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A review of Sri Lankan *Brignolia* including the description of four new species (Araneae: Oonopidae)

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Abstract

Sri Lankan species of the genus *Brignolia* Dumitrescu & Georgescu, 1983 are reviewed and four new species are described: *B. carlmulleri* **sp. nov.**, *B. meemure* **sp. nov.**, *B. ondaatjei* **sp. nov.** and *B. shyami* **sp. nov.** All new species are described based on both sexes. New data on *B. ambigua (*Simon, 1893), *B. parumpunctata* (Simon, 1893), *B. ratnapura* Platnick *et al*., 2011 and *B. trichinalis* (Benoit, 1979) are given. A total of 10 species are now known from Sri Lanka. *B. ambigua, B. carlmulleri* **sp. nov.**, *B. meemure* **sp. nov.**, *B. ondaatjei* **sp. nov.**, *B. ratnapura, B. shyami* **sp. nov.** and *B. sinharaja* are endemic to the island. A key and a distribution map for Sri Lankan *Brignolia* are provided.

Key words: biodiversity, Ceylon, conservation, leaf litter, taxonomy

Introduction

The spider family Oonopidae, commonly known as goblin spiders, includes over 1603 described species in 113 genera (World Spider Catalog 2016). Members of this family are small (1–4 mm), free hunting spiders that inhabit leaf litter or the canopy (Grismado *et al*. 2011). Their coloration is usually yellowish, orange or reddish-brown, although some species can be whitish or pink (Saaristo 2001). Currently, eight genera of goblin spiders have been reported in Sri Lanka: *Aprusia* Simon, 1893a (Grismado *et al*. 2011), *Brignolia* Dumitrescu & Georgescu, 1983 (Platnick *et al*. 2011), *Camptoscaphiella* Caporiacco, 1934 (Baehr & Ubick 2010), *Gamasomorpha* Karsch, 1881 (Eichenberger *et al.* 2012), *Ischnothyreus* Simon, 1893a (Kranz-Baltensperger 2011), *Opopaea* Simon, 1891 (Platnick & Dupérré 2009), *Orchestina* Simon, 1882 (Dalmas 1916, Henrard & Jocqué 2012) and *Xestaspis* Simon, 1884 (Eichenberger *et al.* 2012).

Brignolia was established for a species then thought to be endemic to Cuba. However, a major revision of the genus by Platnick *et al*. (2011) revealed that the genus might be a dominant faunal component inhabiting tropical forest, particularly in the leaf litter. Indeed, below we reveal the presence of four new species, in addition to the known six species, highlighting its diversity in the forest of Sri Lanka.

Brignolia currently contains thirty one species from Borneo, India, Mauritius, Nepal, Philippines, Seychelles, Sri Lanka, Thailand, USA, Vietnam and the West Indies (World Spider Catalog 2016). Male *Brignolia* and *Ischnothyreus* both have heavily sclerotized palps. This character is diagnostic for both genera (Platnick *et al*. 2011). However, *Brignolia* differs from *Ischnothyreus* by the spineless legs and the larger dorsal scutum which covers the abdomen (Edward and Harvey 2014, Platnick *et al*. 2012). In addition, *Brignolia* resemble species of *Opopaea* (Platnick and Dupérré 2009). However, *Opopaea* differ by the presence of a distinct enlarged male palpal patella. Females of *Brignolia* and *Opopaea* are very similar, however, female *Brignolia* have a simple or twisted posterior genitalic tube that is absent in females of *Opopaea* (Platnick *et al*. 2012).

Prior to our study five species of *Brignolia* were known from Sri Lanka, *Brignolia ambigua* (Simon, 1893b), *B. nigripalpis* (Simon, 1893a), *B. parumpunctata* (Simon, 1893b), *B. ratnapura* Platnick *et al.*, 2011 and *B. sinharaja* Platnick *et al.*, 2011. *B. trichinalis* (Benoit, 1979) was provisionally listed as present in the island (World

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Spider Catalog 2016). *B. ambigua* and *B. nigripalpis* were transferred from *Opopaea* (*Opopaea ambigua* Simon, 1893) and *Gamasomorpha* (*Gamasomorpha nigripalpis* Simon, 1893) respectively and redescribed by Platnick *et al*. (2011) in *Brignolia*. However, due to poor sampling during previous studies, the true diversity *Brignolia* in Sri Lanka remained unknown.

The aim of this study is to redescribe several known species and describe four new species of *Brignolia* based on freshly collected material. *B. ratnapura* is redescribed based upon specimens collected during our field work; previously it was known only from Ratnapura, its type locality. Four new species are described. Further, the female of *B. ambigua* is described for the first time and the presence of *B. trichinalis* in Sri Lanka is confirmed.

Material and methods

Sample collection: Field visits were conducted to selected locations around Sri Lanka (Fig. 1). Specimens were collected by sifting litter and leaving the residue overnight in a Winkler extractor or by hand sorting the residue. The collected specimens were examined using an Olympus SZX7 stereomicroscope. Specimens were preserved in 70% ethanol. Preserved specimens were identified using recently published studies (Platnick *et al.* 2011, Saaristo 2010). *Specimen examination*: Male palps (left) were dissected and immersed in Kaiser's glycerol gelatin (Merck KGaA, Darmstadt, Germany), slide mounted, observed and illustrated with the aid of an Olympus BX51 compound microscope attached with a drawing tube. The female epigastric region was dissected and digested in a pancreatin solution (Álvarez-Padilla & Hormiga 2008) for about 3–7 days. Slide mounted and illustrated as described above. Digital images of the specimens were taken with a Leica MC170 HD camera mounted on a Leica M205C stereomicroscope using the software package Leica Application Suite, LAS version 4.6.2 [Build: 410] (Leica Microsystems Limited, Switzerland). Acquired image stacks of different depths (15 to 50 images per stack) were assembled using Helicon Focus (version 6, Helicon soft Ltd) to create a single image with the entire area in focus. Description was done according to Platnick *et al*. 2011. All measurements are given in millimeters. Body length was considered as carapace length + abdomen length (excluding spinnerets). Sampled localities are listed below in alphabetical order of the Provinces and Districts and follow the format of Batuwita & Benjamin 2014. All types and voucher specimens are deposited in the NMSL. Non-type specimens are deposited in the NIFS.

Abbreviations

Institutional abbreviations. NIFS, National Institute of Fundamental Studies, Kandy, Sri Lanka; NMSL, National Museum of Natural History, Colombo, Sri Lanka.

Character abbreviations: ALE, anterior lateral eyes; boc, booklung covers; bpr, bulbus projection; ef, epigastric furrow; epr, endite projection; esc, epigastric scape; lap, lateral apodemes; pgt, posterior genitalic tube; PLE, posterior lateral eyes; PME, posterior median eyes; psg, posterior spiracular groove; pte, pedicel triangular extension; scr, scuto-pedicel ridge; sps, spinneret scutum; tpr, triangular epigynal projection; tr, transverse ridge.

Additional abbreviations: FR, Forest reserve; L, Location; NP, National Park; SNR, Strict Nature Reserve.

Sampled localities

Central Province, Kandy District

L 16: Deltota, Loolcondera FR, 07°08'45" N 80°41'53"E, 1480m, 11 May 2010, leg. S. Batuwita and N. Athukorala, litter.

L 19: Randenigala,Victoria Randenigala Rantabe sanctuary, 07°09'14"N 80°54'12"E, 289m, 11 May 2010, leg. S. Batuwita and N. Athukorala, litter.

L 27: Udawattakelle FR, 07°17'57"N 80°38'29"E, 580 m, 29 December 2011, leg. S. P. Benjamin, litter.

L 29: Meemure, 7°25'51"N 80°50'44"E, 636m, 20 October 2014, leg. N. Athukorala, S. Ranasinghe and C. Clayton, litter.

L 43: Hantane FR, 07°14'57"N 80°36'50"E, 585m, 19 November 2013, leg. M. Rathnayake and I. Sandunika, litter.

L 44: Knuckles, Riverston, Site 02, 07°31'25"N 80°44'20"E, 1240m, 25 February 2015, leg. N. Athukorala, litter/ pitfall trap.

Central Province, Matale District

L 17: NIFS Arboretum, 07°51'34"N 80°40'28"E, 180m, 27 April 2010, leg. S. P. Benjamin and S. Batuwita; 01 December 2011, leg. S. P. Benjamin *et al*., litter.

Central Province: Nuwara Eliya District

L 53: Hakgala Strict Nature Reserve, 6°54'40"N 80°47'36"E, 1913m, 22 January 2015, leg. S. P. Benjamin *et al*., litter.

Eastern Province: Ampara District

L 57: Kokagala, 07°25'28"N 81°3'27"E, 125m, 09 February 2010, leg. S. P. Benjamin and S. Batuwita, litter.

L 66: Nuwaragala FR, 07°26'07.4"N 81°31'58.8"E, 70m, 19 May 2015, leg. N. Athukorala, litter.

North Central Province, Anuradhapura District

L 47: Padaviya, 8°48'0N 80°45'0E, 55m, 10 January 2012, leg. N. Athukorala, litter.

North Western Province, Kurunagala District

L 10: Ethagala FR, 07°28'17"N 80°22'30"E, 190m, 20 August 2010, leg. S. Batuwita; 08 April 2015, S. P. Benjamin *et al*., litter.

North Western Province, Puttalam District

L 22: Wanathavilluwa, 08°10'15"N 79°52'30"E, 30m, 24 May 2010, leg. N. Athukorala, litter.

Sabaragamuwa Province, Kegalle District

L 28: Kurulukele FR, 07°14'12"E 80°20'33"E, 250m, 12 November 2014, leg. N. Athukorala, litter.

Southern Province, Hambantota District

L 59: Tissamaharama, 6°17'N 81°17'E, 18m, 02 February 2014, leg. C. Clayton, litter.

Uva Province, Badulla District

L 30: Ohiya, 06°50'32"N 80°53'05"E, 1280m, 30 August 2011, leg. S. P. Benjamin and N. Athukorala, litter.

L 50: Rawana Ella, forest around cave, 6°51'52.4"N 81°03'01.3"E, 990m, 31 December 2011, leg. S. P. Benjamin *et al*.; 27 June 2014, leg. N. Athukorala and S. Ranasinghe, litter.

L 51: Namunukulla FR, along Passara/Ella road, 6°52'N 81°7'E, 1838m, 22 January 2014, leg. S. P. Benjamin and N. Athukorala; 27 February 2015, leg. S. P. Benjamin, N. Athukorala, litter.

L 52: 189th mp, Between Koslanda and Beragala, 6°44'48.4"N 80°57'56.3"E, 1370m, 01 January 2012, S. P. Benjamin *et al*., litter.

L 67: Bandarawela, 6°50'59.5"N 81°00'48.1"E, 1042m, 31 December 2011, S. P. Benjamin *et al*., litter.

Western Province, Gampaha District

L 60: Kadolkelle FR, 7°11'49"N 79°50'35"E, 10m, 24 September 2014, leg. N. Athukorala, litter.

Taxonomy

Family: Oonopidae Simon, 1890

Genus: *Brignolia* Dumitrescu & Georgescu, 1983

Diagnosis. Male palps heavily sclerotized with dorsal depression. Completely fused bulbus and cymbium. Absences of conspicuous anterior leg spines. Presence of normal palpal patellae. Dorsal scutum covered most of the abdomen in both males and females. Female genitalia with simple or twisted posterior tube. For a more detailed diagnosis see Platnick *et al*. (2011).

Brignolia ambigua (Simon, 1893)

(Figs. 2A–F, 3A–D)

Opopaea ambigua Simon, 1893b: 302.
Brignolia ambigua Platnick *et al*., 2011: 52, figs. 822–837.

Material examined. 1♂ (IFS_Oon_036): Sri Lanka: Central Province, Matale District, NIFS Arboretum,

07°51’34”N 80°40’28”E, 180m, 27 April 2010, leg. S. P. Benjamin and S. Batuwita. 2♀ (IFS_Oon_152,153): same locality data, 01 December 2011, leg. S. P. Benjamin *et al*., litter. 1♂ (IFS_Oon_281): Sri Lanka: Central Province, Kandy District, Knuckles, Riverston, site 02, 07°31′25″N 80°44′20″E, 1240m, 25 February 2015, leg. N. Athukorala, litter.

Diagnosis. Males can be easily recognized by the distally expanded, blunt-tip of the palpal bulb (Figs. 3A, B; figs. 830–837 Platnick *et al*. (2011). Females can be recognized by the dark undulated transverse ridge, near the epigastric furrow (Figs. 3C, D).

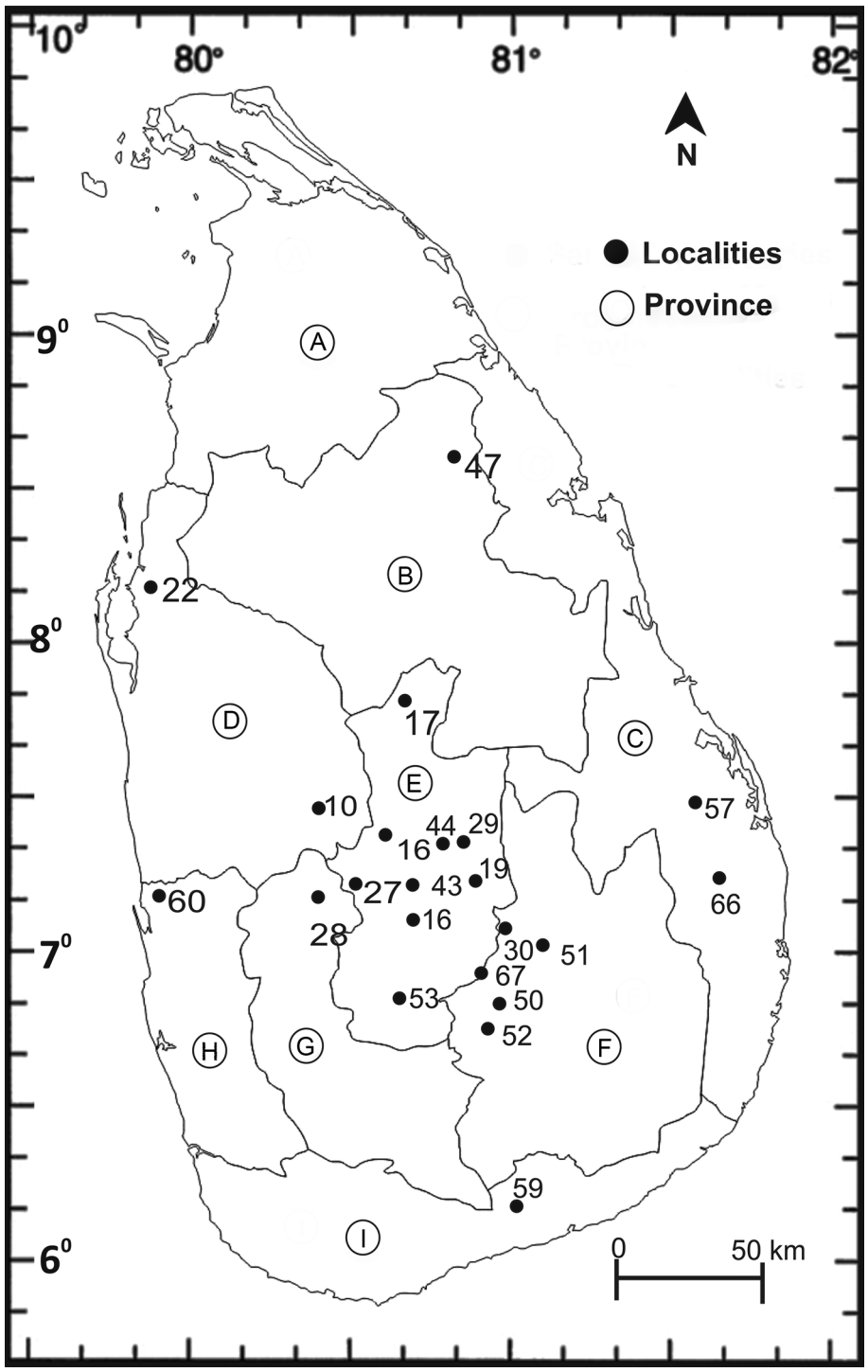

FIGURE 1. Map of Sri Lanka showing known localities for *Brignolia* species. See text for details. A. Northern Province; B. North Central Province; C. Eastern Province; D. North Western Province; E. Central Province; F. Uva Province; G. Sabaragamuwa Province; H. Western Province; I. Southern Province.

