Redescription of *Boliscus decipiens*, with a new synonym in *Boliscus tuberculatus* (Araneae: Thomisidae)

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Abstract

Boliscus decipiens O. Pickard-Cambridge, 1899 from Sri Lanka is redescribed based on type and newly collected material. It is distinguished from congeners by the long, needle-shaped embolus that winds twice around the tegulum. In the light of this new information, an updated diagnosis for *Boliscus tuberculatus* (Simon, 1886) is provided. Further, the monotypic genus *Boliscodes* Simon, 1909 is synonymized with *Boliscus* (*Boliscodes amaenulus* = *Boliscus tuberculatus*).

Keywords: biodiversity • Ceylon • crab spiders • taxonomy

Introduction

Sri Lanka has a described fauna of 28 crab spiders (World Spider Catalog 2019). However, many of them were described over a century ago (Pickard-Cambridge 1883, 1884; Simon 1895; Pocock & Rothschild 1903). Recently, several species of crab spiders have been added to this list (e.g. Benjamin 2000, 2001, 2016; Benjamin & Clayton 2016).

The tropical Asian genus *Boliscus* Thorell, 1891 contains three species: *Boliscus decipiens* O. Pickard-Cambridge, 1899, *Boliscus duricorius* (Simon, 1880), and *Boliscus tuberculatus* (Simon, 1886). It is distingushed from all known Asian genera of the subfamily Bominae by the presence of tubercles on the opisthosoma (Ono 1984). Although *Boliscus* was included in recent phylogenetic studies (Ramírez 2014; Lehtinen 2016), its constituent species were not studied comparatively.

The original type series of *B. decipiens* was collected by G. H. K. Thwaites in Sri Lanka (Pickard-Cambridge 1899). The species has never been documented since. It was thought to be a synonym of *B. tuberculatus* by Ono (1984), although the primary types were not studied at that time. After examination of the types, we conclude that *Boliscus decipiens* and *Boliscus tuberculatus* are, in fact, two different species.

Material and methods

Methodology follows Benjamin (2004). Specimens were photographed using a dissecting microscope (Zeiss Discovery V20) with top illumination and a magnification of up to 150× and digital images were taken with a Zeiss AxioCam HRc camera. Then images were edited using the Zeiss ZEN Pro software package. For a full history of synonymies see the World Spider Catalog (2019). All measurements are in mm.

Abbreviations: NIFS = National Institute of Fundamental Studies, Kandy, Sri Lanka, MNHN = Muséum National d'Histoire Naturelle, Paris, RMNH = Rijksmuseum van Natuurlijke Histoire, Leiden; ALE = anterior lateral eye, PLE = posterior lateral eye, PME = posterior median eye, VTA = ventral tibial apophysis, RTA = retrolateral tibial apophysis; FR = Forest reserve.

Thomisidae Sundevall, 1833

Boliscus Thorell, 1891

Boliscus Thorell, 1891; type species *Boliscus tuberculatus* (Simon, 1886) (= *B. segnis* Thorell, 1891).
Boliscodes Simon, 1909; type species *Boliscodes amaenulus* Simon, 1909, by monotypy. **New synonomy**.

Diagnosis: Members of the genus *Boliscus* can be identified by the presence of various uniformly distributed tubercles most prominently on the abdomen (Figs. 1A–C). Further, males can be identified by the stout VTA, RTA, RTA with prominent serrations and a long, needle-shaped embolus with an embolic division winding twice around tegulum (Figs. 3A–B, 5A,D). Females can be identified by the epigynum without a chitinous hood and a long, winding copulatory duct.

Composition: *Boliscus decipiens, Boliscus duricorius, Boliscus tuberculatus.*

Distribution: Sri Lanka, New Caledonia, China, Japan, Taiwan, Myanmar, Thailand, Singapore, Java

Boliscus decipiens O. Pickard-Cambridge, 1899 (Figs. 1A, 3A,C–D, 4A–H, 5A–F)

Type material: type series of *Boliscus decipiens* (OUMNH b.1242 t9), 3♀, no more label data (examined).

