. 25. *Trilacuna meghalaya*, new species, male (PBI_OON 15401). Legs. A–E. Left leg I. A. Prolateral view. B. Tarsus, prolateral view. C. Same, dorsal view. D. Tibia, retrolateral view. E. Metatarsus, retrolateral view. F. Right leg IV, retrolateral view.

ETYMOLOGY: The specific name is a noun in apposition in honor to Claude Besuchet, one of the collectors of this and other oonopid species from the Himalayas.

DIAGNOSIS: Males of this species can be recognized by having an additional prolateral

row of many short macrosetae on tibiae I (fig. 34B), and also by the distal part of the bulb with a circular foramen with a prolateral bunch of posteriorly directed, curved, setae-like structures, and the embolus and paramembolic processes making a trifid structure

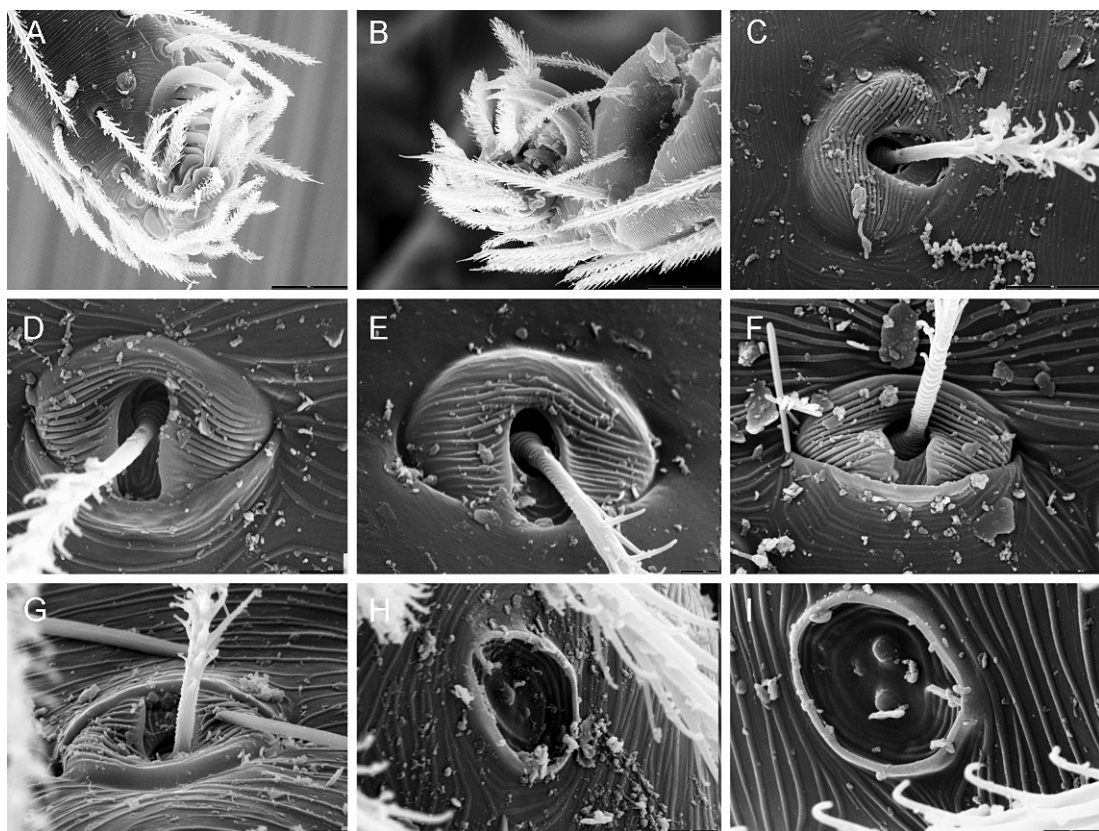


Fig. 26. *Trilacuna meghalaya*, new species, male (PBI_OON 15401). **A.** Tarsal claws, leg I, oblique anterior view. **B.** Tarsal claws, leg IV, retrolateral view. **C–G.** Trichobothria. **C.** Palpal tibia. **D.** Tibia I. **E.** Tibia IV. **F.** Metatarsus I. **G.** Metatarsus IV. **H.** Tarsal organ, palp. **I.** Same, leg I.

(fig. 39D). Females are distinguished by having a darkened band in the posterior margin of the epigastric furrow (fig. 32H) and by the small, rounded posterior receptacle (fig. 39C).

DESCRIPTION: Male (PBI_OON 15005). Total length 2.24. **Cephalothorax:** Carapace sides smooth; nonmarginal pars cephalica setae dark; marginal setae absent. Clypeus setae absent. Eyes all subequal, ALE circular, PLE circular; ALE–PLE separated by less than ALE radius, PME touching. Sternum orange, with radial furrows between coxae I–II, II–III, III–IV, lateral margins with indented extensions between coxae; setae sparse, evenly scattered. Mouthparts: setae dark, scarce on the anterior margin of paturon. **Abdomen:** Book lung covers round. Dorsal scutum orange. Epigastric scutum not protruding. Postepigastric scutum covering

nearly full length of abdomen, orange. Spinneret scutum present, incomplete ring, very narrow. Dorsum setae dark. Epigastric area setae uniform, dark. Postepigastric area setae dark. **Legs:** Patella plus tibia I nearly as long as carapace, femora slightly darker. Leg spination (all spines longer than segment width): leg I: femora pv0-0-1-0, tibiae v2-2-2-0, and an additional prolateral row of many short macrosetae (fig. 34B), metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0. Trichobothria not examined. **Genitalia:** Epigastric region with sperm pore oval, situated at level of anterior spiracles, unmodified. Palp embolus straight, accompanied by a dorso-prolateral paraembolic translucent structure with branched tip and many fili-form structures; prolateral margin of cymbium with two stout dark setae with enlarged bases; distal part of the bulb with a circular

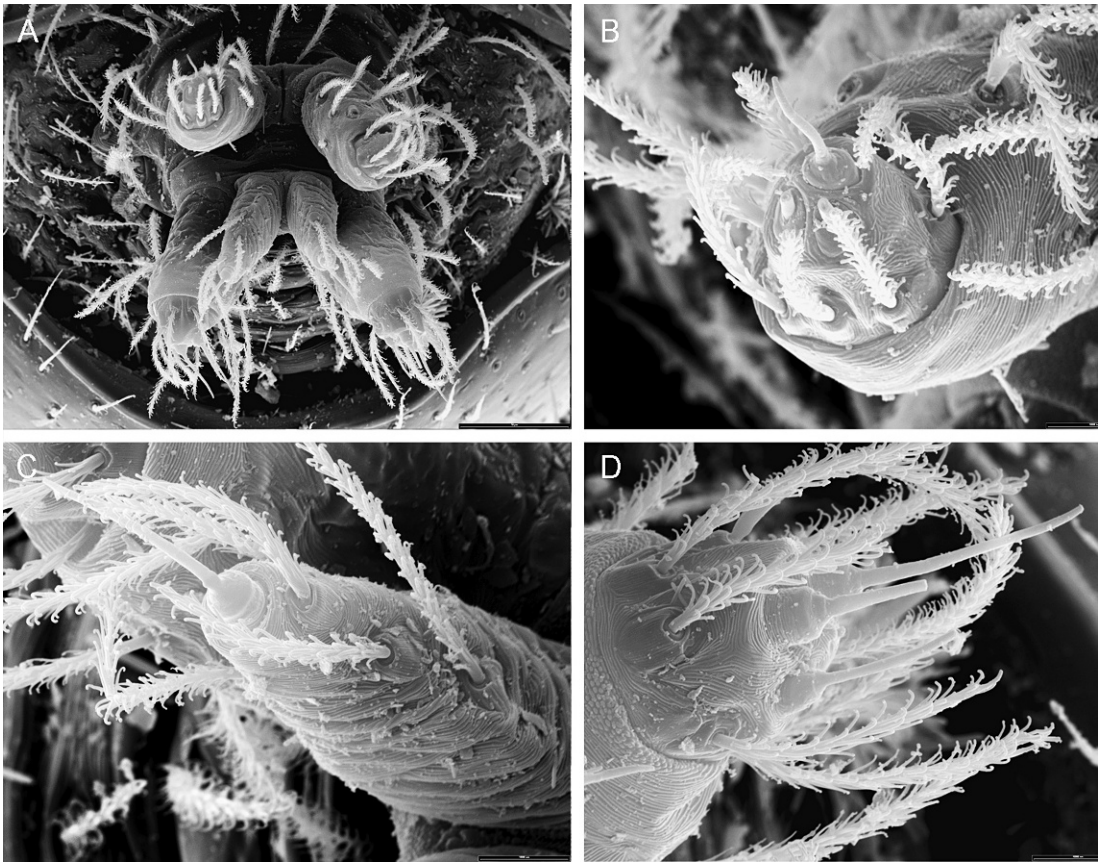


Fig. 27. *Trilacuna meghalaya*, new species, male (PBI_OON 15401). Spinneret morphology. **A.** Spinnerets, posteroventral view. **B.** Detail of right anterior lateral spinneret. **C.** Detail of right posterior median spinneret. **D.** Detail of left posterior lateral spinneret.

distal foramen from where the embolus arises; on its prolateral border is a bunch of posteriorly directed, long, curved, setalike structures (fig. 39D).

Female (paratype, PBI_OON 15393). Total length 2.46. As in male except as noted. **Cephalothorax:** Carapace with slight reticulations on the anterolateral sides; nonmarginal pars cephalica setae in U-shaped row. Eyes PME circular; PME touching for less than half their length. Sternum orange. Mouthparts: chelicerae, endites, and labium orange-brown; paturon distal region abruptly narrowed. Endites distally excavated. Palp without spines. **Abdomen:** Dorsal scutum covering more than 3/4 of abdomen, orange, only very narrow lateral parts of soft tissues are visible from above. Postepigastric scutum orange, with short posteriorly directed lateral

apodemes. Spinneret scutum very narrow.

Legs: Femora slightly darker. Leg spination (all spines longer than segment width): leg I: femora pv0-0-1-0, tibiae v2-2-2-2-0, metatarsi: v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0. Trichobothria not examined. **Genitalia:** Ventral view: posterior margin with a darkened band corresponding to the area with internal papillae where the copulatory opening is presumably located (fig. 32H). Posterior receptacle small, rounded (fig. 39C).

OTHER MATERIAL EXAMINED: INDIA: **Meghalaya:** Garo-Hills: above Tura, 700 m, 25.56000°N, 89.49000°E, Nov. 1, 1978, C. Besuchet, I. Löbl, 1♂ (MHNG PBI_OON 15005).

DISTRIBUTION: Known only from Meghalaya, in northeastern India.

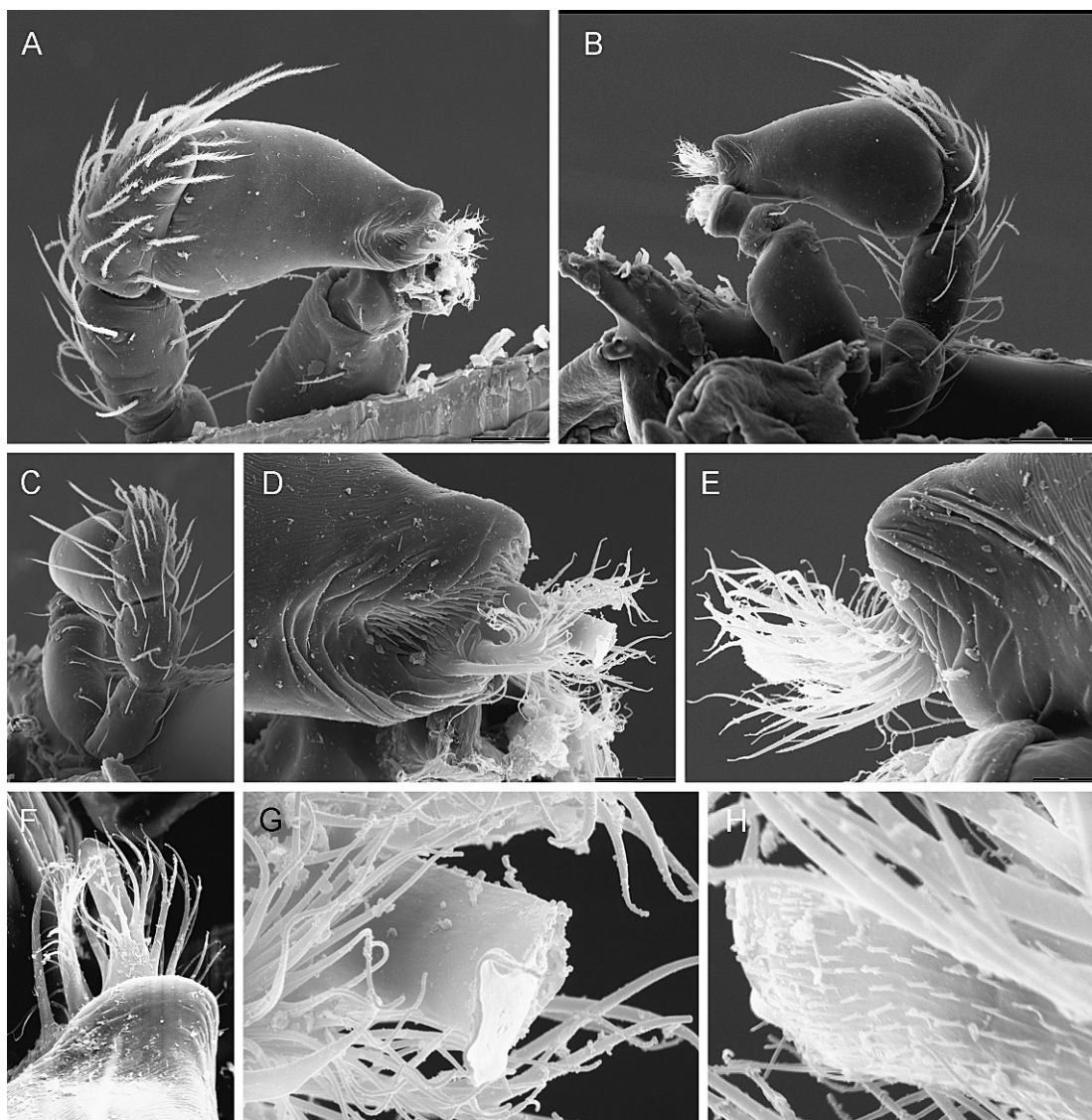


Fig. 28. *Trilacuna meghalaya*, new species, male (PBI_OON 15401). **A.** Left palp, prolateral view. **B.** Same, retrolateral view. **C.** Same, dorsal view. **D.** Detail of the apical part of the copulatory bulb, prolateral. **E.** Same, retrolateral view. **F.** Same, dorsal view. **G.** Tip of embolus, prolateral view. **H.** Same, retrolateral view.

Trilacuna loebli Grismado and Piacentini,
new species
Figure 35

TYPES: Female holotype and female paratype from India: Assam: Manas, Manas Wildlife Sanctuary, 200 m, N 26.72500°, E 91.03600°, Oct. 21–22, 1978, C. Besuchet, I. Löbl (MHNG PBI_OON 12818).

ETYMOLOGY: The specific name is a noun in apposition in honor to Ivan Löbl, one of the collectors of this and other oonopids from the Himalayas.

DIAGNOSIS: Females of this species are recognizable by the worm-shaped posterior receptacle, describing a strong posterior curve before connecting to the uterus externus (fig. 35H–I).

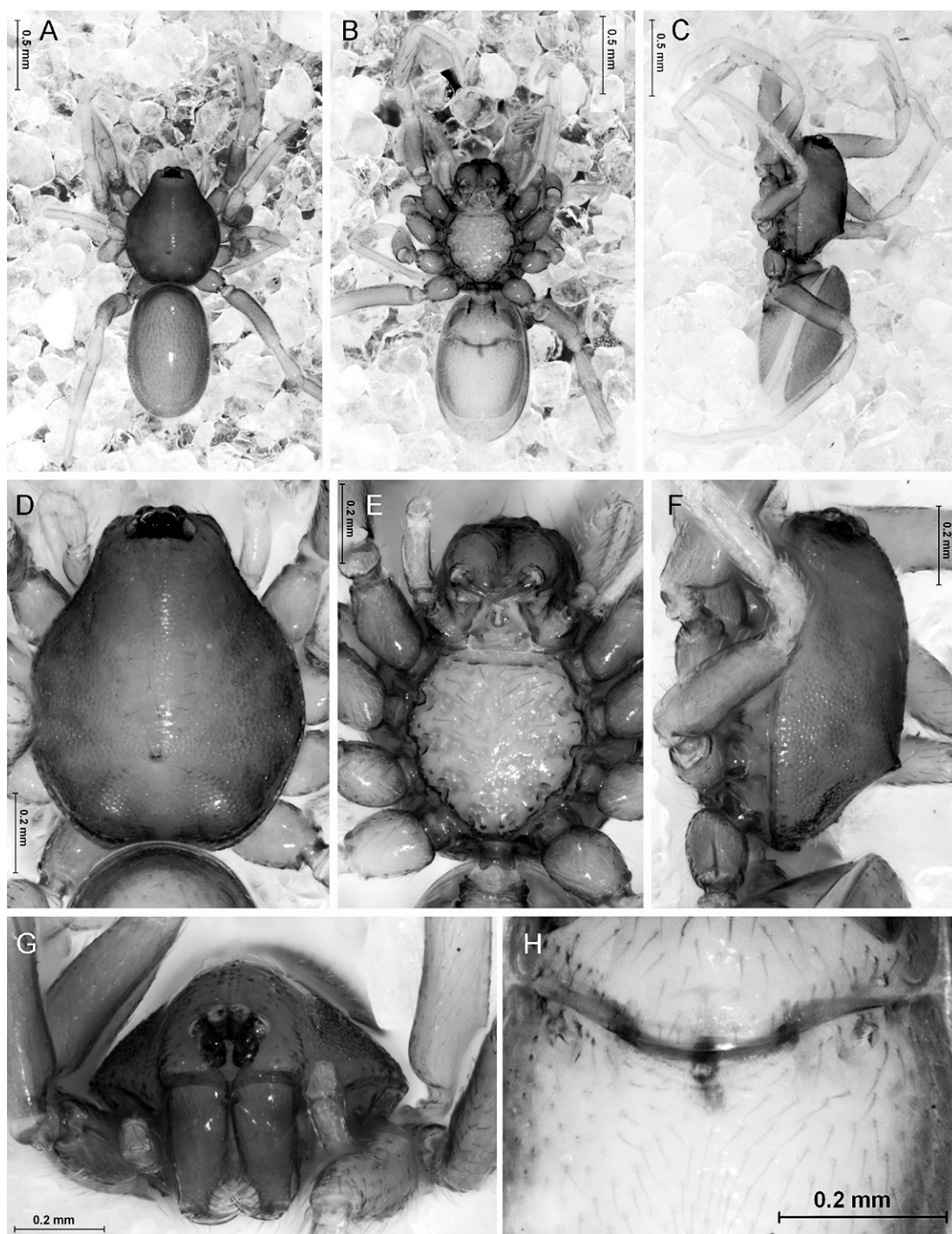


Fig. 29. *Trilacuna meghalaya*, new species, female (PBI_OON 15404). A. Habitus, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Carapace, dorsal view. E. Same, ventral view. F. Same, lateral view. G. Same, anterior view. H. Epigastric area, ventral view.

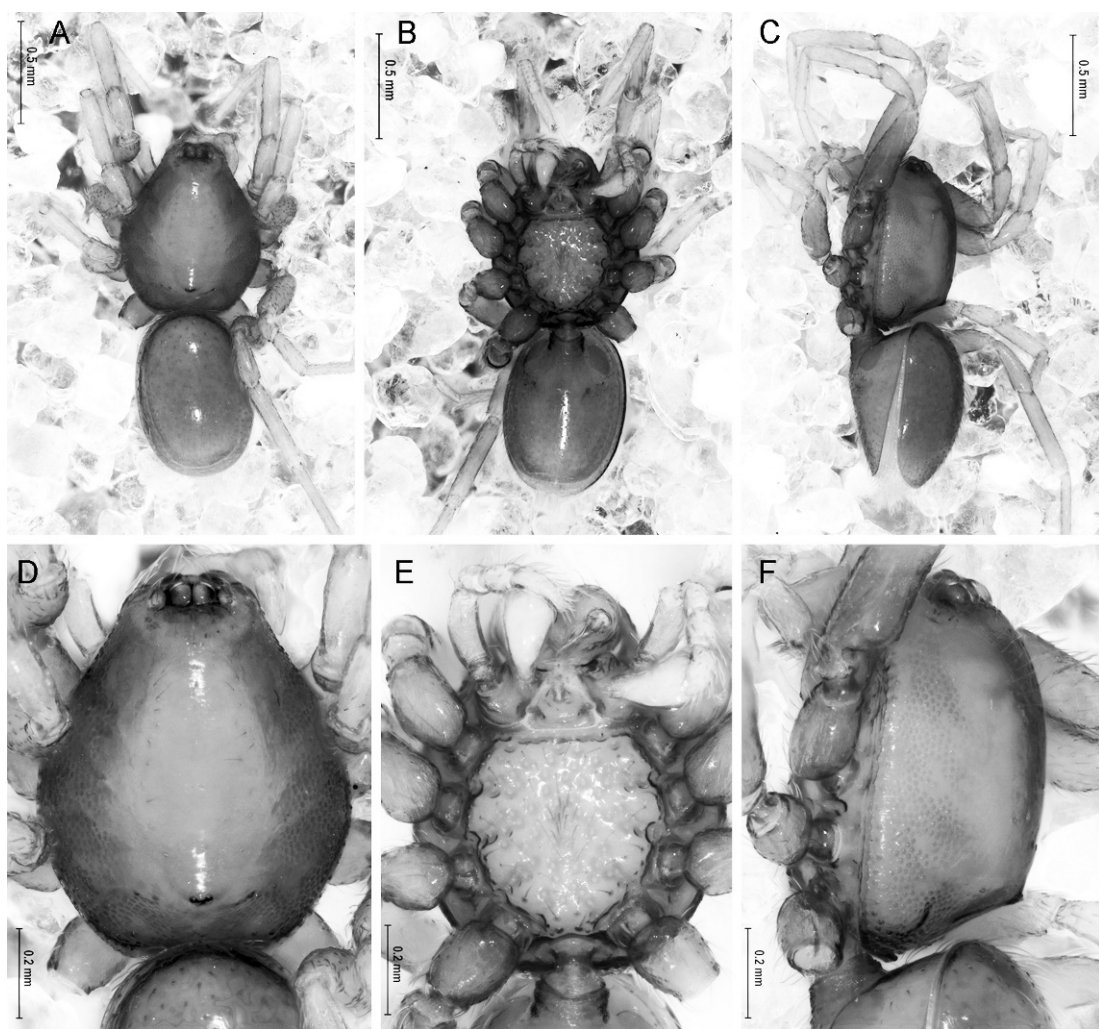


Fig. 30. *Trilacuna meghalaya*, new species, male (PBI_OON 15401). **A.** Habitus dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

DESCRIPTION: Female (paratype, PBI_OON 12818). Total length 1.70. **Cephalothorax:** Carapace sides granulate; nonmarginal pars cephalica setae light, scattered; marginal setae absent. Clypeus setae light, needlelike. Eyes all subequal, all eyes oval; ALE–PLE separated by less than ALE radius, PME touching throughout most of their length. Sternum orange, without radial furrows between coxae I–II, II–III, III–IV, microsculpture covering entire surface, lateral margins unmodified. Mouthparts: chelicerae, endites, and labium orange. Chelicerae

orange; setae light; paturon distal region unmodified. Labium orange; with one or two setae on anterior margin. Endites distally not excavated, orange. Palp without spines. **Abdomen:** Book lung covers round. Dorsal scutum covering full length of abdomen, orange. Postepigastric scutum covering about 2/3 of abdominal length, orange. Dorsum setae dark. Epigastric area dark. Postepigastric area setae dark. **Legs:** Patella plus tibia I nearly as long as carapace. Leg spination (all spines longer than segment width): leg I: femora pv0-0-1-0, tibiae v2-2-2-0, metatarsi



Fig. 31. *Trilacuna meghalaya*, new species, male (PBI_OON 15401). A. Habitus, anterior view. B. Abdomen, ventral view. C. Left palp, retrolateral view. D. Same, dorsal view. E. Same, prolateral view.

v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0. Trichobothria not examined. **Genitalia:** Ventral view: postepigastric scutum with indented anterior margin; posterior receptacle visible through scutum, dark. Internal female genitalia: anterior sclerite T-shaped, connected by muscles presumably to the lateral ends of the transverse bar; posterior receptacle worm shaped, running posteriorly at first, and then describing a wide anterior-

directed curve (fig. 35I), becoming gradually thinner and sinuous, and ending at the epigastric furrow.

Male: Unknown.

OTHER MATERIAL EXAMINED: Same data as the types, 2♀ (MHNG PBI_OON 15303); same locality and collectors, Oct. 22, 1978, 1♀ (MHNG PBI_OON 12791).

DISTRIBUTION: Known only from the type locality.

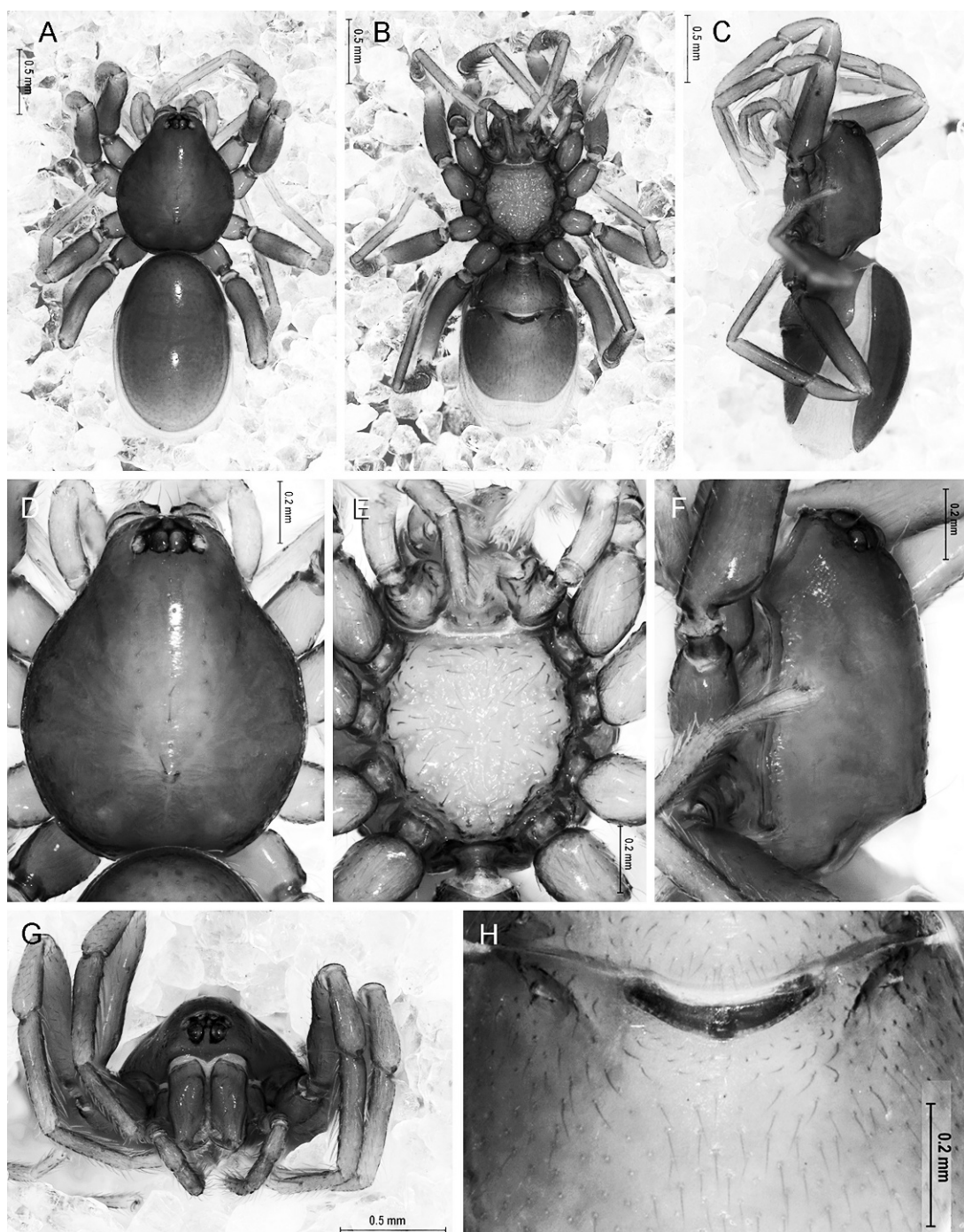


Fig. 32. *Trilacuna besucheti*, new species, female (PBI_OON 15393). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Same, anterior view. **H.** Epigastric area, ventral view.

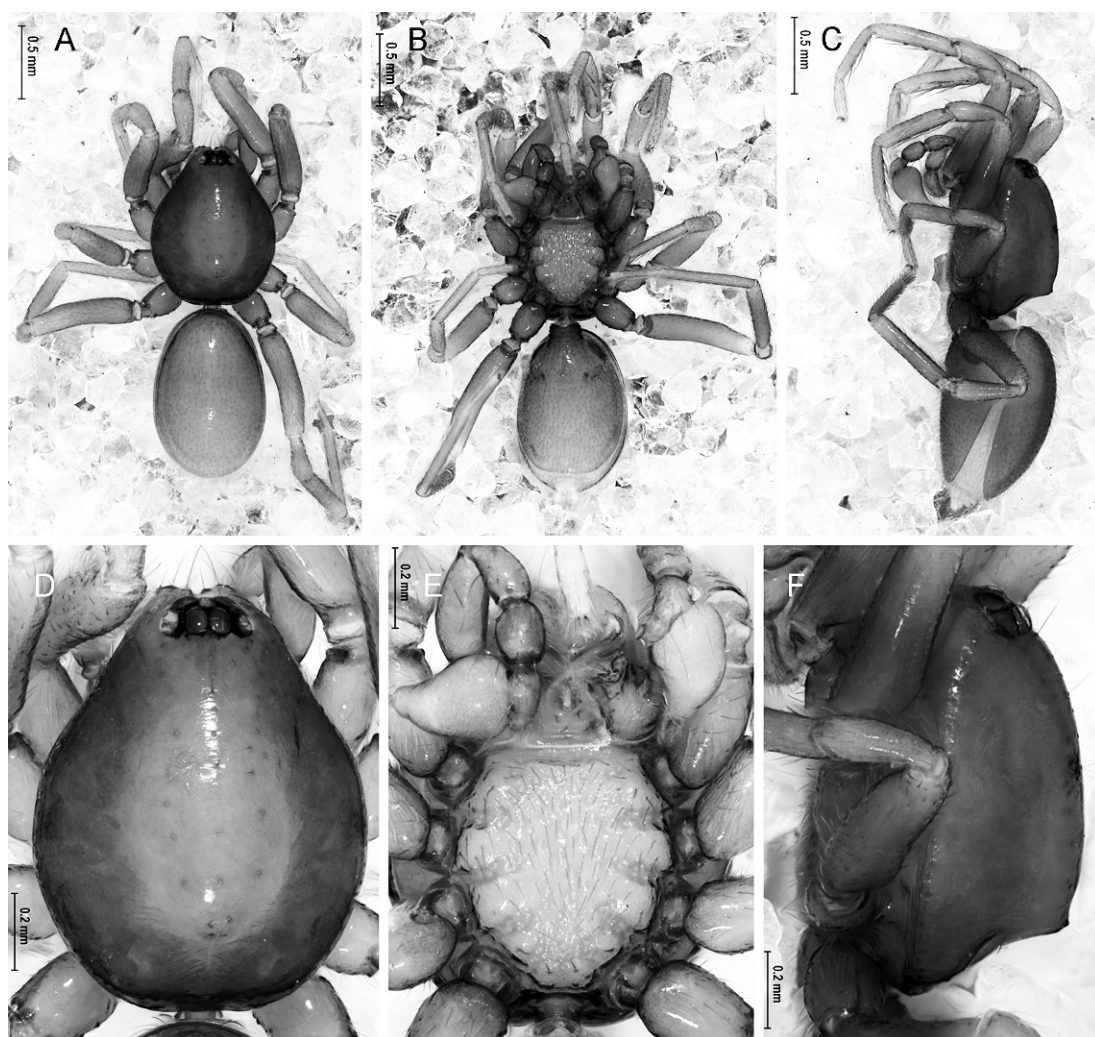


Fig. 33. *Trilacuna besucheti*, new species, male (PBI_OON 15005). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

Trilacuna mahanadi Grismado and
Piacentini, new species
Figures 36–38, 39E–F

TYPES: Male holotype and two female paratypes from India: West Bengal: Darjeeling: Mahanadi near Kurseong, south side, 1200 m, Oct. 6, 1978, C. Besuchet and I. Löbl (MHNG PBI_OON 12672).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males of this species are similar to those of *T. meghalaya* by their relatively simple paraembolic projections on

the male palp, but the bulb is narrow distally, gradually tapering to the area from which the embolus and accompanying elements arise (fig. 39F), and also by the presence of enlarged, stout setae in the epigastric area (figs. 37E–F, 38B). Females are recognizable by the long and tortuous posterior receptacle, with a broad anterior (ending) part, and by the shape of the anterior T-shaped sclerite, with thin, long, acute lateral projections (figs. 36H, 39E).