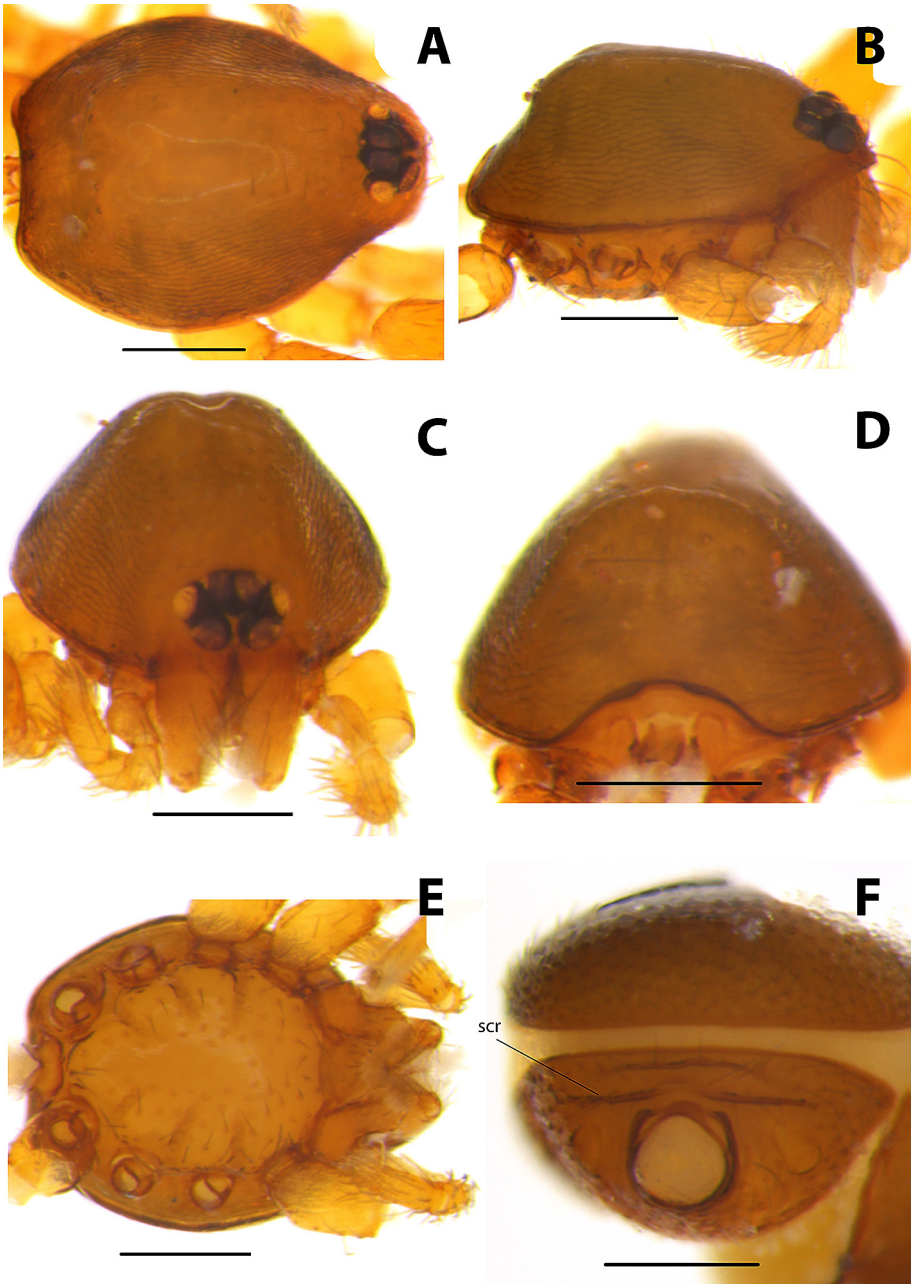

FIGURE 2. *Brignolia ambigua* (Simon, 1893), female from Dambulla NIFS Arboretum. A. carapace, dorsal view; B. same, lateral view; C. same, anterior view; D. same, posterior view; E. sternum, ventral view; F. abdomen, anterior view. scr, scuto-pedicel ridge. Scale bars = 0.2 mm.

Description. Description based on the four specimens listed above. Also see Platnick *et al*. (2011) for a detailed description.

***MALE*:** Body length 1.30. Pars cephalica slightly elevated, pars thoracica sloping gradually to rounded posterior margin. Median portion of sternum with ordinary setae and without distinct pits. Scuto-pedicel region with straight ridge. Genitalia: distal portion of palpal bulb relatively large, as high as cymbium. Bulb distally expanded with a blunt tip, base without triangular projection (Figs. 3A, B).

***FEMALE*:** Body length 1.54. Somatic morphology as male (Fig. 2A, 2B, 2D, 2F). Genitalia: postepigastric region with dark undulated transverse ridge positioned near the epigastric furrow. Postepigastric region with posterior genitalic tube and without any triangular projections, posterior tube very short and narrow (Figs. 3C, D).

Intraspecific variation. Color of carapace and dorsal scuta diverge from pale orange to orange. Scuto-pedicel region with medially straight weak sclerotized ridge (Fig. 2F).

Distribution. Sri Lanka. *Previous record*: Galle. *New records*: Matale District, NIFS Arboretum (L 17), Knuckles (L 44).

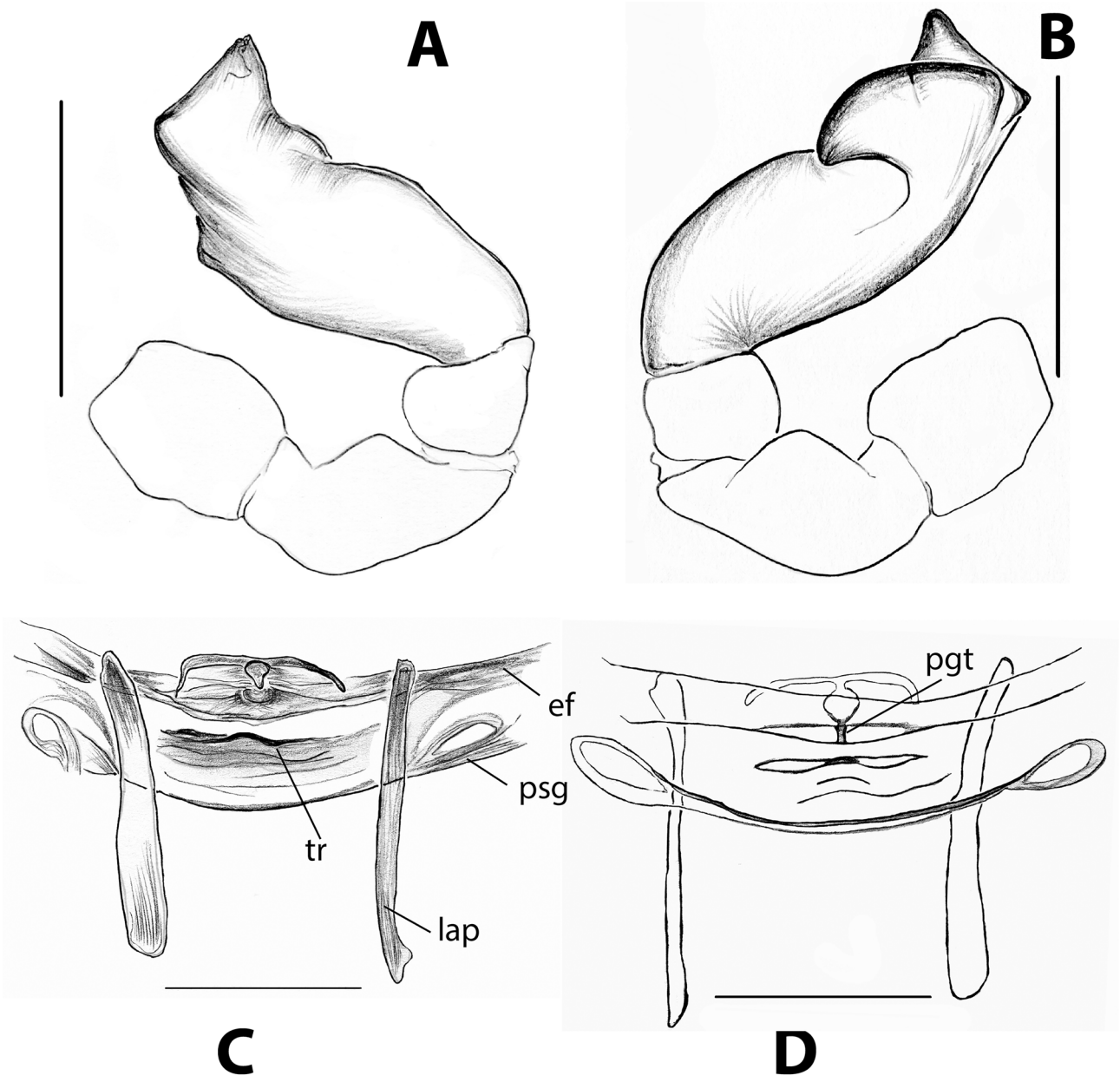

FIGURE 3. *Brignolia ambigua* (Simon, 1893), from NIFS Arboretum. Male. A. right palp, prolateral view; B. right palp, retrolateral view; Female. C. epigastric region, dorsal view; D. same, ventral view. ef, epigastric furrow; lap, lateral apodemes; pgt, posterior genitalic tube; psg, posterior spiracular groove; tr, transverse ridge. Scale bars = 0.1 mm.

***Brignolia carlmulleri* sp. nov.**
(Figs. 4A–H, 5A–H, 6A–B)

Type material. Holotype: 1♂ (IFS_Oon_294): Sri Lanka: Central Province, Kandy District, Knuckles Range, Riverston, site 02, 07°31'25"N 80°44'20"E, 1240m, 25 February 2015, leg. N. Athukorala, pitfall trap. Deposited in NMSL.

Other material examined. 1♂ (IFS_Oon_162): Sri Lanka: Central Province, Kandy District, Hantane, 07°14'57"N 80°36'50"E, 585m, 19 November 2013, leg. M. Rathnayake, I. Sandunika, litter. 1♂ and 4♀ (IFS_Oon_287–289, Oon_293): same locality and data as holotype.

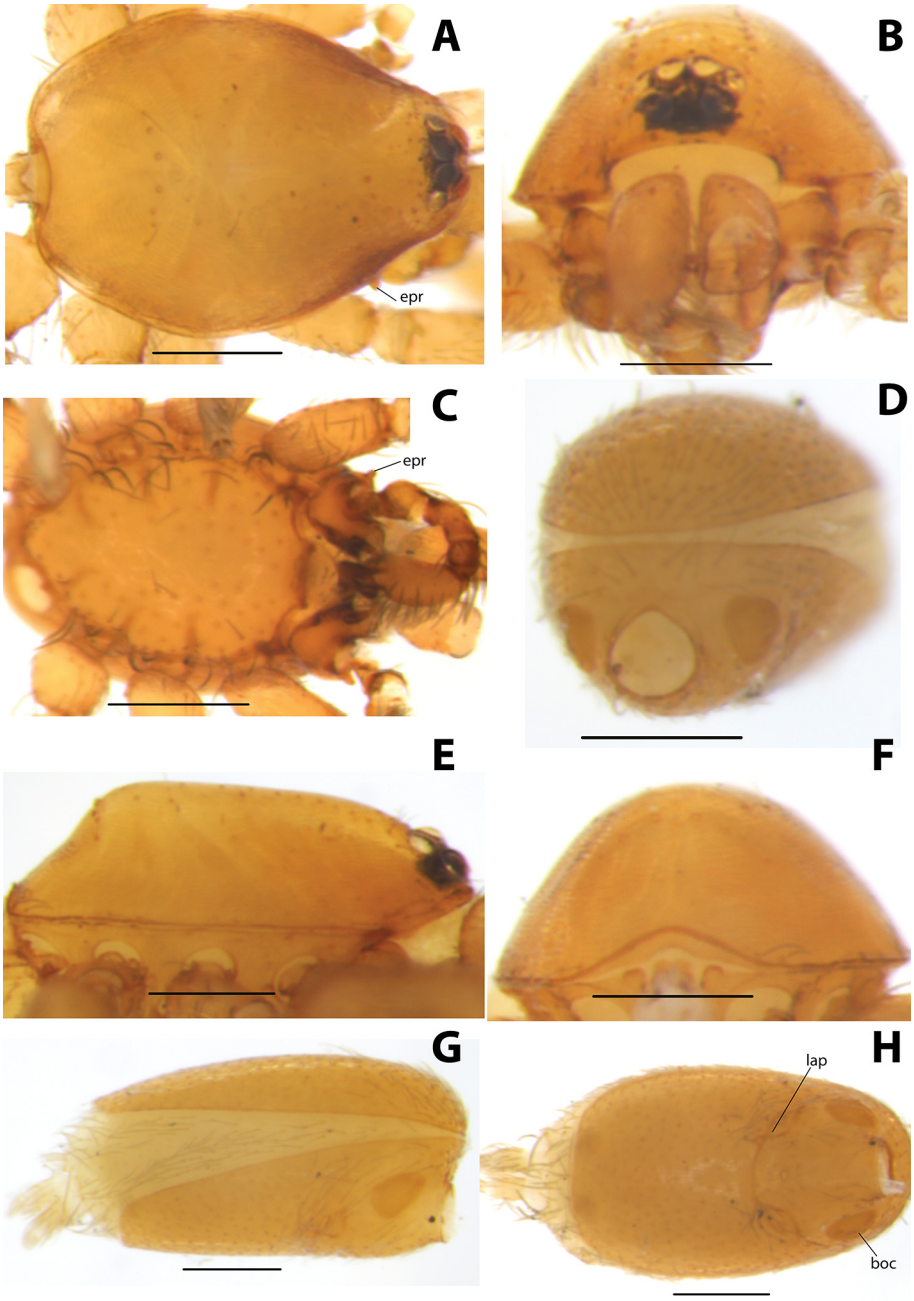

FIGURE 4. *Brignolia carlmulleri* **sp. nov.**, male from Knuckles site 02. A. carapace, dorsal view; B. same, anterior view; C. sternum, ventral view; D. abdomen, anterior view; E. carapace, lateral view; F. same, posterior view; G. abdomen lateral view; H. same, ventral view. boc, booklung covers; epr, endite projection; lap, lateral apodemes. Scale bars = 0.2 mm.

