

STUDIES ON TROPICAL PHOLCIDAE II: REDESCRIPTION OF *MICROMERYS GRACILIS* BRADLEY AND *CALAPNITA VERMIFORMIS* SIMON (ARANEAE, PHOLCIDAE) AND DESCRIPTION OF SOME RELATED NEW SPECIES.

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ABSTRACT

Micromerys gracilis Bradley, ♂, and *Calapnita vermiformis* Simon, ♂, are redescribed and figured and a neotype is erected for *M. gracilis*. Diagnoses are given for the genera *Micromerys* Bradley, *Calapnita* Simon, *Leptopholcus* Simon and *Panjange* Deeleman-Reinhold. *Calapnita* is sufficiently distinct to justify reestablishing it as a separate genus. Descriptions and figures are presented of *Micromerys daviesae* n.sp., ♂, from northeastern Queensland, *Leptopholcus borneensis* n.sp., ♀, and *Calapnita phasmoides* n.sp., ♂, from Kalimantan (Borneo), *Calapnita phyllicola* n.sp., ♂, from Kalimantan, Malay Peninsula and Sumatra, *Calapnita subphyllicola* n.sp., ♂, from Mindanao and of *Panjange mirabilis* n.sp., ♂, from northeastern Queensland. These spiders appear to have passed through parallel morphological transformations as an adaptation to life on leaves in tropical forests. In the *Micromerys* species treated here, small median anterior eyes or pigment specks may be present or absent in the same species. Their absence can not serve to distinguish this genus from *Leptopholcus*. On the basis of the genital organs, all the spiders described here are quite distinct from the alleged *Micromerys* species from Africa and the New World.

INTRODUCTION

The genus *Micromerys* Bradley accommodates a variety of palecoloured pholcids with flat carapace, six eyes in two triads on the sides of the head and a thin, elongate abdomen. Representatives of this genus have been reported from Australia, Asia, Africa and the Americas.

In his 'Histoire Naturelle des Araignées', Simon (1893) placed the monotypic genus *Calapnita* Simon, described one year previously from the Philippines, in synonymy of *Micromerys* on the basis of similarity of body shape and eye constellation. At the same time he created the *Leptopholceae*, comprising *Micromerys* and *Leptopholcus* Simon, which shows the same peculiarities in body form and eye pattern. Subsequent authors (Pickard-Cambridge, Petrunkevitch, Mello-Leitao) added new species from the New World tropics to the genus *Micromerys*. Recently, two authors (Timm 1976, Brignoli 1980) expressed their doubt about the validity of this classification.

The type species of *Micromerys*, *M. gracilis* Bradley was described superficially from the

female only and without illustration. Dr Valerie Todd Davies of the Queensland Museum informed me that the type specimens of *M. gracilis* are lost, but she was able to provide a female specimen from Lake Boronto, Cape York, close to the type locality and agreeing in all respects with the original description. The discovery of new species referable to this genus was incentive to erect a neotype to stabilize the genus and assess differences from related genera.

Calapnita Simon is considered a valid genus, and three new species from the Malay Archipelago are assigned to it here, whereas one new species from Kalimantan is placed in *Leptopholcus* Simon.

One new species from Cape York Peninsula, belonging to a recently described, related genus (*Panjange* Deeleman) is also described in this paper.

A male and female type specimen of each new species has been deposited either in the Queensland Museum (QM) or in the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), The Netherlands; other material is in the author's collection.

Micromerys Bradley, 1877

Micromerys Bradley, 1877 *Proc. Linn. Soc. N.S. Wales* 2 : 118.

Type species: *Micromerys gracilis* Bradley.

DIAGNOSIS

Carapace and abdomen unicoloured, pale green to yellow. Carapace flat, thoracic groove and radiating striae very shallow. Eye triads on the anterior corners of the head, in the male sometimes raised; am eyes very small or absent. Male chelicerae with lateral protrusion. Sternum obtusely rounded behind (Fig. 24), maxillar section of anterior margin with right angle adjacent to coxa I. Abdomen very long and thin, worm-shaped, spinnerets in prolongation of it. Legs very long and thin, metatarsi and tarsi filiform. Three tarsal claws on onychium, those on tarsi I-III of equal size, upper pair curved, with 2-3 ventral teeth or none, those on tarsi IV very small, flat. Male palpal organs long and slender, tarsal appendage with articulating side branch, bulb elongate, embolus large and sclerotized, bulbal apophysis reduced. Shape of tarsal appendage and embolus diagnostic for the species. Female palp with four apical toothless claws (Fig. 6) and a hyaline cone. Epigyne bulging, lacking a chitinized plate and tongue, internal surface of epigynal lip with membranous valves, diagnostic for the species.

REMARKS

The taxonomic position of *M. conica* Simon and *M. debilis* Thorell is uncertain; *Micromerys tipula* and *M. dalei* Petrunkevitch belong to the genus *Leptopholcus*. *Micromerys delicata* Cambridge, and *M. occidentalis* (Mello-Leitao) do not belong to *Micromerys* and may constitute a genus of their own.

Thus the genus is, according to present data, only known from Australia with an unedited species from West Irian.

***Micromerys gracilis* Bradley**
(Figs 1-9, 60)

M. gracilis Bradley, 1877, *Proc. Linn. Soc. N.S. Wales* 2 : 118—Cape York, Queensland, Australia (♀).

MATERIAL EXAMINED

NEOTYPE: 1 ♀, QM S885, Lake Boronto near Somerset, 5 km south of Cape York, 10°46'S, 146°30'E, 3-4.ii.'75, R. Raven.

OTHER: 2 ♀, QM S886, Gordon Creek, Iron Range 12°43'S, 143°19'E, in mesophyll vine forest, 24-30.vi.'76, R. Raven and V. Davies; 1 ♂, 1 ♀, QM S887, 1 ♂, QM S891, Shiptons Flat, 15°48'S, 145°15'E, complex notophyll vine forest on basalt, 16-21.xi.'75, R. Monroe and V. Davies.

DESCRIPTION

NEOTYPE: ♀ : carapace, sternum and abdomen pale yellow, chelicerae, legs and palps straw yellow with a brown area on the prolateral face of femora I and II; distal ends of tibiae and proximal and distal ends of metatarsi darkened. am eyes lacking, instead one very small black speck visible (Fig. 5). Measurements in mm : carapace 1.05 × 0.82, abdomen 6.40; leg measurements are given in Table 1.

TABLE 1: Leg measurements (mm) of *Micromerys gracilis* (Neotype, ♀)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	7.70	0.40	6.25	10.10	3.12
II	5.75	0.40	5.00	7.68	1.25
III	4.32	0.40	3.12	4.55	0.72
IV	7.00	0.40	6.00	8.60	1.20
palp:	0.20	0.10	0.20	—	0.14

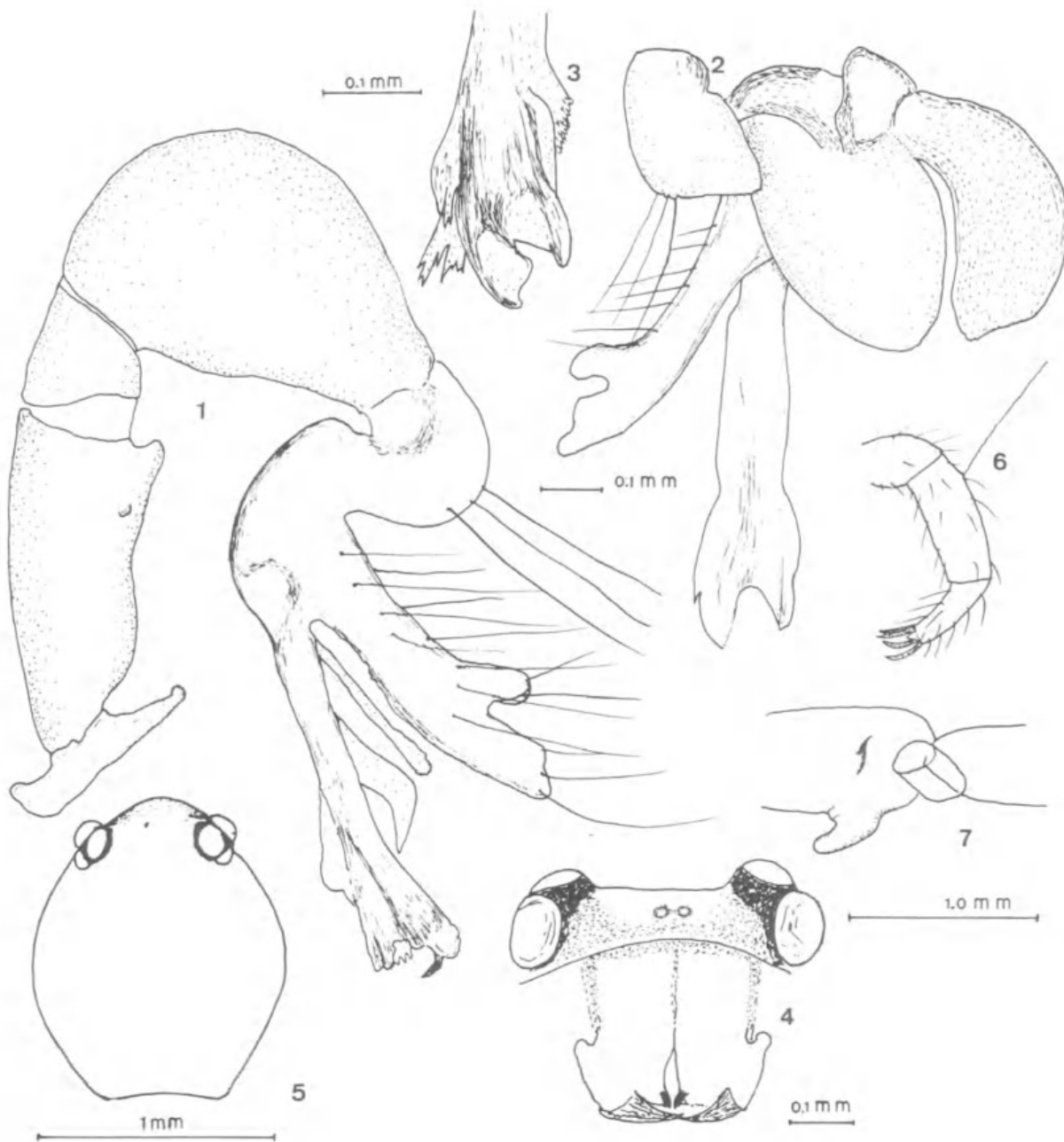
Genital organ (Figs. 8, 9): epigyne entirely unsclerotized. Anteriorly, a grey, horseshoe-shaped area (locking valves of uterus externus) appears through the tegument. On the interior (dorsal) surface of the epigynal lip there are two transverse lamellar valves, the edges of which are sclerotized and partly apparent near the distal margin of the epigynal lip.

