

Revision of *Cebrenninus* Simon, 1887 with description of one new genus and six new species (Araneae: Thomisidae)

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Abstract: The crab spider genus *Cebrenninus* Simon, 1887 is redefined based on morphology of adult males and females. *Cebrenninus* now is constituted of 10 nominal species. The following new species are described: *Cebrenninus banten* sp. nov., *C. berau* sp. nov., *C. magnus* sp. nov., *C. phaedrae* sp. nov., *C. schawalleri* sp. nov., and *C. tangi* sp. nov. Three new synonyms are proposed: *Libania scabricula* Thorell, 1890 syn. nov., *Libania scabricula sulcata* Thorell, 1890 syn. nov., and *Libania annulata* Thorell, 1890 syn. nov. = *Cebrenninus rugosus* Simon, 1887. *Cupa kalawitana* Barrion & Litsinger, 1995 is removed from the synonymy of *C. rugosus* and placed as a distinct species in *Cebrenninus*, i.e. *C. kalawitana* (Barrion & Litsinger, 1995) comb. nov. Morphological comparison of *Cebrenninus* and *Ascurisoma* Strand, 1929 shows that the latter should be considered a junior synonym of the former. Thus, *Ascurisoma striatipes* (Simon, 1897) is transferred to *Cebrenninus*, *C. striatipes* (Simon, 1897) comb. nov. *Crockeria kinabalu* gen. et sp. nov. from Mt Kinabalu National Park, Sabah, is described on the basis of its exceptional palp which has a median apophysis in addition to conductor and embolus. *Libania laevis* Thorell, 1890 syn. nov. is transferred to this new genus, now being called *Crockeria laevis* (Thorell, 1890) comb. nov.

Keywords: Stephanopinae - systematics - taxonomy - biodiversity - relict - Southeast Asia - China - Sri Lanka.

INTRODUCTION

The current biodiversity crisis has led to rush large scale collecting and to studies of many tropical faunas; crab spiders are no exception (Barrion & Litsinger, 1995; Tang & Li, 2009, 2010a, b; Tikader, 1980). However, many recent taxonomic treatments of crab spiders of tropical Asia have failed to examine name bearing type specimens of described species, resulting in the creation of superfluous names and misidentified species (Benjamin, 2011, 2013). Undeniably, although crab spiders are rather common worldwide, many genera have never been adequately characterized, rendering identification of newly collected material difficult. This paper is the third of a series presenting results of collections made by Christa Deeelman-Reinhold and coworkers of spiders living in the forest canopy, as well as collections made by Peter Schwendinger of spiders living in leaf litter. It deals with representatives of the genus *Cebrenninus* (Benjamin, 2013, 2014). These are cryptic, dark brownish spiders that live in dead, dry plant material such as bark and leaf litter. They are distributed throughout tropical Asia.

Spiders of the monotypic genus *Ascurisoma* Strand, 1929 (a replacement name) have never been collected or studied since its description by Simon (1897). Here I redescribe and diagnose *Ascurisoma striatipes* (Simon, 1897) on the basis of newly collected material and transfer it to *Cebrenninus*. This is the only known species of the genus found outside Southeast Asia and most probably it is an evolutionary relict.

MATERIAL AND METHODS

Types and other specimens were borrowed from the following institutions: CAS California Academy of Sciences, San Francisco; MCSN Museo Civico di Storia Naturale “Giacomo Doria”, Genova; MHNG Muséum d’histoire naturelle, Genève; MNHN Muséum National d’Histoire Naturelle, Paris; RMNH Rijksmuseum van Natuurlijke Historie, Leiden; SMF Research Institute Senckenberg, Frankfurt am Main. Methodology follows Benjamin (2011). Specimens used for habitus illustrations were placed in 70% ethanol and photographed using a dissecting microscope (Zeiss Discovery V20) with top

illumination and a magnification of up to 150x. Digital images were taken with a Zeiss AxioCam HRc camera. Images were edited using the Zeiss ZEN Pro software package.

An Amray 1810 housed at the Smithsonian Institution's National Museum of Natural History Scanning Electron Microscope (SEM) facility was used to study and photograph morphological features; relevant methodology is given in detail in Benjamin (2011). Structures of the left body side are depicted unless stated otherwise. Setae are usually not depicted in the final palp drawings. All measurements are given in millimeters. The leg formula is from the longest to the shortest leg. Abbreviations of morphological structures: ALE = anterior lateral eyes, AME = anterior median eyes, C = conductor, CD = copulatory duct, CO = copulatory opening, E = embolus, ETP = extra tegular process, MA = median apophysis, PLE = posterior lateral eyes, PME = posterior median eyes, RTA = retrolateral tibial apophysis, S = spermatheca, STD = sperm duct; connected to embolus.

TAXONOMIC PART

Thomisidae Sundevall, 1833

Cebrenninus Simon, 1887

Ascurisoma Strand, 1929. **Syn. nov.** Replacement name for *Ascuris* Simon, 1897.

Types species: *Cebrenninus rugosus* Simon, 1887.

Diagnosis: Distinguished from other thomisid genera by a combination of the following characters: Presence of a large stout RTA, presence of a free embolus that originates at the center of the bulb, presence of a filiform C, and presence of at least one SDT bend (inward turn). Males also possess a second tegular sclerite, the ETP. All males of the genus lack a MA. In some species males and females lack PME. In *C. rugosus* only females lack PME. Females can be distinguished from those of all other Thomisidae by the presence of large globular spermathecae and by the presence of a CD that is only slightly longer than the thickness of the wall of the S.

Species composition: *Cebrenninus banten* sp. nov., *C. berau* sp. nov., *C. kalawitana* (Barrion & Litsinger, 1995) comb. nov., *C. magnus* sp. nov., *C. phaedrae* sp. nov., *C. rugosus* Simon, 1887, *C. schawalleri* sp. nov., *C. srivijaya* Benjamin, 2011, *C. striatipes* (Simon, 1897) comb. nov. and *C. tangi* sp. nov.

Distribution: China, South-East Asia and Sri Lanka.

Remark on synonymy: The type species of *Ascurisoma*, *A. striatipes* (Simon, 1897), is here considered a typical member of *Cebrenninus* as it meets the criteria given in the diagnosis below.

Cebrenninus banten sp. nov.

Figs 1-3

Holotype: RMNH.ARA.15937; male; Indonesia, Banten Province, West Java, Ujung Kulon Reserve, 6°44'48"S 105°20'1"E, 11.-12.1986, leg. Suharto Djojosedharmo; left legs 1, 2 and 3 missing.

Diagnosis: Easily distinguishable from other known congeners by distinctive shape of E (fine tapered tip), C (weakly sclerotized, more or less the same width along its entire length, concave tip) and RTA (fine tapered tip; Figs 2-3).

Etymology: The species name is a noun in apposition derived from the name of the province in which the type locality lies.

Description: *Male:* Total length: 4.2; prosoma length: 2.0, width: 1.8. Leg I: femur 2.4, patella 0.8, tibia 2.5, metatarsus 2.3, tarsus 0.8. Prosoma red-brown, rounded, eight eyes, LE on light brown-colored mounds, mounds distinct but not touching (Fig. 1). ALE > PLE > PME > AME, AER and PER recurved. Opisthosoma dorsally with irregular black diffused spots, with brown circular spots towards the center and laterally with black spots connected to form bands. Legs uniformly yellow-brown. Leg formula 1243. Chelicera with three promarginal and three retromarginal teeth. Palps as in Figs 2-3.

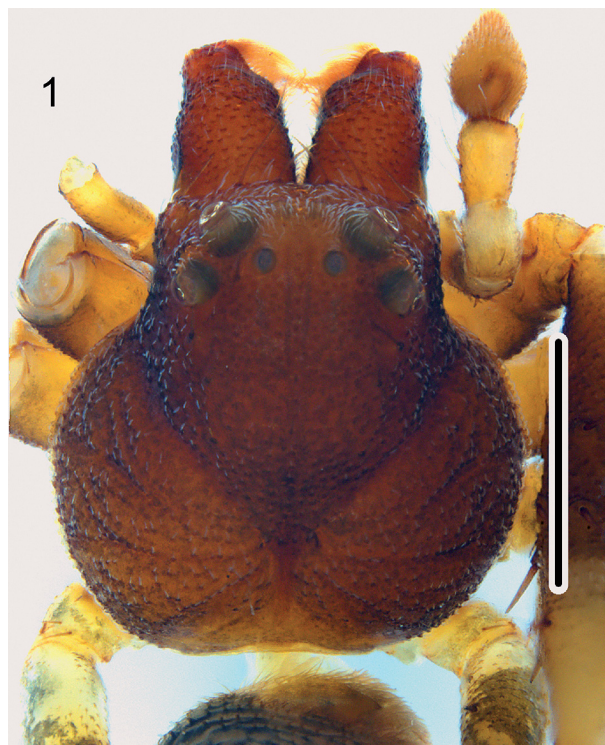
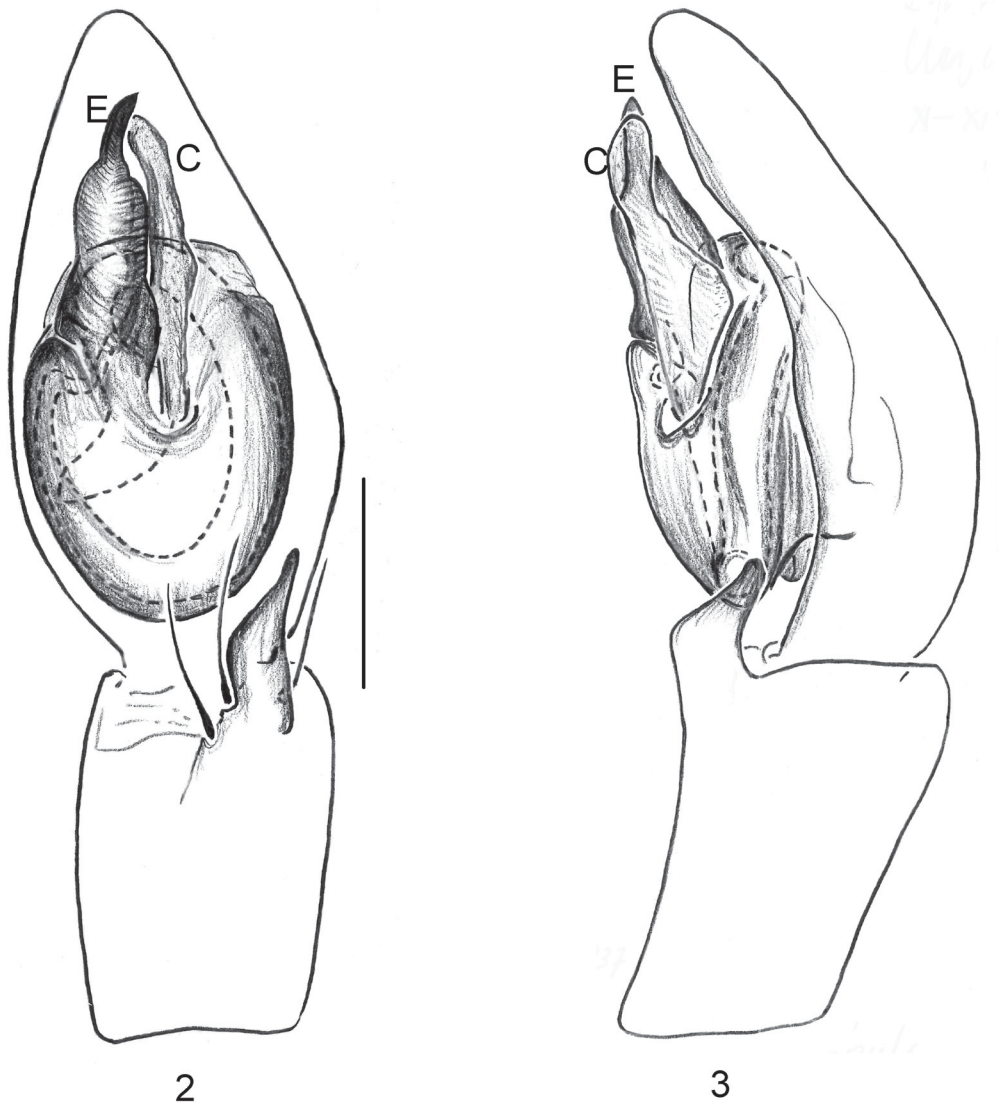


Fig 1. *Cebrenninus banten* sp. nov., male holotype from Indonesia. (1) Prosoma, dorsal view. Scale line = 1.0 mm.



Figs 2-3. *Cebrenninus banten* sp. nov., male holotype from Indonesia. (2-3) Left male palp (2 ventral, 3 retrolateral view). Scale lines = 0.2 mm.

Cymbium of male palp lacking trichobothria, C with concave tip, E stout with a short filiform tip.

Female: Unknown.

Distribution: Known only from the type locality.

