

Two new species of armoured spiders from Malaysia and Australia (Arachnida: Araneae: Tetrablemmidae)

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Summary

In this study, two new tetrablemmid species are described from both sexes, *Ablemma unicornis* sp. n. from Malaysia and *Tetrablemma magister* sp. n. from Australia. Males of *A. unicornis* sp. n. are distinguished from all other *Ablemma* species by the position of a tooth on the carapace behind the eye group and by the shape of the palpal bulb. Females of *A. unicornis* sp. n. are distinguished from most other *Ablemma* species by the profile of the carapace in lateral view and by the narrow eye field in proportion to the carapace width. Males of *T. magister* sp. n. are distinguished from most other *Tetrablemma* species by the shape of the palpal bulb and females by the rounded profile of the carapace in lateral view. Aspects of the sex-linked characters in both species and leg modifications in the male of *A. unicornis* sp. n. are discussed.

Introduction

The family Tetrablemmidae O. Pickard-Cambridge, 1873 comprises armoured spiders with a characteristic pattern of opisthosomal sclerites. They have a large dorsal plate and several separate ventral and lateral plates (e.g. Shear, 1978; Bourne, 1980; Lehtinen, 1981; Burger, 2005). Tetrablemmids have up to six eyes and males often show strong modifications of the clypeus, chelicerae, carapace or anterior legs (e.g. Shear, 1978, 1988; Bourne, 1980; Lehtinen, 1981; Schwendinger, 1989, 1994). Tetrablemmid spiders occur mainly in tropical regions (Shear, 1978; Lehtinen, 1981); most are soil-dwellers but they have also been found in caves, under bark or even in dry, sandy, coastal habitats (Lehtinen, 1981; Deeleman-Reinhold, 1993). Their distribution ranges from Africa via the Indo-Pacific region to South America, with Southeast Asia considered as being the centre of diversity (Brignoli, 1974; Shear, 1978; Deeleman-Reinhold, 1980; Lehtinen, 1981; Brescovit, 2005).

Since only a few studies have dealt with living tetrablemmids, almost nothing is known about their biology. Schwendinger (1989, 1994) observed and collected several pacullines. Burger *et al.* (2006) described the web and mating behaviour of the tetrablemmine *Indicoblemma lannaianum* Burger, 2005 and Edwards & Edwards (2006) investigated the life history and ecology of *Monoblemma muchmorei* Shear, 1978.

Taxonomically, the Tetrablemmidae have been placed as sister group of the Dysderoidea, which consists of the families Orsolobidae, Oonopidae, Dysderidae and Segestriidae (Coddington & Levi, 1991). Shear (1978) treated the small Tetrablemminae (body length usually less than 2 mm) and the much larger Pacullinae (body length up to 20 mm) as separate families. They were united by Lehtinen (1981) in his detailed and compre-

hensive revision of the family. A total of 126 tetrablemmid species in 29 genera are currently recorded (Platnick, 2007). In the present study, two new tetrablemmid species are described from both sexes, *Ablemma unicornis* sp. n. from Malaysia and *Tetrablemma magister* sp. n. from Australia.

Material and methods

Specimens of *Ablemma unicornis* sp. n. and *Tetrablemma magister* sp. n. were examined and measured using a Wild M5A stereomicroscope. The body parts were dissected from the spiders, embedded in Hoyer's medium for light microscopy, and examined under an Olympus BH-2 compound microscope. The drawings were made with an ink pen on finely granulated paper using a drawing tube and then shaded with a graphite pen. They were scanned and edited using Adobe Photoshop Elements 2.0.

The systematic and anatomical terminology proposed by Shear (1978) and Lehtinen (1981) is followed in this paper. Abbreviations used in the text: AMNH = American Museum of Natural History, New York, USA; MHNG = Natural History Museum, Geneva, Switzerland; NMBE = Natural History Museum, Bern, Switzerland. All measurements are given in mm.

Taxonomy

Family TETRABLEMMIDAE O. Pickard-Cambridge, 1873

Subfamily TETRABLEMMINAE O. Pickard-Cambridge, 1873

Genus *ABLEMMA* Roewer, 1963

Ablemma unicornis sp. n. (Figs. 1–14)

Types: Holotype ♂, Malaysia, Pahang, 4 mi NE Cameron Highlands, Berlese extraction, litter in swampy area, 25 April 1977, leg. L. E. Watrous, deposited in AMNH. Paratypes: 2♂ 2♀, same data as holotype (AMNH); 2♀ 2♂, Malaysia, Pahang, Cameron Highlands, Gunung Jasar, sifting, 1550 m, trail 11, 24 March 1993, leg. I. Löbl & F. Calame (WM93-18b), deposited in MHNG.

Etymology: The specific name refers to the tooth on the carapace in males, which is situated in a similar position to the horn of a unicorn.