Etymology. Named for the Sri Lankan writer, poet and journalist, Carl Muller best known for his trilogy: "*The Jam Fruit Tree*", "*Yakada Yaka*" and "*Once Upon A Tender Time*".

Diagnosis. Males can be easily recognized by the dorsally directed palpal bulb with squared palpal tip (Fig. 6A). Females are recognized by the long and convoluted posterior genitalic tube which extends to posterior spiracular groove (Fig. 6B).

Description. Description based on all material.

***MALE*:** Body length: 1.34. Coloration: carapace usually pale orange, sternum and mouthparts pale orange, abdominal scuta pale orange, abdominal inter scutal region white and covered with setae, legs pale orange, palps orange-brown, end part red-brown. Carapace: broadly heart-shaped in dorsal view (Fig. 4A), sides striated, pars cephalica slightly elevated in lateral view (Fig. 4E), anteriorly slightly narrowed, posterolateral edge without angular posterolateral corners, spikes and pits, lateral margin straight, top and posterior margin with enlarged setae,

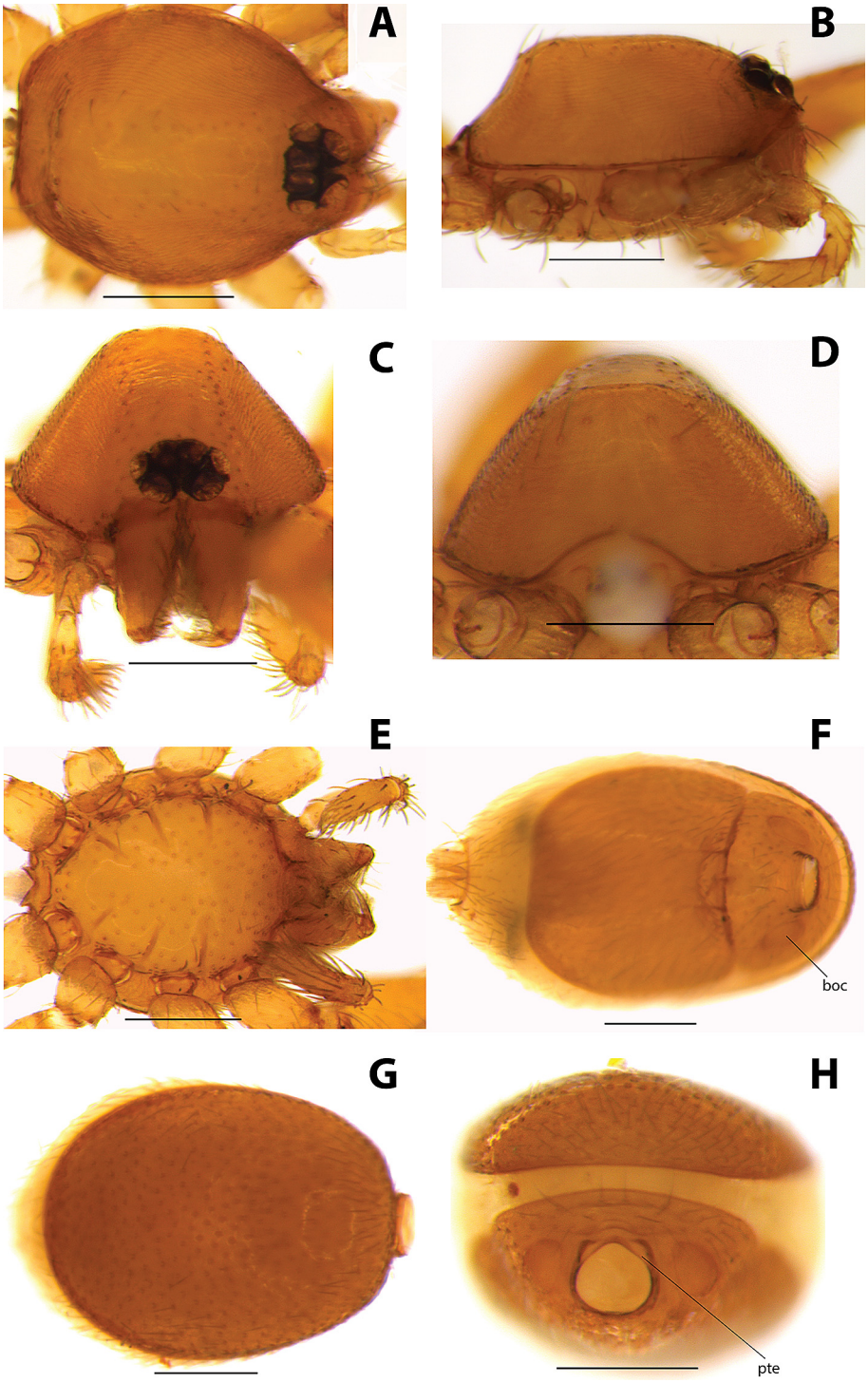

FIGURE 5. *Brignolia carlmulleri* **sp. nov.**, female from Knuckles site 02. A. carapace, dorsal view; B. same, lateral view; C. same, anterior view; D. same, posterior view; E. sternum, ventral view; F. abdomen, ventral view; G. same dorsal view; H. same, anterior view. boc, booklung covers; pte, pedicel triangular extension. Scale bars =0.2 mm.

posterior margin rounded (Fig. 4F). Clypeus: straight in front view (Fig. 4B). Eyes: six, well developed, ALE largest, oval, PME and PLE equal in size and oval. Labium: triangular shaped, fused to sternum, same as sternum sclerotization. Endite: distally not excavated, anteromedian part with stout projection, base with a triangular projection (Fig. 4C), heavily sclerotized than sternum. Sternum: longer than wide, decorated with round pits, radial furrows present between coxa I–II, II–III and III–IV appearing as brown markings (Fig. 4C). Abdomen: ovoid, dorsal scutum strongly sclerotized, cover full length of abdomen, no soft tissue visible from above. Epigastric scutum strongly sclerotized, extend to pedicel region, scuto-pedicel region with scarcely detectable straight scutal

ridge, without dorsolateral triangular extensions (Fig. 4D), booklung covers, large, elliptical without elevation, postepigastric scutum strongly sclerotized, long, semicircular, covering most part of the area and fused to epigastric scutum, with short posteriorly directed lateral apodemes (lap in Fig. 4H). Spinnerets scutum present, short setae present. Legs: spineless. Sperm pore: small, situated at level of anterior spiracular groove. Genitalia: palpal bulb dorsally directed with squared palpal tip (Fig. 6A). Palpal bulb narrowed, base of the palpal bulb without triangular projection. Palpal tibia rounded.

***FEMALE*:** Body length: 1.14. Coloration and somatic morphology as in male. Carapace: broadly oval-shaped in dorsal view (Fig. 5A), sides striated, pars cephalica slightly elevated in lateral view (Fig. 5B). Genitalia: long, convoluted posterior genitalic tube extend to posterior spiracular groove (Fig. 6B).

Intraspecific variation. Body length of females range from 1.14–1.44. In some specimens the sternum is fully decorated with small round pits (Fig. 5E) and the pedicel tube is furnished with transverse, procurved ridges. Small dorsolateral triangular extensions are present in a few specimens (Fig. 5H).

Distribution. Sri Lanka. Kandy District: Hantane (L 43), Knuckles Range, site 02 (L 44).

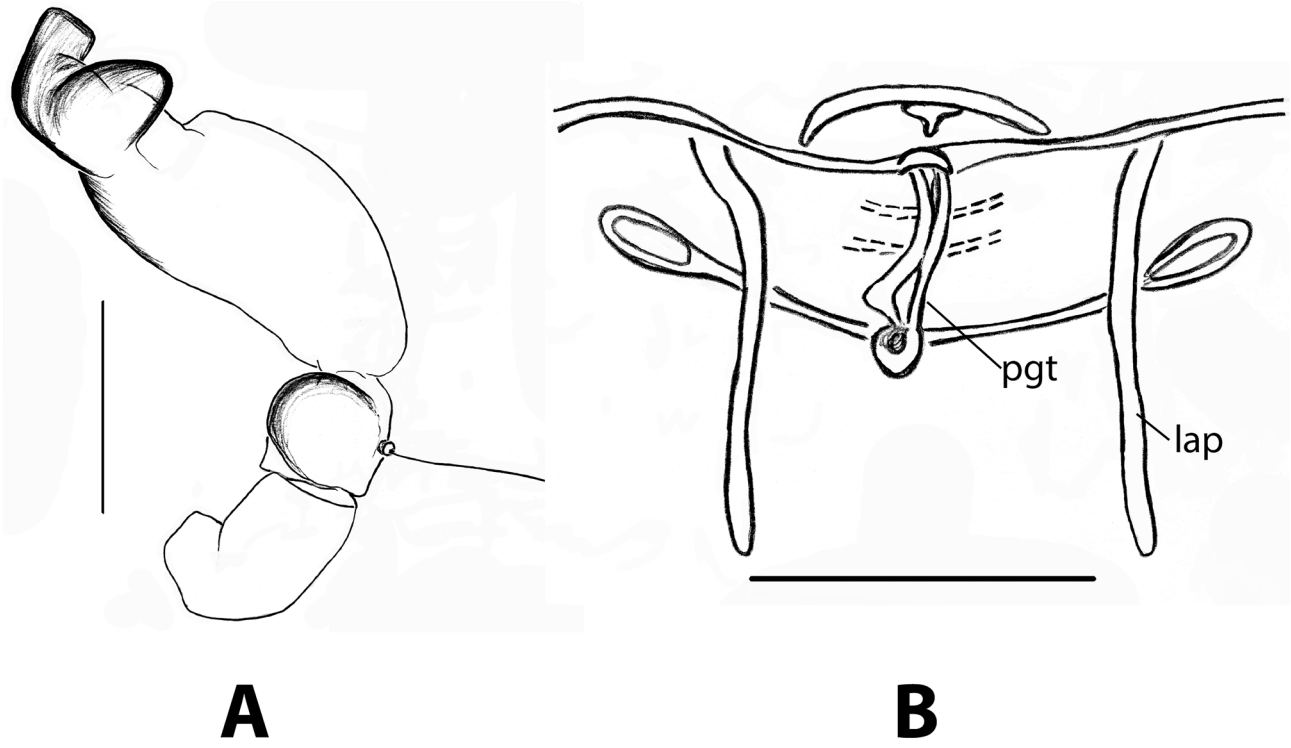

FIGURE 6. *Brignolia carlmulleri* **sp. nov.**, from Knuckles site 02. Male. A. left palp, retrolateral view; Female. B. epigastric region, dorsal view. lap, lateral apodemes; pgt, posterior genitalic tube. Scale bars = 0.1 mm.

***Brignolia meemure* sp. nov.**
(Figs. 7A–H; 8A–D; 9A–D)

Type material. *Holotype* ♂ (IFS_Oon_241): Sri Lanka, Central Province, Kandy District, Meemure, 7°25'51"N 80°50'44"E, 636m, 20 October 2014, leg. N. Athukorala *et al*., litter.

Paratypes: 1♂ and 1♀ (IFS_Oon_242–243): from same locality and data as the holotype.

Etymology. Named for the type locality, used as a noun in apposition.

Diagnosis. Males can be easily recognized by the small pointed dorsal projection on the blunt palpal tip (Fig. 9A). Females can be recognized by the triangular projection above the posterior spiracular groove as in *B. cardamom* Platnick et al., 2011 (Figs. 9C, D). *B. cardamom* is not known to occur in Sri Lanka.

Description. Description based on the types.

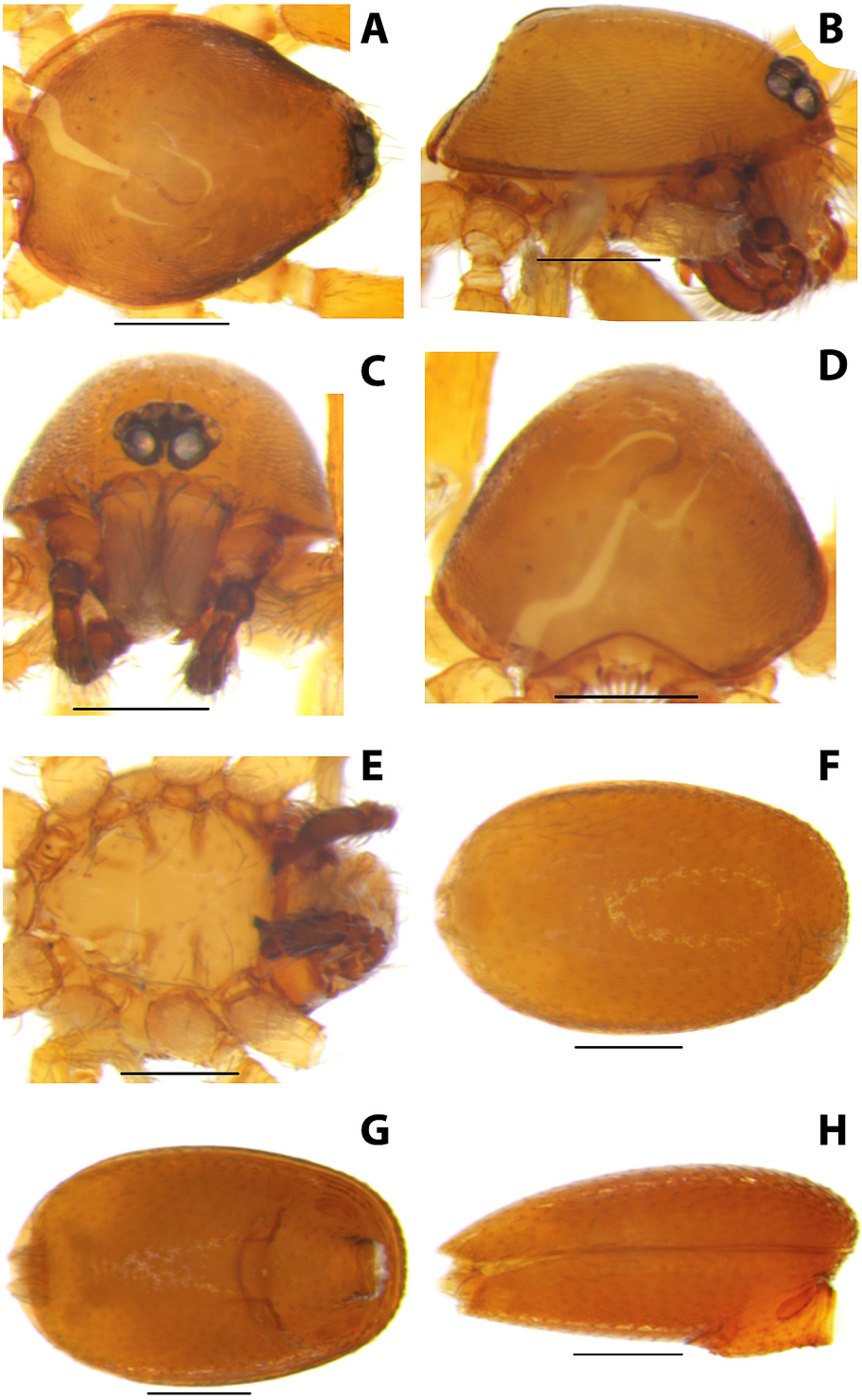

FIGURE 7. *Brignolia meemure* **sp. nov.**, Male. A. carapace, dorsal view; B. same, lateral view; C. same, anterior view; D. same, posterior view; E. sternum, ventral view; F. abdomen, dorsal view; G. same ventral view; H. same, lateral view. Scale bars = 0.2 mm.

