

<https://doi.org/10.25221/fee.459.2>

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**A NEW SPECIES OF THE GENUS *BORBOROPACTUS* SIMON, 1884
(ARANEI: THOMISIDAE) FROM BORNEO ISLAND, MALAYSIA**

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Summary. A new species, *Borboropactus semenchenkoi* sp. n. is described based on the holotype male from Malaysia (Borneo). The new species is similar to the Asian *B. bituberculatus* Simon, 1884 and *B. cinerascens* (Doleschall, 1859) but differs from both by the shape of the male palp. The distribution map of all species of the genus *Borboropactus* Simon, 1884 is also given.

Key words: crab spiders, Araneae, biodiversity, taxonomy, new species, description, Oriental region.

М. М. Омелько, Ю. М. Марусик. Новый вид рода *Borboropactus* Simon, 1884 (Aranei: Thomisidae) с острова Борнео, Малайзия // Дальневосточный энтомолог. 2022. N 459. С. 27-32.

Резюме. С острова Борнео (Малайзия) по самцу (голотип) описан новый вид пауков-бокоходов *Borboropactus semenchenkoi* sp. n. Новый вид наиболее близок к азиатским *B. bituberculatus* Simon, 1884 и *B. cinerascens* (Doleschall, 1859), но отличается их строением копулятивных органов. Приведена карта распространения всех видов рода *Borboropactus* Simon, 1884.

INTRODUCTION

Borboropactus Simon, 1884 is a relatively small genus of odd-looking crab spiders with 16 nominal species (WSC, 2022). Spiders of this genus have an uneven, tuberculate surface of the body (especially the abdomen) due to the presence of tufts of bristles and teardrop-shaped outgrowths. Legs are strong, some segments flattened. Leg I is the longest; the tibiae and tarsi bear several pairs of large ventral spines. *Borboropactus* species predominantly inhabit the forest floor or foliage (Koh & Bay, 2019).

Most of the species belonging to the genus (11) are distributed in South and Southeast Asia, and five species are distributed in Sub-Saharan Africa (Fig. 16; WSC, 2022). At present, only three species are known from the rainforests of Southeast Asia: *B. cinerascens* (Doleschall, 1859), *B. javanicola* (Strand, 1913), and *B. vulcanicus* (Doleschall, 1859). Only one of them, *B. cinerascens*, is reported from mainland Malaysia. Currently, there are no scientifically confirmed records of the genus from Borneo. However, photographs *in situ* of the general appearance of three morphospecies from Sarawak and Brunei were published in Borneo Spiders Photographic Field Guide (Koh & Bay, 2019). None of these specimens have been identified to the species level in that book and are most likely new to science. More than half (9) of all *Borboropactus* species are known by only one sex, most of them by females.

The genus has never been revised globally or regionally. Several species were described or redescribed in surveys focusing on crab spiders of Hainan Island, China (Tang & Li, 2010). In other recently published papers, either single species of the genus were described/redescribed (e.g. Yin *et al.*, 2012; Marusik *et al.*, 2013; Meng *et al.*, 2019) or descriptions were part of revisionary studies of Thomisidae (Benjamin *et al.*, 2008; Benjamin, 2011). In a nutshell, the fauna of *Borboropactus* crab spiders in Southeast Asia remains poorly studied.

While studying of a set of spider material collected in Borneo (mainly Sabah Province), a male specimen of *Borboropactus* was found, which was identified as a species new to science. The main goals of this paper are to provide a detailed description and diagnosis of this new species as well as to discuss distribution of species.

Specimens were photographed by means of a Nikon DS-Ri2 camera attached to a Nikon SMZ25 stereomicroscope in the Far Eastern Federal University (Vladivostok). Photographs were taken in dishes with soft white paper at the bottom, filled with alcohol. Digital images were montaged by using Zerene Stacker software (<http://zerenesystems.com/cms/stacker>). The map was generated using SimpleMappr web application (<https://www.simplemappr.net>). All measurements are in millimeters (mm). Length of leg segments were measured on the lateral side. Leg measurements are shown as: femur, patella, tibia, metatarsus, tarsus (total length). The format of description and terminology follows Tang & Li (2010) with some modifications. Abbreviations used in the text and figures: Legs: *Fe* – femur, *Mt* – metatarsus, *Pa* – patella, *Ss* – spine-like setae, *Ti* – tibia; Eyes: *ALE* – anterior lateral eyes, *AME* – anterior median eyes, *OA* – ocular area; *PLE* – posterior lateral eyes, *PME* – posterior median eyes; Copulatory organs: *Co* – conductor, *E* – embolus, *Ma* – median apophysis, *RTA* – retrolateral apophysis, *Tr* – tegulum ridge.

