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A review of some crab spider species of the genus *Borboropactus* Simon, 1884 (Araneae: Thomisidae) with descriptions of two new species

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Abstract: Taxonomic notes on some species of crab spiders of the genus *Borboropactus* Simon, 1884 are provided. Two new species, *Borboropactus palaniensis* sp. nov. (♀; India) and *B. gialong* sp. nov. (♀; Vietnam) are described. *Borboropactus bituberculatus* Simon, 1884 and *B. semenchenkoi* Omelko & Marusik, 2022 are regarded as junior subjective synonyms of *B. cinerascens* (Doleschall, 1859). *Borboropactus bangkongeus* Barrion & Litsinger, 1995 is removed from the synonymy of *B. cinerascens,* and its female is described for the first time.

Keywords: Arachnida - biodiversity - taxonomy - RTA-clade - Southeast Asia.

INTRODUCTION

Borboropactus Simon, 1884 is a relatively small genus of crab spiders with 18 nominal species from the Oriental and Afrotropical regions (World Spider Catalog, 2024). These spiders live on the forest floor or on the bark of standing trees just above the forest floor (Koh *et al.*, 2022: 686). They are unambiguously identifiable by the presence of a specialized sensory region on the dorsal surface of the tarsi (Benjamin, 2011: fig. 24c-d). *Borboropactus* species are currently placed in the family Thomisidae. However, they share characters, such as the presence of cheliceral teeth, a median apophysis, a conductor and epigynal teeth, with a large group of spiders within the RTA-clade (Benjamin, 2011; Ramírez, 2014; Wheeler *et al.,* 2017). A recent study suggests that *Borboropactus* is more closely related to Psechridae than to Thomisidae (Kulkarni *et al.,* 2023).

This paper aims to review several poorly known species of this genus on the basis of material from tropical Asia collected by Christa L. Deeleman-Reinhold and Peter Schwendinger. This is the ninth contribution of a series based partly on collections of spiders living on the floor and in the canopy of forests in Southeast Asia made by them and co-workers (Benjamin, 2013, 2014, 2016, 2017a, b, 2020; Benjamin & Clayton, 2016; Benjamin & Ranasinghe, 2019).

MATERIAL AND METHODS

Types and other specimens from the following institutions were borrowed and examined: CAS - California Academy of Sciences, San Francisco (CASENT - California Academy of Sciences, Entomological Collection); MCZ - Museum of Comparative Zoology, Cambridge, Massachusetts; MHNG - Museum of Natural History, Geneva; MNHN - National Museum of Natural History, Paris; RMNH - National Museum of Natural History, Naturalis, Leiden; ZFMK - Zoological Research Museum Alexander Koenig, Bonn; ZMMU - Zoological Museum of Moscow University, Moscow. General methodology follows Benjamin (2011). Specimens used for habitus illustrations were placed in 70 % ethanol and photographed with a Zeiss AxioCam HRc camera mounted on a dissecting microscope (Zeiss Discovery V20) with top illumination and a magnification of up to 150x. Images were edited using the Zeiss ZEN Pro software package. Structures of the left male palp are depicted unless otherwise stated. SEM methods are explained in Benjamin (2011). All measurements are in millimetres. The leg formulas are given from the longest to the shortest legs.

Abbreviations of morphological structures: ALE - anterior lateral eyes, AME - anterior median eyes, C - conductor, CD - copulatory duct, E - embolus, EF - epigynal field,

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ET - epigynal teeth, MA - median apophysis, PLE - posterior lateral eyes, PME - posterior median eyes, RTA - retrolateral-apical tibial apophysis, S - spermatheca.

TAXONOMY

Family Thomisidae Sundevall, 1833
Genus *Borboropactus* Simon, 1884

Type species: *Borboropactus squalidus* Simon, 1884.

Borboropactus bangkongeus Barrion & Litsinger, 1995 stat. rev.

Fig. 1F, K

Borboropactus bangkongeus Barrion & Litsinger, 1995: 206, fig. 118a-i (♂).

Borboropactus cinerascens (Doleschall, 1859): – Benjamin *et al*., 2008: 722 (synonymisation). – Lehtinen, 2016: fig. 5a-h (♂ only; misidentification).

Type material: International Rice Research Institute, the Philippines; male holotype; the Philippines, Luzon Island, Laguna Province, Caliraya, Mahipon Village. Not examined.

Material examined: CASENT 9045511; 1 ♀, 1 penultimate ♂ (sexually dimorphic characters of palps developed and visible through transparent cuticle); the Philippines, Luzon Island, Quezon Province, Mount Banahaw de Lucban, 3.78 km WSW of Lucban, 14°03'24"N, 121°19'81"E, manual collecting, night, forest; 14.-22.05.2011; *leg.* H. Wood *et al*.

Diagnosis: Most similar to *B. cinerascens,* males distinguishable by larger median apophysis and shorter embolus (Lehtinen, 2016: fig. 5f cf. Fig. 2A-B), females by pointed epigynal teeth originating between anterior border and midline of the EF (Fig. 1K cf. Fig. 1J). Different from *B. gialong* sp. nov. by pointed epigynal teeth (Fig. 1K cf. Figs 1G, 2F). See diagnosis of *B. cinerascens* for characters separating this species from other congeners.

Description: FEMALE. Generally similar to females of *B. cinerascens* except for the following. Total length 25.5; prosoma length 12.8, width 9.9. Prosoma dark brown, with yellowish patches, mottled with red and dark green, dark central longitudinal median band not well defined; towards posterior end, at highest point, with two projections covered by setae. Leg I: femur 11.4, patella 5.1, tibia 11.1, metatarsus 5.7, tarsus 2.7. Epigyne as in Fig. 1K. Epigynal field (EF) as in Fig. 1K; epigynal teeth (ET) pointed, shorter than 1/10 of EF, arising anterior to midline of EF. Posterior end of EF tapered.

Distribution: Known only from Luzon Island in the Philippines.

Remarks: *Borboropactus bangkongeus* was first described from a single male from Luzon Island (Barrion & Litsinger, 1995: 206, fig. 118a-i). However, the illustrations are wanting in quality. Lehtinen (2016) re-examined the holotype of *B. bangkongeus* and illustrated specimens from the terra typica (i.e. Luzon Island). The specimens examined here are also from the terra typica. The male palp of *B. bangkongeus* shows specific differences: the recognisable MA is half the size of the tegulum, whereas in all examined males of *B. cinerascens* the MA is much smaller, about 0.2 times the length of the tegulum.