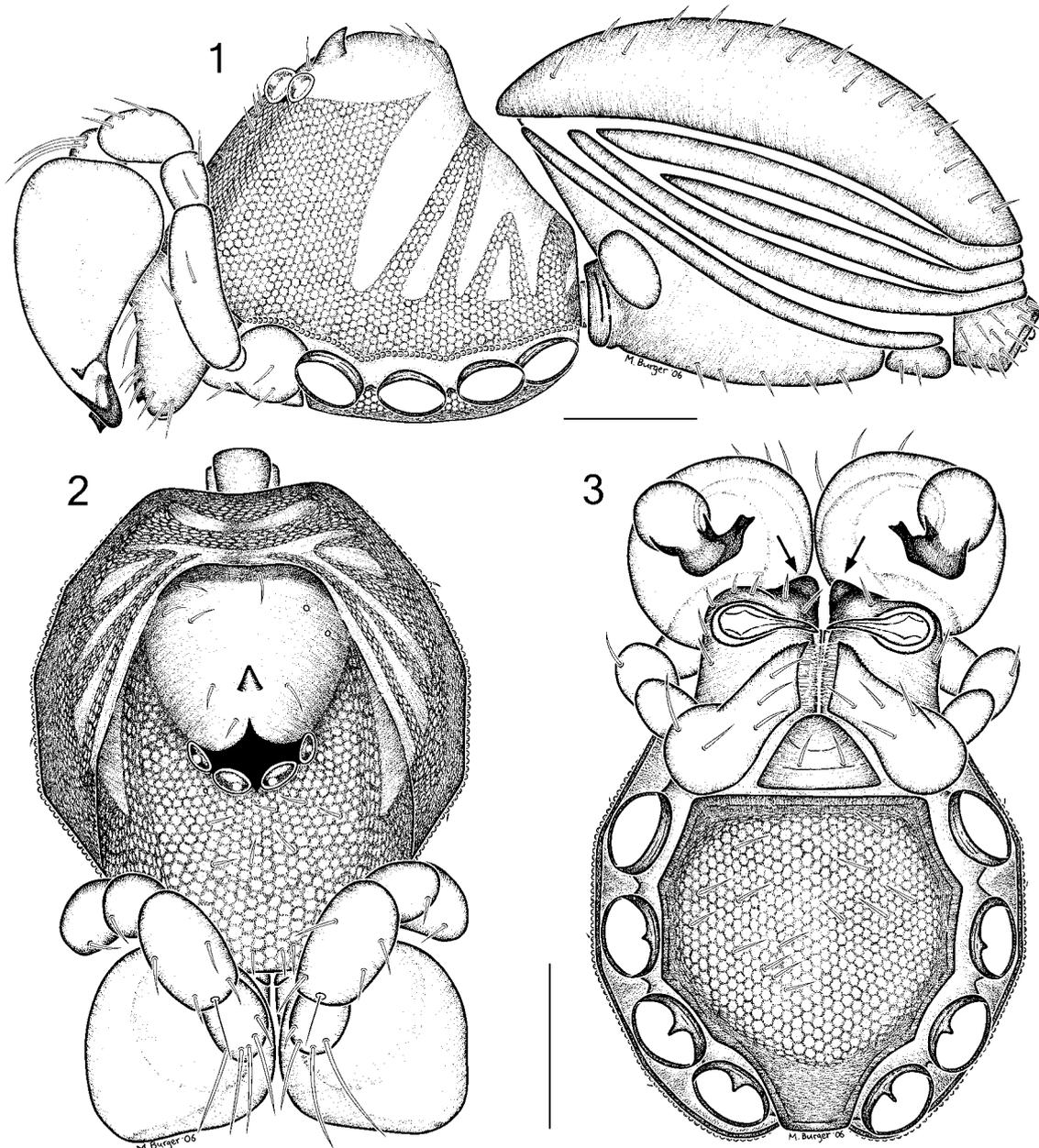
Diagnosis: Males of *A. unicornis* sp. n. are distinguished from all other *Ablemma* species by the position of a tooth anteriorly on the carapace behind the eye group (Figs. 1, 2) and by the shape of the palpal bulb (Figs. 1–3, 5). *Ablemma ruohomaekii* Lehtinen, 1981 has a similar tooth but its position is clearly different. The palpal bulb of *A. unicornis* sp. n. resembles the palpal bulb of the type species *Ablemma baso* Roewer, 1963 but the embolus of *A. unicornis* sp. n. is shorter and flatter. Females of *A. unicornis* sp. n. are distinguished from most other *Ablemma* species by the profile of the carapace in lateral view (Fig. 12) and by the narrow eye field in proportion to the carapace width (Fig. 13). Females of

Ablemma circumspectans Deeleman-Reinhold, 1980, *A. lempake* Lehtinen, 1981, and *A. sternofoveatum* Lehtinen, 1981 have a similar carapace profile in lateral view. However, females of *A. unicornis* sp. n. can be distinguished from those of *A. circumspectans* and *A. lempake* by a different number of eyes and from *A. sternofoveatum* by a broader preanal plate and a narrower eye field.

Description. Male. Measurements (n=1): Prosoma length 0.64, width 0.52, height 0.58 (tooth on carapace excluded). Opisthosoma length 0.88, width 0.66. Lengths of leg and palp segments:

	Fe	Pa	Ti	Mt	Ta	Total
Leg I	0.50	0.16	0.40	0.24	0.24	1.54
Leg II	0.42	0.16	0.34	0.24	0.22	1.38
Leg III	0.36	0.16	0.28	0.24	0.18	1.22
Leg IV	0.48	0.16	0.42	0.30	0.22	1.58
Palp	0.24	0.10	0.18	—	0.08	0.60

