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Revisions of Australian ground-hunting spiders: IV. The spider subfamily Diaprograptinae subfam. nov. (Araneomorphae: Miturgidae)

ROBERT J. RAVEN
Queensland Museum, PO Box 3300, South Brisbane, Queensland 4101, Australia. E-mail: Robert.Raven@qm.qld.gov.au

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Abstract

The newly recognised Diaprograptinae includes the Australian *Diaprograpta* Simon, 1909, *Eupograpta* gen. nov., *Mituliodon* Raven & Stumkat, 2003, *Mitzoruga* gen. nov., *Nuliodon* gen. nov., and the New Zealand *Zealoctenus* Forster & Wilton, 1973. All genera are unique in the Miturgidae *s. strict.* in the possession of claw tufts, and more equivocally, in the apical segment of the posterior lateral spinnerets, which in Diaprograptinae is not as strongly elongated as in *Miturga*. *Diaprograpta* includes the type species, *D. striola* Simon, 1909 from Western Australia, *D. hirsti* **sp. nov.** from South Australia, *D. alfredgodfreyi* **sp. nov.** from Victoria, *D. peterandrewsi* **sp. nov.** from western Queensland and *D. abrahamsae* **sp. nov.** from southeast Queensland. *Eupograpta* includes *E. kottae* **sp. nov.**, sympatric with *Diaprograpta striola* and *E. anhat* **sp. nov.**, from western Queensland. *Mitzoruga* gen. nov. is described to accommodate *Uliodon marmoreus* (Hogg, 1896), *M. insularis* **sp. nov.**, and *M. elapines* **sp. nov.**, from xeric regions of Australia. The genus presents a character combination which challenges the boundary between the Miturgidae Simon, 1886 and Zoridae F. O. P.-Cambridge, 1893. *Nuliodon* gen. nov. includes only *N. fishburni* **sp. nov.** from eastern Australia.

Key words: Zoridae, taxonomy, Australia, biodiversity, biogeography, distribution

Introduction

The Miturgidae Simon, 1886 are small to quite large, fast-moving, ground-hunting spiders that occur for the length and breadth of Australia. They are also reported from Africa, the Middle East and southern USA, Mexico to Argentina. The family has diversified strongly in Australia in xeric areas with the widespread, striped spiders of the genus *Miturga* Thorell, 1870 often the most conspicuous. Hence, they commonly feature in invertebrate pitfall trap surveys.

Our understanding of the relationships of the Miturgidae and, hence, the included genera have changed dramatically since Simon (1886) introduced the group name. Originally, the tribe included only *Miturga* but was later expanded to be included within the liocranine Clubionidae Wagner, 1887 (Simon 1897). However, that initial subfamily concept admitted the ctenid *Vulsor* Simon, 1889, and the zorid *Argoctenus* L. Koch, 1878, along with *Miturga*, *Prochora* Simon, 1886, and two eutichurine genera.

Lehtinen (1967) elevated the Miturgeae to family status but listed it within the Amaurobioidea, rather than the Lycosoidea. Lehtinen's Miturgidae included genera now listed in at least three other families, viz., the preoccupied Machadoniinae (= Griswoldiinae), Uliodoninae (mistakenly founded on *Mituliodon tarantulinus* (L. Koch, 1873), not the type species of *Uliodon* L. Koch, 1873), Tengellidae Dahl, 1908, Amaurobioidinae (now listed in the Anyphaenidae Bertkau, 1878), as well as the Eutichurinae Griswold (1993) made substantive changes to Lycosoidea, to which he transferred the Miturgidae and the elevation of the Tengellidae was supported. Further changes were made by Raven & Stumkat (2001, 2003), Silva (2003) and Raven & Stumkat (2005) through cladistic analyses. Of the miturgid subfamilies included by Lehtinen (1967), Raven & Stumkat (2005) transferred the Griswoldiinae with *Uliodon* and related genera to the Zoropsidae.

Through all, the position of the Eutichurinae has remained unsatisfactorally supported. Despite the absence of supporting cladistic analyses, genera related to *Cheiracanthium* C. L. Koch, 1839 in the subfamily Eutichurinae, are currently listed in the Miturgidae (Platnick 2008). That grouping is here not followed because the two published cladograms which include the Miturgidae (*s. strict.*), Clubionidae and the Eutichurinae show that the Eutichurinae are more closely related to the Clubionidae than to the Miturgidae (Silva, 2003, Raven & Stumkat, 2005). A part of that confusion has lain in the distribution of the longer apical segment of the posterior lateral spinnerets, a character well-known in the Agelenidae C. L. Koch, 1837 and venoniine Lycosidae Sundevall, 1833 and substantially developed in the Hahniidae Bertkau, 1878 and Hersiliidae Thorell, 1870 (e.g., Raven *et al.* 2002). The miturgids treated here reflect the distribution of the short, domed segment of the posterior lateral spinnerets. “Miturgid genera used by Griswold *et al.* (1999) were transferred by Raven & Stumkat (2005) to the Zoropsidae Bertkau, 1882.

This study is one in a series of papers on the Australian Miturgidae and other fossorial families (e.g., Zoridae; Raven 2008). The concept of the Miturgidae was modified implicitly by the removal of taxa like

Amauropelma Raven, Stumkat and Gray , 2001, the separation of *Mituliodon tarantulinus* into a new monotypic genus (Raven & Stumkat 2003) and also by the description of the Australian Zoropsidae Bertkau, 1882 (Raven & Stumkat 2005). The other genera treated here have little previous history. Hogg (1896) described *Zora marmorea* Hogg, 1896 from Central Australia (now Northern Territory) which was later transferred by Rainbow (1911) to *Uliodon* along with other Australian species placed by L. Koch (1873) in *Zora* C. L. Koch, 1847. Raven & Stumkat (2003, 2005) dealt with the complexities of the species included in *Uliodon* but left *Zora marmorea* unplaced. It was originally thought that all genera of the Australian Miturgidae should be treated in one monograph. However, two genera (*Miturga* and a related new genus) were found to be far more diverse than expected and it was felt unwise to continue to delay the publication of these smaller genera while the generic revisions of those two genera progress. *Diaprograpta* Simon, 1909 was described for a single female from southwest Western Australia and has not been even reviewed since.

Materials and methods

Abbreviations are standard for the Araneae (e.g., Raven & Stumkat, 2005); in addition RCH, retrocoxal hymen, a pallid unsclerotised zone retrolaterally on coxa I, was introduced by Raven *et al.* (2002) wherein also is explained the distinction between setae, bristles and hair. Cheliceral dentition is given as 5P, 3R, meaning 5 teeth on the promargin and 3 on the retromargin. Measurements are given in millimetres. Leg measurements are given in the description as leg I: femur, patella, tibia, metatarsus (absent in palp), tarsus, total. Spine counts on lateral and ventral surfaces are dependant on the angle of viewing; hence, absolute differences in, for example, the ventral count on metatarsi III and IV should not be taken as significant as in some cases a ventrolateral spine may have been scored as lateral in one case and ventral in another. A male and female from the same locality are sought for the holotype and allotype, respectively; however, in some cases, specimens that are in better condition and hence better represent the taxon come from other localities. Juveniles collected with adults are assumed to be conspecific but are not considered paratypes here; they are included as an indication of activity and maturation periods. Co-ordinates are given in [] when the locality was not on the specimen label but determined by searching a gazetteer. Digital photographs were taken with a Nikon Coolpix 880 or Nikon Coolpix 5400, hand-held on the eyepiece of a Zeiss Stemi SV11 stereomicroscope, resolution being 3 and 5 megapixels respectively.

Abbreviations

Morphology (figures): acc. s, accesory spine; cond., conductor; cx. t, coxal thorns; d. set., distal erect setae; emb, embolus; m. a, median apophysis; RTA, retrolateral tibial apophysis; teg., tegulum; usc. unsclerotised part of RTA.

Localities: CP, Conservation Park; EP, Environmental Park; ppty, property; QM party, Queensland Museum Terrestrial Biodiversity staff; SF, State Forest.

Museums: BMNH, Natural History Museum, London; QM, Queensland Museum, Brisbane; WAM, Western Australian Museum, Perth; SAMA, South Australian Museum, Adelaide; NMV, Melbourne Museum, Melbourne; AMS, Australian Museum, Sydney; ZMB, Museum für Naturkunde, Berlin.

Taxonomy

Family Miturgidae Simon, 1886

Miturgini Simon, 1886: 373.
Miturgeae: Simon, 1897: 125.
Miturgidae: Lehtinen, 1967: 315, 316; Raven & Stumkat 2003: 105.

Diagnosis (following Raven & Stumkat 2003): Two-clawed lycosoid spiders with grate-shaped tapetum (Fig. 14a, inset) and RTA of male with unsclerotised portion (e.g., Figs. 6c, 14e). Eyes in two rows with posterior row slightly procurved to recurved (e.g., Fig 1c). Male pedal tibiae without basal fracture zone.

Remarks: This diagnosis specifically excludes *Cheiracanthium* and other Eutichurinae which do not have a grate-shaped tapetum or the unsclerotised section of the RTA; the Eutichurinae are considered more closely related to the Clubionidae (see Introduction).

Until version 8.5 of the Platnick catalog of spiders of the world, the year of creation of the Miturgini was considered to be 1885 but has since been corrected to 1886 (Platnick, 2008).

Key to the subfamilies of the Miturgidae

1 Paired movable claw tufts (Figs 14i, 17g) present on tarsi..... Diaprograptinae **subfam. nov.**
- Only scopula extensions below tarsal claws..... Miturginae

Subfamily Miturginae Simon, 1886

Miturgini Simon, 1886: 373.
Miturgeae: Simon, 1897: 125.
Miturginae: Raven & Stumkat, 2003: 110.

Diagnosis. Miturgidae with strong leg scopulae but without true claw tufts; cymbium elongate with little or no groove or comb retrolaterally; cymbium face partially "closed" (see Remarks below).

Included genera. *Miturga* Thorell, 1870, *Prochora* Simon, 1886, *Syrisca* Simon, 1886, *Syspira* Simon, 1895, *Teminius* Keyserling, 1887.

Distribution. Australia (*Miturga*), Middle East and Sicily (*Prochora*), USA to Mexico (*Syspira*), South America and Africa (*Syrisca)*, USA to Argentina (*Teminius*) (Platnick 2008).

Remarks. The cymbia of all *Miturga* species (as well as in *Prochora* and *Teminius*; pers. obs.) are narrow but when the male palp is cut at the femur–trochanter joint and palp is laid with its ventral surface uppermost and the cymbium is rotated to be widest in ventral view, the femur is directed ectally rather parallel and in line with the cymbium. Hence, in resting position, the cymbium is slightly rotated to the midline or "closed"; I have not seen this character outside the Miturginae and the condition is not evident in the Diaprograptinae subfam. nov. The absence of claw tufts is considered the synapomorphy of the subfamily as claw tufts are widely present in the Lycosoidea (Griswold 1993; Silva 2003) as well as Dionychini closely related to the Miturgidae, e.g., Zoridae, Zoropsidae, Clubionidae, Eutichurinae.

Mention of the genus *Miturga* in New Zealand by Forster (e.g., Forster & Forster 1999) in fact referred to the zoropsid *Uliodon* (see Raven & Stumkat 2003).

The genera *Syspira* and *Syrsica* are nominally included following Platnick (2008). However, the type species of *Syspira*, *S. tigrina* Simon, 1895, is represented only by a female; equally, the type species of *Syrisca*, *S. pictilis* Simon, 1886, is represented only by a juvenile. Hence, the diagnostic character of the Miturgidae cannot be confirmed for either genus. Neither genus has been reviewed but in view of the occurrence of species referred to both genera in the synonymy of *Teminius insularis* Lucas, 1857, I suggest that *Syspira* and *Syrsica* may not be valid.

Subfamily Diaprograptinae subfam. nov.

Diagnosis. Differs from Miturginae in having true claw tufts (Fig. 14i) and weak leg scopula; males have a broader cymbium with a distinct to extensive comb of thick curved bristles retrolaterally (Figs 4c, d).

Description. Two claws with true claw tufts (Fig. 14i); eight eyes in two recurved rows (Fig. 14a); tapetum grate-shaped (Fig. 14a, inset); weak spines on tibiae I, II; males lack tibial suture; male palp with RTA bearing unsclerotised area (Fig 11a), bulb complex with conductor and median apophysis but no interlocking tegular lobes, cymbium broad, "open" with weak (*Nuliodon* gen. nov.) to strong (all other genera, except *Zealoctenus* Forster & Wilton, 1973 for which males are unknown) retrolateral groove with long curved bristles; spinnerets set close together, ALS and PLS of similar size, apical segment of PLS short, conical (Fig. 8c); spigots only apical on PMS of females; scopula distinct on metatarsi and tarsi I, II.

Type genus. *Diaprograpta* Simon, 1909.

Genera included. *Diaprograpta*; *Eupograpta* gen. nov., *Mituliodon* Raven & Stumkat, 2003, *Mitzoruga* gen. nov., *Nuliodon* gen. nov., *Zealoctenus* Forster & Wilton, 1973.

Distribution and habitat. Australia (most genera) and New Zealand (*Zealoctenus*).

Remarks. This diagnosis includes all true claw-tufted genera in a single subfamily. Although the short PLS (e.g., Fig. 1d) separate the Diaprograptinae from *Miturga lineata* Thorell, 1870 and a number of other species placed in *Miturga*, many species of *Miturga* (e.g., *M. agelenina* Simon, 1909) also have short PLS with a short apical segment. Raven & Stumkat (2005) included *Miturga*, *Mituliodon*, and *Diaprograpta* in a cladogram focusing on the Zoropsidae. *Mituliodon* was part of a trichotomy with Zoridae–(*Miturga–Diaprograpta*).

Silva (2003) noted in character 95, spination of the female palpal tarsus: "... State 4 refers to ventral spines (e.g., fig. 28a), such as those among the amaurobiids, cycloctenids, and senoculids. ..." However, that character state (4) is present in females of all the taxa examined here for which females are known (none of which were in Silva's (2003) data set).

A character not previously noted in lycosoids is found here but requires better surveying to establish its significance. In many lycosoids there is a very long seta dorsally on the basal and distal pedal patellae (e.g. Fig. 14j) and tibiae.

Key to genera of Diaprograptinae

Males

1. Retrolateral cymbial margin with long groove and long curved bristles (Figs 3b, 4c) 2
- Retrolateral cymbial margin with short groove confined to basal half (Fig. 21a); eastern Australia ..... *Nuliodon fishburni* gen. and **sp. nov.**
2. Conductor extensive, cymbium broad, flattened (Raven & Stumkat 2003, figs 5, 9) ..... *Mituliodon tarantulinus*
- Conductor small, concealed (Fig. 17c) and cymbium rounded, leaf-like (Fig. 14b) 3
3. Cymbium apically with two rows of thickened setae extending from ventral face onto dorsum (Fig. 17e) ..... *Mitzoruga* **gen. nov.**
- Cymbium apically without enlarged setae 4
4. Tibial apophysis (RTA) large, spiralled (Figs 10a, 11a) ..... *Eupograpta* **gen. nov.**
- Tibial apophysis a basal transverse scoop or trianguloid process (Figs 3a, 4c, 5a, 6c, 7a) ..... *Diaprograpta*

Females

1. Abdomen dorsally with stripes (Figs 1a, 2, 8a, 11b, 14g) 2
- Abdomen dorsally entirely grey or mottled without stripes (Fig. 22a) 4
2. Epigyne with median septum isolated widely from lateral ridges (Figs 12a, 13b) ..... *Eupograpta* **gen. nov.**
- Epigyne without median septum (Figs 1e, 9a) or with lateral lobes closely adpressed (Figs 16a, 18a, 20a) 3
3. Epigyne with median lobe not extending to epigynal fold (Figs 1e, 9a) ..... *Diaprograpta*
- Epigyne without median lobe but median septum (Figs 16a, 18a, 20a .....)*Mitzoruga* **gen. nov.**
4. Medium-sized (carapace length 5–6 mm) spiders with black field and paired white spots or lines on ventral abdomen ..... *Mituliodon tarantulinus*
- Small (carapace length, *ca*. 2–3 mm) grey spiders with mottled abdominal venter (Fig. 22g) ..... *Nuliodon fishburni* gen. and **sp. nov.**

Diaprograpta Simon, 1909

Diaprograpta Simon, 1909: 174; Roewer 1955: 509; Lehtinen 1967: 228.

Diagnosis. Females differ from those of *Eupograpta* gen. nov. only in the characters of the epigyne which is short and wide with a broad rectanguloid scape (Figs 1e, 8d, 9a) and closely abutted lateral lobes. Females differ from those of *Mitzoruga* gen. nov. in having the broad elevated epigynal scape (Figs 1e, 8d, 9a). Males differ from those of *Eupograpta* gen. nov. in the RTA being a broad scoop, rather than a twisted spiral (Fig. 3a, 6c). Females differ from *Zealoctenus* only in the position of the eyes in which the AME are lowest and the anterior row is recurved in anterior view.

Type species. *Diaprograpta striola* Simon, 1909, by monotypy.

Included pecies. *Diaprograpta striola* Simon, 1909, *D. abrahamsae* **sp. nov.**, *D. alfredgodfreyi* **sp. nov.**, *D. hirsti* **sp. nov.**, *D. peterandrewsi* **sp. nov.**

Distribution (Fig. 25a)**.** Found near Winton (western Queensland), bayside Brisbane (southeast Queensland), near Adelaide (South Australia), northwestern Victoria and southwestern Western Australia. *Diaprograpta* is the rarest of the Australian miturgid genera represented by only one or two specimens for each of the new species. Despite intensive pitfall trapping over 12 months in a location in which one male (*Diaprograpta abrahamsae* **sp. nov.**) was taken, no further material was found. Judged by the below ground retreats of various species of *Miturga* (pers. obs.; S. Douglass pers. comm.), the most likely explanation is that the spiders of the genus *Diaprograpta* occupy existing cavities in the soil.

Remarks. *Diaprograpta* very closely resembles the monotypic New Zealand *Zealoctenus* which is known only from one female. Raven & Stumkat (2003) suggested that the monotypic *Zealoctenus* may be a synonym of *Diaprograpta*. However, the epigyne and spermathecae of *Zealoctenus* (Forster & Wilton 1973, figs 1039–1041) suggest the genus is distinct.

Of the five species included in *Diaprograpta*, three are known from a single male and the type species in known only from females; only *D. peterandrewsi* **sp. nov.**, is known from both sexes.

Diaprograpta striola Simon, 1909
(Figs 1a–f, 25a)

Diaprograpta striola Simon, 1909: 175. Roewer 1955: 509; Moritz & Fischer 1988: 132.

Material examined. ***Holotype*.** Female, Boorabbin, 31°13'45"S 120°09'42"E, Western Australia, Stn. 95, Michaelsen & Hartmeyer (ZMB 28230).

Other material. Australia: ***Western Australia*:** 3 females, Boorabbin, 31°15'S 120°04'E, July 1980, W. F. Humphreys et al., WA Goldfields survey, BNR 1, Callitris heath isolate (WAM 97/186–88); 1 female, [1j], Buningonia Spring, 31°21'20"S 123°36'10"E, August 1980, W. F. Humphreys, WA Goldfields survey, BSR 1, samphire, spinifex burn (WAM 98/1678, 1679).

Diagnosis. Females differ from those of *D. peterandrewsi* **sp. nov.** in the more rounded epigynal septum and the block-like spermathecae (Fig. 1f). Males unknown.

Description. Female (WAM 97/186)

Carapace 2.88 long, 2.31 wide. Abdomen 5.00 long, 2.88 wide. Total length 8.4. *Colour.* Carapace fawn with dark black stripes from each PLE down carapace; broken black areas along carapace margins. Abdomen dorsally with white narrow dagger-like area anteriorly, with fine black borders, converging and continuing at mid-length. Abdomen dorsally generally light grey (Fig. 1a); two narrow lines from long “V alongside median “V; two broad irregular bands for length of abdomen, lateral margins mottled. Legs not banded. Abdomen ventrally (Fig. 1b) pale grey with symmetrical pattern of darker marks in medial “V and laterally mottled. *Carapace*. Hairs more densely spaced on thoracic region than on cephalica. Cephalic region well

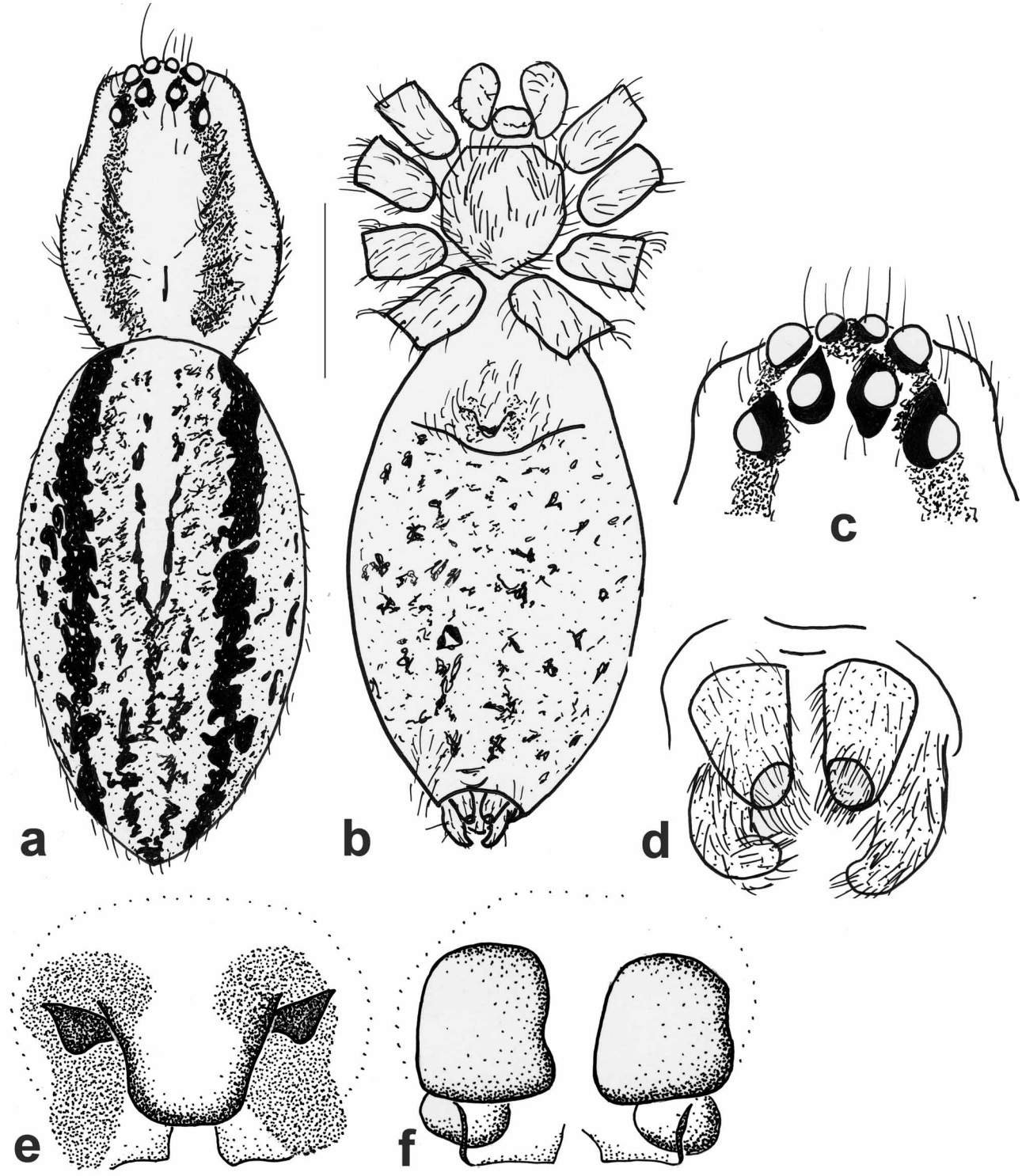

FIGURE. 1. *Diaprograpta striola* Simon, WAM 97/187, female: a, b, carapace and abdomen, dorsal (a) and ventral (b) views; c, eyes, dorsal view; d, spinnerets, ventral view; e, f, epigyne, external (e) and internal (f) view. Scale line: a, b, 1mm; c, 0.5mm; d–f, 0.25mm.

defined, ALE clearly larger than AME. *Labium*. About as long as wide with symmetrical sinusoidal ridge basally at constriction, ridge more sclerotised on outer edges. *Maxillae*. Short, narrower basally but cylindrical, with groove extending from point of labium ridge parallel to posterior edge to *ca*. 0.4 of maxillae. *Sternum*. Cordate with intercoxal corners. Trochanters deeply notched. *Scopula*. All leg tarsi with scopula of

long setae, not so dense as to obscure cuticle, that on IV divided with band of 2 lines of setae. Metatarsi, full for I, II, thinner basally; distal two-thirds of III, IV and in 3 bands, pro- and retroventral and ventral. None on palp. *Legs*. I: 2.50, 1.38, 1.88, 1.50, 1.07, 8.31. II: 2.13, 1.19, 1.69, 1.56, 1.00, 7.56. III: 2.38, 1.00, 1.81, 1.56, 0.69. IV: 3.06, 1.19, 2.63, 2.69, 0.81, 10.38. Palp: 1.06, 0.63, 0.56, –, 1.00, 3.25. *Claws*. IV with 2 small teeth; I with 3–4; 6 on palpal claw. Tufts with dense pads not obviously separated. *Spines*. I: fe p2d2; pa0; ti v2.2; me v2 not strong. II: fe p2d2; pa0; ti v1.1; me v2. III: fe p2d3r1; pa0; ti p2r2v2.2 (or v1.2.2 weak); me p2r1v2.1. IV: fe p1d3r1; ti p2d2r2v1.2.2; me p5r5v3.1. Palp: fe d1.2; pa p1 d1 + apical 1; ti p3r2; ta p3r3 v2 apical. *Spinnerets* (Fig. 1d). Closely set; ALS *ca*. length of PLS; ALS tip domed, PLS longer, triangular. PMS & PLS appear to have large spigots, PMS with small spigot. *Epigyne* (Fig. 1e). Externally a medial triangular broad septum with lateral "wings".