DESCRIPTION: Male (holotype, PBI_OON 12672). Total length 1.38. **Cephalothorax:** Carapace sides smooth; nonmarginal pars

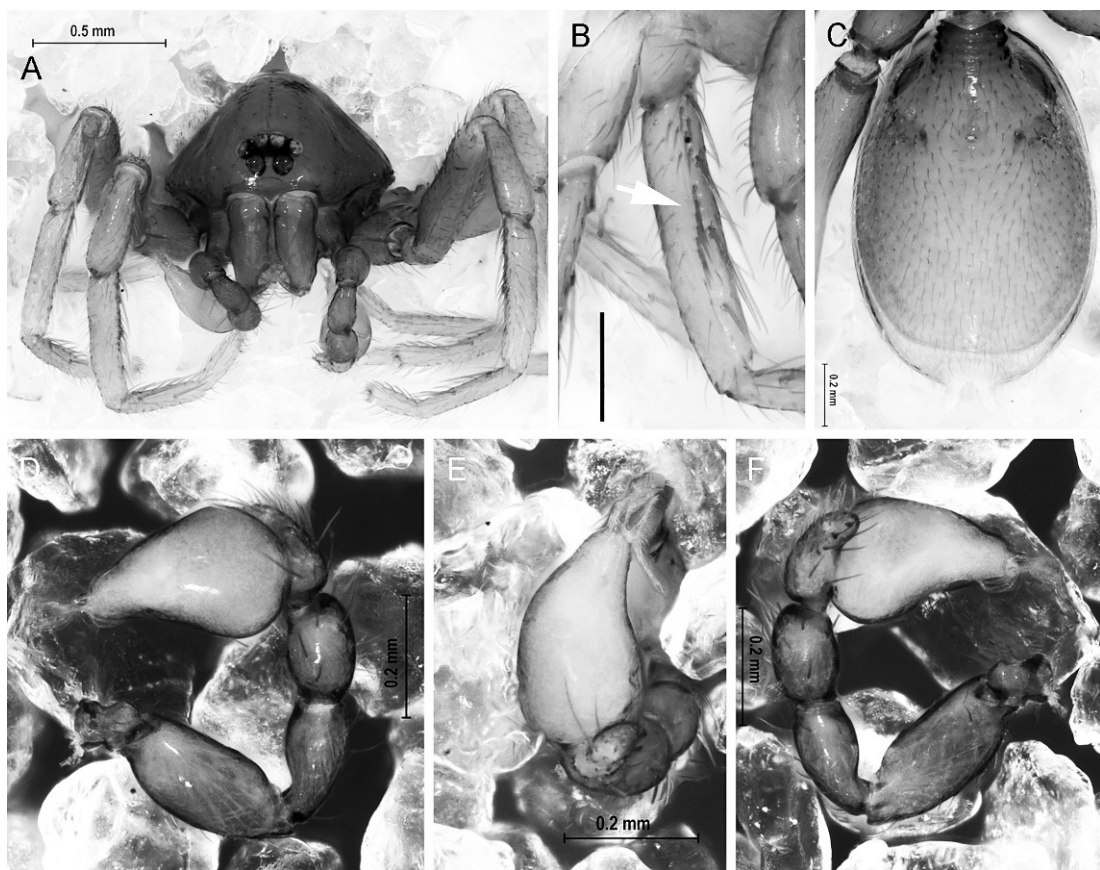


Fig. 34. *Trilacuna besucheti*, new species, male (PBI_OON 15005). **A.** Carapace, anterior view. **B.** Right tibia I, prolateral view (arrow = row of small macrosetae). **C.** Abdomen, ventral view. **D.** Left palp, retrolateral view. **E.** Same, dorsal view. **F.** Same, prolateral view.

cephalica setae dark; marginal setae light, needlelike. Clypeus setae light, needlelike. Eyes on a black area, ALE largest, ALE oval, PLE oval; ALE–PLE separated by ALE radius to ALE diameter, PME separated by less than their radius. Sternum without radial furrows between coxae I–II, II–III, III–IV, microsculpture covering entire surface, lateral margins with indented extensions between coxae, orange; setae abundant, densest medially. Mouthparts: chelicerae orange; setae light. Labium orange. Endites orange, with the distal excavation with irregular margin. **Abdomen:** Book lung covers ovoid. Dorsal scutum orange. Epigastric scutum strongly protruding. Postepigastric scutum covering about 2/3 of abdominal length, orange. Spinneret scutum present, incomplete ring,

slightly sclerotized. Dorsum setae dark. Posterior margin of epigastric protrusion with dark, thickened setae pointing anteriorly, two of them very large; this group of setae is flanked by other strong, erect setae (less thick) at sides and posteriorly, the latter also directed anteriorly (figs. 37E–F, 38B). Postepigastric area setae dark. **Legs:** Patella plus tibia I shorter than carapace. Leg spination (all spines longer than segment width): leg I: (The only known male has only the left leg, which seems to be anomalous), tibiae vp1-1-1-1-0 (the first and the second stronger), vr1-1-1-1-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-0, metatarsi v2-2-0. Trichobothria not examined. **Genitalia:** Epigastric region with sperm pore circular, situated in front of anterior spiracles, rebordered. Palp embolus

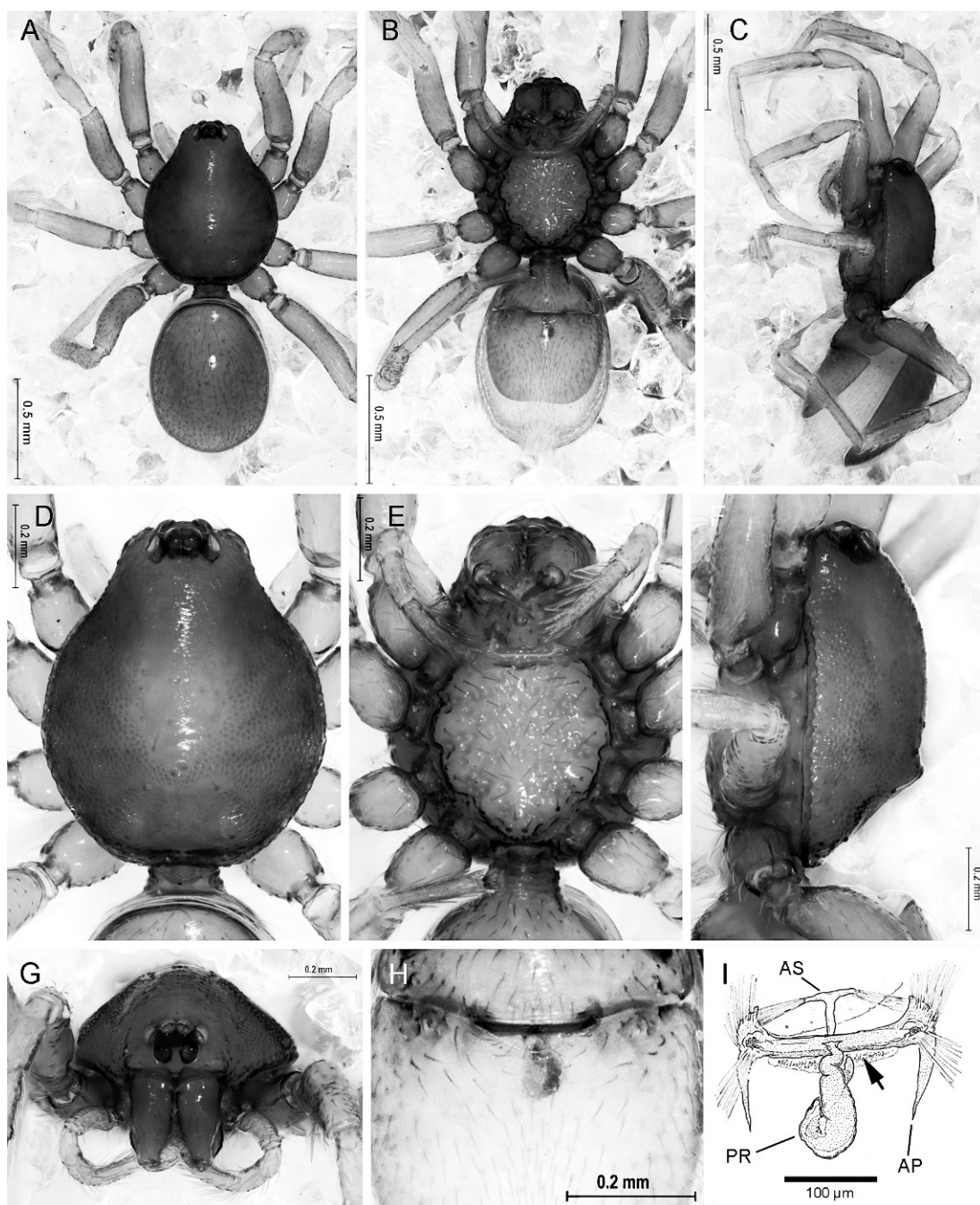


Fig. 35. *Trilacuna loebli*, new species, female (PBI_OON 12818). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Same, anterior view. **H.** Epigastric area, ventral view. **I.** Internal genitalia, dorsal view. AP = apodeme; AS = anterior sclerite; PR = posterior receptacle; arrow = gland field.

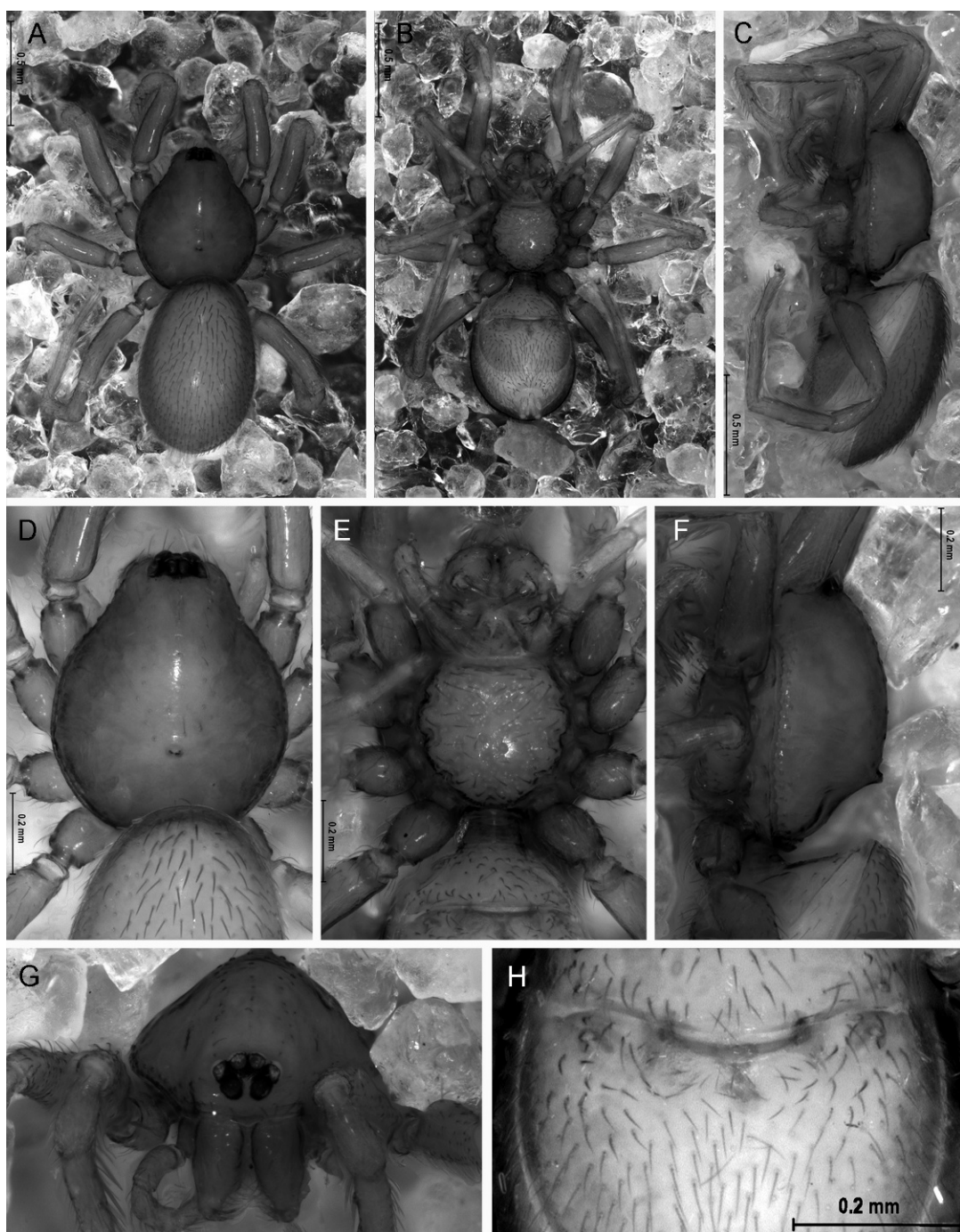


Fig. 36. *Trilacuna mahanadi*, new species, female (PBI_OON 12672). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Same, anterior view. **H.** Epigastric area, ventral view.

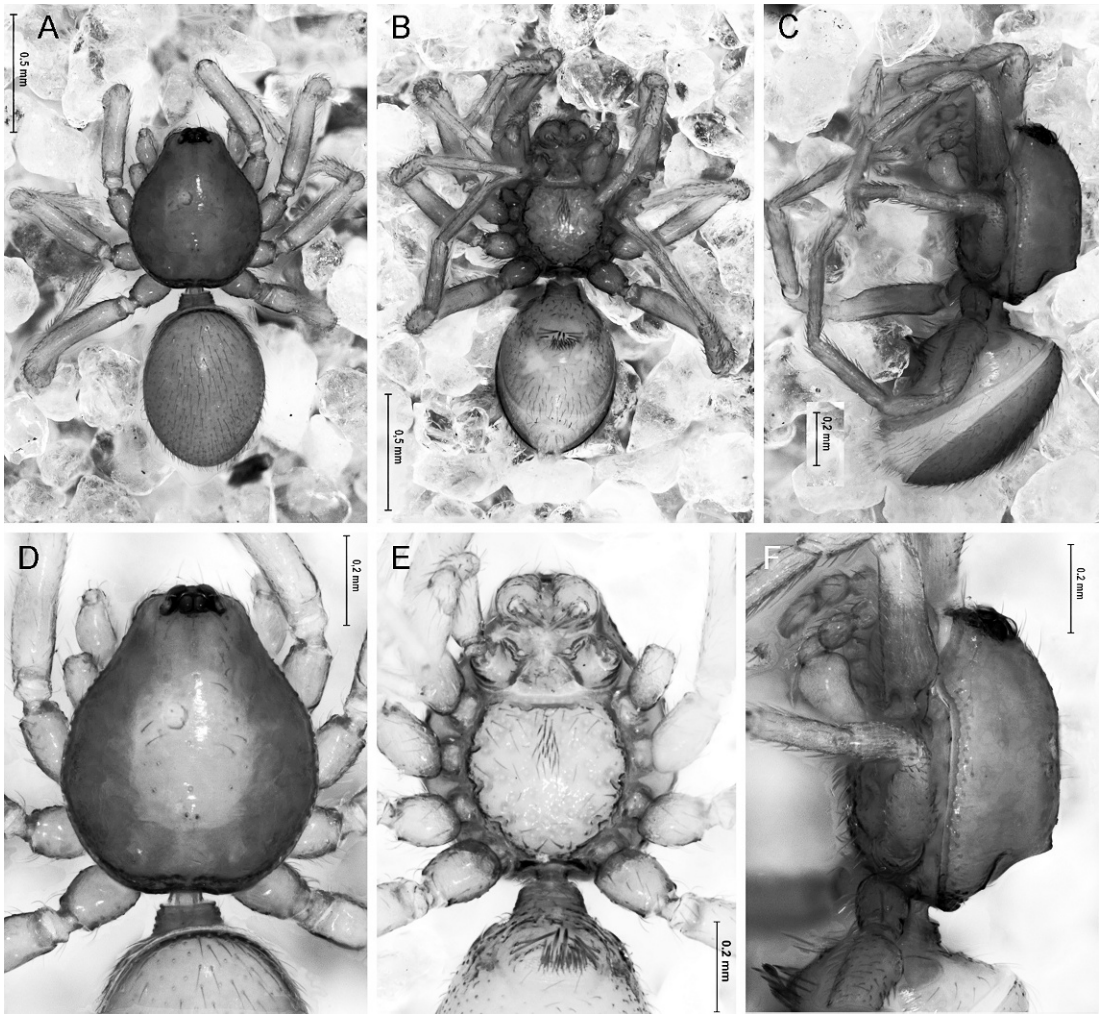


Fig. 37. *Trilacuna mahanadi*, new species, male (PBI_OON 12672). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

straight, accompanied by two paraembolic, acute processes (one dorsal, another retro-lateral); cymbium without stout setae, orange; distal part of the bulb with prolateral border bearing a subapical projection, covered marginally by setaelike structures (fig. 39F).

Female (paratype, PBI_OON 12672). Total length 1.44. As in male except as noted. **Cephalothorax:** Carapace nonmarginal pars cephalica setae in U-shaped row. PME touching for less than half their length. Palp without spines. **Abdomen:** Dorsal scutum covering full length of abdomen, orange. Spinneret scutum slightly sclerotized. **Legs:**

Leg spination (all spines longer than segment width): leg I: femora pv0-0-1-0, tibiae v2-2-2-2-0, metatarsi: v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0. Trichobothria not examined. **Genitalia:** Ventral view: two dark areas (lateral extensions of the internal transverse bar) visible through the cuticle (fig. 36H). Posterior receptacle long and tortuous, with a broad anterior part (with a conspicuous, flattened lumen); anterior T-shaped element with thin, long, and acute lateral projections (fig. 39E).

OTHER MATERIAL EXAMINED: Same data as the types, Oct. 19, 1978, 1♀ (MHNG PBI_OON 12848).

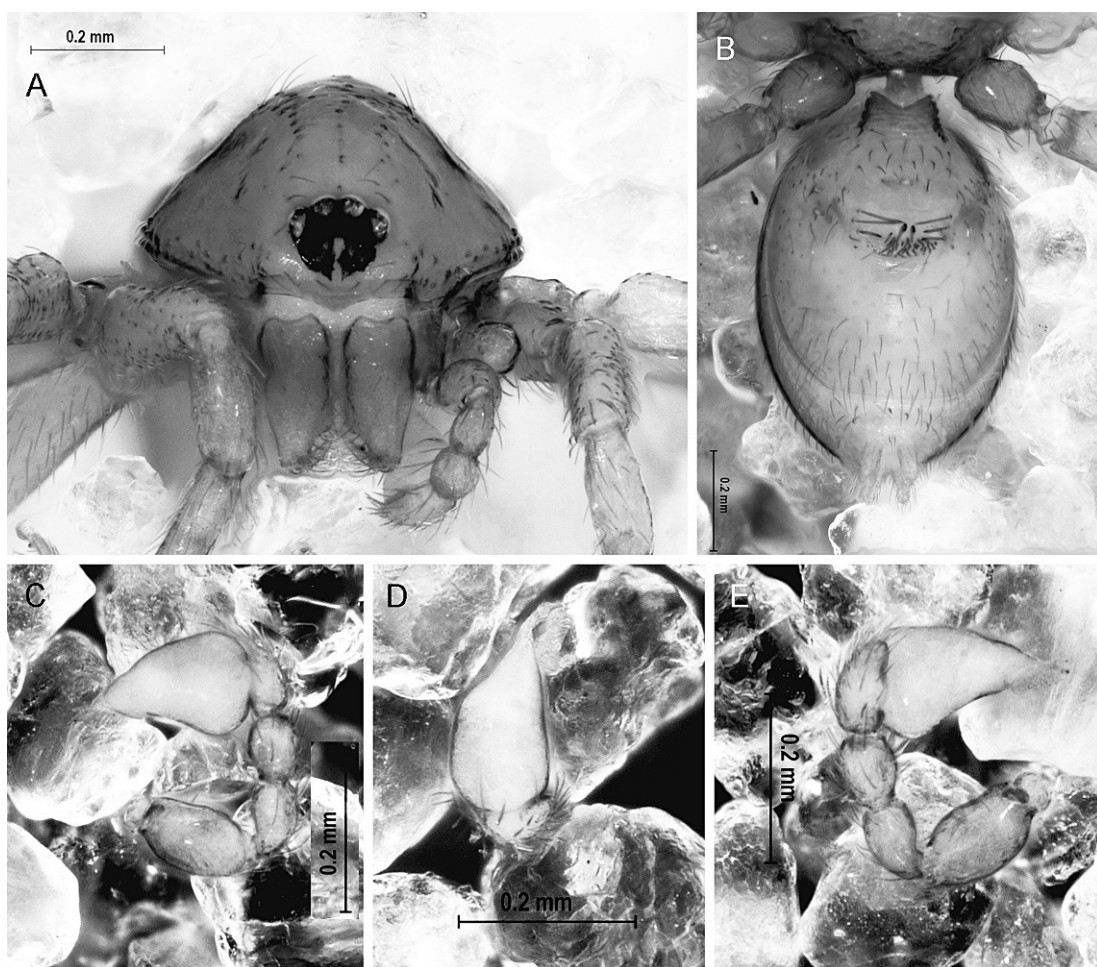


Fig. 38. *Trilacuna mahanadi*, new species, male (PBI_OON 12672). A. Carapace, anterior view. B. Abdomen, ventral view. C. Left palp, retrolateral view. D. Same, dorsal view. E. Same, prolateral view.

DISTRIBUTION: Known only from the type locality.

Trilacuna aenobarba (Brignoli, 1978),
new combination
Figures 40–41, 48B, D

Epectris aenobarbus Brignoli, 1978: 38, figs. 8–9
(male holotype from Bhutan: Thimphu, Jan. 1,
1972, P.M. Brignoli, NMB 23009 PBI_OON
14906; examined).

NOTE: As stated by Platnick and Dupérré
(2009a: 29) this species is clearly misplaced in
Epectris, and is here transferred to *Trilacuna*
by virtue of the characters described below.

DIAGNOSIS: The male of *T. aenobarba* is
almost indistinguishable from that of *T.*
bangla, but differs by the slightly shorter
bulb and, especially, by the thickened palpal
femur (fig. 48B, D).

REDESCRIPTION: Male (holotype, PBI_
OON 14906). Total length 1.92. **Cephalotho-**
rax: Carapace orange, pars cephalica strongly
elevated in lateral view, sides granulate,
carapace of the type specimen crushed; lateral
margin rebordered; nonmarginal pars cepha-
lica setae light, in U-shaped row; nonmarginal
pars thoracica setae lost; marginal setae
absent. Clypeus vertical in lateral view,
median projection absent; setae light, needle-
like. All eyes subequal, oval; posterior eye row

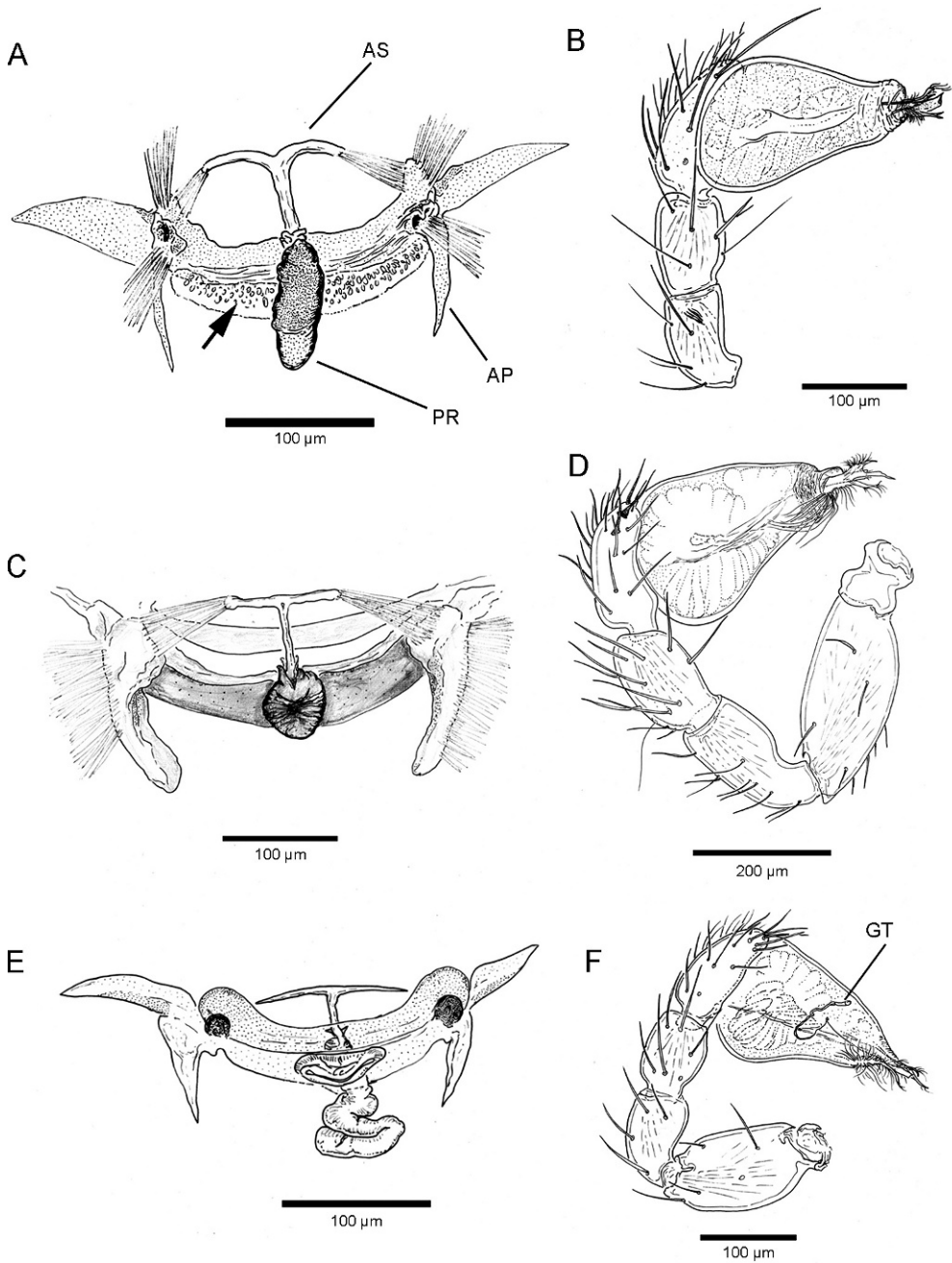


Fig. 39. *Trilacuna* spp., genitalia. **A, B.** *Trilacuna meghalaya*, new species. **A.** Female (PBI_OON 15404), internal genitalia, dorsal view. AP = apodeme; AS = anterior sclerite; PR = posterior receptacle; arrow = gland field. **B.** Male (PBI_OON 15338), left palp, retrolateral view. **C, D.** *Trilacuna besucheti*, new species. **C.** Female (PBI_OON 15393), internal genitalia, dorsal view. **D.** Male (PBI_OON 15005), left palp, prolateral view. **E, F.** *Trilacuna mahanadi*, new species. **E.** Female (PBI_OON 12848), internal genitalia, dorsal view. **F.** Male (PBI_OON 12672), left palp, prolateral view. GT = glandular tube.

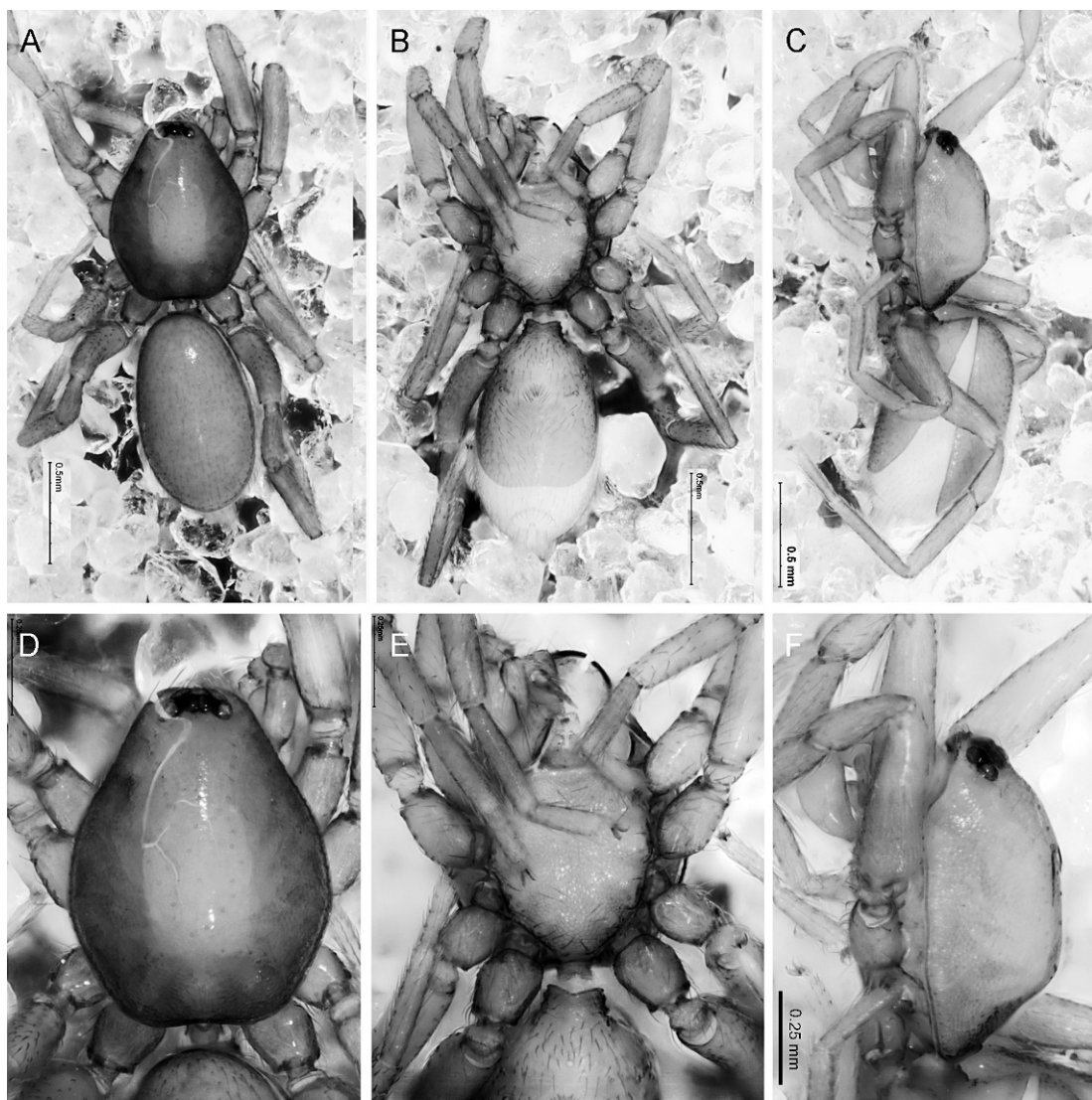


Fig. 40. *Trilacuna aenobarba* (Brignoli), male holotype. **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

recurved from above, straight from front; ALE separated by their radius to diameter, ALE–PLE touching, PME touching throughout most of their length, PLE–PME separated by PME radius to PME diameter. Sternum longer than wide, pale orange, fused to carapace, without radial furrows between coxae I–II, II–III, III–IV, reticulate microsculpture covering entire surface, posterior margin not extending posteriorly of coxae IV; setae sparse, densest laterally, originating from surface. Mouthparts: chelicerae, endites,

and labium pale orange. Endites distally not excavated. **Abdomen:** Dorsum soft portions white. Book lung covers large, round. Posterior spiracles connected by a shallow groove (fig. 4B). Pedicel ribbed, pedicel tube with a triangular ventral incision at the middle. Dorsal scutum pale orange, no soft tissue visible from above. Epigastric scutum not protruding. Postepigastric scutum pale orange, long, almost rectangular, covering about 3/4 of abdominal length, fused to epigastric scutum. Spinneret scutum present,

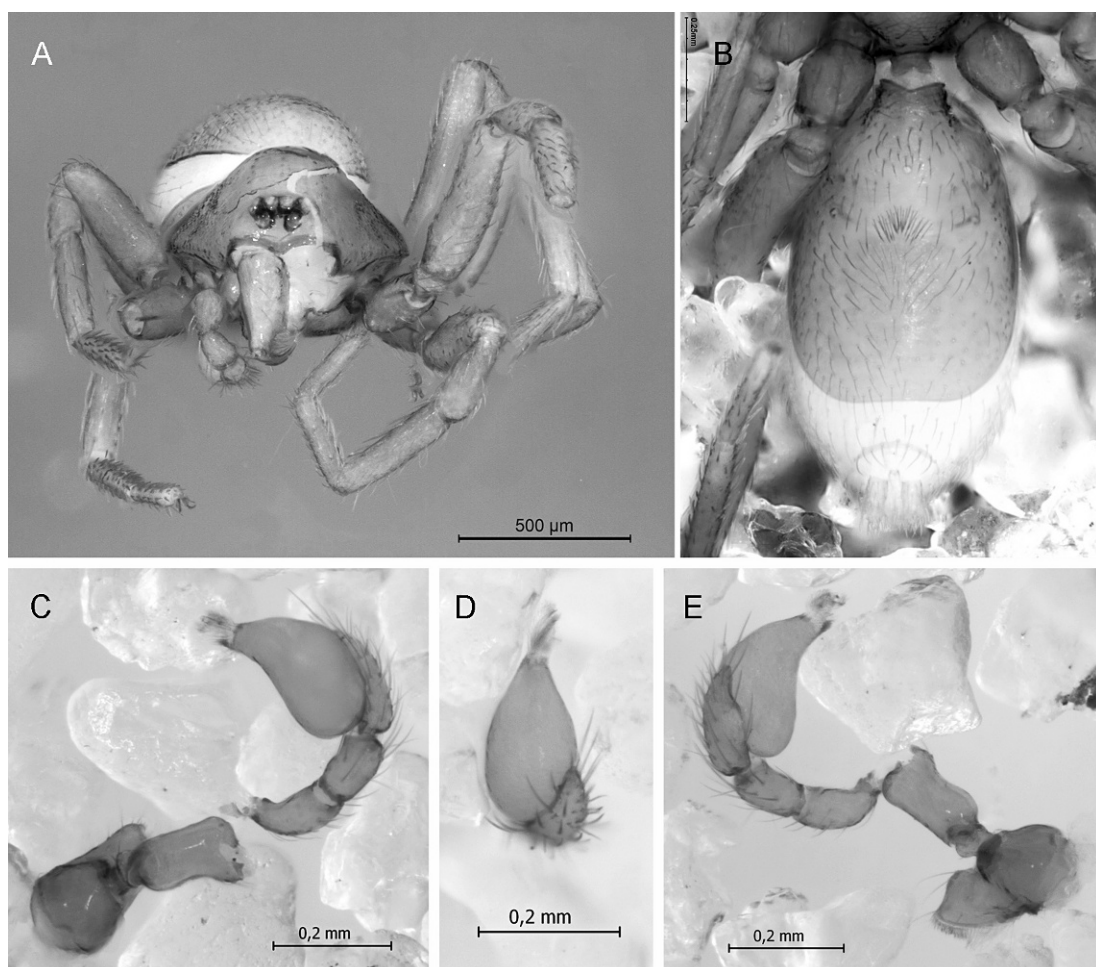


Fig. 41. *Trilacuna aenobarba* (Brignoli), male holotype. **A.** Habitus, anterior view. **B.** Abdomen, ventral view. **C.** Left palp, retrolateral view. **D.** Same, dorsal view. **E.** Same, prolateral view.

incomplete ring. Dorsum setae dark, needle-like. Epigastric area setae uniform, dark, needlelike, a patch of strong, enlarged, posteriorly directed setae in the posterior margin of the epigastric scutum (fig. 41B). Postepigastric area setae dark, needlelike. Spinneret scutum without fringe of setae. **Legs:** Pale orange; patella plus tibia I shorter than carapace. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0. Trichobothria not examined. **Genitalia:** Epigastric region with sperm pore large, circular, situated in front of anterior spiracles. proximal segments of palp pale orange; femur enlarged, dorsally

thickened, with distal bulge (fig. 48D); trichobothria of tibia not examined; cymbium pale orange, distal part of bulb as follows: set of laminae with thin hairlike structures surrounding the base of the embolus (fig. 4B).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from the type locality.

Trilacuna bangla Grismado and Ramírez,
new species

Figures 42–47, 48A, C, E, 49–51

TYPES: Male holotype and one male paratype from India: West Bengal: Darjee-

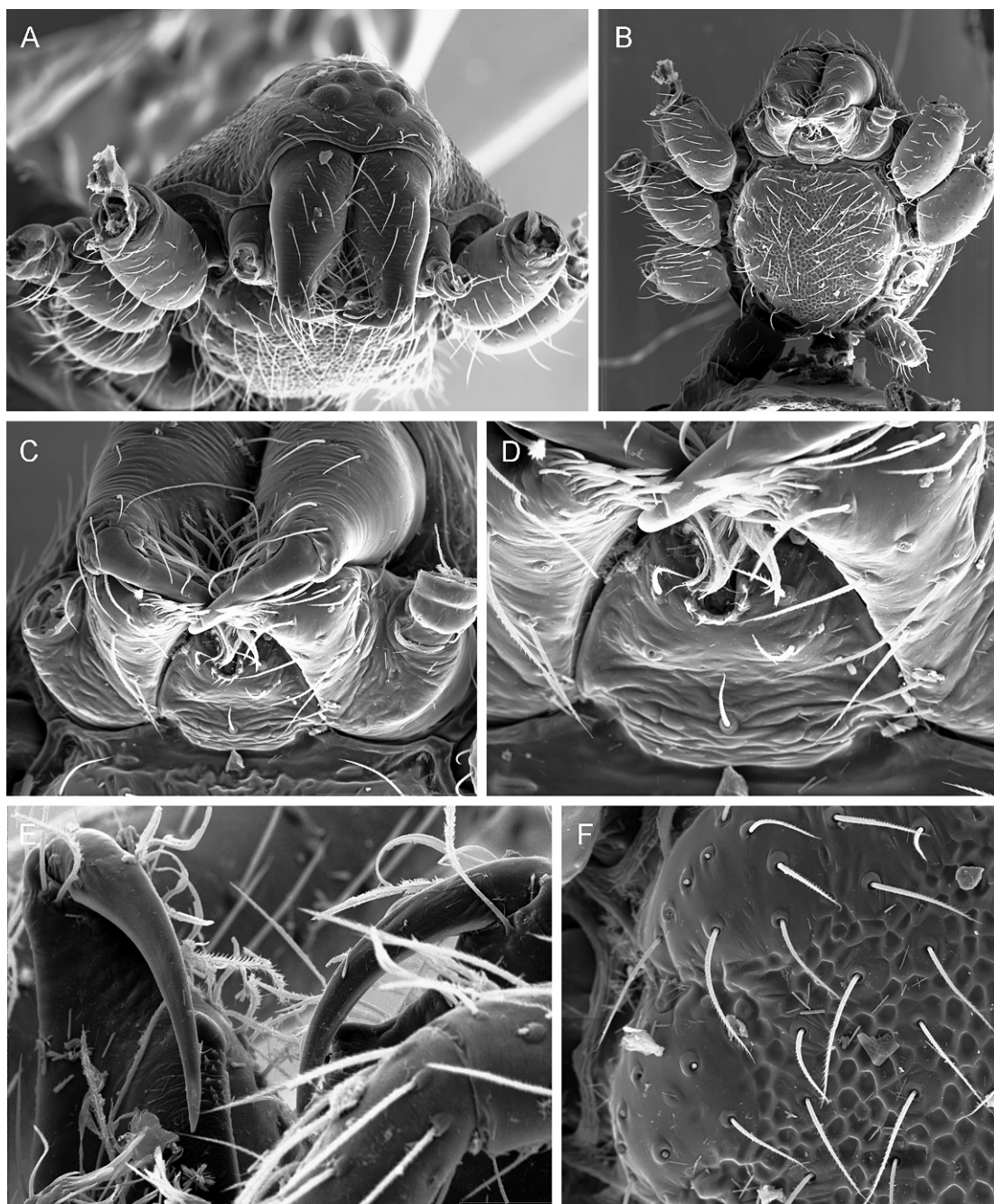


Fig. 42. *Trilacuna bangla*, new species, female (PBI_OON 12833). **A.** Carapace, anterior view. **B.** Same, ventral view. **C.** Chelicerae, ventral view. **D.** Labium, ventral view. **E.** Cheliceral fangs, ventral view (PBI_OON 15975). **F.** Margin of sternum, ventral view.