The epigyne of the specimen examined here (Fig. 1K) differs somewhat from that of the female depicted by Lehtinen (2016: fig. 5c). It is possible that the female depicted by him, in fact, belongs to *B. cinerascens*; both species are known from the Philippines. If that is indeed the case, we also have to consider the possibility that the two species co-exist at some localities. This needs to be investigated in future studies.

Borboropactus cinerascens (Doleschall, 1859)

Figs 1A, B, E, I, J, 2A-E, 3, 4G-I, 5A-C, F

Thomisus cinerascens Doleschall, 1859: 58, pl. 12, fig. 4 (♀).

Borboropactus bituberculatus Simon, 1884: 301 (♀). New synonym.

Borboropactus cinerascens (Doleschall, 1859). – Benjamin *et al.*, 2008: 722, fig. 8a-e (♂, ♀). – Benjamin, 2011: 12, fig. 18a-e (♂, ♀). – Marusik *et al.*, 2013: 198, figs 9-10 (♀).

Borboropactus semenchenkoi Omelko & Marusik, 2022: 28, figs 1-15 (♂). New synonym.

For a complete list of taxonomic references see the World Spider Catalog (2024).

Remarks on new synonyms: The type material of *Borboropactus bituberculatus* and *B. semenchenkoi* was examined and/or sufficiently illustrated (Benjamin, 2011: figs 5a, 20a-b, d; Omelko & Marusik, 2022: figs 1-15) and unambiguously identified as being conspecific with the types of *B. cinerascens*.

Benjamin (2011) distinguished *B. bituberculatus* from *B. cinerascens* on the basis of minor differences in the shapes of MA, E and C. However, after an examination of a large series of specimens, with many specimens even from the same locality displaying various degrees of variability in these structures, this distinction appears not to be sustainable. These names are thus synonymized here. Nevertheless it is possible that cryptic species exist in this genus. This possibility needs to be further investigated on the basis of morphological data as well as mitochondrial and nuclear DNA markers, following a range-wide sampling effort.

Type material: MNHN 5460/1572; 2 ♀ syntypes of *B. bituberculatus* (examined); New Guinea, without additional data. – ZMMU; ♂ holotype of