OTHER FEMALES: in both specimens from Iron Range there are two minute specks in the area of the anterior median eyes; in the Shiptons Flat specimen there are two black interconnected rings. They all show the dark area on the anterior femora. There are no relevant differences in vulval structure. Measurements : Iron Range, carapace 1.10 × 0.95, and 1.20 × 0.96; Shiptons Flat, carapace 1.00 × 0.72.

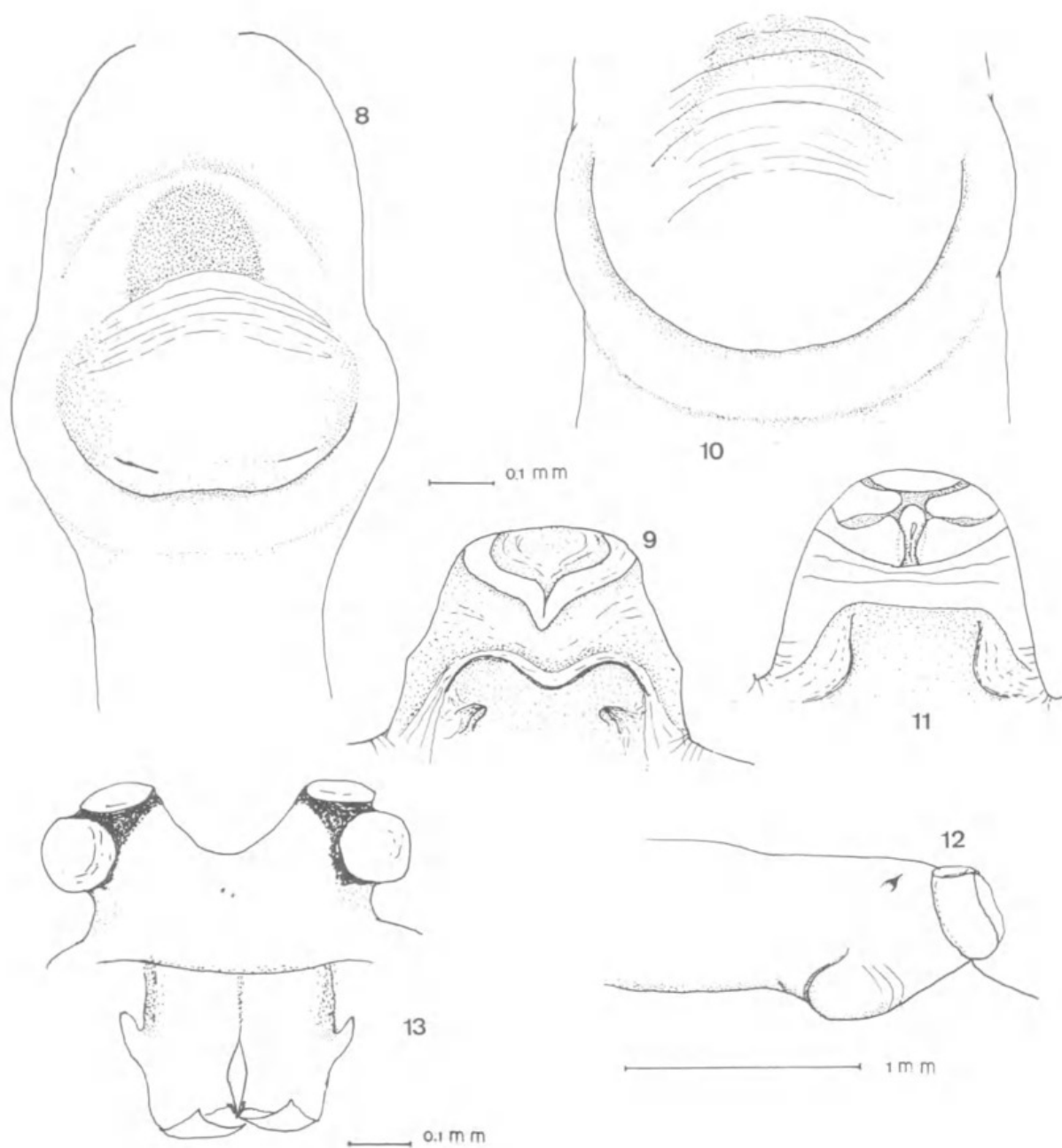
MALES: QM S891 colour as in the ♀, but dark areas on the anterior femora lacking, apex of all femora and patellae orange. Eye groups not raised; between the eye groups in the place of the am eyes there are two tiny interconnected black rings, but no lens is apparent. Chelicerae with obtuse horn laterally (Fig. 4). Anterior femora thinner than in the ♀. Measurements in mm : carapace 1.00 × 0.80, abdomen, 6.50; leg measurements (QM S891) are given in Table 2.

Other ♂ (QM S887) : carapace 1.05 × 0.85, abdomen 5.40; measurements of the first leg are: 7.90, 0.38, 6.82, 11.55, 1.60.

Male palp (Figs. 1-3): femur with small distal apophysis; basal part of tarsal appendage with V-shaped bend; lateral branch provided with



FIGS 1-7: *Micromerys gracilis* Bradley. Figs. 1-4; ♂ (QM S891) Shiptons Flat. 1. right palp, lateral; 2. id., mesal; 3. tip of tarsal appendage, mesal; 4. head and chelicerae, front. Figs 5-7; ♀ neotype (QM S885) Lake Boronto; 5. carapace; 6. palp; 7. anterior part of abdomen, lateral.



FIGS 8-13: Figs 8-9; *Micromerys gracilis* Bradley, ♀ Lake Boronto. 8. anterior part of abdomen, ventral; 9. interior (dorsal) view of epigynal lip, turned up. Figs 10-13, *Micromerys daviesae* n.sp. 10. ♀ Finch Hatton, anterior part of abdomen, ventral; 11. id., interior (dorsal) view of epigynal lip, turned up; 12. id. anterior part of abdomen, lateral; 13. ♂ Finch Hatton, head and chelicerae, front.

TABLE 2: Leg measurements (mm) of *Micromerys gracilis* (QM S891, ♂)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	7.35	0.35	7.32	13.64	—
II	7.28	0.35	6.30	10.00	1.57
III	5.25	0.35	3.67	5.77	1.05
IV	7.87	0.35	6.63	11.02	1.60

various membranous processes. Shape of tarsal appendage and embolus diagnostic.

REMARKS

Anterior median eyes: the neotype female from Lake Boronto, the northernmost locality, shows only one minute pigment speck, hardly perceptible. Both the female specimens from Iron Range have two such tiny dots, whereas the female and two male specimens from the southernmost locality, Shiptons Flat (see Fig. 60) are provided with distinct pigment rings. A lens is never apparent.

Lake Boronto, the neotype locality is only 5 miles from the northernmost tip of Cape York Peninsula. The type locality 'Cape York' probably refers to this area, because Macleay, who led the 1875 'Chevert' expedition to New Guinea that obtained the type specimen, wrote from Somerset: 'Cape York, the northernmost point of Australia lies about 3 miles west of us' (cited in Fletcher J.J. 1929, *Proc. Linn. Soc. N.S.W.* 54: 245).

***Micromerys daviesae* nov. spec.**
(Figs 10–17, 24, 59d, 60)

MATERIAL EXAMINED

HOLOTYPE: 1 ♂, QM S888, Finch Hatton, ME.Q., 21°09'S, 148°38'E, complex notophyll vine forest, in tangled web under leaves, 10.iv.1975, R. Kohout, V. Davies.

PARATYPE: 1 ♀, QM S888, same data as Holotype.

OTHER: 1 ♂, QM S889, Brandy Creek, east of Proserpine, NE.Q., 20°20'S, 148°38'E, complex notophyll vine forest, 24.iv.1975, R. Monroe, V. Davies; 1 ♂ 1 ♀, QM S890, Rundle Range, southeast of Gladstone, SE.Q., 23°40'S, 151°00'E, coastal vine thicket, on trees, 24–31. iii.1975, R. Kohout and V. Davies.

DESCRIPTION

HOLOTYPE: ♂, colour (in alcohol) pale straw yellow with dark edges on carapace and sternum, legs yellow, apical portion of femora, whole patellae, basal and apical part of tibiae and base of metatarsi darkened. Eye triads on stalks (Fig. 13), in place of the am eyes a pair of minute dark

specks, cheliceral lateral horns larger than in *gracilis*. Measurements in mm: carapace 1.15×1.05 , abdomen 5.40; leg measurements are given in Table 3.

TABLE 3: Leg measurements (mm) of *Micromerys daviesae* (Holotype, ♂)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	7.47	0.52	8.05	11.50	2.30
II	9.90	0.52	9.95	10.90	1.72
III	4.60	0.52	—	—	—
IV	8.05	0.52	7.45	12.07	1.07

Palp (Figs 15–17): femur with basal apophysis; tarsal appendage with U-shaped bend, membranous processes lacking; embolus slightly longer than bulb, and longer than in *gracilis*.