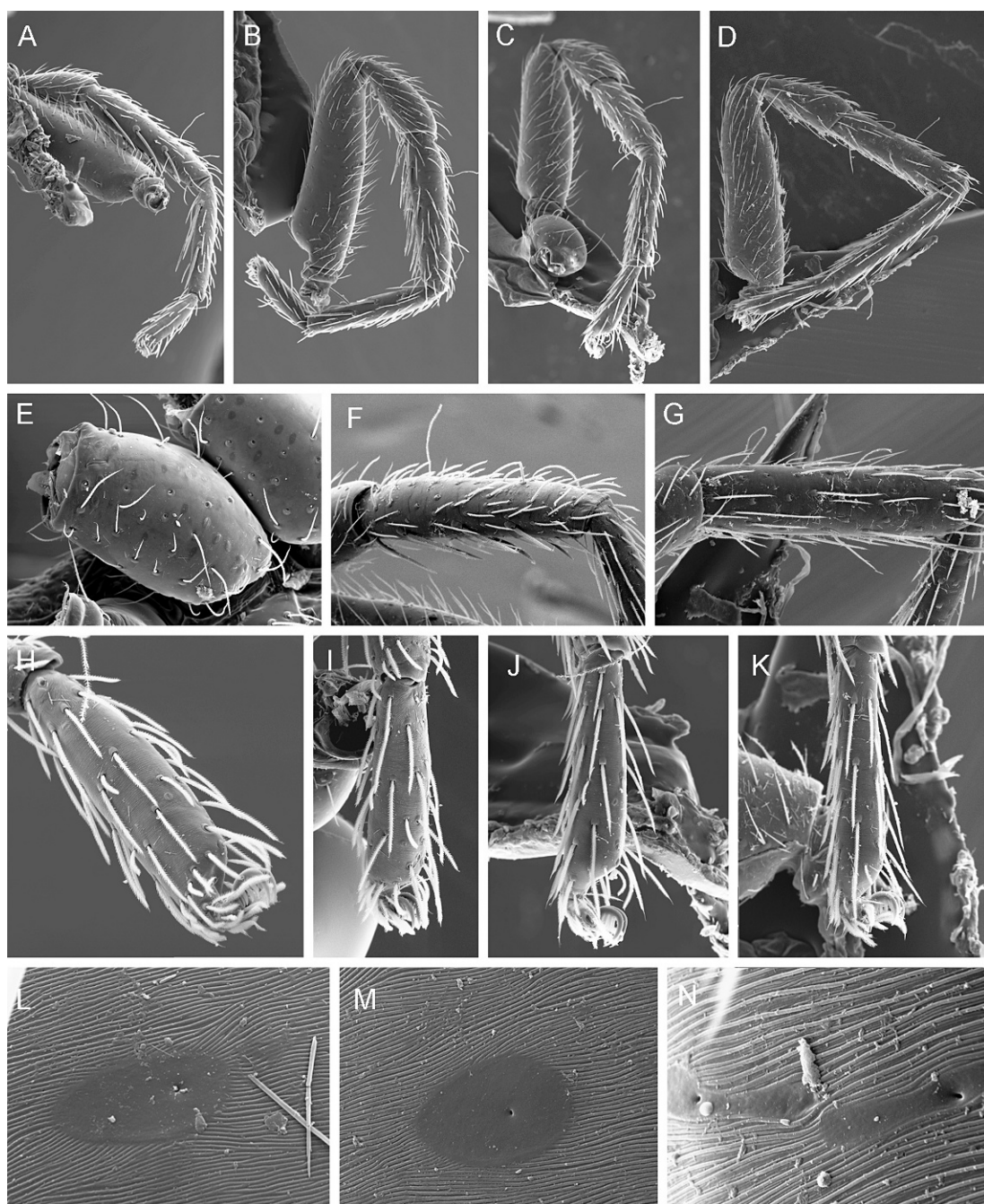


Fig. 43. *Trilacuna bangla*, new species, female (PBI_OON 12833), leg morphology. A. Leg I, prolateral view. B. Leg II, prolateral view. C. Leg III, prolateral view. D. Leg IV, prolateral view. E. Coxa I, ventral view. F. Tibia II, prolateral view. G. Tibia IV, dorsal view. H. Tarsus I, anterior view. I. Tarsus II, prolateral. J. Tarsus III, prolateral view. K. Tarsus IV, prolateral view. L. Platelet on coxa I. M. Platelet on coxa II. N. Platelets on tibia II.

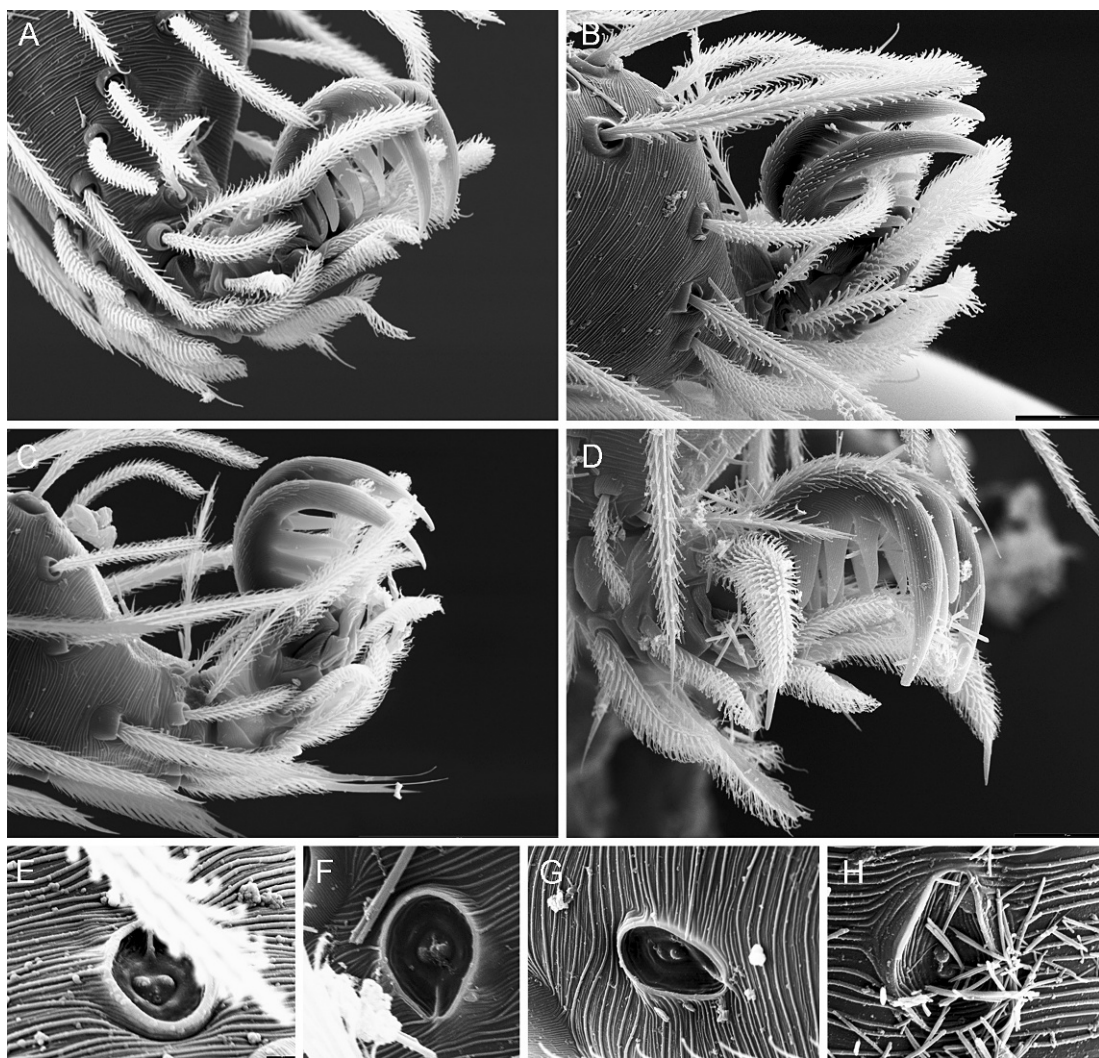


Fig. 44. *Trilacuna bangla*, new species, female (PBI_OON 12833). A–D. Tarsal claws, prolateral view. A. Leg I. B. Leg II. C. Leg III. D. Leg IV. E–H. Tarsal organs. E. Leg I. F. Leg II. G. Leg III. H. Leg IV.

ling: Tonglu, top and near the top, 3100 m, Oct. 16, 1978, C. Besuchet and I. Löbl (MHNG PBI_OON 15539); one female paratype from the same locality, date, and collectors; north slope, 2700 m (MHNG PBI_OON 12779). Additional paratypes: Darjeeling: between Algarah and Labha, 7 km from Algarah, south side, 1900 m, Oct. 11, 1978, C. Besuchet and I. Löbl, three males and 10 females (MHNG PBI_OON 12833).

ETYMOLOGY: *Bangla* is an adjective that means “Bengali” in the local language of

West Bengal, India, the state where the type locality is.

DIAGNOSIS: The male of *T. bangla* is almost indistinguishable from that of *T. aenobarba*, but differs by the slightly longer bulb and, especially, by the unmodified palpal femur (fig. 48C, E). Females are similar to those of *T. hazara* by the reticulated sternum, but they are usually larger, they have longer posterior lateral apodemes in the genitalia (fig. 48A), and a less pronounced dorsal conical projection of the carapace (fig. 49F).

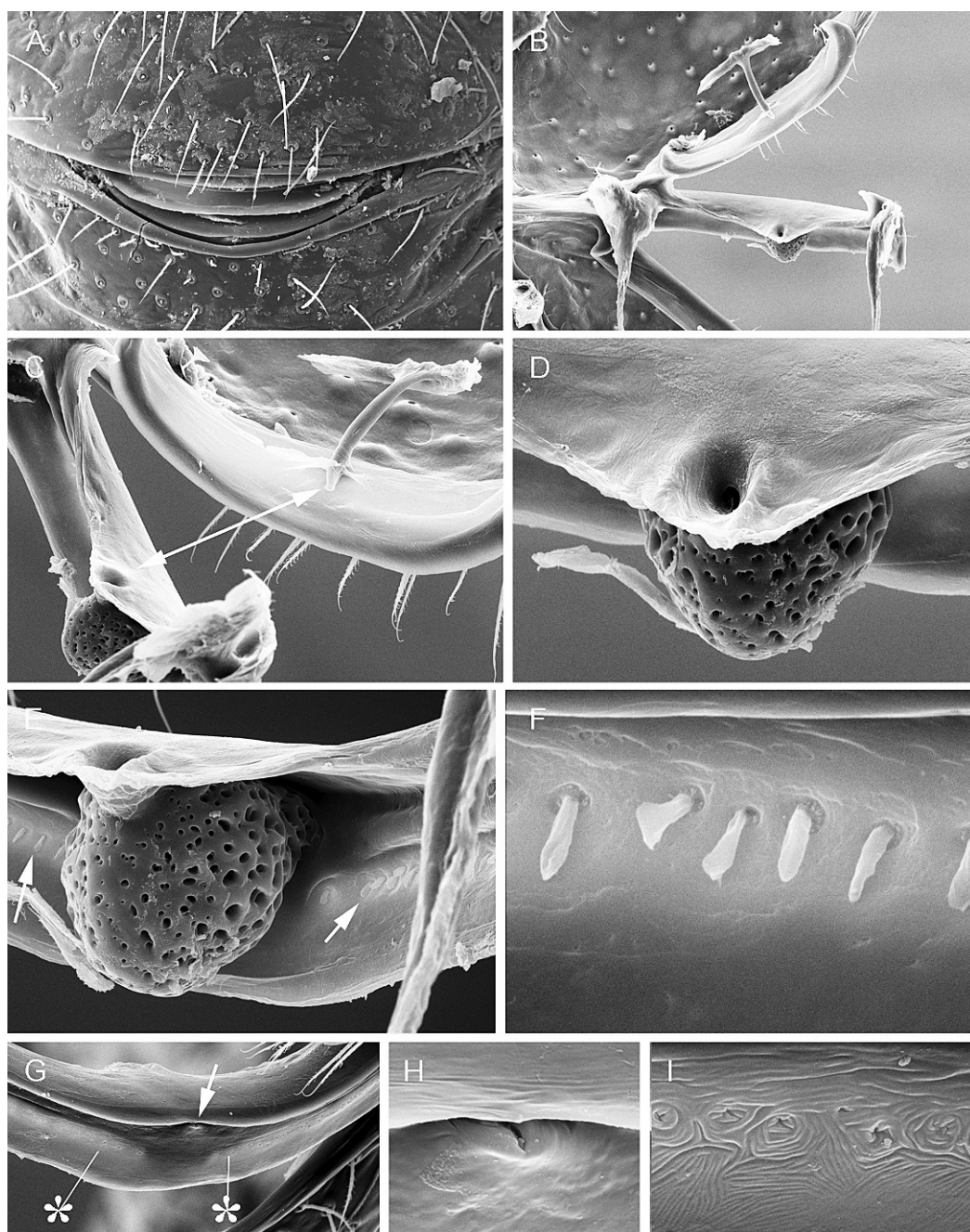


Fig. 45. *Trilacuna bangla*, new species, female (A, PBI_OON 15975, B–F, PBI_OON 12833). Genitalic morphology. A. Epigastric area, ventral view. B. Internal genitalia, dorsal view (transverse plates artificially separated). C. Same, oblique view (double arrow connecting the anterior orifice of the posterior receptacle and the T-shaped anterior sclerite). D. Posterior receptacle, dorsal view, showing its anterior orifice. E. Same, lateral view (arrows = field of glands). F. Same, detail of the glands. G. Transverse genital plates, anterior view (arrow = copulatory opening; asterisk = lateral pore fields). H. Detail of the copulatory opening. I. Detail of the lateral pores.

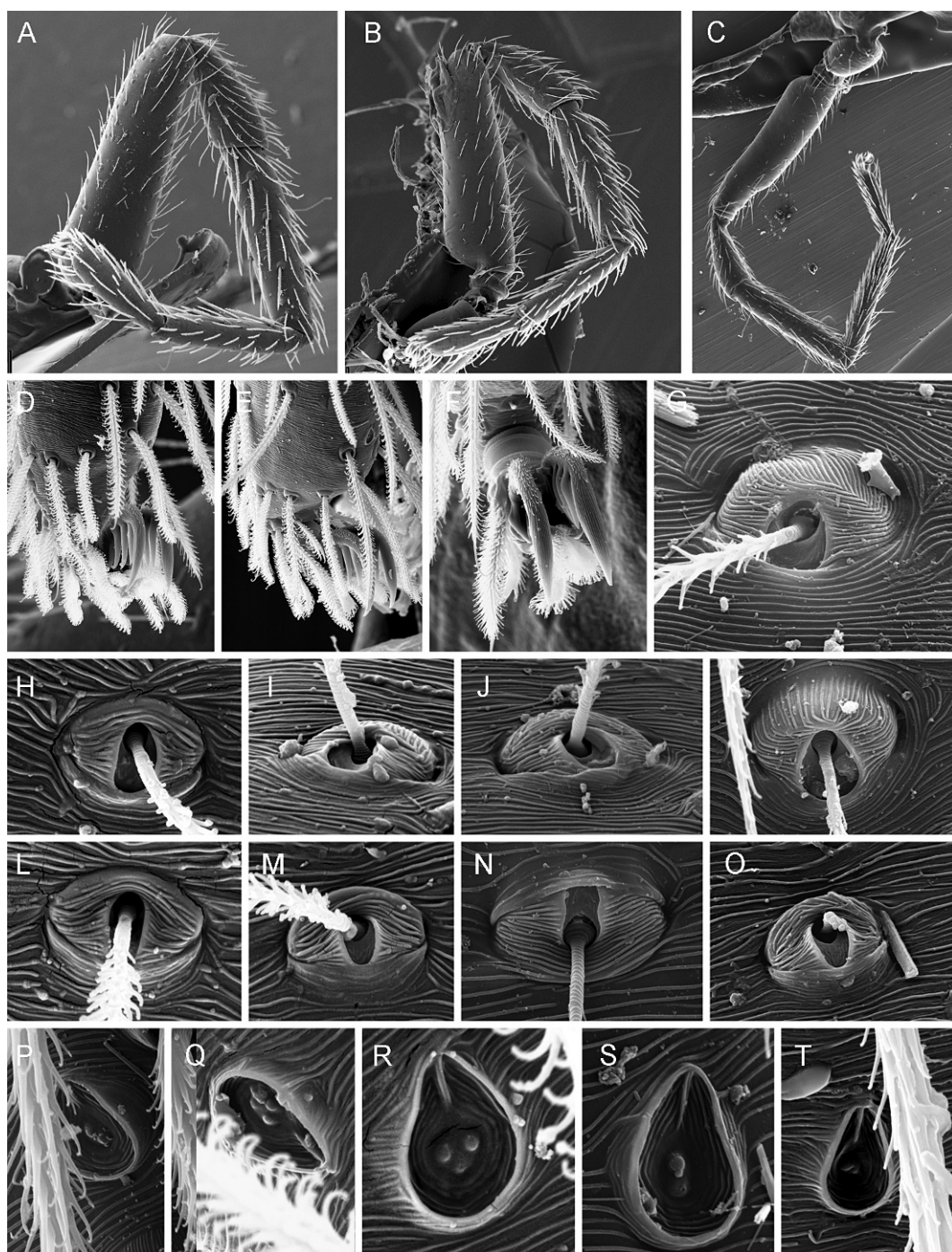


Fig. 46. *Trilacuna bangla*, new species, male (PBI_OON 12833). Leg morphology. A. Leg I, prolateral view. B. Leg II, prolateral view. C. Leg III, retrolateral view. D–F. Tarsal claws. D. Leg I, anterior view. E. Leg II, prolateral view. F. Leg IV, anterior view. G–O. Trichobothria. G. Palpal tarsus. H. Tibia I. I. Tibia II. J. Tibia III. K. Tibia IV. L. Metatarsus I. M. Metatarsus II. N. Metatarsus III. O. Metatarsus IV. P–T. Tarsal organs. P. Palp. Q. Leg I. R. Leg II. S. Leg III. T. Leg IV.

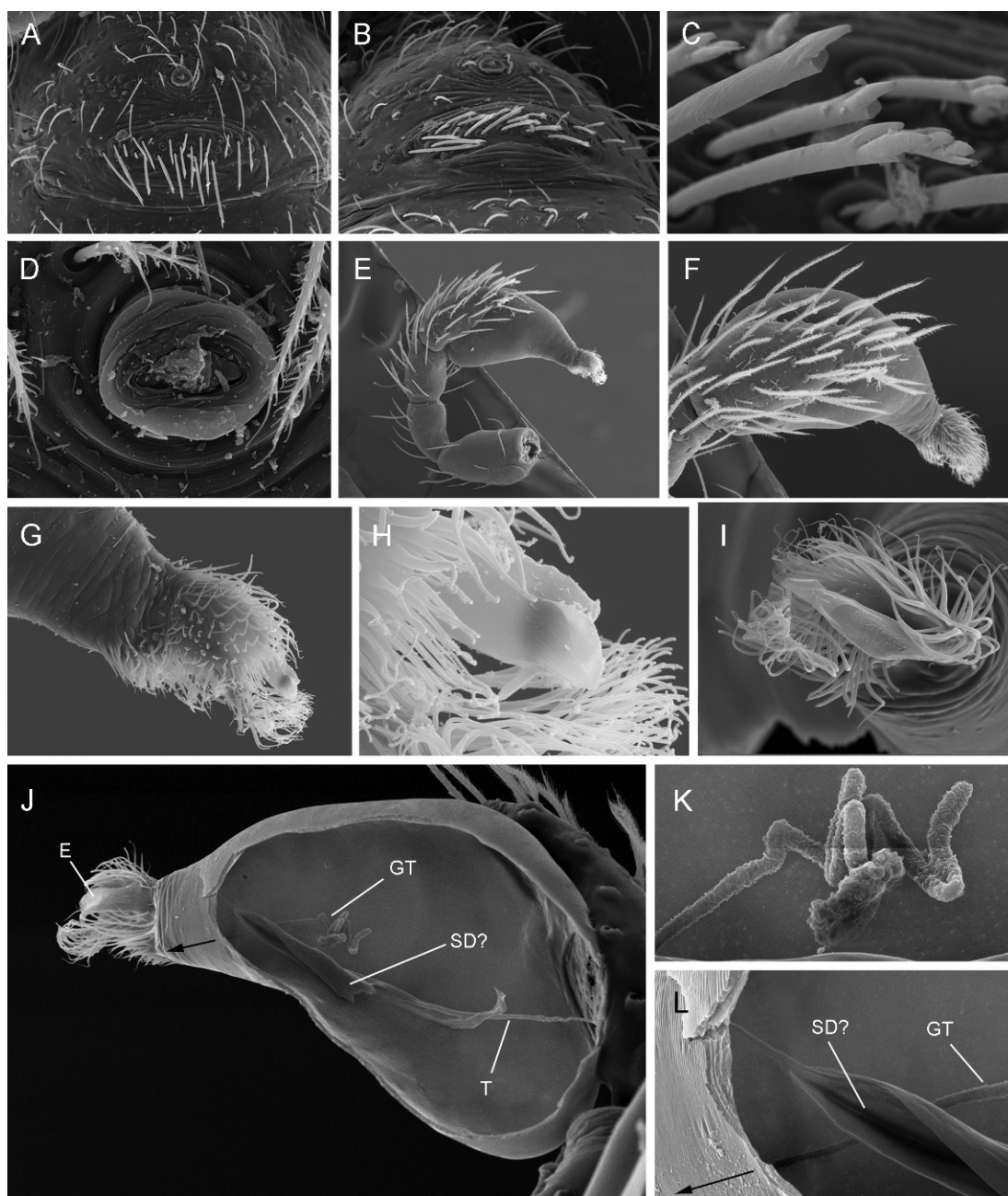


Fig. 47. *Trilacuna bangla*, new species, male (A–D, G, PBI_OON 15975, E–F, H–I, PBI_OON 12833). Genitalic morphology. A. Epigastric area, ventral view. B. Same, posterior view. C. Same, detail of the stout setae. D. Sperm pore. E. Left palp, prolateral view. F. Copulatory bulb, dorsal view. G. Embolus and accompanying laminae, prolateral view. H. Same, detail of embolus tip. I. Same, anterior view. J. Longitudinal section of the left palp, retrolateral view. K. Same, detail of the glandular tube. L. Detail of the apical part of the bulb. GT = internal glandular tube; SD? = sperm duct remnant?; T = longitudinal tendon of muscle M29; black arrow = presumable trajectory of the distal part of the glandular tube.

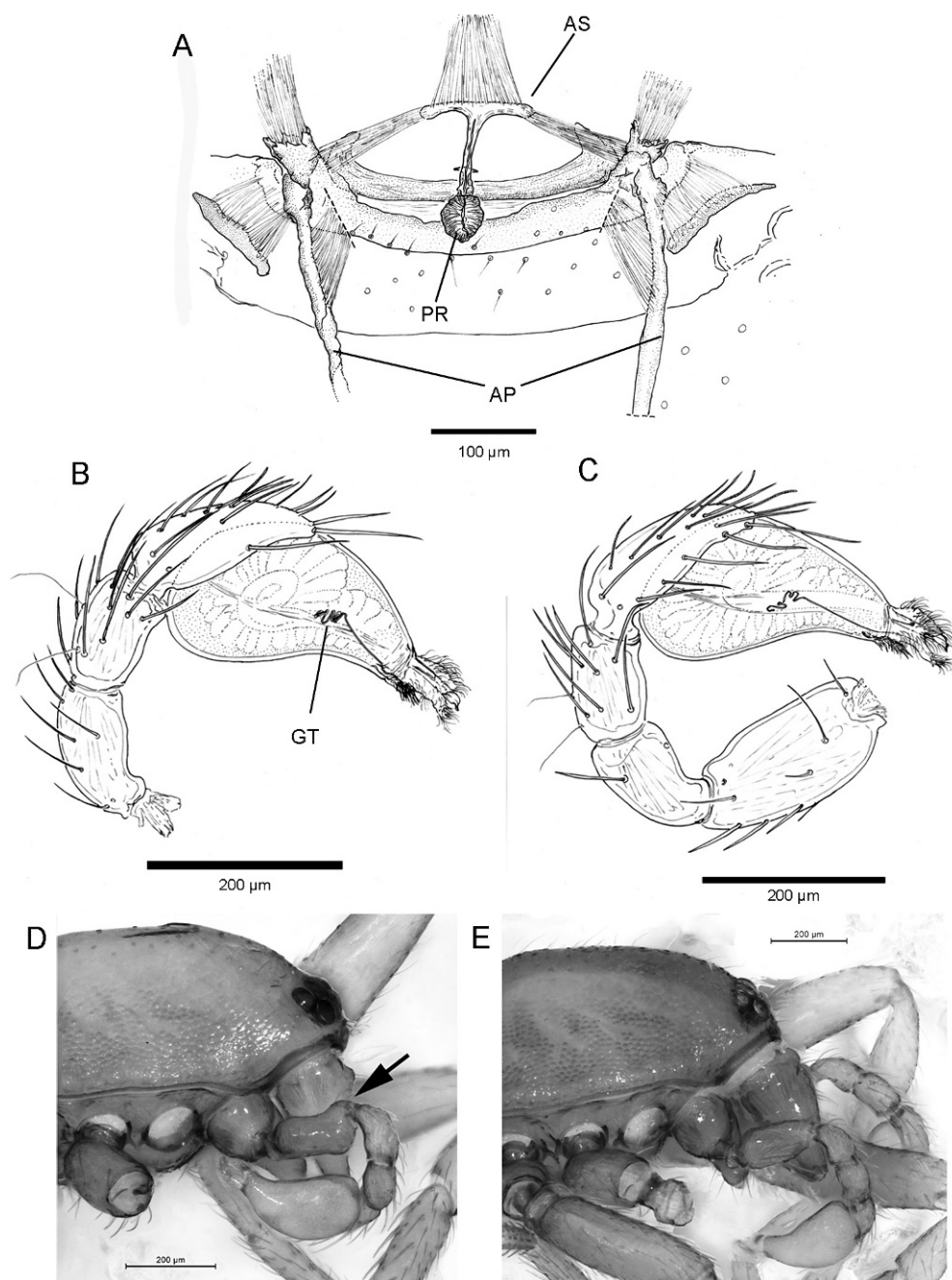


Fig. 48. *Trilacuna* spp. A, C, E. *T. bangla*, new species (PBI_OON 12833). A. Female. C, E. Male. B, D. *T. aenobarba* (Brignoli), male holotype. A. Internal female genitalia, dorsal view. AP = apodemes; AS = anterior sclerite; GT = glandular tube; PR = posterior receptacle. B, C. Left palpi, prolateral view. D, E. Anterior part of carapace, lateral view, showing the enlarged palpal femur of *T. aenobarba* (arrow, in D).

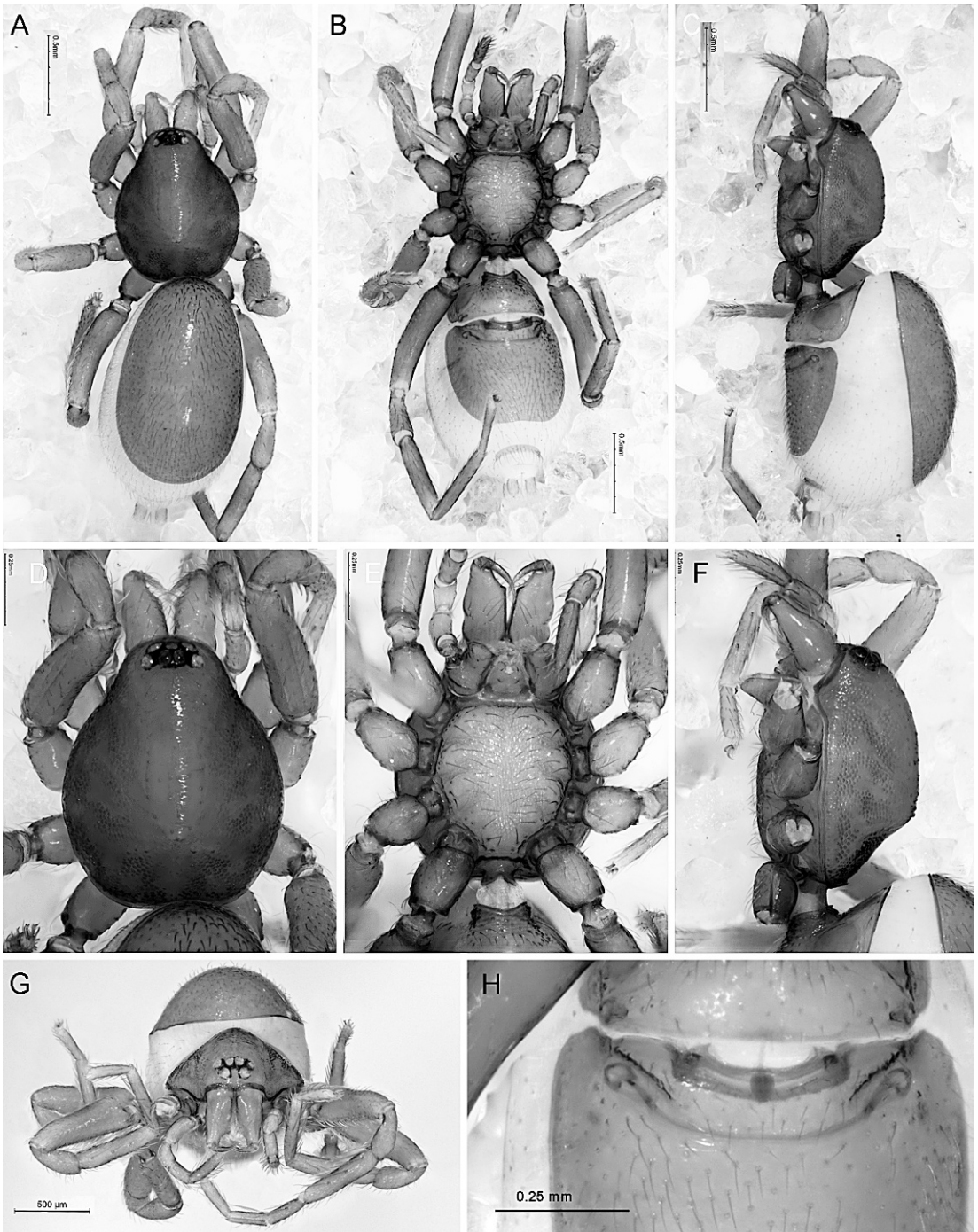


Fig. 49. *Trilacuna bangla*, new species, female (PBI_OON 14770). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Habitus, anterior view. **H.** Epigastric area, ventral view.

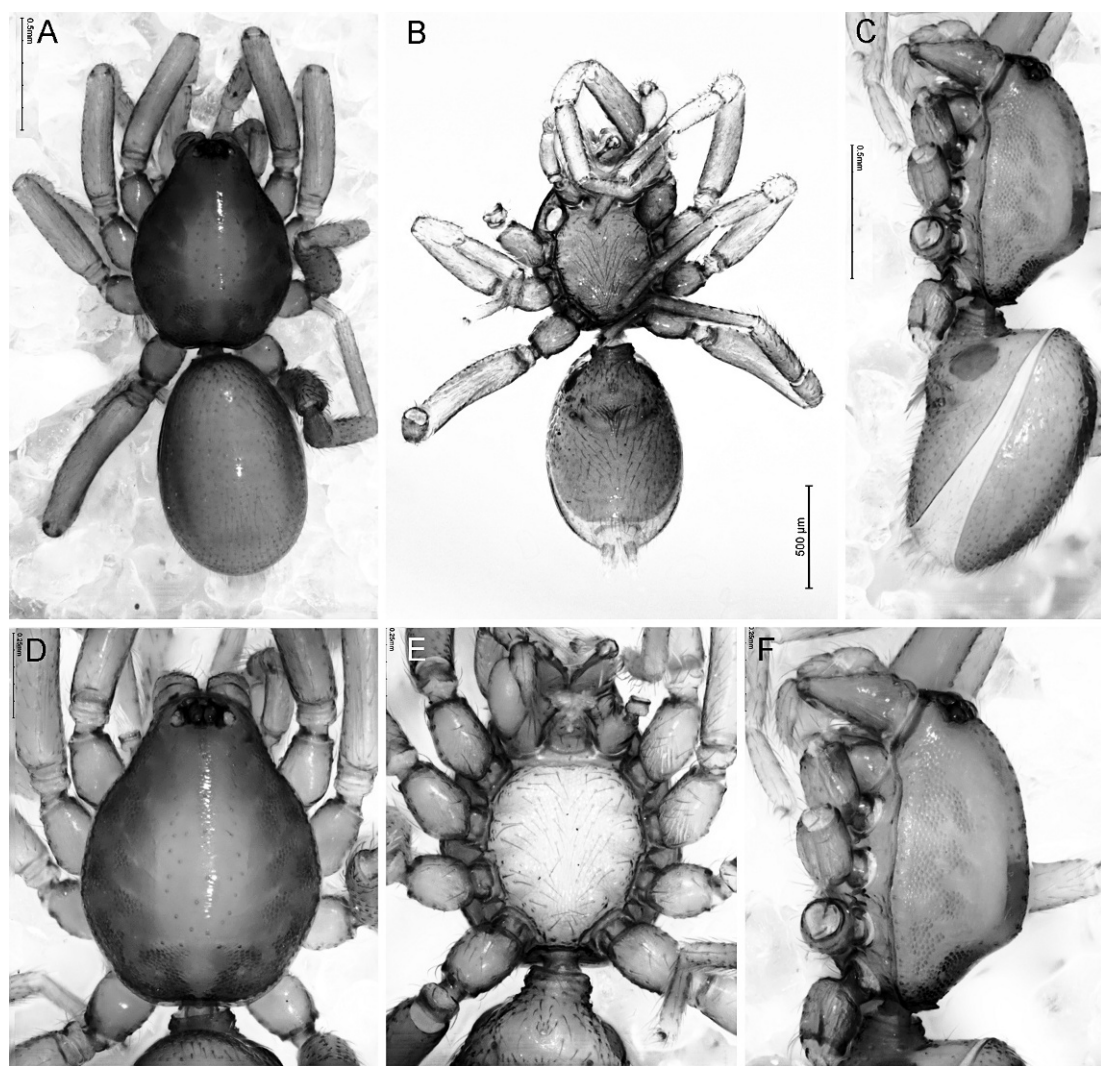


Fig. 50. *Trilacuna bangla*, new species, male (PBI_OON 12833). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

DESCRIPTION: Male (paratype, PBI_OON 12833). Total length 1.89. **Cephalothorax:** Carapace orange-brown, pars cephalica strongly elevated in lateral view, sides granulate; lateral margin rebordered; nonmarginal pars cephalica setae light, in U-shaped row; nonmarginal pars thoracica setae light, needlelike; marginal setae absent. Clypeus vertical in lateral view, median projection absent; setae light, needlelike. All eyes subequal, oval; posterior eye row recurved from above, straight from front; ALE separated by their radius to diameter, ALE–PLE touching,

PME touching throughout most of their length, PLE–PME separated by less than PME radius. Sternum longer than wide, orange-brown, reticulated microsculpture covering entire surface, posterior margin not extending posteriorly of coxae IV, precoxal triangles present, lateral margins with narrow extensions between coxae; setae abundant, evenly scattered, originating from surface. Mouthparts: chelicerae, endites, and labium orange-brown. Chelicerae straight; fangs directed posteriorly. Retromargin with a patch of small denticles before the blunt

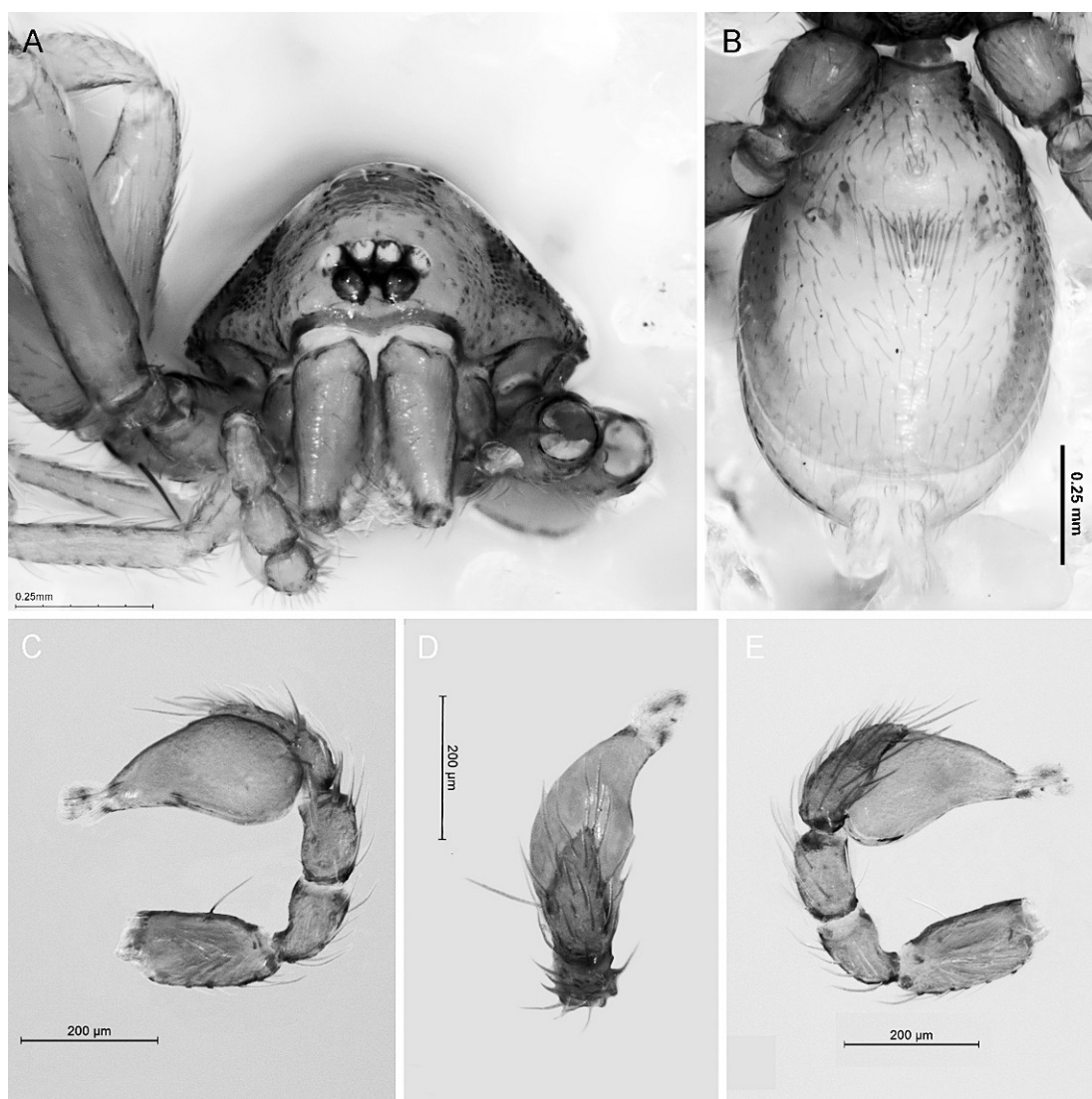


Fig. 51. *Trilacuna bangla*, new species, male (PBI_OON 12833). **A.** carapace, anterior view. **B.** Abdomen, ventral view. **C.** Left palp, retrolateral view. **D.** Same, dorsal view. **E.** Same, prolateral view.

subdistal projection (as in fig. 42E). Endites distally not excavated. **Abdomen:** Dorsum soft portions white. Book lung covers large, round. Posterior spiracles connected by a shallow groove (figs. 47A–B, 51B). Pedicel ribbed. Dorsal scutum orange-brown, covering more than 1/2 to most of abdomen width. Epigastric scutum not protruding. Postepigastric scutum orange-brown, long, semicircular, covering nearly full length of abdomen, fused to epigastric scutum. Spinneret scutum

present, incomplete ring. Dorsum setae dark, needlelike. Epigastric area setae uniform, dark, needlelike, with a patch of strong, enlarged, posteriorly directed setae on the posterior margin of the epigastric scutum, with smooth shaft base and asparaguslike tips (figs. 47A–C, 51B). Postepigastric area setae dark, needlelike. Colulus present, with two setae. **Legs:** Orange-brown; patella plus tibia I shorter than carapace. Cuticle with elongated platelets with pores (as in fig.

