

## Review of the genus *Micropoltys* (Chelicerata: Araneae: Araneidae)

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Received 18.v.2010, accepted 17.ix.2010.

Published online at [www.arthropod-systematics.de](http://www.arthropod-systematics.de) on 03.xi.2010.

### > Abstract

The araneid genus *Micropoltys* Kulczyński, 1911 was originally described based on a single female specimen from western New Guinea. Three new species of the genus are reported here, *M. baitetensis* from eastern New Guinea, *M. debakkeri* from New Guinea and Cape York, and *M. heatherae* from north-eastern Australia and islands in the Torres Strait. No further specimens of *Micropoltys placenta*, the type species, have been discovered and this species is redescribed from the type female. Phylogenetic relationships of *Micropoltys* are briefly discussed.

### > Key words

Araneinae, taxonomy, new species, Indonesia, Papua New Guinea, Australia.

## 1. Introduction

In the second half of the 20<sup>th</sup> Century there were a number of papers published covering parts of the Australian araneid fauna (e.g. DAVIES 1980, 1988; LEVI 1983) as well as a long series of publications on New Guinea spiders by Fr. Chrysanthus, several of which included araneids (e.g. CHRYSANTHUS 1960, 1961, 1971). These publications demonstrated the richness of the Australasian fauna, but for many taxa this was only the tip of the iceberg. More recently there have been further contributions by SMITH (2006), HARMER & FRAMENAU (2008) and a major review of Australian Araneinae conducted by V. Framenau and N. Scharff is resolving many problems in Australian araneid taxonomy and finding new endemic genera (FRAMENAU & SCHARFF 2008, 2009; FRAMENAU et al. 2009, 2010).

The description of the genus *Micropoltys* Kulczyński, 1911 was based on a single female collected in northern Dutch New Guinea (now Papua, Indone-

sia) (KULCZYŃSKI 1911). Kulczyński based the genus name on the suggestion that these spiders might be tiny relatives of *Poltys* C.L. Koch, 1843, because both have widely spaced lateral eyes, a character that is unusual in araneids. *Micropoltys* was first discovered in Australia by HMS in the late 1990s, when sorting specimens tentatively identified as “*Poltys?*” from Queensland. Several additional specimens were later captured (some mistaken for *Poltys* in the field) whilst on a *Poltys* collecting field trip north to Cooktown. This allowed the inclusion of the genus, previously known only from the type female, in a phylogenetic analysis of taxa previously included in the tribe Poltyini (SMITH 2005). This analysis suggested non-monophyly of Poltyini, and little likelihood of any close relationship between *Poltys* and *Micropoltys*. The publication of the analysis in turn produced the offer of more *Micropoltys* specimens from a survey in New Guinea. HWL

originally drafted a redescription of the type species in the 1970s. At the time the draft was not published, but it was invaluable for HMS's work on the Queensland species (SMITH 2005) and parts of this original work are retained in the present publication.

In this study we review the genus *Micropoltys*. We redescribe the type female of *M. placenta* and add three new species to the genus: *Micropoltys baitetensis* sp.nov., *Micropoltys debakkeri* sp.nov. and *Micropoltys heatherae* sp.nov. Based on the new data, we additionally provide a tentative discussion of the phylogenetic position of *Micropoltys*.

## 2. Methods

Specimen examinations, measurements and drawings were made using a Wild M5 or Olympus SZ16 microscope, both fitted with graticule and camera lucida. Photographs in several focal planes (usually 20–30) were taken using a ColorViewI camera mounted on the Olympus SZ16 and layers combined using HeliconFocus software (version 4.21). Plates were composed using Adobe Photoshop (5.0 LE and CS2 9.0). Specimen preparations for scanning electron microscopy either utilized an air dried specimen (the male), which was directly mounted to a stub, or were passed through an alcohol series (75–100%) then critical point dried and mounted on wire or pins. All specimens were coated with gold and viewed using a Zeiss Evo LS15 SEM incorporating a Robinson backscatter detector. Photographs reused from SMITH (2005) were taken on a LEO 435VP SEM. Expanded male pedipalps were drawn from specimens that were in a suitable condition if available, otherwise were expanded by sequential immersion in potassium hydroxide and distilled water. The posterior plates of female epigyna were exposed for illustration by cutting the cuticle at each side and using a needle to lift the still partially attached epigynum and spermathecae out from the epigastric groove. For identification of many specimens only gentle depression of the abdomen behind the groove was needed to see the conformation of the posterior plates. Internal details were drawn from an excised epigynum cleared in lactic acid. Expanded male pedipalps and cleared epigyna were returned to 70% ethanol for storage after drawing; SEM preparations are kept separately in a dehumidified cabinet. Total length refers to the length of the body of the whole animal in what is assumed to be a natural position; hence specimens for which the abdomen is separate have no total length measurement. Carapace height is measured perpendicular to an imaginary average base line drawn through coxae and lower edge of carapace. Carapace