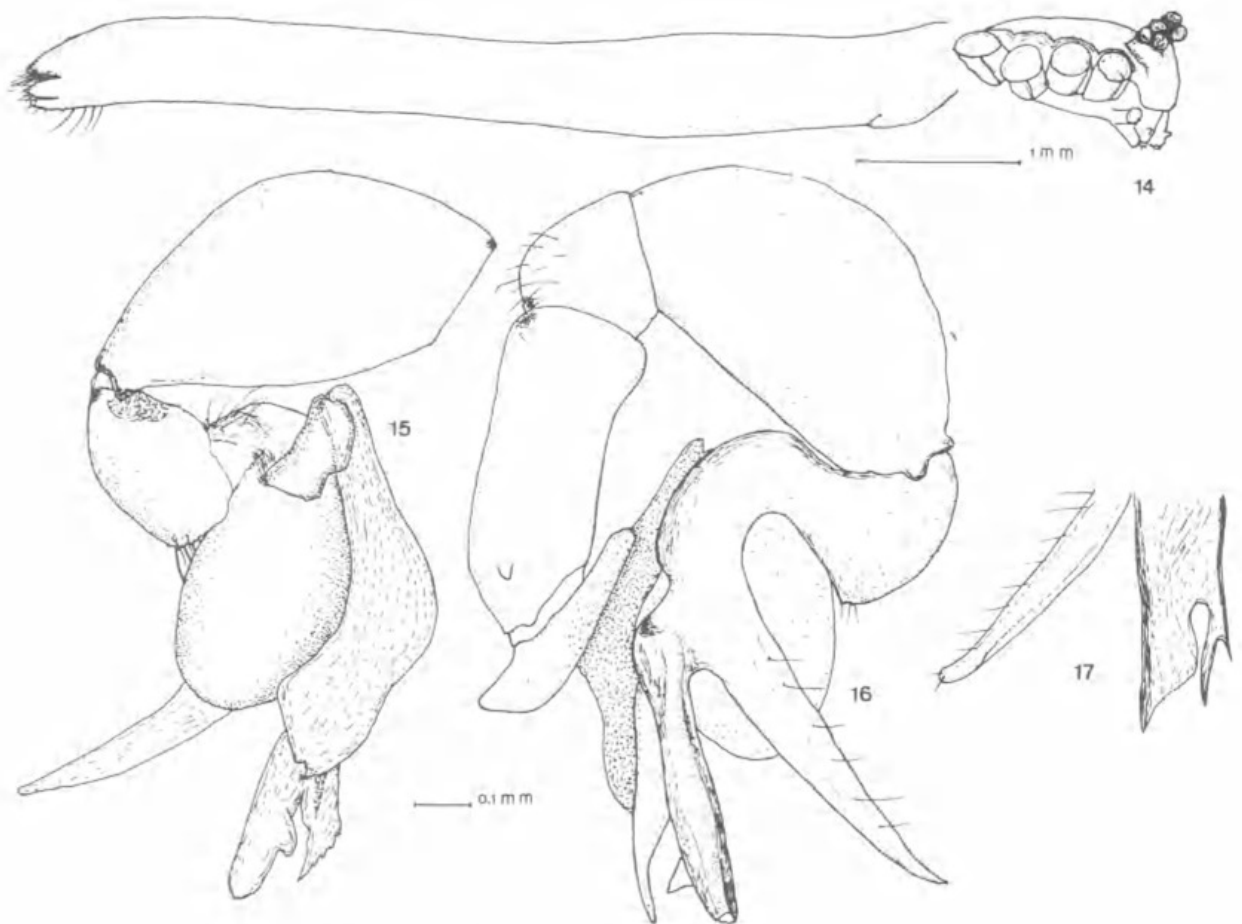
FEMALE (Finch Hatton): patellae and adjacent segment parts only slightly darkened, tibia-metatarsal joints deep brown, the anterior femora bear a dark brown area on the prolateral surface; eye triads not raised. Halfway between the eye groups one minuscule black speck. Chelicerae lack the lateral horn, in other respects similar to the ♂. Measurements in mm: carapace 1.10×1.05 , abdomen 6.40; leg measurements given in Table 4.

TABLE 4: Leg measurements (mm) of *Micromerys daviesae* (Paratype, ♀)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	7.00	0.50	6.50	10.55	—
II	5.00	0.50	5.40	8.15	1.70
III and IV	are lost.				
palp:	0.27	0.12	0.20	—	0.15

Genital organ (Figs 10–12): anterior horseshoe valve of uterus externus not so apparent as in *gracilis*, covered by the epigyne. Sculpture of the internal surface (Fig. 11, upper part) distinctly different from that in *gracilis*. Both the larger valves (lower part in Fig. 11) are weakly sclerotized at their margin, some smaller, transverse ridges in the middle are entirely membranous. Schematic longitudinal section see Fig. 59d.

VARIABILITY: The Brandy Creek male has a light brown pattern on the head and clypeus. The males from Rundle Range and Brandy Creek conform with the type in genital characters and in



FIGS 14-17 : *Micromerys daviesae* n.sp. 14. ♂ Rundle Range, lateral; 15. ♂ Finch Hatton, right palp, mesal; 16. id., lateral; 17. id., tip of tarsal appendage, mesal.

the absence of dark areas on the anterior femora, whereas the Rundle Range female conforms with the paratype as regards colouring and internal epigynal sculpture. Some variability occurs in the am eyes; in the Brandy Creek male one minute speck is all there is to be found, in both the Rundle Range specimens there is nothing left at all.

Leptopholcus Simon, 1893.

Leptopholcus Simon, 1893, *Ann. Soc. Ent. France* 62 : 319.

Type species : *Leptopholcus signifer* Simon—Congo (♂♀).

DIAGNOSIS General appearance as *Micromerys*, am eyes usually present; eye triads not or little raised in the ♂. Male chelicerae with one small basal apophysis or none. Sternum truncated behind, maxillar section of anterior margin with

obtuse angle adjacent to coxa I. Tarsi as in *Micromerys*, but claws of tarsi IV curved (in the Asian species), with 1-2 denticles. Male palpal organ as in *Pholcus*, two branches of the bulbal apophysis straddling the small membranous embolus. Female genital area not covered by a chitinous plate, but with internal chitinized valves in the uterus externus (atrium); epigynal lip without membranous valves on the inside, there may be depressions distally. Porous plates large, elongate.

Distinction of females of *Leptopholcus* and *Micromerys* is difficult and can only be made by examination of the uterus externus.

REMARKS

Species of *Leptopholcus* are known from Africa, Madagascar and Borneo, and there are unedited species from Sri Lanka and Sulawesi.

***Leptopholcus borneensis* nov. spec.**
(Figs 18–23, 59f)

MATERIAL EXAMINED

HOLOTYPE: 1♀ RMNH 9576, Indonesia, Eastern Kalimantan, Sepaku, 1°00'S, 116°54'E, 40 km north of Balikpapan, primary lowland dipterocarp rainforest, on the underside of leaves, 16.vii. 1979, P.R. Deeleman.

OTHER: 3 juvs, same data as holotype.

DESCRIPTION

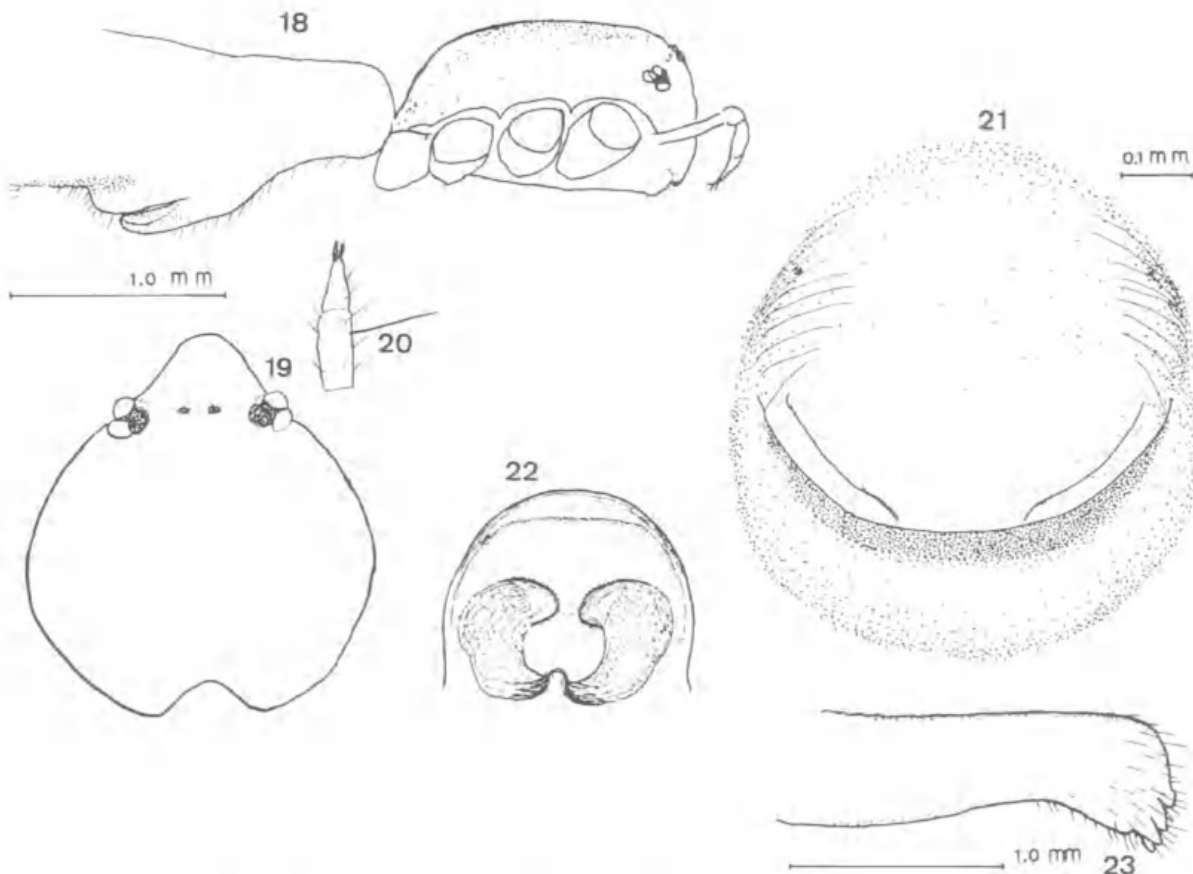
HOLOTYPE: ♀ : all parts pale yellow without any markings; all legs missing in the holotype, in the juveniles legs with slightly darkened patellae; tips of tibiae and bases of metatarsi dark brown. am eyes punctiform (Fig. 19), 3–4 d from each other and much more from the al eyes. Clypeus slightly slanting. Sternum as in Fig. 25. Abdomen rather more voluminous than in the other species; abdomen tip as in Fig. 23. Measurements in mm : carapace 1.20 × 1.20, abdomen 8.40. Legs missing. Palp : 0.21, 0.10, 0.15, 0.17.

Measurements of the largest juvenile : carapace 0.98 × 0.96, abdomen 6.50. Leg I : 6.85, 0.33, 6.37, 9.80, 1.95; femur II 5.95, femur III 3.92, femur IV 6.03.

Genital organ (Figs 21, 22) : distal border of genital area slightly sclerotized; basal part of epigynal lip internally with a pair of reniform plates (Fig. 22). Longitudinal section see Fig. 59f.

REMARKS

The type locality was visited in 1979, 1980 and 1982. Between 1979 and 1980, some of the biggest trees were cut down; after that, logging was abandoned. *L. borneensis* was taken in 1979, together with *Calapnita phasmoides* n.sp., *C. phyllicola* n.sp., and *C. vermiformis* Simon. In 1980 and 1982 however, in spite of intensive searching for several days, *L. borneensis* could not be found again and the same was true for *C. phasmoides*. On the contrary, *C. vermiformis* and especially *C. phyllicola* remained abundant.



FIGS 18–23 : *Leptopholcus borneensis* n.sp., ♀, holotype. 18. anterior part of body, lateral; 19. carapace, dorsal; 20.. tip of palp, dorsal; 21. epigyne, ventral; 22. internal (dorsal) view of epigynal lip, turned up; 23. posterior part of abdomen, lateral.

Calapnita Simon, 1892.*Calapnita* Simon, 1892, *Ann. Soc. Ent. France* 61: 42.*Micromerys* Simon, 1893, *Hist. Nat. Araign.* 1 (2): 474 (Partim).Type species: *Calapnita vermiformis* Simon.