Male. Unknown.

Distribution and Habitat. Known only from the southwest of the Western Australian Goldfields at Boorabbin and Buningonia Springs, an area of spinifex and heath.

***Diaprograpta abrahamsae* sp. nov.**
(Figs 2, 3a, b, 25a, 26b)

Material examined. *Holotype*. Male, Chelsea Rd Bushlands Reserve, 27°29.0'S 153°11.3'E, Queensland, 21 March–29 April 2004, pitfall traps, QM party, coastal ironbark open forest, alt. 15m (QM S68839).

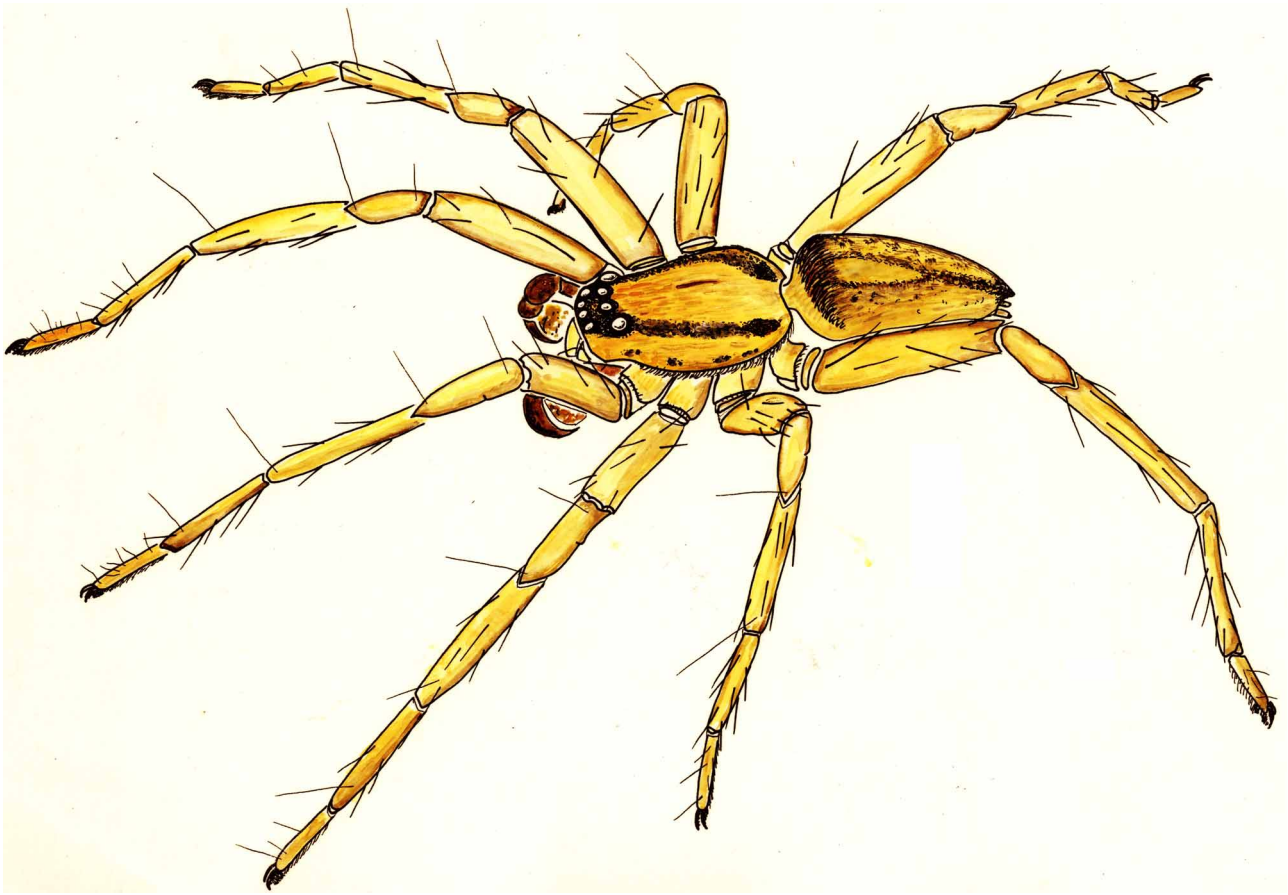

FIGURE 2. *Diaprograpta abrahamsae* **sp. nov.**, holotype male: habitus (illustration by B. Baehr).

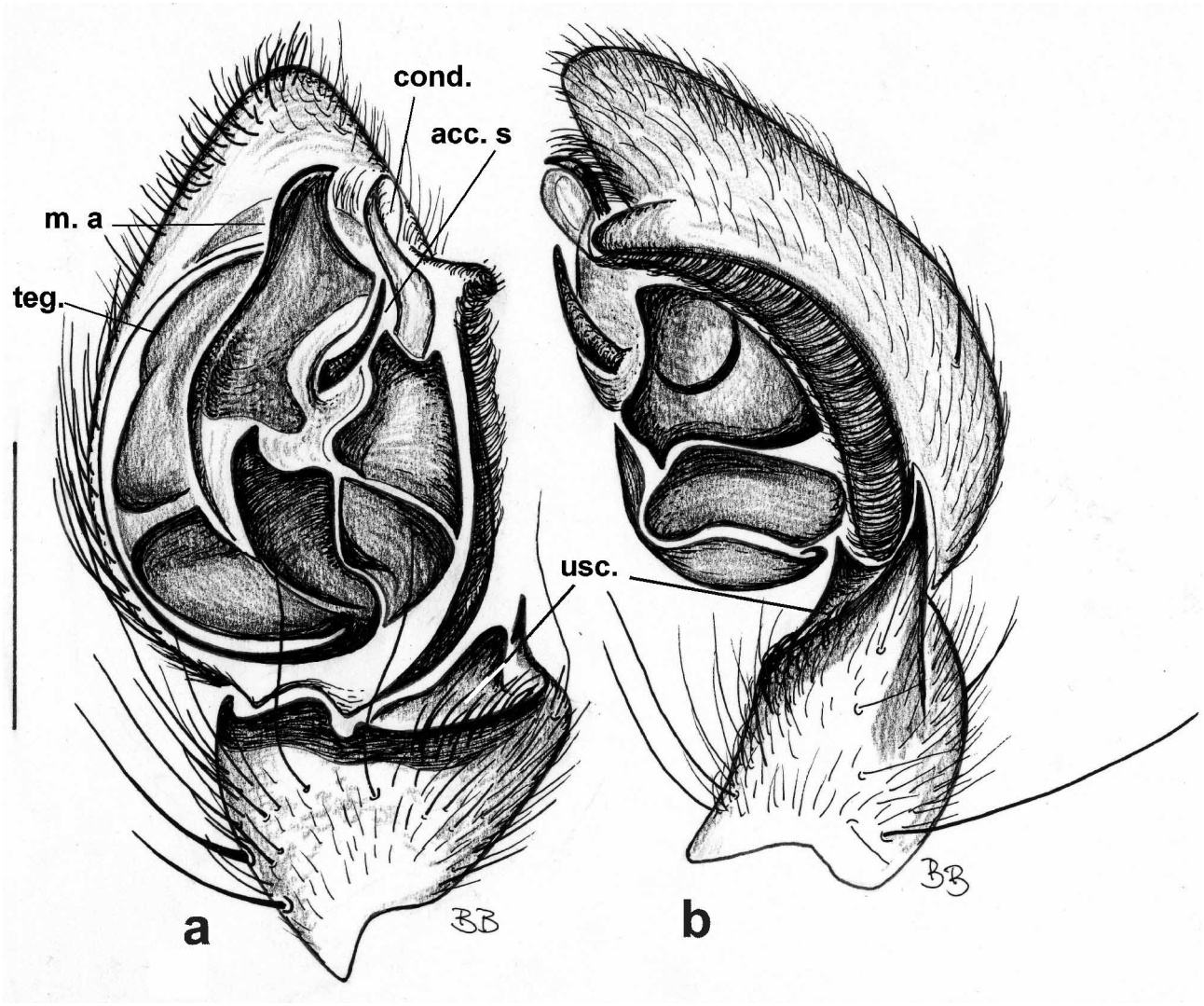

FIGURE 3. *Diaprograpta abrahamsae* **sp. nov.**, holotype male, palpal tibia, cymbium and bulb: a, ventral view; b, tibia and cymbium, retrolateral view. Scale line: 0.5mm.

Diagnosis Male differs from those of all other species by the broad, hooked and trianguloid median apophysis (Fig. 3a); females unknown.

Etymology. The species epithet is in honour of Cr Helen Abrahams, Brisbane City Council, for her support of invertebrate studies in the Brisbane region.

Description. Male (holotype, QM S68839)

Colour (Fig 2). Carapace (separated from underlying muscle) fawn with faint grey shadows from each PLE down carapace, with black spots along carapace edge and 1 large irregular black area at posterior margins; legs not banded. Abdomen dorsally pallid with two long broken medial stripes of dark spots; ventrally fawn with few black spots forming no pattern. *Eyes*. PLE=ALE=PME>>AME. *Chelicerae*: 2R, 3P. *Legs*. I: 2.78, 1.53, 2.88, 2.69, 1.69, 11.57. II: 2.72, 1.19, 2.53, 2.25, 1.44, 10.13. III: 2.38, 1.03, 2.13, 2.00, 1.44, 8.98. IV: 3.41, 1.19, 3.09, 3.47, 1.44, 12.60. Palp: 1.13, 0.56, 0.25, –, 0.75, 2.69. *Spines*: none on patellae. I and II: fe p3d2r2 large; ti p2r2v2.2.2w; me v2.2 long weak. III: fe pv1p1d3r3; ti p2d2.1r2v2.2.2; me p2.1r1.1.1v2.2.1. IV: fe pv1p2d3r3; ti p2d2.1r2v2.2.2; me p1.1.2r2.1.1.2v2.2.1. Palp: fe p1d1.2; pa p1 weak d1 apical; ti p3w. *Scopula*: absent on tibiae; long hairs thin but distinct for distal two-thirds of metatarsi I, half of metatarsi II, sparse and narrow on metatarsi III, IV; moderately dense, entire on tarsi I, II, divided on III, IV. *Palp* (Figs 3a, b). Tibia barrel-shaped, smaller than large RTA; RTA a deeply hollowed semicircular scoop,

medially bisected by high sclerotised "blade" forming bifid apex with point of RTA. Cymbium lacks apical scopula, promargin with long hairs. Bulb: embolus origin basal, long, trilobate and recurves back from retrobasal corner. Median apophysis basally wide, long, twisted with unsclerotised retrodistal edge and apically scooped long thick accessory spine emerges from retrolateral base of median apophysis.

Female. Unknown.

Distribution and Habitat. Known only from red soils in an area of long dense grass in a coastal ironbark open forest in Chelsea (Fig. 26b), a bushland bayside suburb of Brisbane. The male was taken in one of 10 pitfall traps that were set effectively for 14 months. Subsequent pitfall trapping at that location for two years yielded no more material, not even juveniles. This failure may be result of a combination of their claw-tufted morphology and their rarity. (Presumably, the claw-tufts reduce, but do not eliminate, the possibility of the spiders falling into pitfall traps. Collector notes on field labels of similarly-sized *Miturga* of Valerie Davies, former QM curator, describe deep large burrows formed by water flowing through the ground. These spiders may also occupy such “burrows.

This is the most easterly species of the genus, an otherwise xeric-loving group, and the species most remote from its nearest congener and most divergent in its habitat.

***Diaprograpta alfredgodfreyi* sp. nov.**
(Figs 4a–d, 25a)

Material examined. *Holotype*. Male, 13.6 km NW Lascelles, 35°33'S 142°28'E, Victoria, May 1986, A. L. Yen (NMV K4794), drift fence, site 41.

Diagnosis. The male differs from that of *D. hirsti* **sp. nov.** in the narrowly folded median apophysis (Fig. 4a), a less extensive comb on the retrolateral cymbium and the unequally bifurcate tip of the RTA and from *D. striola* in the weaker markings dorsally on the abdomen.

Etymology. In honour of Alfred Lewis Godfrey (1903–2001), inaugural Secretary of the Conservation Council of Victoria, in recognition of his contributions to the environment.

Description. Male (holotype NMV K4794)

Carapace 2.47 long, 1.97 wide. Abdomen 3.50 long, 1.63 wide. Total length, 6. Like *D. striola* except: *Colour.* Carapace fawn with light brown shadows from each PLE to posterior carapace edge; 3 or 4 small black areas along margins of carapace; legs not banded. Abdomen dorsally pallid with small dark areas weakly forming two long medial stripes joining just past midpoint, and weaker still two stripes lateral of that; ventrally pallid with black spots forming no pattern. A small stripe down each chelicera for dorsal half. *Carapace*. Laterally ruptured. Bristle bases only evident dorsally. *Eyes*. PLE=ALE>PME>>AME. *Chelicerae*. Dentition: 2R, 3P. *Legs*. 1: 2.09, 1.00, 2.09, 1.88, 1.28, 8.34. 2: 2.03, 0.94, 1.91, 1.91, 1.16, 7.82. 3: 2.06, 0.88, 1.66, 1.63, 0.94, 7.17. 4: 2.88, 0.97, 2.50, 2.97, 1.16, 10.48. Palp: 0.81, 0.31, 0.31, 0.97, 2.40. *Spines*. I: fe pv1p1d3r2; pa0; ti p2d1r2v2.2.2; me p1r1v2.2. II: fe pv1p2d3r3; pa0; ti p2d2r2v2.2.2; me p2r1v2.2. III: fe pv1p2d3r3; pa0; ti p2d2.1r2v2.2.2; me p1.2.1r1.2.1v2.2.1. IV: fe pv1p2d3r2; pa0; ti p2d2.1r2v2.2.2; me p1.2.2r2.1.1.2v2.2.1. Palp: fe p1d1.1.2r2; pa p1.1d1 apical; ti p1d1 v2 apical. *Scopula*. Long hairs thin but distinct for distal two-thirds of metatarsi I, half of metatarsi II–IV. Long hairs, moderately dense, entire on tarsi I–IV. Claw tufts small, dense, division evident in axial view, as high as claws. *Spinnerets*. ALS = PLS length but ALS thicker. PLS with slightly longer apical segment. *Palp* (Fig. 4). Patella squat, dorsal projection a sclerotised thumb, opposed to sclerotised black dorsal tibial edge. Tibia barrel-shaped, with large RTA; two sclerotised outer plates "sandwich" unsclerotised mid-zone. RTA (Figs 4c, d) a deeply hollowed, semicircular scoop: ventral edge a sharp sclerotised ridge; dorsal edge a thin scooped lamella and then distally a long, narrow, pointed groove forms outer corner of RTA. Cymbium narrow, canoe-like with weak apical scopula and fine erect bristles; retrolateral cymbium excavate with long groove and distal lobular process; groove is thick ridge and length of groove retromargin with dense line of short black bristles as comb; promargin of cymbium with long dense pallid hairs. *Bulb*. Embolus origin long, ovoid, almost transverse;

recurves back from retrobasal corner and tapers quickly to wire-like embolus emerging in long banana-like upcurved grooved conductor. Median apophysis long, twisted with unsclerotised retrodistal edge and apically a scooped diamond; long thick spine-like accessory process emerges adjacent to retrobasal median apophysis; no other division evident. Conductor a long, narrow, upcurved scoop with ventral face sclerotised and sweeping up into gap created by distal lobe of cymbial flange.

Female. Unknown.

Distribution and Habitat (Fig. 25a). Known only from mallee in western Victoria.

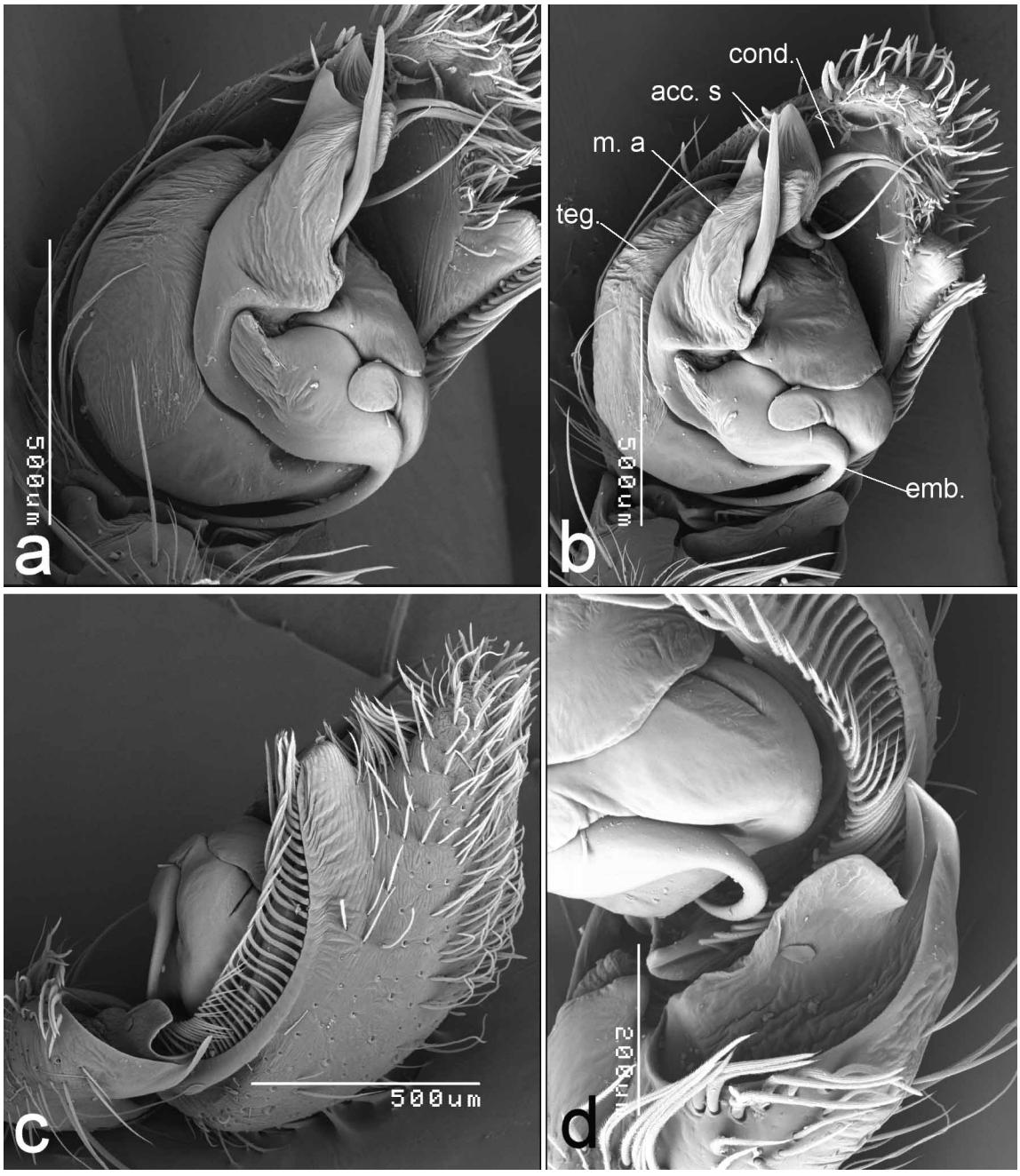

FIGURE 4. *Diaprograpta alfredgodfreyi* **sp. nov.**, holotype male, palpal tibia, cymbium and bulb: a, b, bulb, ventral views; c, tibia and cymbium, retrolateral view; d, RTA, retroventral view.

***Diaprograpta hirsti* sp. nov.**
(Figs 5a, b, 6a–c, 25a)

Material examined. *Holotype*. Male, Gum Lagoon, 36°17'S 140°02'E, South Australia, 26 March 1999, D. Hirst, vehicle vibration (SAMA NN6275).

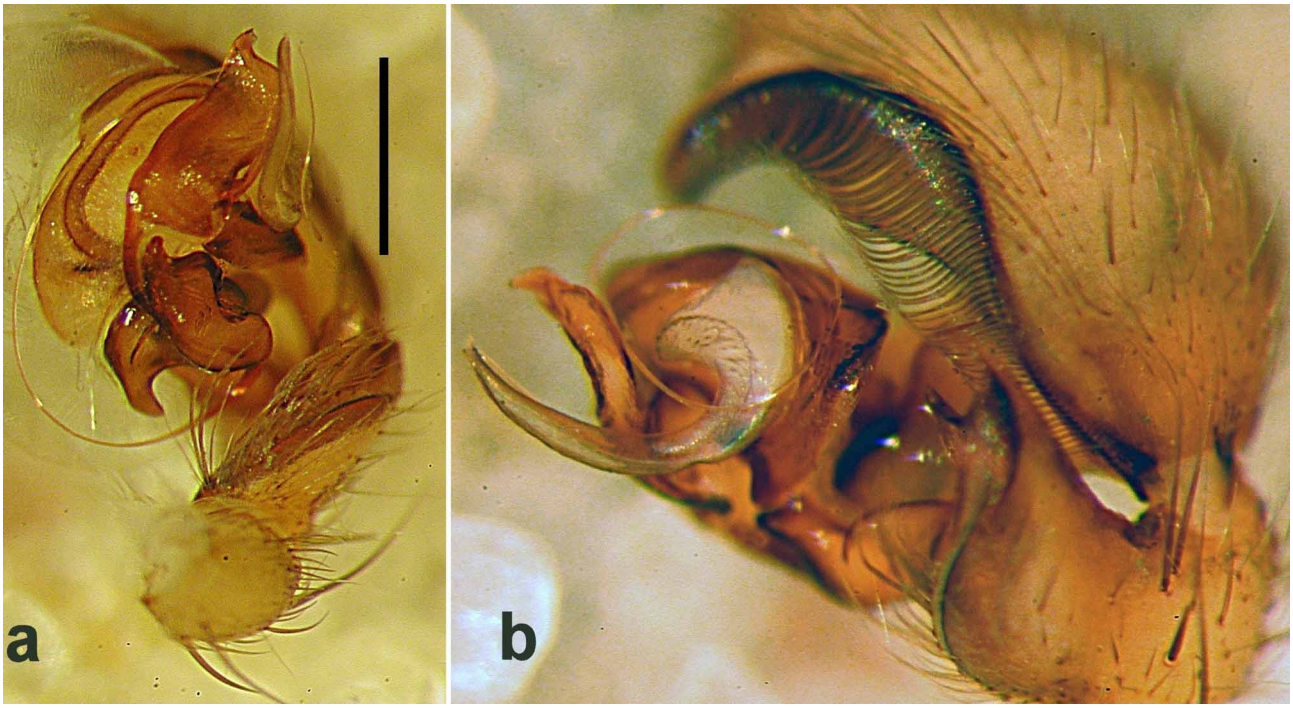

FIGURE 5. *Diaprograpta hirsti* **sp. nov.**, holotype male, palpal tibia, cymbium and bulb: a, bulb, ventral view; b, tibia, cymbium and bulb, retrolateral view. Scale line: 0.5mm.