Other material examined: SRI LANKA: North Western Province: Kurunegala District, Ethagala FR, 07°29′11.23″N 80°22′21.64″E, 1♂ (IFS-Tho_245), 1–28 February 2007, leg. Z. Jaleel; Nikaweratiya, 1♂, 2♀ (IFS-Tho_053–055), 1–4 February 2008, leg. Z. Jaleel; Central Province: Sri Lanka, Kandy, waterworks forest, 1♂, 600 m, general hand collecting, 7 August 1981, leg. P. R. and C. L. Deeleman (RMNH.ARA.17825); Udawattakele FR, 07°17′54″N 80°38′29″E, 1♂ (IFS-Tho_111), 8 June 2015, leg. S. Ranasinghe *et al*.; Matale District, NIFS arboretum, 07°51′36″N 80°40′29″E, 1♂ (IFS-Tho_153), 17 August 2012, leg. S. P. Benjamin *et al*.

Diagnosis: Males of *Boliscus decipiens* can be identified by the long, needle-shaped embolus with an embolic division winding twice around tegulum. The embolus is longer and VTA is more pointed than in *B. tuberculatus*.

Description of male (from Nikaweratiya): Coloration and markings as in Fig. 1A; carapace red-brown or brown

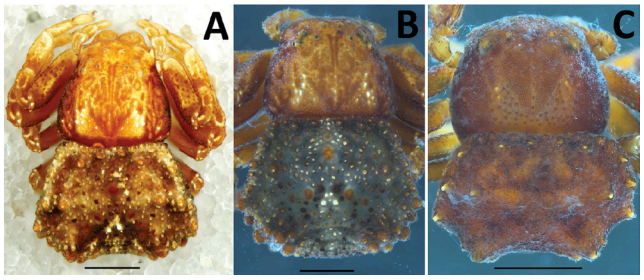

Fig. 1: *Boliscus* habitus. **A** *Boliscus decipiens* female syntype, dorsal view; **B** *Boliscus tuberculatus* female from Selangor, Malaysia, dorsal view; **C** same, male. Scale bars = 0.5 mm.

mottled with dark brown, darkest at the sides, tubercles in the posterior region white. Palps, chelicerae, maxillae, labium and sternum yellow-brown to dark brown. Legs yellow, with darker femora. Abdomen dorsally yellow-brown to dark red-brown, with faint black markings, underside yellow-brown.

Measurements: Total length 1.90; carapace length 0.90, width 0.92; abdomen length 1.00, width: 1.24. Leg I: femur 0.60, patella 0.30, tibia 0.36, metatarsus 0.22, tarsus 0.20; Leg II: femur 0.56, patella 0.30, tibia 0.40, metatarsus 0.24, tarsus 0.20; Leg III: femur 0.40, patella 0.20, tibia 0.22, metatarsus 0.20, tarsus 0.18; Leg IV: femur 0.20, patella 0.20, tibia 0.30, metatarsus 0.18, tarsus 0.18.

Carapace as long as wide to slightly wider than long, with rough surface. Eyes small, lateral eyes on separate, poorly developed tubercles, ALE>PLE=AME>PME with little difference in size. Eye distances ALE/AME 0.10, PLE/PME 0.16, AME-AME 0.18, ALE/ALE 0.44, AME-ALE 0.10, PME-PME 0.22. Sternum longer than wide with the edge extending between coxae. Abdomen tuberculate, longer than wide. Leg formula 2134. Tarsi of male palp with ventral tibial apophysis (VTA) and retrolateral tibial apophysis (RTA), bulb simple in form, without apophyses, embolic division winding twice around tegulum, embolus long, needle-shaped (Fig. 3A).

Description of female (from Nikaweratiya): Total length 2.50; carapace length 1.00, width 1.08; abdomen length 1.50, width 1.64–1.20. Same as male. Abdomen tuberculate, longer than wide, anteriorly narrowed. Epigynum without a sclerotized hood, copulatory opening wide, concave,

Fig. 2: *Boliscus tuberculatus* male palp. **A** ventral view; **B** lateral view. Scale bars = 0.2 mm.