DIAGNOSIS

General appearance as in *Micromerys*, but usually paler in colour and slenderer. Anterior eyes lacking in all known species, eye triads on the sides of the head, not raised in the male. Male chelicerae with basally a lateral horn and distally an anterior tooth. Three tarsal claws, upper pair of leg I–III curved, with 5–6 teeth and much larger than unpaired claw (except in *vermiformis*), claws of leg IV very small, flat, with only some minute teeth or none.

Abdomen as in *Micromerys*. Male palpal elements long and slender, trochanter with spur; femora and patellae show various degrees of lengthening and thinning. Tarsal appendage without articulating side branch, bulb elongate with long, tubular embolus and one lanceolate apophysis. Female genital organ of specialized structure: uterus externus (atrium) an elongate pouch with narrow opening, epigyne not sclerotized, prolonged into a lobe which is either replicated (*vermiformis*) or extended over the opening of the uterus externus to encase a 'vestibulum' (*phyllicola*, *subphyllicola* and *phasmoides*) (Fig. 59c, e), bearing a small tongue apically. Abdomen and legs as in *Micromerys*.

REMARKS

The genus can be subdivided into two groups: that of *vermiformis* (*C. vermiformis* only) has a replicate epigynal lobe and the sternum has a distinct angle in the anterior margin between the maxillar and the coxa I section; the other group comprises the species described here as new, in which the epigynal lobe is prolonged to form a vestibulum and the anterior margin of the sternum shows no distinct angle between the maxillar and the coxa I section.

Distribution: Malay Archipelago.

Calapnita vermiformis Simon

(Figs 26–31, 59a)

Calapnita vermiformis Simon, 1892 *Ann. Soc. Ent. France* 61: 42—Luzon (?).

MATERIAL EXAMINED

HOLOTYPE: 1 ♂, Luzon, Philippines, 'Cueva de Calapnita', Mus. N.H. Paris.

OTHER: Quezon National Park, Atimonan, 14°00'N, 121°52'E, 200 m a.s.l., 1 ♂, 4 ♀, underside of Araceae leaves, 12–13.x.'79, P.R. Deeleman. Mindanao: Mi-

Apo National Park, 6°53'N, 125°16'E, 800 m a.s.l., secondary forest, 1 ♀, juvs., under palmate leaves, 26.iv.'82, P.R. Deeleman. Indonesia, southwest Sulawesi: 23 km west of Camba, 5°00'S, 119°45'E, low forest on karst, 3 ♂, 5 ♀, underside of leaves of various plants, 1–2 m above the ground, 9 + 14.vii.'80, P.R. and C.L. Deeleman. East Kalimantan: Sepaku, 1°00'S, 116°54'E, 40 km north of Balikpapan, primary lowland dipterocarp rainforest, 1 ♂, 1 ♀, 16.vii.'79, 1 ♂, 1 ♀, 5–8.viii.'80, 1 ♂, 3 ♀, 21–22.vii.'82, underside of leaves, P.R. and C.L. Deeleman; Santan, 0°3'S, 117°7'E, sea level, 1 ♂, 2 ♀, (Burke Museum, Seattle), 3.vii.'76, J.R. Thomson. North Sumatra: Bohorok Orang Utan Rehabilitation Centre, 3°29'N, 98°7'E, 90 km west of Medan, primary dipterocarp rainforest, 1 ♂, 2 ♀, 12–19.ii.'83, P.R. Deeleman and Suharto Djojosedharmo.

DESCRIPTION

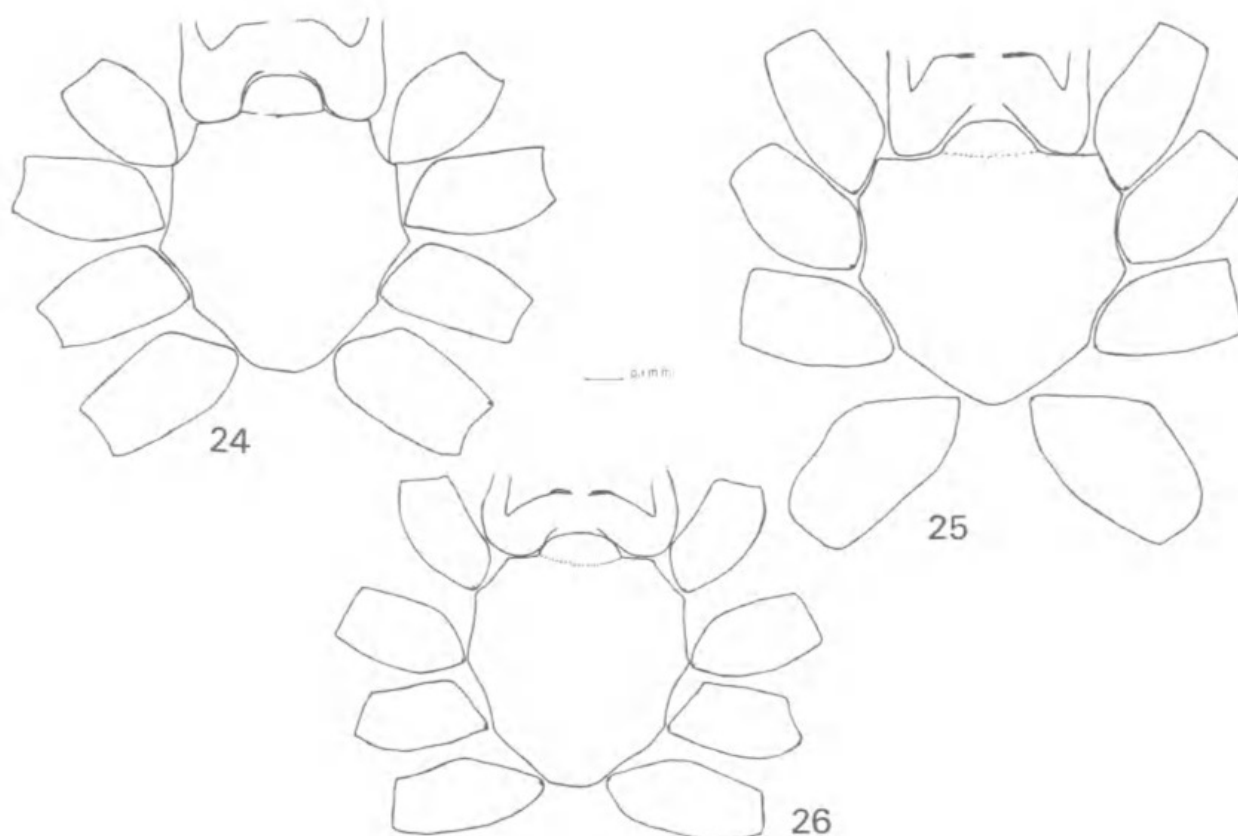
MALE (Quezon Nat. Park): all parts pale yellow, no markings on carapace or abdomen; legs with darkened femoral apex, patella, base and apex of tibia and base of metatarsus. Anterior eyes slightly smaller than posterior eyes. Chelicerae as in Fig. 27, the anterior tooth with two tines. Sternum (Fig. 26) a little longer than wide, roundly truncated behind, coxa I section of anterior margin at a distinct approx. 90° angle with maxillar section. Measurements in mm: carapace 0.91 × 0.82, abdomen 5.05; leg measurements are given in Table 5.

TABLE 5: Leg measurements (mm) of *Calapnita vermiformis* (♂)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	7.65	0.33	7.80	13.10	2.80
II	6.55	—	—	—	—
III	4.32	0.33	3.35	5.28	0.86
IV	6.72	0.33	6.66	10.08	1.30

Palp (Figs 28, 29): spur of trochanter bent like a walking stick; femur ventrally with a series of three knobs, the most proximal of which sticks out proximally to the femoral-trochanter joint, bulb elongate, with a slender, transparent apophysis reaching just beyond the bulbous apex, with a wider, sclerotized base, the much longer embolus is provided with a subapical pore and the tip is crowned with 5 bristles.

FEMALE (Quezon Nat. Park): similar to the ♂, chelicerae unmodified. Measurements in mm: carapace 1.00 × 0.91, abdomen 5.50; leg measurements are given in Table 6.



FIGS 24-26 : sternum and coxae, ventral. 24. *Micromerys daviesae* n.sp. ♀ Finch Hatton; 25. *L. borneensis* n.sp. ♀; 26. *Calapnita vermiformis* Simon ♀ Quezon Nat. Park.

TABLE 6: Leg measurements (mm) of *Calapnita vermiformis* (♀)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	7.40	0.33	7.20	12.70	2.90
II	6.70	0.33	4.56	9.12	1.80
III	4.32	0.33	3.36	5.40	0.95
IV	7.20	0.33	6.20	10.10	1.45
palp:	0.23	0.10	0.14	—	0.21

Genital organ (Figs 30, 31) : epigyne prolonged into a smooth, V-shaped lobe with chitinized margins, folded back. It overlies the slitlike opening of the uterus externus, at the bottom of which the crescent locking valve ('Verschluss', cf. Wiehle 1967, p. 185) appears through the tegument. Schematic longitudinal section, see Fig. 59a.

The material from Mindanao, Sulawesi, Sumatra and Kalimantan does not show any relevant differences.