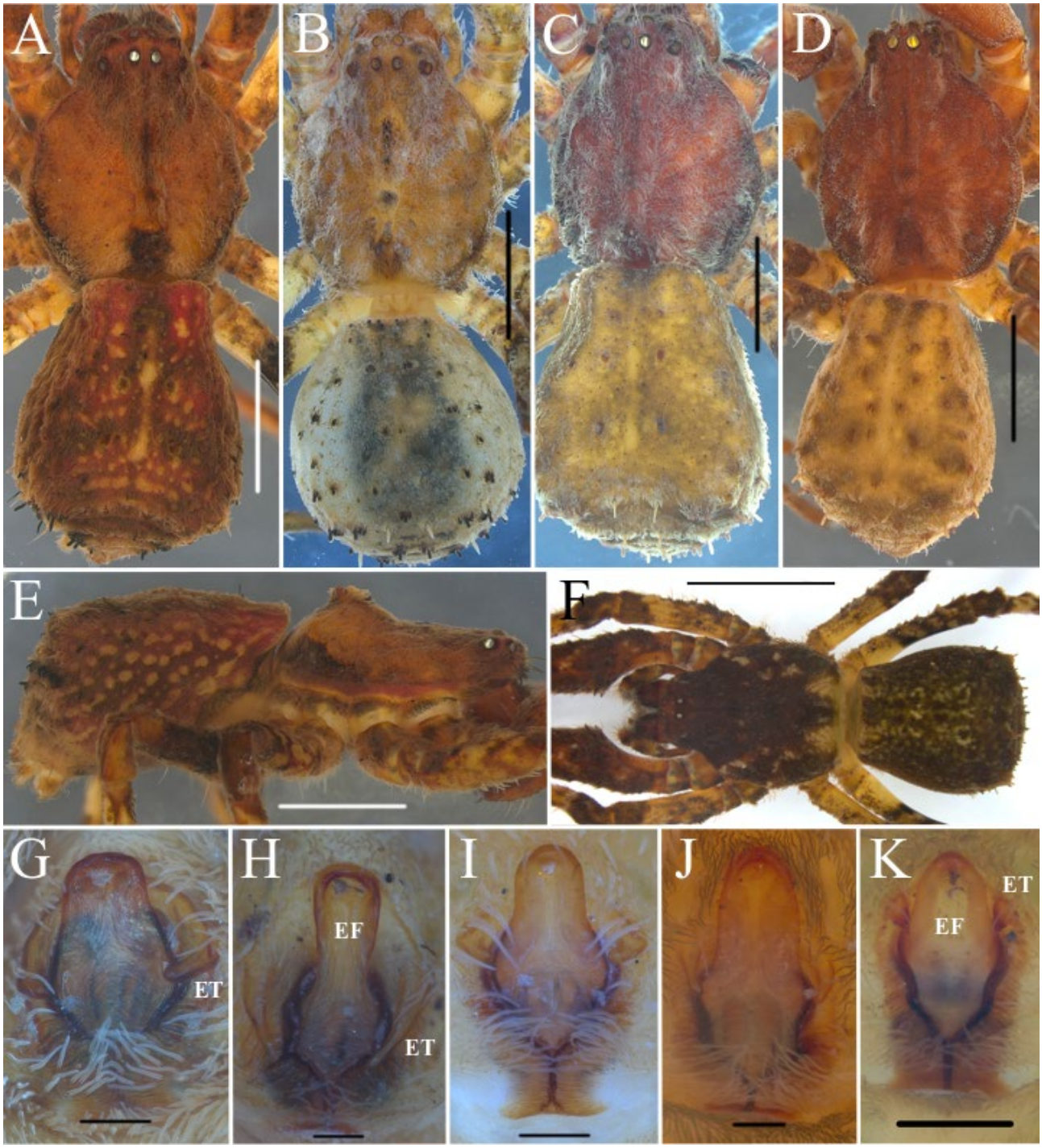


Fig. 1. *Borboropactus cinerascens* from Java (ZFMK Ar24112) (A, E); ditto, specimen from Lingga Island (MHNG) (B, I); *Borboropactus longidens* from Vietnam (MHNG) (C-D, H); *Borboropactus cinerascens* from Thailand (MCZ 31145) (J); *Borboropactus gialong* sp. nov., holotype from Vietnam (MHNG-ARTO-28931) (G); *Borboropactus bangkongeus* Barrion & Litsinger, 1995 from the Philippines (CASENT 9045511) (F, K). (A-C, F) Female, habitus in dorsal view. (D) Male, habitus in dorsal view. (E) Female, habitus in lateral view. (G-K) Epigynum, ventral view. Abbreviations: EF - epigynal field, ET - epigynal teeth. Scale lines: 0.2 mm (G-J), 0.5 mm (K), 2.0 mm (A-E), 5.0 mm (F).

B. semenchenkoi (not examined). No type material of *B. cinerascens* is known to exist (Lehtinen, 2016).

Remark on type material: Since the type material of *B. cinerascens* was presumably lost, it is desirable to select and describe a neotype in order to ground the concept of this species. However, this should only be done with a specimen from the type locality or from as close to it as possible. Such a specimen is not available to me, and it is even not clear where exactly the type locality of this species (Lewiboenger, in Java) is. Thus, the designation of a neotype might require an understanding of the genetic makeup of the populations described here requiring additional material and the analysis of molecular sequences, which is beyond the scope of this study.

New material examined: ZFMK Ar23358, Ar23495, Ar23496, Ar23500; 3♂, 1♀; Papua New Guinea, Madang Province, Mt Wilhelm, Wanang Research Station, 5°46'47"S, 145°1'46"E, 175 m a.s.l.; 2012; *leg.* L. Ponce *et al*. – MHNG; Indonesia, Irian Jaya, Biak Island, Korim, Roidifu, 100 m a.s.l.; 2.02.2001; *leg.* A. Riedel. – RMNH.ARA.15923; 1♂; Borneo, East Malaysia, Sabah, Danum Valley Field Centre, dung pitfall trap; 1.-10.05.1991; *leg.* P.R. and C.L. Deeleman.

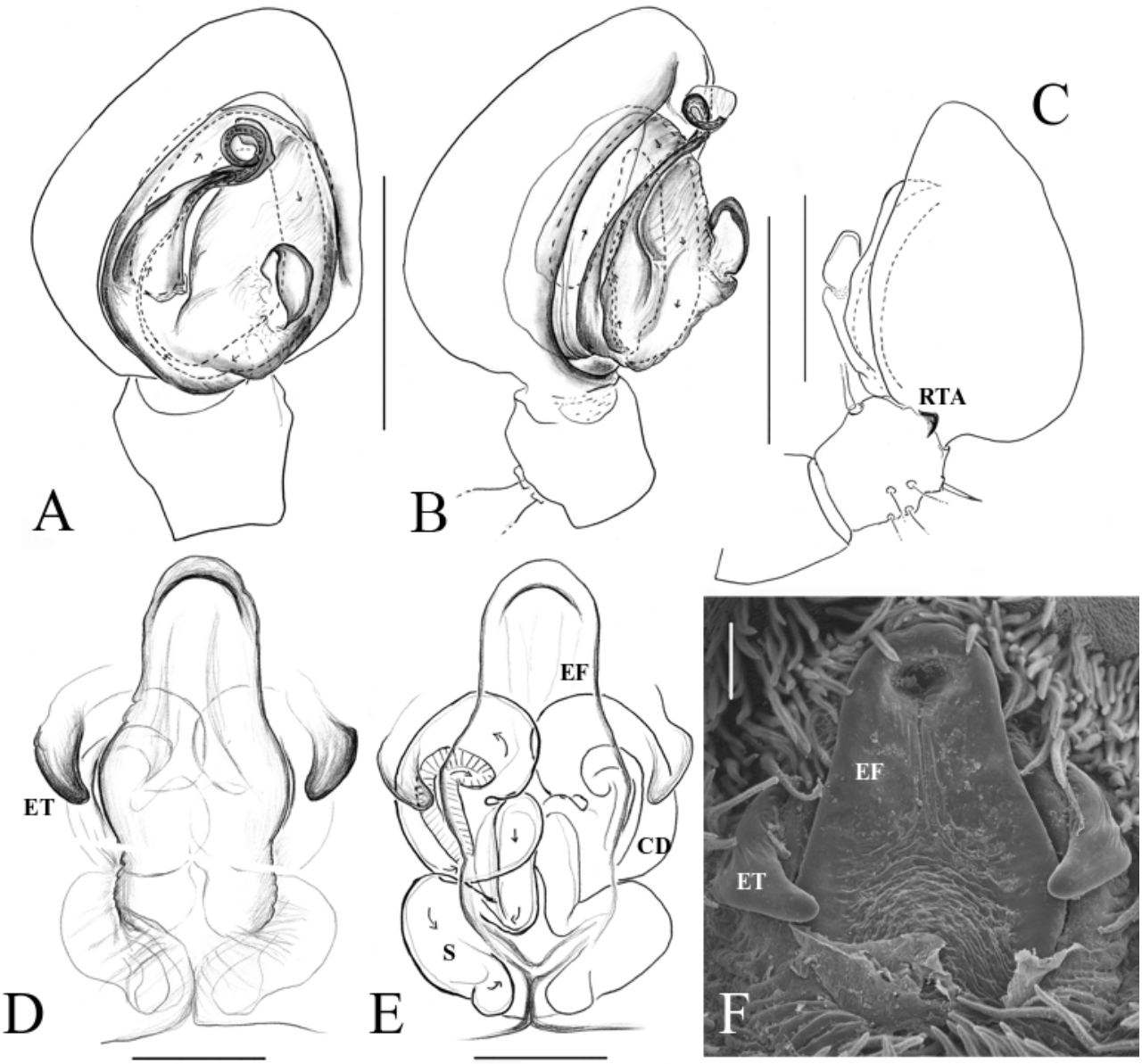


Fig. 2. *Borboropactus cinerascens* (MHNG) (A-E); *Borboropactus gialong* sp. nov., paratype (MHNG-ARTO-28932) (F). (A-C) Male palp. (D, F) Epigynum. (E) Vulva. (A, D, E, F) Ventral view. (B) Prolateral view. (C) Retrolateral view. Abbreviations: C - conductor, CD - copulatory duct, E - embolus, EF - epigynal field, ET - epigynal teeth, MA - median apophysis, RTA - retrolateral-apical tibial apophysis, S - spermatheca. Scale bars: 100 μm (F), 0.2 mm (D-E), 0.5 mm (A-C).