***MALE*:** Body length 1.38. Coloration: carapace usually orange-brown, sternum and mouthparts orange-brown, abdominal scuta orange-brown, abdominal inter scutal region not visible, fully covered with dorsal and ventral scuta; legs pale orange; palps dark red-brown. Carapace: broadly heart-shaped in dorsal view (Fig. 7A), sides striated, pars cephalica strongly elevated in lateral view (Fig. 7B), anteriorly slightly narrowed, posterolateral edge without angular posterolateral corners, spikes and pits, lateral margin straight, enlarged setae present on carapace, chelicerae and clypeus, posterior margin rounded (Fig. 7D). Clypeus: rebordered, straight in front view (Fig. 7C).

Eyes: six, well developed, ALE largest, oval, PME and PLE equal in size and oval. Labium: triangular shaped, fused to sternum, same as sternum sclerotization. Endite: distally not excavated, anteromedian part with stout projection, same as sternum sclerotization. Sternum: longer than wide, decorated with round pits, radial furrows consisting of rows of small pits present between coxa I–II, II–III and III–IV (Fig. 7E). Abdomen: ovoid (Fig. 7F), dorsal scutum strongly sclerotized, cover full length of abdomen, no soft tissue visible from above, epigastric scutum strongly sclerotized, extend to pedicel region (Fig. 7G), scuto-pedicel region with deeply W-shaped scutal ridge (scr in Fig. 8A), thinner at middle but distinct, with small dorsolateral triangular extensions (pte in Fig. 8A), book lung covers, large and elliptical, postepigastric scutum strongly sclerotized, long, semicircular, covering most part of the area and fused to epigastric scutum, with short posteriorly directed lateral apodemes. Spinnerets scutum present (sps in Fig. 8B), short setae present. Legs: spineless. Sperm pore: small, situated at the level of anterior spiracles. Genitalia: distal portion of the bulb relatively large as cymbium, palpal bulb with blunt tip with small dorsally directed projection, middle of the bulb extends ventrally, base of the palpal bulb without triangular projection (Figs. 9A, B).

FEMALE: Body length: 1.40. Coloration and somatic morphology as in male. Pars cephalica strongly elevated in lateral view, rounded posterior margin (Fig. 8C). Genitalia: Postepigastric area with wide anteriorly directed triangular projection originating above posterior spiracular groove, posterior tube not visible (Figs. 9C, D).

Distribution. Known only from the type locality (L 29).

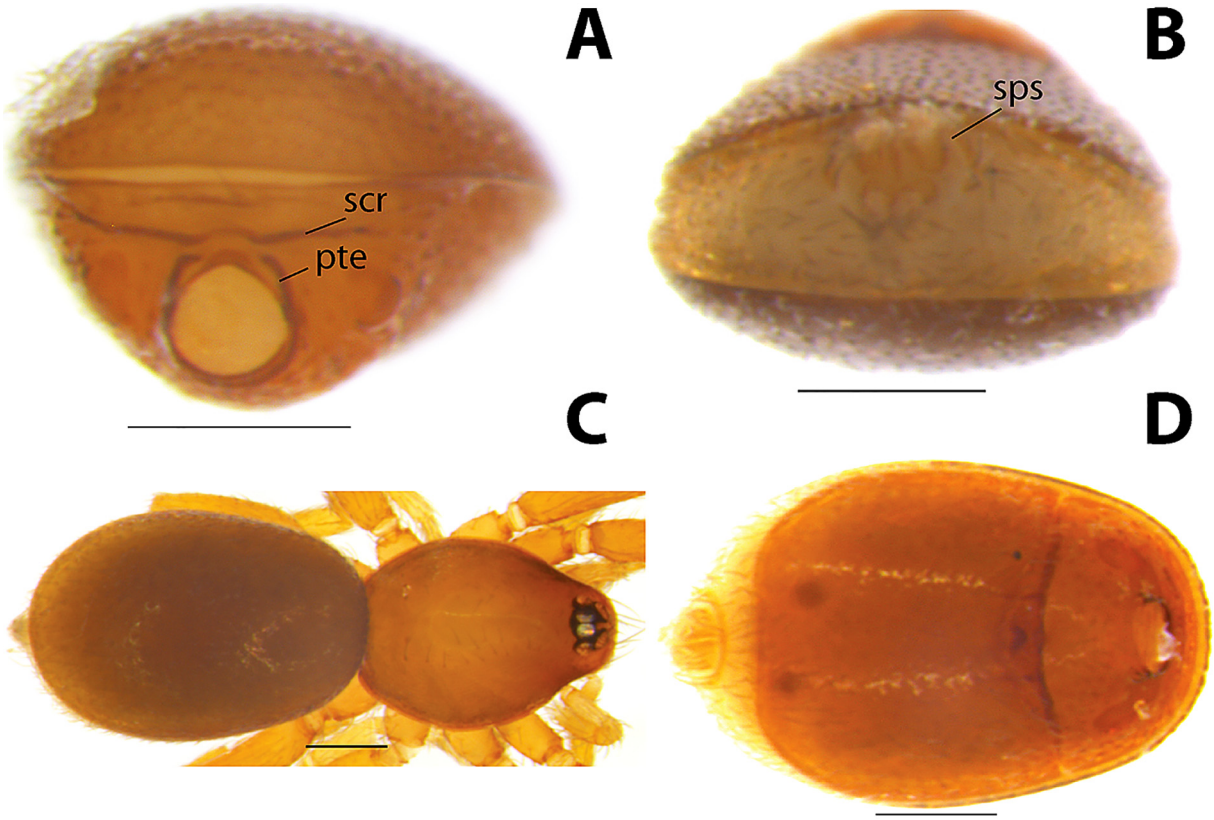

FIGURE 8. *Brignolia meemure* **sp. nov.**. Male. A. abdomen, anterior view; B. same, posterior view; Female. C. habitus, dorsal view; D. abdomen, ventral view. pte, pedicel triangular extension; scr, scuto-pedicel ridge; sps, spinneret scutum. Scale bars = 0.2 mm.

***Brignolia ondaatjei* sp. nov.**
(Figs.10A–H; 11A–F; 12A–D)

Type material. *Holotype* male (IFS_Oon_227): Sri Lanka, Badulla District, Rawana Ella, forest around cave, 6 °51'52.4"N 81°03'01.3"E, 990m, 27 June 2014, leg. N. Athukorala, S. Ranasinghe, litter.

Paratype: 1♀ (IFS_Oon_228): from same locality and data as the holotype.

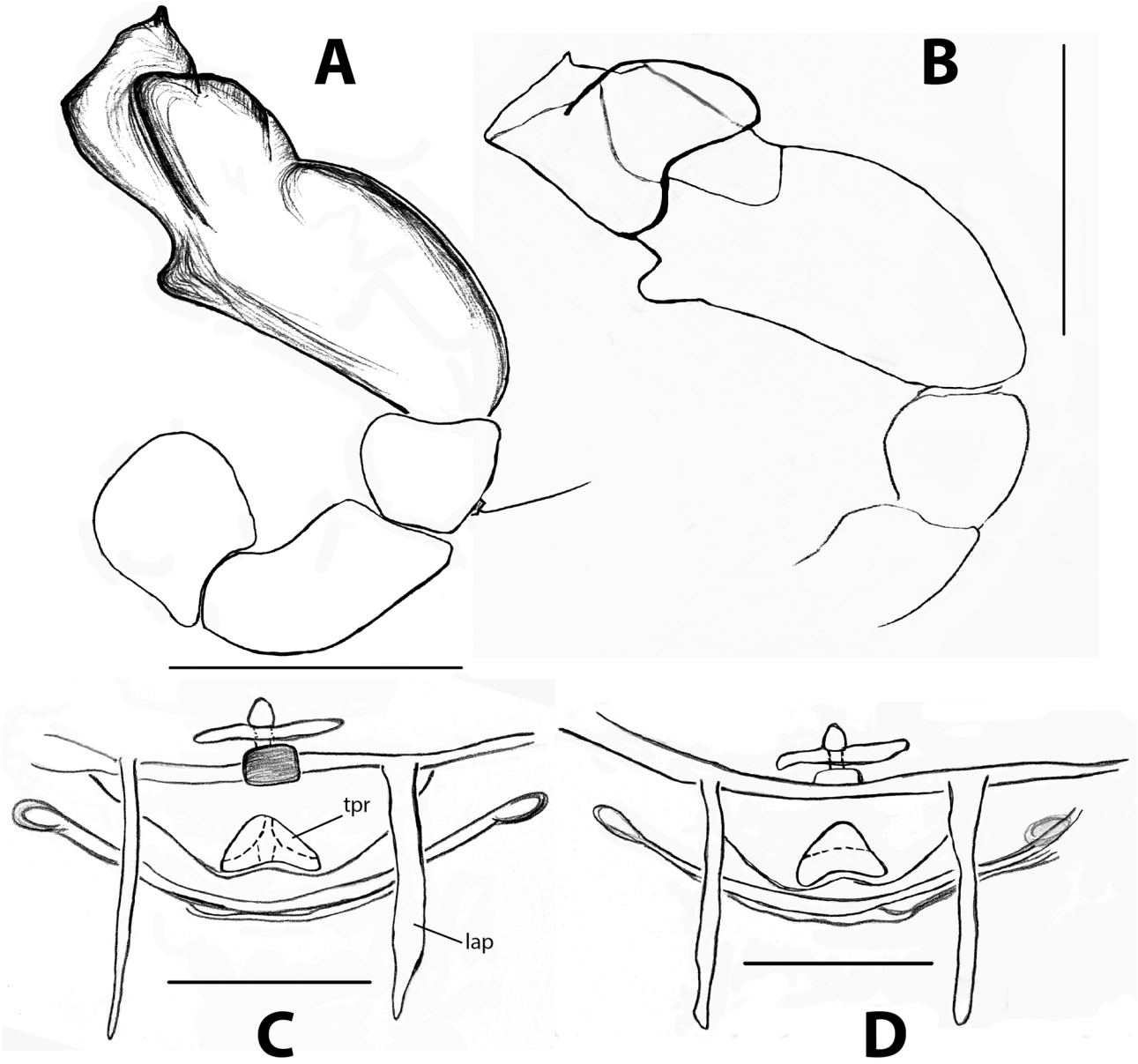

FIGURE 9. *Brignolia meemure* **sp. nov.** Male. A, B. left palp, retrolateral view; Female. C. epigastric region, dorsal view; D. same, ventral view. lap, lateral apodemes; tpr, triangular epigynal projection. Scale bars = 0.1 mm.

Other material examined. 1♂ (IFS_Oon_076): Sri Lanka, Uva Province, Badulla District, Ohiya, 06°50'32"N 80°53'05"E, 1280m, 30 August 2011, leg. S. P. Benjamin, N. Athukorala.

Etymology. Named for Sri Lankan-born Canadian novelist and poet, Philip Michael Ondaatje best known for the "*The English Patient*" and our favorite "*Anils Ghost*".

Diagnosis. Males can be easily recognized by the hammer-shaped palpal tip and the small triangular projection at the base of the bulb (bpr in Fig. 12A). Females can be recognized by the narrowed posterior tube, with a rounded ending and the anteriorly directed, triangular-shaped projection (tpr in Figs. 12C, D).

Description. Description based on all specimens listed above.

***MALE*:** Body length 2.04. Coloration: carapace usually reddish-brown, sternum and mouthparts orange-brown, abdominal scuta reddish-brown, abdominal inter scutal region not visible, fully covered with dorsal and ventral scuta; legs pale orange; palps dark red-brown. Carapace: broadly ovoid in dorsal view (Fig. 10A), smooth, sides striated, pars cephalica strongly elevated in lateral view (Fig. 10B), anteriorly slightly narrowed, with angular posterolateral corners, posterolateral edge without spikes and pits, lateral margin straight, posterior margin squared (Fig. 10D). Clypeus: straight in front view (Fig. 10C). Eyes: six, well developed, ALE largest, oval, PME and PLE

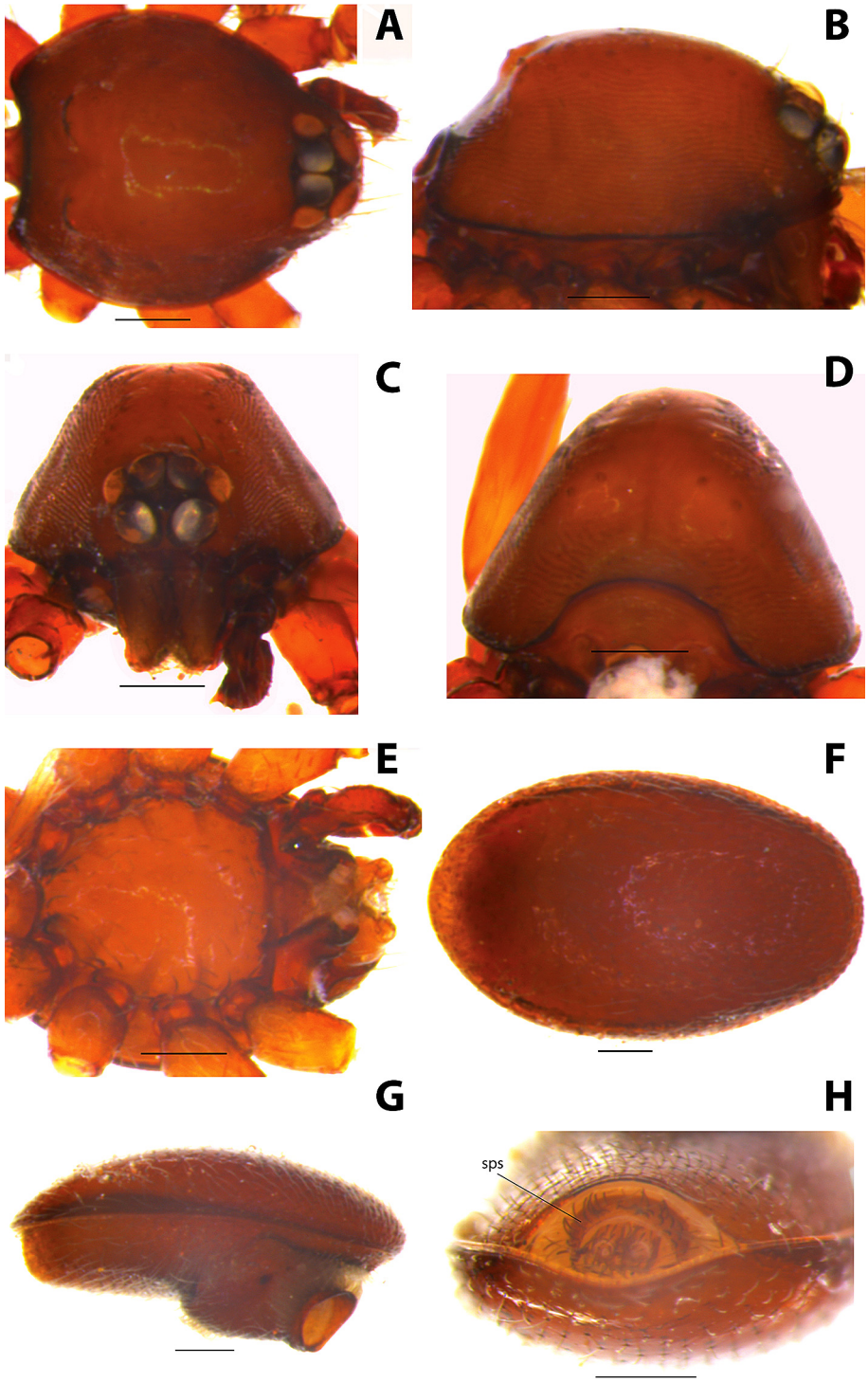

FIGURE 10. *Brignolia ondaatjei* **sp. nov.**, male from Badulla, Rawana Ella. A. carapace, dorsal view; B. same, lateral view; C. same, anterior view; D. same, posterior view; E. sternum, ventral view; F. abdomen, dorsal view; G. same lateral view; H. same, posterior view. sps, spinneret scutum. Scale bars = 0.2 mm.