The holotype of new species will be deposited in the Zoological Museum of Moscow University (ZMMU).

DESCRIPTION OF NEW SPECIES

Borboropactus semenchenkoi Omelko et Marusik, sp. n.

<https://zoobank.org/NomenclaturalActs/C4F29090-63E4-4051-A8E5-3AE144676DE2>

Figs 1–16

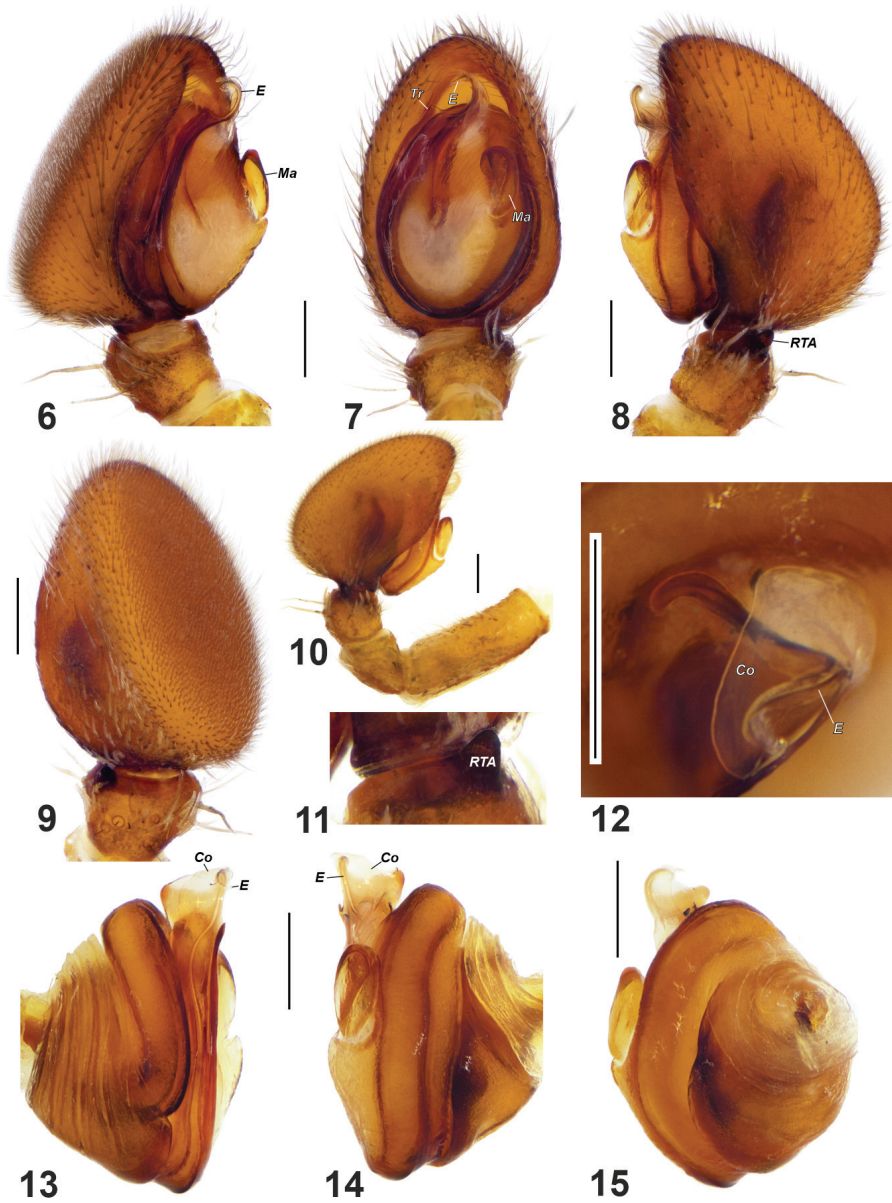
TYPE MATERIAL. Holotype – ♂, **Malaysia**: Sabah Province, 5°23'57"N, 116°06'06"E, 985 m, litter, 6.III 1998, collector unknown (ZMMU).