– MHNG, sample THMA-08/01; 1♂; West Malaysia, Terengganu State, Pulau Perhentian Besar, trail across island, from Teluk Pauh to Teluk Dalam, evergreen rain forest, 5°53'51"N, 102°44'53"E, 50-100 m a.s.l.; 2.-4.06.2008; *leg.* P. Schwendinger. – MHNG; 1♂; West Malaysia, Perak State, Pangkor Island, Pangkor Forest Reserve, 5°53'51"N, 102°44'53"E, 30-150 m a.s.l.; 15./16.12.1997; *leg.* P. Schwendinger. – MHNG, sample VMI-12/16; 1♂; West Malaysia, Pahang State, Tioman Island, above Japemala Resort, 2°44'42.7"N, 104°07'27.7"E, 117 m a.s.l., rainforest; 23.12.2011-2.01.2012; *leg.* L. Monod. – MHNG, sample MAL-04/06; 1♂; West Malaysia, Johor State, 15 km N of Mersing, Gunung Arong, 2°33'12.8"N, 103°45'20.5"E, 20 m a.s.l.; 29./30.05.2004; *leg.* P. Schwendinger. – MHNG, sample MAL-04/04; 1♂; West Malaysia, Johor

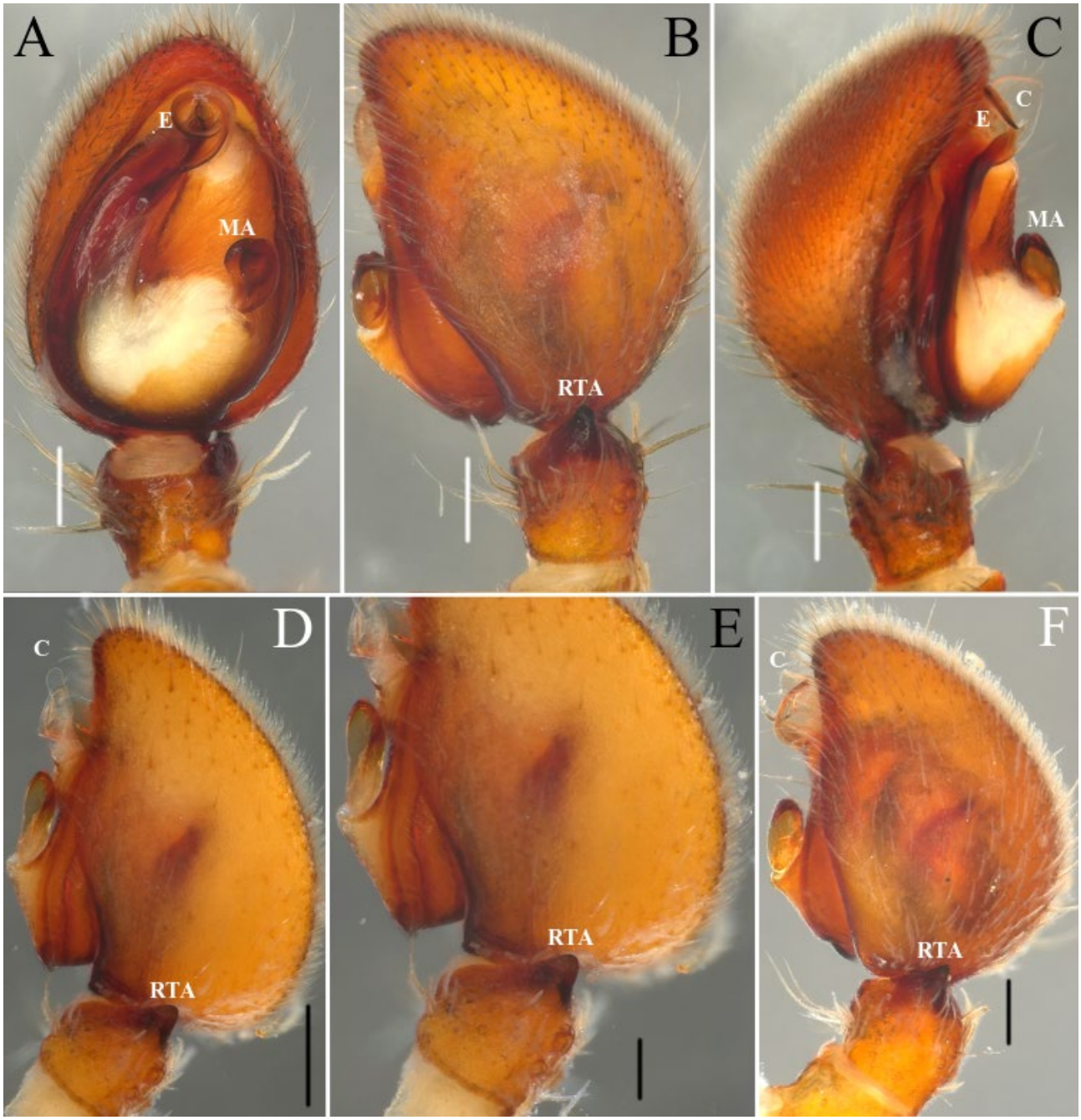
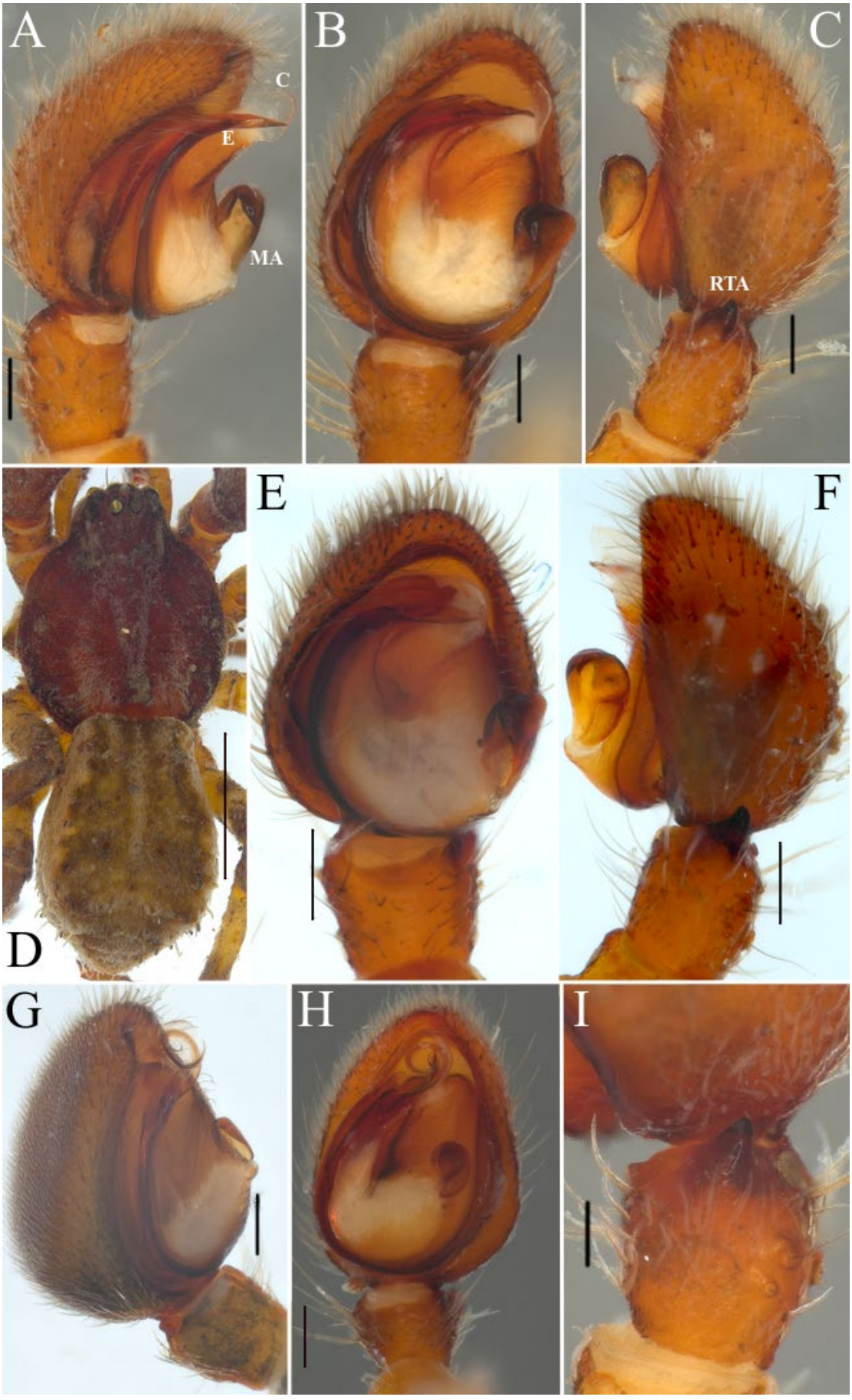