Diagnosis. The male differs from that of *D. alfredgodfreyi* **sp. nov.** in the more extensive comb retrolaterally on cymbium and prolateral lobe on tegular margin (Figs 5, 6); differs from *D. striola* in presence of three dark spots on caput, more mottled lateral carapace, a median stripe on the abdomen and also PME=AME<ALE=PLE.

Etymology. In honour of David Hirst whose knowledge, interest and collection management skills have built the South Australian Museum spider holdings into a fine collection and whose published research on Australian Sparassidae, a ubiquitous and visually dominant group, is highly honoured but has only ever had limited funding.

Description. Male (holotype, SAMA NN6275)

Carapace 2.47 long, 1.94 wide. Abdomen 2.56 long, 1.41 wide. Total length, 5.2. *Colour.* Like *D. striola*. *Eyes*. PME=AME<ALE=PLE. *Chelicerae*. P3, R2. *Legs*: 1: 2.19, 1.00, 2.03, 1.84, 0.97, 8.03. 2: 1.91, 0.81, 1.69, 1.69, 0.97, 7.07. 3: 1.81, 0.94, 1.56, 1.47, 0.84, 6.62. 4: 2.81, 1.06, 2.47, 2.69, 1.03, 10.06. Palp: 0.81, 0.38, 0.38, 1.28, 2.85. *Spines.* I: fe p1d3; ti p2r2v2.2.2; me p1r1v2.2. II: fe p1.2d.1.1r1.1; ti p2d1r2v2.2.2; me p2r1v2.2. III: fe p1.2d3r3; ti p2d2.1r2v2.2.2; me p1.1.2r1.2.1v2.2.1. IV: fe p1.2d3r3; ti p2d2.1.r2v2.2.2; me p1.2.2r2.1.1.1v2.2.1. Palp: fe d1.1 or d 1.1.2; pa p1 d1w; ti p3d1. *Scopula*. Weak on tarsi I–IV; distal cluster on metatarsi I–III, absent on IV. *Palp*. (Bulb expanded, figs 5, 6.) Distal embolic edge deeply undulate; median apophysis rectanguloid with small hook on distal prolateral edge; tegular margin with prolateral lobe. RTA with large lateral expansion with sinuous dorsal scoop. Cymbium with long strong retrolateral comb of strong sinuous spines and ridge forming two distal lobes.

Female. Unknown.

Distribution and Habitat (Fig. 25a). Known only from Gum Lagoon, South Australia, an area of open heath on low rolling sand dunes.

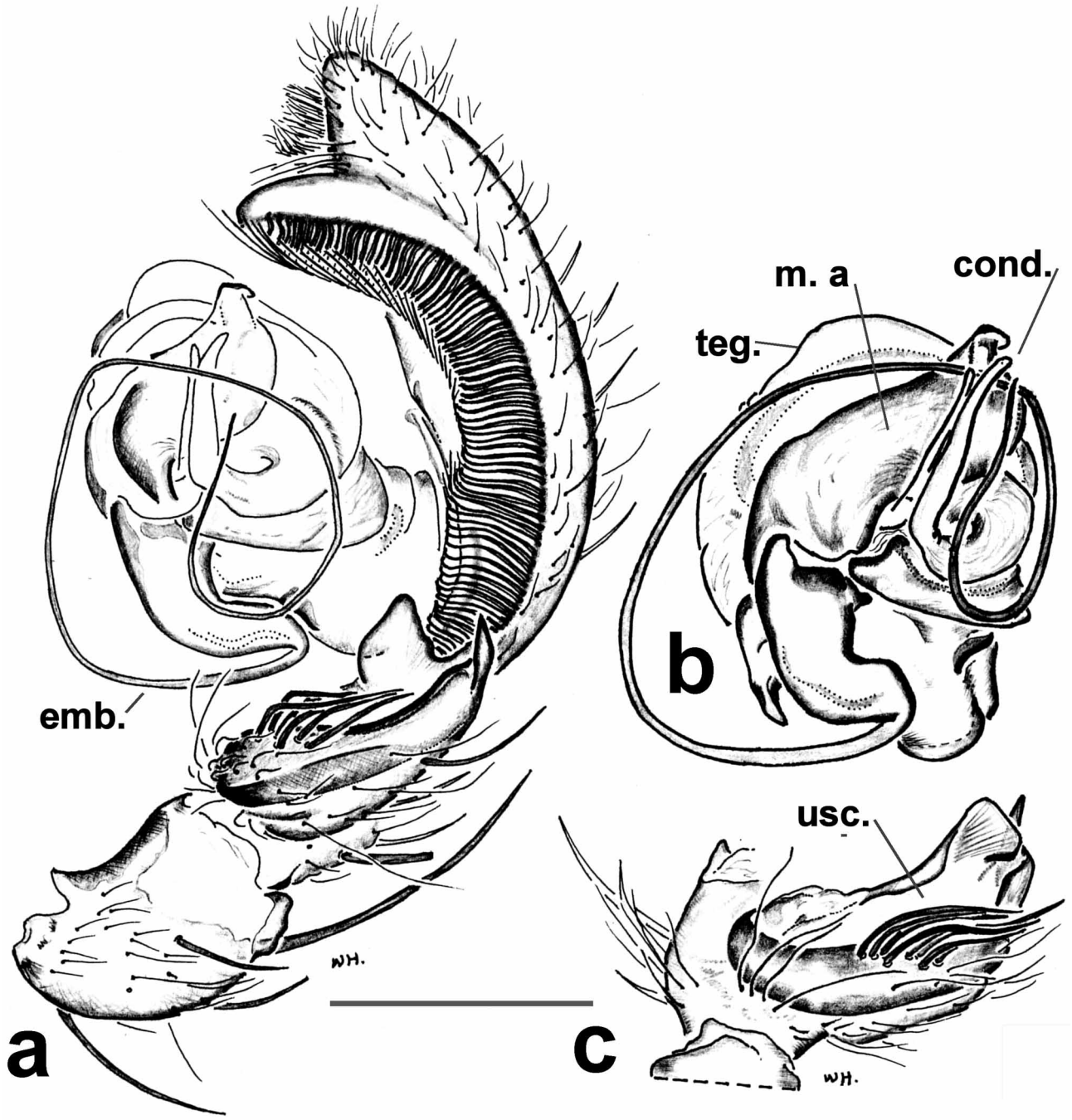

FIGURE 6. *Diaprograpta hirsti* **sp. nov.**, holotype male, palpal tibia, cymbium and bulb: a, palpal tibia, cymbium and bulb; b, bulb with median apophysis at widest; c, RTA, ventral view. Scale line: 0.5mm.

***Diaprograpta peterandrewsi* sp. nov.**
(Figs 7a, b, 8a–d, 9a, b, 25a, 26a)

Material examined. ***Holotype*.** Male, Allen Range, S of Winton, 22°35'15.6"S, 142°56'23.3"E, Queensland, 29 June–7 September 2006, R. Raven, B. Baehr, A. Amey (QM S76030), site G029, alt. 227m.

***Paratypes*.** Female allotype, Mt Cameron, Winton, 22°59'S 14233'E, Queensland, 15–28 May 1977, A. Rozefelds (QM S39453); 1 female, taken with allotype (QM S7295).

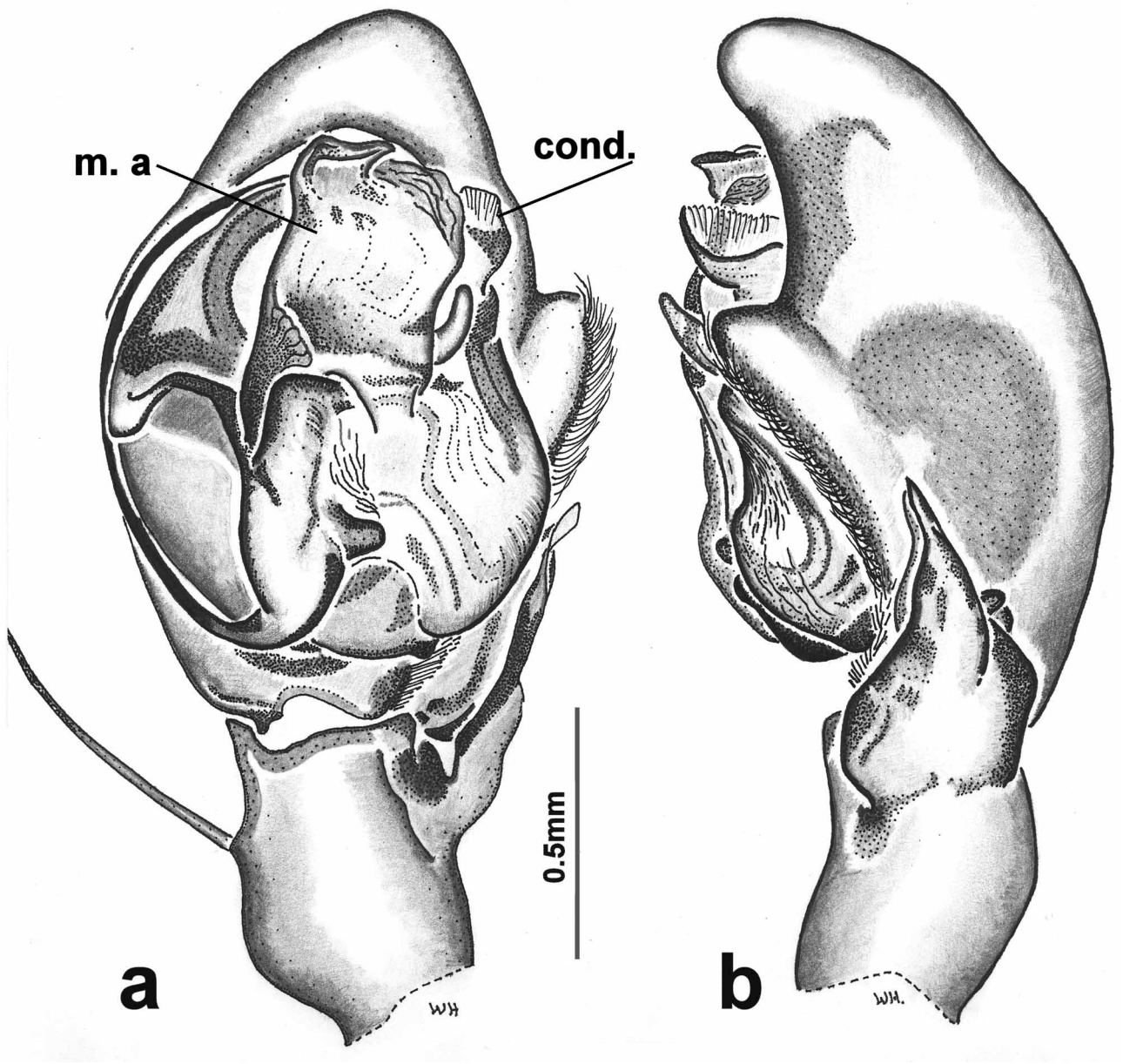

FIGURE 7. *Diaprograpta peterandrewsi* **sp. nov.**, holotype male, palpal tibia, cymbium and bulb: a, ventral view, b, retrolateral view.

Diagnosis. The male differs from that of *D. hirsti* **sp. nov.** in the longer tapering RTA (Fig. 7), smaller and less undulate embolic base and sharply folder hook of median apophysis. Females differ from those of *D. striola* in the more rectangular shape of the septum (Figs 8c, 9a) and the presence of a third pair of spines on tibiae I and II and in being bigger spiders.

Etymology. The specific epithet is a patronym in honour both of Mr Peter Andrews, in small recognition of his revolutionary approach to the Australian environment documented in his book, *Back from the Brink: how Australia's landscape can be saved* and epinomously for Dr Peter Andrews, Chief Scientist, Queensland Government, for his contribution to advancing scientific research in Queensland.

Description. Male (holotype, QM S76030)

Carapace 3.88 long, 2.94 wide. Abdomen 3.63 long, 2.50 wide. *Colour.* As for *D. striola*. *Spines*. One very long basal spine on dorsal femora 3, other dorsal femoral spines broken. Absent on leg patellae. I: fe pv1p1d1.1; ti p1v2.2.2; me p1v2.2. II: fe p3d4r1; ti p2v2.2.2; me p2v2.2. III: fe p2d3r3; ti p2d2r2v2.2.2; me p3d2r1.2.1v2.2.2. IV: fe p1d3r3; ti p2d2.1r2v2.2.2; me p2.1.2.2r2.1.1.2.2v2.2. Palp: fe pv1p1d1.1.2; pa p1; ti

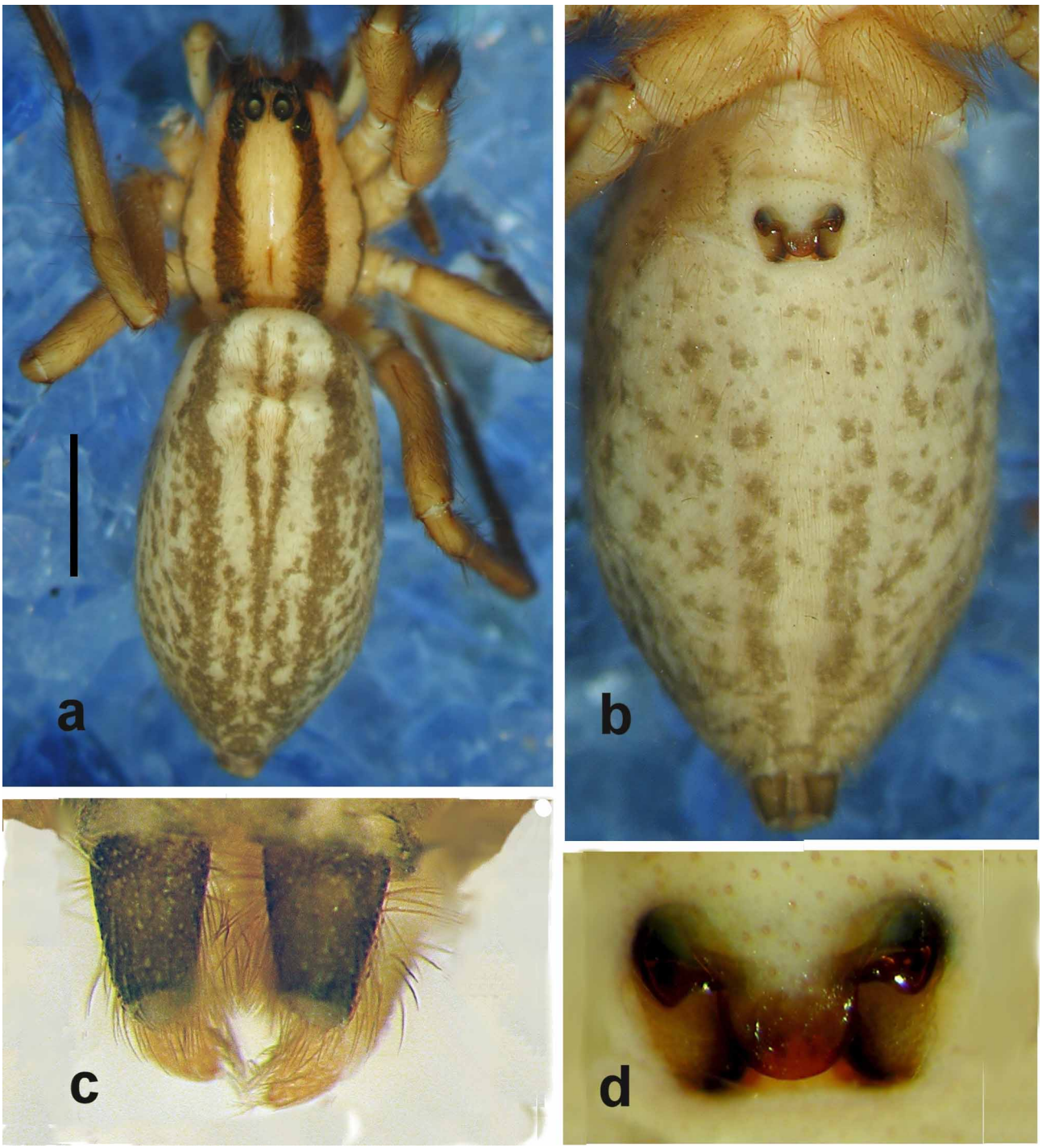

FIGURE 8. *Diaprograpta peterandrewsi* **sp. nov.**, allotype, female: a, b: carapace and abdomen, dorsal (a) and ventral (b) views; c, spinnerets, ventral view; d, epigyne, external view. Scale line: a, 2mm; b, 1.16mm; c; 0.5mm; d, 0.34mm.

p3. *Legs*. Very long dorsal seta on distal patellae and basal and distal on tibiae. I: 3.44, 1.56, 3.00, 2.63, 1.63, 12.25. II: 2.56, 1.38, 2.50, 2.56, 1.31, 10.31. III: 2.88, 1.25, 2.13, 2.56, 1.38, 9.56. IV: 4.06, 1.56, 3.56, 3.75, 1.56, 14.50. Palp: 1.50, 0.69, 0.63, –, 1.56, 4.38. *Scopula*. Light but distinct on leg tarsi through distal third of metatarsi I–IV. *Palp*. Patella with dorsodistal rounded process fitting into sclerotised notch on basal tibia. Tibia stout, ventrally dominated by glabrous "saddle", probasally incrassate, smaller than large RTA, prodistal edge with sclerotised trianguloid plate apically inserting into cymbium; RTA long, complex rolled or fluted into large trianguloid process, retrolateral face pallid, unsclerotised, dorsal edge with darkly sclerotised area terminating with upwardly directed (into side of cymbium) small sclerotised lobe, retroventral edge of tibia

adjacent to base of RTA a small sclerotised trianguloid lobe forming cleft with base of RTA. Cymbium lacks apical scopula, promargin with long bristles, with broad, strongly sclerotised deep groove retrobasally with line of closely curved dark bristles along upper edge extending from base for 0.6 length of cymbium; distal of groove along cymbial edge, a strong band of long curved hairs adpressed closely to the bulb; apex of cymbium almost absent. Bulb: embolus origin basal, almost on prolateral edge, long, clockwise to end above median apophysis. Median apophysis roughly rectanguloid, long, with large prodistal trianguloid keeled process, probasally with a diagonal groove, retrobasally with digitiform lobe arising from dorsal face. Tegulum broadly domed.

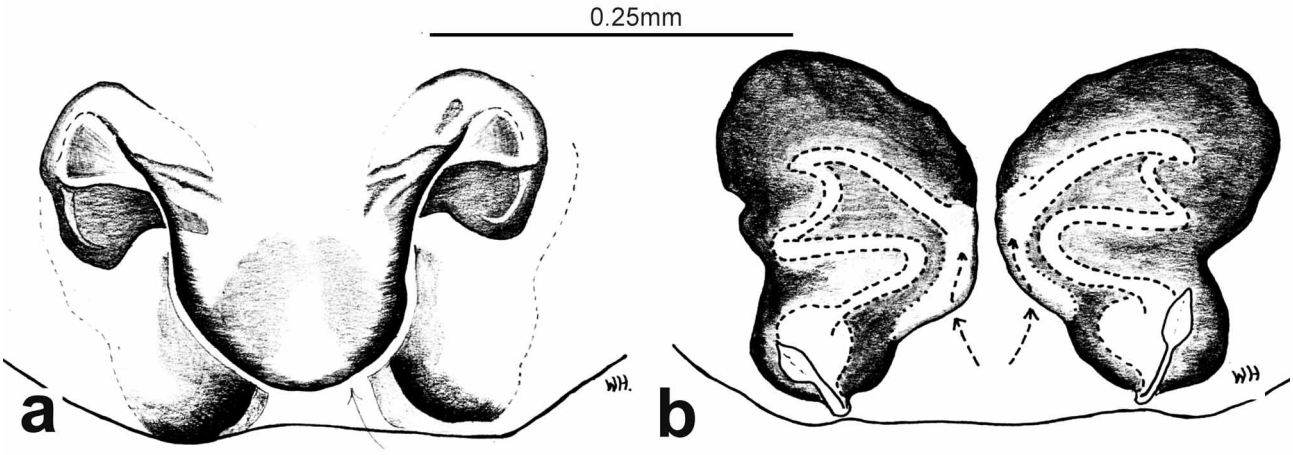

FIGURE 9. *Diaprograpta peterandrewsi* **sp. nov.** allotype, female: a, b, epigyne, external (a) and internal (b) views

Female (allotype, QM S39453)

Carapace 3.38 long, 2.50 wide. Abdomen 6.06 long, 3.25 wide. *Colour.* As for *D. striola*. *Eyes.* AME *ca*. 0.5 ALE. Anterior row recurved, posterior row recurved so posterior edge of PME and anterior edge of PLE form common line. *Spines.* Very long basal spine on dorsal femora I–IV. Absent on leg patellae. I: fe p1.d1.1; ti v2.2; me v2. II: fe p2d1.1; ti v2.1; me v2. III: fe p3d3r1; ti p2r2v2.2.1; me p2r2v2.1. IV: fe p1d3r1; ti p2d2r2v2.2.2; me p1.2.2r1.2.2v2.1.1. Palp: fe d1.2; pa p1d1; ti p3d2; ta p2d1r2 and v2 pair subdistally. *Legs*. Very long dorsal seta on distal patellae and basal and distal on tibiae. Tarsi IV laterally bowed. *Scopula*. On all tarsi; for metatarsi I, for full length but denser in distal half; II, in distal third; III, IV for distal quarter. *Claws*. Tufts dense; paired claws each with 4 teeth. *Spinnerets.* Colulus a small, round, hirsute zone. ALS conical; PMS cylindrical; PLS cylindrical with triangular apical segment. *Epigyne* (Fig. 9). Broad median rounded scape with lateral lobes forming short triangular process.

Distribution and Habitat. Known only from Winton, western Queensland, from an area of open grassland (Fig. 26a).

***Eupograpta* gen. nov.**

Type species. *Eupograpta kottae* **sp. nov.**

Diagnosis. Differs from all other diaprograptines in that females have a large median septum flanked by a pair of large domed unsclerotised areas (Figs 11c, 12a) and that males have a large spiralled RTA (Figs 10d, e, 11a).

Etymology. An euphonious combination of letters based on its sister genus *Diaprograpta*; the gender is feminine.

Description. As for *Diaprograpta* but females with large median septum flanked by large domed unsclerotised areas and males with a large spiralled RTA. Trichobothrial base collariform (Fig. 10g).

Included species. *Eupograpta kottae* **sp. nov.**; *Eupograpta anhat* **sp. nov.**

Distribution and habitat (Fig. 25a). Known from southwestern Western Australia and far western Queensland which include areas of bushland to very xeric habitats.