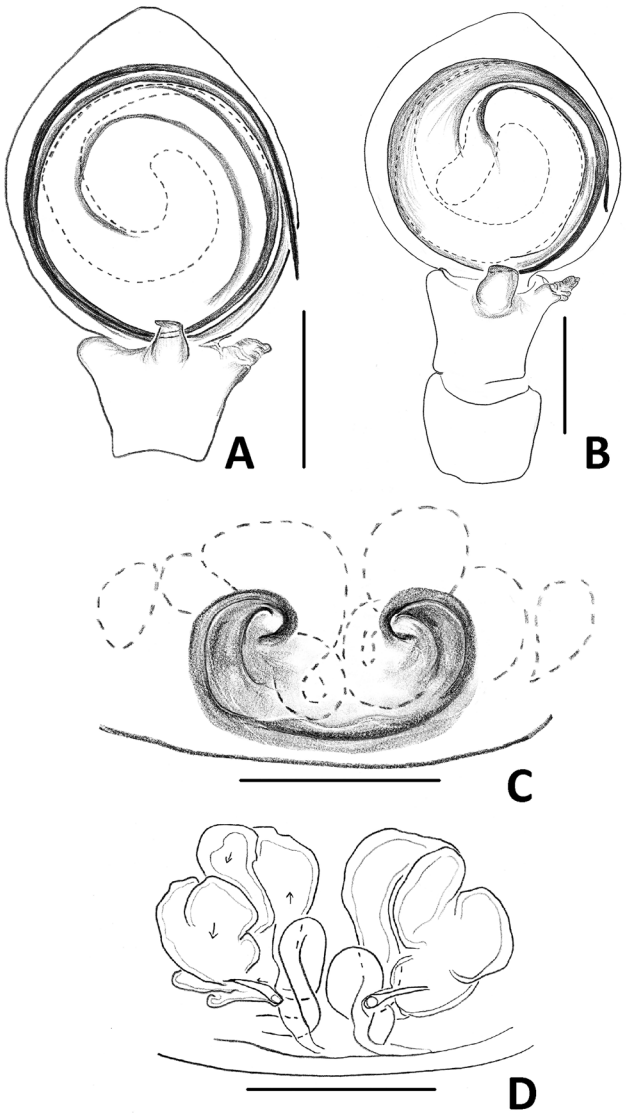

Fig. 3: **A** *Boliscus decipiens* left male palp, ventral view; **B** *B. tuberculatus* left male palp, ventral view; **C** *B. decipiens* female epigynum; **D** same, vulva. Scale bars = 0.1 mm (A), 0.2 mm (B–D).

copulatory duct situated in the posterior part of copulatory opening. Copulatory duct long, winding forwards, atrium present, spermathecae peanut shaped (Figs. 3C–D).

Distribution: Sri Lanka.

***Boliscus tuberculatus* (Simon, 1886)** (Figs. 1B–C, 2A–B, 3B)

Boliscodes amaenulus Simon, 1909. **New synonomy**.

Remarks: The type species of the genus *Boliscodes* Simon, 1909 is *Boliscodes amaenulus* Simon, 1909. The examined nominal specimen is a subadult female (MNHN 22412) from Tonkin (now Vietnam). This specimen is a juvenile *Boliscus*; judging from other juvenile specimens of the genus that we have seen. To assign this name unambigiously to any one species of *Boliscus* is fruitless. Therefore, it is here synonymized with *Boliscus tuberculatus*. The type specimen of *B. segnis* (in MNHN) has been examined, compared to RMNH.ARA.17830 and drawn by C. L. Deeleman. These drawings were made available to us.