***Cebrenninus berau* sp. nov.**

Figs 4-5, 10, 13-16, 30-31, 33-34

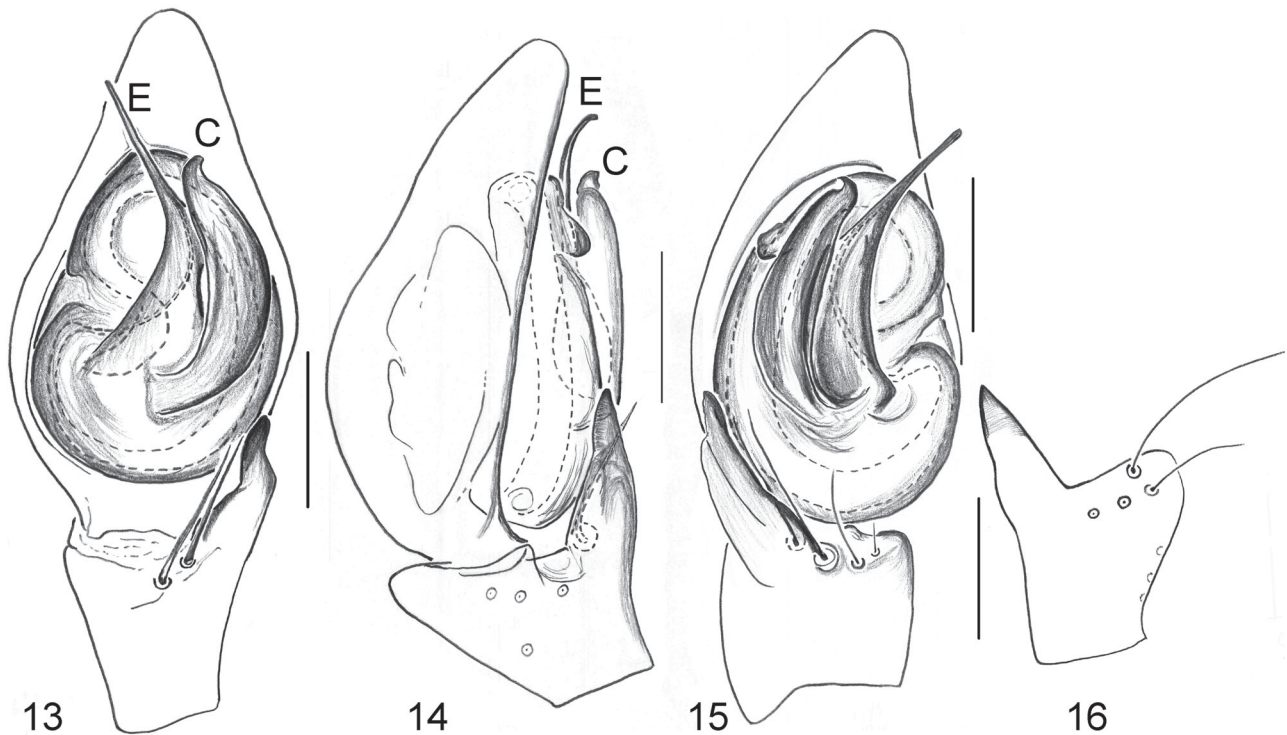
Cebrenninus rugosus.— Ramírez, 2014: 223, fig. 151d. Misidentification.

Holotype: MHNG; male; Indonesia, East Kalimantan Province, Berau District, 1 km off road Tanjungredeb to Tanjungsilor, ca 45 km N of Tanjungredeb, 2°29'33"S, 117°28'46"E, 190 m, primary forest; 29.9.2008 to 3.10.2008; leg. P. Schwendinger (sample IND-08/07).

Other material examined: RMNH.ARA.17165; 1 male, 1 female, 6 juveniles; Indonesia, North Sumatra, Gunung Leuser, Bohorok, litter; 10.08.1982; leg. C.L. and P.R. Deeleman. — RMNH.ARA.17166; 6 males, 12 females; Indonesia, North Sumatra, Gunung Leuser, Ketambe; 2.-4.03.1986; leg. Suharto Djojosedharmo; second date given on label 3.-5.04.1986, trail 64; in addition to the above listed specimens, this sample contained several specimens of *C. phaedrae* sp. nov. — RMNH.ARA.17167; 8 males, 4 females; same locality and collector, lowland leaf litter; 01.05-09.08.1986; in addition to the above listed specimens, this sample contained several specimens of *C. phaedrae* sp. nov. — MHNG; 2 males, 11 females, 9 juveniles, collected with the holotype (sample IND-08/07). — RMNH. ARA.15944; 1 male (damaged, opisthosoma missing, left palp missing); East Malaysia, Borneo, E. Sabah,



Figs 4-12. (4-5, 10) *Cebrenninus berau* sp. nov. from Indonesia, Berau District. (6-8) *C. magnus* sp. nov., holotype. (9, 11-12) *C. rugosus* (9, 12 from Pagat, 11 male lectotype; MNHN 8652/1572). (4, 8, 12) Male, dorsal view. (5, 11) Female, dorsal view. (6-7, 9) Left male palp (6 retrolateral, 7, 9 ventral view). (10) Epigynum, ventral view. Scale lines = 0.2 mm (6, 9, 10), 0.5 mm (7, 11), 1.0 mm (4-5, 12), 2.0 mm (8).



Figs 13-16. (13-14) *Cebrenninus berau* sp. nov., male from Sabah, right palp (13 ventral, 14 retrolateral view). (15) *C. berau* sp. nov., holotype from Berau District, left palp, ventral view. (16) Same palp, RTA, retrolateral view. Scale lines = 0.2 mm.

Danum Valley Field Centre, primary forest, dung trap; 1991; leg. Andrew Davis.

Diagnosis: Similar to *C. phaedrae* sp. nov. and *C. kalawitana* comb. nov., distinguished from these and other known congeners by distinctive shape of E (broad base, slightly enlarged in the center, finely tapered towards tip, tip slightly enlarged; Figs 13, 15), C (curved margins, hooked tip; Figs 13, 30) and RTA (hooked tip; Figs 13-16, 31). Females can be distinguished by the oval spermathecae and by the short CD that seems to be a bit longer than the width of the wall of the S (Figs 33-34). Moreover, both sexes of this species are larger and darker in color than *C. phaedrae* sp. nov.

Etymology: The species name is a noun in apposition taken from the name of the district in which the type locality lies.

Description: *Male:* Total length: 3.1; prosoma length: 1.5, width: 1.4. Leg I: femur 1.8, patella 0.6, tibia 1.7, metatarsus 1.2, tarsus 0.8. Prosoma red-brown, rounded, six eyes, PME absent, LE on light brown-colored mounds, mounds distinct but not touching (Fig. 4). Opisthosoma dorsally with irregular black diffused spots, two pairs of brown circular spots towards the center, laterally black spots connect to form bands (Fig. 4). Legs uniformly yellow-brown. Leg formula

1243, ALE > PLE > AME, AER and PER recurved. Palps as in Figs 13-16, 30-31. Cymbium of the male palp lack trichobothria.

Female: Total length: 3.3-4.0; prosoma length: 1.5-1.7, width: 1.3-1.5. Leg I: femur 1.8, patella 0.5, tibia 1.5, metatarsus 1.0, tarsus 0.7. In general similar to male. Epigynum and vulva as in Figs 33-34. Spermathecae oval, CD short.

Distribution: Known from localities in northern Sumatra and eastern Borneo.

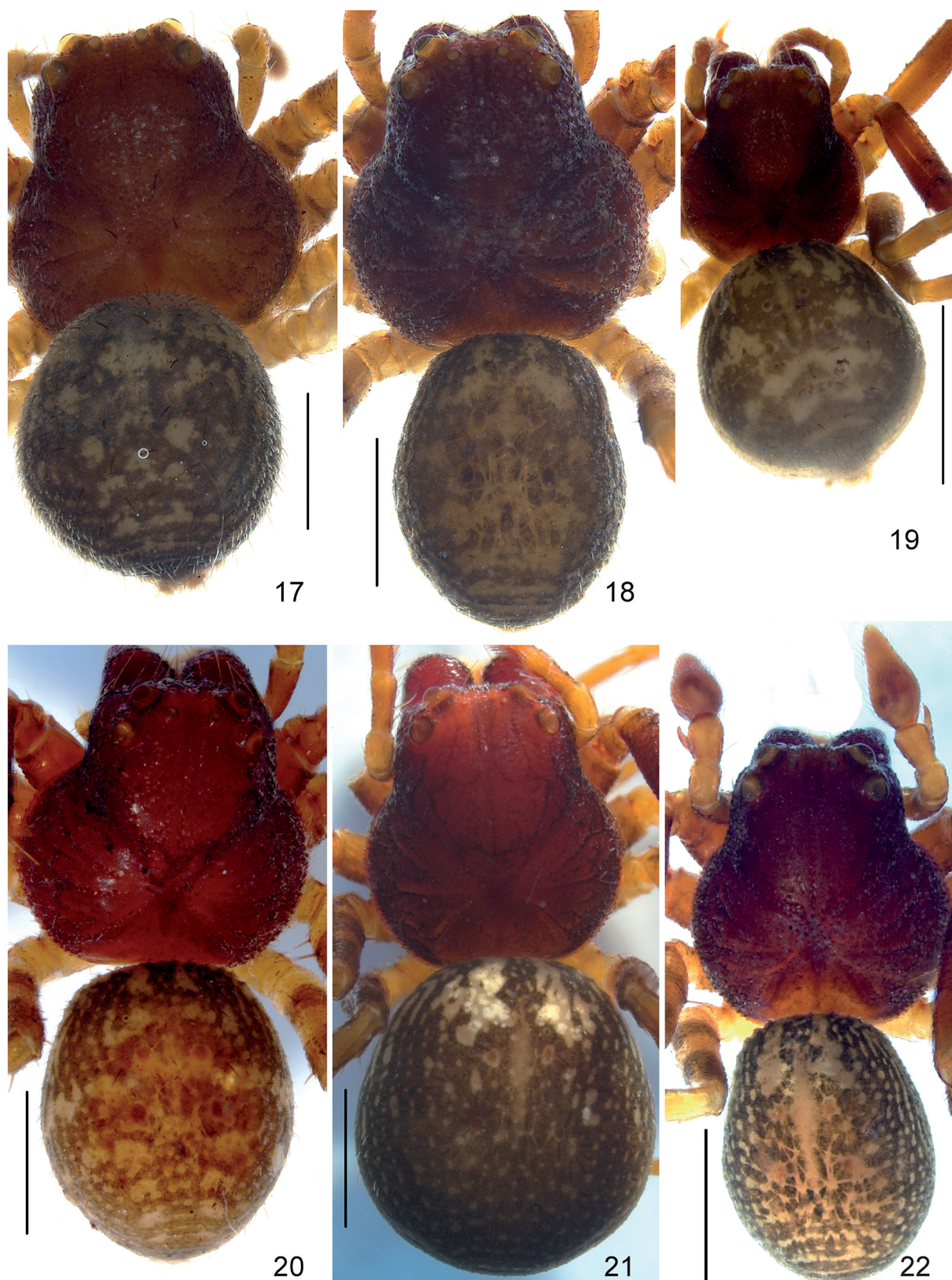
***Cebrenninus kalawitana* (Barrion & Litsinger, 1995)
comb. nov.**

Figs 20-21, 23-26, 27-29, 32

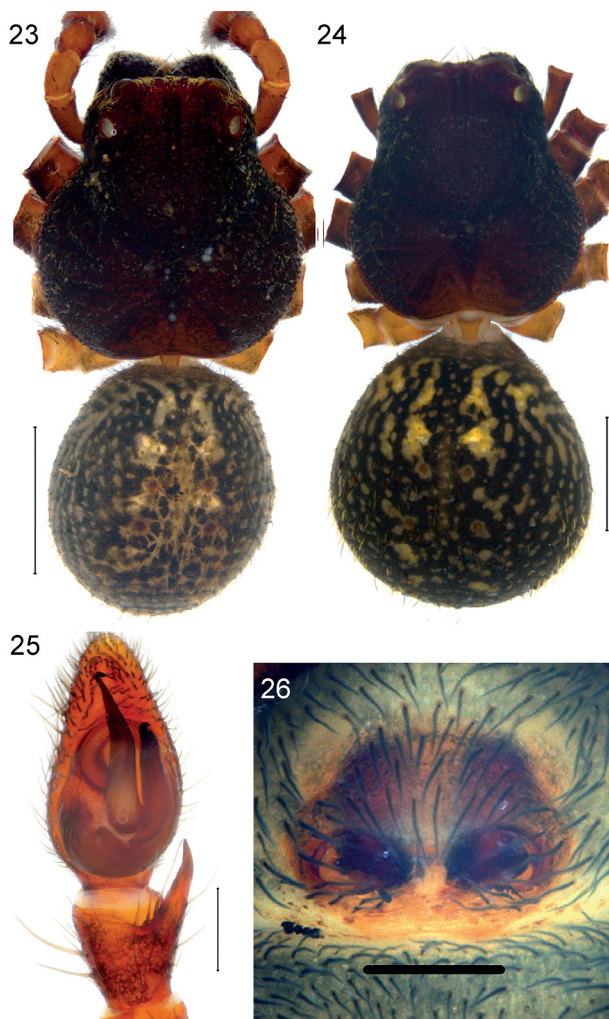
Cupa kalawitana Barrion & Litsinger, 1995: 208, fig. 119a-f.
Type not examined.