Fig. 3. *Borboropactus cinerascens*; male from Java (ZFMK Ar24112) (A-C); male from Borneo (RMNH.ARA.15923) (D-E); male from Tioman Island (MHNG, sample VMI-12/16) (F). (A) Distal part of left male palp, ventral view. (B, D-F) Same, retrolateral view. (C) Same, prolateral view. Abbreviations: C - conductor, E - embolus, MA - median apophysis, RTA - retrolateral-apical tibial apophysis. Scale lines: 0.2 mm.



State, Gunung Pulai, 1°34’50.6”N, 103°30’36.5”E, 50 m a.s.l.; 24.05.2004; *leg.* P. Schwendinger. – MHNG, sample MS-23/06; 2♂, 1♀; West Malaysia, Johor State, Gunung Pulai, 1°35’39”N, 103°32’22”E - 1°36’06”N, 103°32’49”E, 340-620 m a.s.l.; 28./29.09.2012; *leg.* P. Schwendinger & A. Schulz. – MHNG, sample SIM-01/07; 1♀; West Malaysia, Johor State, near Kota Tinggi, at foot of Gunung Muntahak, 1°49’46.8”N, 103°49’59.2”E, 170 m a.s.l.; 26.04.2001; *leg.* P. Schwendinger. – MHNG, sample MAL-04/05; 1♂; West Malaysia, Johor State, near Kota Tinggi, Gunung Muntahak, 1°49’46.8”N, 103°49’59.2”E, 170 m a.s.l.; 26./27.05.2004; *leg.* P. Schwendinger. – MHNG, sample SV-03/01; 2♂; Singapore, Bukit Timah Nature Reserve, Jungle Fall Valley, 1°20’53.3”N, 103°46’35.4”E, 170 m a.s.l.; 3./4.08.2003; *leg.* P. Schwendinger. – MHNG, sample Sum-06/27; 1♂; Indonesia, Sumatra, North Sumatra Province, Nias Island, near road from Gunungsitoli to Hiliduo, 1°15’59”N, 97°32’37”E, 100 m a.s.l.; 24.06.2006; *leg.* P. Schwendinger. – MHNG, sample Sim-01/02; 1♀; Indonesia, Riau Province, Lingga Island, at the foot of Mt Daik, ca 5 km NW of Daik, 0°12’35.9”S, 104°36’58.8”E, 50 m a.s.l., rainforest along stream; 12.06.2001; *leg.* P. Schwendinger. – RMNH.ARA.15908; 1♂; Java, West Java, Tangkuban Perah, pine forest 1463 m a.s.l.; 26.08.2000; no additional data given. – ZFMK Ar24112; 1♂; Java, Cidahu, Gunung Halimun-Salak National Park, 6°43’35”S, 106°43’24”E, Malaise trap, 1470 m a.s.l.; 26.09.2016; *leg.* Giyanto. – ZFMK Ar24111; 1♀; Java, Banten Province, Banten, Gunung Botol, 6°43’42”S, 106°28’41”E, 1730 m a.s.l.; 23.-27.04.2016; *leg.* Indobyosis team. – MCZ 31145; 1♀; Thailand, Nakhon Si Thammarat Province, Namtok Yong National Park, 8°10’43”N, 99°44’50”E, 80 m a.s.l., Malaise trap; 23.-29.07.2008; *leg.* K. U-Prai.