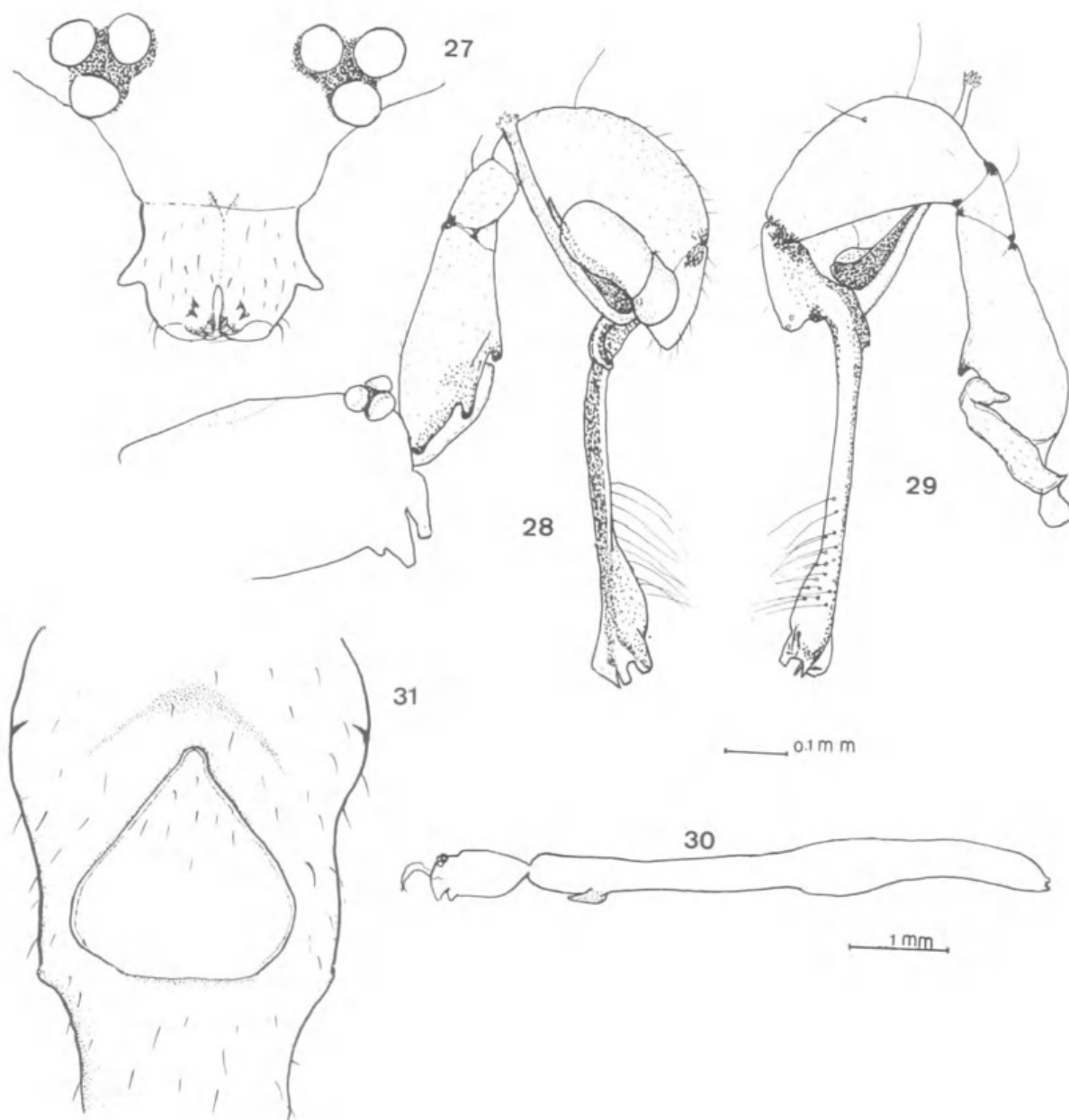
REMARKS

In the field, all individuals were found sitting on the underside of large leaves with outstretched legs, apparently without a web. Some specimens from Sulawesi were taken alive to The Netherlands and kept in glass jars on young palm plants, where they lived for several weeks. Here, between the leaves, they constructed flat webs, very delicate structures of silk, so thin as to be almost invisible. The spiders stayed in their webs upside down in the fashion of *Pholcus phalangioides* Fuesslin. Some of the females held an elongate bunch of eggs in their chelicerae, up to half their body length, which was held in front of them like a sateh stick, in prolongation of the body.

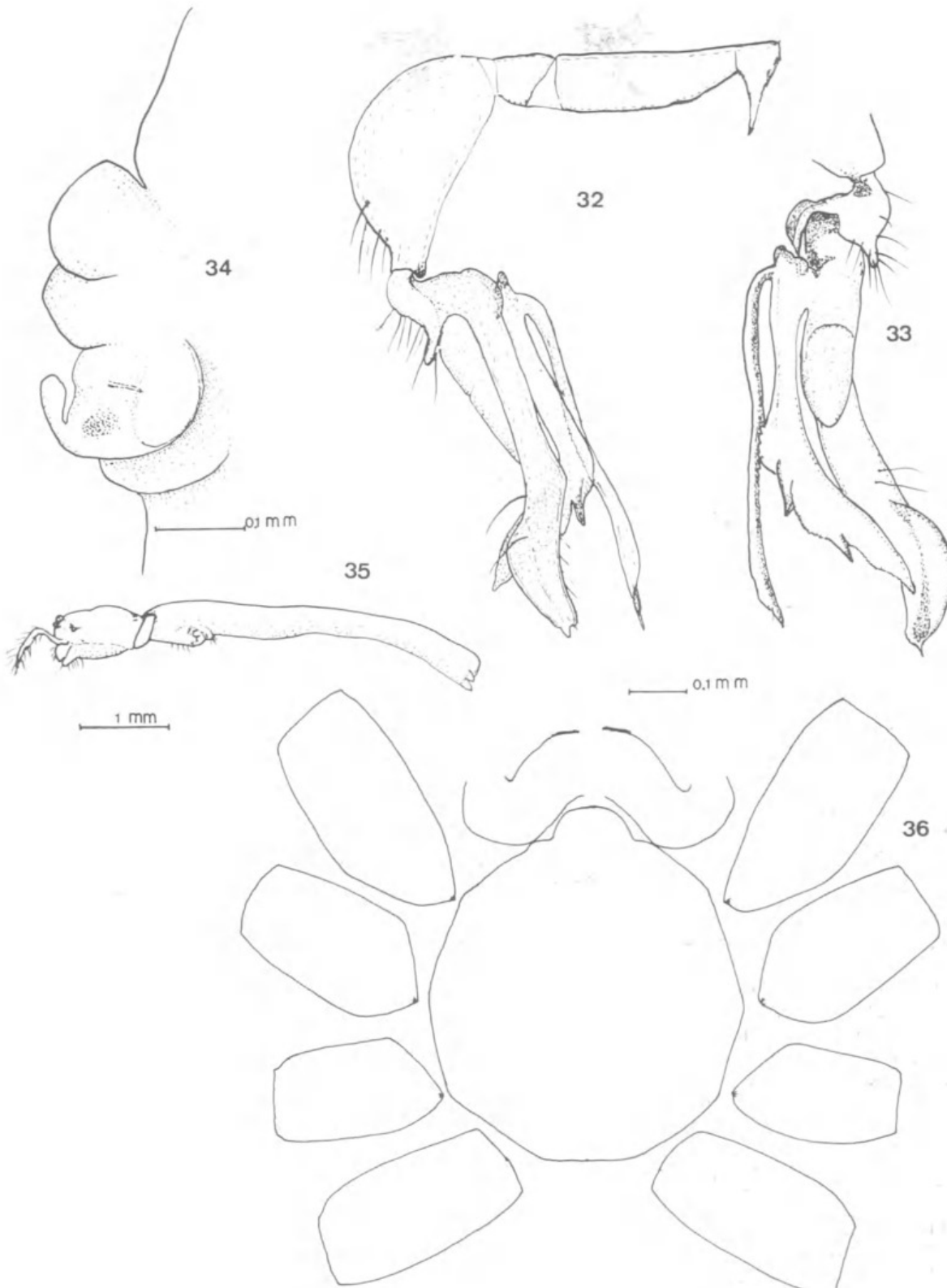
Calapnita phyllicola nov. spec. (Figs 32-39, 59c)

MATERIAL EXAMINED

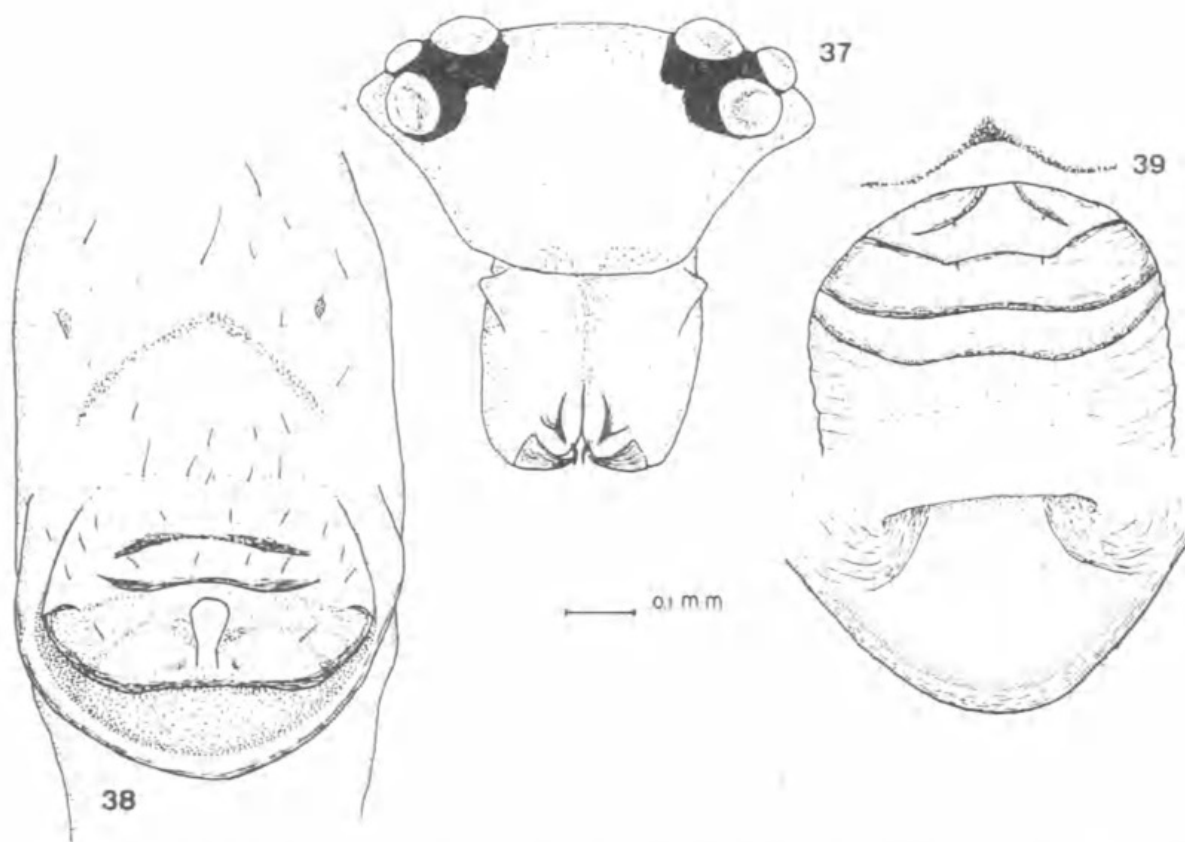
HOLOTYPE: 1 ♂, RMNH 9573, Sepaku, East Kalimantan, Indonesia, 1°00'S, 116°54'E, 40 km N.



FIGS 27-32 : *Calapnita vermiformis* Simon, Quezon Nat. Park. 27. ♂, head and chelicerae, front; 28. ♂, cephalothorax and left palp, mesal; 29. left palp, lateral; 30. ♀ lateral; 31. epigyne and part of abdomen, ventral.



FIGS 32-36 : *Calapnita phyllicola* n.sp., Balikpapan. 32. ♂, left palp, lateral; 33. id., mesal; 34. epigyne, lateral; 35. ♀, lateral 36. ♀, sternum and coxae, ventral.



FIGS 37-39: *Calapnita phyllicola* n.sp., Balikpapan. 37. ♂, head and chelicerae, front; 38. abdomen and epigyne, ventral; 39. internal (dorsal) view of epigynal lip, turned up.