Cebrenninus rugosus. – Tang *et al.*, 2009. Misidentification.

Material examined: SMF 3636; 2 males, 2 females, 3 juveniles; Philippines, Luzon, Laguna Province, Mt Makiling; leg. Baker. – CASENT 9042005; 2 males, 1 female, 1 juvenile; Philippines, Luzon Island, Laguna Province, Malabo Camp, Mt Makiling, 3.46 km SSW of Los Baños, 673 m, 14°08.220'N 121°12.325'E, general collecting, daytime, forest; 10.-12.05.2011, leg. H. Wood *et al.* – CASENT 9045699; 2 juveniles;



Figs 17-22. Photographs of *Cebrenninus* spp., dorsal view. (17-18) Syntypes of *Libania annulata* syn. nov. (= *C. rugosus*) (MCSN, 17 female, 18 male). (19) Female syntype of *Libania scabricula* syn. nov. (= *C. rugosus*) (MCSN). (20) *Cebrenninus rugosus*, male (SMF 3645). (21-22) *C. kalawitana* comb. nov (SMF 3636). Scale lines = 1.0 mm (17-18, 20-22), 2.0 mm (19).



Figs 23-26. Photographs of *Cebrenninus kalawitana* comb. nov. from the Philippines, male (23, 25), female (24, 26). (23-24) Dorsal view of body. (25) Left palp, ventral view. (26) Epigynum, ventral view. Scale lines = 0.2 mm (25-26), 1.0 mm (23-24).

Philippines, Luzon Island, Laguna Province, same locality as above, hand sorting, sifted litter in forest. – CASENT 9043491; 1 male; Philippines, Luzon Island, Laguna Province, Mt Makiling, 3.8 km WSW of Los Baños, 818 m, 14°08'20.1"N 121°11'55.0"E, general collecting, night time; 11.05.2011, leg. H. Wood *et al.* – CASENT 9047524; 1 male; Philippines, Luzon Island, Quezon Province, Mt Banahaw de Lucban, 3.78 km WSW of Lucban, 747 m, 14°05.859"N 121°31.071"E, general collecting, daytime, forest; 14.-22.05.2011, leg. H. Wood *et al.* – CASENT 9047526; 1 male, 1 female; same locality and collection data as above.

Diagnosis: Distinguished from other known congeners by distinctive shape of E (broad based, filiform, tapered towards the tip; Figs 27, 32), C (curved margins, hooked tip; Figs 27-28) and RTA (smooth, gradual tip; Figs 27,

29, 32). Females can be separated on the basis of their oval CO (Fig. 26).

Description: *Male:* Total length: 3.6; prosoma length: 1.8, width: 1.7. Leg I: femur 2.3, patella 1.5, tibia 2.3, metatarsus 1.6, tarsus 0.9. Prosoma uniformly red-brown, rounded, with eight eyes (Figs 22-23). Opisthosoma dorsally with irregular black, diffused spots, anteriorly with white spots, two pairs of brown circular spots towards the center (Figs 22-23). Laterally the black spots connect to form bands (Figs 22-23). Legs uniformly yellow-brown. Leg formula 1243, ALE > PLE > AME > PME, PME less than 0.25 times PLE. In some specimens PME reduced to two black spots. AER and PER recurved, eyes on light brown-colored mounds, mounds not touching. Palps as in Figs 25, 27-29, 32. Cymbium lacking trichobothria. The male of this species was described in detail by Barrion & Litsinger (1995).

Female: Total length: 4.3; prosoma length: 2.1, width: 1.8. Leg I: femur 2.2, patella 1.5, tibia 2.0, metatarsus 1.3, tarsus 1.0. In general similar to male (Figs 21, 24). Epigynum as in Fig. 26.

Distribution: Known only from two mountains on Luzon Island, the Philippines.

Remarks: *Cupa kalawitana* is here removed from the synonymy of *C. rugosus*, proposed by Tang *et al.* (2009). Types have not been seen, however, most of the examined material is from localities very close to the type locality. All examined material could be clearly distinguished from *C. rugosus*, as given in the diagnosis below, and are thus not considered conspecific with it.

Cebrenninus magnus sp. nov.

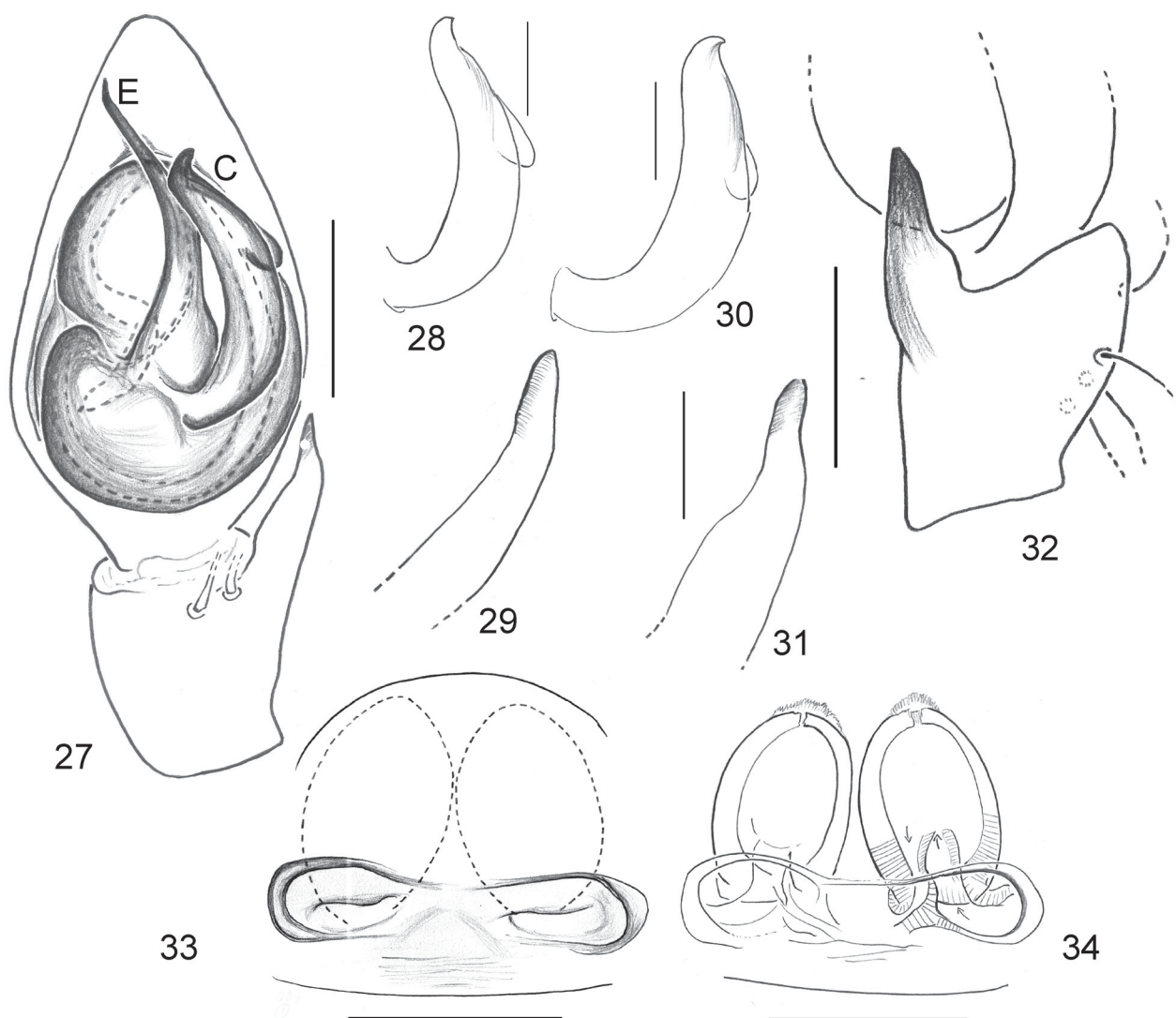
Figs 6-8, 35-36, 38-45

Cebrenninus rugosus. – Tang & Li, 2010a: 23, figs 17a-c, 18a-e, 19a-d. Misidentification.

Cebrenninus rugosus. – Benjamin, 2011: figs 8b, e-f, 27a-b, d-e, 28a-f, 29a-f. Misidentification.

Holotype: MHNG; male; Laos, Champasak Province, Bolaven Plateau, NW of Pakxong, Tham Champee, 15°12'04"N 106°08'07"E, 980 m, secondary forest near stream; 2.10.2010, leg. P. Schwendinger (sample LT-10/25).

Other material examined: CAS; 2 females; Thailand, southern Isan Region, Khao Yai National Park, 750 m, 26.07.1962; leg. E. S. Ross and D. Q. Cavagnaro. – RMNH.ARA.1594; 1 female; Nakhon Ratchasima Province, Khao Yai National Park, 800 m, 4.11.1987, evergreen forest; leg. C. L. and P. R. Deeelman. – RMNH.ARA.17168; 1 female; Nakhon Ratchasima Province, Khao Yai National Park, 800 m, under bark, killed 19.11.1987; 6.11.1987, leg. C. L. and P. R. Deeelman. – MHNG; 1 male; Chiang Mai Province,



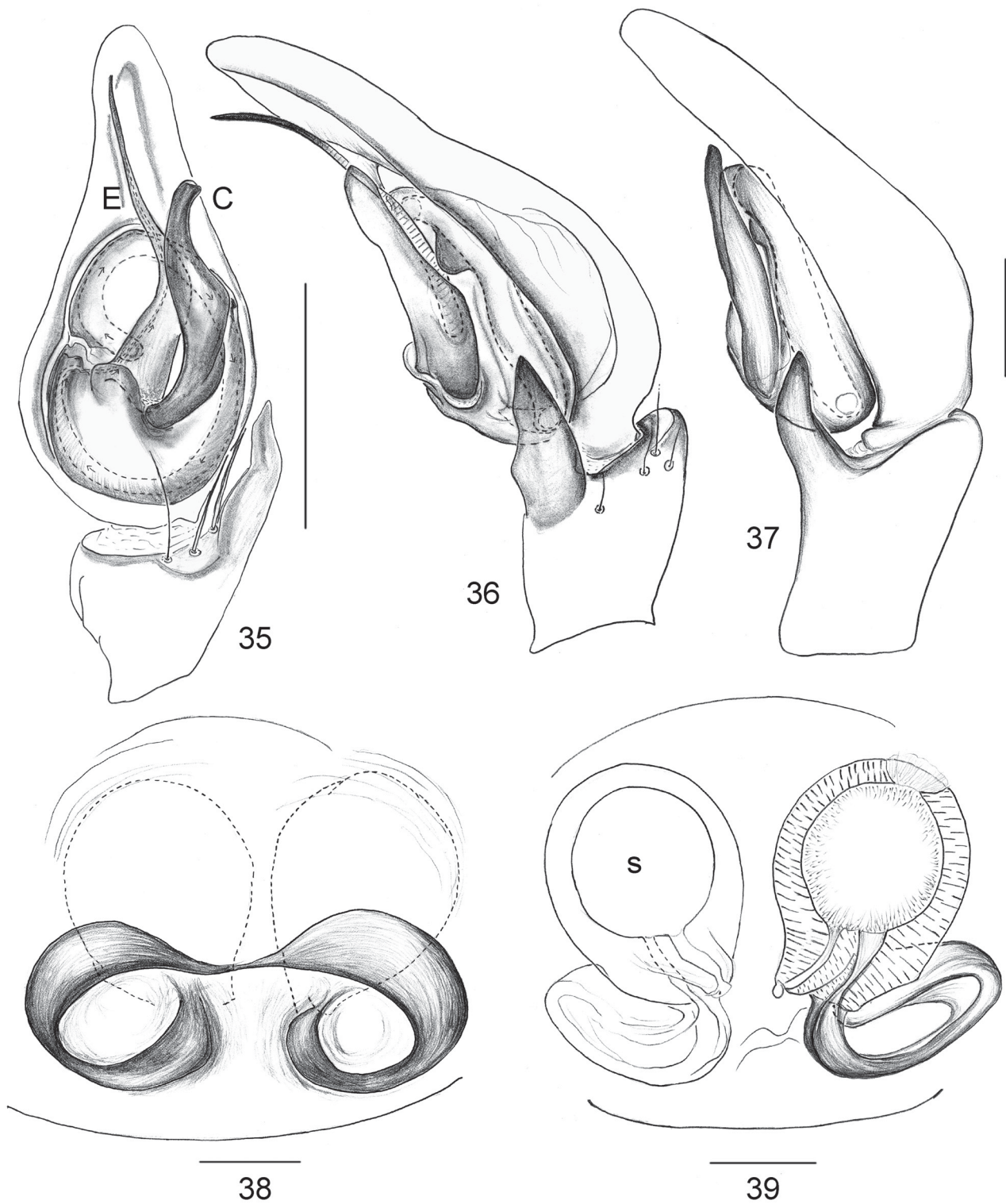
Figs 27-34. (27-29, 32) *Cebrenninus kalawitana* comb. nov from the Philippines. (30-31, 33-34) *C. berau* sp. nov., male from Indonesia, Berau District. (27-32) Left male palp. (28, 30) Conductor. (29, 31-32) RTA. (33) Female epigynum. (34) Vulva. (27-31, 33-34) Ventral view. (32) Retrolateral view. Scale lines = 0.1 mm (28-31), 0.2 mm (27, 32-34).