equal in size and oval. Labium: triangular shaped, fused to sternum, same as sternum sclerotization. Endite: distally not excavated, anteromedian part with stout projection, edges heavily sclerotized than sternum. Sternum: slightly longer than wide, decorated with round pits, radial furrows consisting with rows of small pits present between coxa I–II, II–III and III–IV (Fig. 10E). Abdomen: ovoid, dorsal scutum strongly sclerotized (Fig. 10F), cover full length of abdomen (Fig. 10G), no soft tissue visible from above, epigastric scutum strongly sclerotized, extend to pedicel region, scuto-pedicel region with W-shaped straight transverse ridge (Fig. 11C), book lung covers, nail-shaped (Fig. 11A), dark, oval without elevation, pedicel tube large with dorsolateral triangular extensions, pedicel region

fully covered with fine setae (Fig. 11C). Postepigastric scutum strongly sclerotized, long, semicircular, covering most part of the area and fused to epigastric scutum, with short posteriorly directed lateral apodemes (Fig. 11A). Spinnerets scutum present (Fig. 10H), short setae present. Legs: spineless. Sperm pore: large, elliptical, situated in between anterior and posterior spiracles. Genitalia: palpal bulb with a hammer-shaped palpal tip (Figs. 12A, B) and a small triangular projection at the base of the palpal bulb (bpr in Fig. 12A).

***FEMALE*:** Body length: 2.04, Coloration and somatic morphology same as male (Fig. 11E), pars cephalica strongly elevated in lateral view, squared posterior margin. Genitalia: posterior tube narrow, elongated, with rounded ending, triangular-shaped protrusion anteriorly directed from the posterior spiracular groove (Figs. 12C, D).

Intraspecific variation. Color ranges from reddish-brown to orange-brown. Body length of males ranges from 1.90–2.04. One specimen (IFS_Oon_076) shows long setae on the chelicerae and some strong setae on the top of the carapace. Scuto-pedicel ridge slightly curved and anteriorly directed in some specimens (Figs. 11A–D).

Distribution. Sri Lanka: Badulla District: Ohiya (L 30), Rawana Ella (L 50).

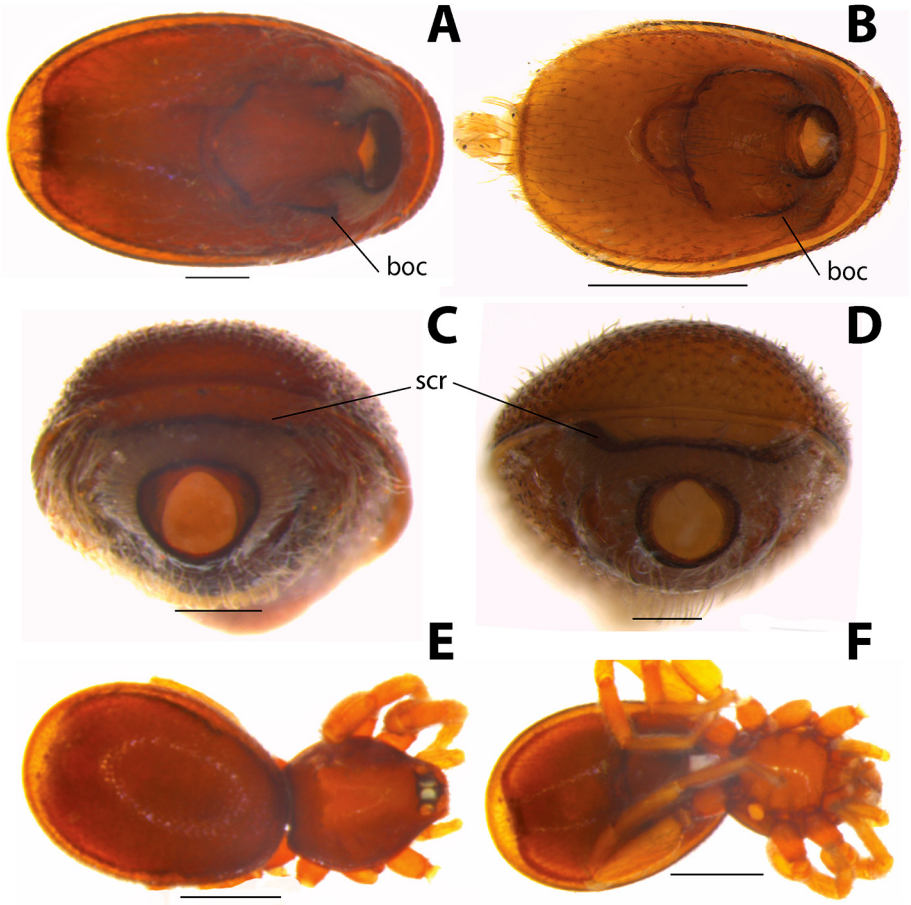

FIGURE 11. Intraspecific variation of *Brignolia ondaatjei* **sp. nov.**, males from Badulla, Rawana Ella and Ohiya. A, B. abdomen, ventral view; C, D. same, anterior view; Female from Badulla, Rawana Ella. E. habitus, dorsal view; F. same, ventral view. boc, booklung covers, scr, scuto-pedicel ridge. Scale bars = 0.2 mm (A, C–D), 0.5 mm (B, E–F).

Brignolia parumpunctata (Simon, 1893)

(Figs. 13A–H, 15A–B)

Xestaspis parumpunctata Simon, 1893b: 305.
Gamasomorpha perplexa Bryant, 1942: 325, figs 11–12, 18.
Opopaea recondite Chickering, 1951: 231, figs 18–19.
Brignolia cubana Dumitrescu & Georgescu, 1983: 107.
Brignolia cubana: Saaristo, 2001: 343, figs 139–141, 142a–b, 143, 144a–b, 145.
Brignolia cubana: Saaristo & van Harten, 2006: 131, figs 1, 2a–b, 3.

Opopaea recondite Burger, 2009: 343, figs 11–16, 23c–g.
Brignolia recondite Platnick & Dupérré, 2009: 4.
Brignolia cubana: Saaristo, 2010: 111, figs 22.139–145.
Brignolia parumpunctata Platnick *et al*., 2011: 14–32, figs. 1–94

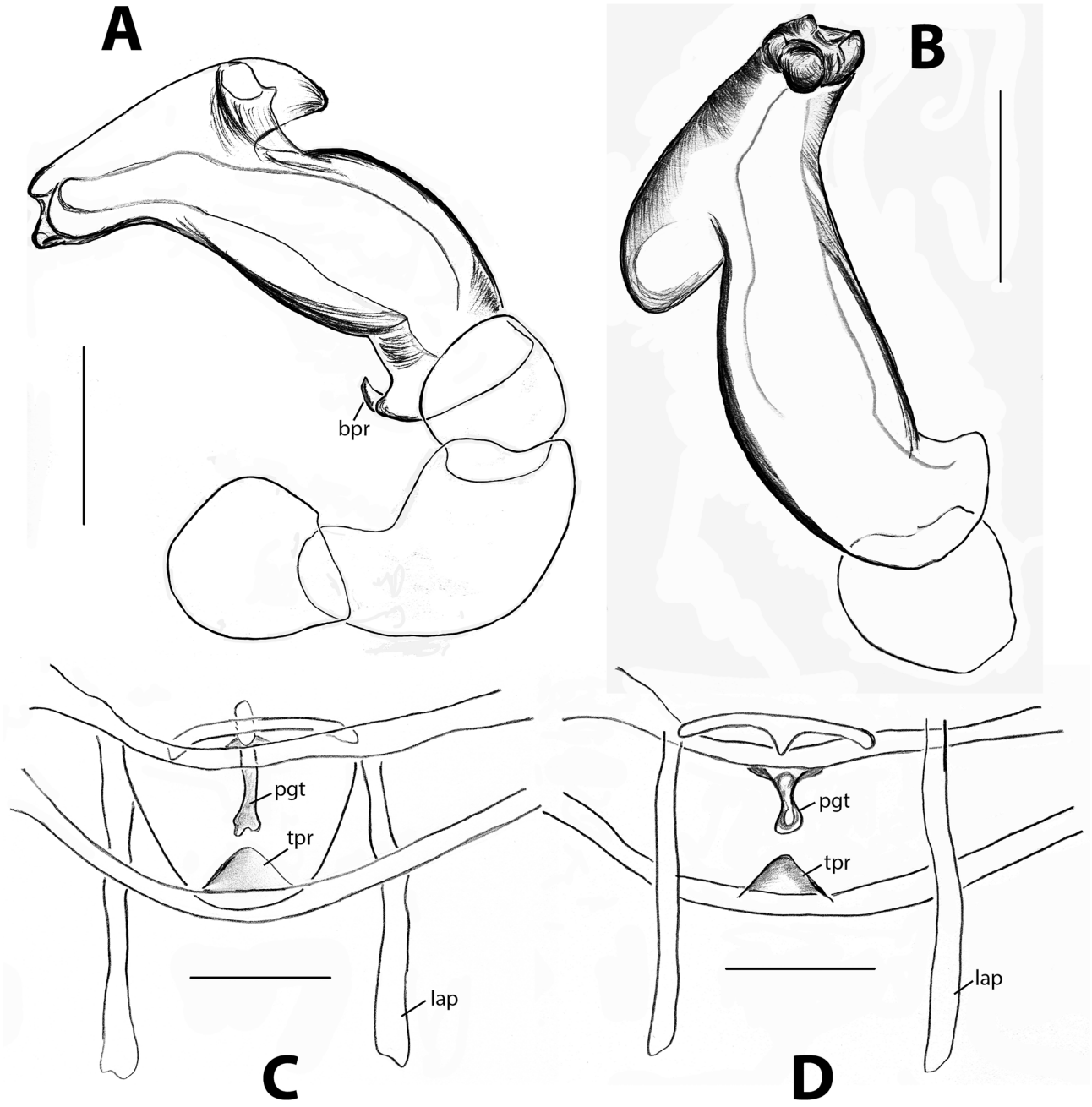

FIGURE 12. *Brignolia ondaatjei* **sp. nov.**, from Rawana Ella. Male. A. left palp, retrolateral view; B. left palp, prolateral view; Female. C. epigastric region, ventral view; D. same, dorsal view. bpr, bulbus projection; lap, lateral apodemes; pgt, posterior genitalic tube; tpr, triangular epigynal projection. Scale bars = 0.1 mm.

Material examined. 2♂ (IFS_Oon_003–004): Sri Lanka, North Western Province, Puttalam District, Wanathavilluwa, 08°10'15"N 79°52'30"E, 30m, 24 May 2010, leg. N. Athukorala. 1♂and 2♀(IFS_Oon_043–045): Eastern Province, Ampara District, Kokagala, 07°25'28"N 81°3'27"E, 125m, 09 February 2010, leg. S. P. Benjamin, S. Batuwita. 1♂and 1♀ (Oon_296–297): Ampara district, Nuwaragala FR, 07°26'07.4"N 81°31'58.8"E, 70m, 19 May2015, leg. N. Athukorala. 1♂and 2♀ (IFS_Oon_079–081): Sri Lanka, North Central Province, Anuradhapura District, Padaviya, 8°48'0N 80°45'0E, 55m, 10 January 2012, leg. N. Athukorala. 1♂ and 1♀ (IFS_Oon_211–212):

Southern Province, Hambantota District, Tissamaharama, 6°17'N 81°17'E, 18m, 02 February 2014, leg. C.I. Clayton. 2♂ and 2♀ (IFS_Oon_232–235): Sri Lanka, Western Province, Gampaha District, Kadolkelle FR, 7°11'49"N 79°50'35"E, 10m, 24 September 2014, leg. N. Athukorala.

Diagnosis. Males be can easily recognized by the ventrally directed protrusion situated medially on the clypeus (Fig. 13C) and by the distinctively curled dorsal protrusion on the palpal bulb (Figs. 15A). Females can be recognized by the rounded, elevated protrusion situated between the epigastric furrow and the groove connecting the posterior spiracles (fig. 93 in Platnick *et al*. (2011).

Description. see Platnick *et al*. (2011).

Distribution. Pantropical (World Spider Catalog, 2016).

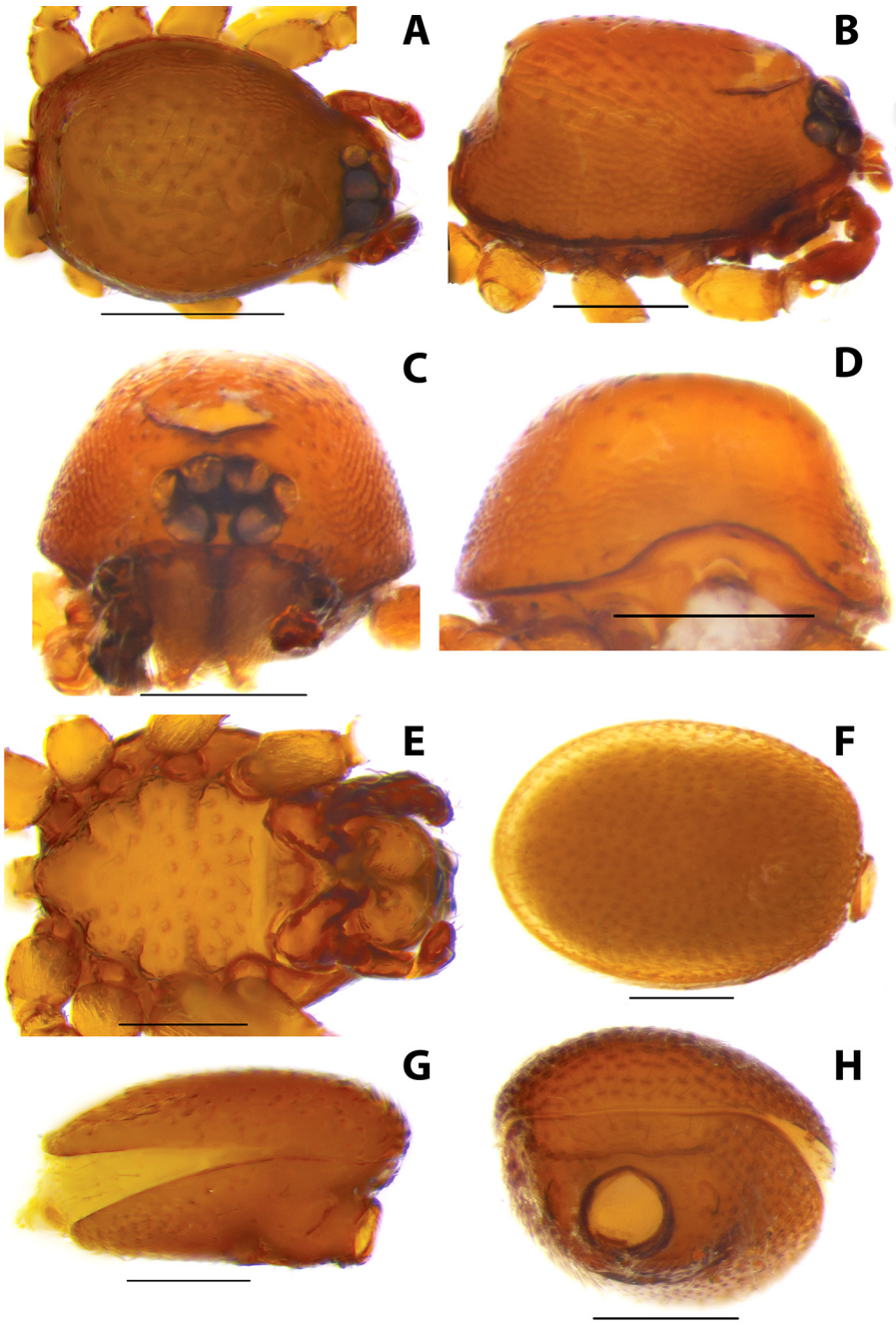

FIGURE 13. *Brignolia parumpunctata* (Simon, 1893), male from Kadolkele FR. A. carapace, dorsal view; B. same, lateral view; C. same, anterior view; D. same, posterior view; E. sternum, ventral view; F. abdomen, dorsal view; G. same lateral view; H. same, anterior view. Scale bars = 0.2 mm.