DIAGNOSIS. By the general appearance and shape of the male palp, *B. semenchenkoi* sp. n. is most similar to *B. bituberculatus* and *B. cinerascens* [cf. Figs 1, 3, 4–8 and 11A–B, 12A–D in Tang & Li (2010)]. The new species can be distinguished from similar species by the length and shape of embolus (*E*) (short, hook-like *vs.* long, coiled), and by the size and

position of median apophysis (larger and located more posteriorly in *B. semenchenkoi* sp. n.). The new species is also similar to the poorly known *B. biprocessus* Tang, Yin & Peng, 2012 but can be differed by the shape of embolus tip (hook-like vs. coiled) and the presence of tooth on tegulum (*T*) (vs. toothless).



Figs 1–5. *Borboropactus semenchenkoi* sp. n., male holotype. 1 – habitus, dorsal view; 2 – same, ventral view; 3 – same, lateral view; 4 – leg II, retrolateral view; 5 – chelicera, posterior view. Abbreviations: *Ss* – spine-like setae. Scale = 1 mm (1–3), 0.2 mm (4–5).



Figs 6–15. *Borboropactus semenchenkoi* sp. n., male holotype: palp (6–10), palp tibia (11), embolic division (12), bulb (13–15). 6, 10, 13 – prolateral view; 7 – ventral view; 8, 14 – retrolateral view; 9, 15 – dorsal view; 12 – anterior view. Abbreviations: *Co* – conductor, *E* – embolus, *Ma* – median apophysis, *RTA* – retrolateral apophysis, *Tr* – tegulum ridge. Scale = 0.2 mm.

DESCRIPTION. Male. Whole body strongly flattened in lateral view (Fig. 3). Total length 5.62. Carapace 2.84 long, 2.50 wide; opisthosoma 2.78 long, 1.90 wide. Eye sizes and interdistances: AME 0.14; ALE 0.14; PME 0.16; PLE 0.15; AME–AME 0.10; AME–ALE 0.12; PME–PME 0.12; PME–PLE 0.25, PLE–ALE 0.16. OA length 0.44, width 1.08. Carapace dark brown with 2 longitudinal yellow bands and poorly distinct radial stripes formed by short white setae. Maxillae and labium brown. Sternum yellowish, without pattern. Chelicerae dark brown with 6 pro- (3 large and 3 small) and 5 retromarginal (3 large and 2 small) teeth with 2 additional minute teeth located in between (Fig. 5).

Femur I swollen medially (Fig. 1), bearing 1 prolateral and 2 ventral spines. Tibia I with 5 pairs of strong ventral spines; metatarsus I with 3 pairs of ventral spines. Leg formula: I, II, III, IV. Some of legs' segments (Tb II, Mt II, Tb III, Mt III and Mt IV) dorsoventrally flattened. Lateral sides of all leg II segments with long, thick, white spine-like setae (*Ss*) (Fig. 4), that are longer on retrolateral sides of segments.

Leg measurements: I: 7.51 (2.44, 0.95, 1.97, 1.45, 0.70); II: 6.01 (1.85, 0.78, 1.56, 1.15, 0.67); III: 5.53 (1.60, 0.68, 1.40, 1.26, 0.59); IV: 5.64 (2.00, 0.59, 1.26, 1.18, 0.61). Leg I segments uniformly brown; femora and metatarsi II–IV brown with irregular black spots; patellae I–IV black; tarsi II–IV dark brown.

Opisthosoma dorsally yellowish brown with dark brown cardiac mark. Lateral sides dark brown. Posterior end of opisthosoma pointed with wart-like outgrowths. Ventral side brown with poorly visible round spots.