Balikpapan, primary lowland dipterocarp rainforest, on the underside of large leaves (mostly palm leaves) in dark sheltered places, part of series collected 14-16.vii.1979, 5-8.viii.1980 and 21-22.vii.1982, P.R. and C.L. Deeleman.

PARATYPES: 5 ♂, 7 ♀, same data as Holotype, 1 ♀ deposited with Holotype (RMNH 9573), others in authors collection.

OTHER MATERIAL: Malay Peninsula: Genting Highlands, little valley on the border of a small stream, 2 ♂, 1 ♀, juvs., underside of large leaves by the stream, 29.vii.'80, P.R. Deeleman. North Sumatra: Bohorok Orang Utang Rehabilitation Centre, 3°29'N, 98°7'E, 90 km west of Medan, primary dipterocarp rainforest, 2 ♀, 1 ♂ subad., 12-19.ii.'83, P.R. Deeleman and Suharto Djojosedharmo; Rimba Panti, 0°7'N, 103°5'E, rainforest, 1 ♂, 1 ♀, underside of hirsute leaves, 3+4.vii.'82, P.R. and C.L. Deeleman.

DESCRIPTION

HOLOTYPE: ♂, colour in life pale green, in alcohol whitish, legs pale, femur-patellar and tibia-metatarsal joints darkened. Male chelicerae, see Fig. 37; sternum (Fig. 36); posterior tip obtusely rounded, angle between maxillar section and coxa I section of the anterior margin very

obtuse. Abdominal tip slightly slanting down, dorsally with a more or less obtuse angle (Fig. 35). Legs longer than in any other species, particularly the metatarsi I. Measurements in mm: carapace 0.90 × 0.82, abdomen 4.00; leg measurements are given in Table 7.

TABLE 7: Leg measurements (mm) of *Calapnita phyllicola* (Holotype, ♂)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	8.40	0.40	8.16	16.32	1.92
II	6.00	0.40	5.76	10.00	1.30
III	4.05	0.40	4.40	5.30	0.85
IV	6.20	0.40	5.30	8.15	1.30

Palp (Figs 32, 33): femur and patella long and cylindrical, tibia swollen, tip of tarsus tubiform; bulbal apophysis very characteristic, with two large, evenly spaced tines along the margin; embolus a straight tube with tapering tip, the

inner margin finely and irregularly serrated, almost twice as long as bulb.

Description of the ♀ paratype: similar to the ♂ but chelicerae unmodified. Measurements in mm: carapace 0.81×0.77 , abdomen 3.85; leg measurements are given in Table 8.

TABLE 8: Leg measurements (mm) of *Calapnita phyllicola* (Paratype, ♀)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	7.20	0.35	7.45	13.70	1.95
II	5.30	0.35	5.05	8.16	1.06
III	3.60	0.35	3.60	4.80	0.77
IV	5.76	0.35	8.40	11.00	1.10
palp:	0.18	0.07	0.14	—	0.15

Genital organ (Figs 38, 39): genital opening overshot by a voluminous, extensible lobe with 3–4 deep, transverse folds, distally a small tongue. This lobe forms, together with the caudal crescent wall on the abdomen, a 'vestibulum' in the proximal half of which is situated the slitlike opening into the uterus externus. The whole organ is practically colourless except for a pair of dumb-bell shaped ridges on the inner (dorsal) side of the lobe, apparent on the outside, and the domed sclerotized locking valves of the anterior of the uterus externus. Due to different degrees of sclerotization, the pattern in ventral aspect may vary. No essential differences were observed between the specimens from Balikpapan and those from the Malay Peninsula and Sumatra.

REMARKS

The remarks made for *vermiformis* apply to this species too. No webs were visible with the spiders in the field, but possibly webs of very fine texture were extended from the leaf margins. As in *vermiformis*, elongate egg parcels were held in front of the head like a stick.

Calapnita subphyllicola nov. spec. (Figs 40–44)

MATERIAL EXAMINED

HOLOTYPE: 1 ♂, RMNH 9575, Davao, Mindanao, Philippines, outside Langub cave, 7°05'N, 125°32'E, in woodland, on underside of large palmate leaves, 25.iv.1982, P.R. Deeelman.

PARATYPES: 1 ♀, RMNH 9575, 2 ♂, 2 ♀, in author's collection, same data as Holotype.

DESCRIPTION

HOLOTYPE: ♂, whole body whitish, legs pale yellow green, joints of legs not darkened. Chelicerae as in Fig. 41. Eyes, sternum and

abdomen as in *phyllicola*. Measurements in mm: carapace 0.90×0.85 , abdomen 5.00; leg measurements are given in Table 9.

TABLE 9: Leg measurements (mm) of *Calapnita subphyllicola* (Holotype, ♂)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	8.10	0.32	8.20	14.85	1.80
II	6.07	0.32	6.10	10.35	1.20
III	4.05	0.32	3.37	5.40	0.75
IV	6.07	0.32	5.51	8.77	1.24

Palp (Fig. 40): similar to *phyllicola*, but femur and patella shorter and thicker, embolus and bulbal apophysis shorter, barely longer than bulb, embolus lacking the serrations, tines of the apophysis closer to each other.

FEMALE: similar to the ♂, chelicerae unmodified. Measurements in mm: carapace 0.95×0.90 , abdomen 4.85; leg measurements are given in Table 10.

TABLE 10: Leg measurements (mm) of *Calapnita subphyllicola* (Paratype, ♀)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	7.20	0.33	6.75	12.45	1.80
II	5.40	0.33	4.95	8.10	1.20
III	4.05	0.33	3.51	4.72	0.82
IV	5.85	0.33	5.17	7.87	1.12
palp:	0.26	0.12	0.14	—	0.17

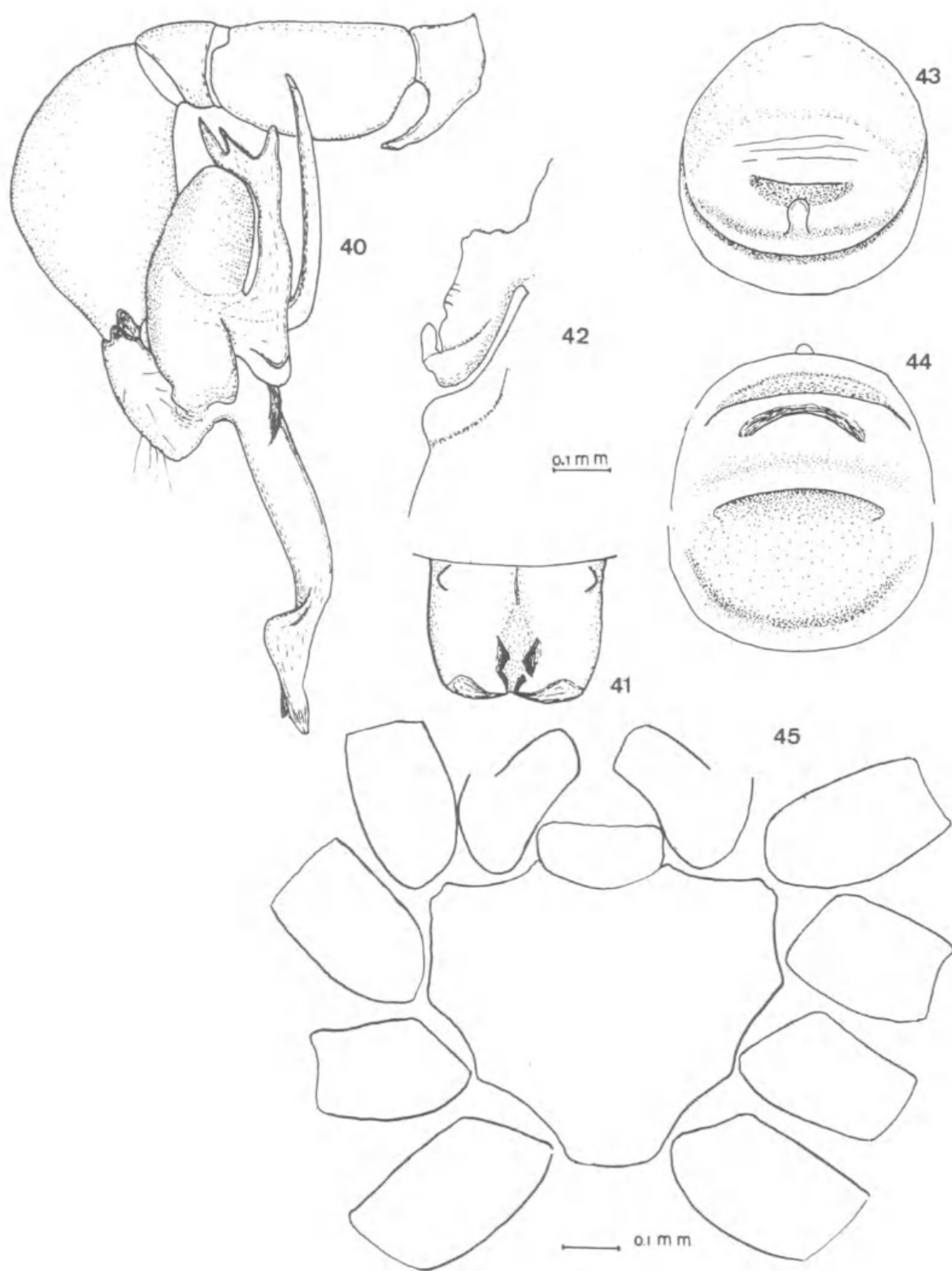
Genital organ (Figs 50, 51): similar to that of *phyllicola*, but shorter, almost round, folds less profound, allowing little extension of the lobe; there is a crescentic transverse ridge on the inner surface of the lobe, apparent through the tegument in the otherwise colourless and rather featureless organ.

Calapnita phasmoides nov. spec. (Figs 46–51, 59e).