***Brignolia ratnapura* Platnick *et al*., 2011**
(Figs.14A–H; 15C–D)

Brignolia ratnapura Platnick *et al*., 2011: 53–58, figs. 269–294

Type material. National Natural History Museum, Leiden, Netherlands. Not examined.

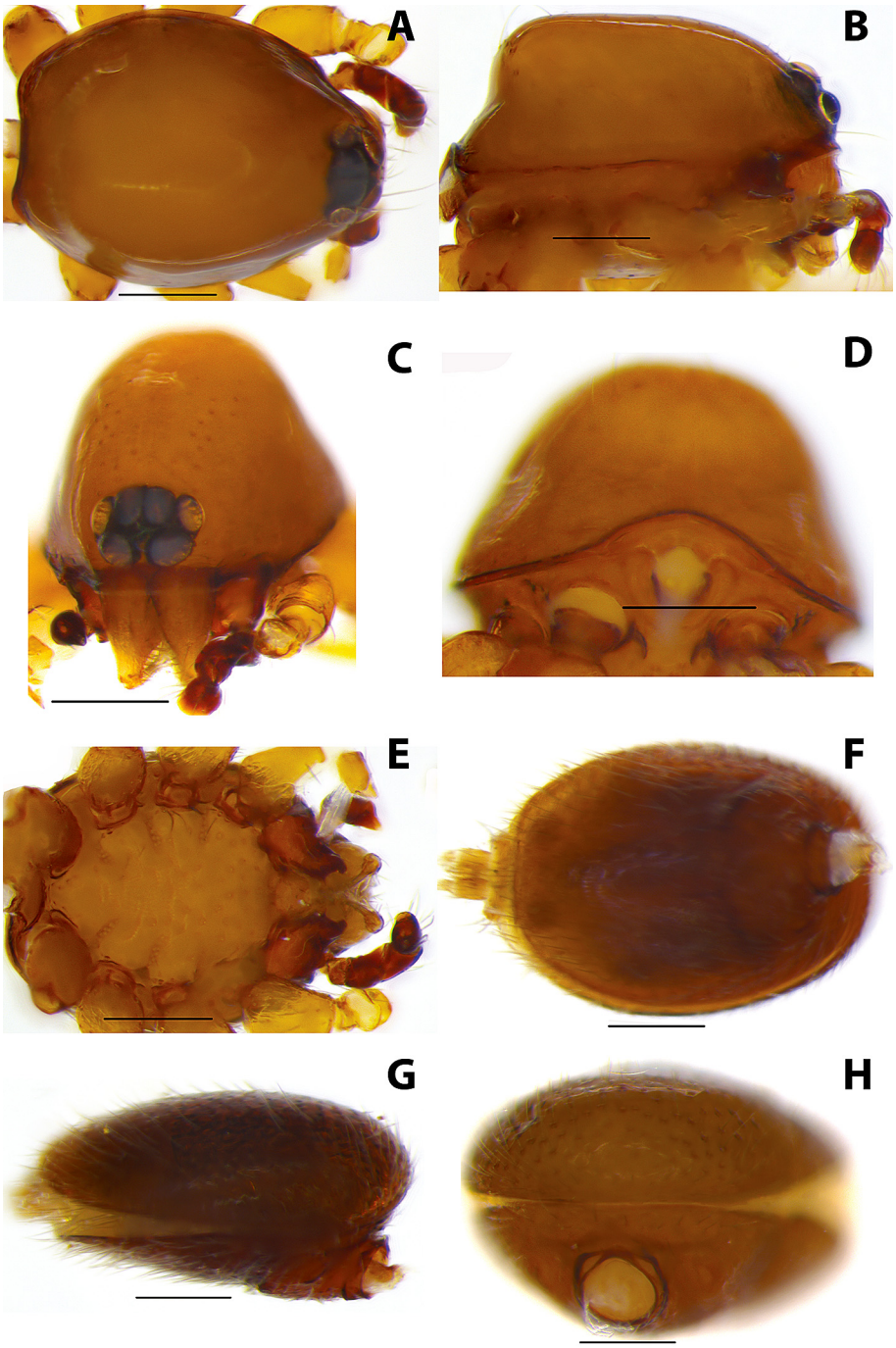

FIGURE 14. *Brignolia ratnapura* Platnick *et al*., 2011, male from Hakgala SNR. A. carapace, dorsal view; B. same, lateral view; C. same, anterior view; D. same, posterior view; E. sternum, ventral view; F. abdomen, ventral view; G. same lateral view; H. same, anterior view. Scale bars = 0.2 mm.

Other material examined. 1♂ (IFS_Oon_022): Sri Lanka, Central Province, Kandy District, Deltota, Loolcondera, 07°08'45" N 80°41'53"E, 1480m, 11 May 2010, leg. S. Batuwita, N. Athukorala. 1♂ and 4♀ (IFS_Oon_051–055): Sri Lanka, North West Province, Kurunagala District, Ethagala FR, 07°28'17"N 80°22'30"E,

190m, 20 August 2010, leg. S. Batuwita. 1♂ and 3♀ (IFS_Oon_267–270): same locality and data, 08 April 2015, S. P. Benjamin *et al*. 1♂ and 1♀ (IFS_Oon_143–144): Sri Lanka, Uva Province, Badulla District, Bandarawela, 6°50'59.5"N 81°00'48.1"E, 1042m, 31 December 2011, S. P. Benjamin *et al*. 1♂ (IFS_Oon_131): Sri Lanka, Badulla District, Uva Province, 189th mile post, between Koslanda and Beragala, 1370m, 6°44'48.4"N 80°57'56.3"E, 01 January 2012, S. P. Benjamin *et al*. 2♀ (IFS_Oon_203–204): Sri Lanka, Uva Province, Badulla District, Namunukulla FR, along Passara/Ella road, 6°52'N 81°7'E, 1337 m, 22 January 2014, leg. S. P. Benjamin, N. Athukorala. 2♂ and 2♀ (IFS_Oon_259–261, 266): same locality and data, 27 February 2015; 1♂ and 1♀(IFS_Oon_216–217): Sri Lanka, Badulla District, Rawana Ella, 990m, 6°51'52.4"N 81°03'01.3"E, 31 December 2011, leg. S. P. Benjamin *et al*. 2♂ and 1♀ (IFS_Oon_256–258): Nuwara Eliya District, Hakgala Strict Nature Reserve, 6°54'40"N 80°47'36"E, 22 January 2015, leg. S. P. Benjamin *et al*. 1♂(IFS_Oon_042): Central Province, Kandy District, Randenigala, Victoria Randenigala Rantabe sanctuary, 07°09'14"N 80°54'12"E, 289m, 11 May 2010, leg. S. Batuwita, N. Athukorala.

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

Diagnosis. Males can be easily recognized by the rounded dorsal protrusion on the palpal bulb (Fig. 15C). However, the protrusion is less coiled as well as a longer and narrower than the dorsal protrusion of *B. parumpunctata*. Females can be recognized by the twisted posterior genitalic tube and the absence of an external epigastric protrusion (Fig. 15D). See also (Platnick *et al*. 2011).

Description. Description based on all material listed above.

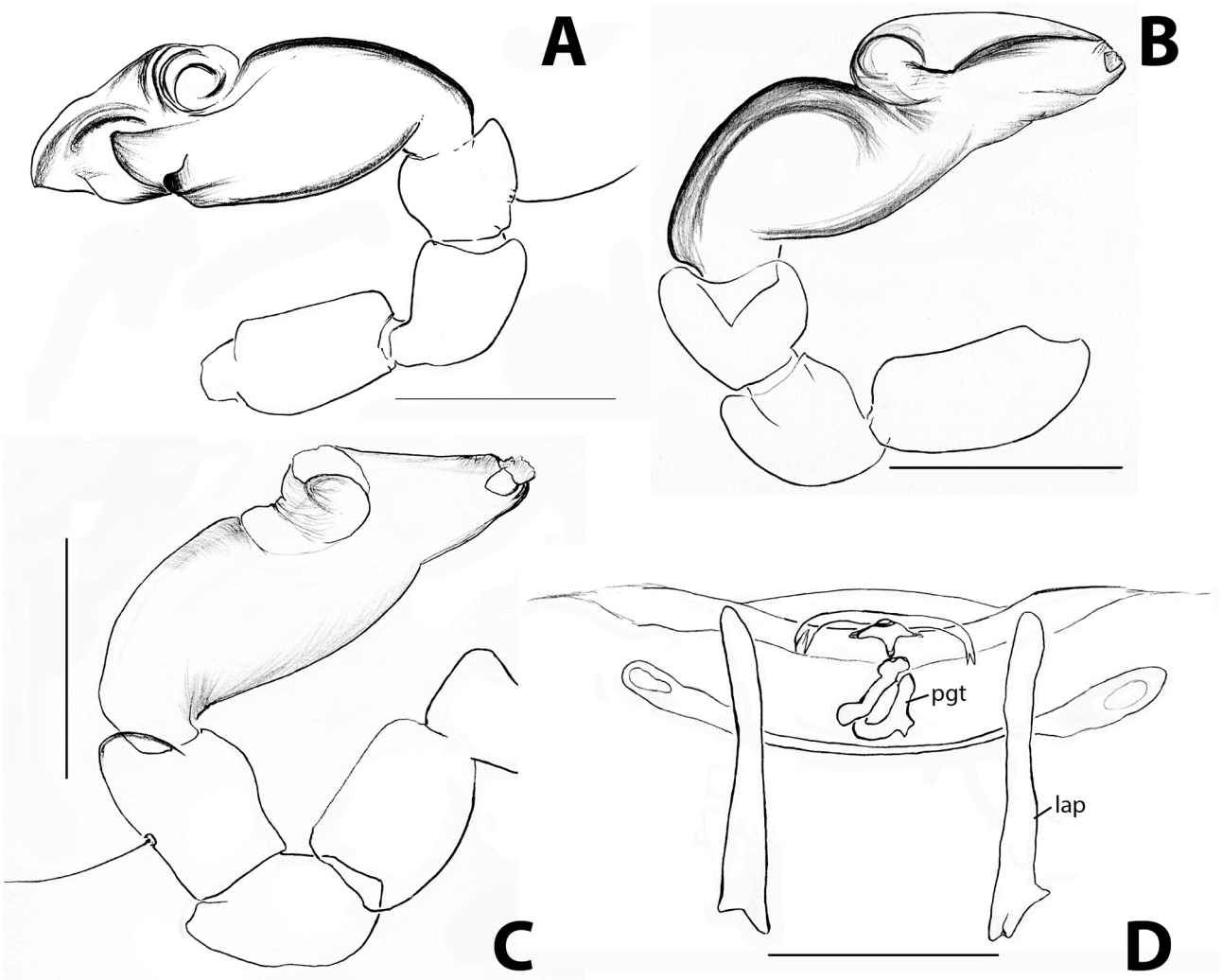

FIGURE 15. *Brignolia parumpunctata* (Simon, 1893), from Kadolkele FR. Male. A. left palp, retrolateral view; B. left palp, prolateral view; *Brignolia ratnapura*, from Hakgala SNR. Male. C. left palp, prolateral view; Female D. epigastric region. lap, lateral apodemes; pgt, posterior genitalic tube. Scale bars = 0.1 mm.

MALE: Body length 1.2–1.8. Coloration: carapace usually orange-brown, sternum and mouthparts pale orange to orange-brown; abdominal scuta orange-brown, abdominal inter scutal region white; legs pale orange; palps dark red-brown; Carapace: ovoid in dorsal view (Fig. 14A), smooth, sides striated, pars cephalica strongly elevated in lateral view (Fig. 14B), anteriorly slightly narrowed, with angular posterolateral corners, posterolateral edge without spikes and pits, lateral margin straight, posterior margin rounded (Fig. 14D). Clypeus: rebordered, straight in front view (Fig. 14C). Eyes: six, well developed, ALE largest, oval, PME and PLE equal in size and oval, posterior eye row slightly procurved from frontal view. Labium: triangular shaped, fused to sternum, same as sternum sclerotization. Endite: distally not excavated, anteromedian part with stout projection, same as sternum sclerotization. Sternum: longer than wide, decorated with small rounded pits, radial furrows consisting of rows of small pits present between coxa I–II, II–III and III–IV (Fig. 14E). Abdomen: ovoid, dorsal scutum strongly sclerotized (Fig. 14G), covers full length of abdomen, no soft tissue visible from above, epigastric scutum strongly sclerotized, extend to pedicel region, scuto-pedicel region with deeply W-shaped transverse ridge, curved middle region lighter (Fig. 14H), book lung covers small, oval without elevation, pedicel tube small with dorsolateral triangular extensions, postepigastric scutum strongly sclerotized, long, semicircular, covering most part of the area and fused to epigastric scutum, with short posteriorly directed lateral apodemes (Fig. 14F). Spinnerets scutum present, short setae present. Legs: spineless. Sperm pore: small, oval, situated at the level of anterior spiracles. Genitalia: small, strongly sclerotized, right and left palps symmetrical. Cymbium completely fused to bulb, not extending distal tip of the bulb. Bulb rounded dorsal protrusion on the palpal bulb (Fig. 15C).

FEMALE: Body length 1.56. Coloration and somatic morphology same as male. Carapace highly elevated, ovoid, smooth, sides striated, lateral margin straight, posterior margin rounded. Genitalia: Postepigastric region without any modification. Posterior genitalic tube convoluted, thicker anteriorly than posteriorly originated from anterior spiracular groove, situated in between epigastric furrow and posterior spiracular groove (Fig. 15D).