near Chiang Mai, Doi Suthep, 1150 m; 30.11.1996, leg. P. Schwendinger. – MHNG; 1 male, 1 female; Chumphon Province, near border between Lang Suan and Phato Districts, Khao Kai Jae Waterfall, 80 m, semi-evergreen rainforest; 21.-22.08.2004, leg. P. Schwendinger. – MHNG; 1 female; Chiang Mai Province & District, near Chiang Mai, Doi Suthep, below Tham Rüsie, 18°48'18"N 98°55'02"E, 1190 m, evergreen hill forest; 31.01.2011, leg. P. Schwendinger (sample THMY-10/10). – MHNG; 1 male, 1 female; Phetchabun Province & District, Tad Mok National Park, near Tad Mok Waterfall, 16°22'02"N 101°23'02"E, 900 m, evergreen gallery forest on earth banks; 25.12.2013, leg. P. Schwendinger (sample TH-13-14/03). – RMNH.ARA.15940; 1 male; Indonesia, Java, West Java, Puncak Pass, 1500-1600 m; leg. P. Beron and

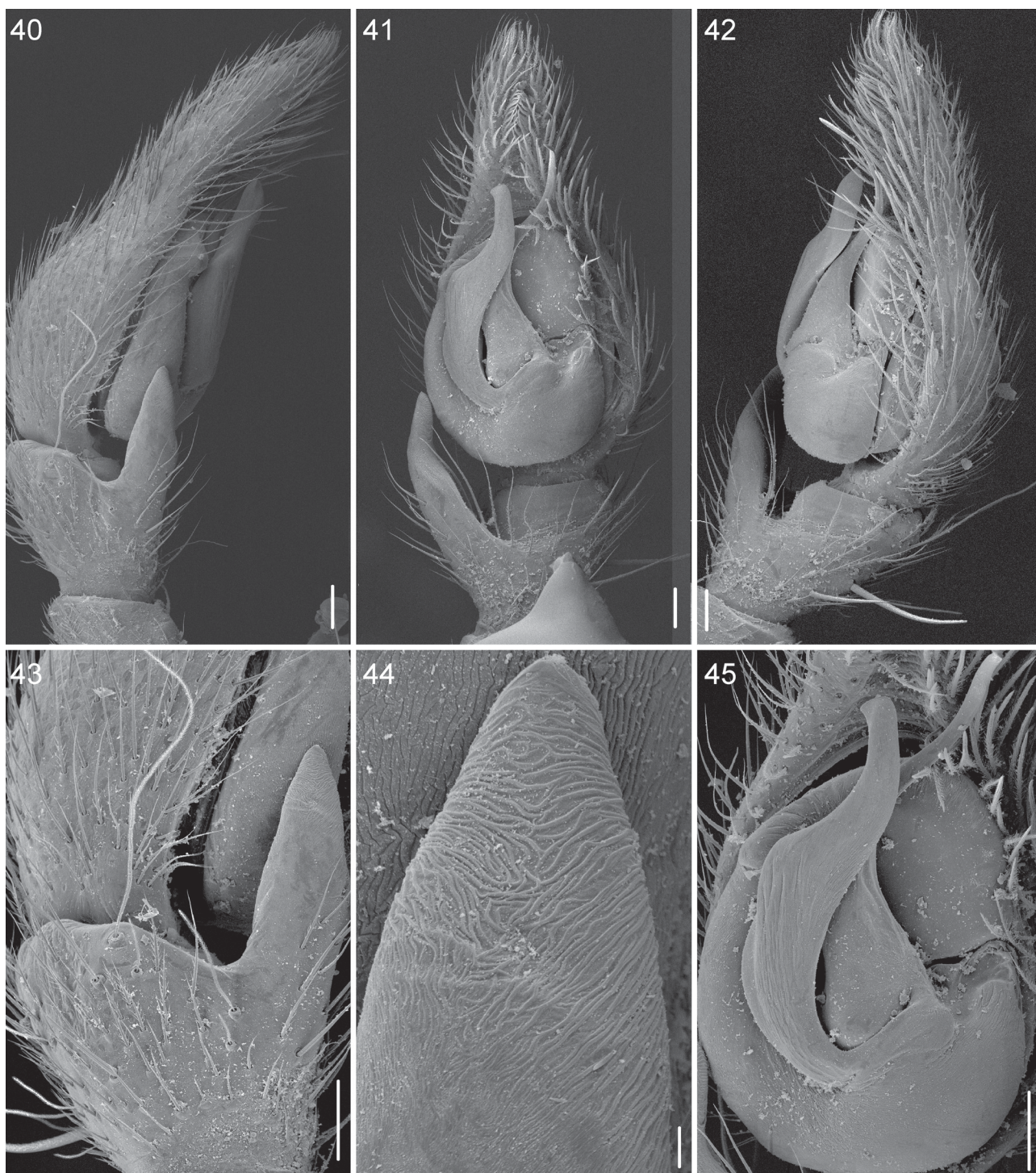
V. Beshkov, no more label data. – RMNH.ARA.15924; 1 male; E-Malaysia, Borneo, West Sarawak, Bako National Park, rain forest, 1.7167°N, 110.4667°E, on slope; leg. C. L. and P. R. Deeelman. – RMNH.ARA.17169; 1 subadult female; E-Malaysia, Borneo, West Sarawak, Semenggoh Arboretum, walking on bark; 10.01.1984, leg. C. L. and P. R. Deeelman.

Diagnosis: Distinguished from known congeners by the larger size (length: 4.7-5.3) and by the distinctive shape of E (filiform; fine tapered tip; Figs 35, 45), C (broadest approximately at the center, apical half curved, slightly broader at the tip; Figs 35-36, 41, 45) and RTA (Figs 35-36, 44). Females can be distinguished by the round CO and S (Figs 38-39).

Etymology: The specific name refers to the size of the spiders.



Figs 35-39. (35-36, 38-39) *Cebrenninus magnus* sp. nov. (37) *C. rugosus* (lectotype). (35-36) Male from Thailand (MHNG), left palp (35 ventral, 36 retrolateral view). (37) Male palp, retrolateral view. (38-39) Female from Thailand. (38) Epigynum, ventral view. (39) Vulva, dorsal view. Scale lines = 0.1 mm (38-39), 0.2 mm (37), 0.5 mm (35-36).

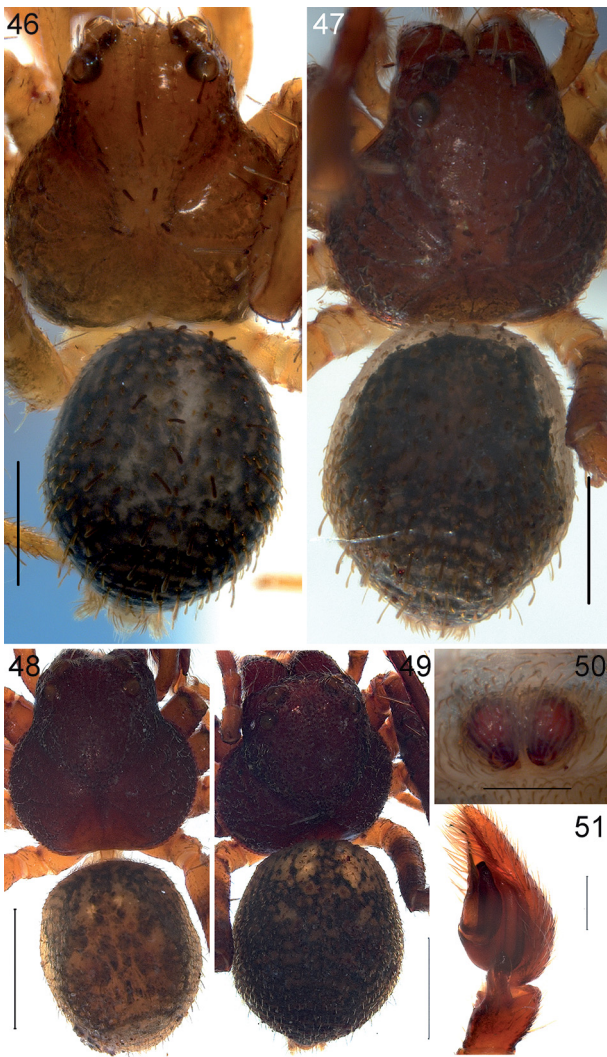


Figs 40-45. Scanning electron micrographs of *Cebrenninus magnus* sp. nov., male from Sumatra (MHNG), right male palp. (40, 43-44) Retrolateral view. (41, 45) Ventral view. (42) Prolateral view. Scale lines = 10 μ m (44), 100 μ m (40-43, 45).

Description: *Male:* Total length: 4.7-5.3; prosoma length: 2.2-3.1, width: 2.0-2.4. Leg I: femur 3.3, patella 1.0, tibia 3.3, metatarsus 2.3, tarsus 1.3. This species was described in detail by Tang & Li (2010a) and Benjamin (2011) under *C. rugosus* and thus is not dealt further here.

Distribution: Known from localities in China (Tang & Li, 2010a), Laos, Thailand, on Java and western Borneo.

Natural history: Probably a bark dweller; often collected on or under bark.



Figs 46-51. (46-47, 50) Photographs of *Cebrenninus phaedrae* sp. nov. (48-49, 51) Photographs of *C. schawalleri* sp. nov. (46, 48, 51) Male. (47, 49-50) Female. (46-49) Dorsal view. (50) Ventral view. (51) Retrolateral view. Scale lines = 0.2 mm (50-51), 0.5 mm (46-47), 1.0 mm (48-49).

***Cebrenninus phaedrae* sp. nov.**

Figs 46-47, 50, 52-56

Holotype: RMNH.ARA.159411; male; Indonesia, Borneo, Central Kalimantan, 40 km N of Palang Karaya, 2°12'36"S 113°55'2"E, secondary forest, litter; 09.1985, leg. Suharto Djojosedharmo.

Other material examined: RMNH.ARA.15942; 4 males, 10 females; Indonesia, Central Kalimantan, Kaharian, 20°2'S, 113°40'E; coll. Deeleman, no more label data. – RMNH.ARA.17170; 5 males, 4 females, 6 juveniles; Indonesia, West Sumatra, Rimba Panti Nature Reserve, lowland primary rainforest, leaf litter on mineral soil; 3.08.1982, leg. C. L. and P. R. Deeleman. – RMNH.ARA.17171; 1 male, 2 females; Indonesia, Central Kalimantan, Kaharian, 20°2' S, 113°40' E,

swampy primary forest, leaf litter; 2.-16.09.1985, leg. Suharto Djojosedharmo. – RMNH.ARA.17172; 1 female; Indonesia, Borneo, West Sarawak, Semergho Arboretum, litter; 1984, leg. C. L. and P. R. Deeleman. – RMNH.ARA.15935; 2 males, 3 females; same locality; 23.03.1985, leg. C. L. and P. R. Deeleman. – RMNH.ARA.17173; 3 males, 7 females, 3 juveniles; Indonesia, North Sumatra, Gunung Leuser, Ketambe, lowland leaf litter trail 1.1; 7.07.1985, leg. Suharto Djojosedharmo. – RMNH.ARA.17174; 4 males, 17 females; same data as above, tr.8.4; 02.08.1985. – RMNH.ARA.17175; 20 males, 31 females, 10 juveniles; same data as above; 1.05.- 9.08.1985, lowland leaf litter; in addition to the above listed specimens, this sample contained several specimens of *C. berau* sp. nov. – RMNH.ARA.17176; 26 males, 38 females; same data as above; 24.03.1986; in addition to the above listed specimens, this sample contained several specimens of *C. berau* sp. nov. – RMNH.ARA.17177; 1 male; same locality, trail 2.4, leaf litter; 4.05.1986, leg. Suharto Djojosedharmo. – RMNH.ARA.15936; 2 males, 1 female; Peninsular Malaysia, Klang Valley, Selangor, Templer's Park, 03°17.60'N 101°39.25'E, litter; 19.03.1985, leg. C. L. and P. R. Deeleman. – RMNH.ARA.17178; 2 females; Peninsular Malaysia, Klang Valley, Selangor, Templer's Park, 03°17.60'N 101°39.25'E, leaf litter; 29.07.1980, leg. C. L. and P. R. Deeleman.