Diagnosis: Among Asian *Borboropactus*, males of *B. cinerascens* can be distinguished from *B. nanda* Lin & Li in Lin *et al.*, 2023 by a shorter embolus (one spiral, see Fig. 2A, versus two spirals in *B. nanda*, see Lin *et al.*, 2023: fig. 58a-c), from *B. brevidens* Tang & Li, 2010 and *B. edentatus* Tang & Li, 2010 by its spiraled embolus (not spiralled in these two species, see Tang & Li, 2010: figs 5b, 6c), from *B. jiangyong* Yin, Peng, Yan & Kim, 2004 by its shorter embolus (Fig. 2A cf. less than one spiral shown in Meng *et al.*, 2019: fig. 5b) and by the shape of the epigyne (Fig. 2D cf. Meng *et al.*, 2019: fig. 2f). Median apophysis smaller than that of *B. bangkongeus* (Fig. 2A cf. Lehtinen, 2016: fig. 5f). Females of *B. cinerascens* can be distinguished from those of *B. bangkongeus* by their longer epigynal teeth (Fig. 2D cf. Lehtinen, 2016: fig. 5c) and from those of *B. gialong* sp. nov., *B. bangkongeus* and *B. jiangyong* by its vase-shaped posterior margin of the epigynal field (Fig. 2D-E, versus truncate in *B. gialong* sp. nov., Fig. 2F; lanceolate in *B. bangkongeus*, Fig. 1K; cruciform in *B. jiangyong*, see Yin *et al.*, 2004: figs 2a, 4a).

Description: MALE. Prosoma somewhat flattened, opisthosoma oval in lateral view (Fig. 5F). Total length 6.5-7.5; prosoma 3.2-3.5 long, 2.4-3.2 wide. Prosoma dark brown, with a dark central longitudinal band, that band thicker towards pedicel, mottled, sides darker than apex. Prosoma towards its posterior end, at its highest point, with a projection covered with setae (Fig. 5F). Eyes in two recurved rows, ALE = PLE > AME = PME. Maxillae, labium and sternum light yellow, without pattern, with dense band of setae along margins. Chelicerae dark brown, with pro- and retromarginal teeth (4/6 and 6/6, respectively, including 1/2 vestigial denticles). Femur I swollen medially, bearing prolateral and ventral spines. Leg I: femur 3.0-4.0, patella 1.2-1.7, tibia 2.7-3.5, metatarsus 1.5-2.3, tarsus 0.7-1.1. Tibia I with five pairs of strong ventral spines; metatarsus I with three pairs of ventral spines. Leg formula: I, II, III, IV. Tarsal trichobothria concentrated in a sensory pit (Benjamin, 2011: fig. 24c-e; Ramírez, 2014: fig. 95a). Opisthosoma dorsally reddish brown, with dark yellow mottles, sides frilled, darker in colour. Rectangular posterior end of opisthosoma wider than anterior end, furnished with flattened macrosetae, these copious on posterior side. Ventral side lighter in colour than dorsal side.

Palp as in Figs 2A-C, 3, 4G-I. Tibia as long as wide, RTA short, extending dorsally, its shape variable, shorter than tibia, tip flat to pointed to rounded. Cymbium longer than wide, with flattened prolateral surface densely covered with short setae (Fig. 4G). Bulb oval in ventral view, conical in lateral view. Median apophysis (MA) large (about 0.2 times size of tegulum), situated at retrolateral margin of tegulum, pear-shaped, longer than wide, its retrolateral edge bent inward (Fig. 2A-C). Conductor membranous, translucent, originating at about 12 o’clock position, with broad base and apex. Embolus (E) originating at about 8 o’clock position and terminating at about 12 o’clock position, apex spiralling 1.5 to 2 coils (Fig. 2A-C). Sperm duct tapering as shown in Fig. 2A.

FEMALE. Habitus (Fig. 1A-B, E) as in male, except as given in the following. Total length 10.1-11.0; prosoma length 4.3-4.5, width 3.5-4.0. Leg I: femur 2.3-3.6,

Fig. 4. *Borboropactus longidens* from Vietnam (sample VN-12/03c, MHNG) (A-C); ditto (sample VN-12/05c, MHNG) (D-F); *Borboropactus cinerascens* from Papua New Guinea (ZFMK Ar23358) (G); ditto, specimen from West Java (RMNH. ARA.15908) (H-I). (A-C, E-I) Distal part of left male palp, prolateral view. (A, G) Same, ventral view. (B, E, H) Same, retrolateral view (C, F, I). (D) Male, habitus in dorsal view. Abbreviations: C - conductor, E - embolus, MA - median apophysis, RTA - retrolateral-apical tibial apophysis. Scale lines: 0.2 mm (A-C, E-I), 2.0 mm (D).

◄

patella 1.2-1.6, tibia 3.0-3.8, metatarsus 1.2-2.0, tarsus 6.0-8.0. Epigyne (Figs 1I-J, 2D-E): posterior margin of epigynal field (EF) vase-shaped as in Figs 1I-J; epigynal teeth (ET) relatively short, as long as 1/6 of median field, originating slightly above midline of EF; copulatory ducts (CD) broad, C-shaped, anteriorly and posteriorly touching each other, wider than spermathecae, their ends swollen; spermathecae looped, connected to each other by sclerotized tissue (Fig. 2E).