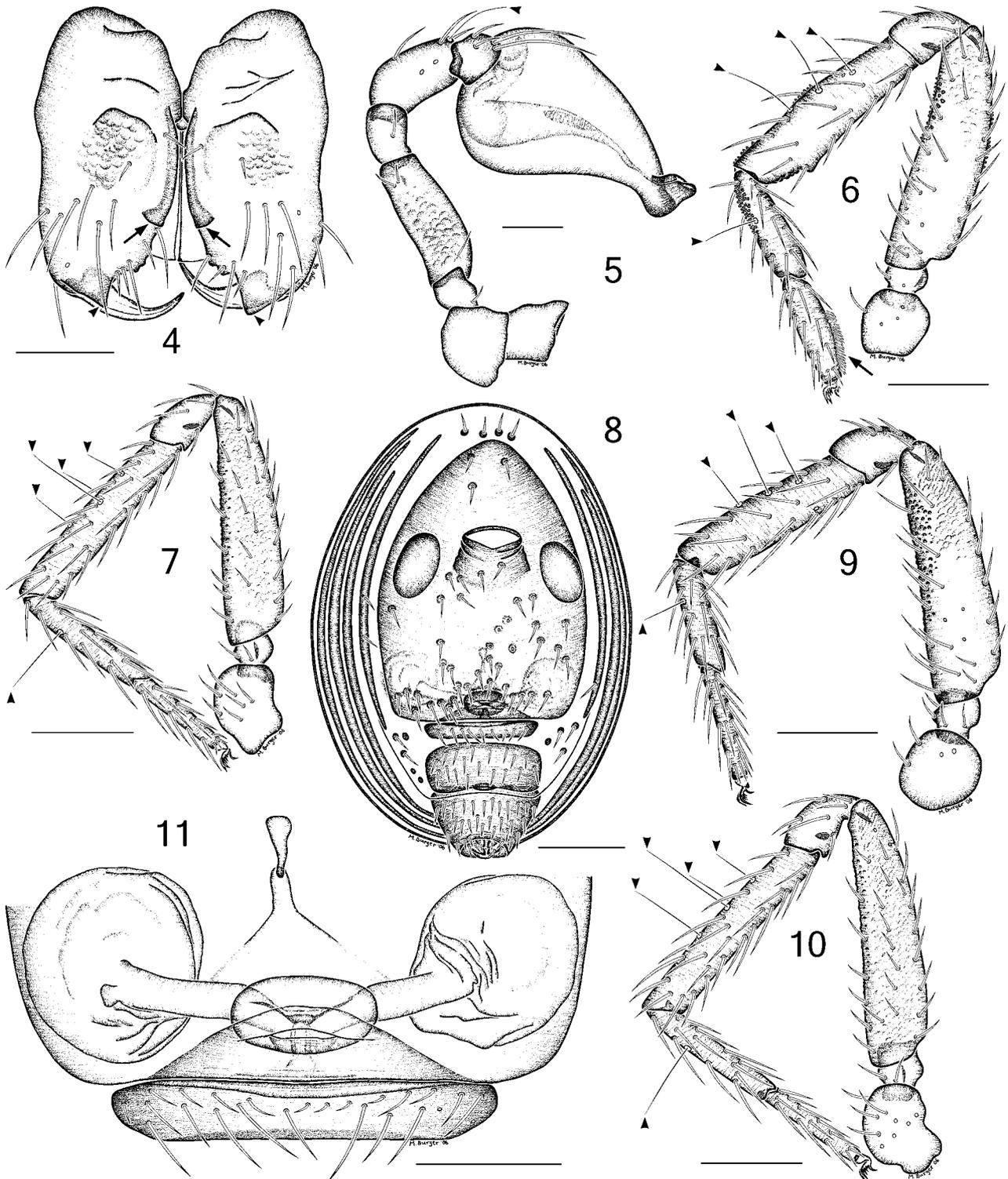
Colour in alcohol: Prosoma, chelicerae, and scuta of opisthosoma orange-brown; palps and legs orange, patellae lighter than other leg segments; apophyses on chelicerae brown; embolus dark brown, distal part almost black; spinnerets pale yellow; membranous areas white. **Carapace:** Strongly elevated in lateral view, box-like (Fig. 1); covered with fine mosaic-like stripe pattern; anterodorsally with pronounced tooth behind eye group (Figs. 1, 2); laterally with a fringe of pits, each bearing a hair (Figs. 1, 2). **Eyes:** Four, not touching each other, arranged in recurved transverse row; PLE smaller than ALE (Fig. 2). **Clypeus:** Steeply ascending; height approximately 4.5 diam. of ALE (Figs. 1, 2). **Sternum and pleurae:** Sternum slightly longer than wide, covered with short hairs and fine mosaic-like sculpture; separating coxae IV by approximately their diameter; pleurae sclerotised, fused with carapace and sternum; hairs on sternum arising from small depressions (Fig. 3). **Labium:**



Figs. 1–3: *Ablemma unicornis* sp. n., male. **1** Lateral view, only some hairs shown; **2** Prosoma, antero-dorsal view; **3** Prosoma, ventral view. Arrows=cheliceral apophyses. Scale lines=0.2 mm.

Subtriangular, approximately 1.5 times as wide as long; separated from sternum (Fig. 3). *Chelicera*: Anterior median part of basal segment slightly swollen, cuticle squamous (Fig. 4); small pointed apophysis on anterior distal surface (arrowed in Figs. 3, 4); typical thin transparent lamina on mesal margin protecting tip of fang; two distal denticles; anterior distal part of basal segment strongly pointed, covered with fine lengthwise ridges

(arrowheads in Fig. 4); fang with small teeth (Fig. 4). *Palp*: Gnathocoxa with distinct teeth on anterior distal margin (Fig. 3); cuticle of femur squamous on retrolateral side; tibia slightly enlarged, with one trichobothrium dorsally near distal end; cymbium short, with several long hairs dorsally at distal end (Fig. 5). *Palpal bulb*: Pyriform, longish, with small dark tooth on retrolateral side distally near embolus (Fig. 1); thick