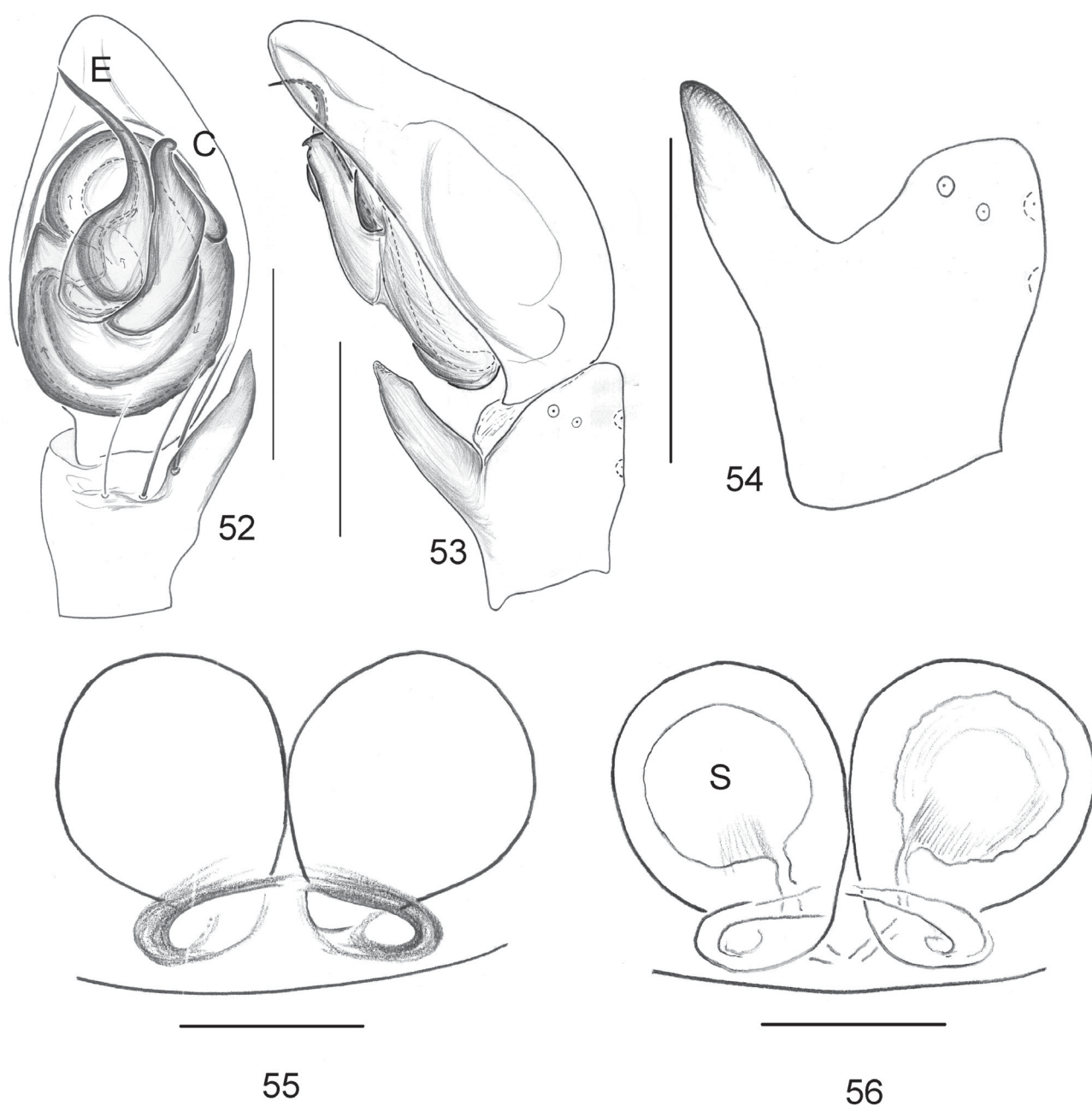
Diagnosis: Similar to *C. berau* sp. nov., distinguished from this and other known congeners by distinctive shape of E (posterior half bottle-shaped, anterior half filiform, tip pointed; Figs 52-53), C (straight prolateral margin, broadest at midpoint, hooked tip; Figs 52-53) and RTA (tapering, pointed tip; Figs 52-54). Females can be distinguished by the round spermathecae, and by short CD not being longer than the width of the wall of S (Figs 55-56). Specimens of both sexes are smaller and lighter in color than specimens of *C. berau* sp. nov.

Etymology: Named after the ancient Greek mythological figure Phaidra.

Description: *Male:* Total length: 2.5; prosoma length: 1.4, width: 1.1. Leg I: femur 1.2, patella 0.3, tibia 1.0, metatarsus 0.7, tarsus 0.5. Prosoma red-brown, rounded, six eyes, PME absent, LE on light brown-colored mounds, mounds distinct but not touching (Fig. 46). Opisthosoma dorsally with irregular black diffused spots, two pairs of brown circular spots towards center, laterally black spots connected to form bands (Fig. 46). Legs uniformly yellow-brown. Leg formula 1243, ALE > PLE > PME. AER and PER recurved. Palps as in Figs 52-54. Cymbium without trichobothria.

Female: Total length: 2.3; prosoma length: 1.2, width: 1.1. Leg I: femur 1.0, patella 0.3, tibia 1.0, metatarsus 0.7, tarsus 0.5. In general similar to male. Epigynum and vulva as in Figs 55-56. Spermathecae rounded, CD short.

Distribution: Known from localities on Borneo, Sumatra and Peninsular Malaysia.



Figs 52-56. *Cebrenninus phaedrae* sp. nov. (52, 54) Male from Malaysia (RMNH.ARA.15936). (53) Male from Indonesia (RMNH.ARA.15941). (55-56) Female from Indonesia (RMNH.ARA.15942). (52-54) Male palp (52 ventral, 53-54 retrolateral view). (55) Epigynum, ventral view. (56) Vulva, ventral view. Scale lines = 0.1 mm (55-56), 0.2 mm (52-54).

***Cebrenninus rugosus* Simon, 1887**

Figs 17-20, 57-64

Cebrenninus rugosus Simon, 1887: 468. – Simon, 1897: 9, figs 1-2. – Tang *et al.*, 2009: 40, figs 1a-f. Misidentification. – Tang & Li, 2010a: 23, figs 17a-c, 18a-e, 19a-d. Misidentification. – Benjamin, 2011: figs 8b, e-f, 27a, b, d-e, 28a-f, 29a-f. Misidentification. – Benjamin, 2011: figs 5c, 5f, 27c. – Ramírez, 2014: 223, fig. 151D. Misidentification.

Libania scabricula Thorell, 1890: 148. **Syn. nov.**

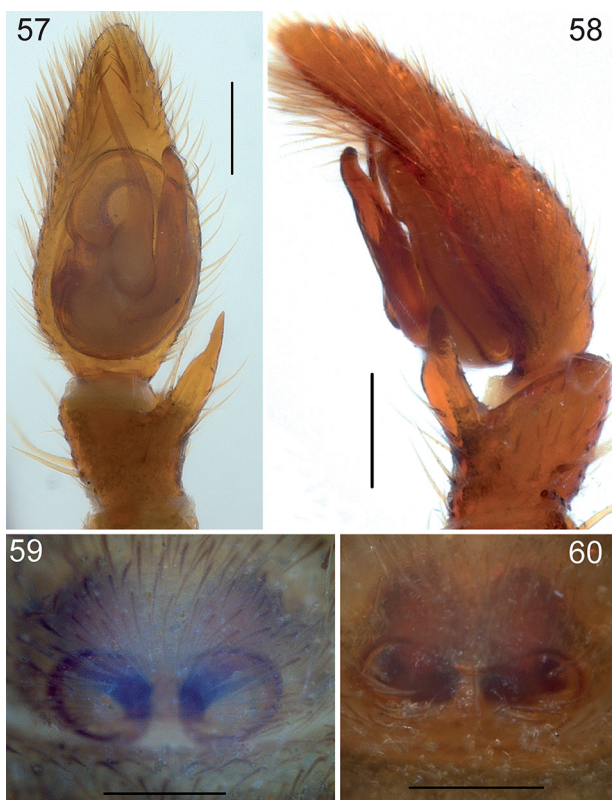
Libania scabricula sulcata Thorell, 1890: 148. **Syn. nov.**

Libania annulata Thorell, 1890: 149. **Syn. nov.**

Libania armillata Thorell, 1890: 149.

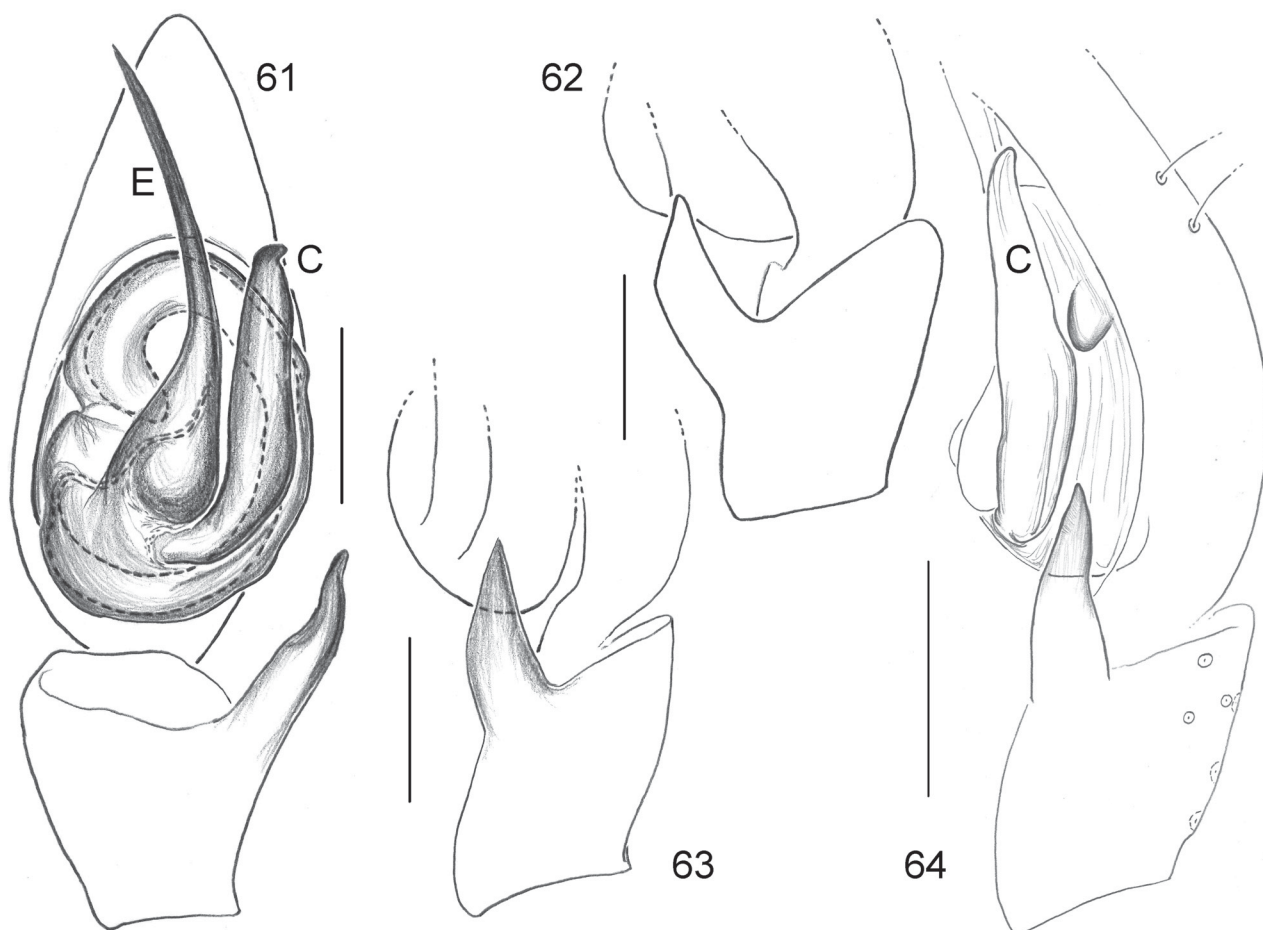
Type material: MNHN 8652/1572; male lectotype (examined); no locality data given. – MCSN; 2 female syntypes of *Libania scabricula* Thorell, 1890 (examined); Cibodas, Java, Indonesia; X.1873, O. Beccari. – MCSN; 2 females, 1 male, 1 juvenile syntypes of *Libania annulata* Thorell, 1890 syn. nov. (examined); Sumatra, Singalang; VII.1878, O. Beccari.

Other material examined: SMF 3645; 7 males;



Figs 57-60. Photographs of *Cebrenninus rugosus*. (57, 59) Syntypes of *Libania annulata* syn. nov. (MCSN, 57 left male palp, ventral view, 59 epigynum, ventral view). (58) *C. rugosus*, male from Indonesia, left male palp, retrolateral view (SMF 3645). (60) Syntype of *Libania scabricula* syn. nov., epigynum, ventral view (MCSN). Scale lines = 0.2 mm.