length is measured parallel to this line. All measurements are in millimeters. Because male pedipalps of Araneidae are rotated the positional descriptors are based on the cymbium being medial, i.e. a full view of the palpal bulb is considered retrolateral. The type species is treated first, followed by the other species in alphabetical order.

## 3. Abbreviations

### Collections

AM	Australian Museum, Sydney, Australia
ANIC	Australian National Insect Collection, Canberra, Australia
MIZ	Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland
QM	Queensland Museum, Brisbane, Australia
RBINS	Royal Belgian Institute of Natural Sciences, Brussels, Belgium

### Morphological and other abbreviations used in text

ALE	anterior lateral eye(s)
ALS	anterior lateral spinneret(s)
AME	anterior median eye(s)
PLE	posterior lateral eye(s)
PLS	posterior lateral spinneret(s)
PME	posterior median eye(s)
PMS	posterior median spinneret(s)
SEM	scanning electron microscope/microscopy

## 4. Taxonomy

Family Araneidae Clerck, 1758  
Subfamily Araneinae Clerck, 1758

### 4.1. *Micropoltys* Kulczyński, 1911

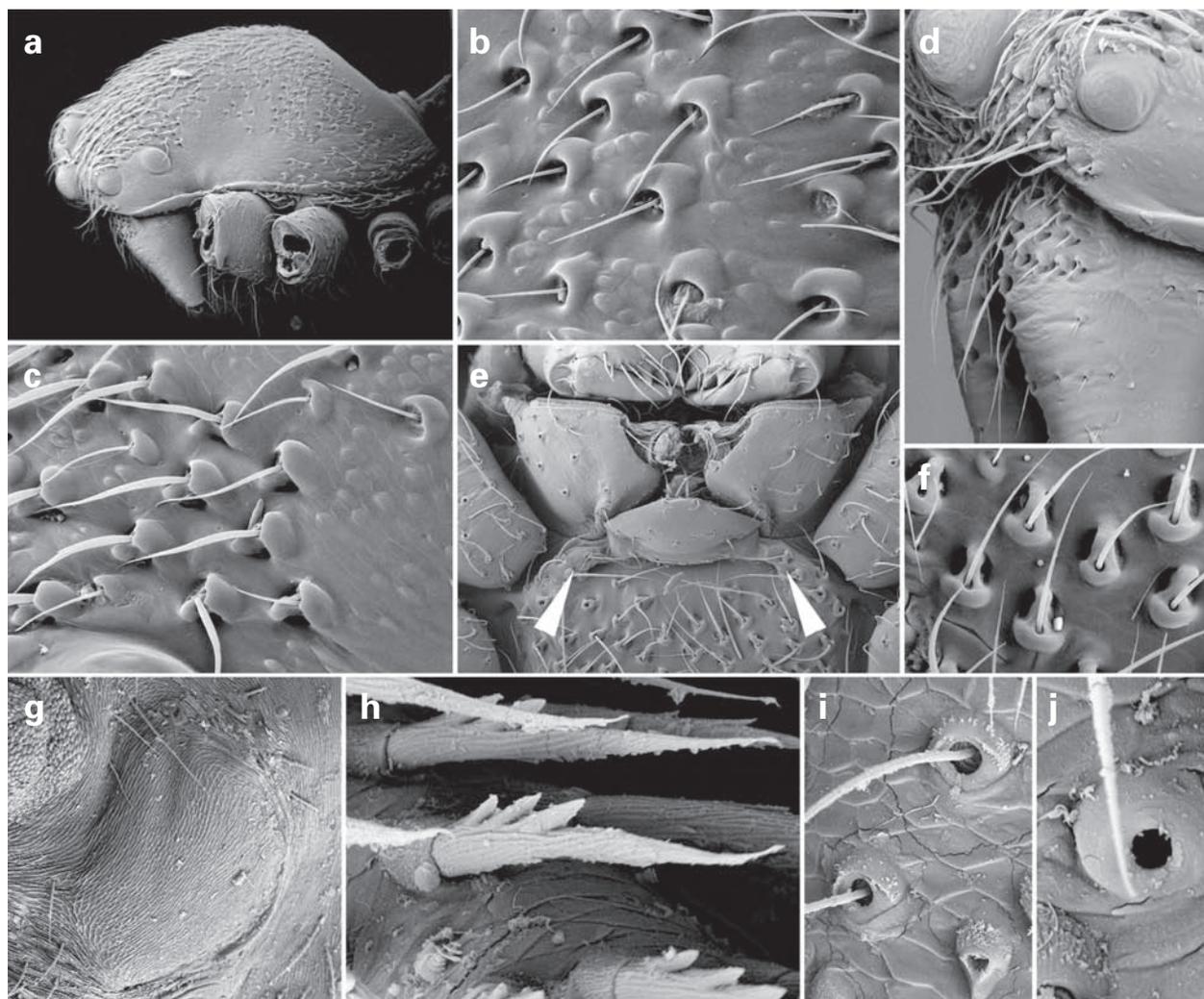
*Micropoltys* Kulczyński, 1911: 504.