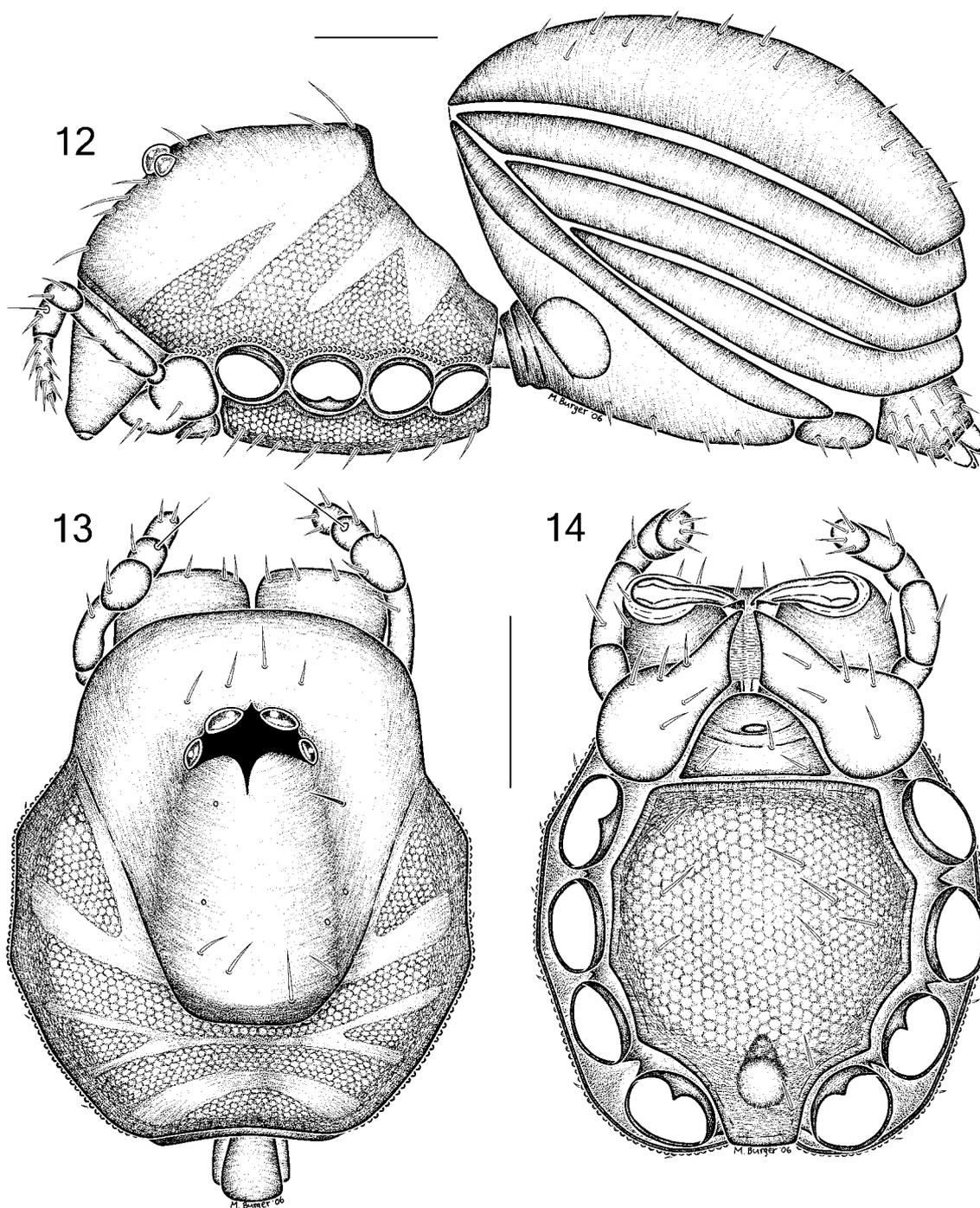


Figs. 4–11: *Ablemma unicornis* sp. n. **4** Male chelicerae, anterior view; **5** Male palp, retrolateral view (palpal bulb twisted due to preparation, showing a more anterior view); **6** Left leg I of male, retrolateral view; **7** Left leg IV of male, retrolateral view; **8** Female opisthosoma, ventral view; **9** Left leg I of female, retrolateral view; **10** Left leg IV of female, retrolateral view; **11** Vulva, ventral view. Arrows in 4=cheliceral apophyses. Arrow in 6=tiny hairs on tarsus. Arrowheads in 4=pointed anterior distal parts of chelicerae. Arrowheads in 5–7, 9, 10=trichobothria. Scale lines=0.1 mm (4, 5, 11), 0.2 mm (6–10).

spermophor shining through cuticle of palpal bulb (Fig. 5); embolus dark, distal part almost black; short and flat, basally thick, distally slightly screwed and bent (Figs. 3, 5). *Legs*: IV–I–II–III; femora with squamous cuticle and small teeth dorsally and ventrally (Figs. 6, 7); patellae small; tibia I thickened, with small teeth dorsally, distal ventral part with apophysis and small humps; tibiae I–III with three trichobothria dorsally, tibia IV with four; metatarsus I with small teeth proximo-dorsally; all metatarsi with one trichobothrium dorsally; tarsus I thickened, with numerous tiny hairs forming scopula disto-ventrally (arrow in Fig. 6); two dentated tarsal claws. *Opisthosoma*: Ovoid; large sclerotised plate covering dorsal surface (Fig. 1); ventrally

covered by four sclerotised plates (for ventral view of opisthosoma compare female, Fig. 8); large pulmonary plate with almost pointed anterior margin, surrounding pedicel and bearing simple book-lungs, followed posteriorly by short postgenital plate, broad preanal plate, and conical anal plate surrounding spinnerets; tiny perigenital plates ventrally near preanal plate, each bearing a hair; additional tiny plates anteriorly; hairs on ventral plates arising from small depressions; opisthosoma laterally with four pairs of strap-like plates, three of them appearing to be fused to corresponding posterior plates (Fig. 1).

Female: Similar to male. Only differences from male are described. *Measurements* ($n=1$): Prosoma length



Figs. 12–14: *Ablemma unicornis* sp. n., female. **12** Lateral view, only some hairs shown; **13** Prosoma, dorsal view; **14** Prosoma, ventral view. Scale lines=0.2 mm.

0.68, width 0.54, height 0.54. Opisthosoma length 1.02, width 0.76. Lengths of leg and palp segments:

	Fe	Pa	Ti	Mt	Ta	Total
Leg I	0.50	0.16	0.40	0.24	0.24	1.54
Leg II	0.42	0.16	0.36	0.24	0.24	1.42
Leg III	0.38	0.16	0.30	0.24	0.18	1.26
Leg IV	0.52	0.16	0.46	0.30	0.24	1.68
Palp	0.14	0.06	0.08	—	0.10	0.38

Carapace: Anteriorly rounded in lateral view; posterior third abruptly sloping, thus forming a sharp edge (Fig. 12); mosaic-like stripe pattern different (Figs. 12, 13). **Eyes:** Eye field narrower in proportion to carapace width (Fig. 13). **Clypeus:** Shorter, height approximately 3.5 diam. of ALE (Fig. 12). **Sternum and pleurae:** Sternum with posterior pit (Fig. 14). **Chelicera:** Apophysis lacking (Figs. 13, 14). **Legs:** Longer (Figs. 9, 10); tibia I not thickened and lacking teeth, humps and apophysis; metatarsus I without teeth; tarsus I not thickened and lacking scopula distally (Fig. 9). **Opisthosoma:** Preanal plate posteriorly with small lateral grooves and small dark median process (Fig. 8). **Vulva:** Outlines of sclerotised parts shining through pulmonary plate (Fig. 8); single slit-like genital opening near posterior margin of pulmonary plate leading into dark oval structure; inner vulval plate triangular; paired copulatory ducts leading into sac-like receptacula with distinctly folded cuticle (Fig. 11).