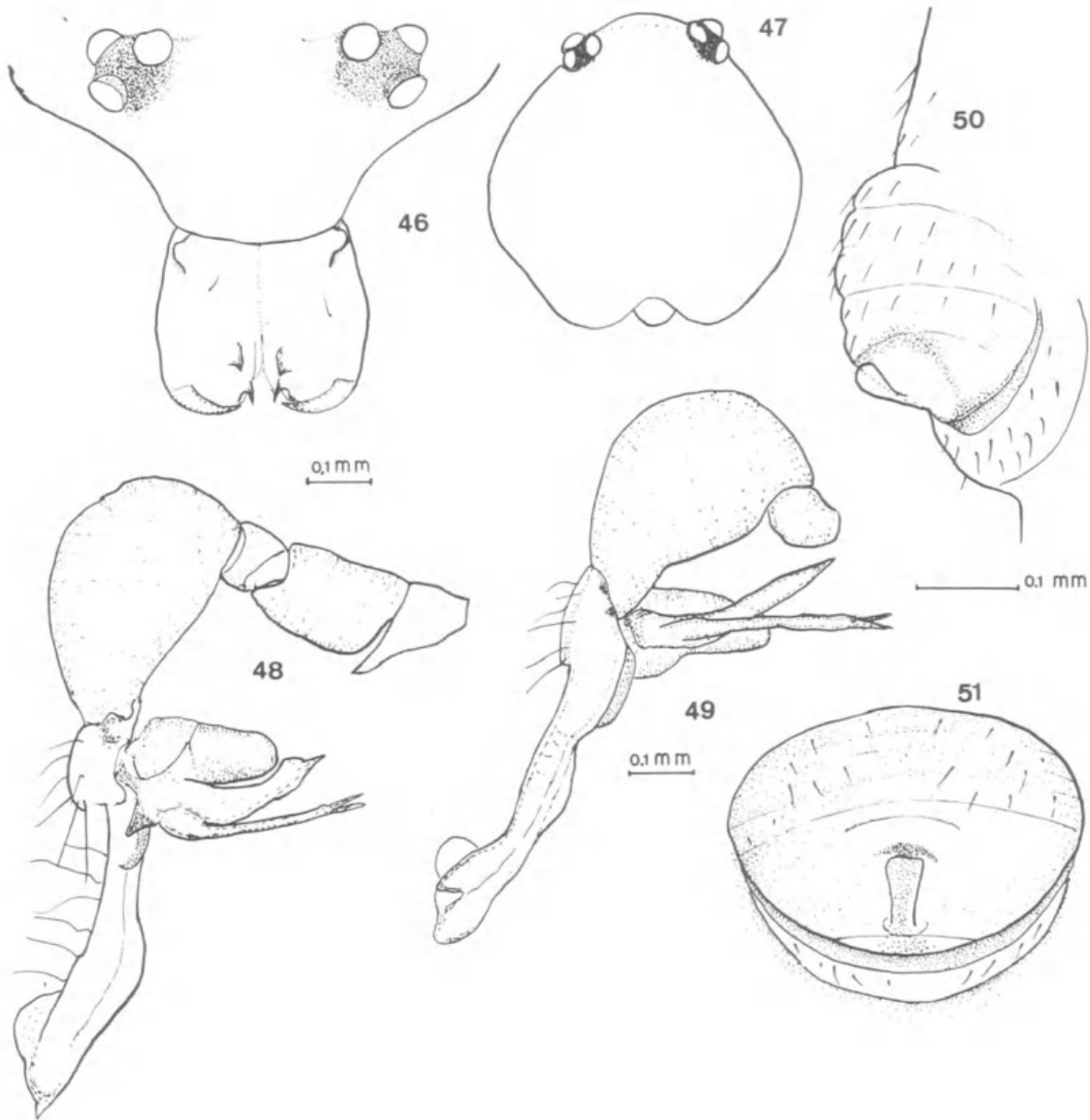
MATERIAL EXAMINED

HOLOTYPE: 1 ♂, RMNH 9574, Sepaku, East Kalimantan, Indonesia, 40 km N. Balikpapan, 1°00'S, 116°54'E, primary lowland dipterocarp rainforest, on the underside of large leaves, 14–16.vii.1979, P.R. Deeelman.

PARATYPE: 1 ♂, RMNH 9574, same data as Holotype.



FIGS 40-45: Figs 40-44, *Calapnita subphyllicola* n.sp., Davao. 40. ♂ right palp, mesal; 41. ♂ chelicerae, front; 42. epigyne, lateral; 43. epigyne, ventral; 44. internal (dorsal) view of epigynal lip, turned up. Fig. 45. *Panjange mirabilis* n.sp., Iron Range, ♀, sternum and coxae.



FIGS 46-51 : *Calapnita phasmoides* n.sp, Balikpapan. 46. ♂, head and chelicerae, front; 47. ♂, carapace; 48. right palp, mesal; 49. left palp, lateral; 50, epigyne, lateral; 51. epigyne, ventral.

DESCRIPTION

HOLOTYPE: ♂, colour pale yellow to whitish, patellae not darkened, only the tibia-metatarsal joints slightly darkened in some legs. Chelicerae as in Fig. 46. Eyes, sternum and abdomen as in *phyllicola*. Measurements in mm : carapace 0.96×0.82 , abdomen 3.60. Anterior legs missing; other measurements given in Table 11.

TABLE 11: Leg measurements (mm) of *Calapnita phasmoides* (Holotype, ♂)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
III	3.60	0.30	3.03	5.00	0.72
IV	5.30	0.30	4.80	7.40	1.15

Male palp (Figs 48, 49) : femur and patella considerably shorter than in *phyllicola* and thicker. The very thin embolus is equipped with a subapical needle, the bulbal apophysis is slightly shorter, flat and sickle-shaped.

FEMALE: similar to the male, chelicerae not modified. Measurements in mm : carapace 0.82×0.80 . Abdomen damaged. Leg measurements given in Table 12.

TABLE 12: Leg measurements (mm) of *Calapnita phasmoides* (Paratype, ♀)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	missing				
II	4.80	0.35	4.55	7.05	1.15
III	3.60	0.35	2.90	4.20	0.72
IV	5.05	0.35	4.55	7.70	1.10
palp:	0.15	0.10	0.14	—	0.18

Genital organ (Figs 50, 51) : similar in structure to *phyllicola*, but lobe with more (5–6) and shallower folds, distally, the lobe is truncated at right angles. The organ is colourless except for a central longitudinal band at the base of the tongue. See also section Fig. 59e.

REMARKS

See remarks under *L. borneensis*.

Panjange Deeleman-Reinhold and Deeleman, 1983.

Panjange Deeleman-Reinhold and Deeleman, 1983, *Zool. Mededel* 57 (14): 123.

Type species : *Panjange lanthana* Deeleman-Reinhold, — Luzon, Philippines (♂ ♀).

DIAGNOSIS

Pale coloured spiders, usually with a pattern on carapace and spots on abdomen. Six eyes in two compact groups on the sides of the head, in the ♂ on turrets; carapace flat or somewhat domed. Abdomen at least three times longer than carapace, truncated or excavated behind. Epigynal lip folded like a concertina. Male palpal femur, patella and tibia cylindrical, tarsal appendage with transverse ridges, bulb elongate, with one lanceolate apophysis.

The genus is known to occur in the Philippines, Sulawesi, Borneo, West Irian and the tip of Cape York Peninsula, Australia.

Panjange mirabilis nov. spec.
(Figs 45, 52–58, 59g, 60).

MATERIAL EXAMINED

HOLOTYPE: ♂, QM S883, Gordon Creek, Iron Range, NE.Q., in mesophyll vine forest, 24–30.vi.1976, R. Raven, V. Davies.

PARATYPE: ♀ QM S884, same data as Holotype

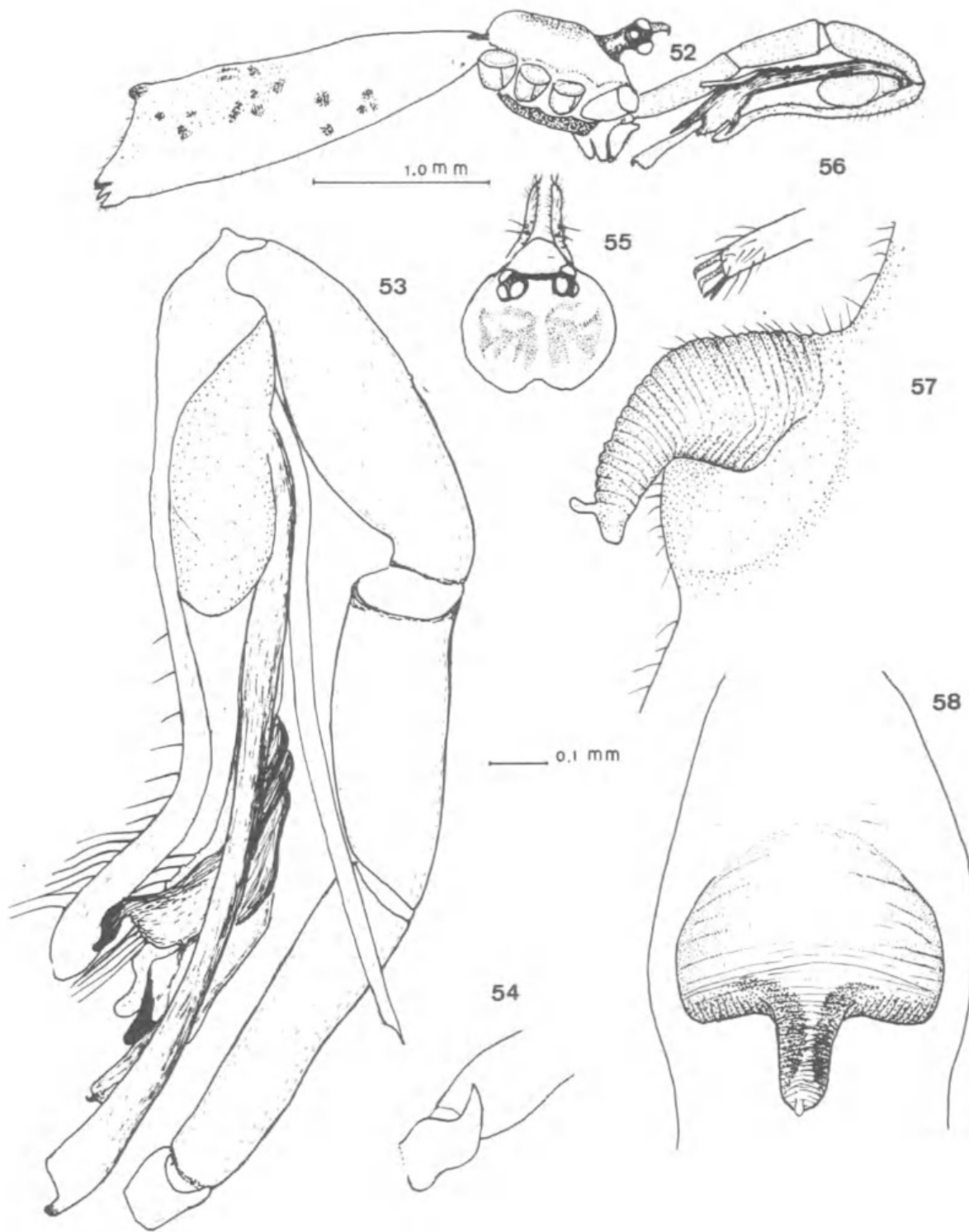
DESCRIPTION

HOLOTYPE: ♂, pale yellow, with pale brown pattern on the carapace (Fig. 55); sternum, ventral side of coxae and trochanters, apical end of femora, patellae, base and apex of tibiae and base of metatarsi brown, a few spots on abdomen brown.