**Type species:** *Micropoltys placenta* Kulczyński by monotypy.

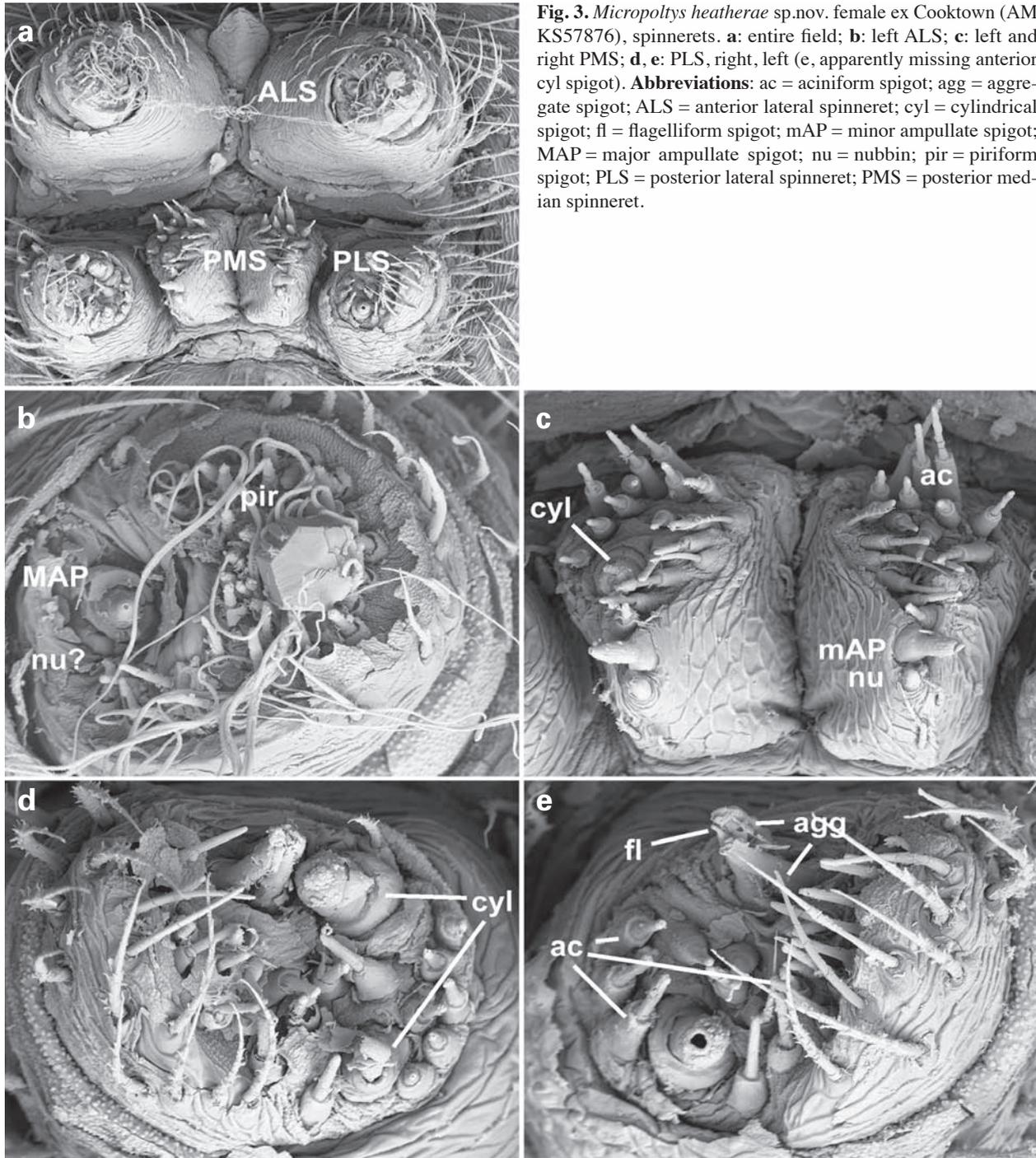
**Diagnosis.** Small araneid spiders with non-contiguous lateral eyes (separation  $\geq 1 \times$  ALE width in most species), transversely indented anterior sternum and roughly textured carapace and sternum. Within the family Araneidae the eye arrangement and small size is diagnostic for adult females. For males, separate from