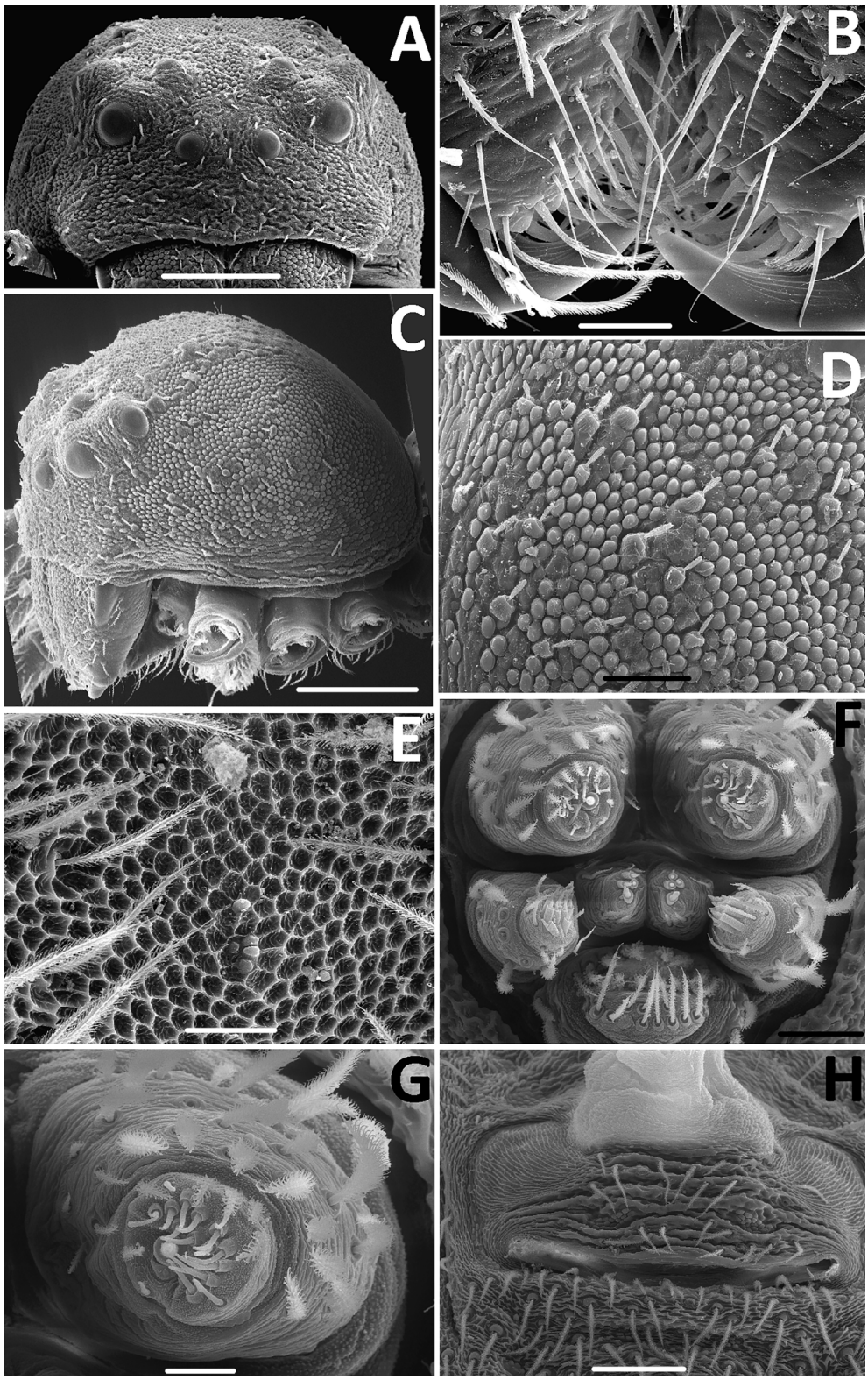

Fig. 4: Scanning electron micrographs of *Boliscus decipiens*. **A** carapace, anterior view; **B** chelicerae; **C** carapace, lateral view; **D** details of carapace; **E** details of sternum; **F** spinnerets; **G** anterior lateral spinnerets; **H** epigrastrum. Scale bars = 200 µm (A, C), 30 µm (B, E), 60 µm (D), 50 µm (F), 20 µm (G), 90 µm (H).

Other material examined: MALAYSIA: Selangor, Subang, near airport KL, oil palm plantation, general sweeping, 1♂, 1♀, 2 December 1990, leg. C. L. Deeleman (RMNH.ARA.17830); same locality and collection data, 1♂ (RMNH.ARA.17828); East Malaysia, Borneo, West Sabah, 6°06′N 116°50′E, Sorinsim, 1♂, 40 yr old adjacent secondary forest Loc 63, 500–700 m, canopy fogging, *Vitex pinnata* (Verbenaceae), tree 8 fog 1, 8 March 1997, leg. A. Floren (RMNH.ARA.17829); same locality, 2♂, 15 yr old adjacent secondary forest Loc 39, 500–700 m, 6°06′N 116°50′E, canopy fogging, *Melochia umbellata* (Sterculiaceae) tree 4 fog 1, 26 March 1997, leg. A. Floren (RMNH.ARA.17826); INDONESIA: NE Bali, Ambengan (Sinaraja), secondary forest near river, general foliage, 1♂, 20 January 1990, leg. Suharto Djojosudharmo; collection Deeleman (RMNH.ARA.17827). 1♂, East Sumba, 9°57′S