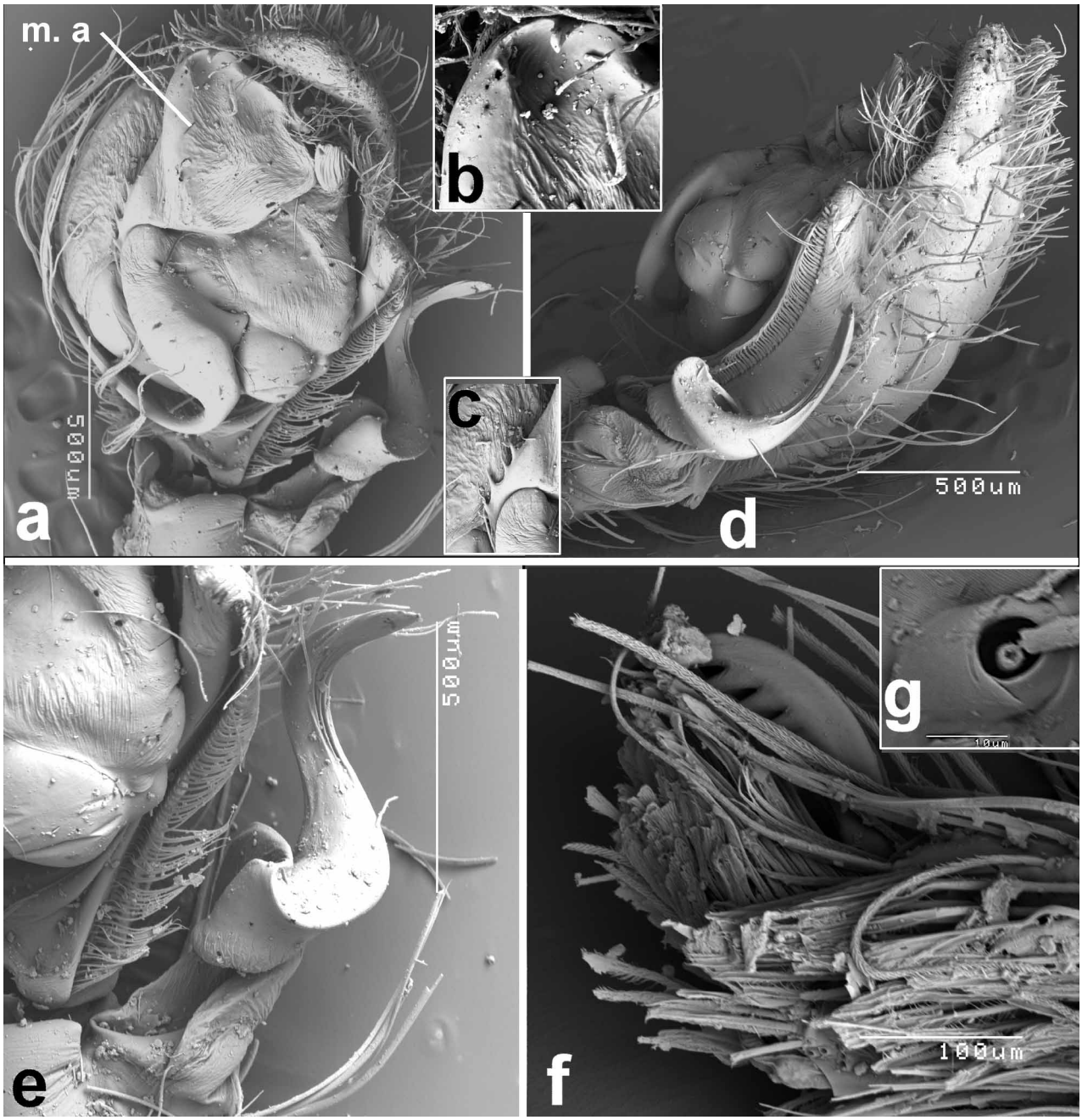

FIGURE 10. *Eupograpta kottae* **sp. nov.**, male, palpal tibia, cymbium and bulb and tarsus: a, bulb, ventral view; b, c, median apophysis ventral views, distal edge (b) and proventral edge (c); d, e, RTA, retrolateral (d) and ventral (e) view; f, end of tarsus showing claws and tufts, lateral view; g, bothrium base.

***Eupograpta kottae* sp. nov.**
(Figs 10a–c, 11a–c, 12a, b, 25a)

Material examined. *Holotype*. Male, Durokoppin Nature Reserve 31°30'S 117°44'E, Western Australia, 3–14 November 1988, D. Mitchell *et al.*, DKR 83 (WAM 97/243).

Paratypes. Allotype female, Boorabbin, 3115'S 12004'E, Western Australia, July 1980, W. F. Humphreys *et al*., WA Goldfields survey, BNR 1, isolate *Callitris* heath (WAM 97/189). ***Western Australia***: 2 males, Perth Airport, 3158'03"S 11558'11"E, 10 May–24 June 1993, wet pitfalls (PA 5), M. S. Harvey, J. M. Waldock (WAM 98/1676, 1677); male, Talbot Rd Reserve, 3152'24"S 11602'52"E, 24 September –18 November 1993, wet pitfalls (TR3), J. M. Waldock *et al*. (WAM 98/1680); female, same data but 28 July –23 September 1993, J. M. Waldock *et al*. (WAM 98/1682); 3 females, same data but 18 November–10 December 1993, J. M. Waldock (WAM 98/1683–5); 2 males [1j.], same data but 24 June –28 July 1993, M. S. Harvey, J. M. Waldock (WAM 98/1689–91); female, same data but dry pitfalls, 22–29 August 1993, J. Dell (WAM 98/1692); 2 males, Talbot Rd Reserve (TR4), 3152'23"S 11602'46"E, 24 September–18 November 1993, J. M. Waldock *et al.* (WAM T74023, T74024); 1 female, same data but 23 November–5 December 1993, J. Dell (WAM98/1744); 1 male, Talbot Rd Reserve (TR1), 3152'05"S 11603'04"E, 24 September–18 November 1993, J. Waldock *et al***.** (WAM T 74026); 1 female, Red Hill, Toodyay Rd, top of Darling Scarp, 3151'S 11606'E, 6 August 1996, B. Y. Main (WAM 98/1686); 1 male, Bold Park (BP3), wet pitfall, 3156'33"S 11546'13"E, 20 May–20 July 1993, M. S. Harvey and J. M. Waldock (WAM 98/1687); 1 male, Bold Park (BP5), 3157'14"S 11546'16"E, 20 May–20 July 1993, M. S. Harvey and J. M. Waldock (WAM T74019); 1 male, Hartfield Park, Forestfield (HF1), wet pitfalls, 3200'00"S 11559'43"E, 16 April–19 June 1996, J. M. Waldock, P. West, A. Longbottom (WAM T74025).

Diagnosis. Females differs from those of *E. anhat* **sp. nov.** in that the median septum of the epigyne (Fig. 12a) is widest distally.

Etymology. Named for Dr Patricia Kott, ascidian taxonomist, Queensland Museum, originally from Western Australia, in recognition of her tireless efforts to raise the profile of taxonomy and the need for more, funded taxonomic positions in Australia.

Description. Male (holotype WAM 97/243)

Carapace 3.00 long, 2.31 wide. Abdomen 3.56 long, 2.19 wide. (Cephalothorax slightly collapsed and abdomen folded under at 90.) *Colour.* Carapace fawn with black stripes from each PLE down carapace; broken black areas along margins of carapace; legs not banded. Abdomen (Fig. 11b) dorsally pallid with two long medial stripes joining just past midpoint, two stripes lateral of that; ventrally pallid. Small stripe down each chelicera. *Carapace*. With gradual anterior constriction. AME set on anterior clypeus. Fovea short, at *ca*. midpoint of carapace; few long anteromedial bristles, 3–5 between MOQ, 2–3 lines of 4–6 long curved bristles anterior to AME on clypeus. Clypeus about twice AME diameter, convex, steep. Fovea moderately long. Short brown bristles uniformly over carapace. Carapace ridge flat between back margin and PME. Clypeus anterior to AME and ALE tumid, pallid. *Eyes*. PME largest. Two recurved rows, posterior more so. Eyes of anterior row set close together; in anterior view, smaller AME set above centres of ALE. Viewing directions: AME up, front, side; ALE front, side; PME up, PLE to side and slightly to back. All eyes encircled with dark shadows. *Chelicerae*. P1 small basal and 2 larger, R2 large basal. Small triangular boss. Labium and maxillae slightly collapsed, see female. *Sternum*. Cordate with uniform cover of long bristles; low radial ridge/mound opposite base of each coxae. *Legs*. Trochanters all deeply notched. No tibial fracture, no tarsal rod. Pilosity: broad long brown bristles of fine hairs. Distinct long bristles off apical patellae. I: 2.77, 1.23, 2.46, 2.15, 1.69, 10.30. II: 2.77, 1.31, 2.23, 1.92, 1.54, 9.77. III: 2.46, 1.15, 2.00, 1.85, 1.38, 8.84. IV: 3.31. 1.31, 3.15, 3.0. Palp: 1.23, 0.69, 0.54, –, 1.54, 4.00. *Trichobothria*. On tibiae, 2 rows 6–8 for length; metatarsi, irregular rows of 8–10; tarsi, 1 row of 8–10, subapical trichobothria longest. *Spines*. 2 basal spines on dorsal femora very long. I: fe p2d2r1; pa0; ti p2v2.2.2; me v2.2. II: fe p3d3r3; pa0; ti p2r1v2.2.2; me p1v2.2, me spines very long. III: fe p4d3r3; pa0; ti p2d2r2v2.2.2; me p4r4v2.2.1. IV: fe p4d3r2; pa0; ti p2d2.1r2v2.2.2 me p3+2l r7 v2.2.1. Palp: fe p1d3r2; pa p1d1; ti p1d1. *Scopula*. Long hair-like setae, thin but distinct for distal two-thirds of metatarsi I, for distal half of metatarsi II–IV. Long hair-like setae, moderately dense, entire on tarsi I–IV almost obscures cuticle on I. Claw tufts small, dense, no division evident. *Claws*. Moderately long, curved with 6–8 long teeth evident above tufts. *Spinnerets*. ALS as long as PLS but ALS thicker. PLS with slightly longer apical segment. *Palp* (Figs 10, 11a). Patellae squat, dorsal projection a sclerotised thumb, opposed to sclerotised back dorsal tibial edge. Tibia barrel-shaped, practically only an apophysis, "sandwich"

with unsclerotised midzone. RTA a very long, elaborate, twisted process with ental grooves and digitiform process twisting apically into fluted cylindrical tip. Long triangular process on proventral corner and collar ventrally. Distal two-thirds ventrally glabrous, saddle-shaped. Cymbium dorsally with triangular process basally against one on tibia; retrobasal sharp corner with excavation more basally; retrolateral cymbium excavate with long groove and distal process; groove on thick ridge and length of groove retromargin with dense line of short black bristles as comb; promargin of cymbium with long densely padded pallid hairs (removed for SEM). Embolus origin long, ovoid; anticlockwise to narrow tip above embolus origin. A large flat median apophysis with edges curved up and returns with small tooth and rounded flange; beside that a sclerotised scooped, boat-shaped conductor surrounding embolus. Massive tegulum. No scopula dorsally on cymbium.

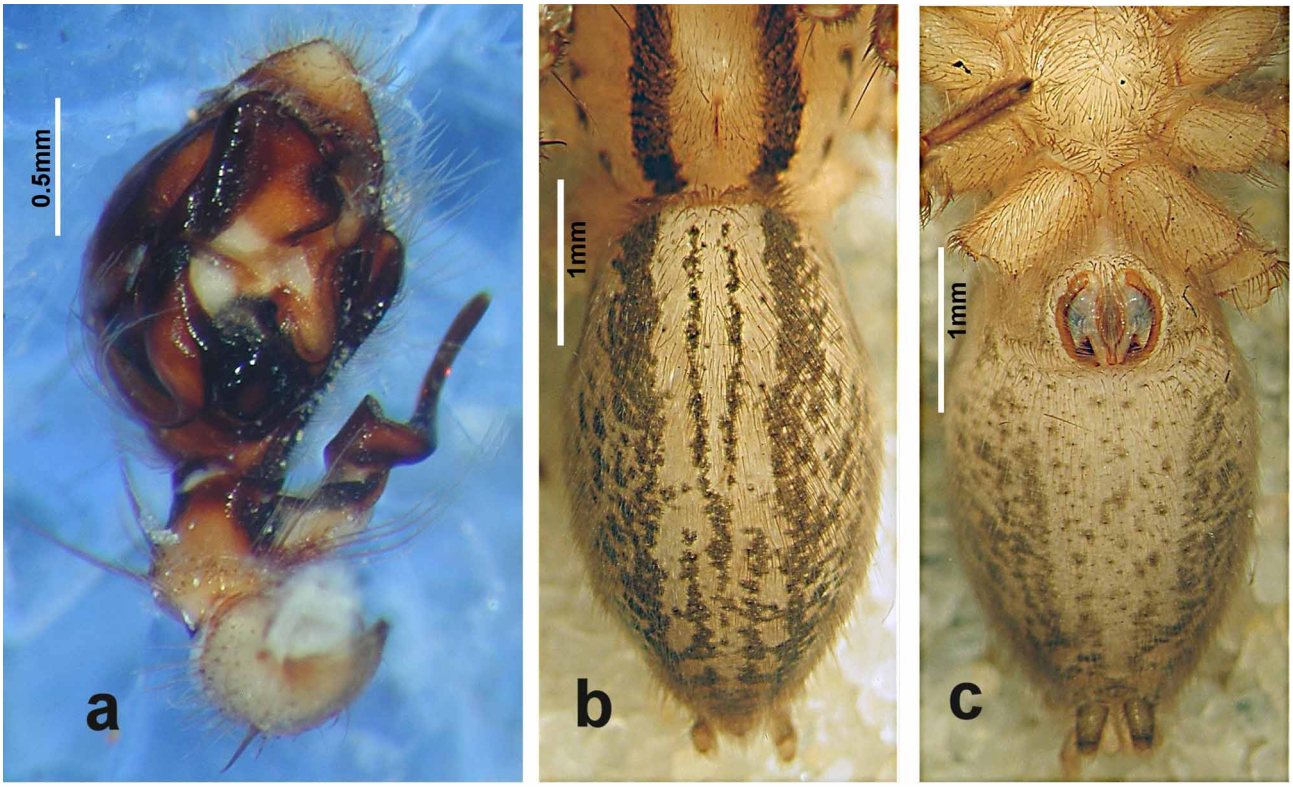

FIGURE 11. *Eupograpta kottae* **sp. nov.**, holotype male (a) and allotype female (b, c): a, patella to cymbium, ventral view; b, c, abdomen, dorsal (b) and ventral (c) view.

Female (allotype WAM97/189)

Carapace 3.45 long, 2.60 wide. Abdomen 4.70 long, 2.85 wide. Like male except: *Colour*. Carapace yellow brown with separated dark semicircles along margin band and broad dark band from PLE to back; chelicerae red-brown with dark vertical medial band. Abdomen dorsally pallid; centrally for anterior half with dark "shoulders" rising to just over the dorsal surface and medial of them two narrow dark lines anteriorly well apart, diverging slightly and shortly but converging gradually (i. e., forming a long narrow “V) to join just behind midpoint, irregular mottling posterior of that forming pallid area centrally, laterally with short dark broken longitudinal diagonal lines and ventrally with vaguely discernible broad pallid ”V with scattered irregular mottling over it. Sternum and legs yellow to orange brown without dark markings or bands. *Carapace*. Light uniform pile of large dark hairs centrally directed; midline from fovea to PME with a wide band of long erect bristles and *ca*. 6 long bristles directed horizontally forward from clypeus. Fovea distinct, crosses into posterior declivity. *Eyes*. In two rows *Chelicerae*. 2R, 3P. *Legs*. Trochanteral notches broad but deep, distinct. RCH distinct, moderately large. I: 2.10, 1.40, 1.95, 1.70, 1.05, 8.20. II: 2.35, 1.40, 1.90, 1.50, 1.15, 8.30. III: 2.60, 1.25, 1.65, 1.45, 1.00, 7.95. IV: 3.05, 1.40, 2.75, 3.45, 1.15, 11.80. Palp: 0.90, 0.50, 0.65,

–, 1.05, 3.10. Scopula as for *D. striola*. *Claws*. I–IV with *ca*. 4–5 teeth, becoming smaller toward base; tufts on IV noticeably smaller than on I–III. *Spines*. Leg patellae without spines. I: fe p1d2; ti v2.2w long; me v2 very long, basal. II: fe p2d2; ti v1.1; me v2 long. III: fe p3d3r2; ti p2r2v2.2.2; me p1r1v2.1. IV: fe p1d3r1; ti p2d2r2v2.2.2; me p1.2.2r2.2.2v2.1. Palp: fe d1.2; pa p1d1 + apical 1; ti p3d2; ta p3d1r3 v2 distal. *Spinnerets*. As in *D. striola* with wide colulus. *Epigyne*. Large, two strongly sclerotised lateral ridges bracket broad hirsute medial scape narrowing strongly in posterior third to form subdistal knob, in distal third scape edges form ridge below which is small slit-like invagination then expanded slightly sclerotised fold below which is a large unsclerotised concavity.

Distribution and habitat (Fig. 25a). Known only from forests on the margins of Perth, southwestern Western Australia and at Boorabbin in the Goldfields to the west.

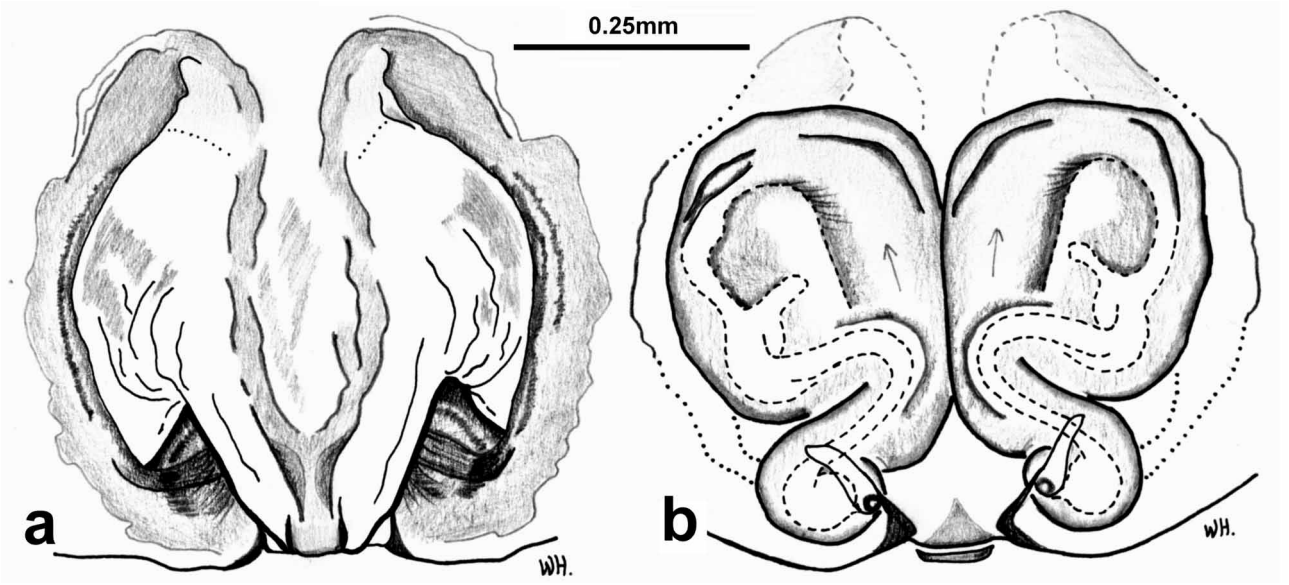

FIGURE 12. *Eupograpta kottae* **sp. nov.**, allotype, female: a, b, epigyne, external (a) and internal (b) views.

***Euprograpta anhat* sp. nov.**
(Figs 13a–c, 25a)

Material examined. *Holotype*. Female, Birdsville track to Mt Isa [no exact locality], western Queensland, June 1987, B. Harvey (NMV K4478).

Diagnosis. Females differ from those of *Eupograpta kottae* **sp. nov.** in that the median septum of the epigyne is trianguloid (Fig. 13b), converging anteriorly to posteriorly.

Etymology. A noun in apposition taken from acronym of the software (Australian Natural Heritage Assessment Tool) used by staff at Department of the Environment, Water, Heritage and the Arts to guide surveys of nationally important natural history sites and that yielded the male of *D. peterandrewsi* as well as many new species of Oonopidae and Prodidomidae.

Description. Female (holotype, NMV K4478)

Carapace 3.44 long, 2.38 wide. Abdomen 4.69 long, 3.00 wide. Total length, 8.5. Like *D. striola* except: *Legs*. 1: 2.38, 1.31, 1.94, 1.69, 1.06; 8.38. 2: 2.31, 1.13, 1.88, 1.88, 1.00; 7.88. 3: 2.13, 1.06, 1.50, 1.56, 0.94; 7.19. 4: 3.13, 1.31, 2.44, 2.63, 1.19; 10.70. Palp: 1.00, 0.56, 0.56, –, 0.94; 3.06. *Spines*. I: fe p2d2; ti v2.2; me v2 not strong. II: fe p2d2; ti v1.1; me v2. III: fe p3d3r2; ti p2r2v2.2 (v1.2.2 weak); me p2r1v2.1. IV: fe p2d2r1; ti p2d2r2v1.2.2; me p5r5v2.1.1. Palp: fe d1.2; pa p1d1 apical; ti p3r2; ta p3r1 v2 apical. *Epigyne* (Figs 13 b, c). Externally a median elongate tongue-like septum overlying pallid rounded cones extending deeply, and with strong sinuous lateral ridge and anteriorly narrowed.

Male Unknown.

Distribution and habitat (Fig. 25a). Known only from the "Birdsville Track to Mt Isa", far western Queensland, an area of open grassland, gibber plains, and desert.

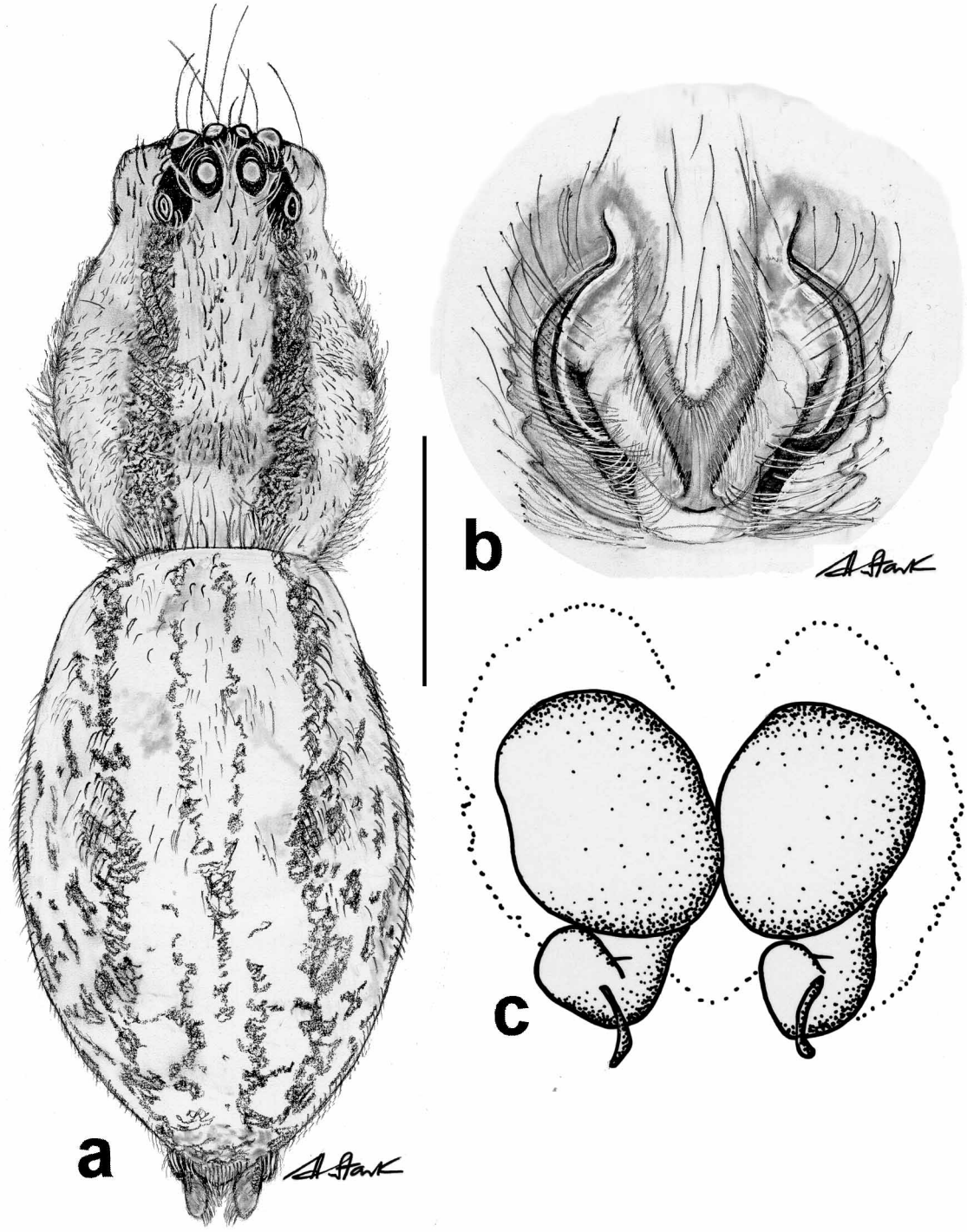

FIGURE 13. *Eupograpta anhat* **sp. nov.**, holotype, female: a, abdomen, dorsal view; b, c, epigyne, external (b) and internal (c) views. Scale line: 2.0mm for a; 0.5mm for b, c.