Additional material examined: 6♂ 7♀, same data as holotype. **MALAYSIA: Pahang: Cameron Highlands:** 6♀ 6♂, Tanah Rata, 4300 ft (1310 m), 7 August 1972, leg. T. Jaccoud; 1♀, Ringlet, 4200 ft (1280 m), 7 August 1972, leg. T. Jaccoud; 2♂, Tanah Rata, 24 March 1977, leg. T. Jaccoud & P. Marcuard (I 82); 13♀ 11♂, 4 mi NE Cameron Highlands, Berlese extraction, mixed hardwood, 24 April 1977, leg. L. E. Watrous; 10♀ 3♂, sifting, 1500 m, trails 4 and 13, 23 March 1993, leg. I. Löbl & F. Calame (WM93-15); 1♀ 1♂, Bukit Mentiga, summit, sifting, 1600 m, trail 14, 23 March 1993, leg. I. Löbl & F. Calame (WM93-16a); 1♀ 1♂, Bukit Mentiga, sifting, 1520 m, trail 14, 23 March 1993, leg. I. Löbl & F. Calame (WM93-17); 19♀ 17♂, Gunung Jasar, sifting, 1550 m, trail 11, 24 March 1993, leg. I. Löbl & F. Calame (WM93-18b); 1♀, sifting, 1400 m, trail 9, 27 March 1993, I. Löbl & F. Calame (WM93-21). **Fraser's Hill:** 1♀, Selangor, 3 km below Fraser's Hill, sifting, 1200 m, 15 March 1993, leg. I. Löbl & F. Calame (WM93-6); 2♀, Kuantun ridge, sifting, 1380 m, 17 March 1993, leg. I. Löbl & F. Calame (WM93-8); 1♀ 3♂, NE side, 1200 m (3°44'N, 101°46'E), 25 August 2004, leg. A. Schulz (AS-04/08); 1♂, S side, 1300 m (3°42'N, 101°45'E), 26 August 2004, leg. A. Schulz (AS-04/10); 1♀ 1♂, 1 km S of town, 1250 m (3°41'N, 101°45'E), 27 August 2004, leg. A. Schulz (AS-04/12); 3♀ 1♂, 2 km S of town, 1300 m (3°43'N, 101°44'E), 29 August 2004, leg. A. Schulz (AS-04/16). **Perak: Cameron Highlands:** 6♀ 7♂, Berinchang, 26 March 1977, leg. T. Jaccoud & P. Marcuard (I 96); 1♂, Cascade of Sungei Simei, 28 March 1977, leg. T. Jaccoud & P. Marcuard (I 85). Material deposited in MHNG except for leg. L. E. Watrous, deposited in AMNH.

Genus *TETRALEMMA* O. Pickard-Cambridge, 1873

Tetrablemma magister sp. n. (Figs. 15–28)

Types: Holotype ♂, Australia, N Queensland, Kuranda, Kuranda State Forest, 360 m, rainforest litter, 27 July 1982, leg. S. & J. Peck, deposited in AMNH. Paratypes, 2♂ 2♀, same data as holotype.

Etymology: The specific name is in honour of my dear brother Hermann "Magister" (= teacher) Burger.

Diagnosis: Males of *Tetrablemma magister* sp. n. are distinguished from most other *Tetrablemma* species by the shape of the palpal bulb (Figs. 15–17, 19). The following species have similar palpal bulbs to that of *T. magister* sp. n.: *Tetrablemma loebli* Bourne, 1980, *T. manggarai* Lehtinen, 1981, *T. marawula* Lehtinen, 1981, *T. mardionoi* Lehtinen, 1981, and *T. phulchoki* Lehtinen, 1981. However, *T. magister* sp. n. can be distinguished from *T. loebli* by a different position of the eye group and by an unmodified metatarsus I (Fig. 20), from *T. manggarai* by an unmodified tibia I (Fig. 20), from *T. marawula* by a different position of the eye group and by a more box-like profile of the carapace in lateral view, from *T. mardionoi* by an unmodified tibia I and slightly curved tips of the cheliceral horns, and from *T. phulchoki* by a different position of the eye group and longer cheliceral horns (cf. Ono, 1982). Females of *T. magister* sp. n. are distinguished from most other *Tetrablemma* species by the rounded profile of the carapace in lateral view (Fig. 26). Females of *T. samoense* Marples, 1964 and *T. vietnamense* Lehtinen, 1981 have a similar profile of the carapace in lateral view, but *T. magister* sp. n. can be distinguished from *T. samoense* by the broader and more rounded preanal plate, and from *T. vietnamense* by its smaller size and lack of a dark spot in the genital area.

Description: Male: Measurements (n=1): Prosoma length 0.46, width 0.40, height 0.40. Opisthosoma length 0.64, width 0.50. Lengths of leg and palp segments:

	Fe	Pa	Ti	Mt	Ta	Total
Leg I	0.30	0.12	0.22	0.16	0.16	0.96
Leg II	0.24	0.12	0.20	0.14	0.16	0.86
Leg III	0.20	0.12	0.14	0.14	0.14	0.74
Leg IV	0.30	0.12	0.26	0.20	0.16	1.04
Palp	0.12	0.06	0.10	—	0.04	0.32

Colour in alcohol: Prosoma, chelicerae, and scuta of opisthosoma orange; palps and legs light orange, patellae lighter than other leg segments; spinnerets pale yellow; membranous areas white. **Carapace:** Strongly elevated in lateral view, box-like (Fig. 15); entirely covered with fine mosaic-like pattern; long hair behind eye group at posterior end of elevated part; hair-bearing tubercles along lateral borders (Figs. 15–17). **Eyes:** Four, arranged in compact group at posterior end of elevated part of carapace; PLE smaller than ALE (Figs. 15, 16). **Clypeus:** Steeply ascending; height approximately 3.5 diam. of ALE (Fig. 15). **Sternum and pleurae:** Sternum approximately as long as wide, covered with short hairs and fine mosaic-like sculpture; separating coxae IV by slightly more than their diameter; pleurae sclerotised, fused with carapace and sternum; hairs on sternum arising from small depressions (Fig. 17). **Labium:** Triangular, approximately twice as wide as long; separated from sternum (Fig. 17). **Chelicera:** Basal segment anteriorly with hump extending into long, straight horn with slightly curved tip (Figs. 15, 16, 18); base of hump with slightly wrinkled cuticle; cheliceral horn approximately 0.6 times as long as basal segment; typical thin transparent lamina on mesal margin of basal segment protecting tip of fang; fang with small teeth (Fig. 18). **Palp:** Cuticle