Figs 61-64. *Cebrenninus rugosus*, left palp. (61-62) Male from Indonesia (SMF 3645). (63) Syntype of *Libania annulata* syn. nov. (MCSN). (64) Male from Indonesia (RMNH.ARA.15939). (61) Palp, ventral view. (62-63) RTA, retrolateral view. (64) Palp, retrolateral view. Scale lines = 0.2 mm.



Indonesia, Sumatra, west coast, Gunung Singgalang, 1800 m; 1925, leg. E. Jacobson. – RMNH.ARA.15939; 1 male, 1 female, several juveniles; Indonesia, East Sumatra, Gunung Leuser N.P., Bohorok, 3°30'0"N, 97°30'0"E, leaf litter, 10.08.1982, leg. C. L. and P. R. Deeleman. – MHNG; 1 male, 1 female; Indonesia, South Kalimantan Province, Pagat, ca 6 km E of Barabai, Gunung Batu Benawa, 2°38'40"S, 115°24'46"E, 110 m, secondary forest on lime stone; 11.-14.10.2008, leg. P. Schwendinger (sample IND-08/18).

Remarks on synonymy: Type material of *Libania scabricula* and *L. annulata* unambiguously match the type of *C. rugosus*. The type of *Libania scabricula sulcata* is lost; however, it is considered similar to *L. scabricula* based on the original description and thus is here placed in the synonymy of *C. rugosus*. Some of the examined material is from the type locality of *L. annulata*, i.e. Sumatra, Singalang (= Gunung Singgalang). All of it unambiguously matches the type of *C. rugosus*. The synonymization of *L. armillata* is by Roewer (1954) and is followed here. Furthermore, as Mt Singgalang is very rich in species, all these synonymies should be further assessed when more material from that region becomes available.

Diagnosis: Distinguished from known congeners by the presence of two dorsal trichobothria on the cymbium, distinctive shape of E (filiform; oval base, tapering to a fine tip; Figs 57, 61), C (broadest just above base, partly straight retrolateral margin, hooked tip; Figs 57-58, 61, 64) and RTA (inward turn approximately at midpoint, pointed tip; Figs 57-58, 61-64). Females can be distinguished by the round CO and S (Figs 59-60).

Description: *Male* from Gunung Singgalang (SMF 3645): Total length: 4.3-4.6; prosoma length: 2.1, width: 2.0. Leg I: femur 2.2, patella 0.7, tibia 2.2, metatarsus 1.3, tarsus 0.9. Prosoma uniformly red-brown, eight eyes (Figs 17-20). Opisthosoma dorsally with irregular black, diffused spots, anteriorly with white spots, two pairs of brown circular spots towards the center, laterally black spots connect to form bands (Figs 17-20). Legs uniformly yellow-brown. Leg formula 1243, ALE > PLE > AME > PME (AME 0.5 times ALE). AER and PER recurved, eyes on light brown-colored mounds, mounds of LE not touching. Palps as in Figs 61-64. Cymbium of male palp with two dorsal trichobothria (Fig. 64).

Female: Total length: 3.0; prosoma length: 1.5, width: 1.4. Leg I: femur 1.2, patella 0.5, tibia 1.2, metatarsus 0.9, tarsus 0.6. In general similar to male. ALE > PLE > AME, PME absent. Epigynum and vulva as in Figs 59-60.

Distribution: Known from localities on Sumatra and Borneo.

Cebrenninus schawalleri sp. nov.

Figs 48-49, 51, 65-69

Holotype: SMF; male; Philippines, Leyte, Visca, North Baybay, primary forest, 200-500 m; leg. W. Schawaller *et al.*, 22.02.1991.

Other material examined: SMF; 1 male collected together with the holotype. – SMF; 2 females; Philippines, Leyte, Lake Danao, forest edge, 500 m; leg. W. Schawaller *et al.*, 19.02.1991.

Diagnosis: Similar to *C. rugosus*, distinguished from this and other known congeners by distinctive shape of E (broad, lateral projection just below curved, hook-like tip; Figs 65-66), C (curved retrolateral margin, stout hooked tip; Figs 65-66) and RTA (tip beak-shaped; Figs 66-67). Females can be distinguished by the elongated/oval spermathecae (Figs 68-69).

Etymology: Named after the collector.

Description: *Male:* Total length: 3.6; prosoma length: 1.7, width: 1.7. Leg I: femur 2.1, patella 0.7, tibia 2.0, metatarsus 1.0, tarsus 0.7. Opisthosoma dorsally with irregular black, diffused spots, anteriorly with white spots, two pairs of brown circular spots towards the center, laterally black spots connecting to form bands (Figs 48-49). Legs uniformly yellow-brown. Leg formula 1243, ALE > PLE > AME > PME, PME reduced, barely visible, PME less than 0.25 times PLE. AER and PER recurved, eyes on light brown-colored mounds, mounds of LE not touching. Palps as in Figs 51, 65-67. Cymbium lacking dorsal trichobothria.

Female: Total length: 3.8; prosoma length: 1.8, width: 1.8. Leg I: femur 2.0, patella 0.7, tibia 1.8, metatarsus 1.3, tarsus 0.9. In general similar to male. Epigynum and vulva as in Figs 68-69.

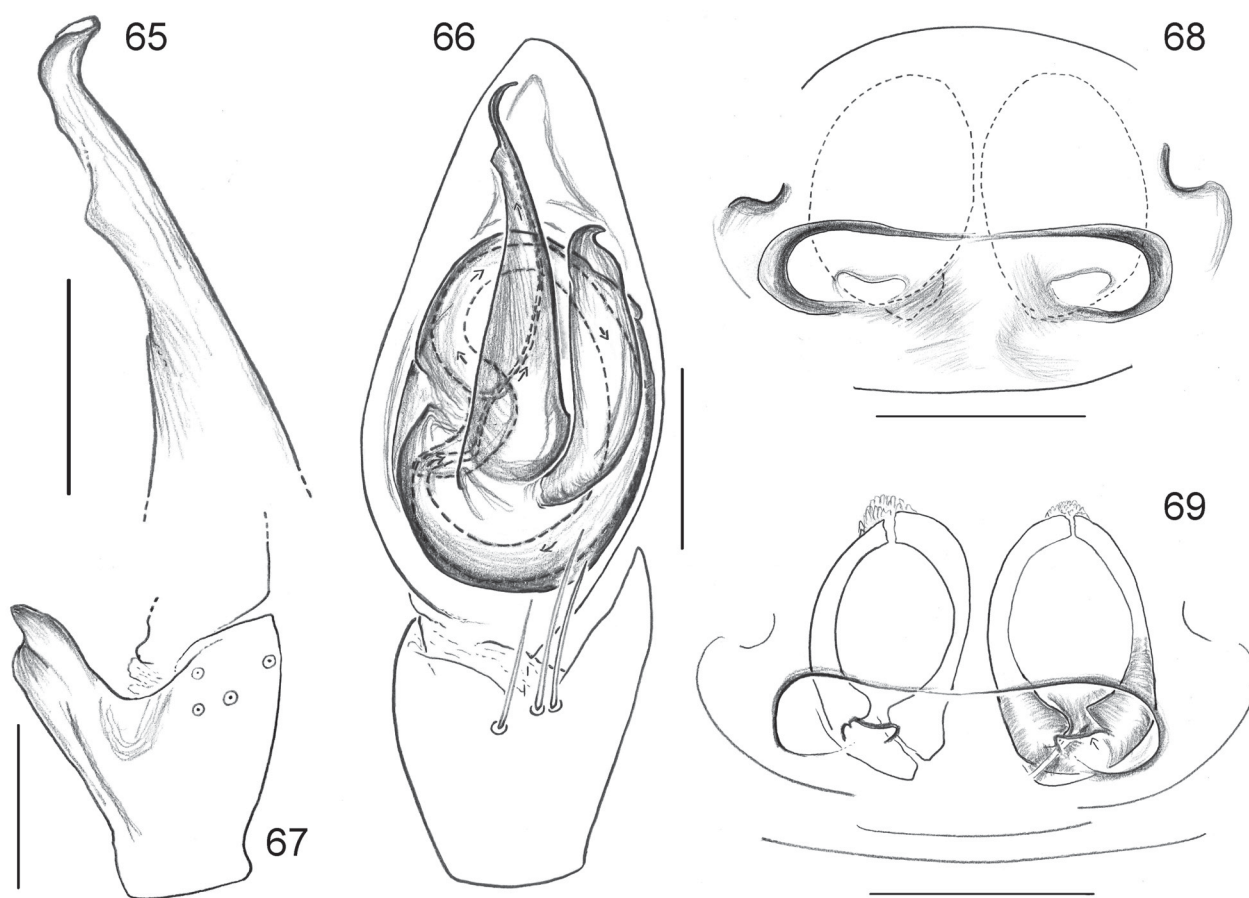
Distribution: Philippines, Leyte.

Cebrenninus srivijaya Benjamin, 2011

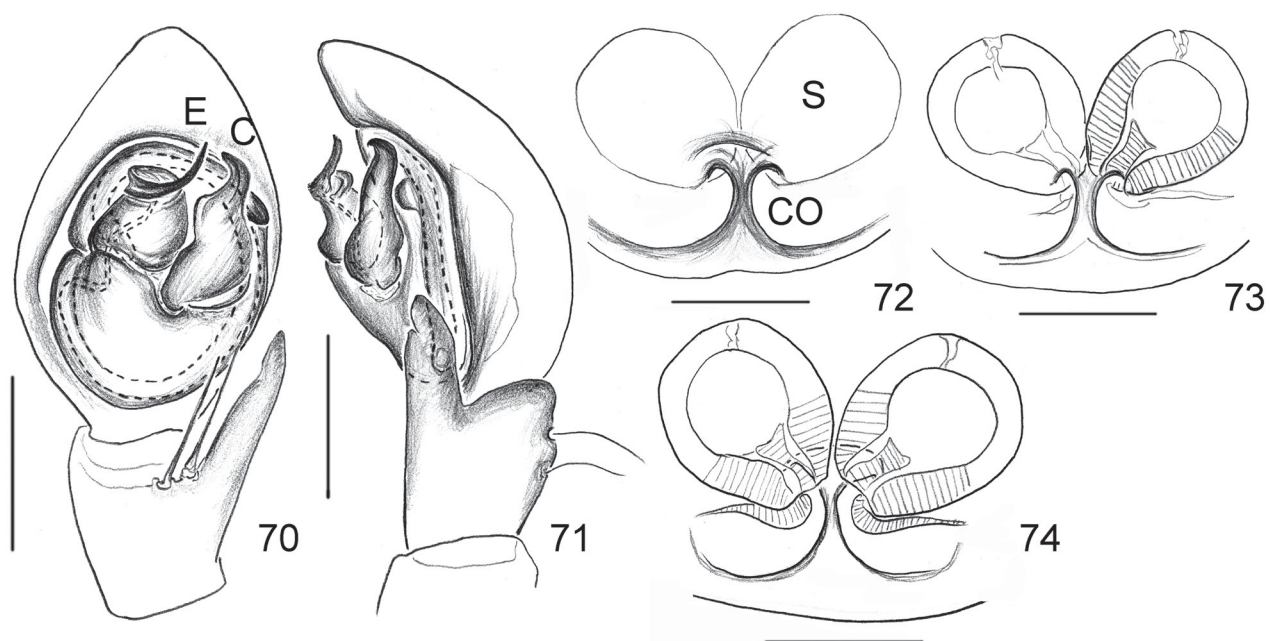
Figs 70-80

Cebrenninus srivijaya Benjamin, 2011: 13, figs 6d, 30a-e, 31a-f, 32a-f.

Material examined: RMNH.ARA.15931; 11 males, 23 females; Indonesia, Sumatra, Mt Singgalang, 400-520 m, secondary forest, leaf litter; 7.-4.07.1994, leg. Suharto Djojosedharmo; collection Deeelman. – RMNH.ARA.17179; 2 males, 2 females; same data as previous sample; 7.-24.06.1994. – RMNH.ARA.15932; 29 males, 27 females; Indonesia, Sumatra, Kerinci Seblat National Park, 2°25'S 101°29'E, 800 m, nr., river, leaf litter; 21.-30.07.1988, leg. Suharto Djojosedharmo, collection Deeelman. – RMNH.ARA.17180; 1 female, 1 juvenile; Indonesia, N. Sumatra, Gunung Leuser, Ketambe, litter; 26.06.1985, leg. Suharto Djojosedharmo, (with label: 6 eyed "Hedenna").



Figs 65-69. *Cebrenninus schawalleri* sp. nov. (65) Tip of embolus. (66) Male palp. (67) RTA, retrolateral view. (68) Epigynum, dorsal view. (69) Vulva. (65-66, 69) Ventral view. Scale lines = 0.1 mm (65), 0.2 mm (66-69).