***Mitzoruga* gen. nov.**

Type species. *Mitzoruga elapines* **sp. nov.**

Diagnosis. Males differ from those of *Eupograpta* in the short deeply bifid RTA (Fig. 14e) and females by the epigyne having two lobes beside a median septum (Fig. 16a). They differ from those of *Nuliodon* gen. nov.

in the slender form of the median apophysis with its long axis in the same line as the long axis of the embolus origin (Fig. 17a); tips of the RTA elongate, bifid (Fig. 14e); extensive comb of spine-like bristles along the retrolateral cymbial groove (Fig. 15b). Also, unlike *Nuliodon* gen. nov., the carapace is marked either with stripes (Fig 14g) or a dark submarginal bar.

Description. 8 eyes in 2 rows, both rows clearly recurved (Fig. 14a); eyes of similar size but lateral eyes larger than medians. Claw tufts dense and similar on I–IV; scopula dense on tarsi I–IV and metatarsi I, II, distal, weaker and divided on III; absent on leg IV and tibiae. Ventral spines on tibiae and metatarsi I, II, weak, not paired, similar in male and female. Trochanters with wide, shallow asymmetrical notches. Maxillae (Fig. 14h) short, basally truncate, ectal edge slightly indented basally, rounded ectal apex with long serrula, ental edges form rounded apex; shallow, glabrous, diagonal groove basally. Labium longer than wide with indistinct submarginal grooves. Chelicerae small, unmodified, fang short; dentition 2R, 3P. Weak proventral spines on femora I, II. Tarsi III, IV bowed in lateral view. *Male palp*. Tibia short with large RTA with 2 similar apices joined by unsclerotised trough (Fig 14e). Cymbium short, wide, apical cone pointed, with dense ridge of short blunt thick recurved setae apically (Fig. 17e); no dorsal scopula; retrolateral groove shallow and with strong comb of short curved spines on margin. Tegulum n-shaped, arising centrally; slender to wide median apophysis with apical sclerotised hook; small conical conductor behind median apophysis. Embolus origin broad, separate from median apophysis, on retrobasal corner tapers quickly to wire and proapically is cradled by low, pallid, conical conductor. Six spinnerets: ALS coniform, clearly separated by about half diameter at base; apical segment short conical, large spigots not evident. PMS and longer; PLS cylindrical, slightly longer than ALS; no large spigots evident; all apical segments short, coniform. Colulus is a small, hirsute triangular area. Tracheal spiracle near spinnerets. Epigyne a broad median scape flanked by large low lateral lobes. Pattern: carapace yellow brown with slightly darker medial zone and margins, boundary enhanced by long dark hairs, often with longitudinal stripes; abdomen dorsally pallid, anteriorly with one dark central and two short dark paramedial bands breaking into four chevrons forming diamond-shaped pale zone centrally; ventrally pallid with light irregular dark mottling around edges. Legs yellow brown with dark wide rings on tibiae and metatarsi.

Etymology. A contraction of *Miturga* and *Zora*; the gender is feminine.

Distribution, habitat and biology. Known from southwestern Western Australia, South Australia, western New South Wales, northeastern Queensland, and the Northern Territory. Most material used here was taken by allowing a 4-wheel-drive diesel vehicle to idle and collecting the spiders attracted by the vibration. WAM98/1700–1733 so collected included 29 juveniles and 5 females of *M. insularis* **sp. nov.**

Included species. *Mitzoruga elapines* **sp. nov.**, *Mitzoruga insularis* **sp. nov.**, *Zora marmorea* Hogg, 1896.

Key to the species of *Mitzoruga*

Males

1 RTA apically deeply bifid with each point long and apically close (Figs 15c, 19c)..... 2
- RTA short, widely bifid with short points (Fig. 17b)..... *M. insularis*
2 Median apophysis narrow and converges from base (Figs 19a, b)..... *M. marmorea*
- Median apophysis wide, widens distally then narrows (Figs 15a, d)..... *M. elapines*

Females

1 Copulatory fossae small, ovoid; median septum extends to posterior margin (Fig. 18a)..... *M. insularis*
- Copulatory fossae wide, sigmoidal (Figs 16a, 20a)..... 2
2 Lateral epigynal ridges concave (Fig. 16a)..... *M. elapines*
- Lateral epigynal ridges directed ectally (Fig. 20a)..... *M. marmorea*

Relationships. The male palp of *Mitzoruga* shows strong affinity to that of the Australian zorid *Argoctenus* (see *A. aurens* Hogg, 1911, Forster and Wilton 1973, fig. 1033) in the location and nature of the

embolic origin and the form of the median apophysis. However, unlike all known zorids, the RTA has an unsclerotised component which Raven and Stumkat (2003) took as a miturgid autapomophy. Equally, unlike all known zorids, except *Hestimodema* Simon, 1909, the eyes of the Miturgidae are of similar size and the eye group is both clearly wider than long and occupies relatively more of the head width. Hence, until all miturgids and zorids are revised, *Mitzoruga* gen. nov. seems best placed in the Miturgidae.
Of the three species, the two most closely related are considered to be *M. elapines* **sp. nov.** and *M. marmorea* which share the deeply bifurcate RTA and the sigmoidal margins of the copulatory fossae.

Biogeography. *Mitzoruga insularis* **sp. nov.** occurs across drier parts of southern Australia, from southwestern New South Wales and Victoria to South Australia, apparently absent from the Nullarbor Plain and in the southwest of Western Australia. Although a disjunct distribution, it seems to be latitudinally based. In contrast, the very disjunct records of *M. elapines* **sp. nov.**, southeast of Adelaide and then west of Townsville, northern Queensland, suggest massive gaps in sampling. Its distribution does, however, partially complement that of its more xerophilic sister, *M. marmorea.*

***Mitzoruga elapines* sp. nov.**
(Figs 14a–j, 15a–d, 16a, b, 25a)

Material examined. *Holotype*. Male, Cape River, Pentland 20°26'30"S 145°31'50"E, northeastern Queensland, 4 August 1997, R. Raven (QM S31422).

Paratype. Allotype female, taken with holotype (QM S31423).

Other material examined. Australia: *Queensland*: Female, same data as holotype (QM S31424). ***South Australia***: male, Trinity Gardens, Adelaide, 34°56'S, 138°37'E, 15 October 1988, D. Hirst (SAMA NN6192); female, same data but 12 March 1988 (SAMA NN61949); female, Nuriootpa, 34°29'S 139°00'E, 27 October 1991, A. F. Longbottom (WAM 98/1693); female, Kapunda, 34°21'S 138°55'E, 28 May 1995, A. F. Longbottom, under rocks at copper/barite mine, S.1786 (WAM 98/1697).

Diagnosis. Males differ from those of *M. insularis* in the much broader tripartite median apophysis (Fig. 15d), the narrower base of embolus (Fig. 15a), the deeply incised closely juxtaposed apices of the RTA (Fig. 15c) and the presence of thick setae on coxae I–III as well as coxae IV; females differ in the relatively larger basal lobe of the spermathecae (Fig. 16b) giving a more block-like appearance to the spermathecal folds.

Etymology. From elapine, alluding to the long pair of front fangs of the most venomous snakes of the family Elapidae Boie, 1827.

Description. Male (holotype QM S31422)

Carapace 4.00 long, 2.48 wide. Abdomen 4.32 long, 2.64 wide. *Colour* (Figs 14a, b). (seemingly recently moulted) Carapace pallid with 2 narrow dark lateral bands and pair of wider dark bands from behind PLE more or less straight until they converge slightly at posterior declivity; eye region black. Abdomen dorsally pallid with narrow “V anteromedially breaking up into 3 irregular spots in posterior third; lateral of “V broader, irregular longitudinal bands. Legs concolorous with carapace, no bands. Sternum, maxillae and labium pallid; abdomen ventrally pallid with light black mottling strong laterally and posteriorly but weakening centrally. *Carapace*. Long black hairs on margins; short fine on carapace; long setae between AME; clypeus rounded distinct. *Eyes*. AME: ALE: PME: PLE, 10: 11: 10: 11. ALE much closer to AME than AME apart; PME as far apart as from PLE, ALE slightly larger and lower (in anterior view) than AME–all directed to front and side. Anterior row clearly recurved; posterior row strongly recurved or in two rows, with PLE directed to side and up. *Chelicerae.* Small, porrect; dentition 3P, 2R. Fangs short, transverse. Boss small but distinct. Maxillae rounded rectangular with triangular, shallow depression diagonally from corner to distal edge. Labium short, shield-shaped. Sternum (Fig 14h) cordate; setal patterns fine radial, inwardly directed setae. *Legs*. Coxal bases with slight triangular projections entally, 20–30 short thorn-like spines ventrally on retroventral half of coxae I–IV, more numerous on IV (Figs 14f, h). Trichobothria in *ca*. 2 rows each of 8–10

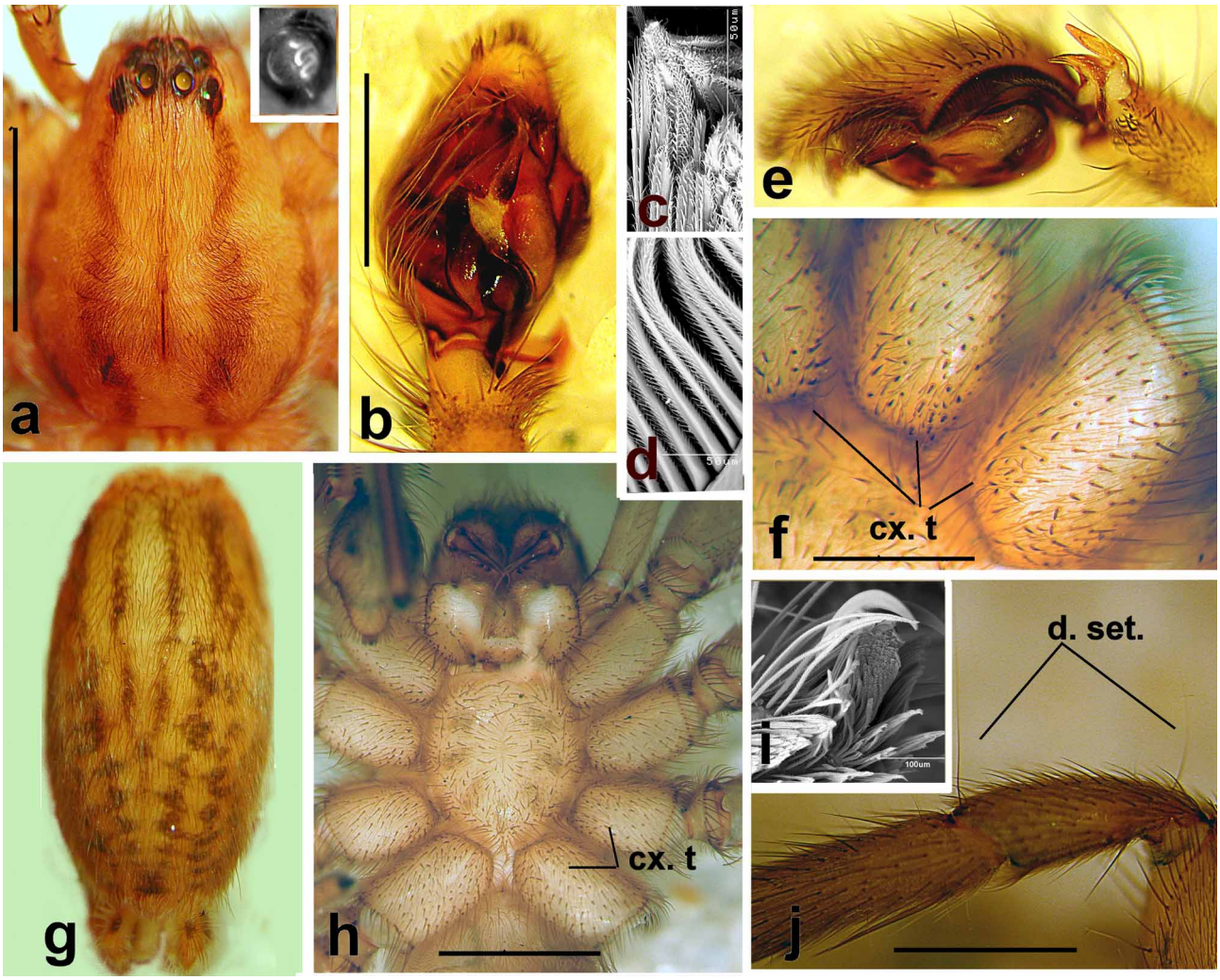

FIGURE 14. *Mitzoruga elapines* **sp. nov.**, male: a, carapace, dorsal view; inset shows grate-shaped tapetum of PME of WAM 98/1693; b, palpal tibia and bulb, ventral view; c, tips of enlarged cymbial setae; d, shafts of enlarged cymbial setae; e, palpal tibia and bulb, retrolateral view; f, coxae III, IV, showing "thorns", ventral view; g, abdomen, dorsal view; h, sternum, maxillae and coxae, ventral view; I, claws and claw tufts; j, patella and tibia I, prolateral view, showing long bristles apically and distally on patella. Scale line: 2mm for a, g (same scale); 0.5 mm for b, e (same scale); 2mm for h, 1mm for f, j.

for length of tibiae, metatarsi and tarsi. Trochanteral notches shallow, symetrical, as wide as deep on IV. I: 3.23, 1.38, 3.00, 2.54, 2.00, 12.15. II: 3.00, 1.38, 2.46, 2.15, 1.77, 10.75. III: 2.61, 1.15, 2.00, 1.92, 1.38, 9.06. IV: 3.61, 1.31, 3.31, 3.15, 1.54, 12.92. Palp: 1.54, 0.77, 0.69, –, 1.31, 4.31. *Scopula*. Tarsi I–II entire, hairs long, not dense, not obscuring cuticle; IV with line of emergent setae. Metatarsi I–II weak, in 2 lateral bands for distal two-thirds and also ventral for distal quarter; weak on distal quarter on III, IV and tibiae. *Spines.* I: fe pv1p1d3r1; pa 0; ti p2r2v2.2.2; me p1r1v2.2. II: fe pv1p2d3r2; pa 0; ti p2d1 r2v2.2.2; me p1r1v2.2. III: fe p4d3r4; pa p1; ti p2d2.1r2v2.2.2; me p1.2.1r2.1.1 v2.2.1. IV: fe p4d3r2; pa 0; ti p2d2.1r2v2.2.2; me p2.2.1r2.2.2v2.2.1.1. Palp: fe p1d1.2; pa p1; ti p3. *Claws.* Long, with 3 long and one short basal teeth; tufts (Fig. 14i) strong but small, paired and conical. *Abdomen*. Tracheal spiracle small, near spinnerets. ALS short with domed tips. PMS cylindrical. PLS small with slightly elongated apical segment, orange with large spigot. *Palp* (Figs. 14b–e, 15). Tibia short with long triangular prong on prolateral corner, dorsal depression across to large bifid process on retrolateral edge; RTA a large cone with unsclerotised distal face transversed by two keels and slender sinuous prong dorsally off face of median process (Fig 14e); retroventral collar of tibia sclerotised with distinct erect cone and narrow notch beside base of RTA. Subtegulum prolateral and roughly

triangular rounded ridge distally with sclerotised collariform conductor. Median apophysis subapico-central, flat, shield-like, with small medial process distally and vertical claw-like process retrolateral of it. Embolus origin small, basal; embolus tapers quickly runs clockwise arising retrodistally. Cymbium asymetrical with short rounded apex and distinct wide sclerotised groove retrolaterally and with strong comb of curved setae ectally (Figs. 14c, d).

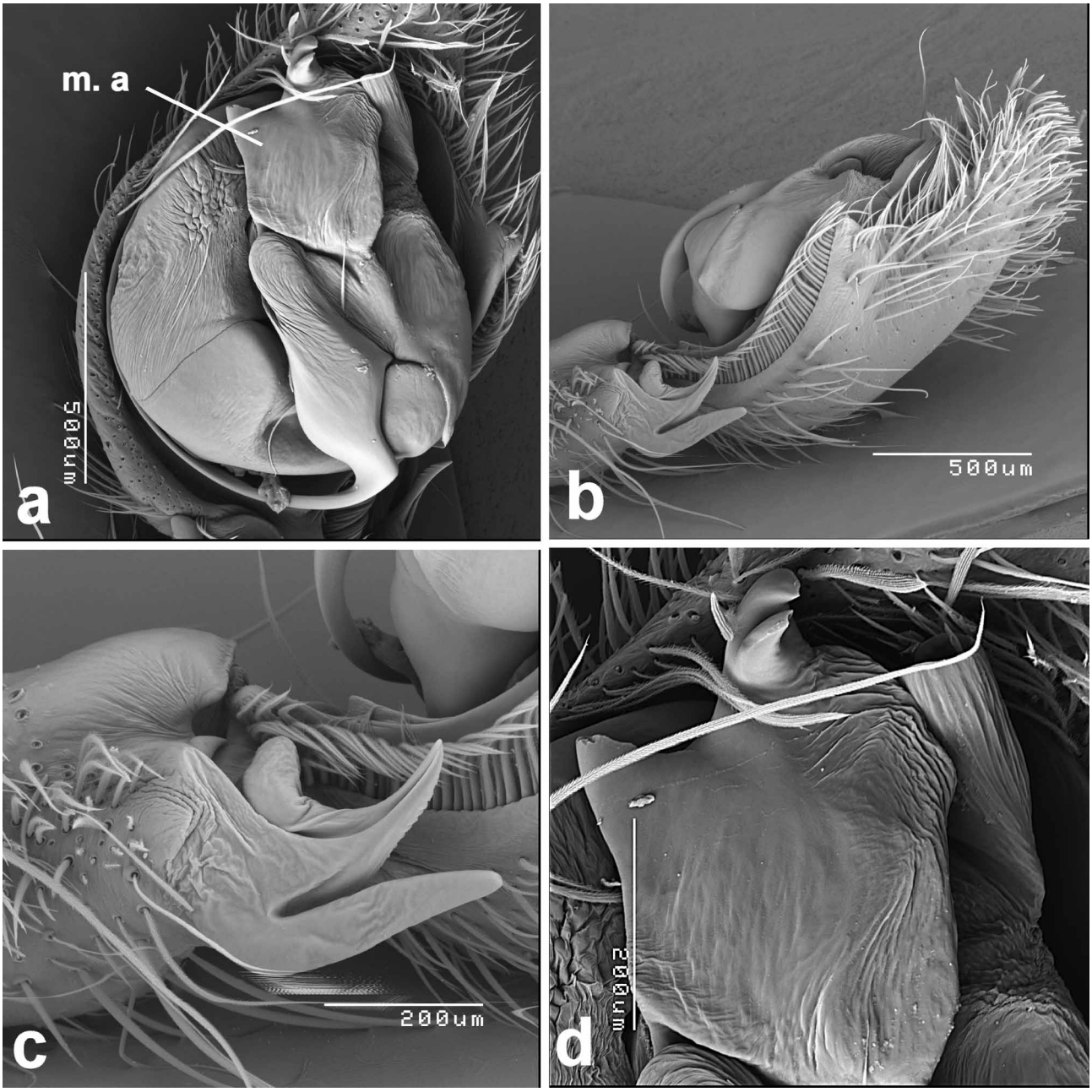

FIGURE 15. *Mitzoruga elapines* **sp. nov.**, palpal tibia and cymbium, scanning electron micrographs: a, bulb, ventral view; b, cymbium and tibia, retrolateral view; c, RTA, retrolateral view; d, median apophysis, ventral view.

Female (allotype, QM S31423)

Carapace 3.92 long, 3.04 wide. Abdomen 5.36 long, 3.20 wide. *Colour.* Pattern like male but darker, stronger. Carapace margin with irregular "intrusions" and with narrow grey medial band through eyes and fovea. Abdomen dorsally dark with irregular pallid “V breaking up into dots posteriorly. Legs dark brown with orange brown metatarsi and tarsi. *Eyes*. AME:ALE:PME:PLE, 7:11:11:13. Posterior row recurved. *Chelicerae*. Like male but stout, same dentition with pallid region anteriorly above fang. *Legs*. Coxae

ventrally without thorn-like spines. *Claws*. Tufts like male; palpal claws with 3 teeth but no tuft. I: 2.69, 1.23, 2.46, 1.92, 1.38, 9.68. II: 2.54, 1.23, 2.61, 2.00, 1.54, 9.92. III: 2.54, 1.00, 1.92, 1.85, 1.23, 8.54. IV: 3.23, 1.31, 3.15, 3.46, 1.54, 12.69. Palp: 1.00, 0.61, 0.69, 1.00, 3.30. *Spines*. I: fe pv1p1d2; pa0; ti v2.2.2w; me v2 basal. II: fe p2d2r1; pa0; ti v1.2.2w; me v2 basal. III: fe p4d3r2; pa0; ti p2d2r2v2.2.2; me p2.1r1.2.1v2.1. IV: fe p2d3r1; pa0; ti p2d2.1r2v3.2.2; me p1.2.2r1.2.2v2.2.1. Palp: fe p1d1.2; pa p1; ti p3d2; ta p3r3v2. *Scopula*. Dense, almost obscures cuticle on tarsi I–IV, entire on I–III, divided by 1–2 lines of setae on IV. Metatarsi I–II full, dense, entire, except for space around spines; III, IV divided into 3 parts. Scopula of short hairs also in distal half of tibiae I, II, in 3 bands on III, and few scattered setae on IV. *Epigyne* (Figs 16a, b). Narrow anterior medial ridge and wide septum posteriorly.

Distribution and habitat (Fig. 25a). Known only from Cape River, west of Charters Towers, northeast Queensland, and near Adelaide, South Australia. At Cape River, the spiders were taken in litter around the bases of grasses in open eucalypt forest.