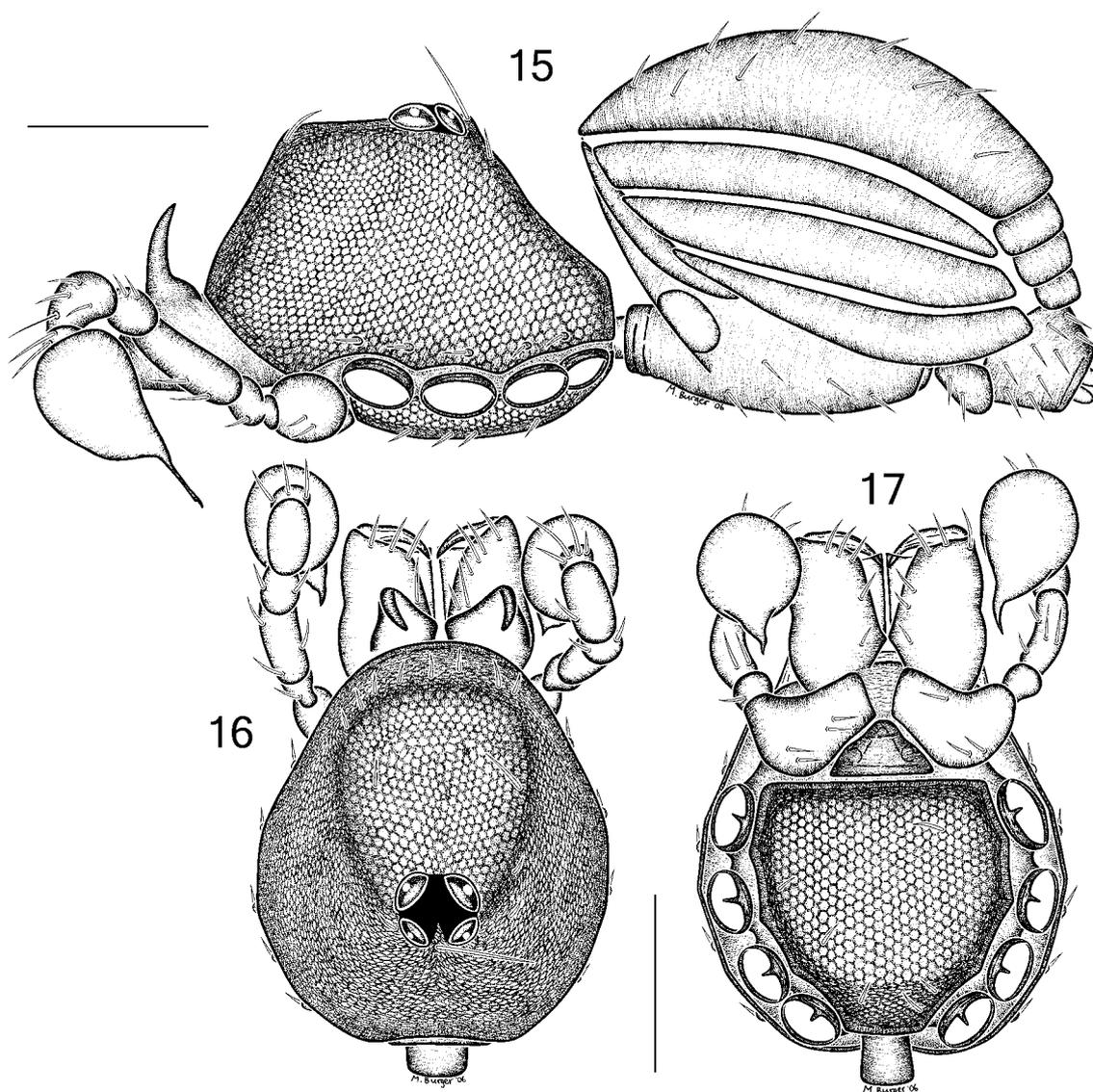
of femur partly squamous on retrolateral side; tibia slightly enlarged, with one trichobothrium dorsally near distal end; cymbium short, with few long hairs dorsally (Fig. 19). *Palpal bulb*: Pyriform, longish, with convoluted spermophor shining through cuticle of palpal bulb; thread-like embolus straight, with simple tip (Fig. 19). *Legs*: IV–I–II–III; femora with squamous cuticle and small teeth ventrally; patellae small; tibiae I–III with three trichobothria dorsally, tibia IV with four; metatarsi with one trichobothrium dorsally; two dentated tarsal claws (Figs. 20, 21). *Opisthosoma*: Ovoid; large sclerotised plate covering dorsal surface (Fig. 15); ventrally covered by four sclerotised plates (for ventral view of opisthosoma compare female, Fig. 22); large pulmonary plate with rounded anterior margin, surrounding pedicel and bearing simple book-lungs, followed posteriorly by short postgenital plate, broad preanal plate, and conical anal plate surrounding spinnerets; pulmonary plate with pits and slight furrows; anal plate with short median anterior process; two rows of few tiny perigenital plates ventrally, each bearing a hair, additional perigenital plates near postgenital plate; laterally with four pairs of

strap-like plates, most ventral pair very short, followed by three short strap-like posterior plates situated between dorsal plate and anal plate (Fig. 15).

Female: Similar to male. Only differences from male are described. *Measurements* ($n=1$): Prosoma length 0.48, width 0.38, height 0.38. Opisthosoma length 0.76, width 0.54. Lengths of palp and leg segments:

	Fe	Pa	Ti	Mt	Ta	Total
Leg I	0.32	0.12	0.24	0.16	0.18	1.02
Leg II	0.30	0.12	0.22	0.16	0.18	0.98
Leg III	0.24	0.12	0.20	0.16	0.16	0.88
Leg IV	0.38	0.12	0.30	0.22	0.20	1.22
Palp	0.08	0.03	0.04	—	0.08	0.23

Carapace: Rounded in lateral view; mosaic-like pattern different (Figs. 26, 27). *Eyes*: Situated anteriorly on carapace (Fig. 26); PLE farther apart, thus eyes appear arranged more in recurved transverse row rather than in compact group (Fig. 27). *Clypeus*: Shorter, height approximately 2.6 diam. of ALE (Fig. 26). *Labium*: Somewhat more rounded (Fig. 28). *Chelicera*: Cheliceral horn absent; hump reduced to small lateral