**Fig. 1.** *Micropoltys debakkeri* sp.nov. ex Baiteta Forest, habitus. **a:** female, lateral (sample T9); **b:** male, lateral (sample T9). Scale bar = 0.5 mm.



**Fig. 2.** *Micropoltys heatherae* sp.nov., SEM micrographs. **a–f:** Male ex Cape Tribulation Rd (AM KS86740); **a:** cephalothorax, lateral; **b:** hooded setal bases, carapace posterolateral area; **c:** pitted setal bases, caput area (PLE at bottom); **d:** setae in lower eye region and basal cheliceral paturon; **e:** anterior sternum and mouthparts, lateral borders of transverse anterior concavity indicated by arrowheads; **f:** pitted setal bases on sternum. **g–j:** Female ex Cooktown (AM KS57876); **g:** book lung cover, left; **h:** setae ventrally on left tarsus IV; **i:** trichobothria on tibia, left leg IV; **j:** tarsal organ, left leg IV. Source photos for Figs. 2b and 2f previously used in SMITH (2005).



**Fig. 3.** *Micropoltys heatherae* sp.nov. female ex Cooktown (AM KS57876), spinnerets. **a:** entire field; **b:** left ALS; **c:** left and right PMS; **d, e:** PLS, right, left (e, apparently missing anterior cyl spigot). **Abbreviations:** ac = aciniform spigot; agg = aggregate spigot; ALS = anterior lateral spinneret; cyl = cylindrical spigot; fl = flagelliform spigot; mAP = minor ampullate spigot; MAP = major ampullate spigot; nu = nubbin; pir = piriform spigot; PLS = posterior lateral spinneret; PMS = posterior median spinneret.

*Poltys* by the presence of an endite tooth and leg I with coxal hook.

**Description.** The male of the type species is unknown, hence caution should be exercised in the application of this generic description of male characters.

Small spiders (body length range 1.5–3.0 mm), with males about 2/3 size of females (Fig. 1a,b).

**Coloration.** Carapace, chelicerae, sternum and mouthparts yellow to brown, often with darker markings, black around some or all eyes, white border to maxillae and labium in female, reduced in male.

Abdomen, dorsum with central brownish folium often with darker median stripe, ground colour mottled, pattern vague towards anterior, black points of folium persistent (Figs. 5a, 6a, 8a, 10a); underside with or without white patches; anterior apex of abdomen has inverted white “Y” or diamond strongly produced in some specimens (Figs. 6e, 8e), almost absent in others. Legs, femurs pale amber often darkening distally, lower legs mottled brown, amber and cream, rear legs ground colour paler.