Figs 70-74. *Cebrenninus srivijaya*, male holotype and female paratype from Sumatra (MHNG). (70-71) Male palp (70 ventral, 71 retrolateral view). (72) Epigynum, ventral view. (73-74) Vulva (73 ventral, 74 dorsal view). Scale lines = 0.1 mm (72-74), 0.2 mm (70-71).

Diagnosis: Similar to *C. berau* sp. nov. and *C. phaedrae* sp. nov., distinguished from these and other known congeners by distinctive shape of E (posterior half cylindrical, anterior half filiform, partly surrounding its base; Figs 70-71, 75, 78), C (posterior half broad, anterior half a stout hook; Figs 70-71, 75, 79) and RTA (pointed, ventrally slanted tip; Figs 71, 76).

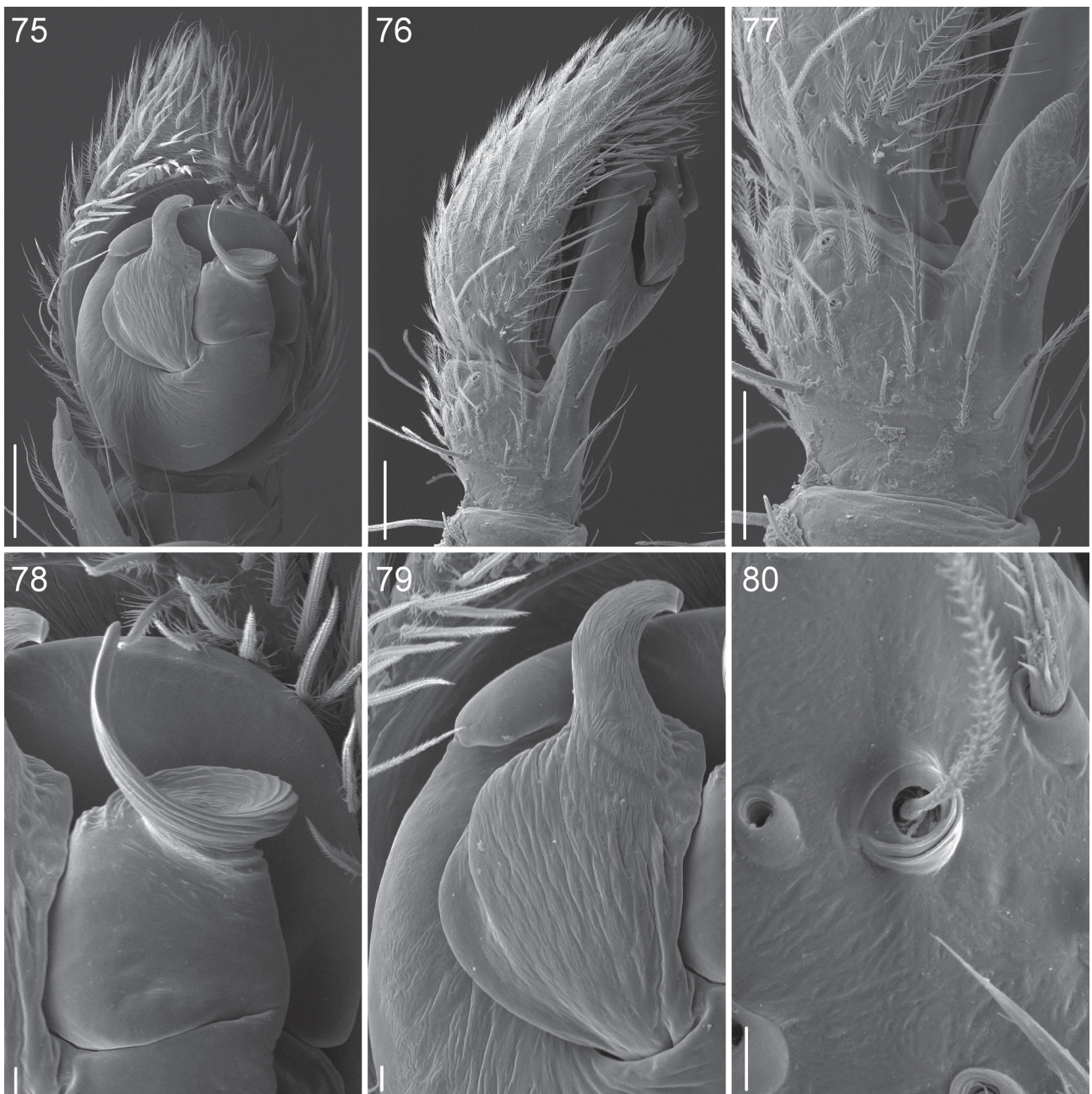
***Cebrenninus striatipes* (Simon, 1897) comb. nov.**

Figs 81-91

Ascuris striatipes Simon, 1897: 9.

Ascurisoma striatipes (Simon, 1897).– Strand, 1929: 14
(generic replacement name).

Type material: MNHN 17268; 1 female, 3 juvenile syntypes (examined); Sri Lanka, Central Province, Kandy (no more data given). – MNHN 11680; 1 juvenile



Figs 75-80. Scanning electron micrographs of *Cebrenninus srivijaya*, right palp of male paratype from Sumatra (MHNG). (75) Bulbus, ventral view. (76) Palp, retrolateral view. (77) Tibial trichobothria, retrolateral view. (78) Embolus, ventral view. (79) Conductor, ventral view. (80) macro-trichobothrium on palpal tibia, retrolateral view. Scale lines = 10 μ m (75-77), 100 μ m (78-80).

syntype? (examined); Africa, Sierra Leone (no more data given). The adult female from Sri Lanka is here designated as the lectotype to clearly define the genus.

Other material examined: MHNG; 1 male, 2 females; Sri Lanka, Central Province, Kandy District, Knuckles Range, Corbett's Gap, 7°23'39"N, 80°51'38"E, 1360 m; 19.08.2010, leg. S. P. Benjamin and S. Batuwita. All three specimens were collected as juveniles and reared to adulthood in the lab. The final molt of the male was on 16.10.2010 and of one female on 30.10.2010.

Remarks: The juvenile from Sierra Leone looks very much like the specimens from Sri Lanka. However, the validity of a taxon or its presence in a given locality cannot be based on a juvenile specimen. I doubt the presence of *C. striatipes* comb. nov. in Sierra Leone; this specimen might belong to a yet unknown species of the genus *Geraesta* Simon, 1889.

Diagnosis: Distinguished from known congeners by the distinctive shape of E (broad, thickest in the upper half, stout tip; Figs 86-87) and C (reduced, fine tip; Fig. 86).

Description: *Male:* Total length: 2.9; prosoma length: 1.4, width: 1.4. Leg I: femur 1.4, patella 0.5, tibia 1.4, metatarsus 0.8, tarsus 0.6. Prosoma uniformly black (red-brown in preserved specimens), eight eyes surrounded by red patches (Figs 81-82). Opisthosoma dorsally brown/black with irregular white, diffused spots, white spots very apparent in preserved specimens (Fig. 85). Legs black with yellow-brown patches, clearly visible on femur I and II. Leg formula 1243. Palps as in Figs 86-87. Tibia shorter than bulb, bulb oval, RTA well developed, with two large setae at its base. E broad, thickest in upper half, with stout tip (Figs 86-87). C reduced, with fine tip. SDT with two turns (Figs 86-87).

Female: Total length: 4.1; prosoma length: 1.7, width: 1.8. Leg I: femur 1.6, patella 0.7, tibia 1.6, metatarsus 1.0, tarsus 0.6. In general similar to male (Figs 83-84). Epigynum as in Figs 88-91.

Distribution: Known only from the Knuckles Range, Sri Lanka.

Cebrenninus tangi sp. nov.

Cebrenninus rugosus.— Tang *et al.*, 2009: 40, fig. 1a-f. Misidentification.

Holotype: Hunan Normal University, Hu 060901; 1 male (not examined); China, Yunnan Province, Gongshan County, Dulongjiang Township, Qinglangdang, 27°41'N 98°17'E; 1.09.2006, leg. P. Hu.

Other material examined: None.

Diagnosis: Similar to *C. kalawitana* and *C. rugosus*, distinguished from both species by the presence of eight eyes (PME reduced in *C. kalawitana*) and by

shorter E and C (relatively longer in *C. kalawitana* and *C. rugosus*; Tang *et al.*, 2009: 40, fig. 1a-f cf. Figs 25, 57).

Etymology: Named after my friend Dr Guo Tang (1974-2014).

Description: See Tang *et al.* (2009). Females are unknown.

Distribution: Known only from the type locality.

Crockeria gen. nov.

Type species: *Crockeria kinabalu* sp. nov.

Etymology: The genus is named after William Maunder Crocker (1843-1899), who was an administrator in Borneo.

Diagnosis: Males of *Crockeria* gen. nov. can be distinguished from males of other Stephanopinae by the following combination of characters: presences of a stalked MA with a concave apex, presence of a sclerotized filiform C, and a broad-based filiform E. Females can be distinguished by the C-shaped CO, short CD and round S.

Remarks: *Crockeria* gen. nov. is most closely related to and likely to be confused with *Cebrenninus*, *Epidius* Thorell, 1877, *Ibana* Benjamin, 2014 and *Pharta* Thorell, 1891, known from the Oriental region. It can be separated from these genera, in addition to the characters given above, as follows: from *Cebrenninus* by the longer copulatory ducts and lack of ETP; from *Epidius* by the absence of an elongated male palpal tibia (tibia is longer than the cymbium in *Epidius*); from *Pharta* by the absence of a macro-trichobothrium on the palpal tibia, the absence of serrated tarsal setae, the absences of posterior epigynal pockets and by oval, dual-chambered spermatheca; from *Ibana* by the combined presences of a MA, C and E.

Description: See description of the type species below.

Species composition: *Crockeria kinabalu* sp. nov. and *Crockeria laevis* (Thorell, 1890) comb. nov.

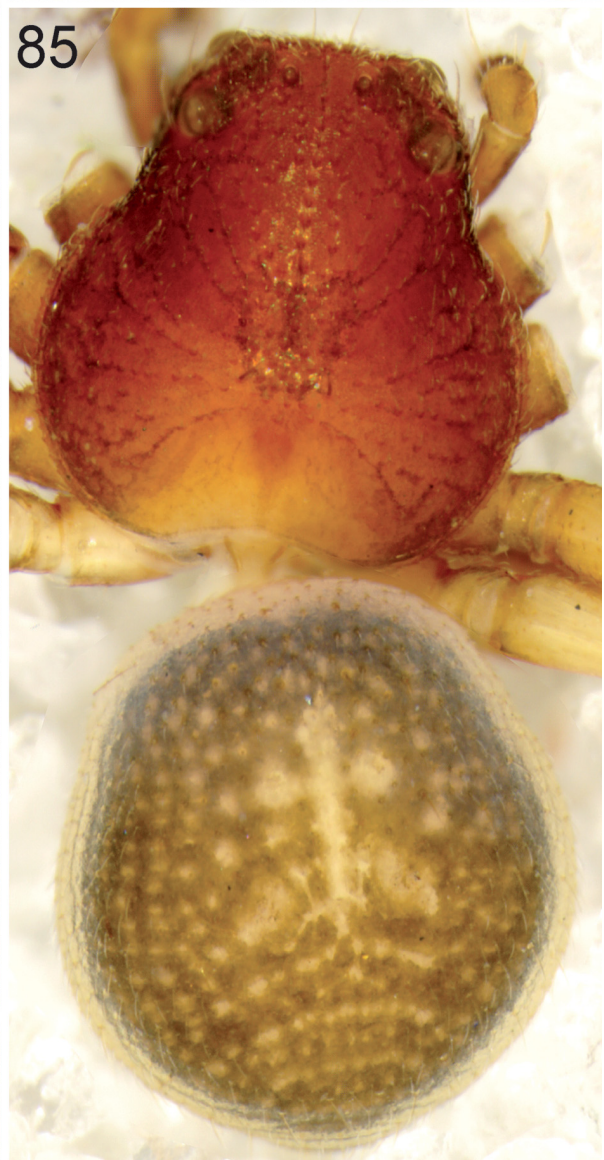
Distribution: Sumatra (Mt Singgalang), Borneo (Sabah: Mt Kinabalu).