43N). Leg spination (all spines longer than segment width): leg I: tibia v2-2-2-0, metatarsi v2-2-0; leg II: tibia v2-2-2-0, metatarsi v2-2-0. Trichobothria: tibia: each with three; metatarsus: each with one; opening longitudinally narrowed; hood covered by numerous low, closely spaced, mostly transverse ridges, differentiated from the distal plate mainly by this distinct ridging and by two lateral incomplete grooves, both of which nearly at same level; basal expansion of trichobothrial setae with annular ridges (fig. 46G–O); tarsal organs (fig. 46P–T) with two sensilla visible in the palp, legs III–IV, three in legs I–II, distal one very small (fig. 46Q–R). **Genitalia:** Epigastric region with sperm pore small, circular, situated in front of anterior spiracles, unmodified. Palp proximal segments orange-brown; embolus short, straight; tibial trichobothria with opening slightly less elongated than in legs (fig. 46G); cymbium orange-brown, bulb pale orange, tapering apically, distal part with a set of laminae with hairlike structures surrounding the base of the embolus; the dorsal lamina is broad, fully covering the embolus from above, the prolateral one is very short, situated at base of the dorsal lamina; a further lamina extending ventrally, surpassing the embolar tip. Embolus nearly straight, with flattened tip (fig. 47E–I). Internally, the thin, tortuous glandular tube discharges near the most ventral of the “hairy” paraembolic laminae (fig. 47J–L).

Female (paratype, PBI_OON 12833). Total length 2.33. As in male except as noted. **Abdomen:** Posterior spiracles connected by groove (fig. 4H). Dorsal scutum covering full length of abdomen. Posterior margin of epigastric scutum straight. Postepigastric scutum long, almost rectangular, covering about 3/4 of abdominal length. Colulus with one seta. **Legs:** Pale orange. Leg spination as in male. Superior tarsal claws with an enlarged distal tooth, giving appearance of bifid claws (fig. 4D). **Genitalia:** Posterior receptacle relatively small, rounded, lateral apodemes very long, posteriorly directed (figs. 45B, 48A); plus two narrow, diagonal, posterior apodemes near the tracheal spiracle, visible through the cuticle as darker marks (figs. 48A, 49H). Copulatory opening small, only visible after the artificial separa-

tion of the transverse plates (fig. 45G, H), in this area open the small internal glands through tiny pores (fig. 45E, F, I); anterior sclerite T-shaped, apparently functioning as a cap locking the anterior orifice of the posterior receptacle (fig. 4C).

OTHER MATERIAL EXAMINED: INDIA:

West Bengal: Darjeeling: Algarah, 1800 m, Oct. 9, 1978, C. Besuchet and I. Löbl, 1♀ (MHNG PBI_OON 12765); Ghoom, Tigerhill, south side, 2300 m, Oct. 13, 1978, C. Besuchet and I. Löbl, 1♀ (MHNG PBI_OON 15317); Tigerhill, 2600 m, Oct. 18, 1978, C. Besuchet and I. Löbl, 2♀ (MHNG PBI_OON 12819), 1♂ (MHNG PBI_OON 15412); **NEPAL:** **Bagmati:** above Shermathang, 2900 m, Apr. 26, 1981, I. Löbl, A. Smetana, 1♂ (MACN-Ar 28837 PBI_OON 15269); Malemchi, in rotten branches, leaves, grass, and moss, 2800 m, Apr. 17, 1981, I. Löbl, A. Smetana, 1♀ (MACN-Ar 28836, PBI_OON 15259); Dobate Ridge northeast of Barabhise, leaf litter and moss in the oak forest, 2700 m, May 2, 1981, I. Löbl, A. Smetana, 2♀ (MHNG PBI_OON 15265). **Dhawalagiri:** Myagdi Khola: Boghara, 1800 m, May 26, 1995, J. Martens and W. Schawaller, 1♀ (NMBE PBI_OON 15841); 1♂ (NMBE PBI_OON 15841). **Gandaki:** Gorkha: Buri Gandaki, Nyak, *Pinus excelsa*, 2450 m, Aug. 1, 1983, J. Martens and W. Schawaller, 2♂ (SGN PBI_OON 15753); 1♀ (SGN PBI_OON 15753); Manang: Marayandi, 2200 m, Apr. 12, 1980, to Apr. 13, 1980, Martens, Ausobsky, 1♀ (SGN PBI_OON 15750); Marsyandi, 2550 m, Apr. 14, 1980, to Apr. 17, 1980, Martens and Ausobsky, 1♀ (SGN PBI_OON 15756). **Kosi:** Sankhuwasawa: forest south of Mangsingma, 2200 m, Apr. 11, 1984, I. Löbl, A. Smetana, 1♀ (MHNG PBI_OON 15310); Goru Dzire Dara, east side, 3350 m, Apr. 9, 1984, I. Löbl, A. Smetana, 1♂ (MHNG PBI_OON 15513); pass northeast of Mangmaya, dry forest on north face, 2300 m, Apr. 6, 1984, I. Löbl, A. Smetana, 1♀ (MHNG PBI_OON 15663); peak south of Mangsingma, bamboo-moss forest, leaf litter of bamboo and *Rhododendron*, 2800 m, Apr. 7, 1984, I. Löbl, A. Smetana, 3♀ (MHNG PBI_OON 15666); Valley Induwa Kola, 2000 m, Apr. 14, 1984, I. Löbl, A. Smetana, 2♀ (MHNG PBI_OON 15311). **Mechi:** Ilam:

Gitang Khola, 2550 m, Mar. 28, 1980, to Mar. 31, 1980, Martens, Ausobsky, 1♂ (SGN PBI_OON 15723); 3♀ (SGN PBI_OON 15723); Panchthar: Paniporua, mixed broad-leaved forest, moss forest litter, 2300 m, Apr. 16, 1988, to Apr. 20, 1988, J. Martens and W. Schawaller, 1♂ (SGN PBI_OON 15731); 3♀ (SGN PBI_OON 15731); Paniporua, 2300 m, Apr. 16, 1988, to Apr. 20, 1988, J. Martens and W. Schawaller, 1♀ (SGN PBI_OON 15761); zw. Deorali, Pusapati u. Sheldoti, 2800 m, Aug. 28, 1983, Martens, Daams, 1♀ (SGN PBI_OON 15743); 1♂ (SGN PBI_OON 15743); Taplejung: Lasse Dhara ridge and Alm Lasseham, 3300 m, Sept. 6, 1983, to Sept. 7, 1983, Martens, Daams, 1♂ (SGN PBI_OON 15773); 2♀ (SGN PBI_OON 15773); Omje Kharka NW Yamputhin, 2500 m, May 1, 1988 to May 6, 1988, J. Martens and W. Schawaller, 1♂ (SGN PBI_OON 15728); pasture Lasseham NW Yamputhin, mature *Abies-Rhododendron* forest, 3500 m, May 6, 1988, to May 9, 1988, J. Martens and W. Schawaller, 2♂ (SGN PBI_OON 15770); 1♀ (SGN PBI_OON 15770); upper Simbua Khola Valley, near Tseram, mature *Abies-Rhododendron* forest, 3350 m, May 10, 1988, to May 15, 1988, J. Martens and W. Schawaller, 1♀ (SGN PBI_OON 15982); upper Simbua Khola, ascent to pasture Lasseham, mature mixed *Tsuga-Rhododendron*-broad-leaved forest, 3150 m, May 15, 1988, J. Martens and W. Schawaller, 2♂ (SGN PBI_OON 15746); Yamputhin ascent to pass Deorali, cultural land, bush, 2600 m, May 16, 1988, J. Martens and W. Schawaller, 1♀ (SGN PBI_OON 15755); Panchthar Dist. upper running for Mai Majuwa Khola, Dhorpar Kharka, 2700 m, Aug. 27, 1983, to Aug. 28, 1983, Martens, Daams, 1♀ (SGN PBI_OON 15712); Sankhua Distr., above Pahakhola, *Quercus semecarpifolia-Rhododendron*, 2600 m, May 31, 1988, to June 3, 1988, J. Martens, W. Schawaller, 3♀ (SGN PBI_OON 15975); 5♂ (SGN PBI_OON 15975); Jan. 1, 1983, J. Martens, 1♂ (SGN PBI_OON 15763).

DISTRIBUTION: Apparently widely distributed in northeastern India (West Bengal) and Nepal (from Dhawalagiri to Mechi) between 1800 to 3500 m.

Trilacuna hazara Grismado and Ramírez,
new species
Figure 52

TYPES: Female holotype from Pakistan: Khyber Pakhtunkhwa (formerly North-West Frontier Province): Mansehra District: Above Naran, in a side valley, under chestnut trees, 2600 m, June 1, 1983, C. Besuchet and I. Löbl (MHNG PBI_OON 15665); 1 female paratype with same data, under rocks, near snow, next to a river (MHNG PBI_OON 15662). Note: The label says “Hazara”; that name is used for a region currently belonging to Khyber Pakhtunkhwa Province.

ETYMOLOGY: *Hazara* is an old name of the region where the type locality is located. Noun in apposition.

DIAGNOSIS: Females are similar to those of *T. bangla* by the reticulated sternum, but are usually smaller, they have shorter lateral apodemes in the genitalia (fig. 52I), and have a more pronounced dorsal conical projection of the carapace (fig. 52F).

DESCRIPTION: Female (holotype, PBI_OON 15665). Total length 1.98. **Cephalothorax:** Carapace orange, piriform in dorsal view, pars cephalica strongly elevated in lateral view, anteriorly narrowed to between 0.5 and 0.75 times its maximum width, sides granulate; lateral margin rebordered; non-marginal pars cephalica setae light, in U-shaped row; nonmarginal pars thoracica setae absent; marginal setae absent. Clypeus vertical in lateral view, median projection absent; setae light, needlelike. Eyes: ALE circular, PME oval, PLE circular; posterior eye row straight from above, procurved from front; ALE separated by more than their diameter, ALE–PLE separated by less than ALE radius, PME separated by less than their radius, PLE–PME separated by PME radius to PME diameter. Sternum longer than wide, not fused to carapace, with radial furrows between coxae I–II, II–III, III–IV, surface reticulate, without pits, microsculpture covering entire surface, posterior margin not extending posteriorly of coxae IV, extensions of precoxal triangles absent, lateral margins with rounded extensions between coxae, orange; setae sparse, light, densest laterally, originating from surface. Mouthparts: chelicerae, endites, and labium pale

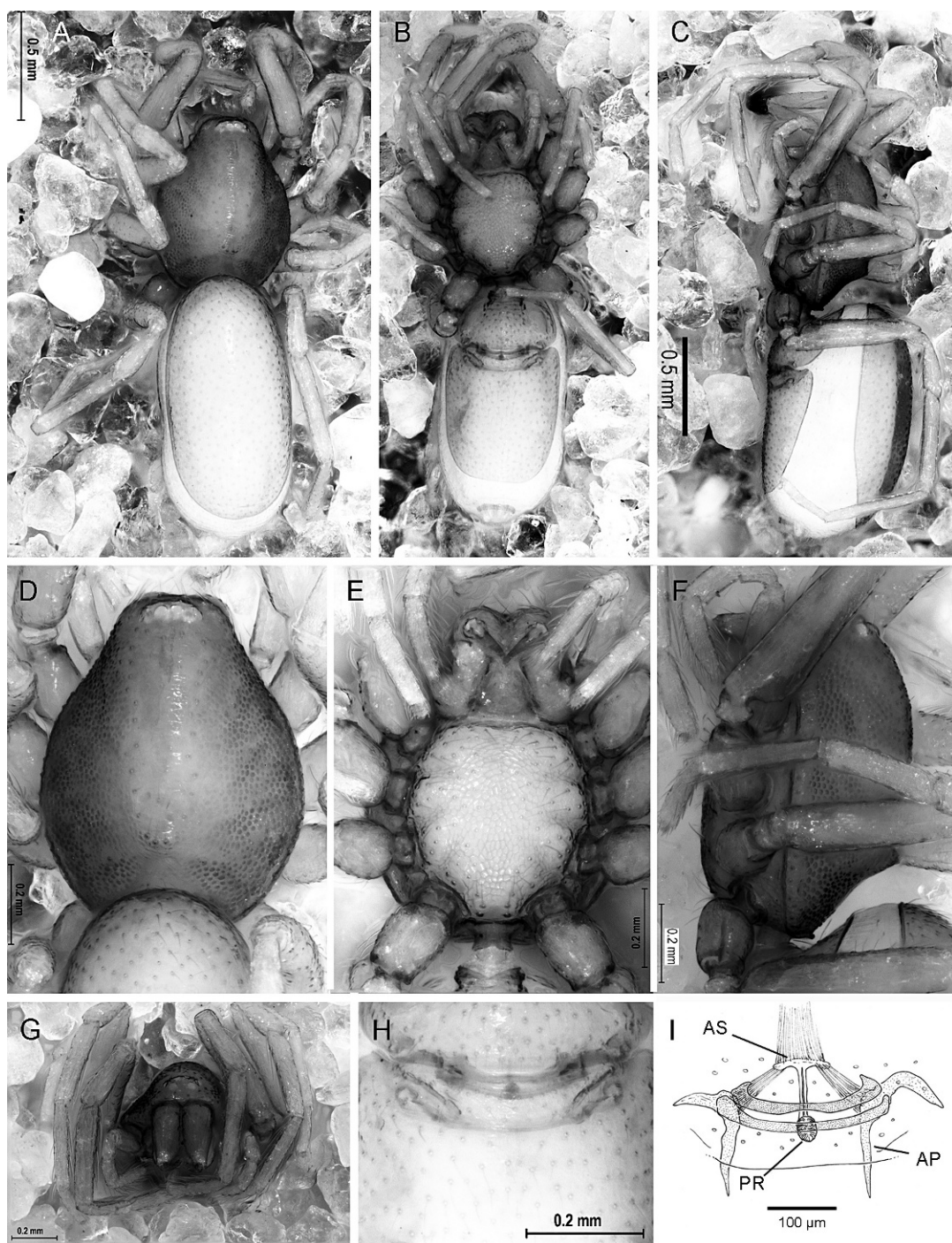


Fig. 52. *Trilacuna hazara*, new species, female (PBI_OON 15665). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Same, anterior view. **H.** Epigastric area, ventral view. **I.** internal female genitalia, ventral view. AS = anterior sclerite; AP = apodeme; PR = posterior receptacle.

orange. Chelicerae straight; fangs directed medially; setae light. **Abdomen:** Dorsum soft portions white. Book lung covers large, ovoid. Posterior spiracles connected by groove (fig. 52H). Pedicel ribbed. Dorsal scutum pale orange, covering full length of abdomen, no soft tissue visible from above. Postepigastric scutum pale orange, long, almost rectangular, covering about 3/4 of abdominal length. Setae of dorsum, and epigastric and postepigastric areas light, needlelike. Spinneret scutum with fringe of needlelike setae. **Legs:** Pale orange; patella plus tibia I shorter than carapace. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-0, metatarsi v2-2-0. Trichobothria not examined. **Genitalia:** Rounded, small posterior receptacle visible through the cuticle, between two sclerotized ridges. Anterior sclerite T-shaped, lateral sclerites relatively short, with lateral additional extensions (fig. 52I).

OTHER MATERIAL EXAMINED: PAKISTAN: Khyber Pakhtunkhwa (Northwest Frontier Province): Mansehra District: Kaghan Valley, Malkandi Frst, roots of *Rubus*, July 6, 1985, S. Vit, 1♀ (MHNG PBI_OON 12486).

DISTRIBUTION: Pakistan: Khyber Pakhtunkhwa.

Himalayana Grismado, new genus

TYPE SPECIES: *Himalayana kathmandu* Grismado, new species.

ETYMOLOGY: The generic name refers to the Himalayan range, the region where members of this genus lives, and is feminine in gender.

DIAGNOSIS: This genus resembles *Trilacuna* and *Dysderoides* by the cheliceral, labial, and the genitalic morphology; it differs from *Dysderoides* by having well-developed eyes and by lacking macrosetae on legs III and IV and from *Trilacuna* by the short postepigastric scutum in females, found only around the epigastric furrow (fig. 63H), by having a furrow connecting the posterior tracheal spiracles in males (figs. 59G, 65B), and by the acute projection in the prolateral dorsal part of the male copulatory bulb (fig. 62 D–H).

DESCRIPTION: Male. **Cephalothorax:** Pars cephalica slightly to strongly elevated (fig. 58B). Carapace orange, without any pattern, piriform in dorsal view, with rounded posterolateral corners, posterolateral edge without pits, posterior margin not bulging below posterior rim, anterolateral corners without extension or projections, posterolateral surface without spikes, surface of elevated portion of pars cephalica smooth, thorax without depressions, fovea absent, without radiating rows of pits; lateral margin straight, without denticles, lateral margin rebordered; plumose setae near posterior margin of pars thoracica absent. Nonmarginal pars cephalica setae needlelike, in U-shaped row; non-marginal pars thoracica setae needlelike; marginal setae needlelike. Clypeus margin unmodified, sinuous in front view (fig. 58C), vertical in lateral view, high, ALE separated from edge of carapace by their radius or more, median projection absent; setae light, needlelike. Chilum absent. Eyes six, well developed (fig. 58F–H), ALE circular; PLE–PME separated by less than PME radius. Sternum (fig. 58D) uniform, not fused to carapace, median concavity absent, without radial furrows between coxae, radial furrow opposite coxae III absent, surface finely reticulate, without pits, microsculpture covering entire surface, sickle-shaped structures absent, anterior margin unmodified, posterior margin not extending posteriorly of coxae IV, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae approximately equal, without posterior hump; setae sparse, dark, needlelike, originating from surface, without hair tufts. Mouthparts: chelicerae straight, anterior face unmodified (fig. 58E); promargin without teeth; fangs without toothlike projections, shape normal, without prominent basal process, tip unmodified; setae light, needlelike, evenly scattered; paturon inner margin with pairs of enlarged setae, distal region abruptly narrowed, posterior surface unmodified, promargin unmodified, inner margin with small denticles (at least in *H. kathmandu*, see fig. 54D), laminate groove absent. Labium triangular, not fused to sternum, anterior margin deeply incised (fig. 59A), same as sternum in sclerotization; with six or more setae on anterior margin,

subdistal portion with unmodified setae. Endites distally not excavated, serrula present in single row (fig. 59B), anteromedian tip unmodified, posteromedian part unmodified, same as sternum in sclerotization. **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly, interscutal membrane rows of small sclerotized platelets absent. Book lung covers large, without setae, anterolateral edge unmodified. Posterior spiracles connected by groove (fig. 59D). Pedicel tube ribbed (fig. 59F), scutopedicel region unmodified, scutum extending far dorsal of pedicel, plumose hairs absent, matted setae on anterior ventral abdomen in pedicel area absent, cuticular outgrowths near pedicel absent. Dorsal scutum strongly sclerotized, without color pattern, covering full length of abdomen, no soft tissue visible from above, not fused to epigastric scutum, middle surface smooth, sides smooth, anterior half without projecting denticles. Epigastric scutum strongly sclerotized, surrounding pedicel, small lateral sclerites absent. Postepigastric scutum strongly sclerotized, long, semicircular, covering nearly full length of abdomen, fused to epigastric scutum, anterior margin unmodified, without posteriorly directed lateral apodemes. Spinneret scutum present, incomplete ring. Supraanal scutum absent. Dorsum setae needlelike. Epigastric area setae uniform, dark, needlelike. Postepigastric area setae needlelike. Dense patch of setae anterior to spinnerets absent. Interscutal membrane with setae. **Legs:** Without color pattern; femur IV not thickened, same size as femora I–III, patella plus tibia I shorter than carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex absent, tibia IV ventral scopula absent, metatarsi I and II mesoapical comb absent, metatarsi III and IV weak, ventral scopula absent. Coxae (at least in *H. kathmandu*) with oval platelets with pores (fig. 60A–C). Leg spines present in legs I and II (usually four ventral pairs on the tibiae and two ventral pairs on metatarsi); occasionally one ventral apical spine on tibiae IV. Tarsi I–IV without inferior claw. **Genitalia:** Epigastric region with sperm pore situated at level of anterior spiracles (fig. 59G); furrow without Ω -shaped insertions, without setae; males of some species with stout, long setae in the epigastric area (figs. 68B, 75B). Palp

normal size, not strongly sclerotized, right and left palps symmetrical, proximal segments pale orange; embolus light, prolateral excavation absent; trochanter normal size, unmodified; femur two or more times as long as trochanter, conspicuously enlarged in some species, without posteriorly rounded lateral dilation (figs. 65C–E, 81C–E), attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia trichobothria of tibia not examined; cymbium pale orange, not fused with bulb, not extending beyond distal tip of bulb, plumose setae absent, without stout setae, without distal patch of setae; bulb 1 to 1.5 times as long as cymbium, slender, tapering apically. Distal part of bulb with prolateral dorsal pointed, acute projection, and a set of laminae with filiform projections accompanying the embolus (fig. 62A–H).

Female: As in male except as noted. **Cephalothorax:** Eyes PME circular, PLE circular; posterior eye row straight from above; ALE separated by their radius to diameter. Sternum longer than wide (fig. 54A), pale orange, lateral margins unmodified; setae evenly scattered. Palpal claw absent; spines absent; tarsus unmodified. Claws of legs IV with a notably enlarged distal tooth on the internal row, making them appear bifid (at least in *H. kathmandu*, fig. 57D–E). **Abdomen:** Dorsum soft portions pale white, without color pattern. Pedicel tube short. Dorsal scutum orange to pale orange, more than 1/2 to most of abdomen width. Epigastric scutum not protruding, without lateral joints. Postepigastric scutum short, only around epigastric furrow (fig. 63H). Dorsum setae dark. Postepigastric area setae dark. Spinneret scutum with fringe of needlelike setae. Colulus present. **Genitalia:** Copulatory opening (visible in *H. kathmandu* and *H. martensi*, figs. 63H, 66H) located between ventral transverse plates, leading to a rounded posterior receptacle, which presumably leads anteriorly to the final part of the uterus externus (inferred by its similarity with *Trilacuna*). Anterior sclerite T-shaped, similar as in *Trilacuna*, apparently without lumen; it has conspicuous lateral bars with attached muscles leading to the ventral transverse plates. Laterally, below the trans-

verse plates, two apodemes (shorter than in *Trilacuna*) also have muscle connections (figs. 72A, C, E, 82A, C, E).

COMPOSITION: Six species, all new, here described.

DISTRIBUTION: Himalayan range in Nepal and northern India.

NOTE: The most useful characters for separating species are found in males, especially in the palp, and in the presence or absence of special setae on the epigastric area. This genus *Himalayana* seems to be very conservative in the female genitalic and somatic morphology, making it difficult to distinguish congeners and to match the females with males of the same species. In this paper we chose to match the sexes by geographical criteria, and with the aid of characters such as body size, eye size, and/or the degree of sclerotization of the scuta. We have no hypothesis about intrageneric relationships.

Himalayana kathmandu

Grismado, new species

Figures 53–65, 72A–B

TYPES: Male holotype and two female paratypes from Nepal: Bagmati: Kathmandu District: above Gul Bhanjyang, leaf litter and moss in oak forest, 2600 m, Apr. 6, 1981, I. Löbl, A. Smetana (MHNG PBI_OON 15268); one male and two female paratypes from Phulchauki at south of Kathmandu, leaf litter, 2500 m, May 10, 1981, I. Löbl, A. Smetana (MHNG PBI_OON 15258); two female paratypes from Sheopuri Mt, *Quercus semecarpifolia* forest, 2300 m, June 25, 1988, Martens and Ausobsky (SGN PBI_OON 15984).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: *H. kathmandu* is the largest (>2 mm total length) and most heavily sclerotized species of the genus, and can be further recognized by the following combination of characters: males have elongated and gradually tapering copulatory bulb, enlarged palpal femur (figs. 65C–E, 72B) and lack thick setae on the epigastric area (fig. 65B); in females, the internal genitalia are very similar to those of *H. martensi*, but the lateral apodemes are longer (fig. 72A).

DESCRIPTION: Male (holotype, PBI_OON 15268). Total length 2.10. **Cephalothorax:** Carapace orange-brown, pars cephalica slightly elevated in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, sides granulate; lateral margin rebordered; nonmarginal pars cephalica and thoracica setae lost (only their bases remain); marginal setae needlelike. Eyes all subequal, PME circular, PLE circular; posterior eye row recurved from both above and front; ALE separated by their radius to diameter, ALE–PLE separated by ALE radius to ALE diameter, PME touching for less than half their length. Sternum longer than wide, lateral margins unmodified, orange; setae densest laterally. Mouthparts: chelicerae orange; fangs directed medially. Endites orange. **Abdomen:** Dorsum soft portions not visible from above. Book lung covers elliptical. Pedicel tube short. Epigastric scutum not protruding, orange. Postepigastric scutum orange. Spinneret scutum with fringe of needlelike setae. Colulus present. **Legs:** Orange. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-0, metatarsi v2-2-0. Cuticle with elongated platelets less defined than in *Trilacuna*, and usually without pores (except on ventral coxae, fig. 60A–D). Trichobothria: tibia: each with three; metatarsus: each with one; opening longitudinally narrowed; hood covered by numerous low, closely spaced transverse ridges, differentiated from the distal plates mainly by being distinctly ridged, and by two lateral incomplete grooves; both are nearly at the same level; basal expansion of trichobothrial setae with annular ridges (fig. 61A–I); tarsal organs with two sensilla visible on palp and legs III–IV, three on legs I–II (fig. 61J–N). **Genitalia:** Epigastric region with sperm pore small, circular, unmodified. Palp: femur thickened; tibia nearly as long as patella; cymbium ovoid in dorsal view; bulb pale orange, distal part with a dorsal pointed, acute protrusion along the first third of the embolus (slightly curved in the SEM preparations, fig. 62); one dorsal retrolateral and one prolateral accompanying laminae with filiform projections, the latter mostly as a brush only; a bunch of aligned projections near the base of the of the prolateral lamina

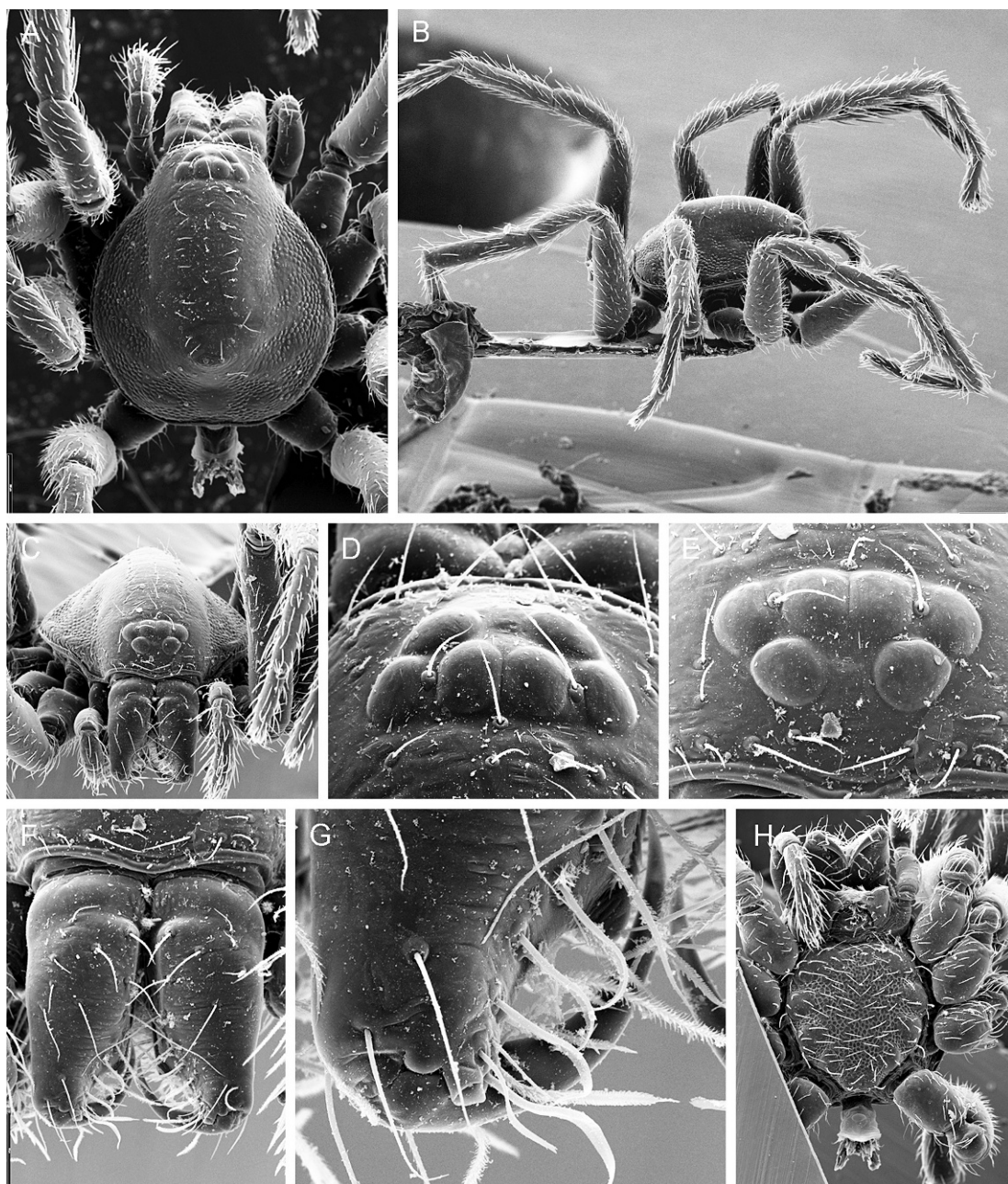


Fig. 53. *Himalayana kathmandu*, new species, female (PBI_OON 15388). A. Carapace, dorsal view. B. Cephalothorax and appendages, lateral view. C. Carapace, anterior view. D. Ocular area, dorsal view. E. Same, anterior view. F. Chelicerae, anterior view. G. Same, detail of right fang. H. Cephalothorax, ventral view.

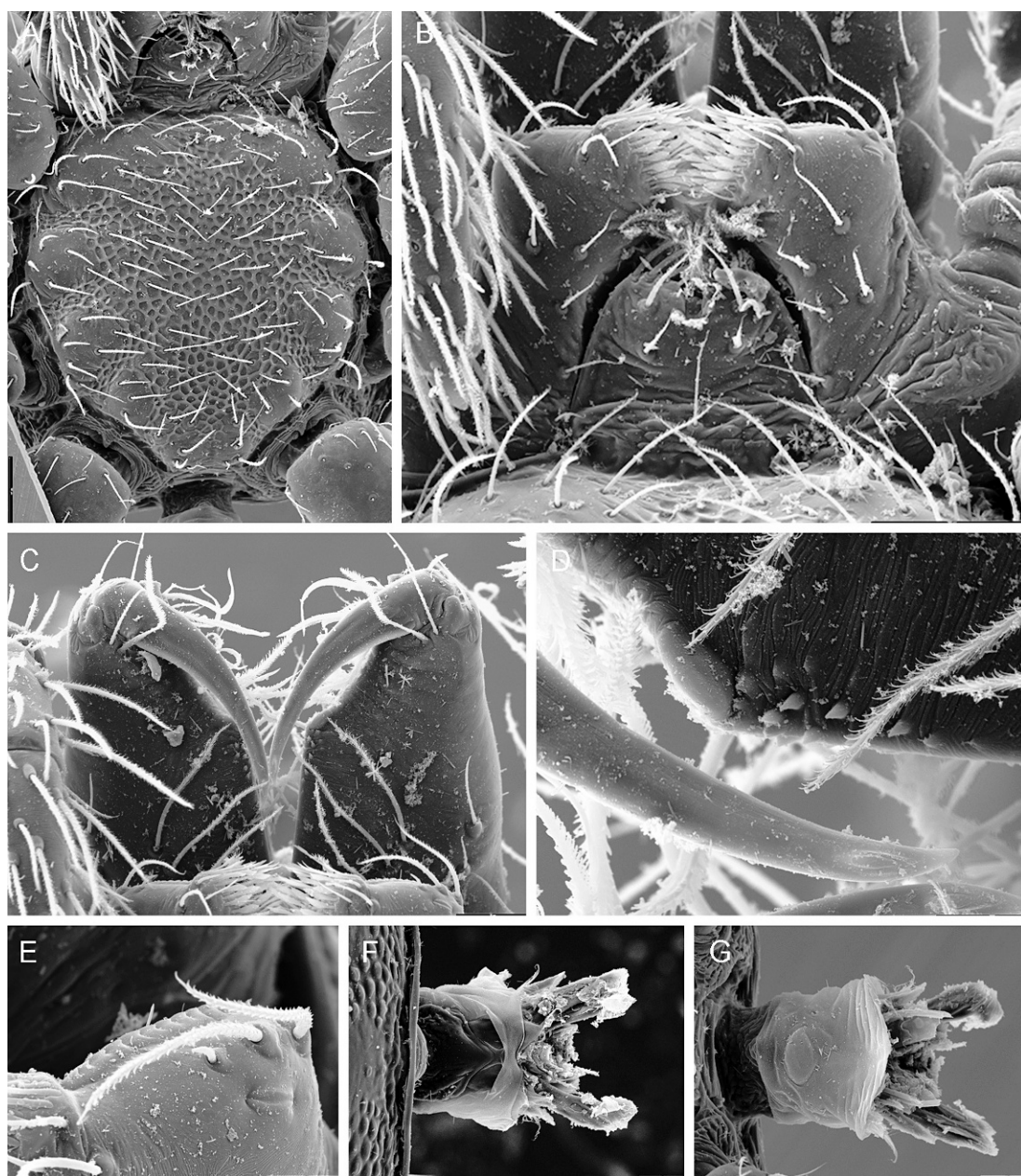


Fig. 54. *Himalayana kathmandu*, new species, female (PBI_OON 15388). A. Sternum, ventral view. B. Endites and labium, ventral view. C. Chelicerae, ventral view. D. Same, detail showing retromarginal denticles. E. Left serrula, ventral view. F. Pedicel, dorsal view. G. Same, ventral view.