Distribution. Sri Lanka. *Previous records*: Sinharaja FR, Ratnapura. *New records*: Kandy District: Deltota, Loolcondera (L 16), Nuwara Eliya District: Hakgala Strict Nature Reserve (L 53), Kurunagala District: Ethagala FR (L 10), Badulla District: Koslanda/ Beragala (L 52), Bandarawela (L 67), Namunukulla FR (L 51), Rawana Ella (L 50),Gampaha District: Kadolkelle FR (L 60).

Intraspecific variation. Body length of males ranges from 1.22–1.78. Coloration varies from orange-brown to pale orange, sternum with small rounded pits more visible in some specimens, two small black spots present on either side of the posterior part of the postepigastric scutum. Degree of sclerotization of palps varies from dark orange-brown to red-brown.

Brignolia shyami **sp. n.**
(Figs.16A–H; 17A–F; 18A–D)

Type material. *Holotype* 1♂ (IFS_Oon_244): Sri Lanka, Kegalle District, Kurulukele FR, 07°14'12" E 80°20'33" E, 250m, 12 November 2014, leg. N. Athukorala. Deposited in NMSL.
Paratype: 2♀ (IFS_Oon_245, 252): from same locality and data as holotype. Deposited in NMSL.

Etymology. Named for Shyam Selvadurai, a Sri Lankan Canadian novelist best known for the novels "*Funny Boy"* and "*Cinnamon Gardens*".

Diagnosis. Males can be easily recognized by the palp which has a triangular dorsally directed projection and a beak-like palpal tip (Figs. 18A, B). Females can be recognized by the lip-like ridge in between epigastric furrow and posterior spiracular groove (Fig. 17F, 18C, D).

Description. Description based on the types.

MALE**:** Body length 1.42. Coloration: carapace, sternum and mouthparts pale yellow, abdominal scuta pale yellowish-white, abdominal inter scutal region not visible, fully covered with dorsal and ventral scuta; legs pale yellow; palps yellow; palpal tip dark yellow-brown. Carapace: broadly oval in dorsal view (Fig. 16A), sides slightly striated, pars cephalica slightly elevated in lateral view (Fig. 16B), anteriorly slightly narrowed, posterolateral edge without angular posterolateral corners, spikes and pits, lateral margin straight, chelicerae with enlarged setae, posterior margin rounded (Fig. 16D). Clypeus: straight in front view (Fig. 16C). Eyes: six, well developed, ALE largest, oval, PME and PLE equal in size and oval. Labium: triangular shaped, fused to sternum, same as sternum sclerotization. Endite: distally not excavated, anteromedian part with stout projection, base with a

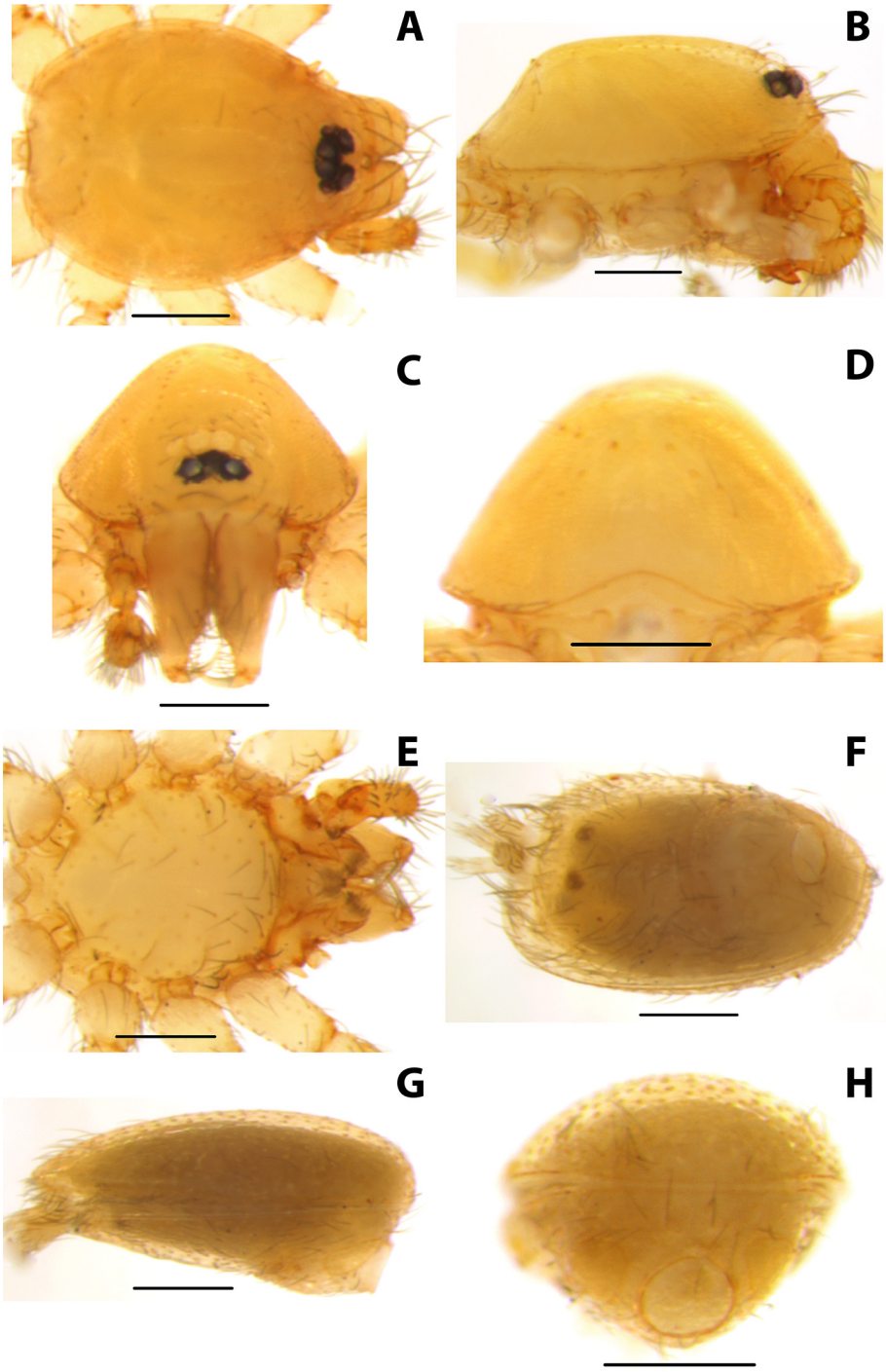

FIGURE 16. *Brignolia shyami* **sp. nov.**, male from Kegalle, Kurulukele FR. A. carapace, dorsal view; B. same, lateral view; C. same, anterior view; D. same, posterior view; E. sternum, ventral view; F. abdomen, ventral view; G. same lateral view; H. same, anterior view. Scale bars = 0.2 mm.

triangular projection (Fig. 16E, 17 A,B), heavily sclerotized than sternum. Sternum: broad, decorated with round pits, radial furrows present between coxa I–II, II–III and III–IV and appear as light brown markings (Fig. 16E). Abdomen: ovoid, dorsal scutum strongly sclerotized, covers full length of abdomen (Fig. 16G), no soft tissue visible from above, epigastric scutum strongly sclerotized, extend to pedicel region, scuto-pedicel region with scarcely detectable, straight scutal ridge without small dorsolateral triangular extensions (Fig. 16H), book lung covers small without elevation, postepigastric scutum strongly sclerotized, long, semicircular, covering most part of the area and fused to the epigastric scutum, two dark brown patches present near the posterior part just above spinnerets (Fig. 16F). Spinnerets scutum not detectable, short setae present. Legs: spineless. Sperm pore: small,

situated at level of anterior spiracular groove. Genitalia: palpal bulb narrow, with a dorsally directed triangular projection and a beak-like tip. Base of the palpal bulb without a triangular projection (Figs. 18A–B). Palpal tibia rounded.

***FEMALE*:** Body length: 1.52. Coloration and somatic morphology same as male, pars cephalica slightly elevated in lateral view, rounded posterior margin, endite projection absent (Figs. 17C–D). Genitalia: postepigastric region with large lip-like ridge (Fig. 17F) situated between epigastric furrow and posterior spiracular groove (Figs. 18C–D). Postepigastric region with posterior genitalic tube and without any triangular projections, posterior tube extends close to the ridge.

Distribution. Sri Lanka: Kegalle District: Kurulukele FR (L 28).

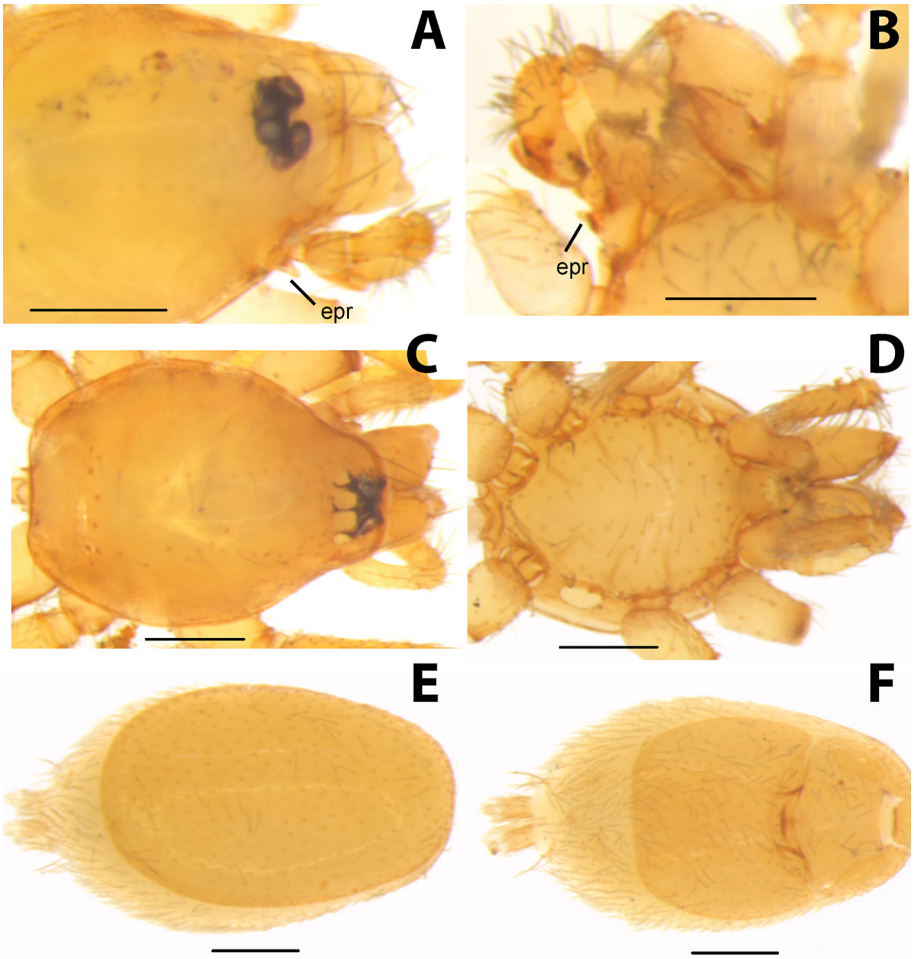

FIGURE 17. *Brignolia shyami* **sp. nov.**, male from Kegalle, Kurulukele FR. A, B. projection; Female. C. carapace, dorsal view; D. sternum, ventral view; E. abdomen, dorsal view; F. same, ventral view. epr, endite projection. Scale bars = 0.2 mm.

Brignolia trichinalis (Benoit, 1979)

(Fig. 19A–B)

Gamasomorpha trichinalis Benoit, 1979: 192, figs 2a–e.
Lisna trichinalis Saaristo, 2001: 342, figs 131A–B, 132–134, 135A–B, 136–138
Lisna trichinalis: Saaristo: Saaristo, 2010: 132, figs 22.131–138.
Brignolia trichinalis Platnick *et al*., 2011: 43–45, figs 190–223.

Material examined. One ♀ (IFS_Oon_165): Sri Lanka, Central Province, Kandy District, Udawattakelle FR, 07°17'57"N 80°38'29"E, 580m, 29 December 2011, leg. S. P. Benjamin, litter.

Diagnosis. Males can be easily recognized by the extended lobe at the tip of the palp (figs. 198–205 in Platnick *et al*. (2011). Females can be recognized by the long epigastric scape (Figs. 19A–B; figs. 221–223 in Platnick *et al*. (2011).

Description. see Platnick *et al*. (2011).
Distribution. Mauritius, Seychelles and Sri Lanka (new record).

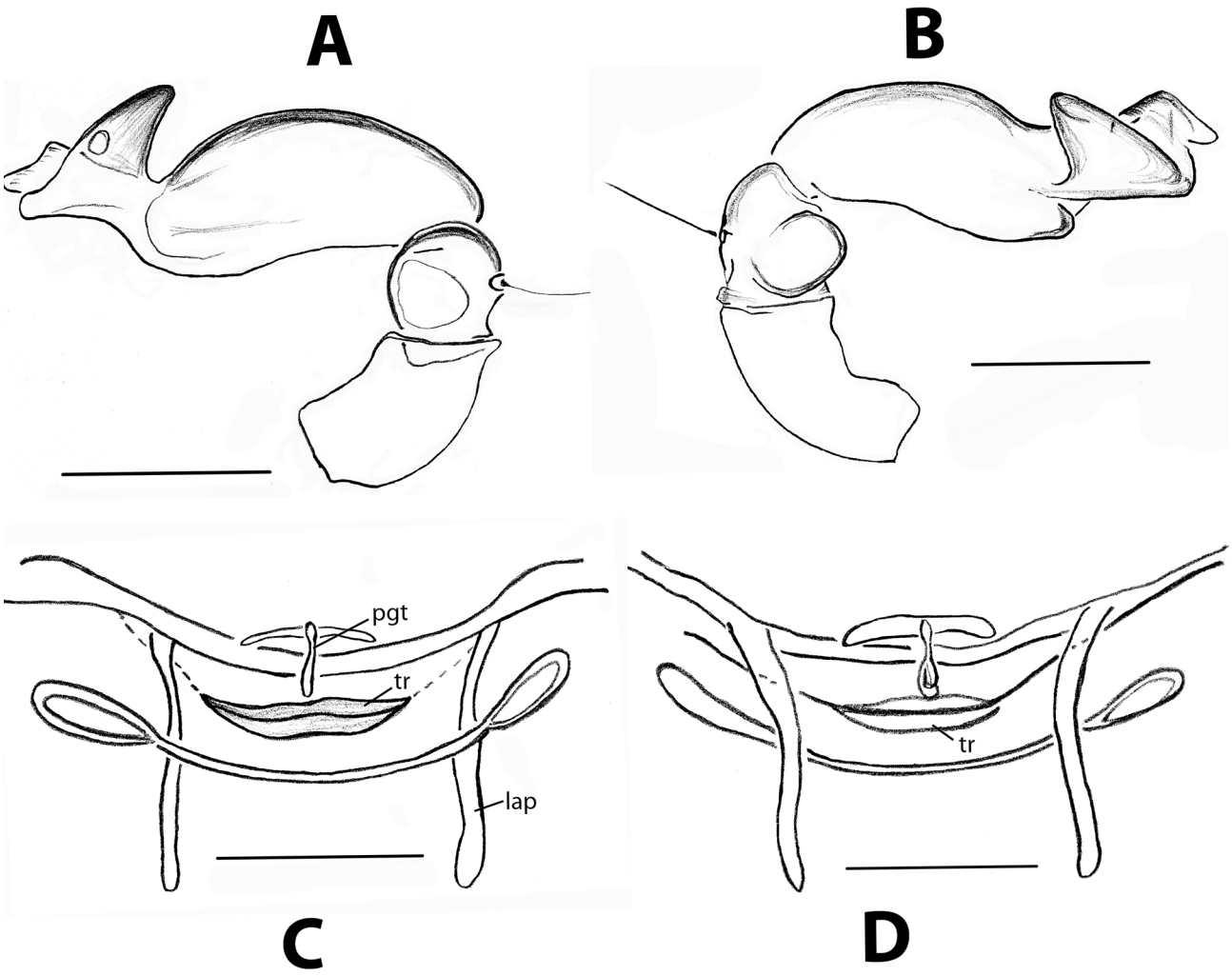

FIGURE 18. *Brignolia shyami* **sp. nov.**, from Kegalle, Kurulukele FR. Male. A, B. left palp, retrolateral view; Female. C. epigastric region, ventral view; D. same, dorsal view. lap, lateral apodemes; pgt, posterior genitalic tube; tr, transverse ridge. Scale bars = 0.1 mm.