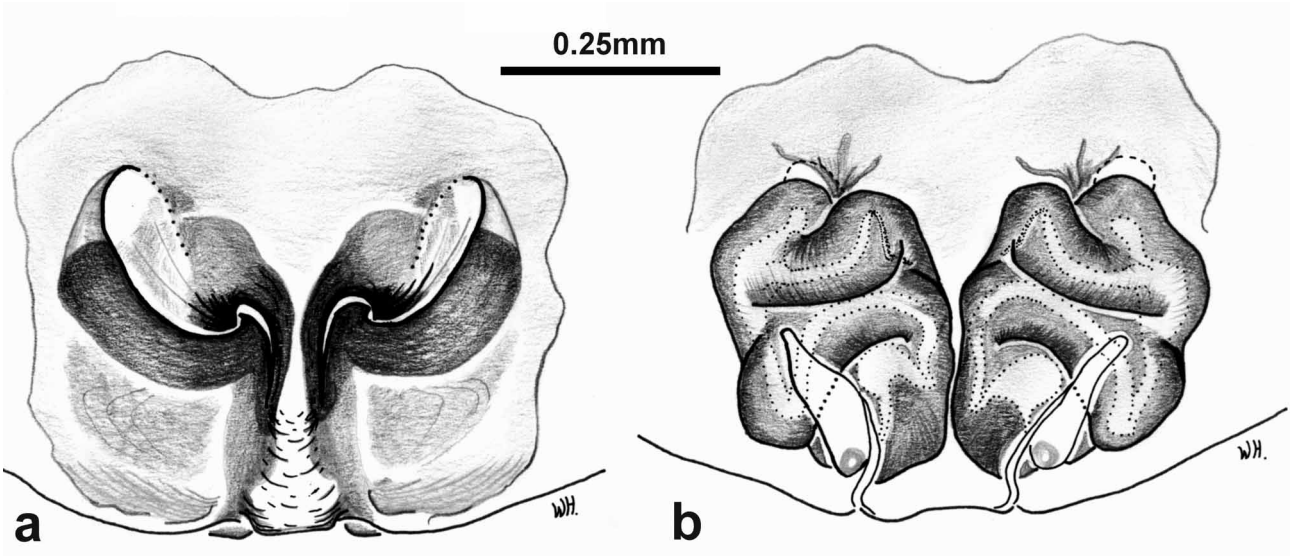

FIGURE 16. *Mitzoruga elapines* **sp. nov.**, female WAM 98/1697: a, b. epigyne, external (a) and internal (b) views.

***Mitzoruga insularis* sp. nov.**
(Figs 17a–g, 18a, b, 25a)

Material examined. ***Holotype.*** Male, Dudley Conservation Park , Kangaroo Island, 35°48'S 137°52'E, South Australia, 11–12 November 1987, D. Hirst (SAMA NN6218).

Paratypes. Allotype female, same data as holotype (SAMA NN6219). ***South Australia*****:** 1 male, 8 females [3j], same data as holotype (SAMA NN6220–8); 2 males, Grassdale, Kelly Hill CP, Kangaroo Is, 9 November 1987, D. Hirst (SAMA NN6239–40); 1 male, Aldinga Scrub, 30 December 1986, D. Hirst (SAMA NN6229); 1 female, Dudley CP, Kangaroo Is, 2 November 1987, D. Hirst, (SAMA NN6243); 1 female, Sellicks–Aldinga Scrub, 16–26 June 1987, E. G. Mathews, J. A. Forest (SAMA NN6230); 1 female, [4j2p], Sellicks–Aldinga Scrub, 13 April 1987, D. Hirst (SAMA NN6273); 2 females, Bucks Camp Well, hill N of, Mt Rescue CP, 35°36'S 140°18'E, 18 March 1992, D. Hirst (SAMA NN6270–1); 3 females, same data (SAMA NN6267–9); 1 female, [4j], NE Jimmy's Well, 35°51'S 140°18'E, 20 March 1992, D. Hirst (SAMA NN6184); 2 females, Box Flat, 35°36'S 140°23'E, 19 March 1992, D. Hirst, mallee, litter (vibration) (SAMA NN6250–1); 2 females, 4km S Box Flat, 35°38'S 140°23'E, 19 March 1992, D. Hirst (SAMA NN6216–7); 1 female, 10km N Kelira, Hirst's Old Farm, 36°37'S 140°10'E, 22 March 1992, D. Hirst, vibration (SAMA NN6203); 2 females, Kellys Hills Caves, around Kangaroo Is, 2 December 1984, J. Thurmer (SAMA NN6241–2); 2 males, 4 females [1j1p], Cape Torrens CP, Kangaroo Is, end of Jump-off Rd, 4 November

1987, D. Hirst (SAMA NN6244–9); 4 females, Jimmy's Well, 35°17'S 140°02'E, 17 March 1992, D. Hirst (SAMA NN6211–3, NN6272); 2 females, between Bucks Camp Well and Rabbit Is, 35°56'S 140°19'E, 18 March 1992, D. Hirst (SAMA NN6214–5); 1 female, 4km N Bucks Camp Well, Mt Rescue CP, 35°54'S 140°18'E, 18 March 1992, D. Hirst, vibration (SAMA NN6272); 1 male, 1 female, 2.4 km N Sandford Dam, Danggalli CP, 33°19'05"S, 140°54'49"E, 22 November 1996, D. Hirst (SAMA NN6123); 1 female, Koppio Hills, NW Todd R Reservoir, W side of Bald Hill, near creek, 26 March 1987, D. C. Lee and D. Hirst (SAMA NN6274); 1 female [1j], Kolay Hut, 32°33'S 135°36'E, 8–11 December 1989, D. Hirst (SAMA NN6232); 1 male, 18 miles E Abrakurrie, 4 January 1960, P. Aitken (SAMA NN6231); male, Kangaroo Is, Flinders Chase NP, West Bay, 35°54'S 136°32'E, pan trap, January 1986, A. D. Austin (WAM 98/1694); 1 female, Crystal Brook Caravan Park, 33°21'S 138°12'E, South Australia, 21 April 1992, D. Hirst (SAMA NN6196); 7 females, Gum Lagoon CP, 36°17'S 140°20'E, 26 March1992, D. Hirst, vibration (SAMA NN6204–10); 1 male, Renmark, 14km WNW, 34°06'S 140°36'E, mallee on dune, pitfall and intercept traps, 13 December 1995–25 January 1996, K. R. Pullen (QM S70305). ***Western Australia*****:** 2 females, Stirling Range NP, White Gum Flat, 34°24'S 117°55'E, 1 April 1993 (under wandoo bark), M. S. Harvey, J. M. Waldock (WAM 98/1698–99); female, Huntingdale, 11 December 1988, A. F. Longbottom (WAM 98/1695); female, Dwellingup, 32°43'S 116°04'E, Curara block, pitfall trap, 24 September 1976, J. D. Majer (WAM 98/1696); 1 female, same locality, 1971, J. Springett (AMS KS52064); 3 females, Gelorup, lot 101, Gelorup Drive, 33°23'S 115°39'E, attracted to vibration of vehicle, 15 March 1996, K. F. and A. F. Longbottom (WAM 98/1700–1703); 1 male, 1 female, Hepburn Heights (HH2), wet pitfalls, 31°49'07"S 115°46'11"E, 28 November 1995–29 January 1996, M. S. Harvey, J. M. Waldock (WAM T74021, T74022); 1 male, Cannington Botanical Reserve, 32°01'29"S 115°58'57"E, December, 1986, W. Humphreys *et al*. (WAM T56016); 1 male, 2 females, York, 10km SW, 31°57'S 116°42'E, rocky scrub, litter, 5 December 1996, R. J. Raven (QM S31462). ***New South Wales*****.** 1 male, Gubatta (site 8G), 33°35'S 146°36'E, road verge, 6–14 December 1999, D. Driscoll (QM S53938); 1 male, as above but 12–18 October 1999 (QM S52895); 1 male, Gubatta (site 9G), 33°34'S 146°32'E, spinifex, 6–14 December 1999, D. Driscoll (QM S53772); 1 female, as above but 12–18 October 1999 (QM S52977); 1 female, Humbug Ck, 8km SW West Wyalong, 33°59'S 147°10'E, grassland, 18 December 1997–10 January 1998, K. and D. Krebs (QM S46702); 1 female, Taleeban (site 8T), 33°53'S 146°28'E, road verge, 3–10 November 1999, D. Driscoll (QM S52663). ***Victoria***. 1 female, Murray Valley Highway, Skeleton Creek crossing, 36°07'S 145°11'E, 2–7 December 1994, S. Hinkley *et al*. (NMV K4415).

Diagnosis. Males differ from those *M. marmorea* in the stouter palpal tibia (Fig. 17a), RTA and cymbium and the narrower median apophysis, and from *M. elapines* **sp. nov.** in the simple undivided median apophysis (Fig. 17c) and the absence of thorn-like spines on coxae I–III. Females differ from those of *M. elapines* **sp. nov.** in the broad epigynal septum that extends back to the epigynal fold.

Description. Male (holotype, SAMA NN6218)

Carapace 2.06 long, 1.59 wide. Abdomen 2.50 long, 1.25 wide. Total length, 4.8. *Colour.* Carapace fawn with narrow dark lateral bands and pair of wider paler paramedial bands to posterior declivity; eye region fawn. Abdomen dorsally pallid with narrow “V anteromedial; lateral of “V broader, irregular longitudinal bands. Legs concolourous with carapace, darker bands subbasally and distally on tibiae and metatarsi. Sternum, maxillae and labium fawn brown; abdomen ventrally pallid with light black mottling strong laterally and posteriorly but weakening centrally. *Carapace*. Uniform cover of long light brown hairs. *ca*. 10 long thick bristles project forward from clypeus. *Eyes*. ALE=PLE>AME=PME. Both rows clearly recurved, posterior row almost forming 2 rows. *Chelicerae.* Small, vertical; dentition, 3P, 2R. Sternum cordate; strong outward bristles on margin, weak centrally radial bristles otherwise, also present but shorter on ventral coxae including maxillae. *Legs. ca*. 17 long, thick, lanceolate bristles on retroventral edge of coxae IV only. Leg 1: 1.53, 0.78, 1.41, 1.16, 0.72; 5.60. Leg 2: 1.41, 0.81, 1.16, 1.16, 0.78; 5.41. Leg 3: 1.38, 0.75, 1.00, 1.13, 0.63; 4.89. Leg 4: 1.88, 0.97, 1.63, 1.88, 0.66; 7.02. Palp: 0.75, 0.31, 0.34, 0.78; 2.18. *Scopula*. Weak on metatarsi and tarsi I, II; sparse on tarsi III, IV. *Spines.* Very long spines basally on dorsal femora. I: fe pv1p1d2r2; pa0; ti p2v2.2.2; me v2.2. II: fe pv1p2d3r2; pa0; ti p2v2.2.2; me p1v2.2. III: fe pv1p2d3r3; pa 0; ti p2d2r2v4.2.2; me p1.2.1r2.2.1v2.2.1. IV: fe pv1p2d3r2; pa0; ti p2d2.1r2v4.2.2; me p2.2.2r2.2.2v2.2.1. Palp: fe p1d1.1.2; pa p1;

ti p2d2w. *Palp*. Tibia stout, as long as wide; RTA is two long conical prongs arising from common, short, domed base with transverse ridge marking narrow unsclerotised distal face. n (or inverted U)-shaped tegulum with low, small, translucent groove forming conductor. Median apophysis central, narrow, apical hook offset lower than base. Embolus origin gourd-shaped. Cymbium asymmetrical with short rounded apex and distinct wide sclerotised ridge retrolaterally for full length, strong comb of curved setae ectally; apically a wide band of thick, recurved setae; prolaterally with unmodified setae.

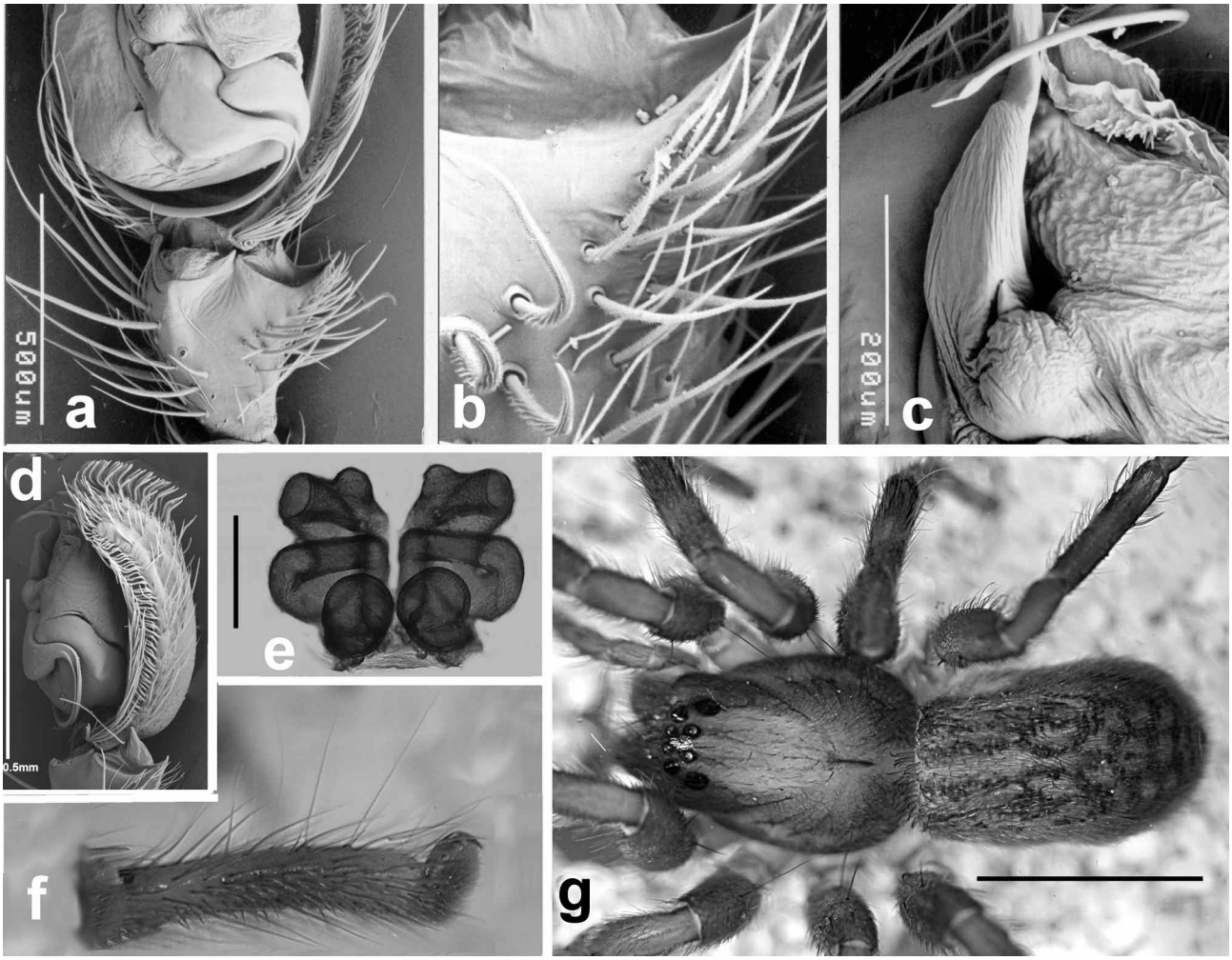

FIGURE 17. *Mitzoruga insularis* **sp. nov.**, male and female: a–d, male palpal tibia and cymbium, scanning electron micrographs, ventral view (a), cymbium and tibia ventral view (b), RTA tip, ventral view (c), bulb close-up, retrolateral view (d); e, female spermathecae, dorsal view; f, female tarsus I, showing claw tufts and trichobothria; g, female, dorsal view. Scale lines: f as for d, 2mm for g.

Female (allotype, SAMA NN6219)

Carapace 2.47 long, 1.88 wide. Abdomen 3.19 long, 2.03 wide. Total length, 6.2. *Colour*. Carapace like male. Abdomen dorsally dark with medial dark "V with ectal arms forming irregular dark chevrons; ventrally as male; legs as male but darker bands. *Claws*. With tufts, like male; palpal claw with 3 teeth and no tuft. No modified setae on coxae. *Legs*. I: 1.53, 1.03, 1.16, 0.97, 0.59; 5.28. II: 1.47, 0.88, 1.09, 1.09, 0.53; 4.81. III: 1.38, 0.81, 0.94, 0.97, 0.53; 4.63. IV: 1.97, 1.06, 1.63, 1.78, 0.66; 7.10. Palp: 1.09, 0.38, 0.41, 0.63; 2.51. *Spines*. No paired lateral spines on metatarsi III, as on IV. I: fe pv1d2w; pa0; ti v1.2.2w; me v2 basal. II: fe p1d2w; pa0; ti v1.2.2w; me v2 basal. III: fe pv1p2d3r1; pa0; ti p2r2v3.2.2; me p1r1v2.1. IV: fe p2d3r2; pa0; ti p2d2.1r2v3.2.2; me p2.2.2r2.2.2v2.2.1. Palp: fe d1.1.2; pa p2; ti p2; ta p2r2v2 apical. *Scopula*. Dense, but not obscuring cuticle on metatarsi and tarsi I, II; absent on tibiae. *Epigyne* (Figs 18a, b). Anteriorly with isolated pair of procurved lunate fossae; posteriorly with narrow medial septum with rounded lateral lobes.

Distribution and habitat. Known from southwestern Western Australia from low sand dunes, with low mallee, some *Triodia*, heath or low eucalypts; on Kangaroo Island and north of Adelaide, South Australia and western Victoria and New South Wales.

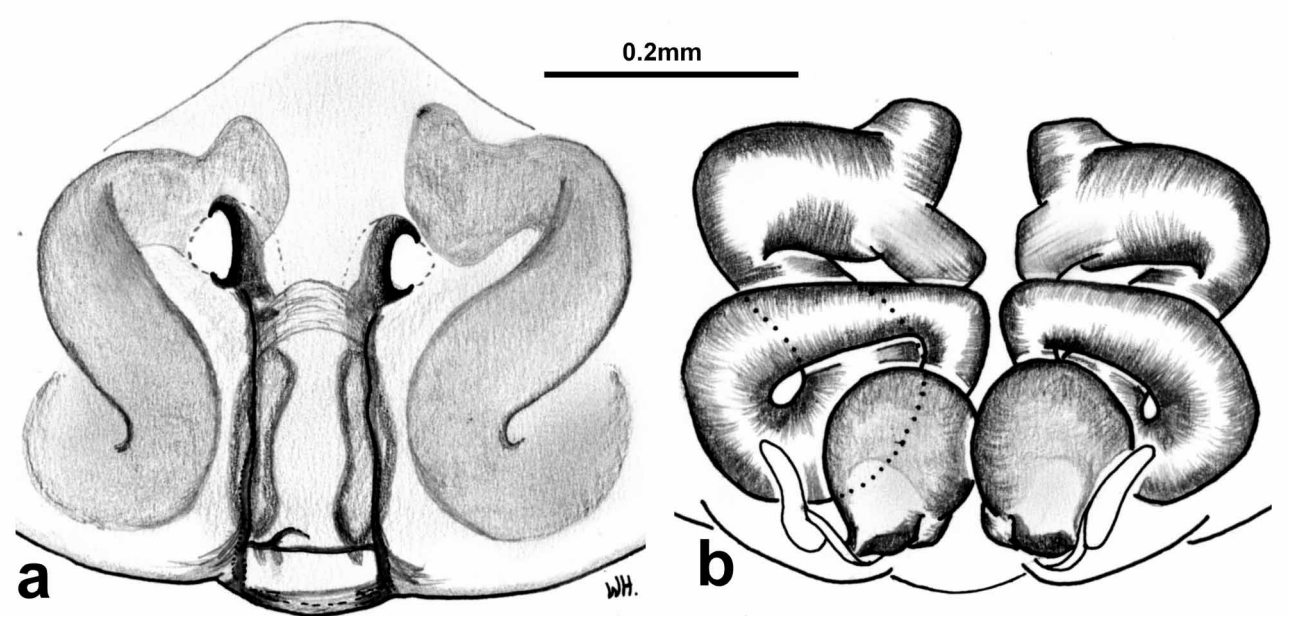

FIGURE 18. *Mitzoruga insularis* **sp. nov.**, allotype, female SAM NN6219: a, b, epigyne, external (a) and internal (b) views.

***Mitzoruga marmorea* (Hogg, 1896), comb. nov.**
(Figs 19a–c, 20a, b, 25a)

Zora marmorea Hogg, 1896: 326.
Uliodon marmoreus: Rainbow 1911: 247.

Material examined. *Syntypes*. 2 females, Palm Creek, McDonnell Ranges, 24°04'S 132°40'E, Northern Territory,1896, Horn Expedition, 1896 (NMV K936, 937); 2 males, 1 female, same data (AMS KS52055, ex. K1959); 1 female, same data (BMNH 1897.1.1.18.7).

Other material. Australia: *Northern Territory*: male, Glen Helen, 23°25'S 132°14'E, 20 July 1933 (NMV K4472); 3 females, Illamurta Springs (vibration), 24°18'30"S 132°41'10"E, 24 March 1993, D. Hirst (SAMA NN6234–6); 1 female [3 penultimate males], same locality as previous, 23 March 1993 (SAMA NN6233); 1 female, same locality as previous, 25–26 March 1993 (SAMA NN6237); 1 female, 16km W of Ruby Gap National Park entrance, 23°30'S 134°49'E, 22 March 1993, D. Hirst (SAMA NN6238). ***South Australia***: 1 female, 8.7km WSW Johnson Bore, 29°33'30"S 136°08'21"E, 6 October 1995, D.E.L.M. Stony Desert Biological Survey (SAMA NN6197); 2 males, 2 females [11j], North Mt Woodroffe, 26°16'S 131°45'E, 21 October 1994, ex mallee, Pitjantjatara Lands Survey (SAMA NN6198–201); 1 female, 7km Mt Woodroffe, 26°17'S 131°48'E, 16 October 1994, Pitjantjatara Lands Survey (SAM NN6202); 1 female, Christmas Ck, Mt Crispe, 26°24'S 135°23'E, ANZSES Expedition, 27 August 1992 (NMV K4471).

Diagnosis. Males differ from those of *M. insularis* in the relatively longer male palpal tibia (Fig. 19a), RTA (Fig. 19c) and cymbium and the broader median apophysis (Fig. 19b), and from *M. elapines* in the simple undivided median apophysis. Distodorsal ridge of recurved setae on cymbium poorly defined and no thicker setae posterolateral of that (Fig. 19a). Females differ from those of *M. insularis*, **sp. nov.** in the broader epigynal septum (Fig. 20a) and smaller trianguloid shape formed by the dissimilarly wide spermathecae (Fig. 20b).

Description. Male (NMV K4472)

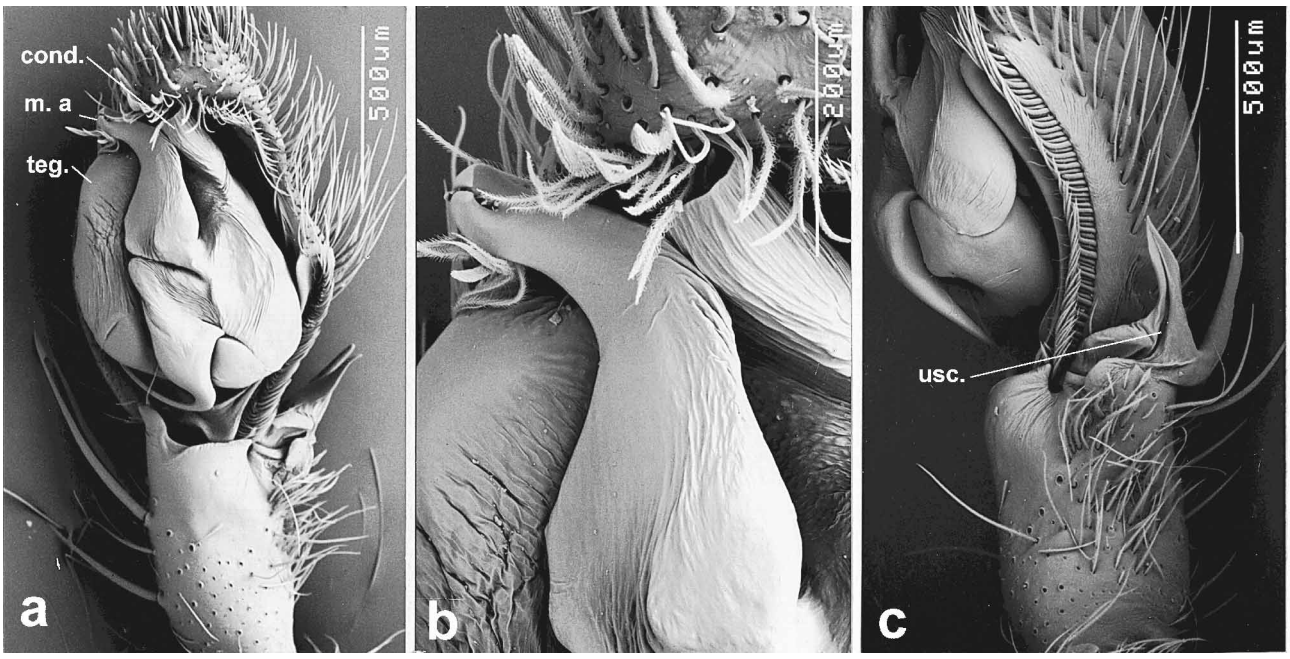

FIGURE 19. *Mitzoruga marmorea* (Hogg), male, palp tibia and cymbium, scanning electron micrographs: a, ventral view; b, median apophysis, ventral view; c, RTA and cymbial edge, retrolateral view.