(fig. 62E). Embolus straight, tip curved to the prolateral side, with distal incised margin (fig. 62H–I).

Female (paratype, PBI_OON 15984). Total length 2.24. As in male except as noted.

Cephalothorax: Carapace orange. Eyes ALE, PME subequal, larger than PLE; PLE–PME separated by less than PME radius. Sternum orange. Palp without spines. **Abdomen:** Dorsal scutum strongly sclerotized, covering

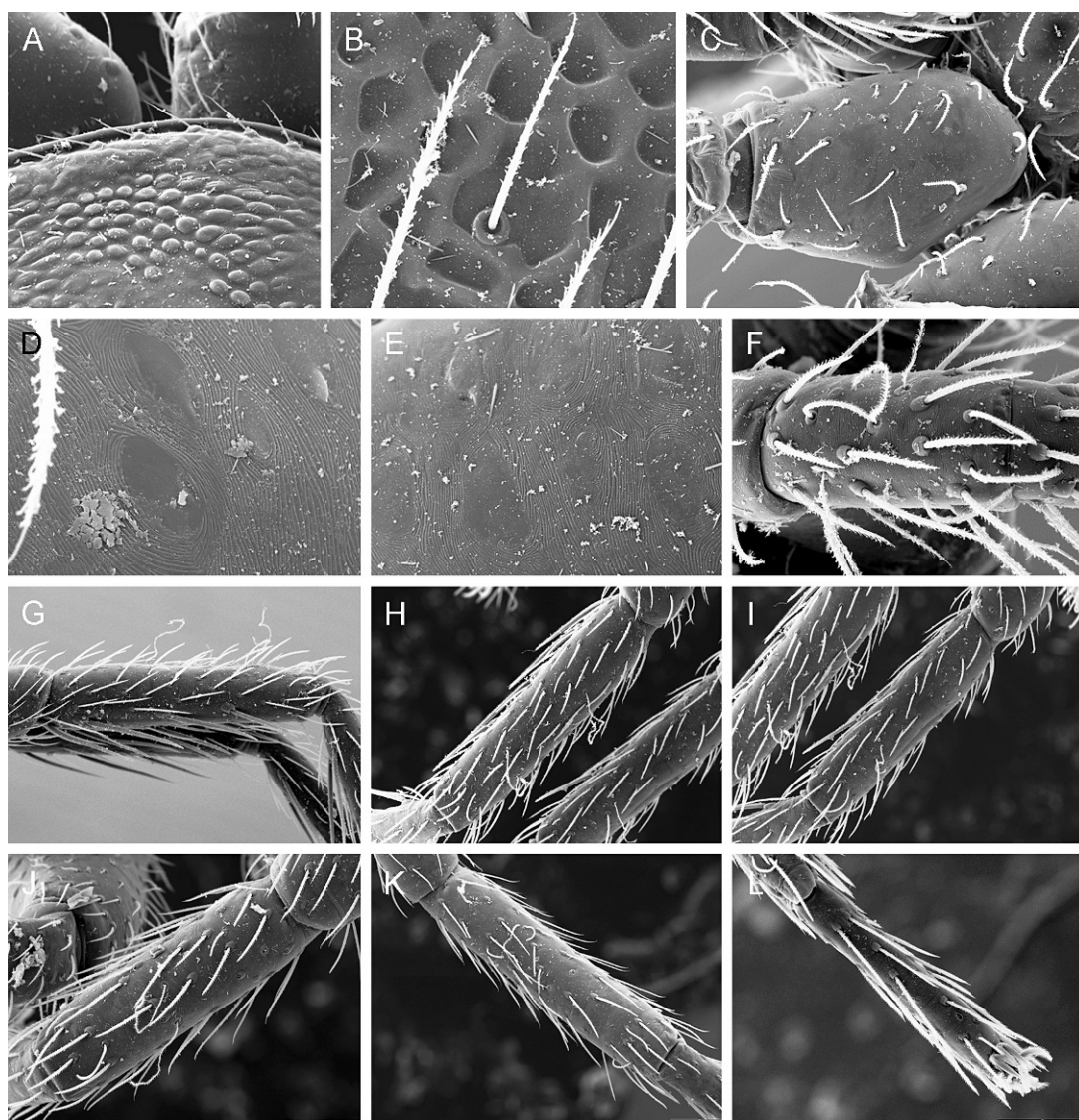


Fig. 55. *Himalayana kathmandu*, new species, female (PBI_OON 15388). **A.** Carapace margin, dorsal view. **B.** Sternum, texture of the cuticle. **C.** Coxa I, ventral view. **D.** Same, detail of platelets. **E.** Platelets on coxa IV, ventral view. **F.** Palpal tibia, dorsal view. **G.** Tibia I, prolateral view. **H.** Same, dorsal view. **I.** Tibia II, dorsal view. **J.** Tibia III, dorsal view. **K.** Tibia IV, dorsal view. **L.** Tarsus IV, dorsal view.

more than 3/4 of abdomen, orange. Epigastric scutum strongly sclerotized, orange. Postepigastric scutum strongly sclerotized, not fused to epigastric scutum, orange. **Legs:** Patella plus tibia I nearly as long as carapace. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-0, metatarsi v2-2-0. **Genitalia:** Copulatory opening small, marked

on a darkened area between the ventral transverse plate (fig. 63H); lateral apodemes relatively long (fig. 72A), small rounded posterior receptacle and T-shaped anterior sclerite visible through the cuticle.

OTHER MATERIAL EXAMINED: NEPAL: **Bagmati:** Kathmandu District: Phulcoki, 2700 m, Oct. 15, 1983, I. Löbl, A. Smetana, 4♀ (MHNG PBI_OON 15377); Phulcoki,

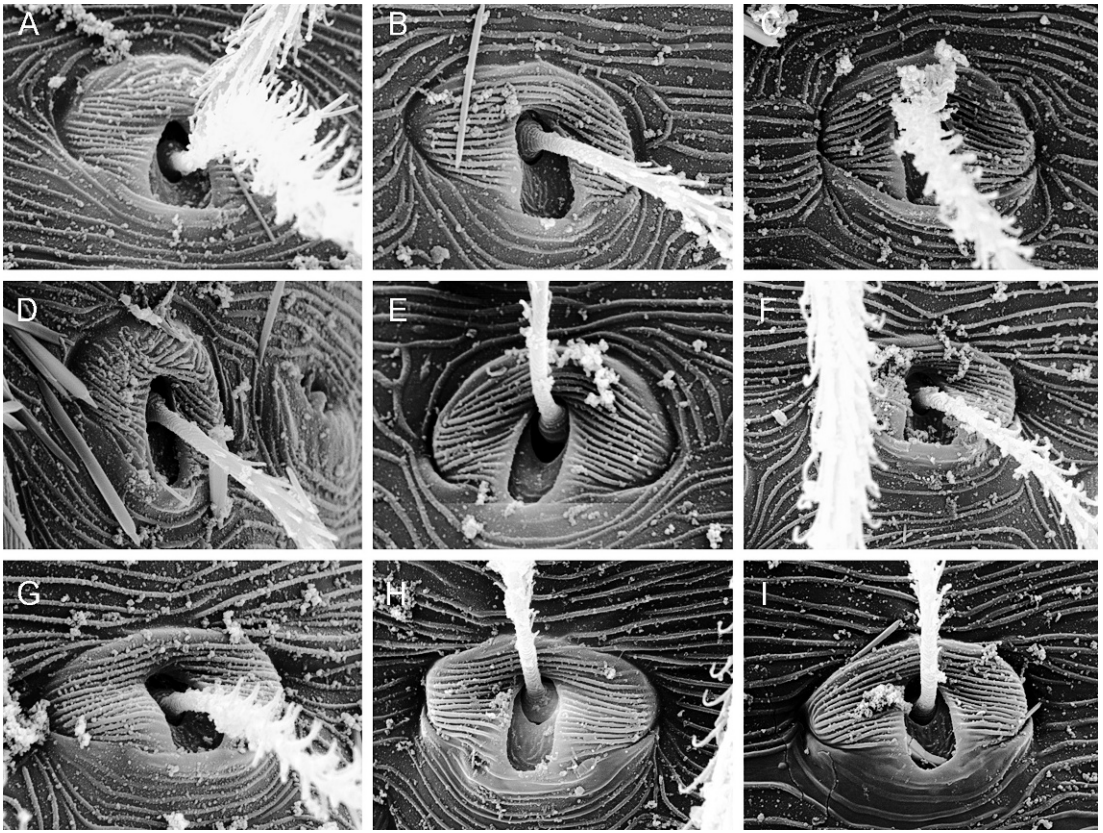


Fig. 56. *Himalayana kathmandu*, new species, female (PBI_OON 15388). Trichobothria. A. Palpal tibia. B. Tibia I. C. Tibia II. D. Tibia III. E. Tibia IV. F. Metatarsus I. G. Metatarsus II. H. Metatarsus III. I. Metatarsus IV.

sifting leaf litter at base of oak trees, 2650 m, Oct. 14, 1983, I. Löbl, A. Smetana, 1♂ (MHNG PBI_OON 15388); 2♀ (MHNG PBI_OON 15388); Phulcoki, north face, humid forest, leaf litter at base of rocks, 2600 m, Oct. 16, 1983, I. Löbl, A. Smetana, 1♂ (MHNG PBI_OON 15520); Phulcoki, north side, leaf litter, 2500 m, Apr. 28, 1984, to Apr. 29, 1984, I. Löbl, A. Smetana, 7♀ (MHNG PBI_OON 15664); 1♂ (MHNG PBI_OON 15664); above and below Chau-bas, *Rhododendron* forest, 2500 m, Apr. 4, 1981, I. Löbl, A. Smetana, 1♂, 1♀ (MACN-Ar 28841, PBI_OON 15266); Burlung Bhan-jyang, in grassland, 2600 m, Apr. 5, 1981, I. Löbl, A. Smetana, 2♂ (MHNG PBI_OON 15264); 1♀ (MHNG PBI_OON 15264); Malemchi, 2800 m, Apr. 14, 1981, I. Löbl, A. Smetana, 1♀ (MHNG PBI_OON

15263); Phulchauki, south of Kathmandu, 1700 m, May 10, 1981, I. Löbl, A. Smetana, 1♀ (MHNG PBI_OON 15267); Tarke Ghyang, 2650 m, Apr. 19, 1981, I. Löbl, A. Smetana, 1♀ (MHNG PBI_OON 15261).

DISTRIBUTION: Nepal (Bagmati and Dhaulagiri), between 2300 and 2800 m above the sea level (except for a single record at 1700 m).

Himalayana martensi Grismado, new species
Figures 66–68, 72C–D

TYPES: Male holotype, one male and one female paratypes from Nepal: Gandaki: Manang Dist., Marsyandi, 2200 m, Apr. 12–13, 1980, Martens and Ausobsky (SGN PBI_OON 14923).

ETYMOLOGY: The specific name is a noun in apposition in honor to Jochen Martens,

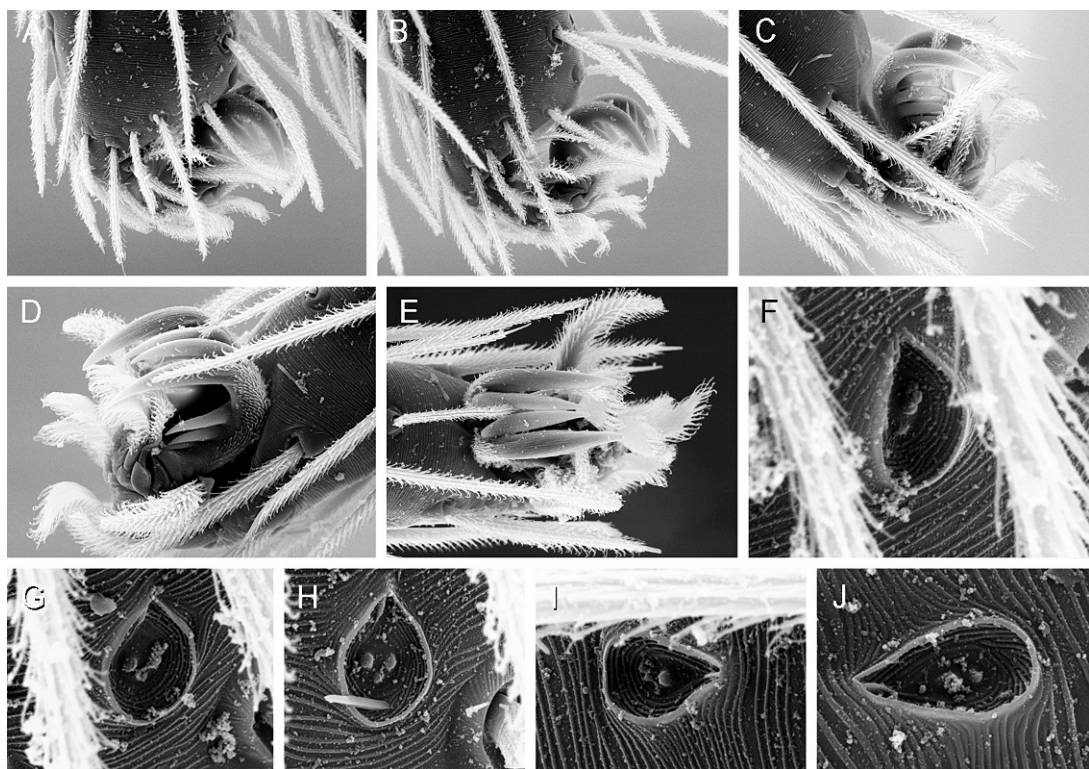


Fig. 57. *Himalayana kathmandu*, new species, female (PBI_OON 15388). Tarsal morphology. A–E. Tarsal claws. A. Leg I, prolateral view. B. Leg II, prolateral view. C. Leg III, retrolateral view. D. Leg IV, retrolateral view. E. Same, dorsal view. F–J. Tarsal organs. F. Palp. G. Leg I. H. Leg II. I. Leg III. J. Leg IV.

one of the collectors of this and other oonopid species from the Himalayas.

DIAGNOSIS: Males of this species are recognizable by the following combination of characters: copulatory bulb with globose basal and median part, slightly tickened palpal femur (figs. 68C–E, 72D) and stout, forwardly directed enlarged setae on the posterior part of the epigastric scutum (fig. 68B); in the females, the internal genitalia resemble those of *H. kathmandu*, but the lateral apodemes are shorter (fig. 72C). In addition, both sexes are smaller than *H. kathmandu* (total length <1.8 mm) and only slightly sclerotized.

DESCRIPTION: Male (holotype, PBI_OON 14923). Total length 1.64. **Cephalothorax:** Carapace orange, pars cephalica slightly elevated in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, sides granulate; lateral margin rebordered; non-marginal pars cephalica setae needlelike, in

U-shaped row; nonmarginal pars thoracica setae needlelike; marginal setae needlelike. Eyes ALE largest, PME circular, PLE circular; posterior eye row recurved from above, straight from front; ALE separated by their radius to diameter, ALE–PLE separated by less than ALE radius, PME separated by less than their radius. Sternum longer than wide, lateral margins unmodified, orange; setae evenly scattered. Mouthparts: chelicerae, labium, and endites orange; fangs directed medially. **Abdomen:** Dorsum soft portions not visible from above. Book lung covers elliptical. Pedicel tube short. Dorsal scutum orange. Epigastric scutum not protruding, orange. Postepigastric scutum orange. Spinneret scutum with fringe of needlelike setae. Colulus present. **Legs:** Pale orange. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-0-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-0-0, metatarsi v2-2-0.

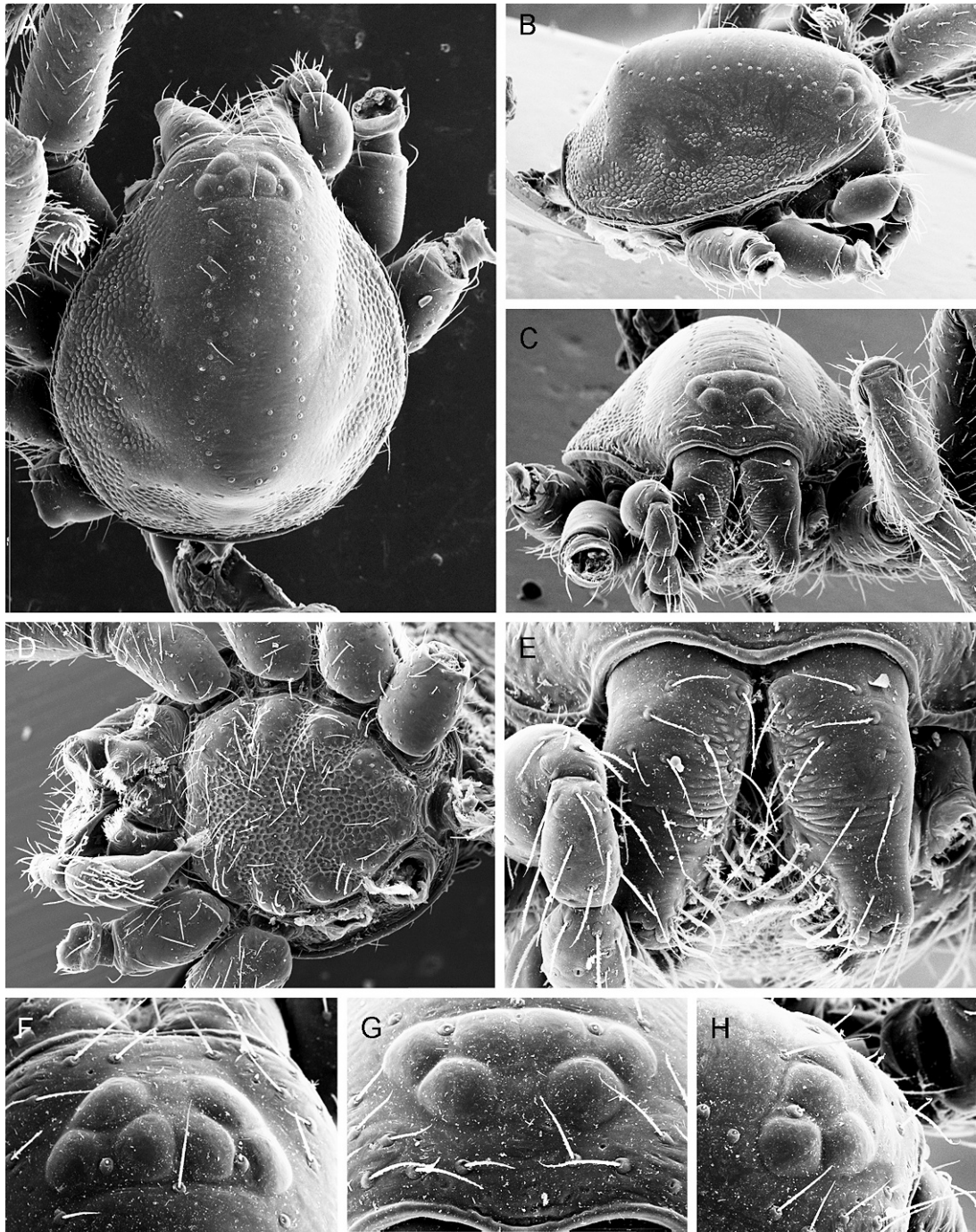


Fig. 58. *Himalayana kathmandu*, new species, male (PBI_OON 15388). **A.** Carapace, dorsal view. **B.** Same, lateral view. **C.** Same, anterior view. **D.** Cephalothorax, ventral view. **E.** Chelicerae, anterior view. **F.** Ocular area, dorsal view. **G.** Same, anterior view. **H.** Same, lateral view.

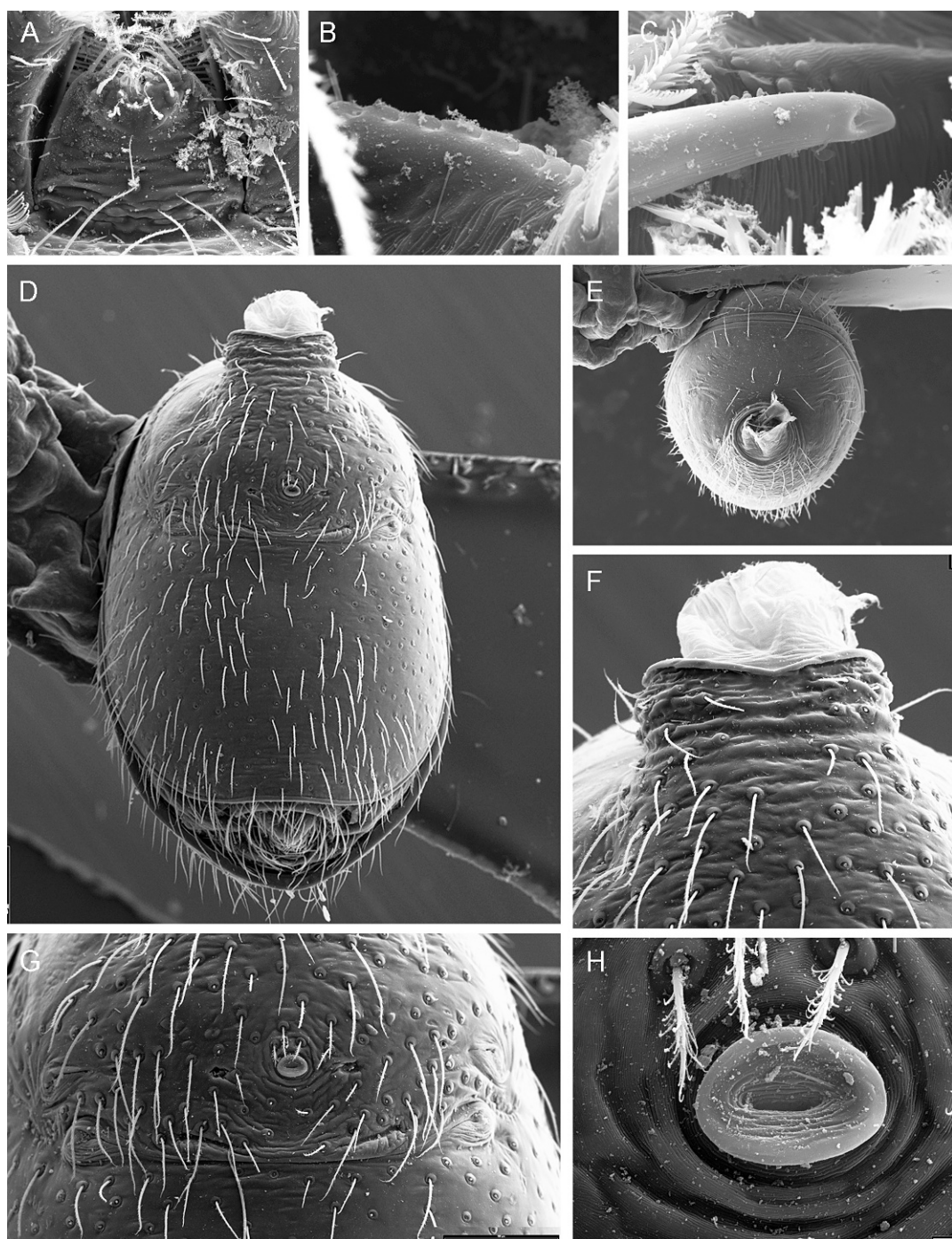


Fig. 59. *Himalayana kathmandu*, new species, male (PBI_OON 15388). A. Labium, ventral view. B. Serrula. C. Left cheliceral fang, venom outlet. D. Abdomen, ventral view. E. Same, anterior view. F. Pedicel, ventral view. G. Epigastric region, ventral view. H. Same, detail of the sperm pore.

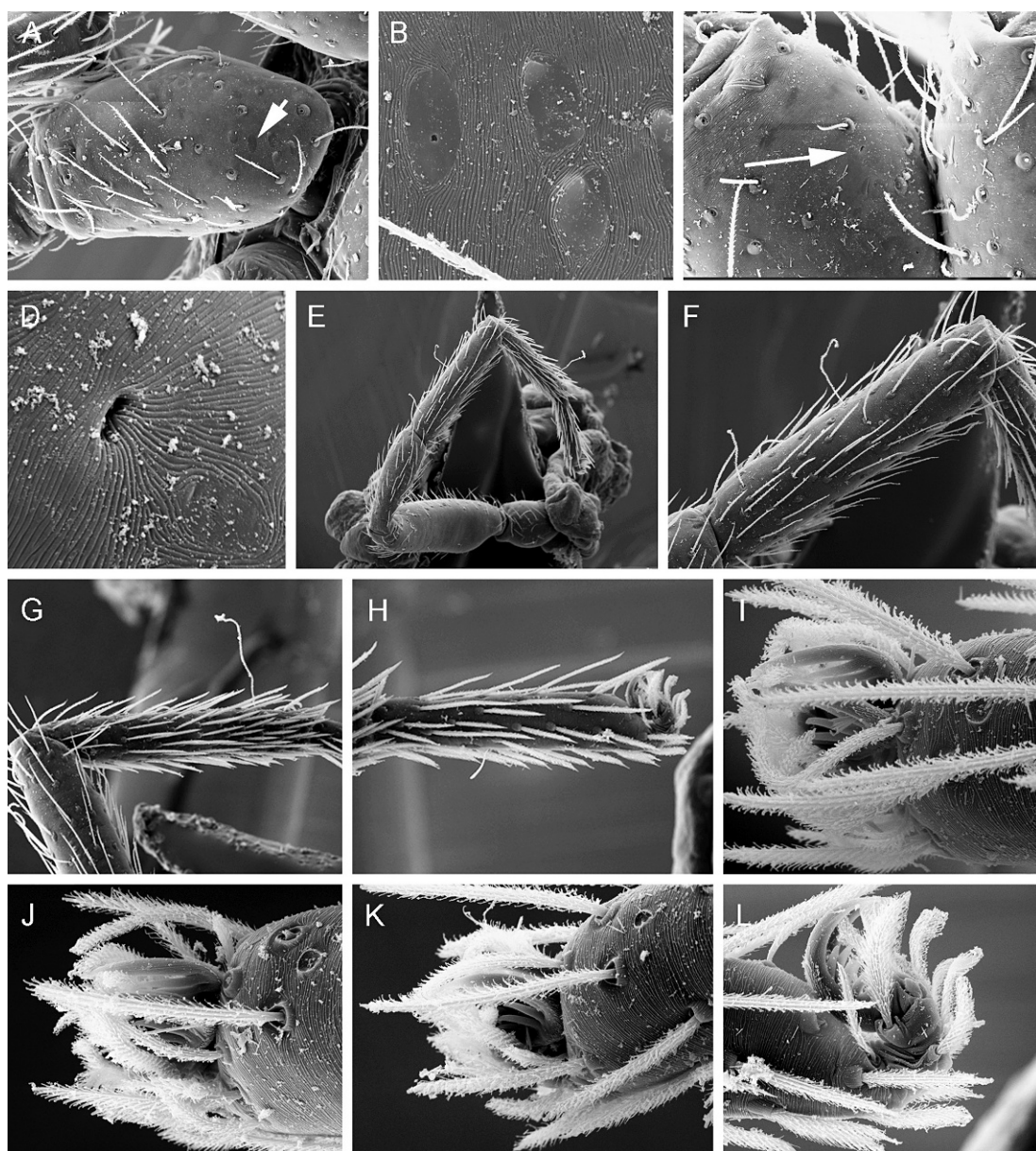


Fig. 60. *Himalayana kathmandu*, new species, male (PBI_OON 15388). Leg morphology. **A.** Coxa I, ventral view (arrow = platelet with pore). **B.** Same, detail of the platelets. **C.** Coxa III, ventral view (arrow = pore). **D.** Same, detail of pore. **E.** Leg IV, prolateral view. **F.** Same, detail of tibia. **G.** Same, detail of metatarsus. **H.** Same, detail of tarsus. **I–L.** Tarsal claws. **I.** Leg I, anterior view. **J.** Leg II, dorsal view. **K.** Leg III, retrolateral view. **L.** Leg IV, retrolateral view.

Tarsi I–IV superior claw tooth not examined in detail. Trichobothria not examined. **Genitalia:** Epigastric region with sperm pore small, oval, unmodified; stout, forwardly directed enlarged setae on the posterior part of the

epigastric scutum (fig. 68B). Palpal embolus with one dorsal and one prolateral accompanying laminae with filiform projections (more numerous in the latter, fig. 72D); femur slightly thickened; patella nearly as long as tibia;

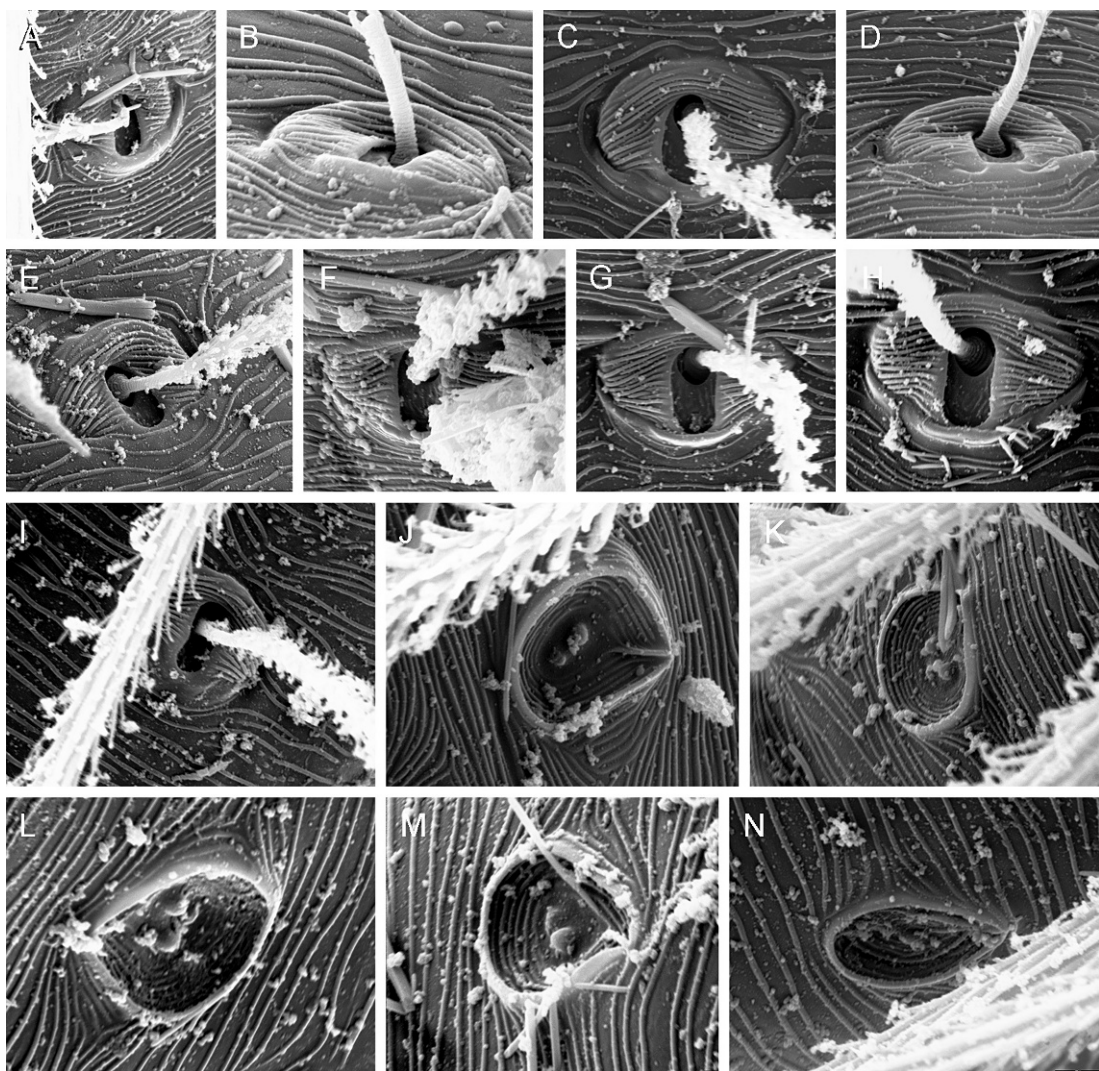


Fig. 61. *Himalayana kathmandu*, new species, male (PBI_OON 15388). A–I. Trichobothria. A. Palpal tibia. B. Tibia I. C. Tibia II. D. Tibia III. E. Tibia IV. F. Metatarsus I. G. Metatarsus II. H. Metatarsus III. I. Metatarsus IV. J–N. Tarsal organs. J. Palp. K. Leg I. L. Leg II. M. Leg III. N. Leg IV.

cymbium narrow in dorsal view; bulb pale orange, distal part with a dorso-prolateral pointed, short, acute projection (fig. 72D).

Female (paratype, PBI_OON 14923). Total length 1.74. As in male except as noted. **Cephalothorax:** Eyes PLE–PME touching. Palp without spines. **Abdomen:** Dorsal scutum covering more than 3/4 of abdomen, orange. Epigastric scutum not strongly sclerotized, orange. Postepigastric scutum not strongly sclerotized, not fused to epigastric

scutum, orange. **Legs:** Patella plus tibia I shorter than carapace. Leg spination (all spines longer than segment width): leg I: tibiae: v2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-0-0, metatarsi: v2-2-0. **Genitalia:** Copulatory opening rounded, large, visible with stereomicroscope (fig. 66H). Lateral apodemes short (fig. 72C).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from the type locality.

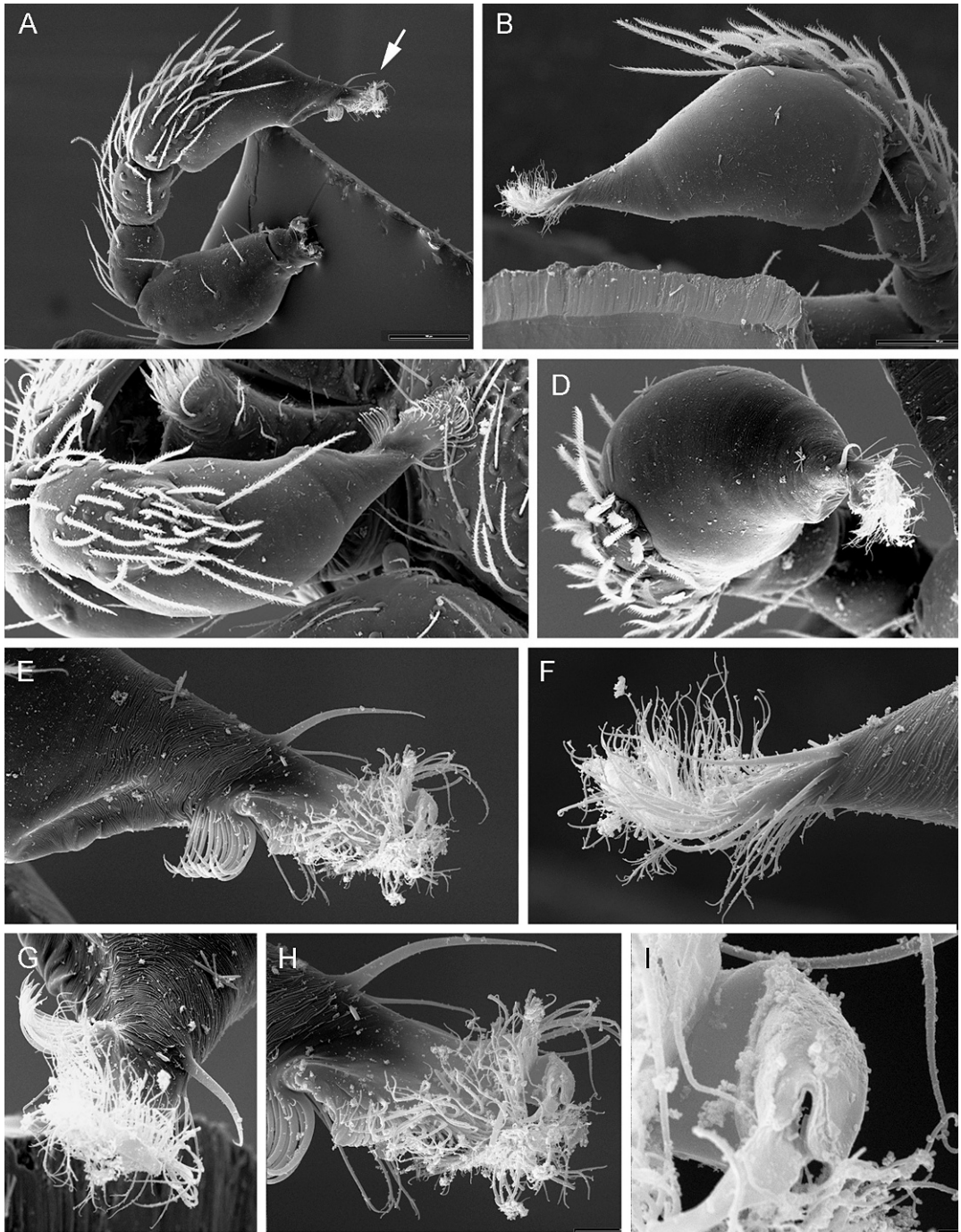


Fig. 62. *Himalayana kathmandu*, new species, male (PBI_OON 15388). Palpal morphology. **A.** Left palp, prolateral view (arrow = acute dorsal projection). **B.** Left copulatory bulb, retrolateral view. **C.** Right bulb, dorsal view. **D.** Left bulb, apical view. **E.** Same, detail of the embolus and accompanying laminae, prolateral view. **F.** Same, retrolateral view. **G.** Same, anterior view. **H.** Same, detail of the tip of the embolus, prolateral view. **I.** Same, closer view.