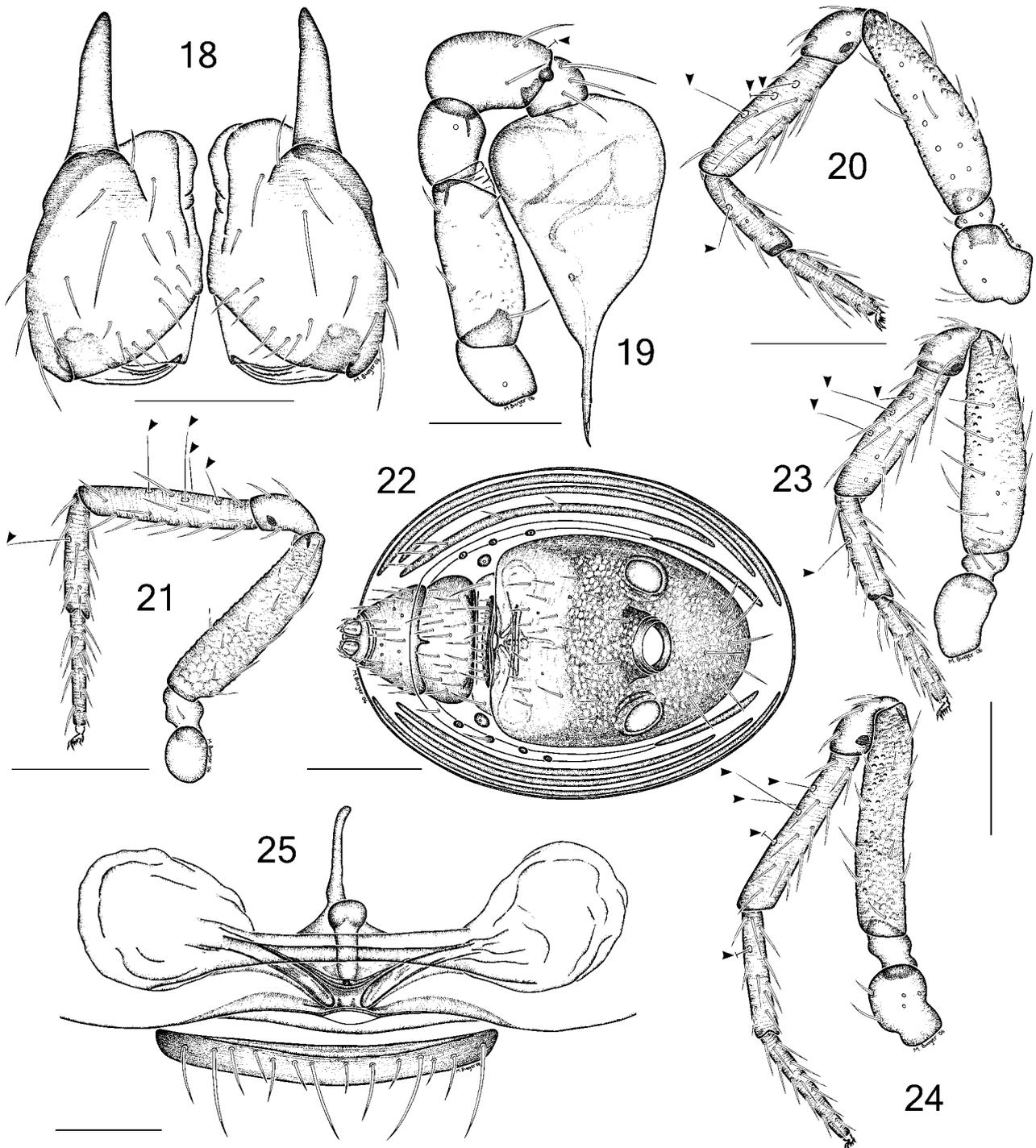
Figs. 15–17: *Tetrablemma magister* sp. n., male. **15** Lateral view, only some hairs shown; **16** Prosoma, dorsal view; **17** Prosoma, ventral view. Scale lines=0.2 mm.

knob (Fig. 27). *Legs*: Longer (Figs. 23, 24). *Opisthosoma*: Pulmonary plate with strong folds in genital region near posterior margin; anterior margin of preanal plate distinctly folded (Fig. 22). *Vulva*: Outlines of sclerotised parts shining through pulmonary plate (Fig. 22); single oval genital opening near posterior margin of pulmonary plate leading into paired sclerotised copulatory ducts; central vulval process bolt-like; inner vulval plate triangular with long thin central branch; sac-like receptacula with distinctly folded cuticle (Fig. 25).

Additional material examined: 5♂ 6♀, same data as holotype; 5♂ 8♀, Australia, Queensland, rainforest, 40 km N Daintree, 10 m., Cape Tribulation, leaf & log litter, 12 July 1982, leg. S. & J. Peck, deposited in AMNH.

Discussion

Cheliceral locking mechanisms (by apophyses or modified hairs) during copulation occur in different spider families, e.g. Scytodidae (Dabelow, 1958) or Pholcidae (Huber, 2002). Lehtinen (1981) suggested that