Variation: The body colouration is variable and may mimic the predominant colour of the microhabitat (Ramírez, 2014). Colouration of prosoma/opisthosoma and size/shape of mottles on the specimen from Lingga Island (see Fig. 1B) are very different from

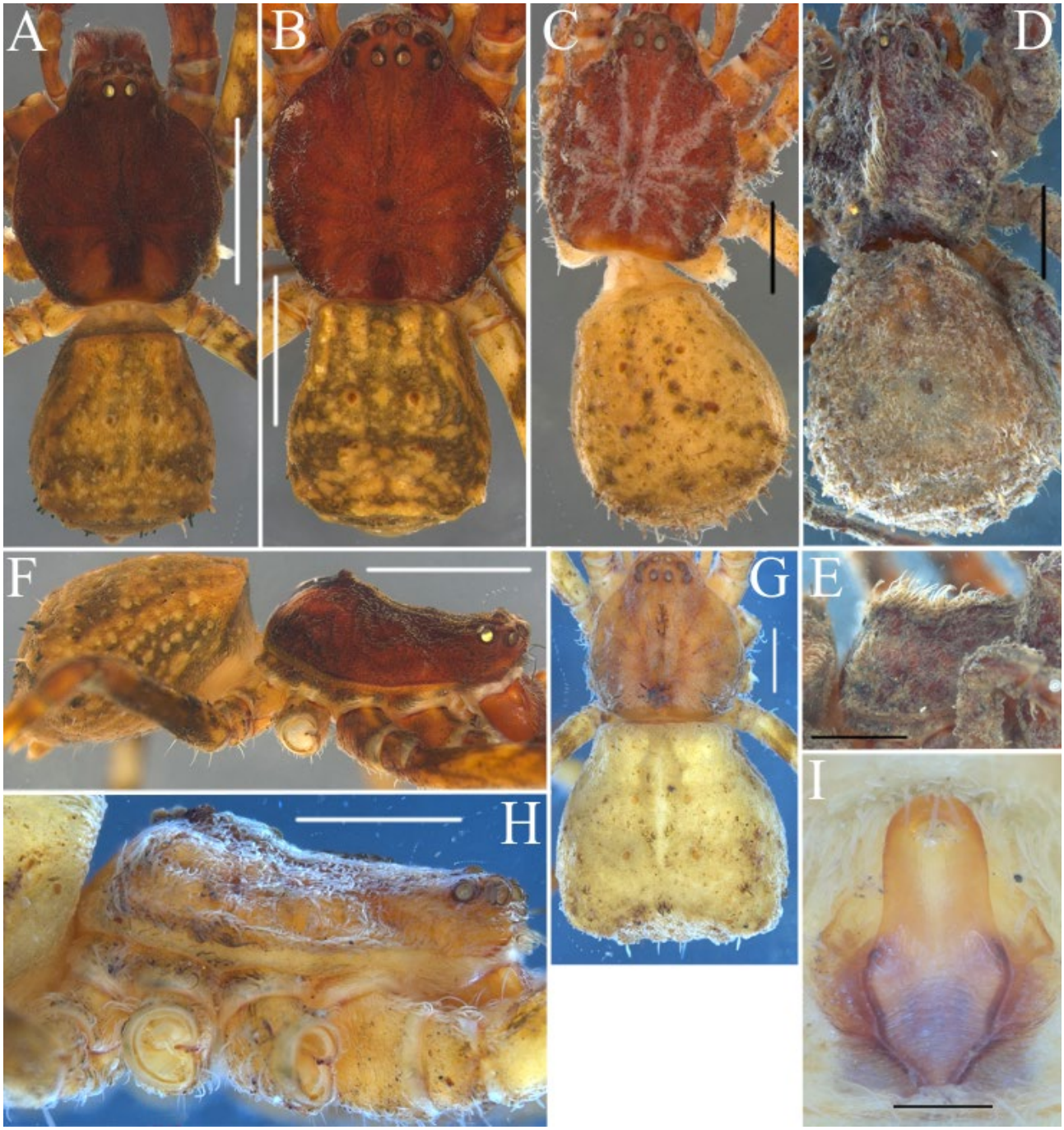


Fig. 5. *Borboropactus cinerascens*, male from Java (ZFMK Ar24112) (A, F); ditto, male from Tioman Island (MHNG) (B); ditto, male from Borneo (RMNH.ARA.15923) (C); *Borboropactus gialong* sp. nov., female holotype from Vietnam (MHNG-ARTO-28931) (D-E); *Borboropactus palaniensis* sp. nov., female holotype (G-I). (A-D, G) Habitus, dorsal view. (E-F, H) Same, lateral view. (I) Epigyne, ventral view. Scale lines: 0.2 mm (I), 2.0 mm (A-H).

those of other specimens examined here. The prosoma is rounded and the opisthosoma is rectangular in the specimen from Tioman Island (see Fig. 5B). The shape of the RTA is very variable, with some individuals possessing a miniaturized blunt RTA, and some with a fairly large tapering RTA. The length of the embolus tip is also variable, ranging from a single spiral to two spirals. The shape of the median field as well as the shape and position of the epigynal teeth are also quite variable (Figs 1I-J). There is a cluster of dark-coloured setae on the anterior margin of the epigyne of the specimen from Lingga Island (Fig. 1J).

Distribution: Brunei (1♀ from Belait, Kampong Labi, in personal collection of Joseph K. H. Koh, nº 6.04.23.0033, see Koh & Ming, 2019: 304), China, India (Nicobar Island), Indonesia (Kalimantan, Java, Moluccas, Sumatra), New Guinea, Peninsular Malaysia, the Philippines, Singapore (Benjamin *et al*., 2008: 711; Koh *et al*., 2022: 686; Joseph K. H. Koh, personal communication), Thailand.

Borboropactus longidens Tang & Li, 2010

Figs 1C-D, H, 4A-F

Borboropactus longidens Tang & Li, 2010: 21 (♀). – Li *et al*., 2023: 172, figs 1a-j, 2a-g, 3a-j (♂, ♀).

Borboropactus bituberculatus Simon, 1884: 301 (♀). – Ramírez, 2014: 257, fig. 172d (♀; misidentification).

Material examined: MHNG, sample VN-12/02c; 1♀; Vietnam, Vinh Phuc Province, Tam Dao National Park, 3 km N of Tam Dao city, 21°28’51”N, 105°37’55”E, 1050 m a.s.l., evergreen forest with bamboo; 12.05.2012; *leg.* P. Schwendinger & A. Schulz. – MHNG, sample VN-12/03c; 2♂; evergreen forest 1 km SE of Tam Dao city, 21°26’49”N, 105°39’06”E, 1000-1200 m a.s.l.; 13./14.05.2012; *leg.* P. Schwendinger & A. Schulz. – MHNG, sample VN-12/05c; 1♂; Ha Noi Province, Ba Vi District, Mt Ba Vi, 21°03’35”N, 105°22’02”E, 1000-1070 m a.s.l., evergreen forest; 16./18.05.2012; *leg.* P. Schwendinger & A. Schulz.