**Cephalothorax.** Carapace pear-shaped in dorsal view, with marginal rim (Fig. 2a), arched in lateral

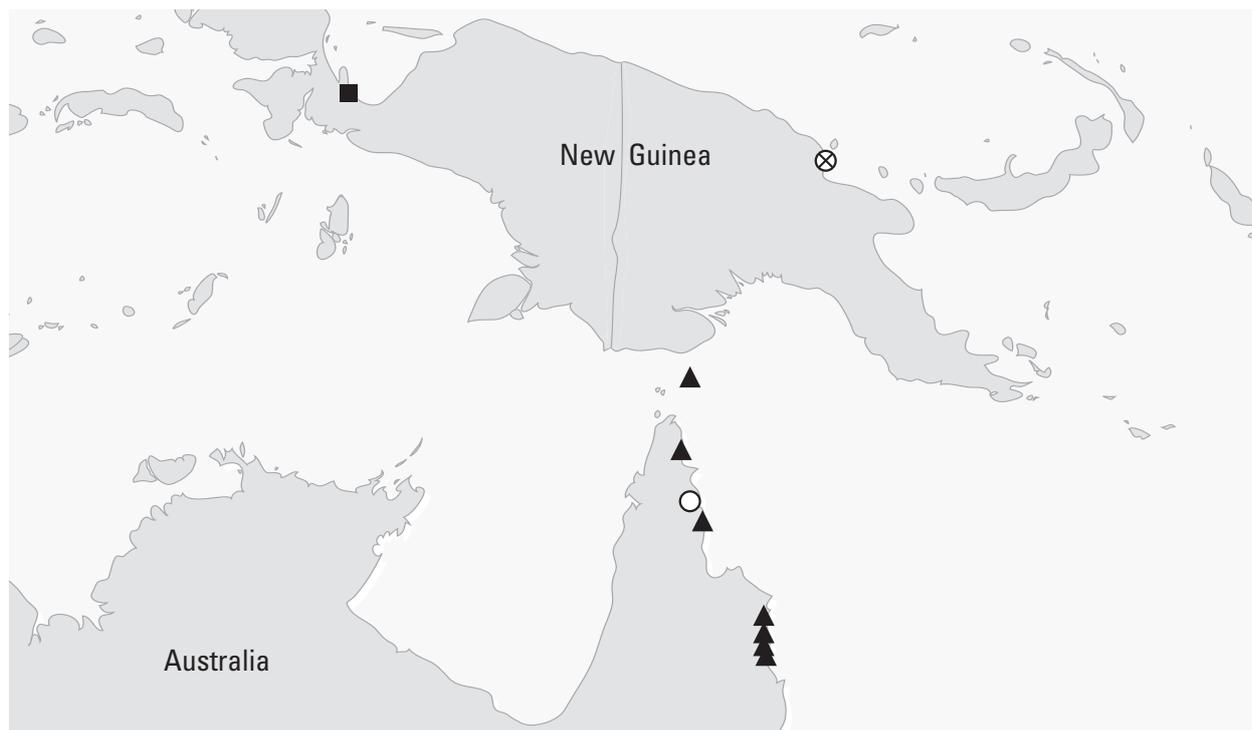


Fig. 4. Map of records of *Micropoltys* species. ■ = *M. placenta*; ⊗ = *M. baitetensis*; ○ = *M. debakkeri*; ▲ = *M. heatherae*.

view, highest at mid-length, caput and some other areas rugose with setal bases raised on one side (“hooded”; Fig. 2a–c), setae short and stout, towards rear setal bases lower, and carapace glossy elsewhere; fovea absent; median eyes prominent, AME or PME largest, lateral eyes smaller, ALE and PLE separated by at least an ALE width in all species except *M. baitetensis*; tapetum present in all secondary eyes, in PME reduced to a crescent; chilum absent in most species, visible as paired slivers in *M. baitetensis* females, rounded clypeal extension present in *M. debakkeri* and *M. heatherae* [scored as a clypeal tooth by SMITH (2005), however, this does not seem to be the clypeal tooth character intended by SCHARFF & CODDINGTON (1997, character 46), which therefore should be coded (0) absent in *Micropoltys*]; cheliceral paturon medium-long, robust, lateral boss present, smooth; fangs of medium length, curved, tips touch or cross medially; cheliceral teeth not examined in all species, usually four promarginal, three retromarginal plus denticles within rows or in furrow between; cheliceral anterior surface with area of prominent setal bases (Fig. 2d); endites oblong, with serrula, male endites with well developed lateral tooth; labium wider than long, rounded; sternum cordate, broadly pointed posteriorly, with transverse anterior concavity around labium bordered laterally by thickened cuticle (Fig. 2e); sternum texture rugose, covered with short, stout anteriorly directed setae with prominent setal bases (Fig. 2f).

*Legs.* Leg formula I>II>IV>III; leg IV relatively shorter in males; tibiae I and II of males similar in build

and setation; coxa I and femur II of males with hook and groove respectively; tarsus IV of females with field of broadly toothed setae (Fig. 2h), trichobothria with small hood (Fig. 2i), tarsal organ mounded with circular opening (Fig. 2j).