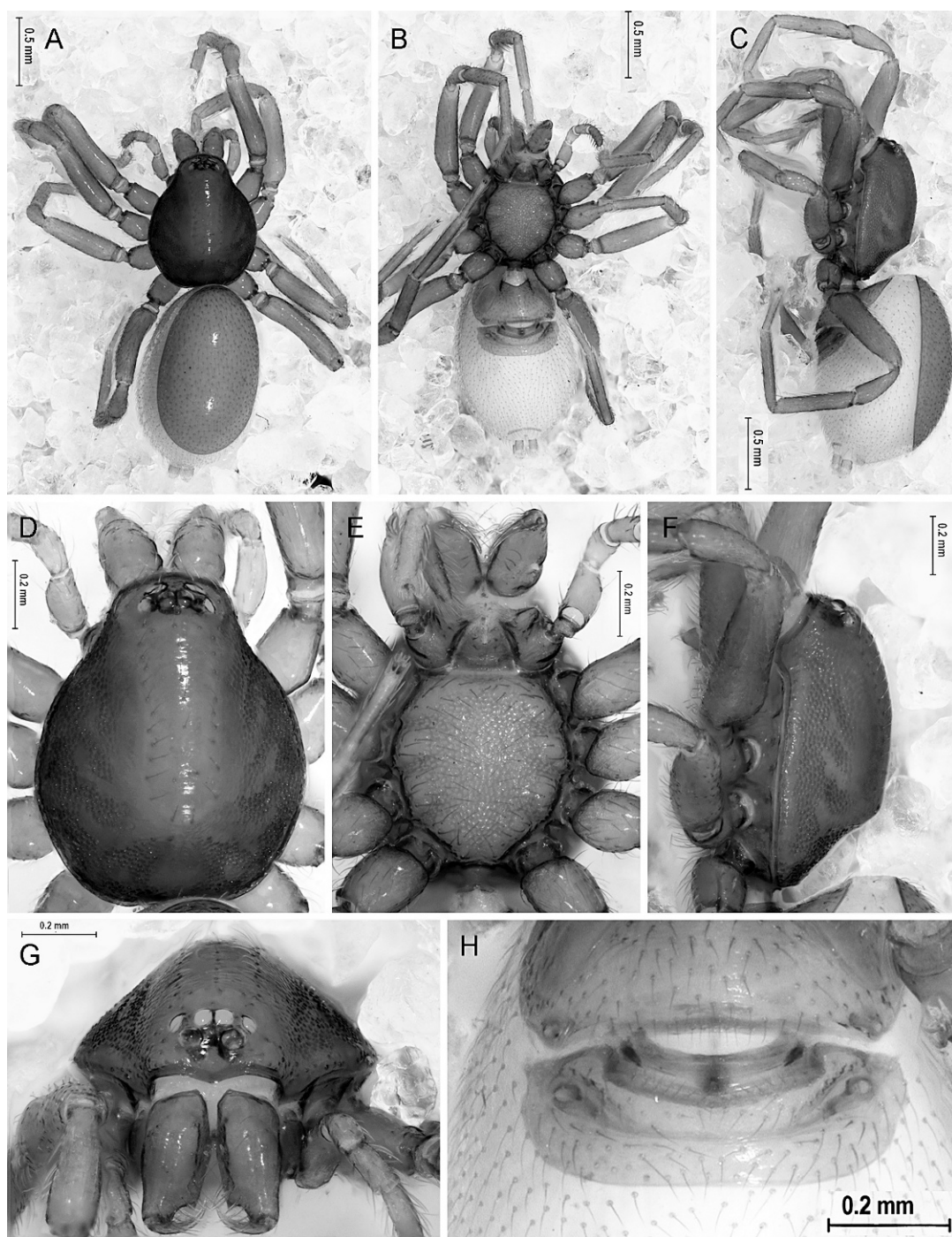


Fig. 63. *Himalayana kathmandu*, new species, female (PBI_OON 15984). A. Habitus, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Carapace, dorsal view. E. Same, ventral view. F. Same, lateral view. G. Same, anterior view. H. Epigastric area, ventral view.

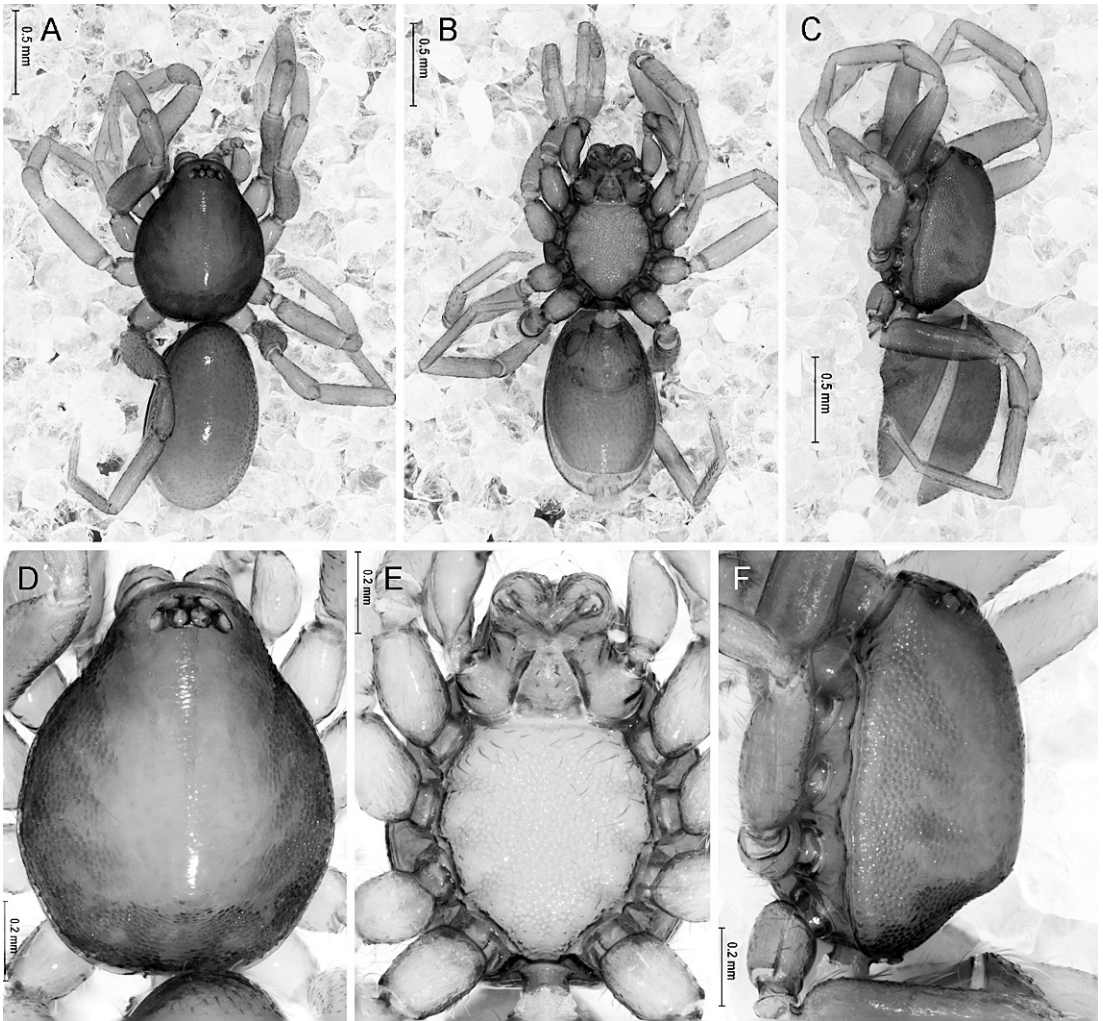


Fig. 64. *Himalayana kathmandu*, new species, male (PBI_OON 15268). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

Himalayana castanopsis

Grismado, new species

Figures 69–71, 72E–F

TYPES: Male holotype from Nepal: Mechi: Ilam: Mai Pokhari, *Castanopsis* forest remnant, 2200 m, Apr. 9–10, 1988, J. Martens and W. Schawaller (SGN PBI_OON 15978). Three female paratypes with same data (SGN PBI_OON 15747).

ETYMOLOGY: The specific name is a noun in apposition referring the dominant trees in the forest where the types were collected.

DIAGNOSIS: Males of this species are easily recognizable by the conspicuous bunch of dark, thickened setaelike projections on the prolateral base of the embolus (figs. 71D–E, 72F). Females are distinguished by the very short lateral branches of the anterior sclerite, with rounded endings (fig. 72E).

DESCRIPTION: Male (holotype, PBI_OON 15978). Total length 1.60. **Cephalothorax:** Carapace pars cephalica slightly elevated in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, sides granulate; lateral margin rebordered; non-

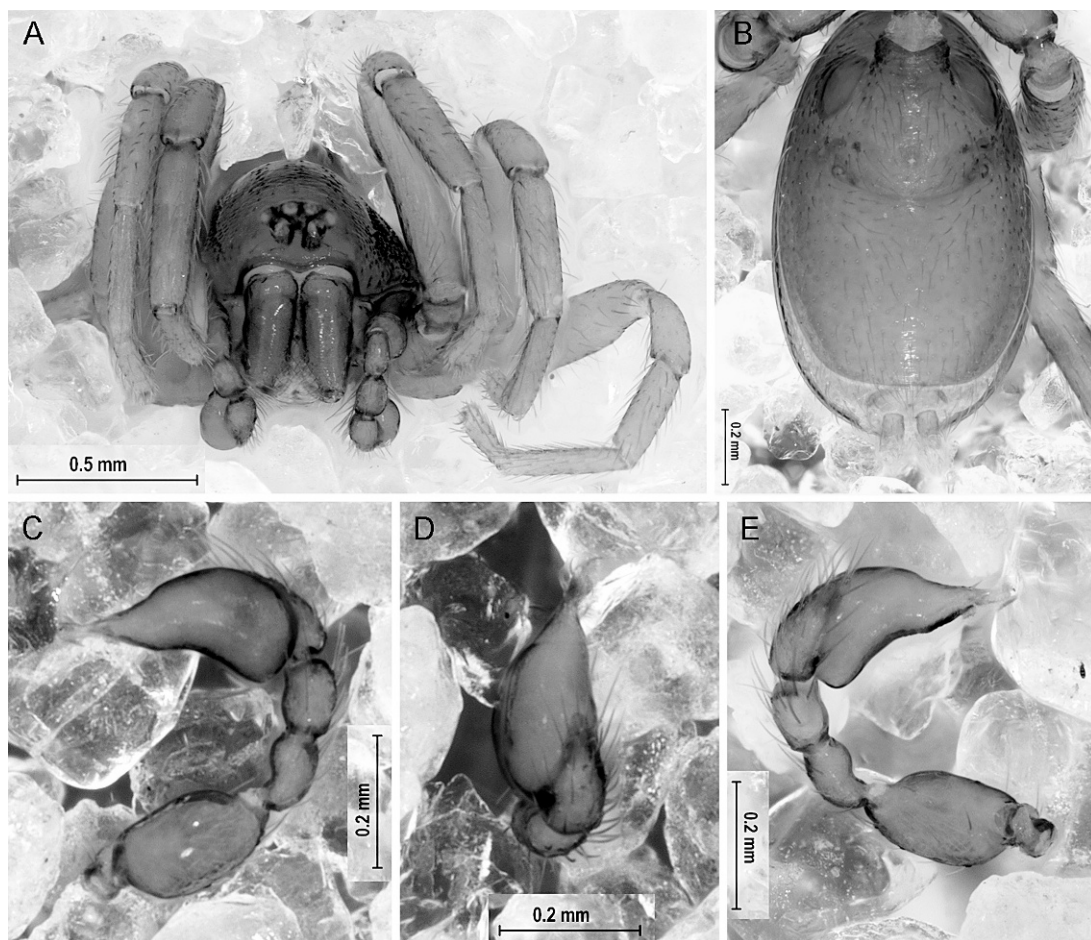


Fig. 65. *Himalayana kathmandu*, new species, male (PBI_OON 15268). A. Habitus, anterior view. B. Abdomen, ventral view. C. Left palp, retrolateral view. D. Same, dorsal view. E. Same, prolateral view.

marginal pars cephalica setae needlelike, in U-shaped row; nonmarginal pars thoracica setae needlelike; marginal setae needlelike. Eyes all subequal, PME circular, PLE circular; posterior eye row straight from above, procurved from front; ALE separated by their radius to diameter, ALE–PLE touching, PME touching throughout most of their length. Sternum longer than wide, lateral margins unmodified, orange; setae evenly scattered. Cheliceral fangs directed medially. **Abdomen:** Dorsum soft portions not visible. Book lung covers round. Pedicel tube short. Dorsal scutum orange. Epigastric scutum not protruding. Postepigastric scutum orange. Dorsum setae dark. Postepigastric area setae dark, with enlarged forwardly

directed setae, converging with similar epigastric setae around the furrow connecting the posterior spiracles. Spinneret scutum with fringe of needlelike setae. Colulus present, with two needlelike setae. **Legs:** Pale orange. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0. Tarsi I–IV superior claws tooth not examined in detail. Trichobothria not examined. **Genitalia:** Epigastric region with sperm pore small, oval, unmodified. Palp: femur normal size, slightly thickened; cymbium narrow in dorsal view; bulb yellow-brown, distal part with a prolateral bunch of many stout tickened, dark setaelike projections (figs. 71 D–E, 72F).

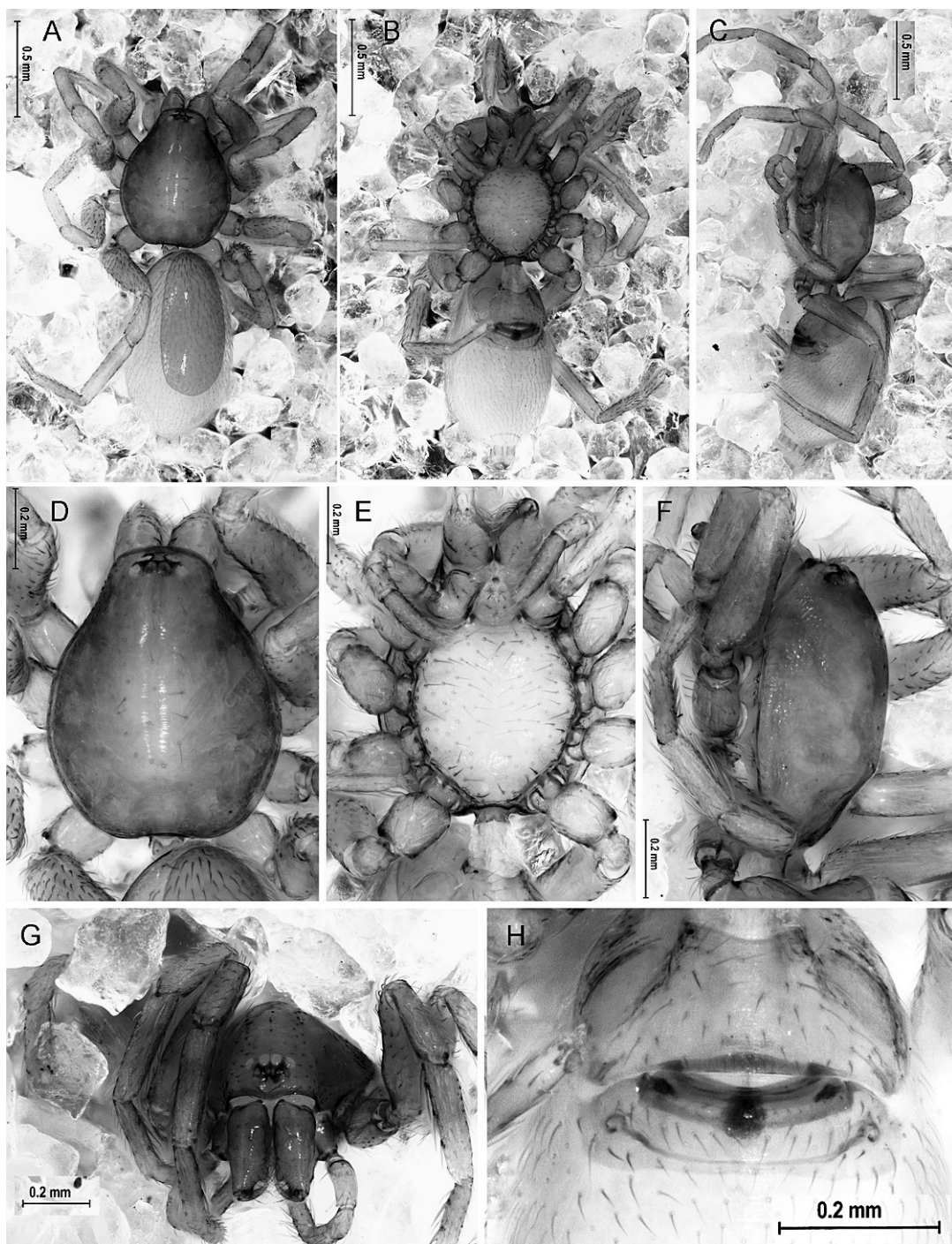


Fig. 66. *Himalayana martensi*, new species, female (PBI_OON 14923). A. Habitus, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Carapace, dorsal view. E. Same, ventral view. F. Same, lateral view. G. Same, anterior view. H. Epigastric area, ventral view.

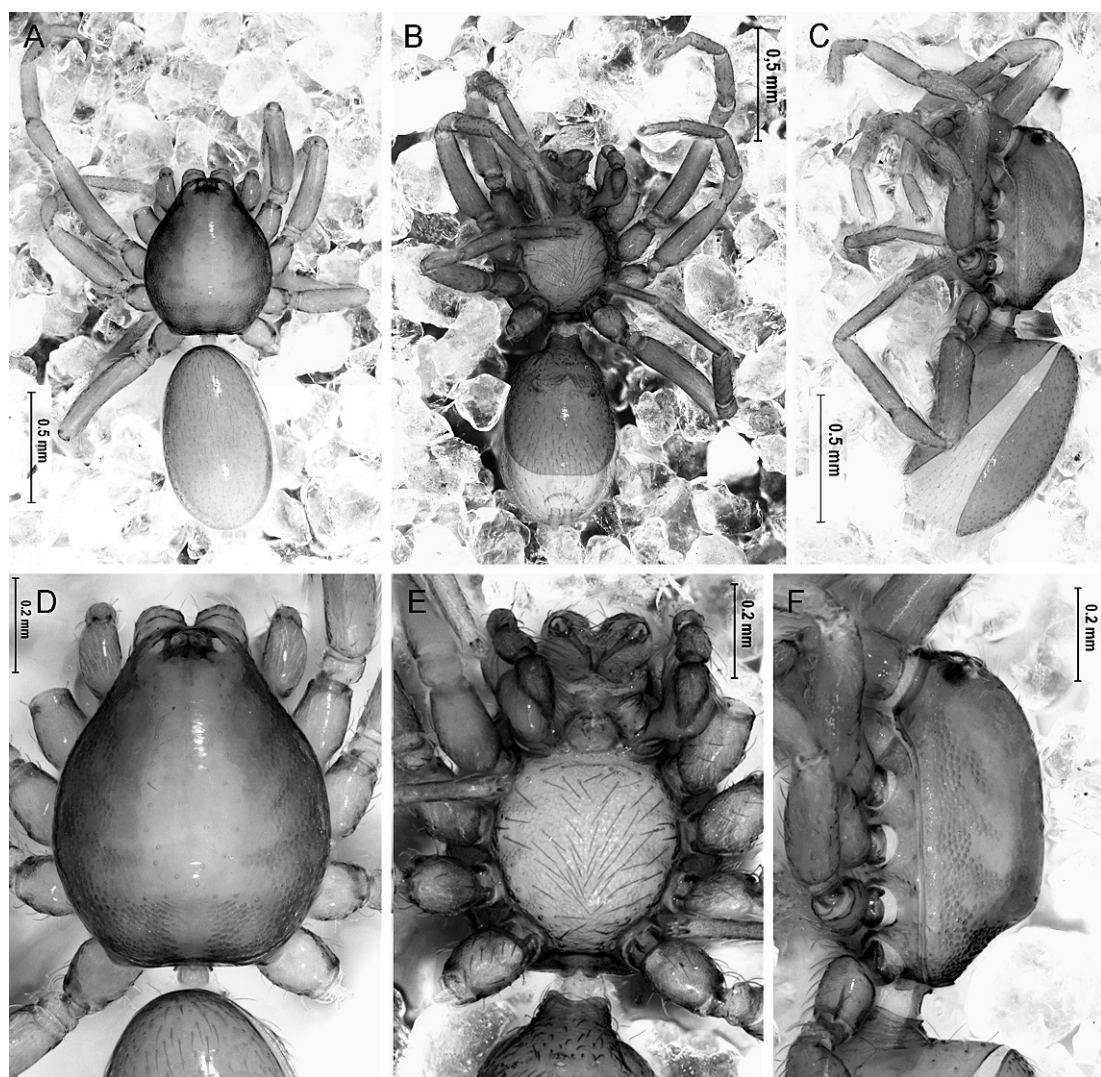


Fig. 67. *Himalayana martensi*, new species, male (PBI_OON 14923). A. Habitus, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Carapace, dorsal view. E. Same, ventral view. F. Same, lateral view.

Female (paratype, PBI_OON 15747). Total length 1.76. As in male except as noted. **Cephalothorax:** Eyes PLE–PME separated by less than PME radius. Palp without spines. **Abdomen:** Dorsal scutum less sclerotized, covering more than 3/4 of abdomen. Epigastric and postepigastric scuta not strongly sclerotized, not fused. **Legs:** Patella plus tibia I shorter than carapace. Leg spination as in male. **Genitalia:** Copulatory opening not visible; anterior sclerite with very short lateral

transverse projections with rounded endings (fig. 72E).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from the type locality.

Himalayana andreae Grismado, new species
Figures 73–75, 82A–B

TYPES: Male holotype from India: West Bengal: Darjeeling: between Lopchu and

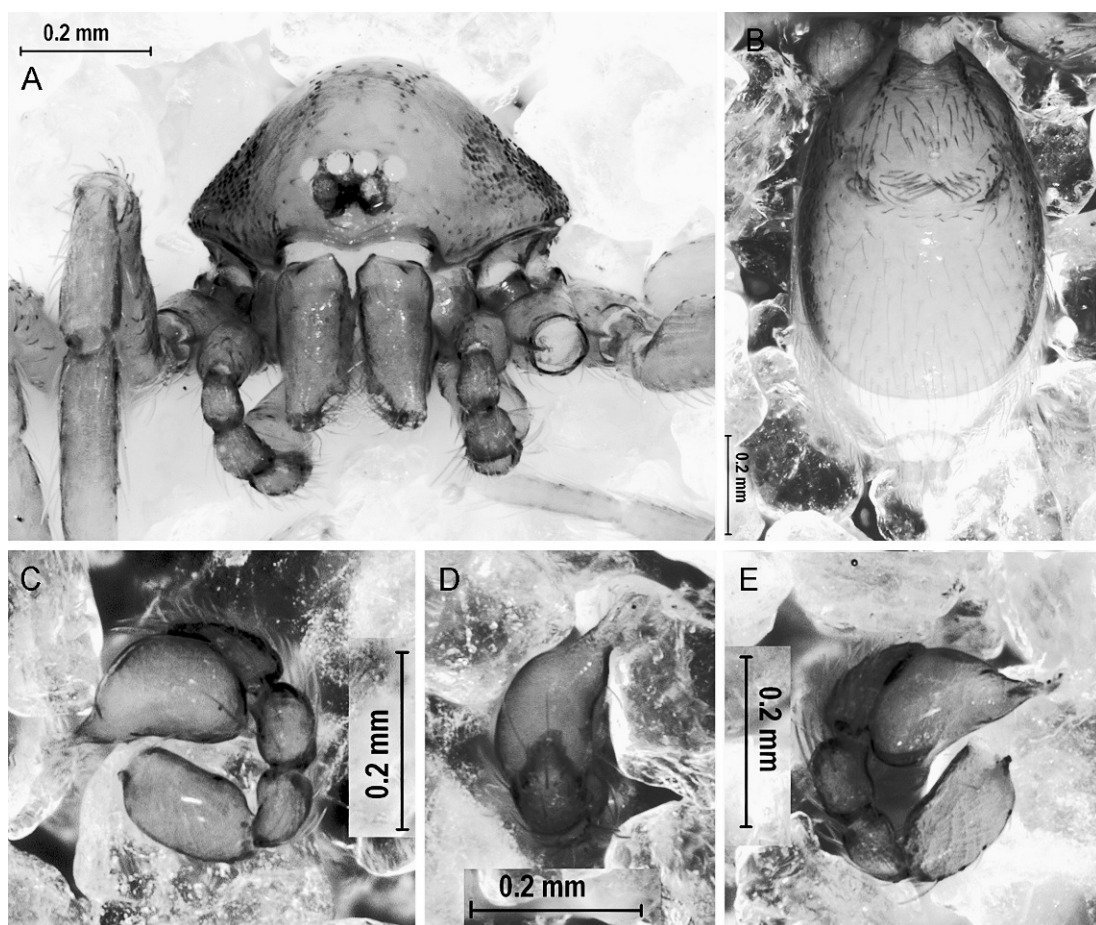


Fig. 68. *Himalayana martensi*, new species, male (PBI_OON 14923). A. Carapace, anterior view. B. Abdomen, ventral view. C. Left palp, retrolateral view. D. Same, dorsal view. E. Same, prolateral view.

Ghoom at 13 km from Ghoom, north slope, 2000 m, Oct. 12, 1978, C. Besuchet and I. Löbl (MHNG PBI_OON 15540); one male paratype with same data (MHNG PBI_OON 12902); one female paratype from Ghoom, Tigerhill, south side, leaf litter, 2300 m, Oct. 13, 1978, C. Besuchet and I. Löbl (MHNG PBI_OON 12820).

ETYMOLOGY: The specific name is a patronym in honor of Andrea Raya, wife of the first author.

DIAGNOSIS: Males of this species are recognizable by the conspicuously protruding epigastric scutum bearing two lateral brush-shaped bunches of long, straight, dark setae (fig. 75B) and by the long, flattened, anteriorly directed setaelike projections on the

prolateral side of the copulatory bulb (figs. 75C–E, 82B). Females resemble those of *H. castanopsis* by the short lateral branches of the T-shaped anterior sclerite, but their endings are acute rather than rounded, and the lateral apodemes are slightly longer (fig. 82A). The female genitalia are also similar to that of *H. siliwaleae*, but differs somatically by the more sclerotized scuta and by the wider sternum (fig. 73E).

DESCRIPTION: Male (holotype, PBI_OON 15540). Total length 1.42. **Cephalothorax:** Carapace pars cephalica strongly elevated in lateral view, anteriorly narrowed to between 0.5 and 0.75 times its maximum width, sides strongly reticulate; lateral margin smooth; nonmarginal pars cephalica in U-shaped row,

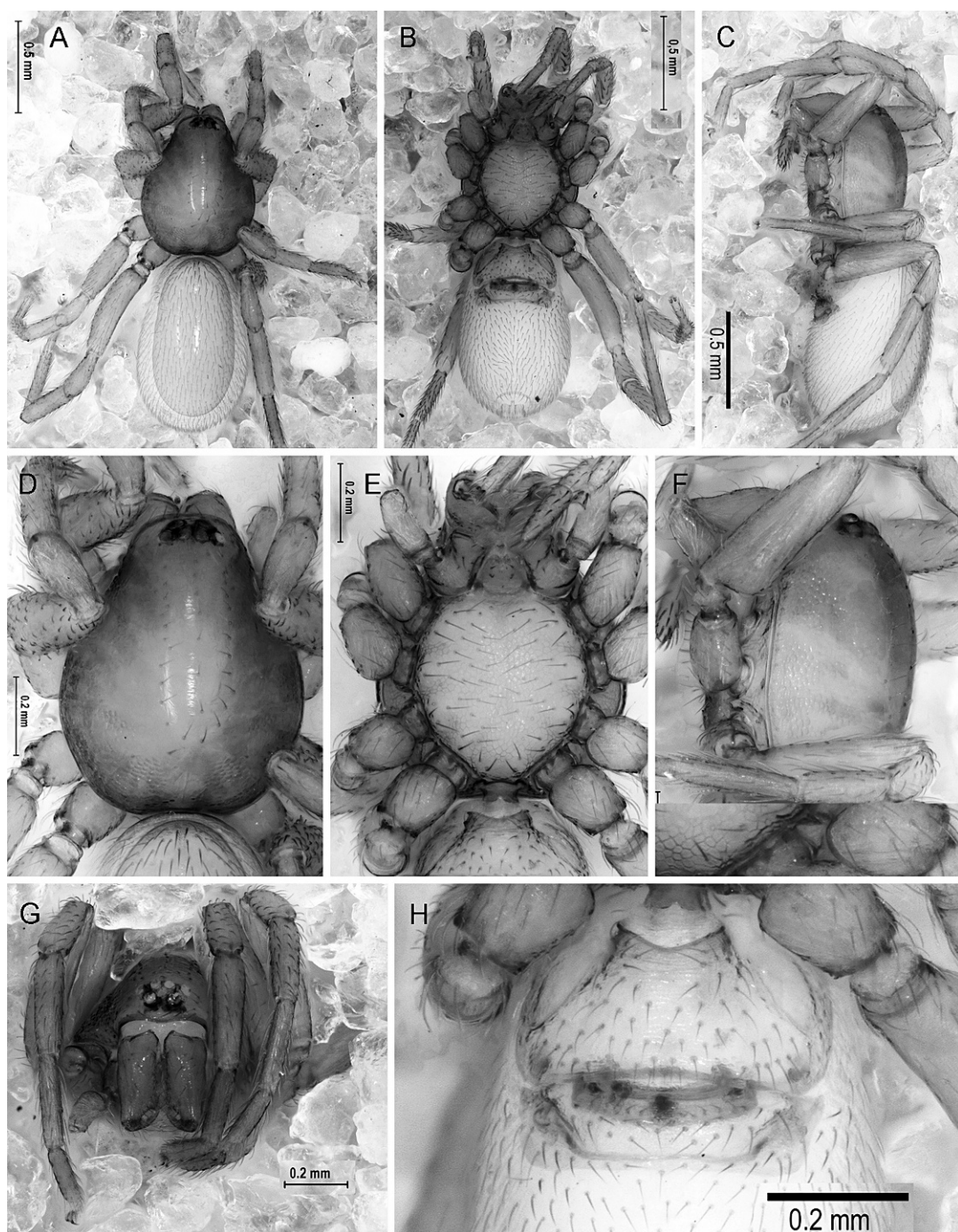


Fig. 69. *Himalayana castanopsis*, new species, female (PBI_OON 15747). A. Habitus, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Carapace, dorsal view. E. Same, ventral view. F. Same, lateral view. G. Same, anterior view. H. Epigastric area, ventral view.

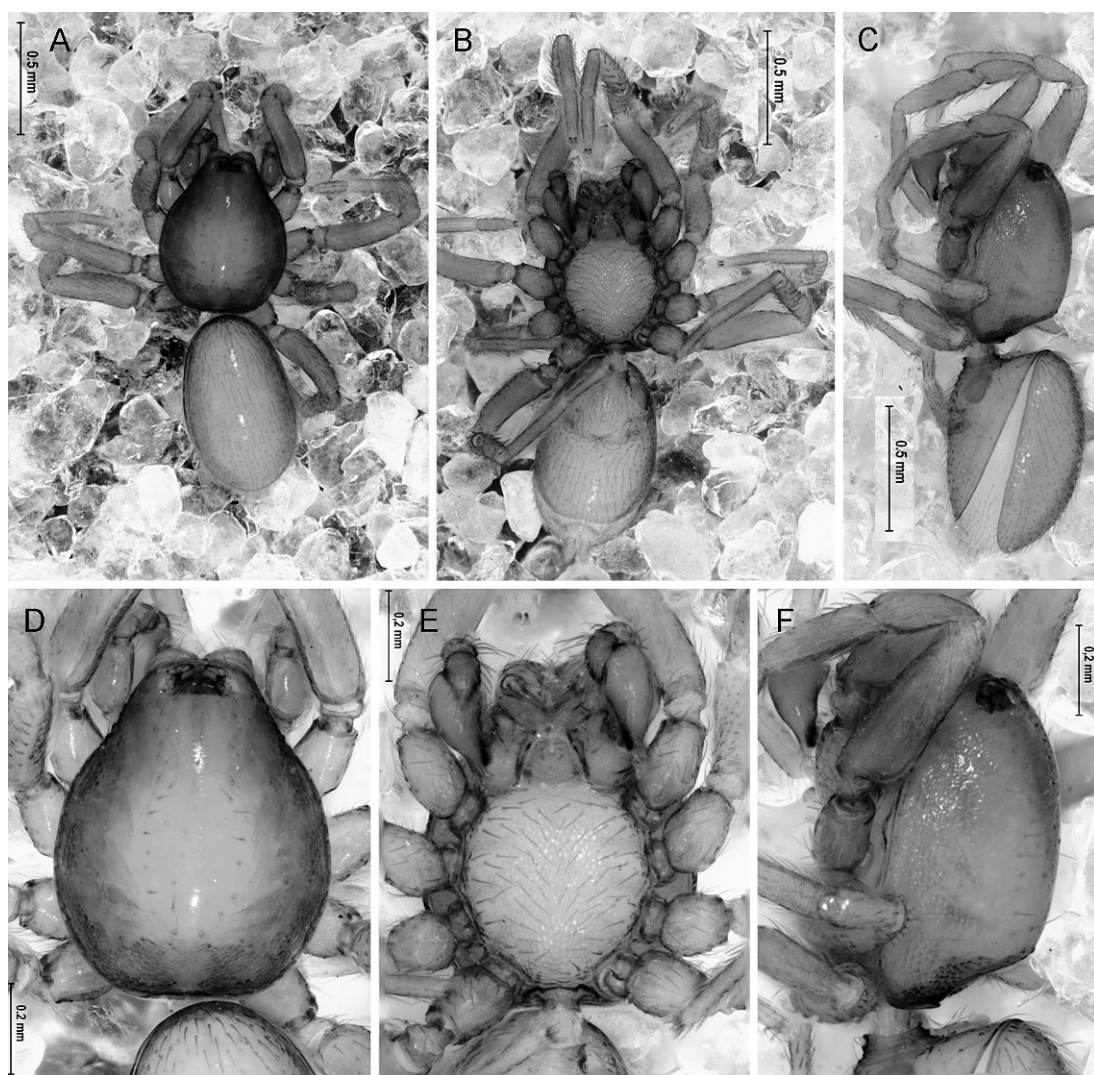


Fig. 70. *Himalayana castanopsis*, new species, male (PBI_OON 15978). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

lost; nonmarginal pars thoracica setae lost (only their bases remain); marginal setae absent. Eyes all subequal, PME oval, PLE oval; posterior eye row recurved from both above and front; ALE separated by more than their diameter, ALE–PLE touching, PME touching for less than half their length. Sternum as long as wide, lateral margins with narrow extensions between coxae, orange; setae densest laterally. Chelicerae, endites, and labium orange. **Abdomen:** Book lung

covers ovoid. Pedicel tube medium sized. Dorsal scutum orange. Epigastric scutum strongly protruding. Postepigastric scutum orange. Dorsum setae light. Epigastric area with a pair of ventrolateral brushlike bunches of stout setae between the respiratory openings (fig. 75B). Postepigastric area setae light, absent in the area between the sperm pore and the posterior spiracles. Spinneret scutum with fringe of stout setae. Colulus represented only by setae. **Legs:** Pale orange. Leg

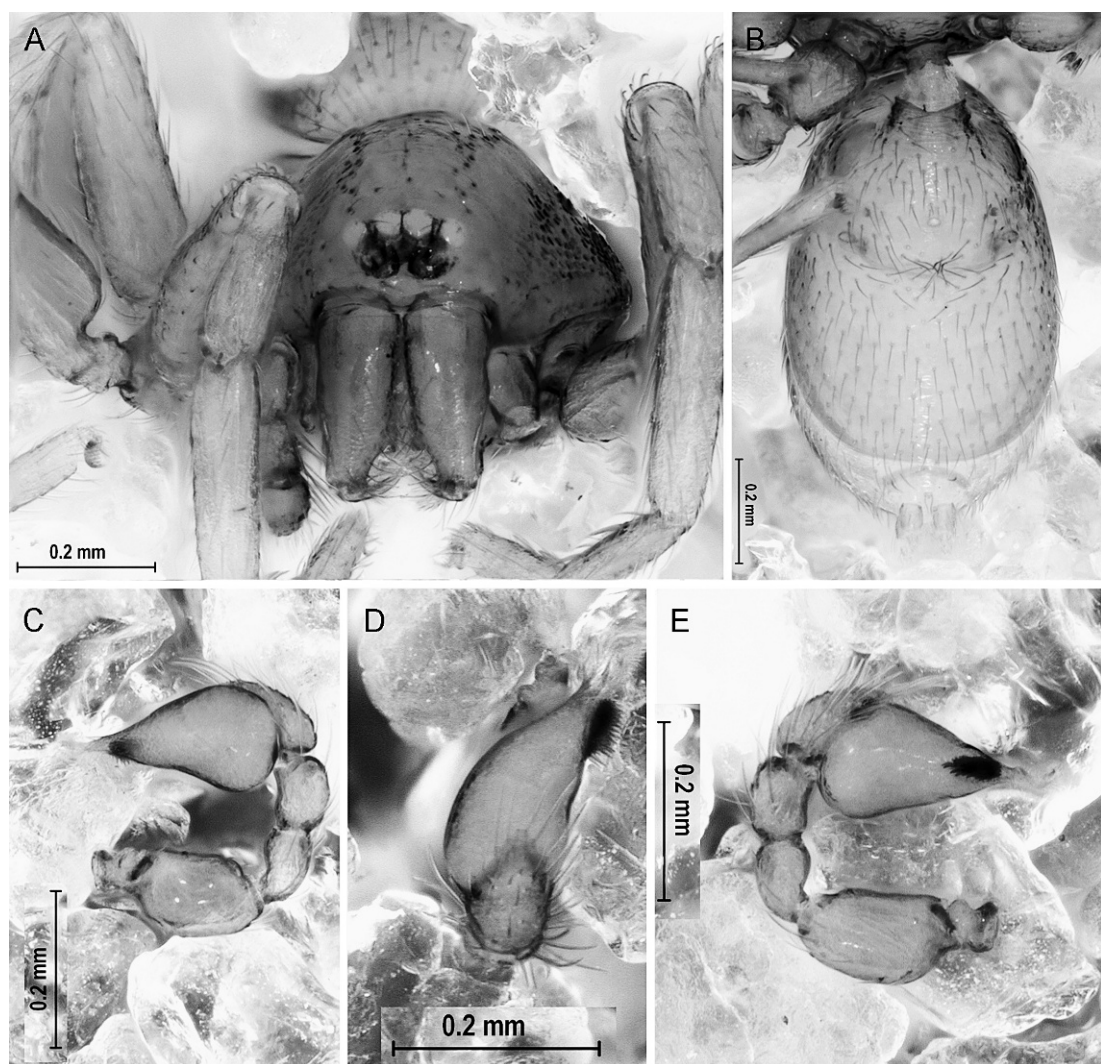


Fig. 71. *Himalayana castanopsis*, new species, male (PBI_OON 15978). A. Habitus, anterior view. B. Abdomen, ventral view. C. Left palp, retrolateral view. D. Same, dorsal view. E. Same, prolateral view.

spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibia v2-2-2-2-0, metatarsi v2-2-0. Tarsi I–IV superior claws tooth not examined in detail. Trichobothria not examined. **Genitalia:** Epigastric region with sperm pore large, circular. Palp: femur enlarged; cymbium ovoid in dorsal view; bulb pale orange, distal part with long, flattened, posteriorly directed setaelike projections on the prolateral side (figs. 75C–E, 82B).