Carapace 3.83 long, 2.77 wide. Abdomen 3.77 long, 2.00 wide. *Colour.* Carapace, including eye region, fawn, without darker marking. Otherwise like *M. elapines* **sp. nov.**. *Carapace.* Uniform cover of long fawn hairs. 5–8 long thick bristles project forward from clypeus. *Eyes*. AME clearly smallest. Both rows clearly recurved, posterior row more so. *Chelicerae*. Small, vertical; dentition, 3P, 2R. Sternum cordate; uniform cover of thick, erect, hardly tapering bristles, also present but shorter on ventral coxae including maxillae. *Spines.* Very long spines basally on dorsal femora. I: fe pv1p1d3r2; pa0; ti p2r2v4.2.2; me p1r1v2.2. II: fe pv1p2d3r2; pa0; ti p2r2v3.2.2; me p1r1v2.2. III: fe pv1p3d3r3; pa 0; ti p2d2r2v3.2.2; me p1.2.1r2.2.1v2.2.1. IV: fe p4d3r2; pa0; ti p2d2.1r2v3.2.2; me p1.2.1r2.2.1 v2.2.1. Palp: fe p1d1.1.2; pa p1; ti p3. *Legs.* RCH a pinhole. Coxal bases with slight triangular projections posteriorly. I: 3.25, 1.67, 2.58, 2.83, 1.83, 12.17. II: 3.17, 1.67, 2.83, 2.58, 1.58, 11.83. III: 2.67, 1.33, 1.75, 2.75, 1.83, 10.33. IV: 3.92, 1.67, 3.50, 3.83, 1.33, 14.25. Palp: 1.75, 1.00, 0.83, –, 1.33, 4.92. *Scopula*. Tarsi (rubbed) I–II present; hairs dense, obscuring cuticle; IV with line of emergent setae. Metatarsi I–II strong, in 2 lateral bands for distal two-thirds and also ventral for distal quarter; in weak distal quarter on III, IV and tibiae. Claw tufts strong, as high as claws. *Palp* (Figs 19a–c). Tibia *ca*. twice as long as wide with long curved triangular prong on prolateral corner; RTA laterally resembles two long narrow curved beaks with unsclerotised areas at each base; retroventral collar of tibia sclerotised with distinct erect cone and narrow notch beside base of tibia apophysis. Subtegulum prolateral and roughly triangular rounded ridge distally with long, wide, sclerotised, collariform conductor. Median apophysis (Fig. 19b) central, slightly scooped, shield-like, with small bifid apex distally. Embolus origin small, basal; embolus tapers quickly runs clockwise arising retrodistally. Cymbium asymmetrical with short rounded apex and distinct wide sclerotised groove retrolaterally and with strong comb of curved setae ectally; deep retrolateral groove for *ca*. half length; apically a narrow but poorly defined ridge of thick, recurved setae.

Female SAMA NN6237. Like male but: *Colour.* Carapace orange brown with narrow brown edge on lateral margin and pair of irregular brown patches postero-lateral of fovea. Abdomen like male. *Legs*. I: 2.44, 1.34, 1.97, 1.69, 1.03, 8.47. II: 2.25, 1.25, 1.91, 1.59, 0.94, 7.94. III: 2.13, 1.13, 1.69, 1.50, 1.03, 7.33. IV: 2.81, 1.25, 2.44, 2.72, 1.03, 10.25. Palp: 0.97, 0.56, 0.72, –, 0.94. *Spines*. None on patellae I–IV. I: fe p2d2; ti v1.2.1; me v2. II: fe p4d2; ti v1.2.1; me v2. III: fe p4d3r3; ti p3d2r2v1.2.2; me p1.2.1r1.2.1v2.1. IV: fe p2d3r1; ti p3d2.1r2v1.2.2; me p1.2.2r2.2.2v2.1.1.1. Palp: fe p1d1.2; pa p1 d1 apical; ti p3r2; ta p2r2v2.

Scopula. Absent on tibiae; full on metatarsi I, II and tarsi I–III, distal half of metatarsi III, weak on tarsi IV, absent on metatarsi IV. *Epigyne* (Figs 15a, b). A wide median septum anteriorly interlocking with wide L- or J-shaped fossae.

Distribution (Fig. 25a)**.** Known only from MacDonnell Ranges in southern Northern Territory and nearby Glen Helen and northern and central South Australia.

Remarks. Although the material from South Australia was taken quite remote from other material, the epigyne both internally and externally are consistent with the material from the Northern Terittory. The syntypes were all in poor condition.

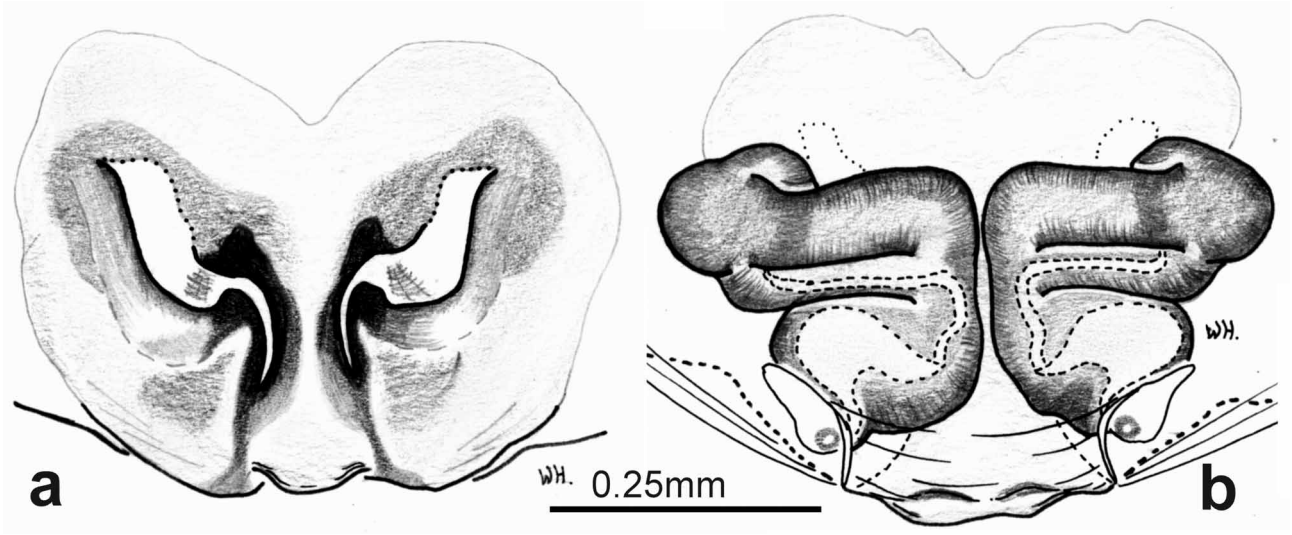

FIGURE 20. *Mitzoruga marmorea* (Hogg), female: a, b. epigyne, external (a) and internal (b) views.

***Nuliodon* gen. nov.**

Type species. *Nuliodon fishburni* **sp. nov.**

Diagnosis. Differs from *Miturga* in the presence of claw tufts (Fig. 24a), from *Mituliodon* in the absence of strong scopulae on metatarsi and tarsi I–IV, the form of the male palp (Fig. 21a, b), viz., short embolus, absence of cymbial groove and small conductor. Resembles *Mitzoruga* gen. nov. in the distodorsal crest of thick curved setae on cymbium (Fig. 21a), and the carapace shape but males differ in the stout RTA (Figs 21c, d), the absence of dark stripes on the carapace (Fig. 22e) and the large median apophysis is not in the same line as the embolus origin (Fig. 21a).

Etymology. Based on the zoropsid genus name *Uliodon* which it somatically resembles; the gender is feminine.

Description. Carapace brown with irregular darker flecks along striae (Figs 22b, e); abdomen dorsally fawn with irregular mottling forming weak internested "V"s; ventrally with irregular darker mottling; legs brown with weak paler bands (Figs 22a, e, g). Carapace pear-shaped with gentle anterior constriction; caput low; fovea present reaching to edge of posterior declivity; caput slightly elevated, distinct; other striae indistinct; lightly hirsute. Clypeus *ca*. one AME diameter high. Eight eyes in two rows: anterior narrower, recurved; posterior more recurved (Fig. 22b). All eyes of similar size with anterior row eyes slightly larger. Group occupies two-thirds of headwidth. AME on common tubercle on clypeal edge, look forward, to side and up; ALE less than 1 diameter away look more up and to side, PME paler look up, *ca*. 1 diameter apart; PLE look to side. Chelicerae small, vertical with small boss; fangs short, diaxial; dentition 3 small P, 2 R, of short furrow; long pallid ovoid area prolaterally above fangs. Maxillae (Fig. 22f) roughly diamond-shaped with rounded corners and shallow basal diagonal groove; serrula long. Labium (Fig. 22f) short, shield-like.

Sternum (Fig. 22f) almost lenticular; converges in front, rounded margins, strong setae along marginal band, marginal setae outward, central setae radially directed inward. *Legs*. Coxae with rounded inner edges, anterior corner of basal strial attachment triangular, smaller process on posterior corner. RCH raised, pallid. Coxae IV of male cluster of *ca*. 10–20 long thick setae on ventral inner corner (Fig. 22d). Trochanters short, with small but distinct deep notches *ca*. 1.5 times wider than deep (Fig. 22g). Tarsi slightly curved. Female palpal tarsus tapered conical, unmodified; claw clearly evident. *Scopula*: on male weak, thin on tarsi I, II, not obscuring cuticle reduced to distal group of setae on III, IV, weak, thin, lateral group of scattered hairs on metatarsi I, II, absent on III, IV and tibiae. Scopula slightly denser in females than males, for *ca*. 0.8 of metatarsal length, full length of tarsus. Trichobothria in 2 rows on tibiae, an irregular line on metatarsi, two bands on tarsi, distal most trichobothria on each segment very long. Trichobothrial base collariform (Fig. 24a). Tarsal organ ovoid with ovoid aperture (Fig. 24b). *Spines*. Male (female): proventral spine on femora I, II weak; patellae aspinose; tibiae I, II with 3 pairs of weak spines (only 3–4 thicker bristles) ventrally, much weaker than on metatarsi; 2 (1) pairs on ventral metatarsi I, II. Female palp: fe p1; pa d1 elongate; ti p3d2 all strong; ta p3d1r2 v2 subdistally. Preening combs absent. *Claws*. 2 claws with 3–6 teeth; claw tufts dense, fused, as high as claws but not obscuring teeth. Female palpal claw with 3–4 teeth. *Spinnerets* (Fig. 22g). Colulus small. Female: ALS *ca*. 2x diameter of PLS and longer, PLS slightly longer than PMS with conical apical segment; PMS long, cylindrical with no enlarged spigots on tip or dorsally. *Male Palp* (Fig. 21). Tibia short, with retrodistal RTA with inner keel and outer flange with unsclerotised crescent between them. Cymbium short with ovoid apical scopula and long thick recurved setae apically; apical cone wide, short, retromargin with wide flattened area with medial groove for basal third; light cage of long bristles on promargin (Fig. 21a). Bulb: tegulum with several processes and lobes apart from prominent distal bifid median apophysis and short embolus originating on mid-prolateral edge; small conductor below median apophysis. *Epigyne* (Figs 22c, g, 23a, b). Externally a pair of anterior crescentic ridges set diagonally; medially forming shallow trough posteriorly; vulva simple, copulatory fossae funnel-shaped with short twisted duct leading to enlarged distal spermatheca and fertilisation duct.

Distribution and habitat (Fig 25a, 26b)**.** Known only from leaf litter in open eucalypt, wet sclerophyll, semi-evergreen vine thicket, Blackbutt close forest and heath mixed with eucalypt forest from Rockhampton to Ipswich, southeast Queensland.

Remarks. *Nuliodon* gen. nov. includes the smallest miturgids known (total length about 5 mm); the spiders are common in open forest, but not rainforest, leaf litter. Perhaps as a result of limited spider surveys in the Brisbane area prior to 1990, records of these spiders prior to 1978 are lacking. Despite this, these spiders were taken very close to long-occupied suburbs and in bushland on the Griffith University campus. Hence, this new species has literally long been in the backyards of Brisbane dwellers.

***Nuliodon fishburni* sp. nov.**
(Figs 21a–d, 22a–g, 23a, b, 24a–c, 25a, 26b)

Material examined. ***Holotype***. male, Fraser Island: Orchid Beach, Fishburn property, 24°57'S 153°17'E, southeastern Queensland, 19 August–16 September 1997, pitfall, R. Raven, P. Lawless, eucalypt forest (QM S31483).

***Paratypes*.** Allotype female, North Stradbroke Island, Enterprise Mine, Mallee #3, 27°35'S 153°26'E, southeastern Queensland, 11 January 2002, QM party (QM S72691).

Other material examined. **Australia: *Queensland*:** *Southeastern Queensland***:** 5 males, 3 females, same data as holotype (QM S31485); 4 females, Bellbird Grove, Brisbane Forest Park, 27°28'S 153°00'E, 9 January 1997, R. J. Raven (QM S31336); 1 male, Belmont Hills Bushlands, 27°30'S 153°07'E, 1–30 October 2003, QM party (QM S63963); 1 male, same data but 30 October–1 December 2003 (QM S63964); 1 female, same data but 1 November 2003 (QM S63967); 1 female, same data but 30 January–1 March 2004 (QM S63973); 1 male, Binjour Plateau, Redvale Rd, 25°32'S 151°27'E, 23 September–21 December 1997, intercept flight trap,

G. Monteith, D. Cook, open forest (QM S44526); 1 female, Binjour Plateau, 25°28'S 151°22'E, 17 November 2000, R. Raven, B. Baehr (QM S60166); 1 male, 2 females, Binjour Plateau, "dump" S of Highway, 2528'S 151°22'E, 16 November 2000–13 January 2001, pitfall trap, R. Raven, rainforest (QM S58608); 1 female, Braemar SF, 27°12'S 150°50'E, 4–8 February 1980, R. Raven and Qld Museum, cypress and brigalow, litter (QM S39141); 1 female, same data but 15–19 October 1979 (QM S39140); 1 male, 1 female, Buhot Creek, Burbank, 27°35'S 153°10'E, 30 June–28 July 2003, pitfall trap, S. Wright, E. Volschenk, woodland/riparian

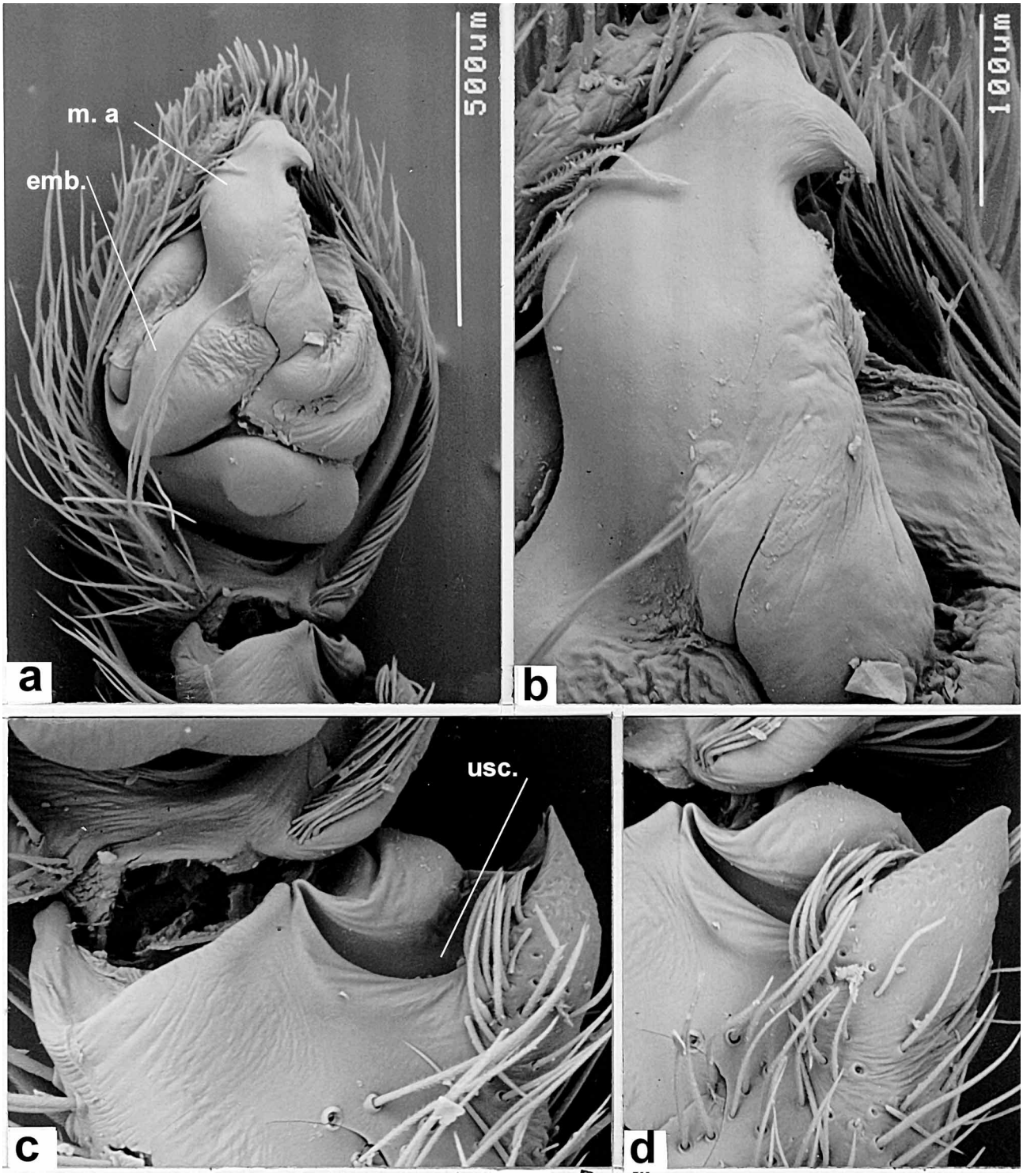

FIGURE 21. *Nuliodon fishburni* **sp. nov.**, male: a, palpal tibia, cymbium and bulb, ventral view; b, median apophysis, ventral view; c, d, RTA, ventral (c) and retrolateral view (d).

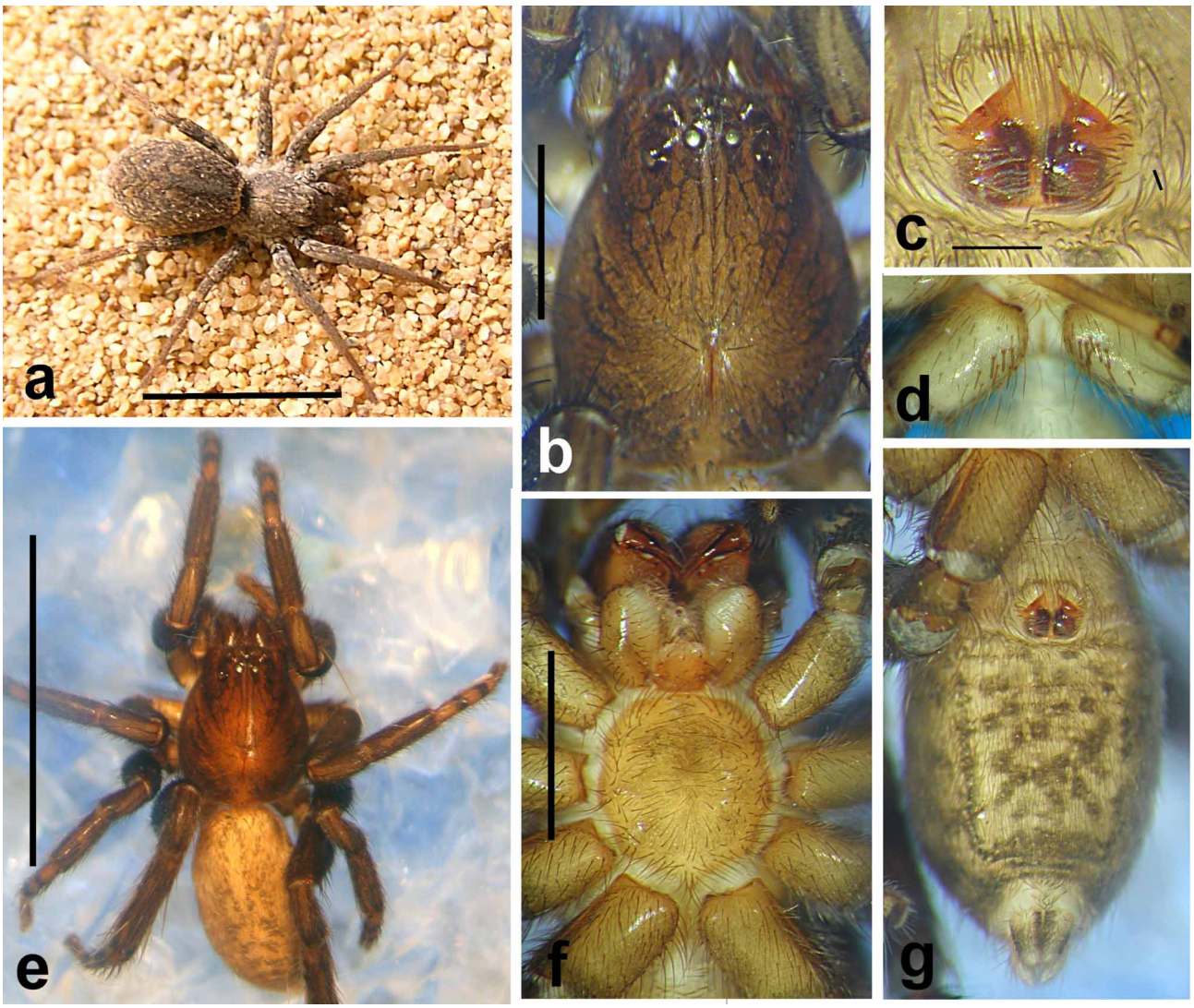

FIGURE 22. *Nuliodon fishburni* **sp. nov.**, female: a, habitus; b, carapace, dorsal view; c, epigyne, external view; d, coxae IV, ventral view; e, carapace, abdomen and legs, dorsal view; f, sternum, maxillae and labium, ventral view; g, abdomen, ventral view. Scale lines: 5mm for a, e; 1mm for b, f; d, f, g to same scale; 0.2mm for c.