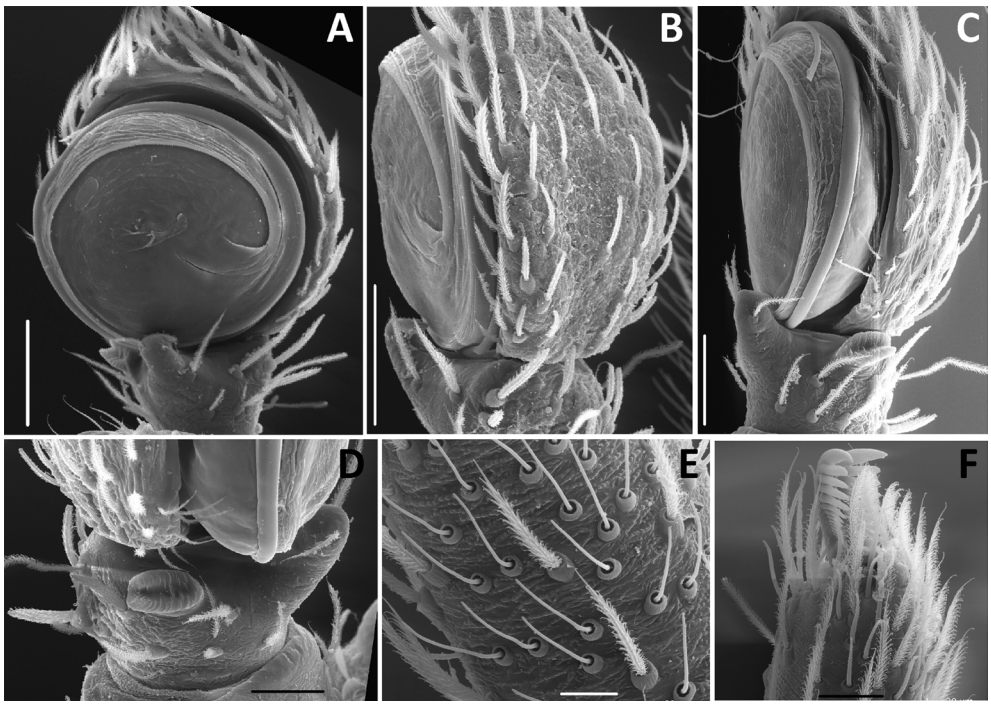

Fig. 5: Scanning electron micrographs of *Boliscus decipiens*. **A** right male palp, ventral view; **B**, **C** same, lateral views; **D** same, tibia, retrolateral view; **E** setae of leg I dorsal view; **F** tarsal claw of leg I. Scale bars = 90 µm (A), 80 µm (B), 60 µm (C), 40 µm (D), 20 µm (E), 30 µm (F).

120°30′E, *Luku melolo* forest, general leaf litter, 5 February 2001, leg. C. L. Deeleman (RMNH.ARA.17831).

Diagnosis: *B. tuberculatus* is similar to *B. decipiens*, but differs in having a blunt VTA with a shorter embolus. See Ono (1984) for detailed description.

Description: See Ono (1984) and Ramírez (2014).

Distribution: Indonesia, Malaysia, China, Myanmar to Japan.

Acknowledgements

This study was funded by National Science Foundation of Sri Lanka (Grant No. RG/2015/EB/04). Additional funding came from the National Institute of Fundamental Studies and the Alexander von Humboldt Foundation. Thanks to Christa L. Deeleman-Reinhold and Karen van Dorp (RMNH) for making available the spider specimens described herein. The SEMs were taken with assistance from Karin Ulmen and Hans-Joachim Krammer (ZFMK). Bernhard Huber (ZFMK) was of great assistance to SPB during his time in Bonn.

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