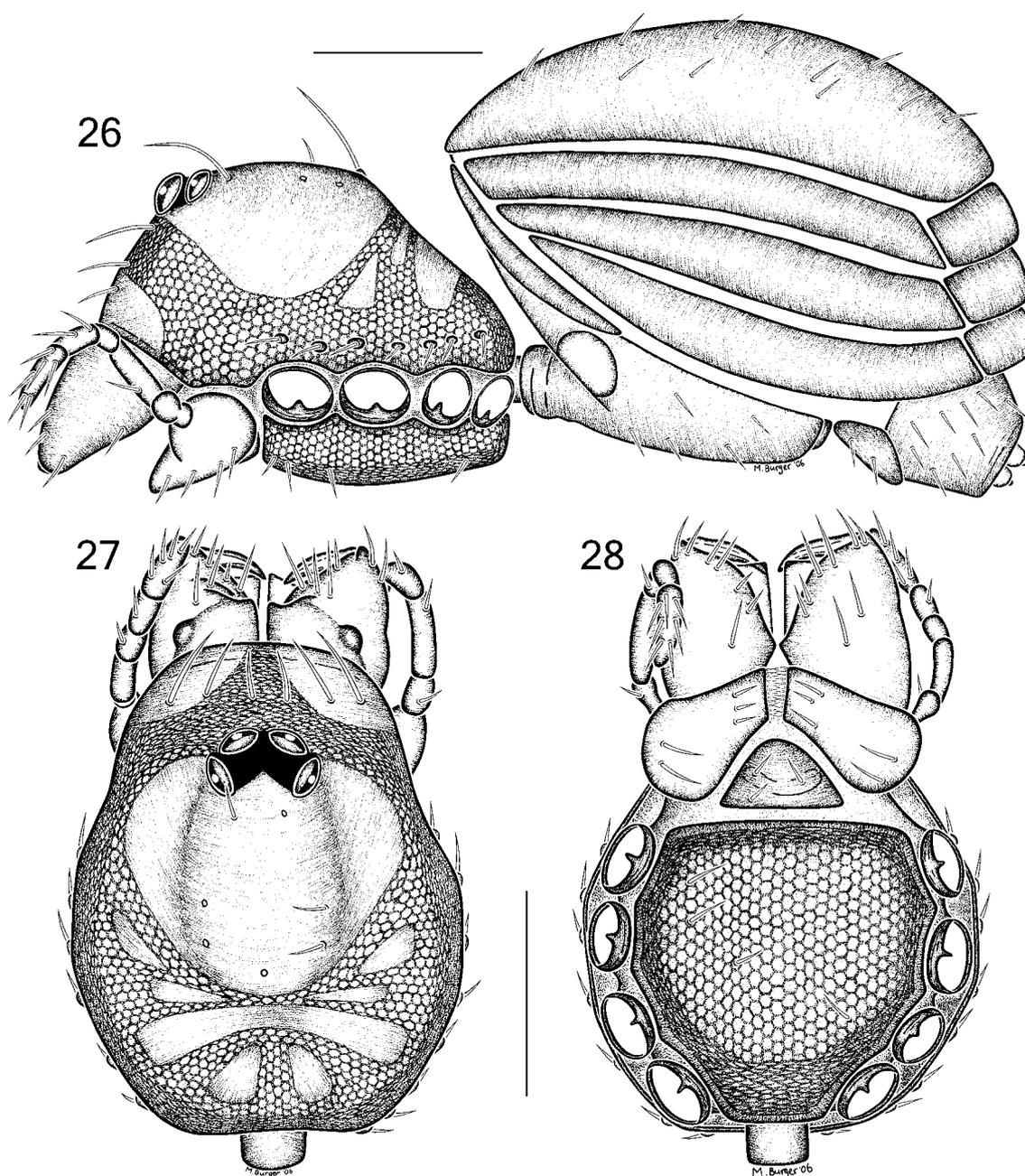


Figs. 18–25: *Tetrablemma magister* sp. n. **18** Male chelicerae, anterior view; **19** Male palp, retrolateral view; **20** Left leg I of male, retrolateral view; **21** Left leg IV of male, retrolateral view; **22** Female opisthosoma, ventral view; **23** Left leg I of female, retrolateral view; **24** Left leg IV of female, retrolateral view; **25** Vulva, ventral view. Arrowheads=trichobothria. Scale lines=0.1 mm (18, 19), 0.2 mm (20–24), 0.05 mm (25).

the apophyses on the male chelicerae of some tetrablemmids and the grooves on the preanal plate of females are sex-linked characters. This assumption was confirmed by the study of Burger *et al.* (2006), which represented the first documentation of the mating behaviour of a tetrablemmid species. In the copulatory position, the male of *Indicoblemma lanaiantum* is inverted and faces in the same direction as the female. He seizes the opisthosoma of the female with apophyses on his chelicerae, which fit exactly into grooves on her preanal plate, thus forming a locking mechanism (Burger *et al.*, 2006). Assuming that the copulatory positions of *Indicoblemma* and *Ablemma* are the same, the cheliceral apophyses in males of *Ablemma unicornis* sp. n. (Figs. 3, 4) and the grooves on the female's preanal plate (Fig. 8) probably have the same function.

Interestingly, there are some tetrablemmids in which the male has huge cheliceral apophyses whereas the female lacks corresponding grooves on the preanal plate (Burger, 2005). This is also the case in *Tetrablemma magister* sp. n. (Figs. 15, 16, 18, 22), and the large apophyses may be used by the male to grasp the female more firmly during copulation (Burger, 2005). However, the simultaneous absence of male cheliceral apophyses and female grooves in species such as *Singaporemma halongense* Lehtinen, 1981 seems to contradict this explanation. *Ablemma* species with a tooth on the carapace in males and a pit on the sternum in females may lock these structures during copulation (Lehtinen, 1981), which could also be the case in *A. unicornis* sp. n.

Males of *A. unicornis* sp. n. have tibial apophyses on their first legs (Fig. 6) which could be used by the male to



Figs. 26–28: *Tetrablemma magister* sp. n., female. **26** Lateral view, only some hairs shown; **27** Prosoma, dorsal view; **28** Prosoma, ventral view. Scale lines = 0.2 mm.

grasp the legs or chelicerae of the female in order to push her back and into the mating position before copulation, as occurs e.g. in theraphosids (Yanez *et al.*, 1999). Burger *et al.* (2006) showed that sometimes males of the tetrablemmid *Indicoblemma lannaianum* indeed push the females back before copulation, as in theraphosids, but then take up a different copulatory position. Males of some other tetrablemmid species also have apophyses on their metatarsi I (Lehtinen, 1981).

Another interesting leg modification in males of *A. unicornis* sp. n. is the swollen tarsus I with numerous tiny hairs on its ventral side (Fig. 6). Similar leg modifications have been reported in species of the genera *Ablemma*, *Borneomma* and *Brignoliella* (Deeleman-Reinhold, 1980; Lehtinen, 1981; Shear, 1988). The tiny hairs on the swollen tarsi I of males of *Brignoliella ratnapura* Shear, 1988 are specialised setae. Shear (1988) suggested that they might function as chemosensors. However, the hairs on the tarsi I of male *A. unicornis* sp. n. appear unspecialised. They seem to form some kind of scopula which could provide a better grip before or during mating. Males of *Monoblemma muchmorei* use their first legs to hold on to the female during copulation (Edwards & Edwards, 2006) unlike e.g. *Indicoblemma lannaianum* (Burger *et al.*, 2006).

Acknowledgements

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