Female (paratype, PBI_OON 12820). Total length 1.80. As in male except as noted.

Abdomen: Epigastric and postepigastric scuta lightly sclerotized, without special setae or protrusions. **Legs:** Leg spination as in male. **Genitalia:** Lateral branches of the T-shaped anterior sclerite short and acute, lateral apodemes relatively long (fig. 82A).

OTHER MATERIAL EXAMINED: INDIA: West Bengal: Darjeeling: between Algarah and Labha, 7 km from Algarah, south side, 1900 m, Oct. 11, 1978, C. Besuchet and I. Löbl 1♂ (MACN-Ar 28840, PBI_OON 12847).

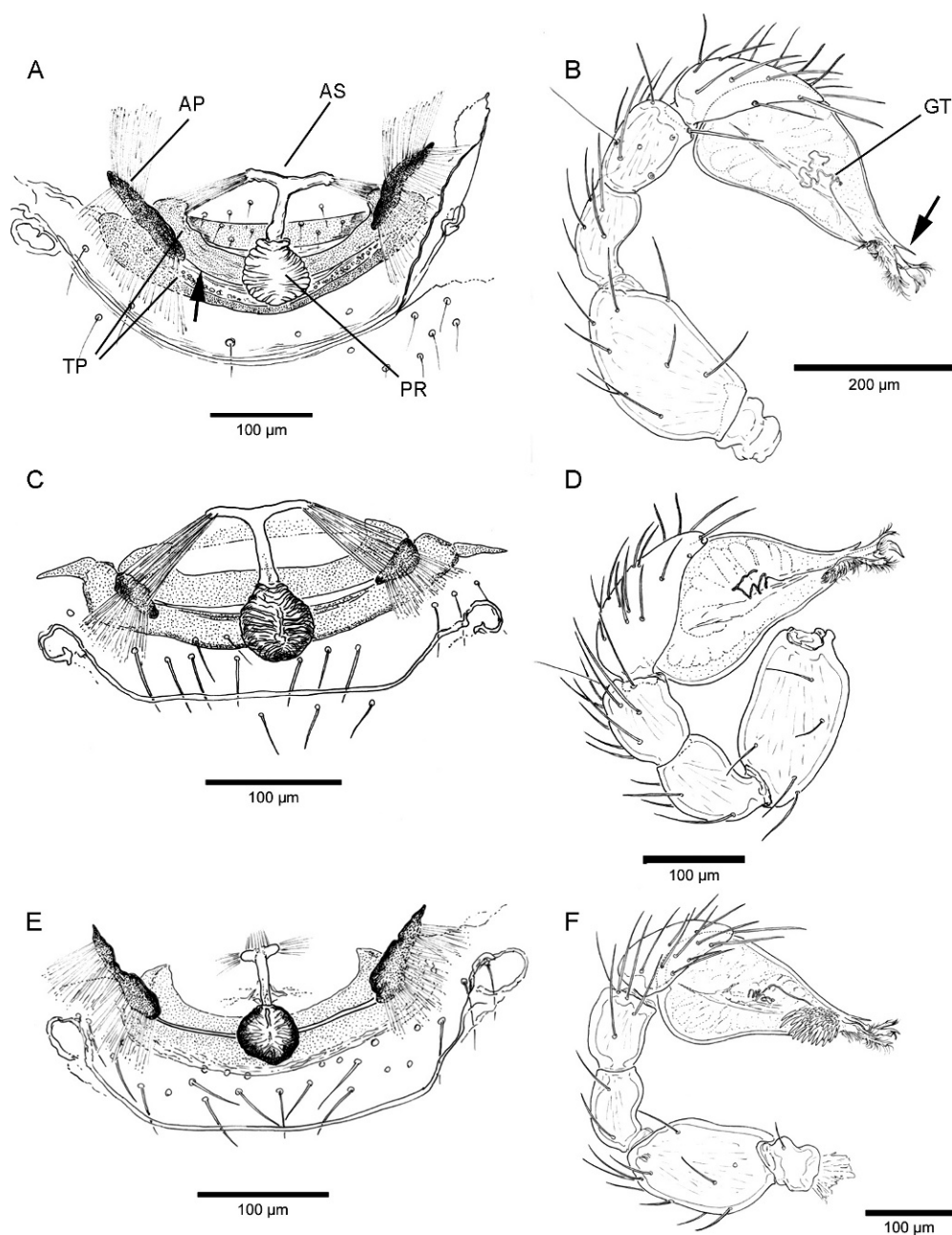


Fig. 72. *Himalayana* spp. genitalia. **A, B.** *Himalayana kathmandu*, new species. **A.** Female (PBI_OON 15258), internal genitalia, dorsal view. AP = apodeme; AS = anterior sclerite; PR = posterior receptacle; TP = transverse plates; arrow = glandular field. **B.** Male (PBI_OON 15268), left palp, retrolateral view. Arrow = acute dorsal projection; GT = glandular tube. **C, D.** *Himalayana martensi*, new species. **C.** Female (PBI_OON 14923), internal genitalia, dorsal view. **D.** Male (PBI_OON 14923), left palp, prolateral view. **E, F.** *Himalayana castanopsis*, new species. **E.** female (PBI_OON 15747), internal genitalia, dorsal view. **F.** Male (PBI_OON 15978), left palp, prolateral view.

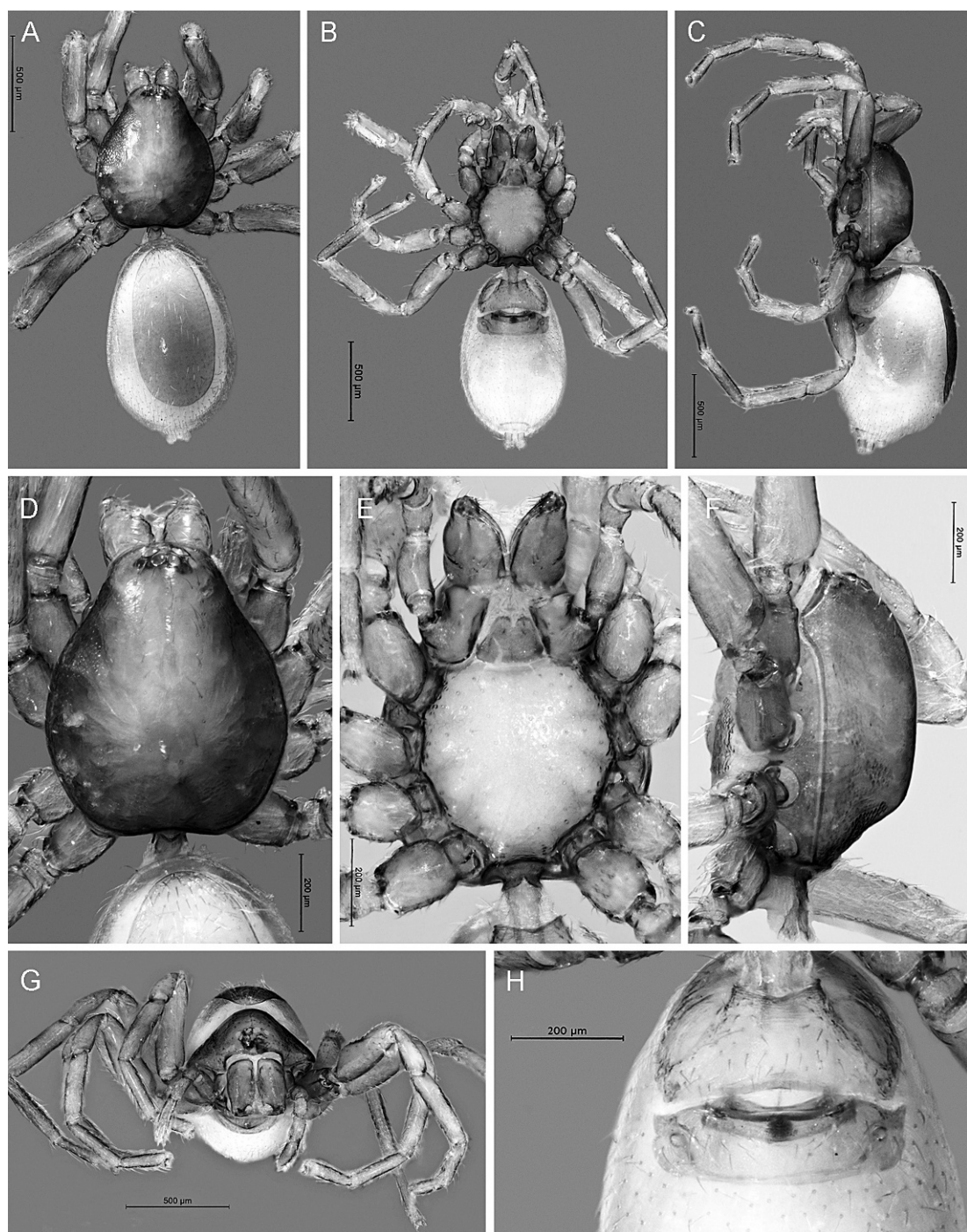


Fig. 73. *Himalayana andreae*, new species, female (PBI_OON 12820). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Habitus, anterior view. **H.** Epigastric area, ventral view.

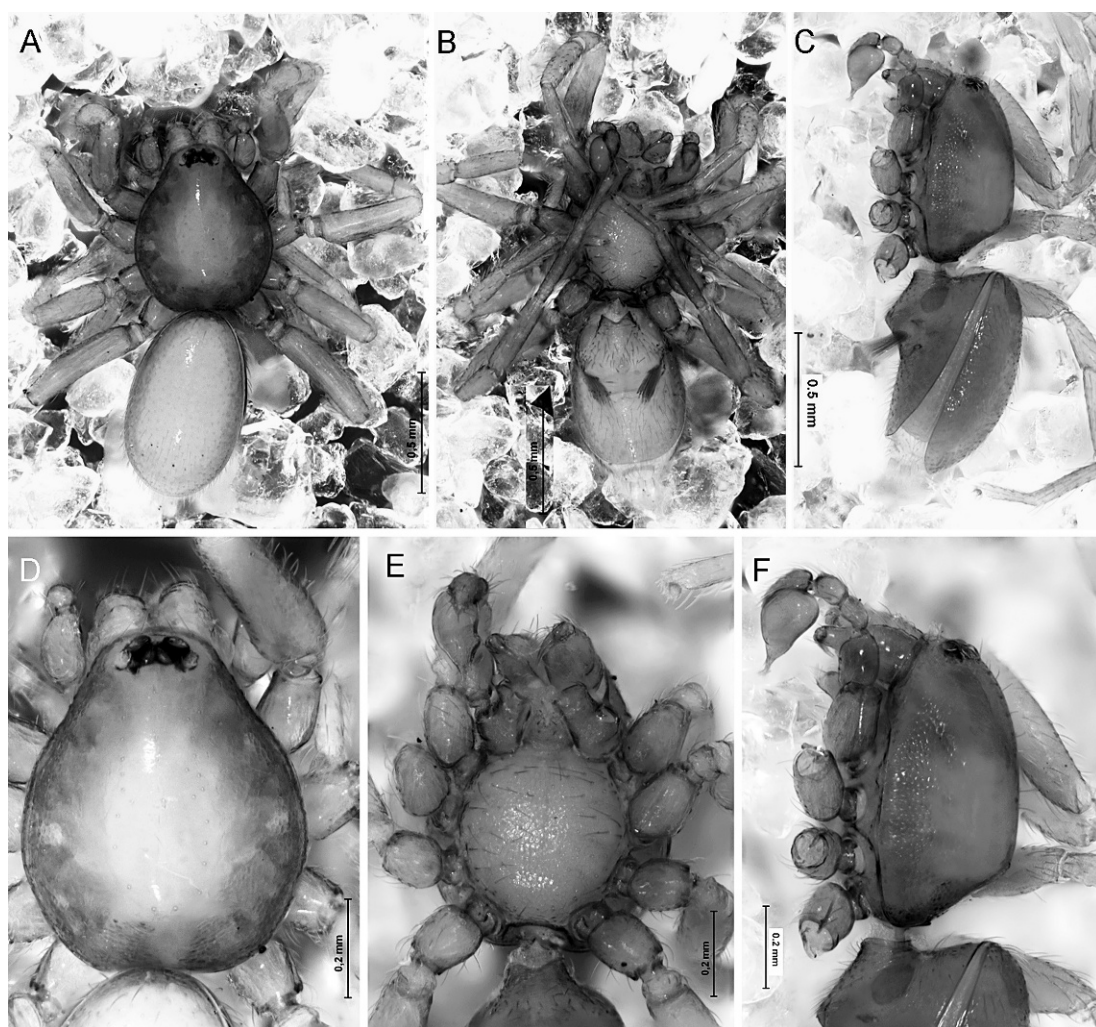


Fig. 74. *Himalayana andreae*, new species, male (A, B, D, PBI_OON 15540; C, E, F, PBI_OON 12902). A. Habitus, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Carapace, dorsal view. E. Same, ventral view. F. Same, lateral view.

DISTRIBUTION: Darjeeling, in West Bengal (northeastern India), between 1900 and 2300 m above the sea level.

Himalayana siliwalae Grismado, new species
Figures 76–78, 82C–D

TYPES: Male holotype and two male paratypes from India: West Bengal: Darjeeling: Mahanadi near Kurseong, south side, 1200 m, leaf litter, Oct. 6, 1978, C. Besuchet and I. Löbl (MHNG PBI_OON 15398); same data, one female and one male paratypes

(MHNG PBI_OON 12603 and 15812 respectively).

ETYMOLOGY: The specific name is a noun in apposition in honor of the Indian arachnologist Manju Siliwal, and in gratitude for her help in obtaining bibliographic material and other information about goblin spiders from India.

DIAGNOSIS: *H. siliwalae* is the most lightly sclerotized species of the genus. Males and females have their genitalia very similar to those of *H. kathmandu*, but they are very small sized (total length <1.6 mm), lightly

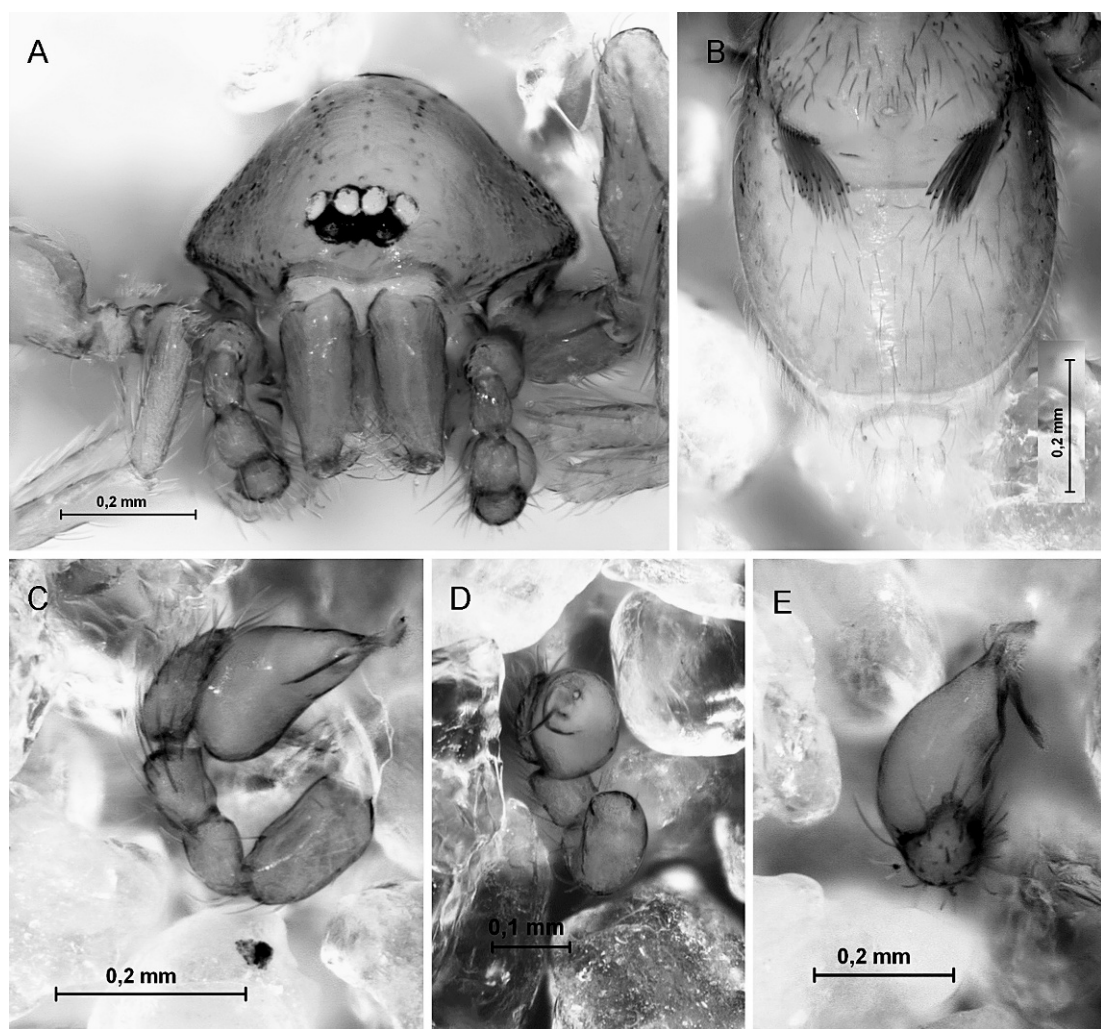


Fig. 75. *Himalayana andreae*, new species, male (A, B, PBI_OON 15540; C–E, PBI_OON 12847). A. Carapace, anterior view. B. Abdomen, ventral view. C. Left palp, prolateral view. D. Same, anteroventral view. E. Same, dorsal view.

sclerotized, and with relatively reduced eyes (figs. 76, 77).

DESCRIPTION: Male (paratype, PBI_OON 15398). Total length 1.52. **Cephalothorax:** Carapace pars cephalica slightly elevated in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, sides finely reticulate; lateral margin rebordered; non-marginal pars cephalica setae needlelike, in U-shaped row; nonmarginal pars thoracica and marginal setae needlelike. Eyes all subequal, relatively small, PME circular, PLE circular; posterior eye row straight from

above, procurved from front; ALE separated by their radius to diameter, ALE–PLE separated by less than ALE radius, PME touching. Sternum longer than wide, lateral margins unmodified, orange; setae evenly scattered. Mouthparts: chelicerae orange; fangs directed medially. Endites orange. **Abdomen:** Dorsum soft portions not visible from above. Book lung covers elliptical. Pedicel tube short. Dorsal scutum orange. Epigastric scutum not protruding, orange. Postepigastric scutum orange. Spinneret scutum orange. Colulus present. **Legs:** Orange.

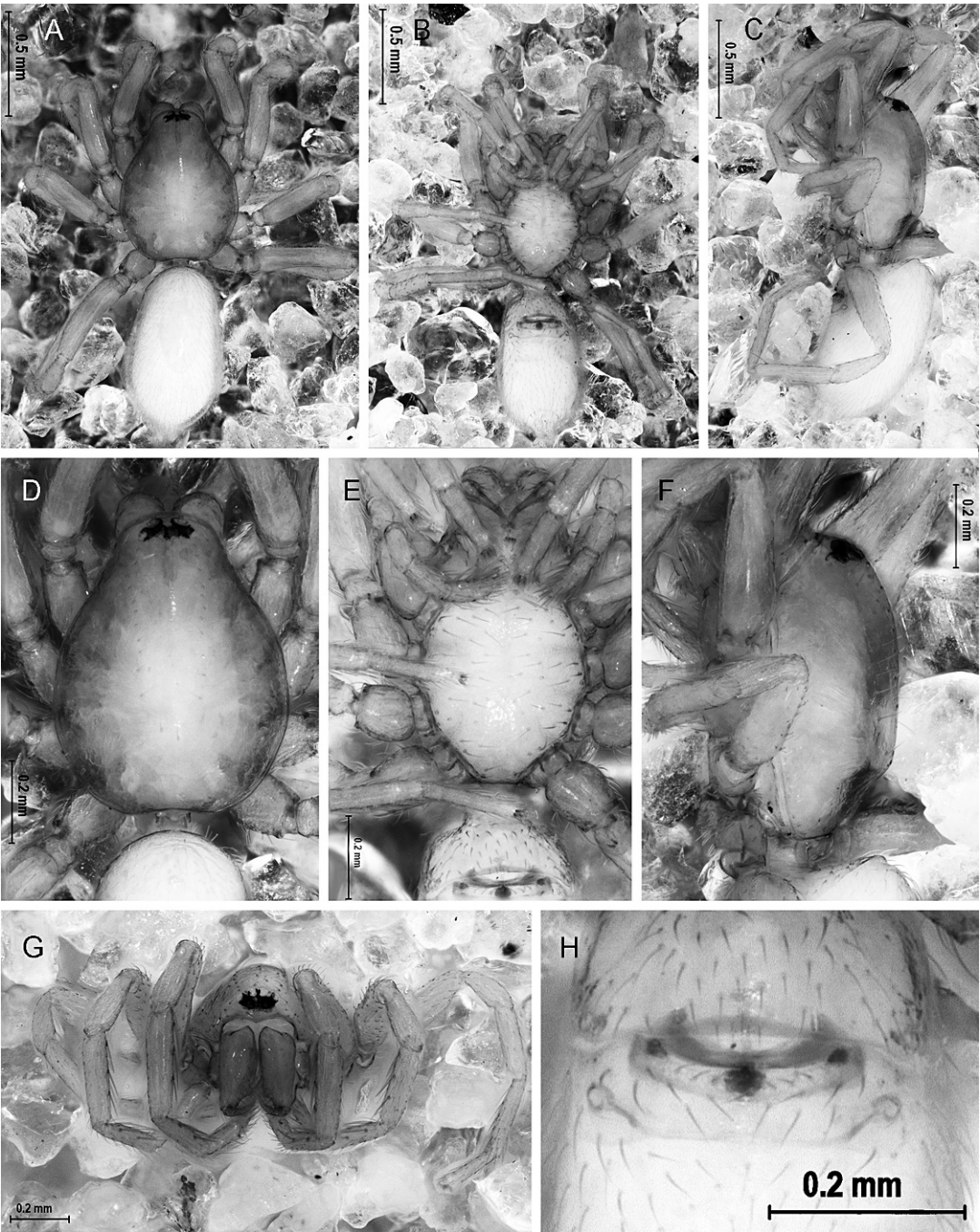


Fig. 76. *Himalayana siliwalae*, new species, female (PBI_OON 12603). A. Habitus, dorsal view. B. Same, ventral view. C. Same, lateral view. D. Carapace, dorsal view. E. Same, ventral view. F. Same, lateral view. G. Same, anterior view. H. Epigastric area, ventral view.

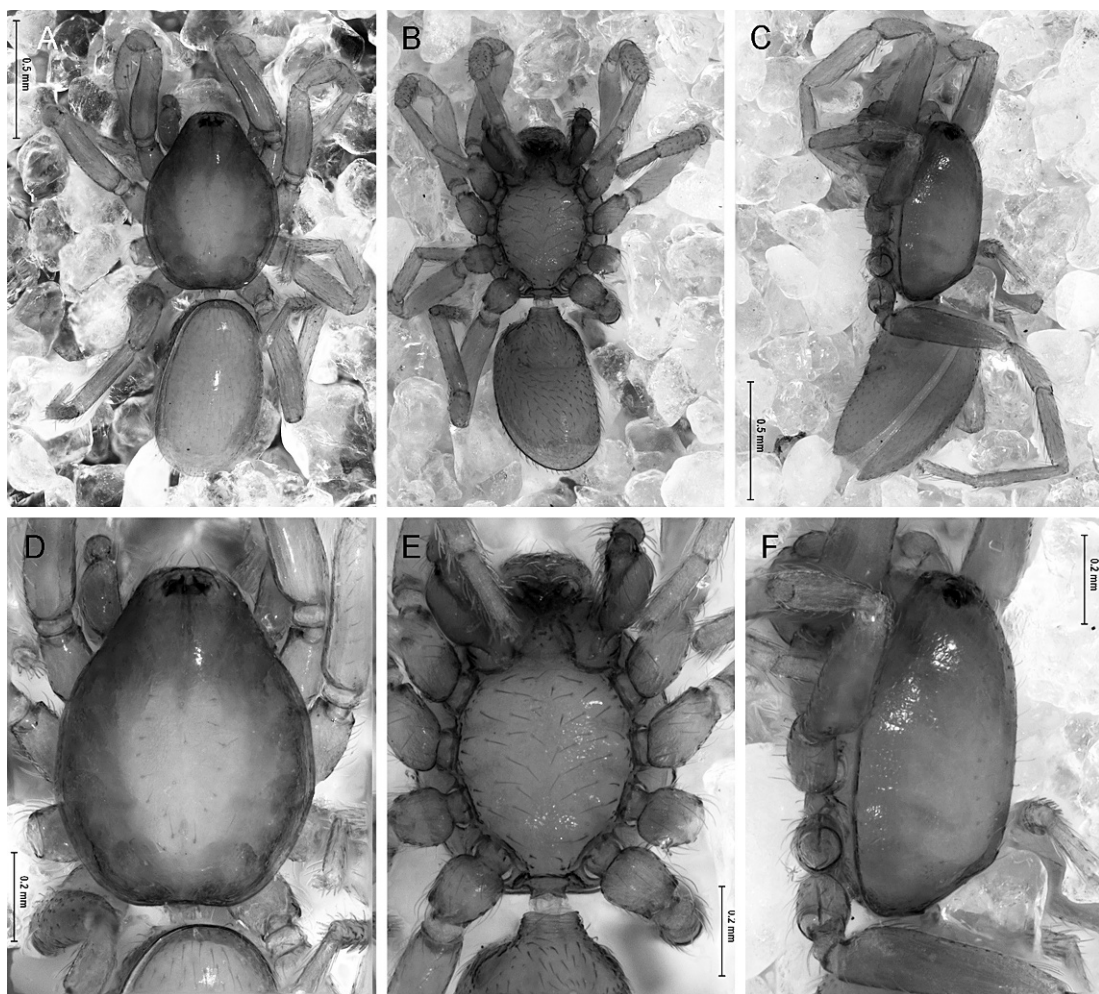


Fig. 77. *Himalayana siliwalae*, new species, male (PBI_OON 15398). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi v2-2-0. Tarsi I–IV superior claws tooth not examined in detail. Trichobothria not examined. **Genitalia:** Epigastric region with sperm pore small, oval, unmodified. Palp (figs. 78C–E, 82D): femur normal size; tibia nearly as long as patella; cymbium narrow in dorsal view; bulb pale orange, distal part with acute, short, dorso-prolateral projection reaching to the half of the embolus, with one retrolateral and one prolateral accompanying laminae with filiform projections (more numerous in the latter).

Female (paratype, PBI_OON 12603). Total length 1.50. As in male except as noted. **Cephalothorax:** Carapace pale orange, anteriorly narrowed to between 0.5 and 0.75 times its maximum width, sides smooth. Eyes PLE–PME separated by PME radius to PME diameter. Palp without spines. **Abdomen:** Dorsal scutum weakly sclerotized, covering 1/2 to 3/4 of abdomen, pale yellowish (fig. 76A). Epigastric and postepigastric scuta weakly sclerotized, not fused to each other. **Legs:** Pale orange; patella plus tibia I shorter than carapace. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II:

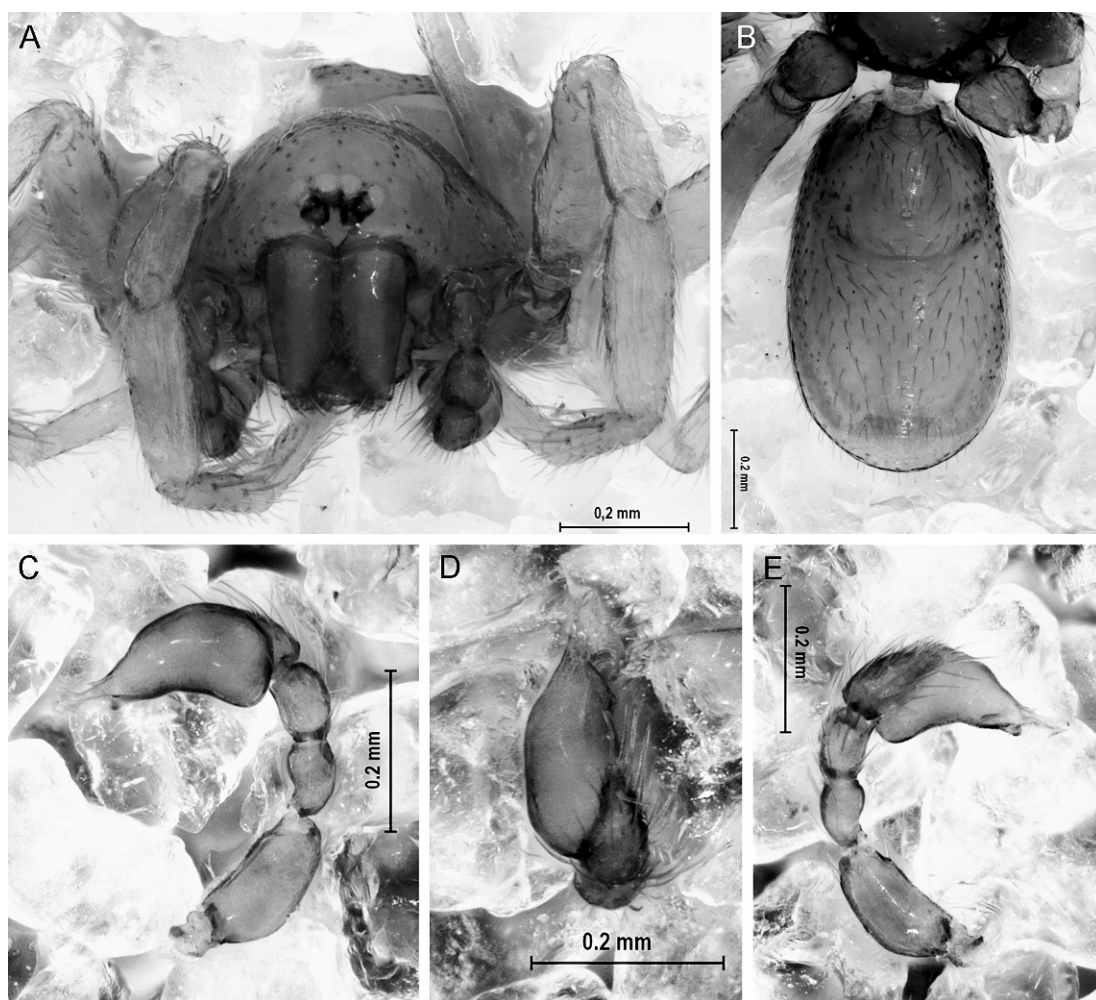


Fig. 78. *Himalayana siliwalae*, new species, male (PBI_OON 15398). **A.** Habitus, anterior view. **B.** Abdomen, ventral view. **C.** Left palp, retrolateral view. **D.** Same, dorsal view. **E.** Same, prolateral view.

tibiae v2-2-2-0-0, metatarsi v2-2-0. **Genitalia:** Posterior receptaculum small, rounded. Anterior sclerite with acute, short lateral transverse projections (fig. 82C).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from the type locality, at around 1200 m (the lowest altitude record for the genus).

Himalayana parbat Grismado, new species
Figures 79–81, 82E–F

TYPES: Male holotype from Nepal: Dhaulagiri: Parbat: zw. Deorali u. Chitre, 2700 m, May 1–2, 1995, J. Martens and W. Schawaller (SGN PBI_OON 15983), two

female paratypes with same data (SGN PBI_OON 15729); one additional male paratype from Parbat Dist., Chitre, gebüschreiches Bachbett, 2400 m, May 4, 1980, Martens and Ausobsky (SGN PBI_OON 15717).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males of *H. parbat* are almost indistinguishable from those of *H. siliwalae*, but are larger sized (total length >1.7 mm) and have a thickened palpal femur (fig. 81C, E); females are distinguished from all congeners by the anterior T-shaped sclerite, which has a narrow stalk and thin, longer, acute transverse extensions (fig. 82E).