Palp as in Figs 6–15. Femur 1.2 times shorter than cymbium; patella 1.25 times longer than tibia (Fig. 10). Tibia short, as long as wide, RTA short, about 1/3 of tibia's length, wider than long with tip rounded (Figs 8, 11). Cymbium about 1.4 times longer than wide, with flattened prolateral surface covered with dense short setae (Fig. 6), retrolateral side grooved with sparse, longer setae (Figs 8, 9). Bulb oval in ventral view and conical in lateral, 1.3 times longer than wide. Anterior part of tegulum with noticeable ridge (*Tr*) (Fig. 7). Median apophysis large, about 1/3 of bulb's length, twice longer than wide, with its retrolateral edge bent inward (Figs 6–8, 14). Conductor (*Co*) membranous, originating at about 12:00 o'clock position in the form of a thin translucent sheet, conical in shape (Figs 12, 13–15). Embolus (*E*) originates at about 7:30 o'clock position and terminates at about 11:45 o'clock position (Figs 6–8, 12, 13–15). Sperm duct tapering at 6:30–7:00 o'clock position (Fig. 13).

DISTRIBUTION. Known only from the type locality (Fig. 16).

ETYMOLOGY. The specific name is a patronym in honor of Alexander Semenchenko (Vladivostok, Russia), a well-known Russian ichthyologist and geneticist.

CONCLUSION

As it was pointed out in the introduction, there are no confirmed records of *Borboropactus* in Borneo, however, a few photographs of three morphospecies were published in the photographic field guide (Koch & Bay, 2019). It is important to note that these species by their general appearance (coloration of the carapace and the dorsal side of the abdomen) are quite different from *B. semenchenkoi* sp. n. and were found in the province of Sarawak and Brunei, located at least 200 kilometers southwest of the type locality of the new species. This allows us to conclude that at least four species of *Borboropactus* occur in Borneo. The main problem of studying this genus is the cryptic lifestyle of these spiders (mainly litter), as a result of which they are difficult to collect. Considering the number *Borboropactus* species occurring in southern China, it can be assumed that the real diversity of the genus in Southeast Asia is much larger than what is known at the moment. Distribution records of all species is presented on Fig. 16. We accounted (accumulated) records given in taxonomic works, most records refer just to type localities.

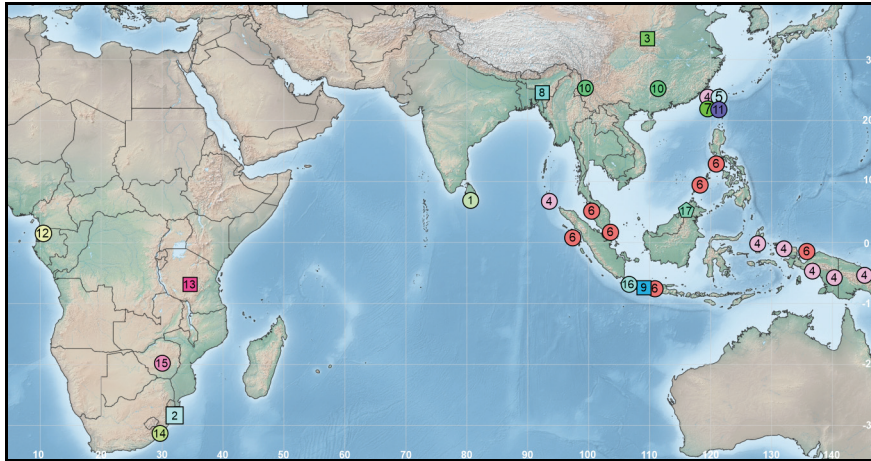


Fig. 16. Distribution records of *Borboropactus* spp.: *B. asper* (1), *B. australis* (2), *B. biprocessus* (3), *B. bituberculatus* (4), *B. brevidens* (5), *B. cinerascens* (6), *B. edentatus* (7), *B. elephantus* (8), *B. javanicola* (9), *B. jiangyong* (10), *B. longidens* (11), *B. noditarsis* (12), *B. nyerere* (13), *B. silvicola* (14), *B. squalidus* (15), *B. vulcanicus* (16), *B. semenchenkoi* sp. n. (17).

ACKNOWLEDGEMENTS

English of the final draft was kindly checked and corrected by Alireza Zamani (Turku, Finland).

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