(QM S62858); 2 males, same data but 6 November 2003, QM party (QM S68911); 2 males, Camira, 27°37'S 152°55'E, 20 October 1996, R. J. Raven (QM S31329, S31353); 1 male, Doolandella, Paradise Rd, 27°36'S 153°01'E, 1–15 February 2002, pitfall trap, C. Burwell, open forest (QM S62981); 1 female, Drewvale, Illaweena St, 27°38'S 153°03'E, 17 February 2004, QM party (QM S68915); 1 female, Enoggera Reservoir, 27°26'S 152°54'E, 27 January–15 March 2000, pitfall trap, G. Monteith, J. Holt, open forest (QM S70396); 1 male, Fraser Island, Orchid Beach, Marloo Ave, 24°57'S 153°18'E, 7 July –3 December 1998, R. Raven, P. Lawless (QM S51875); 2 males, Fraser Is, Orchid Beach, 24°57'S 153°18'E, 20 August–7 December 1997, pitfall trap, R. Raven, P. Lawless, heathland (QM S41755); 1 male, Gold Creek Reservoir, 27°27'S 152°52'E, 1–30 October 2003, pitfall trap, QM party, spotted gum, open forest (QM S63965); 1 female, same data but 31 March –30 April 2004 (QM S63966); 1 female, same data but 23 February 2004 (QM S63968); 2 males, 1 female, same data but 30 October–1 December 2003 (QM S63969); 1 male, same data but 1 December 2003–2 January 2004 (QM S63970); 1 male, same data but 2–30 January 2004, QM S63971); 1 male, same data but,30 January–1 March 2004 (QM S63972); 1 male, 1 female, same data but 4 November 2003 (QM S63974); 1 male, Griffith University, Nathan, Brisbane, 27°28'S 153°02'E, 11 December 1975, berlesate, G. Oliver, scribbly gum, heath (QM S39147); 1 male, as above but 2–30 January 2004 (QM S68912); 1 male,

Ipswich: Kholo, Coal Ck, 27°34'S 152°44'E, 13 January–16 May 1999, G. Monteith, open forest (QM S49997); 1 male, 1 female, Karawatha Forest, 27°37'S 153°05'E, 1994, D. Stewart (QM S39183); 1 male, 1 female, Karawatha Forest, site 6, 27°37'S 153°05'E, 2–31 October 2003, QM party, eucalypt woodland (QM S54970); 1 male, 5 November 2003 (QM S54978); 1 female, Kroombit Tops, Site 16, 24°22'S 151°02'E, 14 December 1983, G. Monteith, V. Davies, J. Gallon, G. Thompson, open forest, sieved litter (QM S39139); 1 female, Lake Broadwater (Site 2), 27°20'S 151°05'E, 3 January –25 February 1986, QLD Museum and M. Bennie (QM S39530); 1 male, same data but, 17 May–24 November 1985 (QM S39531); 1 male, Moreton Is, 27°11'S 153°24'E, 29 November 1978, V. Davies T. Tebble, beach, litter (QM S31084); 1 male, Mt Coot-tha, Brisbane, 27°29'S 152°57'E, 17 December 1996, R. J. Raven, open forest (QM S41182); 1 male, same data but, March – August 1992, Brian Heterick (QM S41271); 1 male, 1 female, Mt Deongwar, 3km S (site 1), 27°13'S 152°14'E, 14 October –30 December 1998, G. Monteith, D. Cook, wet sclerophyll (QM S50103, S50104); 2 males, same data but 30 December 1998–26 March 1999, G. Monteith (QM S50039); 16 females, 8 males, North Stradbroke Is, Enterprise Mine, Blackbutt site 1, 27°33'S 153°27'E, 8–9 January 2002, QM party (QM S55469; S55502, S56511, S55766); 1 male, same data but Blackbutt #2, 8–22 January 2002, QM party (QM S55508); 1 male, 3 females, same data but 27°34'S 153°27'E, 9 January 2002 (QM S55445), Blackbutt #3; 4 females, same data but Mallee #1, 27°34'S 153°26'E, 11 January 2002, mallee (QM S55430, S55436); 3 females, [2j], same data but Mallee #2, 27°35'S 153°26'E (QM S55442); 1 female, same data but 10 January 2002, C. J. Burwell (QM S55527); 2 males, 6 females, same data but Mallee #3, 11 January 2002, QM party (QM S55433); 2 females, [1j], same data but 7 January 2002 (QM S55765); 1 female, same data but Scribbly Gum #1, 27°36'S 153°26'E, 9–10 January 2002, D. J. Cook, scrubby gully (QM S55591); 1 male, 6 females, same data but Scribbly Gum #2, 10 January 2002, QM party (QM S56343); 1 male, 6 females [10j], same data but Scribbly Gum #3, 27°36'S 153°26'E, 8–22 January 2002 (QM S55566); 1 female, same data but 10 January 2002 (QM S55772); 1 female, North Stradbroke Is: "Gordon" (Gc), 27°38'S 153°24'E, March 1997, U. Nolte, open forest (QM S40989); 1 female [1j], North Stradbroke Is., "Gordon" (GE), 27°40'S 153°24'E, September 1997, U. Nolte, open forest (QM S41014); 1 male, 2 females, Nipping Gully (Site 1), 25°40'S 151°25'E, 18 December 1998–26 January 1999, pitfall trap, G. Monteith, C. Gough, rainforest (QM S50394); 2 males, Orchid Beach, Fraser Is, 24°57'S 153°19'E, 7 March–1 October 1996, pitfall trap, R. J. Raven, heathland (QM S31291); 1 male, 1 female, Pine Mt EP, 27°32'S 152°41'E, 13 January–16 May 1999, pitfall trap, G. Monteith, open forest (QM S49992); 2 males, 3 females, [2 penultimate males], Ransome Reserve, 27°29'S 153°11'E, 10 November 2003, QM party, Casuarina woodland (QM S68914); 1 male, same data but 1 December 2003–2 January 2004 (QM S68917); 1 male, same data but, 2–29 January 2004 (QM S68916); 1 male, same data but, 30 October –1 December 2003 (QM S68913); 1 female, Rochedale SF, 27°37'S 153°08'E, 5 March 1985, R. J. Raven (QM S39145); 1 male, same data but 20 December 1979, R. Raven, V. Davies (QM S39146); 1 male, 2 females, same data but 23 November 1979 (QM S39143); 1 male, 1 female, same data but 31 January 1980 (QM S39144); 2 females, Springfield, Brisbane, 152°55'E 27°40'S, 19 September 1998, K. Walker, G. Robinson (QM S42750, S42755); 1 male, Taroom District, Boggomoss (No.19), 25°25'S 150°00'E, 11 November 1996– January 1997, G. Monteith, D. Cook (QM S36208); 1 male, The Bluff, Keysland, 26°13'S 151°41'E trap, 24 November 1995–3 February 1996, flight intercept trap, G. Monteith, open forest (QM S37635). ***Mideastern Queensland***. 2 females, Blackdown Tableland, 23°50'S 149°02'E, 1–6 February 1981, R. J. Raven (QM S39142); 1 male, Mt Archer, Rockhampton, 23°20'S 150°35'E, 19 July–22 October 1990, pitfall trap, D. Wallace, R. Raven, K. Williams, semi-evergreen vine thicket (QM S19594); 1 male, Mt Chalmers (Hollins ppty), 23°18'S 150°38'E, D. Wallace (QM S22180); 1 male, Mt Gavial, 3km SSE, 23°37'S 150°28'E, 18 December 1998–14 March 1999, pitfall trap, D. J. Cook, open forest (QM S49989); 1 male, Olsen's Caverns (DW8), 23°10'S 150°27'E, 21 March 1991, pitfall trap, D. Wallace, R. Raven, K. Williams, open forest (QM S19834); 1 female, The Caves (DW 7), 23°11'S 150°27'E, 18 July –23 October 1990, pitfall trap, D. Wallace, R. Raven, K. Williams, open forest (QM S41287); 2 females, 2 males, Yeppoon, Bangalee Beach, 23°06'S 150°44'E, 1 December 1992–March 1993, pitfall and intercept traps, A. Walford, (QM S27485, S27488).

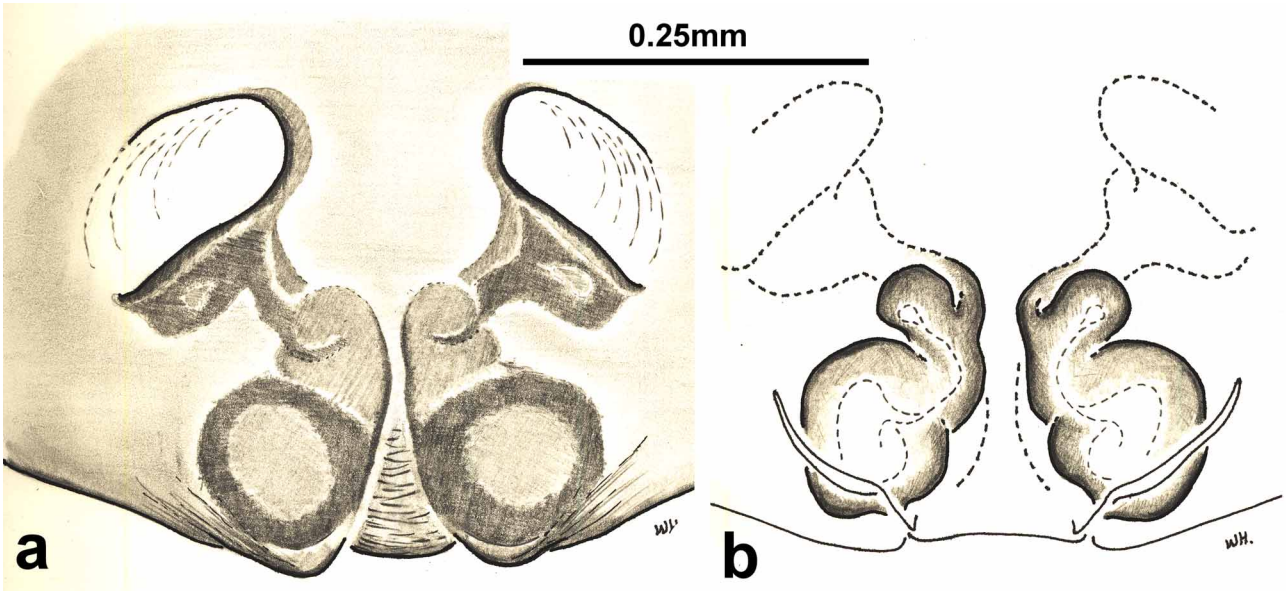

FIGURE 23. *Nuliodon fishburni*, **sp. nov.** Female QM S39530: a, b. epigyne, external (a) and internal (b) views.

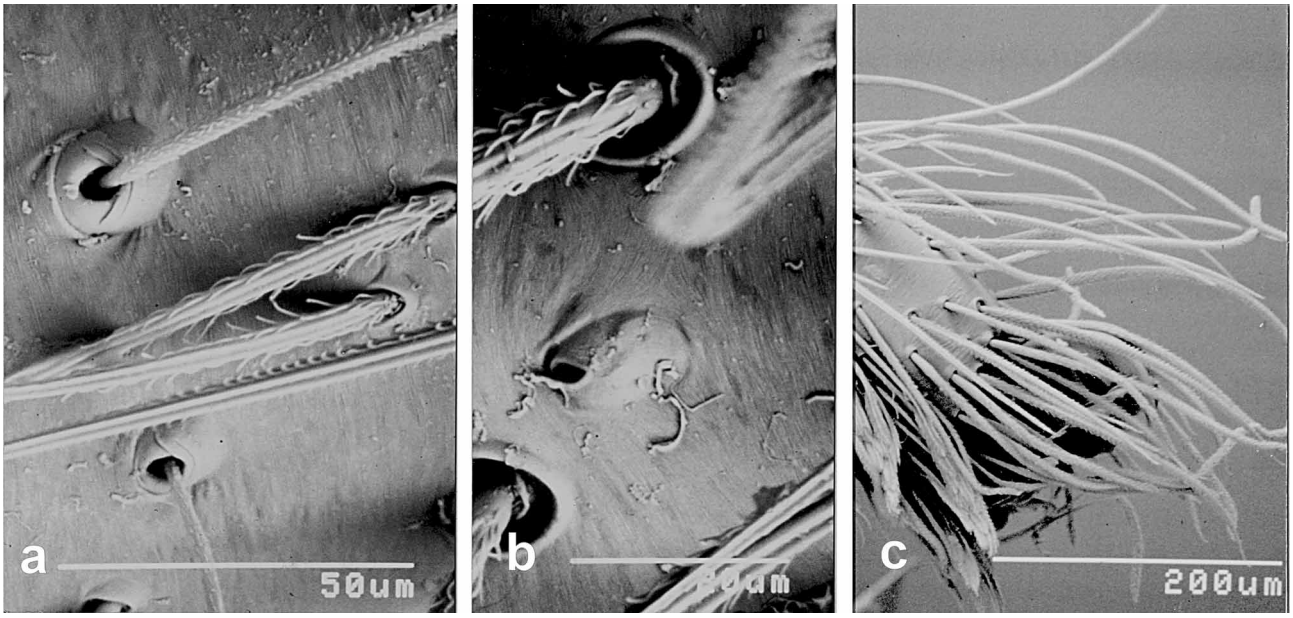

FIGURE 24. *Nuliodon fishburni* **sp. nov.**, female, scanning electron micrographs: a, tarsal trichobothria and cuticle, dorsal view; b, tarsal organ, dorsal view; c, claw tufts.

Diagnosis: As for genus.

Etymology: For Paul Fishburn, Queensland wildlife (EPA) ranger and naturalist, Fraser Island, in appreciation of his diverse knowledge, excellent observations and sound field advice.

Description. Male (holotype, QM S31483)

Carapace 2.25 long, 1.75 wide. Abdomen 2.65 long, 1.31 wide. *Colour.* Carapace mottled dark brown with lighter band centrally and submarginally; chelicerae and legs concolorous except for metatarsi orange brown with brown medial and distal rings, tarsi light orange-brown; sternum, maxillae, labium and coxae light orange-brown. Abdomen dorsally greyish-fawn with black flecks becoming larger and more dominant laterally but almost absent ventrally. *Carapace*. Light cover of short grey, fine bristles; band of *ca*. 12 long bristles project forward from clypeal edge. *Chelicerae*. Long bristles on inner edge. *Legs*. Coxae and trochanters dorsally with prolateral line of *ca*. 6 long bristles projecting forward with distinct gap to similar

group on retrolateral face. I: 1.56, 0.97, 1.41, 1.13, 0.78, 5.84. II: 1.34, 0.97, 1.22, 0.97, 0.72, 5.22. III: 1.41, 0.78, 1.06, 1.16, 0.72, 5.13. IV: 2.03, 0.94, 1.69, 1.78, 0.69, 7.13. Palp: 0.66, 0.41, 0.41, –, 0.71, 2.19. *Spines*. I: fe pv1p1d2; ti v2.2.2; me v2.2. II: fe pv1p1d2; ti p1v2.2.2; me p1r1v2.2. III: fe pv1p2d3r3; ti p3d1.2r2v2.2.2; me p1.2.2r2.2.2v2.2.3. IV: fe pv1p2d3r1; ti p3d2r3v3.2.2; me p2.2.1r2.2.2v2.2.3. Palp: fe p1d1.1.1.2; pa 0; ti p1. *Palp* (Fig. 21). RTA includes two processes, flat outer and larger process pointing dorsally and spike on ventral corner; deep sclerotised saddle across to low ridge beside tibia; unsclerotised crescent in saddle between two. *Bulb*. Subtegulum flat, rounded on probasal corner; tegulum roughly C-shaped from mid-prolateral edge distally across to mid-retrolateral edge. Median apophysis a large apically bifid hooked process distocentrally; embolus origin large triangular, from median apophysis base swings across to prolateral edge at *ca*. half of bulb passing behind median apophysis to rest in small conductor on retrodistal corner.

Female (allotype, QM S72601)

Carapace 2.18 long, 1.63 wide. Abdomen 2.81 long, 1.75 wide. Total length 6.13. As for genus but: *Colour*. Carapace, legs and ventral abdomen like male, pattern on dorsal abdomen faded. *Legs*. RCH small, high on face. I: 1.31, 0.91, 1.13, 0.81, 0.63, 4.78. II: 1.16, 0.84, 1.00, 0.72, 0.53, 4.25. III: 1.09, 0.72, 0.84, 0.72, 0.53, 3.91. IV: 1.78, 0.84, 1.38, 1.59, 0.63, 6.22. Palp: 0.69, 0.34, 0.38, –, 0.59, 2.00. *Spines*. I, II: fe p1d2; pa 0; ti v4 bristles; me v2 basal. III: fe pv1p2d3r1; pa 0; ti p2r2v2.2.2; me p2r2v2.1.1. IV: fe p1d2r1; ti p2d3r2v2.2.2; me p2.2.2.r2.2.2v2.2.1. Palp: fe p1d2; pa p1; ti p3r1v0; tarsus p3d1r2, v2 predistal. *Scopula*. Weak but entire on tarsi I, II; weak in distal quarter of metatarsi I, II; weak on tarsi III, none on IV. *Epigyne* (Figs 22c, e, 23a, b). Broadly ovoid with funnels forming diagonal ridges anteriorly. *Spinnerets*. Colulus absent. ALS slightly coniform; PMS cylindrical, almost as long as ALS but about 0.5 diameter; PLS coniform, smaller than ALS, apical segment coniform; no enlarged spigots evident on any articles.

Distribution and habitat (Fig 25a)**.** The spiders are found commonly in leaf litter formed in eucalypt forest (e.g., Fig. 26b) on sandy soil along the coats to about 120km inland from about Rockhampton to southern Queensland.

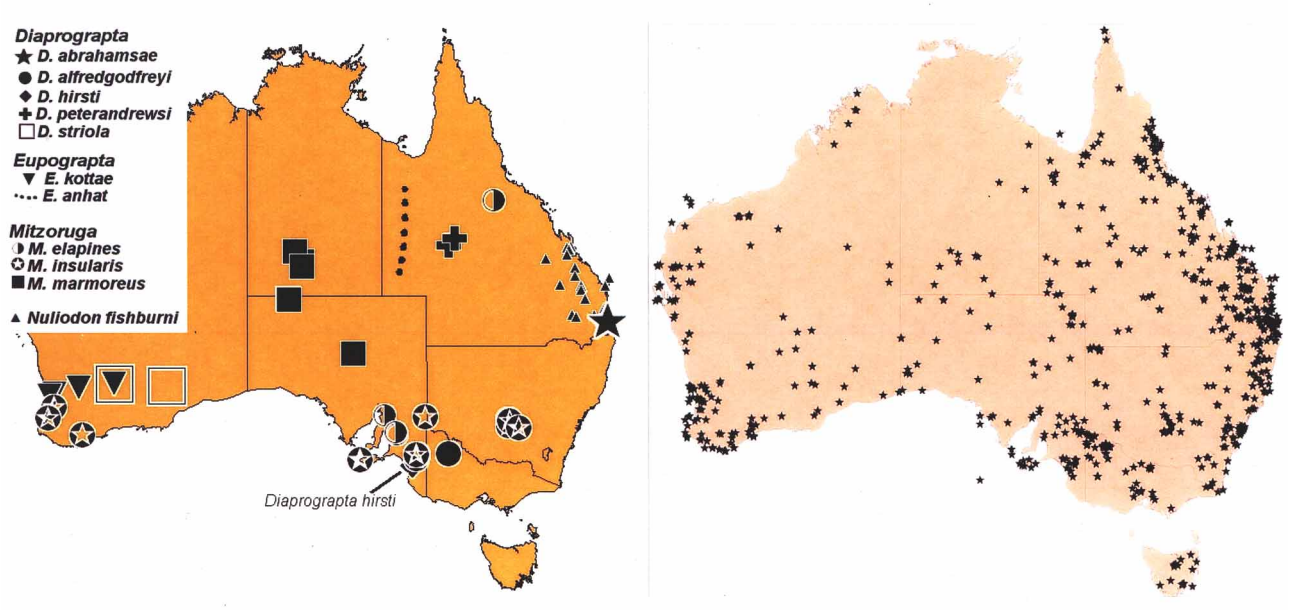

FIGURE 25. Distribution records of Miturgidae in Australia: a, *Diaprograpta*, *Eupograpta*, *Mitzoruga* and *Nuliodon*; b, all records of Miturgidae for Australia.

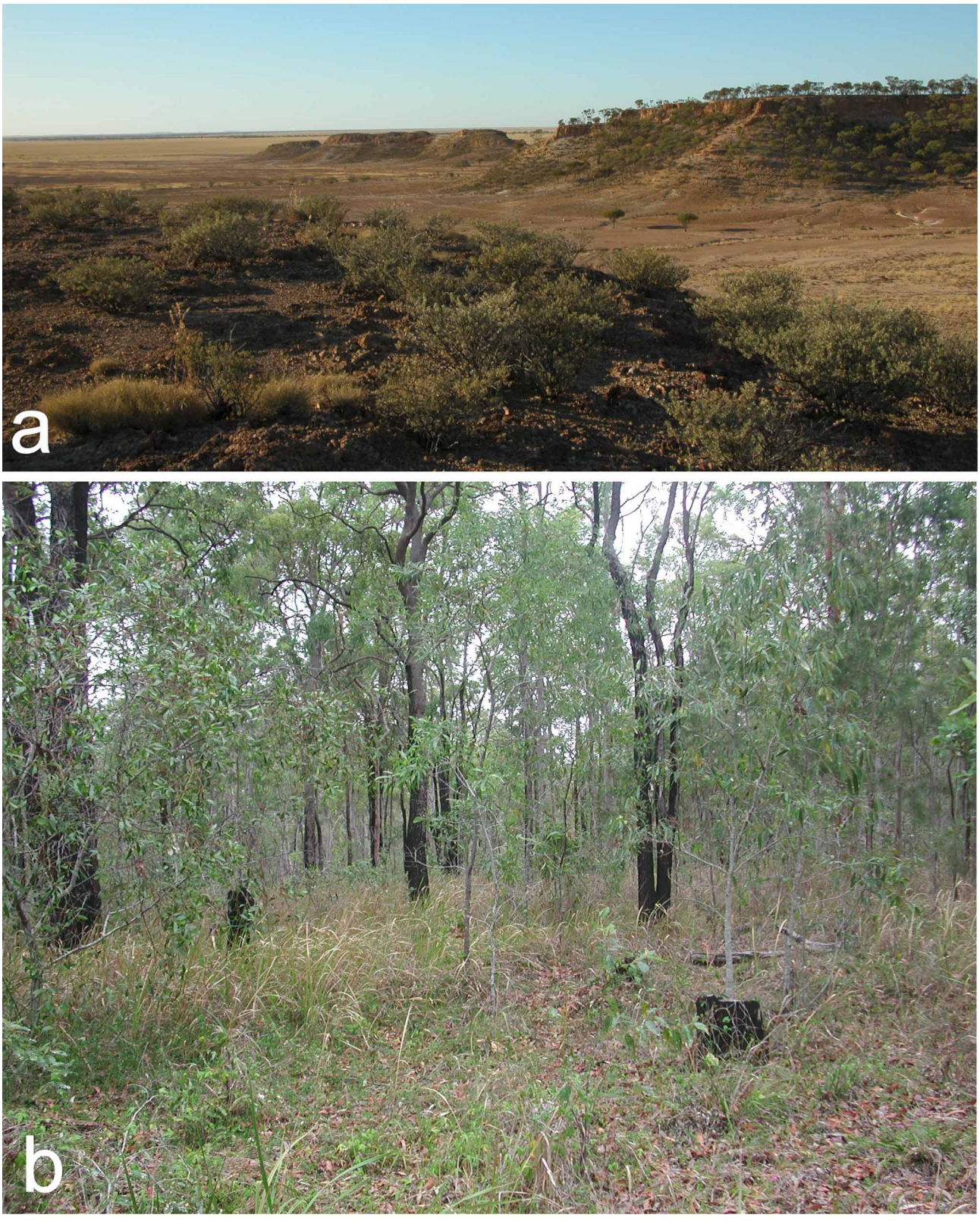

FIGURE 26. Habitats of miturgid species: a, *Diaprograpta peterandrewsi* **sp. nov.**, Ayrshire Hills, near Winton, Western Queensland (Photo: Andrew Amey); b, *Diaprograpta abrahamsae* **sp. nov.** and *Nuliodon fishburni* **sp. nov.**, Chelsea bushland, near Brisbane (Photo: R. Raven).

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