Diagnosis: Among Asian *Borboropactus*, males of *B. longidens* are similar to those of *B. brevidens* (see Tang & Li, 2010: 12, fig. 5a-d), *B. edentatus* (see Tang & Li, 2010: 12, fig. 9a-d) and *B. jiangyong* in possessing an embolus that lacks the spiraling tip characteristic of *B. cinerascens* and *B. nanda*. However, *B. longidens* can be easily distinguished by a pear-shaped median apophysis in a basal-retrolateral position on the tegulum (vs. oval in *B. brevidens* and hook-shaped in *B. edentatus*). The MA in *B. jiangyong* is also pear-shaped, but the embolus is twisted (Meng *et al*., 2019: fig. 5a, b) vs. straight in *B. longidens* (Fig. 4A, F). Females of *B. longidens* are distinguished by their epigynal field and longer epigynal teeth which are narrower and longer, respectively, than in any other congeneric species (Fig. 1H cf. e.g. Fig. 1G, J). Females differ from those of *B. jiangyong* by their cruciform epigynal field (1H cf. Meng *et al*., 2019: fig. 3c, g).

Description: MALE. Habitus as in Figs 1D, 4D. Generally similar to *B. cinerascens* except for the following. Total length 7.6-9.5; prosoma length 3.6-4.3, width 3.1-3.3. Leg I: femur 4.5, patella 1.2, tibia 4.0, metatarsus 3.5, tarsus 1.0. Palp (Fig. 4A-C, E-F) with a relatively longer, hook-shaped RTA with a pointed tip. C broad. E originating at 9 o’clock position, 0.5 times length of tegulum, tapered, without spirals.

FEMALE. Habitus as in Fig. 1C. Total length 10.1; prosoma length 4.7, width 3.9. Leg I: femur 3.5, patella 6.0, tibia 2.3, metatarsus 1.6, tarsus 0.9. Epigyne (Fig. 1H) with EF truncate, apex broader than central part, posteriorly tapering. Epigynal teeth very long, as long as half of median field, arising above copulatory openings. CD kidney-shaped (Tang & Li, 2010: fig. 15a-d). See also Ramírez (2014: fig. 172d).

Distribution: Known from China (Hainan Island) and Vietnam.

Borboropactus palaniensis sp. nov.

Fig. 5G-I

Material examined: MHNG-ARTO-28930; ♀ holotype; India, Madras, Palani Hills (on label given as “Palni Hills”), Kodaikanal, 2100 m a.s.l., tamisages dans la forêt au-dessus de la ville (sifting in a forest above the city); 11.11.1972; *leg.* C. Besuchet & I. Löbl.

Diagnosis: The new species resembles and is easy to be confused with *B. asper* (Pickard-Cambridge, 1884). It can be distinguished by epigynal teeth with an elbow-shaped bend (Fig. 5I vs. smoothly curved in *B. asper*, see Marusik, Omelko & Benjamin, 2013: fig. 7) and by the tapered posterior end of the epigynal field (Fig. 5I; curved in *B. asper*, see Marusik, Omelko & Benjamin, 2013: fig. 5).

Etymology: Named after the hills in which lies the type locality of this species.

Description: FEMALE. Similar to that of *B. cinerascens* except for the following. Total length 7.0; prosoma length 2.7, width 2.5. Prosoma light brown, dark central longitudinal band absent, with posterior projection (Fig. 5G, H) shorter than in *B. cinerascens* (Fig. 1E). Opisthosoma light yellow, not mottled, sides frilled, not darker in colour than the rest. Triangular posterior end of opisthosoma (Fig. 5G, H) furnished with less flattened macrosetae than in *B. cinerascens*. Leg I: femur 2.3, patella 1.2, tibia 2.0, metatarsus 1.0, tarsus 5.0.

Epigyne: epigynal field as in Fig. 5I; epigynal teeth (ET) relatively short, as long as 1/7 of median field, arising at midline of EF; posterior end of EF tapered.

Distribution: Known only from the type locality in southern India.

Borboropactus gialong sp. nov.
Figs 1G, 2F, 5D-E

Borboropactus sp.: – Benjamin, 2011: 11, fig. 21.

Material examined: MHNG-ARTO-28931, sample SV-03/20; ♀ holotype; Vietnam, Lam Dong Province, Datanla Waterfall about 5 km S of Da Lat, 11°54'02"N, 108°26'54"E, 1300 m a.s.l., evergreen hill forest; 5./11./12.09.2003; *leg.* P. Schwendinger. – MHNG-ARTO-28932; 6♀ paratypes; collected together with the holotype.

Etymology: Name in apposition, in honor of the Vietnamese Emperor Gia Long (1762-1820).

Diagnosis: Among Asian *Borboropactus*, females of this species are similar to those of *Borboropactus nanda*. They can be distinguished by the broad, right-angle bend (almost boot-like) of the ET and by the somewhat truncated anterior edge of the EF (Fig. 2F cf. Lin & Li, 2023: fig. 59a, b). Furthermore, this species can be distinguished from most other species of the genus by its dark brown colour (Fig. 5D, E).

Description: FEMALE. Total length 5.2; prosoma length 2.8, width 2.4. Prosoma raised, central ridge dark brown, generally much darker than in all other known species of *Borboropactus*, not mottled, ventrally lighter than dorsally. Prosoma with central longitudinal ridge furnished with macrosetae; ridge connected to posterior projection (Fig. 5E); that projection shorter than in *B. cinerascens* (see Fig. 1E). Opisthosoma triangular (in lateral view). Leg I: femur 2.0, patella 0.9, tibia 2.4, metatarsus 1.6, tarsus 0.8. Legs I-IV lighter than prosoma, sides yellowish brown. Epigyne as in Fig. 2F; EF truncate, its apex squared-off; ET base broad.

Distribution: Known only from its type locality in the mountains of southern Vietnam.

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