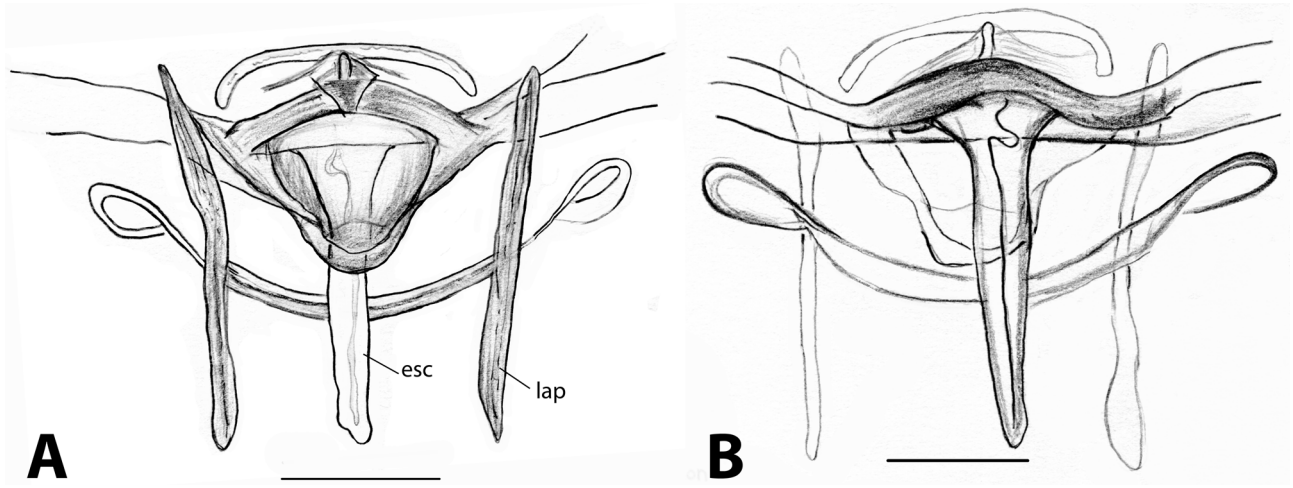

FIGURE 19. *Brignolia trichinalis* (Benoit, 1979), female from Kandy, Udawattakele FR. A. epigastric region, dorsal view; B. same, ventral view. esc, epigastric scape. Scale bars = 0.1 mm.

Key to *Brignolia* of Sri Lanka

1 Males with median clypeal enlargement extending over the base of chelicerae (Fig. 13C); palpal bulb with curled dorsal projection forming a complete circle (Fig. 15A); female postepigastric region with elevated disk (figs. 69, 93 in Platnick *et al*. 2011) . . . . . *B. parumpunctata*

- Males without median clypeal enlargement; dorsal projection on palpal bulb otherwise (if rounded, not a complete circle; female postepigastric region without a elevated disk 2

2 Pars cephalica strongly elevated, pars thoracica sloping steeply (Figs. 7B, 10B, 14B) 3

- Pars cephalica only slightly elevated, pars thoracica sloping gradually to posterior margin (Figs. 2B, 4E, 16B) 7

3 Posterior carapace margin rounded (Figs. 2D, 4F, 7D, 14D, 16D) 4

- Posterior carapace margin squared (Fig. 10D; fig. 242 in Platnick *et al*. 2011) 6

4 Palpal bulb with distinct distal lobe (figs. 199, 204 in Platnick *et al*. 2011); epigastric region with long scape (Fig. 19A) . . . . . *B. trichinalis*

- Palpal bulb without distinct distal lobe, epigastric region without scape 5

5 Palpal bulb with rounded dorsal projection (Fig. 15C); epigastric region with twisted posterior genitalic tube (Fig. 15D) . . . . . *B. ratnapura*

- Palpal bulb with blunt-tip and small dorsal projection (Fig. 9A); epigastric region with wide anteriorly directed triangular projection (Fig. 9C) . . . . . *B. meemure* **sp. nov.**

6 Posterior margin of carapace with conspicuous, distinctly widened, lateral triangular sclerotizations, palpal bulb dorsally directed, flattened tip; females with broad triangular process in between the epigastric furrow and the posterior spiracular groove (figs. 250, 264 in Platnick *et al*. 2011) . . . . . *B. sinharaja*

- Posterior margin of carapace uniform in width, palpal bulb with hammer-shaped tip (Fig. 12A); females with an anteriorly directed triangle originating from the posterior spiracular groove (Fig. 12C) . . . . . *B. ondaatjei* sp. nov.

7 Males 8

- Females 11

8 Palpal bulb with dorsally directed triangular projection anteriorly (Figs. 6A, 18A; figs. 808–811 in Platnick *et al*. 2011) . . 9

- Palpal bulb without dorsally directed triangular projection anteriorly, but with a distally expanded, blunt-tip (Fig. 3A) . . . . . *B. ambigua*

9 Triangular projection on base of the endite (Figs. 4A, C 17A, B), edge of palpal tibia rounded (Figs. 6A, 18A, B) 10

Triangular projection on base of the endite absent, edge of palpal tibia not rounded . . . . . *B. nigripalpis*

10 Tip of the palpal bulb square-shaped (Fig. 6A) . . . . . *B. carlmulleri* **sp. nov.**

- Tip of the palpal bulb beak-like (Fig. 18A) . . . . . *B. shyami* **sp. nov.**

11 Postepigastric region with ridge in between epigastric furrow and posterior spiracular groove (Figs. 3C–D, 18C–D) 12

- Postepigastric region without ridge in between epigastric furrow and posterior spiracular groove 13

12 Dark undulated transverse ridge near the epigastric furrow (tr in Fig. 3C) . . . . . *B. ambigua*

- Lip-like transverse ridge between epigastric furrow and posterior spiracular groove (tr in Figs. 18 C–D) . . *B. shyami* **sp. nov.**

13 Postepigastric region with anteriorly directed triangular projection (figs. 820–821 in Platnick *et al*. 2011) . . . . *B. nigripalpis*

- Postepigastric region without anteriorly directed triangular projection (Fig. 6B) . . . . . *B. carlmulleri* **sp. nov.**

Discussion

Comparative morphology of Sri Lankan *Brignolia*: Platnick *et al*. (2011) distinguished two groups of species within *Brignolia* based on carapace morphology. In one group of species, also termed "the low shouldered group", the pars cephalica is relatively low and the pars thoracica slops gradually to the posterior margin. Sri Lankan species included in this group are: *B. ambigua*, *B. carlmulleri* **sp. nov.**, *B. nigripalpis* and *B. shyami* **sp. nov.** (Figs. 2B, 4E, 16B). Sri Lankan species included in the second, "high shouldered group", with a strongly elevated pars cephalica and a steeply sloping pars thoracica are: *B. meemure* **sp. nov.**, *B. ondaatjei* **sp. nov.**, *B. parumpunctata*, *B. ratnapura*, *B.sinharaja* and *B. trichinalis* (Figs. 7B, 10B, 13B, 14B).

Next feature of interest noted in Platnick *et al*. (2011) is the posterior margin of the carapace; this can be either rounded (Figs. 2D, 4F, 7D, 14D, 16D) or squared (Fig. 10D, fig. 242 in Platnick *et al*. (2011). All low shouldered Sri Lankan species have the smooth, rounded rim, whereas high shouldered species have a squared dorsal rim. Although *B. meemure* **sp. nov.**, *B. parumpunctata*, *B. ratnapura* and *B. trichinalis*, all which belonged to the high shouldered group, retained a rounded rim. Platnick *et al*. (2011) suggested that they might be basal members of this group.

Presence in males of a triangular projection on base of the endite (Figs. 4C, 17A, B) is a distinct feature of *B. carlmulleri* **sp. nov.** and *B. shyami* **sp. nov.** Its presence might be synapomorphic for these two species. They may be sister species, based on this as well as palpal characters such as the dorsally directed palpal tip and the rounded palpal tibia (Figs. 6A, 18A).

Decorations around the scuto-pedicel region are informative, which include shape of the dorsal ridge, pair of anteriolateral triangles, presence of setae. The dorsal ridge can be present or absent, straight to deeply W-shaped. *B. ambigua*, *B. carlmulleri* **sp. nov.** and *B. shyami* **sp. nov.** present a barely visible straight scutal ridge, but few specimens of *B. carlmulleri* **sp. nov.** lack the scutal ridge. Whereas, all other Sri Lankan *Brignolia* except for *B. sinharaja* bear a W-shaped straight ridge (Figs. 2F, 11D, 14H). The W-shaped scutal ridge is apomorphic to a high shouldered-square rimmed species group (Platnick *et al*. 2011). In addition, anteriolateral triangles (Figs. 8A, 14H) are prominent in many species, such as *B. ratnapura*, *B. sinharaja*, *B. parumpunctata* and *B. meemure* **sp. nov.**

When we considered their genitalic characters, size of the palp, shape/size/direction of the tip and presence of projections a range of interspecific variations seems to occur with Sri Lankan species. The distal part of the palpal bulb is relatively large and as high as the cymbium in Indo-Sri Lankan *Brignolia*, than in *B. cobre* Platnick *et al*., 2011, from Florida and the West Indian (Platnick *et al*. 2011). Shape of the palpal tip also differ among species; *B. carlmulleri* **sp. nov.** has a squared blunt tip, *B. meemure* **sp. nov.** a blunt ended tip with a small projection, *B. ondaatjei* **sp. nov.** has a hammer-shaped and *B. shyami* **sp. nov.** a beak-like tip. In addition, the orientation of the tip of the palpal bulb and the presence of triangular projection at the base of the bulb are distinctive. Papal tips of *B. carlmulleri* **sp. nov.**, *B. nigripalpis* and *B. shyami* **sp. nov.** are dorsally directed (Figs. 6A, 18A, fig. 808 in Platnick *et al*. 2011), while a triangular projection at the base is present in *B .nigripalpis* and *B. ondaatjei* **sp. nov.** (Fig. 12A, fig. 803 in Platnick *et al*. 2011). *B. ratnapura* and *B. parumpunctata* share a curved dorsal protrusion on the male palpal bulb (Figs. 15A–C). Females show interspecific variations, for instance in shape and size of the posterior tube, anterior/posterior directed projection and size/shape of the projection. In addition, presence of unique characters is also helpful for identifying species. Such as, the posterior tube that is shorter in *B. ambigua* and *B. trichinalis*, whereas *B. ondaatjei* **sp. nov.** has a long, narrow posterior tube with a rounded ending (Figs. 12C–D). *B. ratnapura* and *B. carlmulleri* **sp. nov.** have a long, convoluted tube (Figs. 15D, 6B). However, the posterior tube of *B. ratnapura* is located between the epigastric furrow and the posterior spiracular groove (Fig. 15D), whereas the tube of *B. carlmulleri* **sp. nov.** is extended up to the posterior spiracular groove (Fig. 6B). *B. meemure* **sp. nov.**, *B. nigripalpis* and *B. ondaatjei* **sp. nov.** share an anteriorly directed, triangular-shaped projection in the epigastric region (Figs. 9C–D, 12C–D, fig. 820 in Platnick *et al*. 2011). Interestingly, few species show unique characters that can be considered as automorphic features, *B. ambigua*: semicircular sclerotized ridge (Figs. 3C–D), *B. parumpunctata*: small, median, knob-like projection (figs. 93–94 in Platnick *et al*. 2011), *B. shyami* **sp. nov.**: lip-like sclerotized ridge (Figs. 18C–D) and *B. trichinalis*: a long scape (Figs. 19A–B).

Distribution of Sri Lankan *Brignolia*: Ten species of *Brignolia* are now recorded from Sri Lanka: *B. ambigua, B. carlmulleri* **sp. nov.**, *B. meemure* **sp. nov.**, *B. nigripalpis, B. ondaatjei* **sp. nov.**, *B. parumpunctata, B. ratnapura, B. shyami* **sp. nov.**, *B. sinharaja* and *B. trichinalis*. Out of them seven species; *B. ambigua, B. carlmulleri* **sp. nov.**, *B. meemure* **sp. nov.**, *B. ondaatjei* **sp. nov.** *B. ratnapura, B. shyami* **sp. nov.** and *B. sinharaja* are endemic to Sri Lanka.

The pantropical *B. parumpunctata* has been previously reported from Sri Lanka (previous record: 1♂, Western province, Moragalla in 1989; Platnick *et al*. (2011). Here we report new localities (Eastern Province, North Central Province, North Western Province, Southern Province) for this species. *B. parumpunctata* is morphologically very similar to the Sri Lanka endemic *B. ratnapura*. Our collections suggest that *B. parumpunctata* is restricted to low elevation forests (10–125m), whereas *B. ratnapura* is widely distributed throughout the country. The two species *B. ratnapura* and *B. sinharaja* were previously only known from Sinharaja FR, in Ratnapura. We have not found *B. sinharaja* outside its type locality; it might be restricted to the type locality. Platnick *et al*. (2011) mentioned that two males of *B. trichinalis* were found among the type series of *B. nigripalpis*. We have found females of *B. trichinalis* from Udawattakele FR. *B. trichinalis* was previously known from Mascarene and Seychelle Islands and noted as possibly present in Sri Lanka. We can now confirm its presence in Sri Lanka.

Three of the four new *Brignolia* species described here are restricted in distribution to submontane and montane, cloud forests of the central highlands of Sri Lanka. *B. ondaatjei* **sp. nov.** is known only from two sites in the Badulla District (L 50, L 30; 990–1280m). *B. meemure* **sp. nov.** is known only from an isolated forest patch in Kandy District (L 29; 636 m). *B. carlmulleri* **sp. nov.** is known only from Hantane and Knuckles mountain ranges in the Kandy District (L 43,44; 585–1240 m).

Submontane and montane cloud forests of the central highlands of Sri Lanka are known to be home to a vast number of endemic flora and fauna (Werner, 1988; Werner & Balasubramaniam, 1992). These forests are increasingly threatened due to woodcutting of old trees for timber, fire wood collection, cultivation of cardamom and simple vandalism. These endemics might also be adversely affected by humane induced climate change.

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