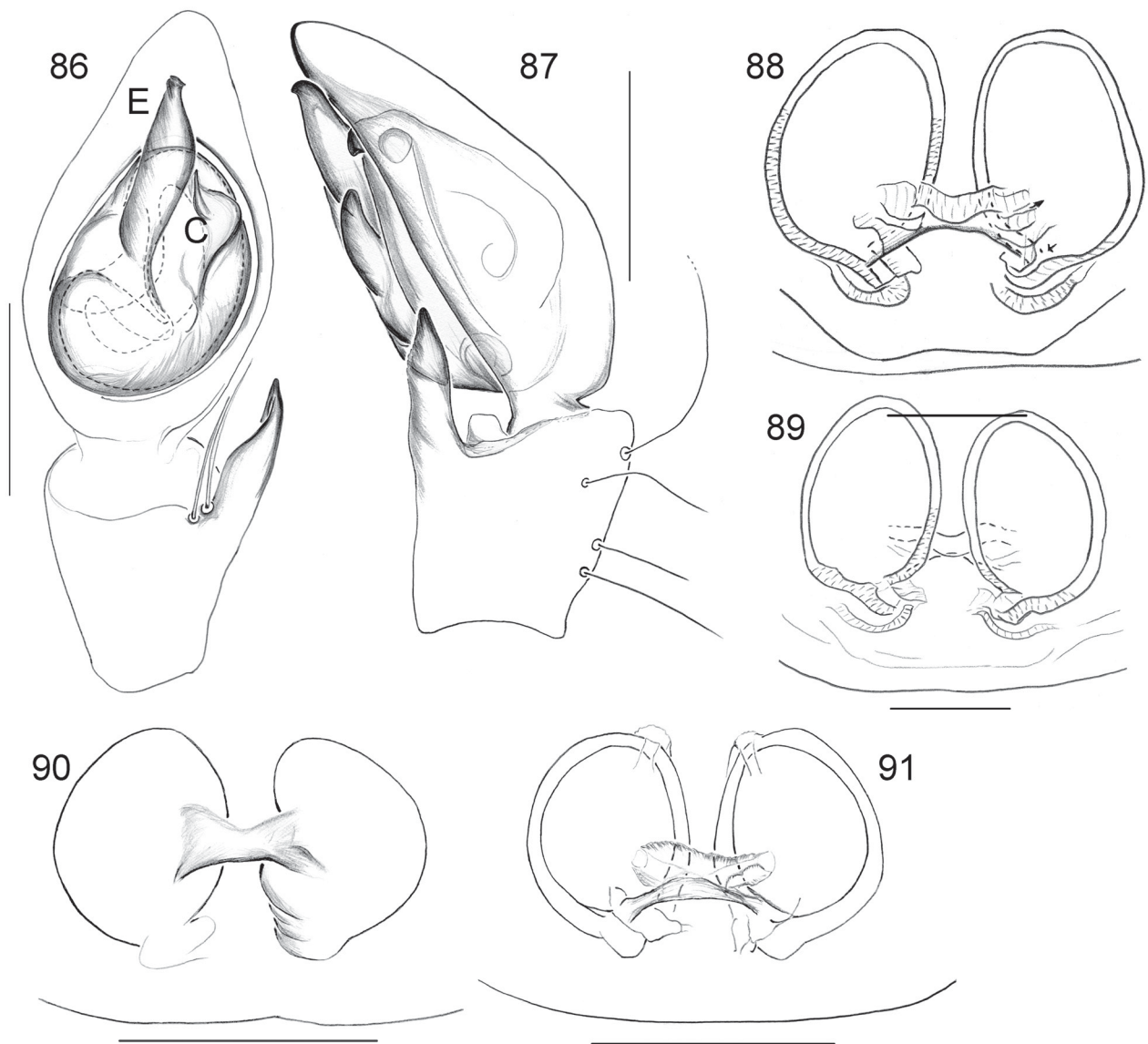
Crockeria kinabalu sp. nov.

Figs 92-93, 96-99

Holotype: RMNH.ARA.15929; male; East Malaysia, Borneo, Sabah, Mt Kinabalu National Park, 15 year old secondary forest, 500-700 m, loc 46, fogging canopy tree 8 *Vinex pinnata*, relog 1 after 8 days; 10.03.1997, leg. A. Floren.

Diagnosis: *Crockeria kinabalu* sp. nov. can be





Figs 86-91. *Cebrenninus striatipes* (Simon, 1897) comb. nov. (86-87) Male from Knuckles Range, left palp (86 ventral, 87 retrolateral view). (88) Female lectotype, epigynum, ventral view. (89) Vulva of same specimen, ventral view. (90) Female from Knuckles Range, epigynum, ventral view. (91) Vulva of same specimen, ventral view. Scale lines = 1.0 mm (88-89), 0.2 mm (86-87, 90-91).

Figs 81-85. *Cebrenninus striatipes* (Simon, 1897) comb. nov. (81-82) Male in life. (83-84) Female in life. (50) Female lectotype, dorsal view (MNHN 11680).



distinguished from the only other known species of the genus, *Crockeria laevis* (Thorell, 1890) comb. nov., by the smaller CO (Figs 98-99 cf. Fig. 95).

Etymology: The species name is a noun in apposition taken from the name of the type locality.

Description: *Male:* Total length: 3.2; prosoma length: 1.5, width: 1.3. Leg I: femur 1.3, patella 0.5, tibia 1.3, metatarsus 1.2, tarsus 0.6. Coloration and markings as in Figs 92-93, prosoma dark brown, much darker than opisthosoma. Palps as in Figs 96-97, tibia with a single apical apophysis, tip tapering; tegulum oval, MA stalked, apex concave; C sclerotized, broad-based, with filiform tip; E, filiform, shorter than C. Leg formula 1243, ALE > PLE > PME > AME. AER and PER recurved, eyes on light brown-colored mounds.

Female: Total length: 4.0; prosoma length: 1.7, width: 1.7. Leg I: femur 1.5, patella 0.7, tibia 1.6, metatarsus 1.3, tarsus 0.7. In general similar to male. Epigynum and vulva as in Figs 98-99. CO with C-shaped lateral margins, CD short and tapering, S rounded.

Other material examined: RMNH.ARA.15926; 1 male, 1 female; East Malaysia, Borneo, Sabah, Mt Kinabalu National Park, Sorinsim, 15 year old secondary forest, 500-700 m, fogging canopy tree 8 *Vinex pinnata*, refog 1 after 8 days, loc 57; 6.03.1997, leg. A. Floren. – RMNH.ARA.17181; 1 male, not well preserved, some legs missing; East Malaysia, Borneo, Sabah, Mt Kinabalu National Park, 6°05'N 116°50'E, 40 year old secondary forest, 500-700 m, fogging canopy tree 2 *Vinex pinnata*, fog 1, loc 52; 5.03.1997, leg. A. Floren.

Distribution: Known only from the type locality.

***Crockeria laevis* (Thorell, 1890) comb. nov.**

Figs 94-95

Libania laevis Thorell, 1890: 148.

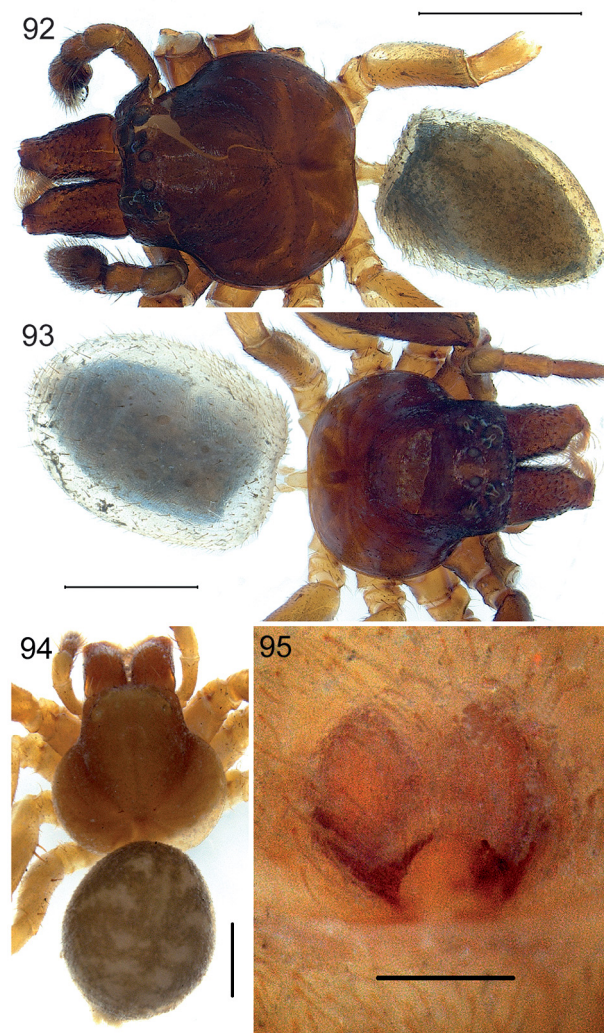
Cebreninus laevis. – Simon, 1897: 8.

Type material: MCSN; 1 female syntype of *Libania laevis* Thorell, 1890 (examined); Indonesia, Sumatra, Singalang, no more data; 8.1878; O. Beccari.

Diagnosis: This species can be distinguished from the only other known congeneric species, *Crockeria kinabalu* sp. nov., by the larger CO (Fig. 95 cf. Figs 98-99).

Description: The type is very fragile, with several legs detached, and was not measured to avoid further damage. Habitus as in Fig. 94. Coloration unclear; specimen bleached due to preservation. Epigynum as in Fig. 95. Male unknown.

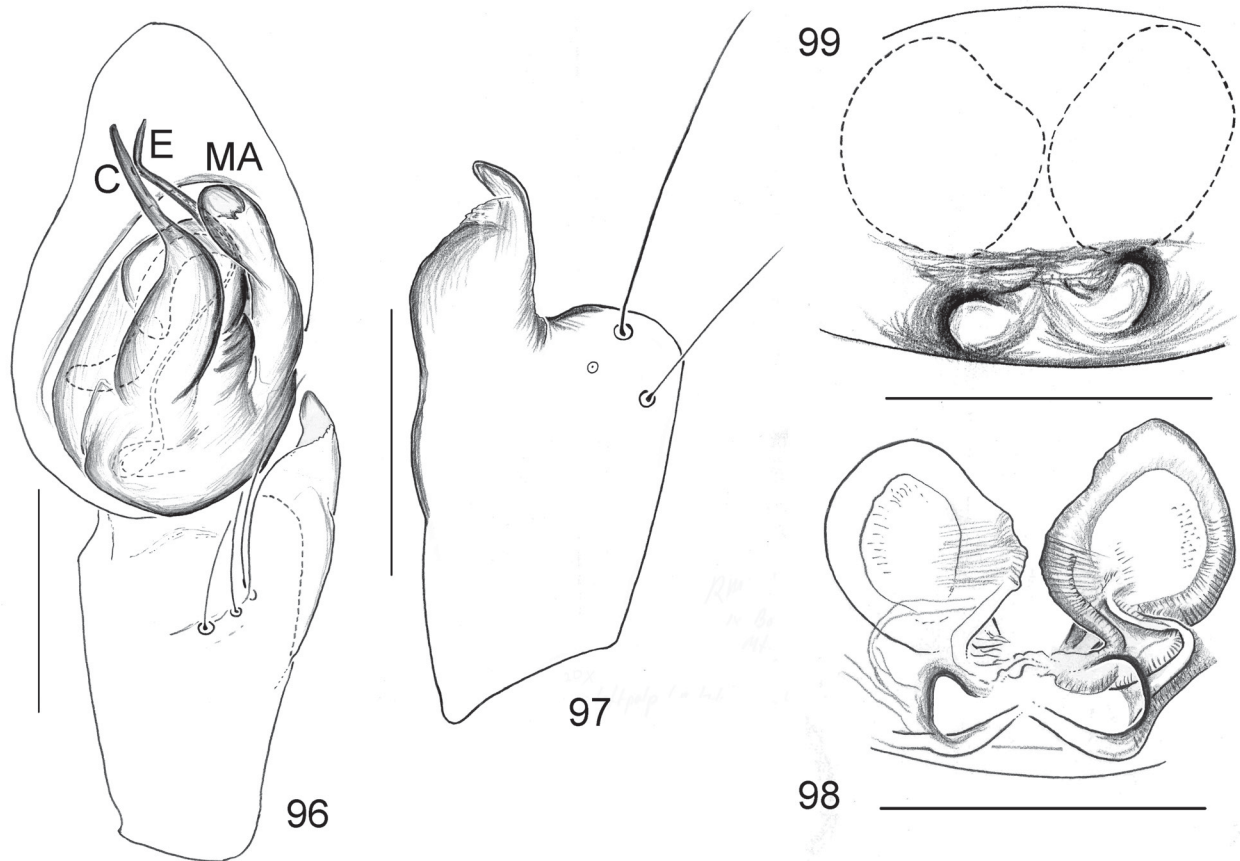
Distribution: Known only from the type locality on Sumatra.



Figs 92-95. (92-93) *Crockeria kinabalu* gen. et sp. nov. (92) Male holotype from Sabah (RMNH.ARA.15929). (93) Female from Sabah (RMNH.ARA.15926). (94-95) Syntype of *C. laevis* comb. nov. (MCSN). (92-94) Habitus, dorsal view. (95) Vulva, ventral view. Scale lines = 1.0 mm (92-94), 0.2 mm (95).

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Figs 96-99. *Crockeria kinabalu* gen. et sp. nov., male and female from Sabah (RMNH.ARA.15926). (96) Male palp, ventral view. (97) RTA, retrolateral view. (98) Epigynum, ventral view. (99) Vulva, ventral view. Scale lines = 0.2 mm.

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