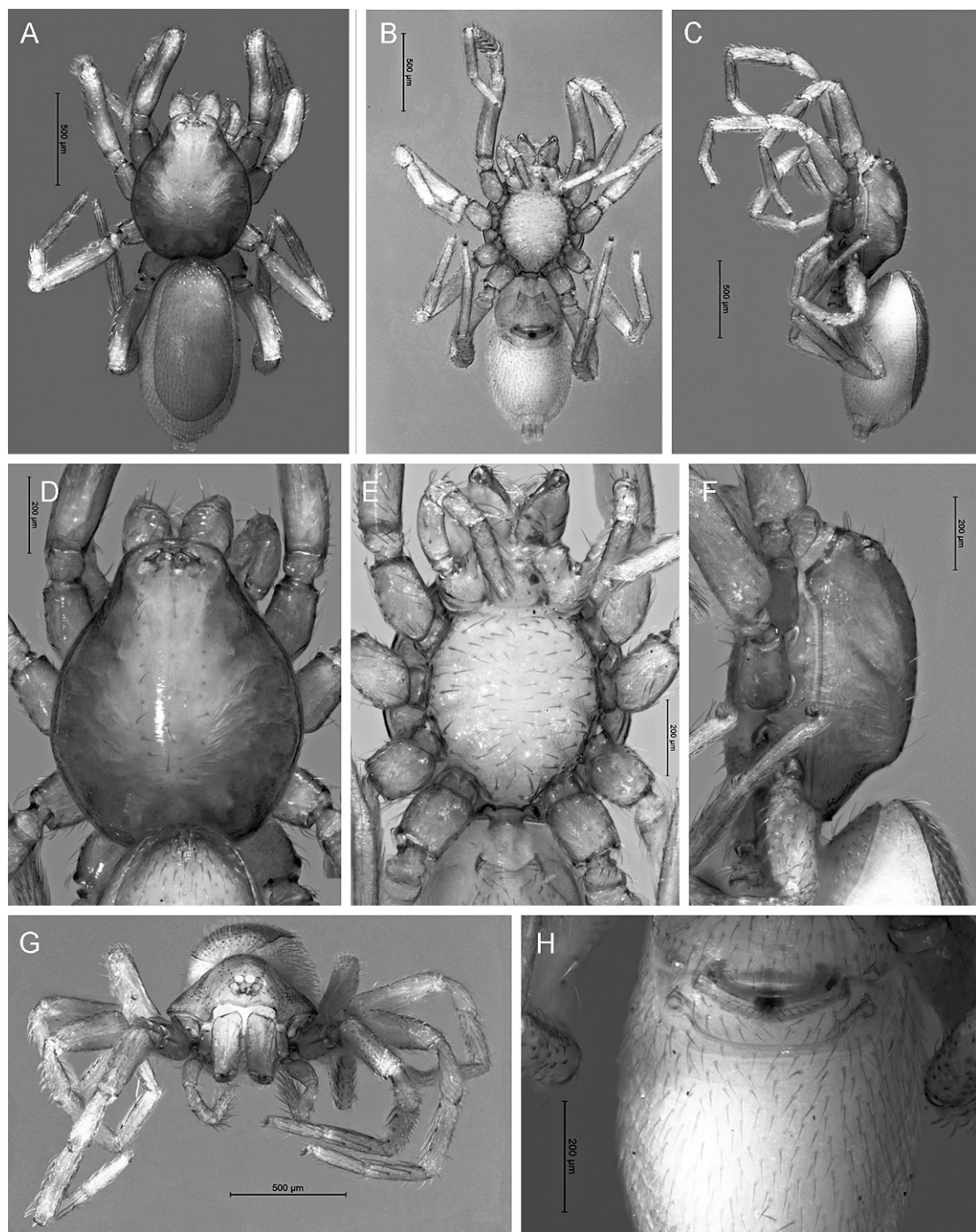


Fig. 79. *Himalayana parbat*, new species, female (PBI_OON 15729). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Same, anterior view. **H.** Epigastric area, ventral view.

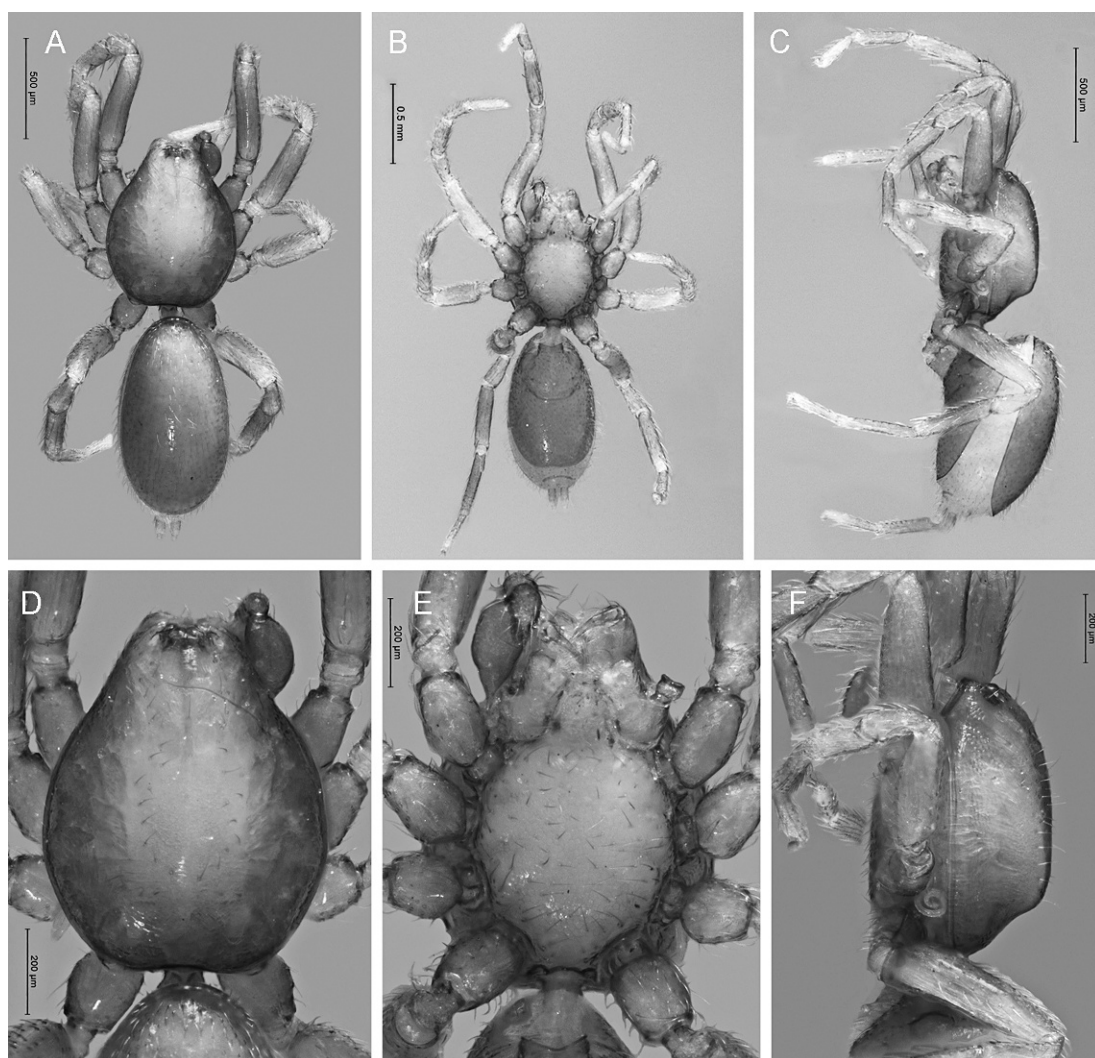


Fig. 80. *Himalayana parbat*, new species, male (PBI_OON 15983). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view.

DESCRIPTION: Male (holotype, PBI_OON 15983). Total length 1.86. **Cephalothorax:** Carapace pars cephalica strongly elevated in lateral view, anteriorly narrowed to 0.49 times its maximum width or less, sides granulate; lateral margin rebordered; non-marginal pars cephalica setae dark, needle-like, in U-shaped row; nonmarginal pars thoracica setae dark, needlelike; marginal setae absent. Eyes all subequal, PME circular, PLE circular; posterior eye row recurved from above, straight from front; ALE separated by more than their diameter,

ALE–PLE separated by less than ALE radius, PME touching for less than half their length. Sternum longer than wide, precoxal triangles present, lateral margins unmodified, orange; setae evenly scattered. Mouthparts: chelicerae, endites, and labium orange; fangs directed medially. **Abdomen:** Book lung covers elliptical. Pedicel tube medium, unmodified. Dorsal scutum orange. Epigastric scutum not protruding. Postepigastric scutum orange. Setae of dorsum and epigastric and postepigastric light. Spinneret scutum without fringe of setae. Colulus represented

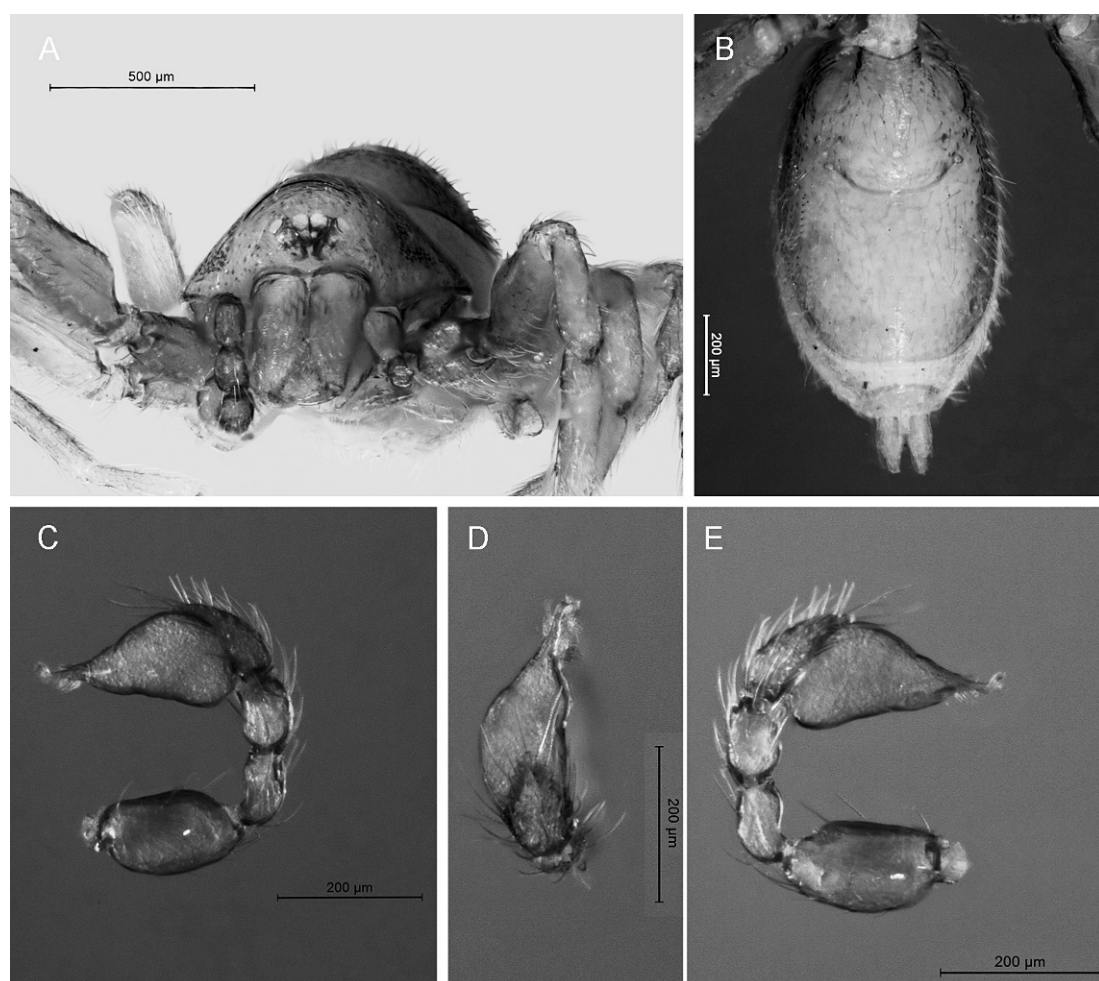


Fig. 81. *Himalayana parbat*, new species, male (PBI_OON 15717). **A.** Habitus, anterior view. **B.** Abdomen, ventral view. **C.** Left palp, retrolateral view. **D.** Same, dorsal view. **E.** Same, prolateral view.

only by setae. **Legs:** Pale orange. Leg spination (all spines longer than segment width): leg I: tibiae v2-2-2-2-0, metatarsi v2-2-0; leg II: tibiae v2-2-2-2-0, metatarsi: v2-2-0. Tarsi I–IV superior claws tooth not examined in detail. Trichobothria not examined. **Genitalia:** Epigastric region with sperm pore small, circular. Palp: femur enlarged; cymbium narrow in dorsal view; bulb pale orange; embolus flanked by one retrolateral and one prolateral accompanying laminae with filiform projections (more numerous in the latter, figs. 81C–E, 82F).

Female (paratype, PBI_OON 15729). Total length 1.76. As in male except as noted.

Cephalothorax: Carapace pale orange. Eyes PLE–PME separated by less than PME radius. Palp without spines. **Abdomen:** Dorsum soft portions white. Dorsal scutum lightly sclerotized, covering more than 3/4 of abdomen. Epigastric scutum lightly sclerotized. Postepigastric scutum lightly sclerotized, not fused to epigastric scutum. **Legs:** Patella plus tibia I shorter than carapace. Leg spination as in male. **Genitalia:** Dorsal view: similar to those of *H. siliwalae*, but the anterior T-shaped sclerite has a narrower stalk and the thin transverse extensions are longer (fig. 82E).

OTHER MATERIAL EXAMINED: None.

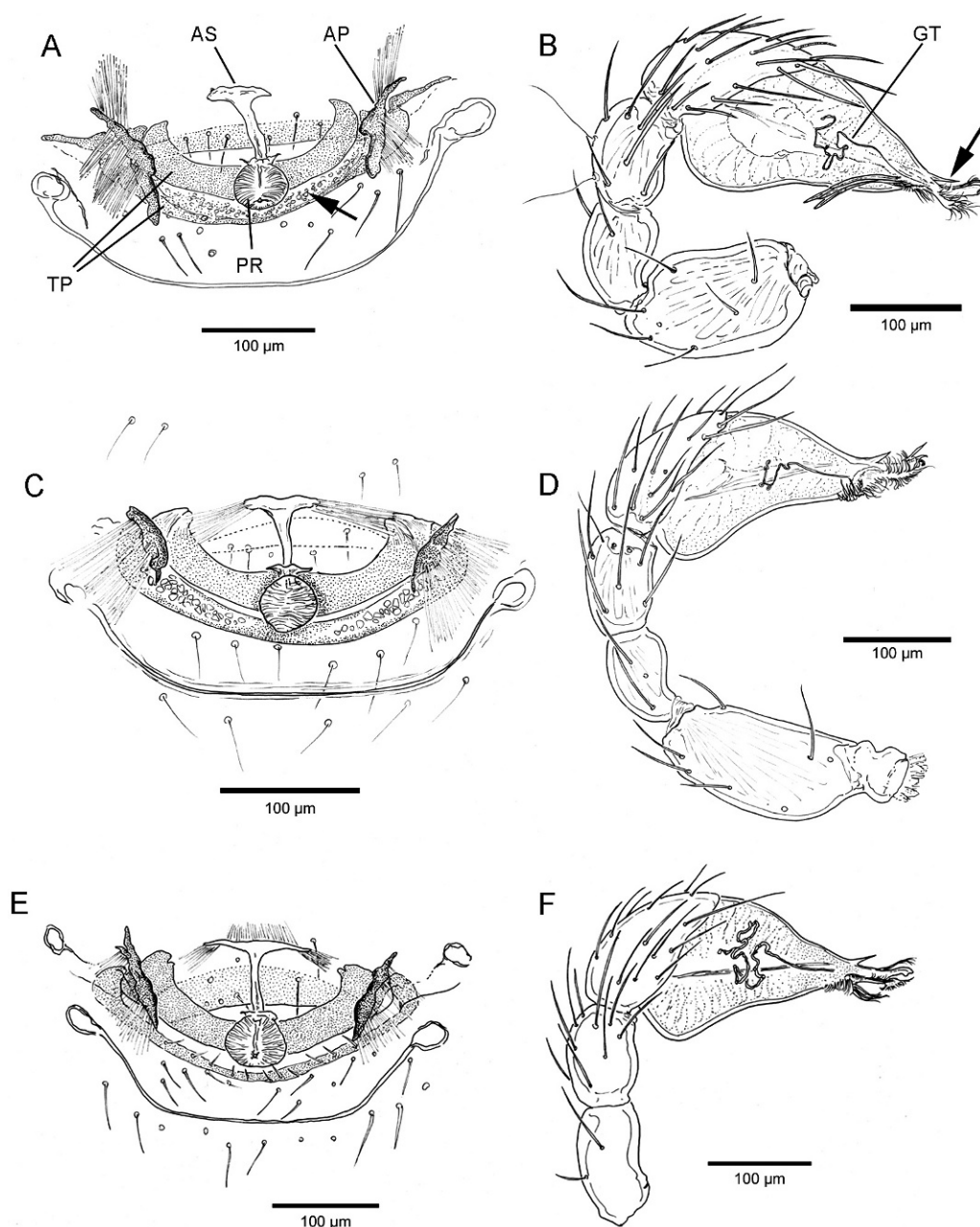


Fig. 82. *Himalayana* spp. genitalia. **A, B.** *Himalayana andreae*, new species. **A.** Female (PBI_OON 12820), internal genitalia, dorsal view. AP = apodeme; AS = anterior sclerite; PR = posterior receptacle; TP = transverse plates; arrow = gland field. **B.** Male (PBI_OON 12847), left palp, retrolateral view. Arrow = acute dorsal projection; GT = glandular tube. **C, D.** *Himalayana siliwalae*, new species. **C.** Female (PBI_OON 15812), internal genitalia, dorsal view. **D.** Male (PBI_OON 15398), left palp, prolateral view. **E, F.** *Himalayana parbat*, new species. **E.** Female (PBI_OON 15729), internal genitalia, dorsal view. **F.** Male (PBI_OON 15983), left palp, prolateral view.

DISTRIBUTION: Parbat District (Dhawala-giri, Nepal).

Camptoscaphiella Caporiacco

Camptoscaphiella Caporiacco, 1934: 118, pl. 1, fig. 1 (type species *Camptoscaphiella fulva* Caporiacco). Brignoli, 1976: 252.

DIAGNOSIS AND DESCRIPTION: See Baehr and Ubick, 2010.

Camptoscaphiella glenniei (Fage, 1946),
new combination
Figure 83

Triaeris glenniei Fage 1946: 384 (female holotype from India: Uttarakhand: Dehra Dun: Chakrata Taksil: Moila cave, 2691 m, N 30.77694°, E 77.78722°, 12–19.I.1946, Brig. E.A. Glennie, deposited in BMNH, PBI_OON 43075; examined).

NOTES: The heart-shaped sternum, the general morphology of the carapace, the size of the abdominal scuta, the leg spine pattern, and, especially, the genitalic conformation show no significant differences from all the other known species of *Camptoscaphiella* (see Baehr and Ubick, 2010). The slightly longer legs and the reduced eyes of this species are here considered as adaptations to the cavernicolous habitat rather than as an indication for a different generic placement.

Given that the holotype is the only known specimen, we decided not to dissect the genitalia for fine study of the internal details (as, for example, the disposition of apodemes). We opted only to clarify the entire abdomen to assign its generic placement temporarily and to obtain a gross differentiation from the other known species (fig. 83H–J).

DIAGNOSIS: *Camptoscaphiella glenniei* differs from all congeners by its reduced eyes (fig. 83D, G). *Camptoscaphiella sinensis* Deeleman-Reinhold, 1995, is a completely eyeless species, while all the other *Camptoscaphiella* have normally developed eyes (Baehr and Ubick, 2010).

REDESCRIPTION: Female (holotype): Total length 2.65. **Cephalothorax:** Carapace pale orange, without any pattern, broadly oval in dorsal view, pars cephalica strongly elevated in lateral view, anteriorly narrowed to 0.49

times its maximum width or less, with rounded posterolateral corners, posterolateral edge without pits, posterior margin not bulging below posterior rim, posterolateral surface without spikes, surface of elevated portion of pars cephalica smooth, sides finely reticulate, thorax without depressions, fovea absent, without radiating rows of pits; lateral margin undulate, rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; nonmarginal pars cephalica setae light, needlelike, scattered; nonmarginal pars thoracica setae absent; marginal setae absent. Clypeus margin unmodified, straight in front view (fig. 83G), sloping forward in lateral view (fig. 83F), high, ALE separated from edge of carapace by their radius or more, median projection absent; setae light, needlelike. Chilum absent. Eyes six, reduced (but apparently still functional, fig. 83D), ALE largest, ALE oval, PME circular, PLE circular; posterior eye row straight from above, procurved from front; ALE separated by their radius to diameter, ALE–PLE separated by less than ALE radius, PME touching for less than half their length, PLE–PME separated by PME radius to PME diameter. Sternum as long as wide, pale orange, uniform, not fused to carapace, median concavity absent, without radial furrows between coxae I–II, II–III, III–IV, surface smooth, without pits, microsculpture absent, sickle-shaped structures absent, anterior margin unmodified, posterior margin not extending posteriorly of coxae IV, lateral margin without infracoxal grooves, distance between coxae approximately equal, extensions of precoxal triangles present, lateral margins unmodified, without posterior hump; setae sparse, light, needlelike, evenly scattered, originating from surface. Mouthparts: chelicerae, endites, and labium pale orange. Chelicerae straight, anterior face unmodified; directed medially, shape normal, without prominent basal process, fang tip unmodified; setae light, needlelike, evenly scattered; paturon distal region unmodified, posterior surface unmodified, promargin unmodified, inner margin unmodified. Labium triangular, not fused to sternum, anterior margin indented at middle. Endites distally not excavated, serrula present in single row, anteromedian tip unmodified,

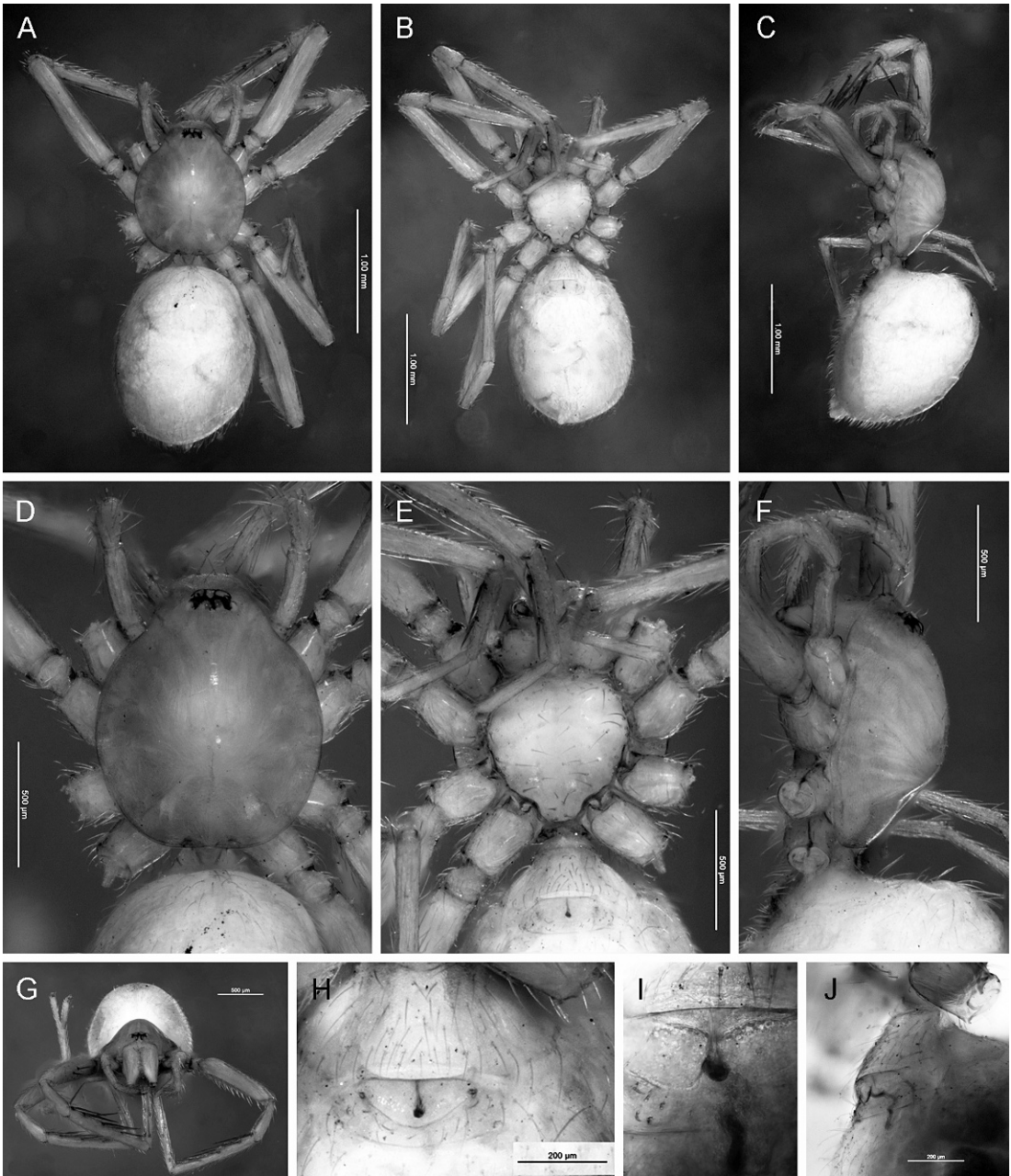


Fig. 83. *Camptoscapbiella glenniei* (Fage), new combination, female holotype (PBI_OON 43075). **A.** Habitus, dorsal view. **B.** Same, ventral view. **C.** Same, lateral view. **D.** Carapace, dorsal view. **E.** Same, ventral view. **F.** Same, lateral view. **G.** Habitus, anterior view. **H.** Epigastric area, ventral view. **I.** Same, cleared, ventral view. **J.** Same, lateral view.

posteromedian part unmodified. Palp spines and claws absent; tarsus unmodified. **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly, interscutal membrane rows of small sclerotized platelets absent; dorsum soft portions pale white, without color pattern. Book lung covers large, ovoid, without setae, anterolateral edge unmodified. Posterior spiracles connected by groove. Pedicel tube short, ribbed, scutopedicel region unmodified, scutum not extending far dorsal of pedicel, plumose hairs absent, matted setae on anterior ventral abdomen in pedicel area absent, cuticular outgrowths near pedicel absent. Dorsal scutum weakly sclerotized, pale orange, without color pattern, covering less than 1/2 of abdomen, between 1/4 and 1/2 abdomen width, not fused to epigastric scutum (fig. 83G), middle surface and sides smooth, anterior half without projecting denticles. Epigastric scutum weakly sclerotized, surrounding pedicel, not protruding, small lateral sclerites absent. Postepigastric scutum weakly sclerotized, pale orange, widely hexagonal, only around epigastric furrow, not fused to epigastric scutum, anterior margin with triangular lateral joints fitting under epigastric scutum. Spinneret scutum absent. Supraanal scutum absent. Dorsum setae light, needlelike. Epigastric area setae uniform, light, needlelike. Postepigastric area setae, light, needlelike. Dense patch of setae anterior to spinnerets absent. Colulus represented only by setae. **Legs:** Pale orange, without color pattern; femur IV not thickened, same size as femora I–III, patella plus tibia I longer than carapace, tibia I unmodified. Leg spination (all spines longer than segment width): leg I: femur: pv0-0-1-1-0-0; tibia: v2-2-2-2-0; metatarsus: v2-2-0, leg II: tibia: v2-2-2-2-0; metatarsus: v2-2-0, leg III: tibia: v1ap, leg IV: tibia: v1ap. Tarsi I–IV superior claws tooth not examined in detail. Tarsi I to IV without inferior claw. Trichobothria not examined. **Genitalia:** External copulatory opening slitlike (fig. 83H–J). Copulatory duct narrow, long, with its proximal half directed posteriorly, and distal half sinuous, turned to dorsal. The area where the duct is bent looks (in ventral view) as a darkened thickening (fig. 83I).

Male: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from the type locality.

ACKNOWLEDGMENTS

We wish to thank those who have supplied specimens and their institutions: Janet Beccaloni (BMNH), Peter Schwendinger (MHNG), Christine Rollard (MNHN), Yvonne Kranz-Baltensperger and Christian Kropf (NHMB), Ambros Hänggi and Urs Wüest (NMB), Karen Van Dorp (RMNH), and Jochen Martens (SGN). We are also grateful to Norman I. Platnick, Yvonne Kranz-Baltensperger, Mark Harvey, and the editors for their critical comments on early versions of the manuscript; to Christian Kropf and, again, Yvonne Kranz-Baltensperger (MHNG) for the initial proposal for working with important collections of Asian oonopids; to María Eugenia González Márquez and Juan Manuel Andía Navarro (MACN) for their assistance with many photographs, and to Wouter Fannes for the photographs of *Dysderoides typhlos* (fig. 12). Matthias Burger provided comments and clarifications on his studies on the genitalic morphology of *Prethopalpus fosuma*; Christian W. Fischer and N.I. Platnick directed our attention to the specimen of *Dysderoides synrang*, Peter Schwendinger has provided important data about the correct spelling of many Thai localities, and Darrell Ubick generously shared information about the genus *Camptoscapphiella*. This study was financed in part by the U.S. National Science Foundation (grant no. 0613754 for a Planetary Biodiversity Inventory of the spider family Oonopidae), and by FONCyT PICT-1393 and CONICET PIP 3209 to M.J.R.

REFERENCES

- Álvarez-Padilla, F., D. Ubick, and C.E. Griswold. 2012. *Noideattella* and *Tolegnaro*, two new genera of goblin spiders from Madagascar, with comments on the gamasomorphoid and silhouettelloid oonopids (Araneae, Oonopidae). *American Museum Novitates* 3745: 1–76.
- Baehr, B.C., and D. Ubick. 2010. A review of the Asian goblin spider genus *Camptoscapphiella* (Araneae: Oonopidae). *American Museum Novitates* 3697: 1–65.

- Baehr, B.C., M.S. Harvey, M. Burger, and M. Thoma. 2012. The new Australasian goblin spider genus *Prethopalpus* (Araneae, Oonopidae). *Bulletin of the American Museum of Natural History* 369: 1–113.
- Brescovit, A.D., A.B. Bonaldo, A.J. Santos, R. Ott, and C.A. Rheims. 2012. The Brazilian goblin spiders of the new genus *Predatoroonops* (Araneae, Oonopidae). *Bulletin of the American Museum of Natural History* 370: 1–68.
- Brignoli, P.M. 1976. Spinnen aus Nepal, III. Über einige Spinnen aus dem Himalaya, dazu Revision einiger Arten aus dem Karakorum (Arachnida, Araneae). *Ergebnisse der Forschungs-Unternehmens Nepal Himalaya* 5: 229–253.
- Brignoli, P.M. 1978. Ergebnisse der Bhutan-Expedition 1972 des Naturhistorischen Museums in Basel. Araneae: Fam. Oonopidae, Agelenidae, Hahniidae und Mimetidae. *Entomologica Basiliensia* 3: 31–56.
- Burger, M., W. Nentwig, and C. Kropf. 2003. Complex genital structures indicate cryptic female choice in a haplogyne spider (Arachnida, Araneae, Oonopidae, Gamasomorphinae). *Journal of Morphology* 255: 80–93.
- Caporiacco, L. di. 1934. Aracnidi dell'Himalaia e del Karakoram. *Memorie della Società Entomologica Italiana* 13: 113–160.
- Eichenberger, B., and Y. Kranz-Baltensperger. 2011. New *Trilacuna* species from Thailand, Malaysia and Sumatra (Araneae, Oonopidae). *Zootaxa* 2823: 1–31.
- Fage, L. 1946. Araignées cavernicoles de l'Inde. *Bulletin Muséum Nationale d'Histoire Naturelle Paris* (2) 18: 382–388.
- Forster, R.R., and N.I. Platnick. 1985. A review of the austral spider family Orsolobidae (Arachnida, Araneae), with notes on the superfamily Dysderoidea. *Bulletin of the American Museum of Natural History* 181 (1): 1–230.
- González Reyes, A.X., J.A. Corronca, and M.B. Cava. 2010. New species of *Unicorn* Platnick and Brescovit (Araneae, Oonopidae) from north-west Argentina. *Munis Entomology and Zoology* 5: 374–379.
- Grismado, C.J. 2008. A taxonomic revision of the spider genus *Ariadna* Audouin, 1826 in Argentina and Chile, with the description of five new species (Arachnida, Araneae, Segestriidae). *Zoosystema* 30: 333–360.
- Grismado, C.J., and M.J. Ramírez. 2013. The New World goblin spiders of the new genus *Neotrops* (Araneae: Oonopidae), Part I. *Bulletin of the American Museum of Natural History* 383: 1–150.
- Griswold, C., T. Audisio, and J. Ledford. 2012. An extraordinary new family of spiders from caves in the Pacific Northwest (Araneae, Troglorap-toridae, new family). *ZooKeys* 215: 77–102.
- Fannes, W., and Jocqué, R. 2008. Ultrastructure of *Antoonops*, a new, ant-mimicking genus of Afrotropical Oonopidae (Araneae) with complex internal genitalia. *American Museum Novitates*, 3614: 1–30.
- Huber, B.H. 2004. Evolutionary transformation from muscular to hydraulic movements in spider (Arachnida, Araneae) genitalia: a study based on histological serial sections. *Journal of Morphology* 261: 364–376.
- Huber, B.H. 2005. Sexual selection research on spiders: progress and biases. *Biology Reviews* 80: 363–385.
- Izquierdo, M., N. Ferretti, and G. Pompozi. 2012. On *Puan*, a new genus of goblin spiders from Argentina (Araneae, Dysderoidea, Oonopidae). *American Museum Novitates* 3757: 1–22.
- Knoflach, B., K. Pfaller, and F. Stauder. 2009. *Cortestina thaleri*, a new dwarf six-eyed spider from Austria and Italy (Araneae: Oonopidae: Oonopinae). *Contributions to Natural History* 12: 743–771.
- Platnick, N.I., and N. Dupérré. 2009a. The goblin spider genera *Opopaea* and *Epectris* (Araneae, Oonopidae) in the New World. *American Museum Novitates* 3649: 1–43.
- Platnick, N.I., and N. Dupérré. 2009b. The American goblin spiders of the new genus *Escaphiella* (Araneae, Oonopidae). *Bulletin of the American Museum of Natural History* 328: 1–151.
- Platnick, N.I., and N. Dupérré. 2009c. The goblin spider genus *Heteroonops* (Araneae, Oonopidae), with notes on *Oonops*. *American Museum Novitates* 3672: 1–72.
- Platnick, N.I., and N. Dupérré. 2010a. The goblin spider genus *Scaphiella* (Araneae, Oonopidae). *Bulletin of the American Museum of Natural History* 332: 1–156.
- Platnick, N.I., and N. Dupérré. 2010b. The goblin spider genera *Stenoonops* and *Australoonops* (Araneae, Oonopidae), with notes on related taxa. *Bulletin of the American Museum of Natural History* 340: 1–111.
- Platnick, N.I., and N. Dupérré. 2010c. The Andean goblin spiders of the new genera *Niarchos* and *Scaphios* (Araneae, Oonopidae). *Bulletin of the American Museum of Natural History* 345: 1–120.
- Platnick, N.I., and N. Dupérré. 2011. The goblin spider genus *Simoonops* (Araneae, Oonopidae). *American Museum Novitates* 3724: 1–30.
- Platnick, N.I., and N. Dupérré. 2012. The Caribbean goblin spider genera *Scaphioides*

- and *Hortoonops* (Araneae, Oonopidae) American Museum Novitates 3751: 1–62.
- Platnick, N.I., J.A. Coddington, R.R. Forster, and C.E. Griswold. 1991. Spinneret morphology and the phylogeny of haplogyne spiders (Araneae, Araneomorphae). American Museum Novitates 3016: 1–73.
- Platnick, N.I., et al. 2012a. Tarsal organ morphology and the phylogeny of goblin spiders (Araneae, Oonopidae), with notes on basal genera. American Museum Novitates 3736: 1–52.
- Platnick, N.I., L. Berniker, and Y. Kranz-Baltensperger. 2012b. The goblin spider genus *Ischnothyreus* (Araneae, Oonopidae) in the New World. American Museum Novitates 3759: 1–32.
- Platnick, N.I., N. Dupérré, L. Berniker, and A.B. Bonaldo. 2013. The goblin spider genera *Prodyserina*, *Aschnaonops*, and *Bidysderina* (Araneae, Oonopidae). Bulletin of the American Museum of Natural History 373: 1–102.
- Platnick, N.I., N. Dupérré, R. Ott, and Y. Kranz-Baltensperger. 2011. The goblin spider genus *Brignolia* (Araneae, Oonopidae). Bulletin of the American Museum of Natural History 349: 1–131.
- Platnick, N.I., N. Dupérré, R. Ott, B. Baehr, and Y. Kranz-Baltensperger. 2012c. The goblin spider genus *Pellicinus* (Araneae: Oonopidae), part 1. American Museum Novitates 3741: 1–43.
- Platnick, N.I., N. Dupérré, D. Ubick, and W. Fannes. 2012d. Got Males?: The enigmatic goblin spider genus *Triaeris* (Araneae: Oonopidae). American Museum Novitates 3756: 1–36.
- Ramírez, M.J. 2000. Respiratory system morphology and the phylogeny of haplogyne spiders (Araneae, Araneomorphae). Journal of Arachnology 28: 149–157.
- Simon, E. 1893. Histoire naturelle des araignées, 1: 257–488. Paris: Roret.
- Tong, Y.F., and S.Q. Li. 2007. One new genus and four new species of oonopid spiders from southwest China (Araneae: Oonopidae). Annales Zoologici 57: 331–340.
- Ubick, D., and C.E. Griswold. 2011a. The Malagasy goblin spiders of the new genus *Malagiella* (Araneae, Oonopidae). Bulletin of the American Museum of Natural History 356: 1–86.
- Ubick, D., and C.E. Griswold. 2011b. The Malagasy goblin spiders of the new genus *Molotra* (Araneae, Oonopidae). American Museum Novitates 3729: 1–69.

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