Carapace slightly domed, dorsal plateau flat, without median groove, 6 eyes in two triads, all eyes a little larger than the posteriors. Eyes raised on a stalk (Fig. 52), the mesal margin of which is prolonged into a spike. Clypeus long and slanting. Chelicerae with rounded apophysis near the base, distal apophysis lacking. Sternum as in Fig. 45, wider than long, obtusely rounded behind. Abdomen $3 \times$ length of carapace, distally widening, obliquely truncated (Fig. 52). Measurements in mm : carapace 0.77×0.81 ; leg measurements given in Table 13.

TABLE 13: Leg measurements (mm) of *Panjange mirabilis* (Holotype, ♂)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	missing				
II	5.45	0.33	4.62	8.08	1.30
III	3.46	0.33	3.46	4.62	0.75
IV	5.80	0.33	4.30	7.00	1.15



FIGS 52-58: *Panjange mirabilis* n.sp., Iron Range. 52. ♂, from side; 53. ♂, right palp, mesal; 54. ♂ palpal trochanter and part of femur, lateral; 55. ♀, carapace and palps dorsal; 56. ♀, tip of palp, lateral; 57. epigyne, lateral; 58. epigyne, ventral.

Palp (Figs. 53, 54) : femur, patella and tibia long and cylindrical, not enlarged. Tarsus with a long, vermiform prolongation with claviform tip. Tarsal appendage straight and thin, nearly as long as femur, patella and tibia together, distally widening and branching into three apophyses of various shapes; the middle one is decorated with three parallel transverse ridges. Bulb twice as long as wide, embolus filiform, transparent, as long as tarsus, bulbal apophysis extremely long, longer than tarsal appendage, colourless but for the clawlike tip.

FEMALE: similar to the ♂, eyes not raised, chelicerae unmodified. Distance between the eye groups about 1.5 d. Abdomen with rectangular truncation posteriorly. Measurements in mm : carapace 0.76×0.77 ; leg measurements given in Table 14.

TABLE 14: Leg measurements (mm) of *Panjange mirabilis* (Paratype, ♀)

Legs:	femur	patella	tibia	meta-tarsus	tarsus
I	6.84	0.33	7.10	9.75	—
II	missing				
III	3.80	0.33	3.00	4.62	0.80
IV	4.65	0.33	4.75	8.00	1.25

Palpal tarsus (Fig. 56) : with four apical claws, no hyaline cone. Epigynal projection (Figs. 57, 58) very wrinkled over the whole width, V-shaped, base only a little wider than tip. A wide, extensible opening leads into the uterus externus, at the entrance of which a pair of large porous plates are apparent.

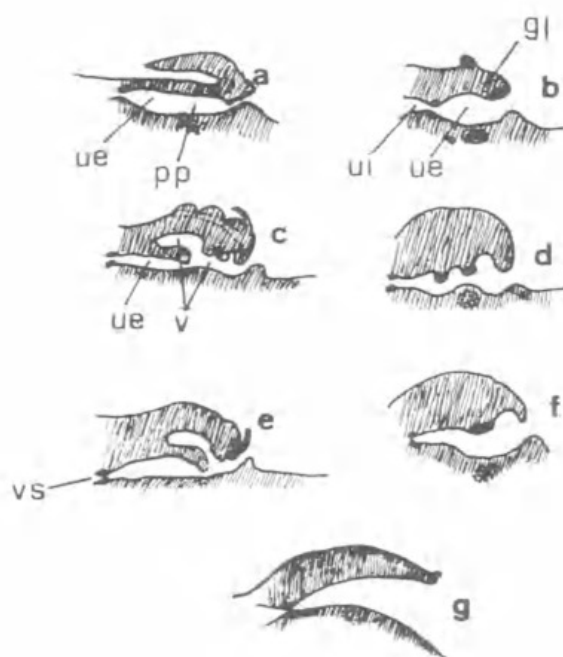


FIG 59. Diagrammatic longitudinal section of female genital organ, ventral surface uppermost. a. *Calapnita vermiformis* Simon; b. *Pholcus phalangioides* Fuesslin; c. *Calapnita phyllicola* n.sp.; d. *Micromerys daviesae* n.sp.; e. *Calapnita phasmoides* n.sp.; f. *Leptopholcus borneensis* n.sp.; g. *Panjange mirabilis* n.sp. ue: uterus externus; ui: uterus internus; pp: porous plate; el: epigynal lip; v: vestibulum; vs: 'Verschluss'.

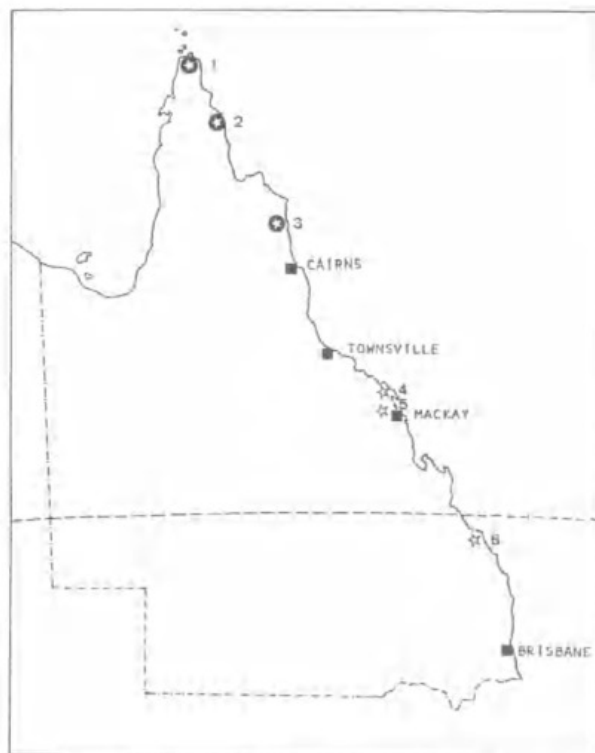


FIG. 60. Locations of *Micromerys* spp. in Queensland, Australia. *M. gracilis* Bradley. 1. Cape York; 2. Iron Range; 3. Shiptons Flat. *M. daviesae* n.sp. 4. Brandy Creek; 5. Finch Hatton; 6. Rundle Range.

KEY TO THE GENERA OF INDO-AUSTRALIAN LEAF-DWELLING PHOLCIDAE

The following key to the pholcid genera is based partly on my own unpublished material. The two genera *Belisana* Thorell and *Uthina* Simon have been rarely discussed in the literature

and have never been well defined — they are included here for the sake of completeness.

1. Abdomen globular or angular, less than $2 \times$ carapace length; 6 eyes in two triads, am absent 2
 Abdomen at least $2 \times$ carapace length; 6 eyes in two triads, am small or absent 3
2. Distance between triads 1-2 d *Spermaphora* Hentz
 Distance between triads 3 d or more *Belisana* Thorell
3. Abdomen truncated posteriorly $2-4 \times$ carapace length; carapace and abdomen in most cases with faint pattern or dark spots; carapace more or less domed; in the ♂: eye groups raised, in the ♀: distance between pm eyes 1-2 d 4
 Abdomen worm-shaped, $5 \times$ or more carapace length, distally tapering, spinnerets in prolongation of it; carapace flat; in the ♂: eye groups not or only a little raised, in the ♀: distance between pm eyes 3 d or more 6
4. am eyes absent; in the ♂: eye groups on stalks; epigyne posteriorly produced into a wrinkled 'trunk' with apical tongue; male palpal elements slender, tarsal appendage with transverse ridges, bulbal apophysis simple, lanceolate *Panjange* Deeleman
 am eyes present or absent, in ♂ ocular area raised or eyes on stalks; ♀ genital area chitinized, epigyne with tongue; ♂ palp bulgy, 2 chitinized branches of bulbal apophysis astride embolus 5
5. am eyes present *Pholcus* Walckenaer
 am eyes absent *Uthina* Simon
6. Epigyne posteriorly prolonged and folded; ♂ chelicerae with 2 apophyses, ♂ eye groups not raised *Calapnita* Simon
 Epigyne posteriorly not prolonged, without tongue, but with internal valves, ♂ chelicerae with 0 or 1 apophysis 7
7. Male palpal elements long and slender, embolus large and sclerotized, flat, bulb elongate, bulbal apophyses reduced *Micromerys* Bradley
 Male palp of the *Pholcus* type: elements short and bulgy, bulb round, 2 chitinized branches of apophysis straddling the embolus *Leptopholcus* Simon

DISCUSSION

From the study of the material described here, some interesting points emerge. The species in the genera *Micromerys*, *Calapnita* and *Panjange* differ from other pholcids by the lengthened and slender male palpal elements and the absence of a chitinized plate on the epigyne. The first two genera share profound changes in the body form and eye position with *Leptopholcus*. This transformation is probably related to their mode of life: they have abandoned residence in near-ground webs and adopted a leaf-dwelling existence in tropical rainforests, where they construct much reduced webs close to the undersurface of the leaf or attached to the leaf margin. In the pholcids of the genus *Belisana* Thorell, similar but independent transformations of carapace shape and eye position have taken place; these spiders too are found on the underside of leaves.

I do not consider slender palps primitive and suggest that they were derived from pholcid ancestors having shortened, expanded palpal elements. The loss of volume would be expected, considering the tendency of the whole spider to become cryptic and sticklike. Usually these pale green or yellow spiders are found in daytime on the underside of leaves with exposed veins. The long, thin body looks like the midrib of a leaf, with the legs stretched out laterally in pholcid fashion like side veins, perfectly blending with the background of the leaf. Rounded swollen palps would be conspicuous in this situation. The females' habit of carrying her eggs in front of her head in a stringlike bunch reinforces the sticklike appearance of the animal.

In the genus *Micromerys*, individuals with and without vestigial anterior median eyes may occur within the same species. This means that reduction of these eyes has occurred recently or is still in progress in this genus. The same phenomenon was observed in African *Leptopholcus* species by Brignoli (1980). As Simon's distinction between *Leptopholcus* and *Micromerys* was based on the presence or absence of these eyes, division on this character is invalid. However, genital organs in *Micromerys* and *Calapnita* described in this paper differ from those in *Leptopholcus* not only by being longer and thinner, but also in basic structure and composition of their components. In tropical Africa and Central America, species with elongate bodies, flat carapaces and a shifted eye position, which have been placed in the genus

Micromerys, must have evolved from local lineages.

In conclusion, evidence is accumulating that the taxonomic unit 'Leptopholceae' based on body form, rests on convergence as an adaptation to a particular way of life. On the basis of genital organs, *Micromerys* is quite distinct from both *Leptopholcus* and *Calapnita* and unrelated to Central American species incorrectly placed in *Micromerys*. *Panjange* is not so strongly adapted, but in this genus some remarkable novelties in the genital organs of both males and females were developed.

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