*Abdomen.* Abdomen oval or elliptical, sometimes with slight anterior humps in females but males plain ovoid; booklung covers oval, with single furrow (Fig. 2g) [SCHARFF & CODDINGTON (1997) character 64, previously coded as unfurrowed by SMITH (2005), should be (1) grooved]. Spinnerets (*M. heatherae* female AM KS57876; Fig. 3a–e). ALS: major ampullate medial, nubbin presence unconfirmed, probably 30–40 piriform spigots (obscured by silk and debris on both sides); PMS: minor ampullate and nubbin posterior, cylindrical midway, 19 aciniform spigots; PLS: triad on anterior margin, two cylindrical spigots (on right spinneret, anterior one apparently absent on left), approximately 20 aciniform spigots. [Most spinneret characters were not previously coded (SMITH 2005), the SCHARFF & CODDINGTON (1997) codings for *M. heatherae* would now be: 69 (0), 70 (0), 71 (2), 72 (1), 73 (0).]

*Female epigyne.* With a short scape with pocket (Fig. 12a), flanked by rounded lobes in ventral view; arrangement of posterior plates diagnostic for species; entelegyne, short copulatory ducts lead from between posterior plates to flanged or lobed spermathecae. Note basal scape and surrounding tissue strongly wrinkled when flaccid but probably less so when expanded: both flaccid and expanded examples found amongst *M. de-*

*bakkeri* specimens. [Scape surface smooth or wrinkled (SCHARFF & CODDINGTON 1997: character 31) previously coded (0) in error (SMITH 2005), should be (1) wrinkled].

**Male pedipalp.** Comment: the palpal structures of *M. heatherae* and *M. debakkeri* are very similar, whilst *M. baitetensis* is clearly related but with a rather differently shaped subterminal apophysis and terminal apophysis; the male of *M. placenta* is unknown. Note the mass immediately above the embolus in Fig. 12c is contamination, as is the roughly awn-shaped structure visible in the apical view (Fig. 12d) between the bases of the conductor and terminal apophysis. Femoral tubercle present [previous coding (SMITH 2005) should be amended to (1) “present” from (2) “present with macroseta”: although there is a seta in a similar position to that illustrated for *Augusta glyphica* (Guérin, 1839) (SCHARFF & CODDINGTON 1997: fig. 4), it is hardly a macroseta], patella with a single macroseta, paracymbium a typical araneine hook (Fig. 12e); pedipalp with median apophysis and conductor; median apophysis simple, rounded, with single tooth-like point directed apicomediaally (Fig. 12c); conductor entire, roughly triangular with a groove for the embolus, base lightly sclerotised, distal portion membranous; embolic division with radix, complex subterminal and terminal apophyses, and embolus; terminal apophysis bulbous basally with laminar flange and membrane dorsally, and lobed or longitudinally folded terminal part; subterminal apophysis a long or short forked prong (microstructure of prongs of the subterminal apophysis of *M. baitetensis* not examined, but in *M. heatherae* upper appears to be rigid, scrolled structure, lower an open curl cradling the embolus, see Fig. 12c), subterminal apophysis closely associated with the embolus in all three species for which males are known; sperm duct passes through radix and briefly through the base of the haematodocha before entering the embolus (*M. heatherae*, *M. baitetensis*); embolus jagged and blade like under light microscope, flattened tube with flared terminal aperture visible under SEM (flattened plug visible in Fig. 12e appears to be exudate), without cap, running clockwise.

**Distribution.** The genus is only recorded from the wet tropics of north-eastern Australia and New Guinea (Fig. 4).

**Included species.** *Micropoltys placenta* Kulczyński, *M. baitetensis* sp.nov., *M. debakkeri* sp.nov., *M. heatherae* sp.nov.

#### 4.2. *Micropoltys placenta* Kulczyński

Figs. 4, 5a – h

*Micropoltys placenta* Kulczyński, 1911: 504, pl. 20, figs. 68, 74.

**Diagnosis.** Female: Distinguished from *M. baitetensis* by lateral eyes separated by an ALE diameter and epigynum in posterior view with median plate clearly differentiated. Separated from other species by the shape of the epigynum in posterior view, with median plate ventral border truncate and sides almost parallel (Fig. 5h). Male: Unknown.

**Description, female (holotype).** *Comment.* The abdomen is detached from the cephalothorax. Of the limbs, only pedipalps, left leg I and right leg III are attached to the specimen. Left(?) leg II is present loose in the vial, other legs are missing.

*Coloration.* Abdomen, most of the dorsal pattern lost (Fig. 5a), ventrally (Fig. 5b) with epigastric area pale, pale patch extending towards, but not reaching spinnerets, no pale spots evident lateral to pedicel.

*Morphology.* Carapace (Fig. 5c,d) gently arched, rugosity appears less pronounced than in other species. Abdomen (Fig. 5a) smoothly elliptical but shape may be affected by slight dorso-ventral compression.

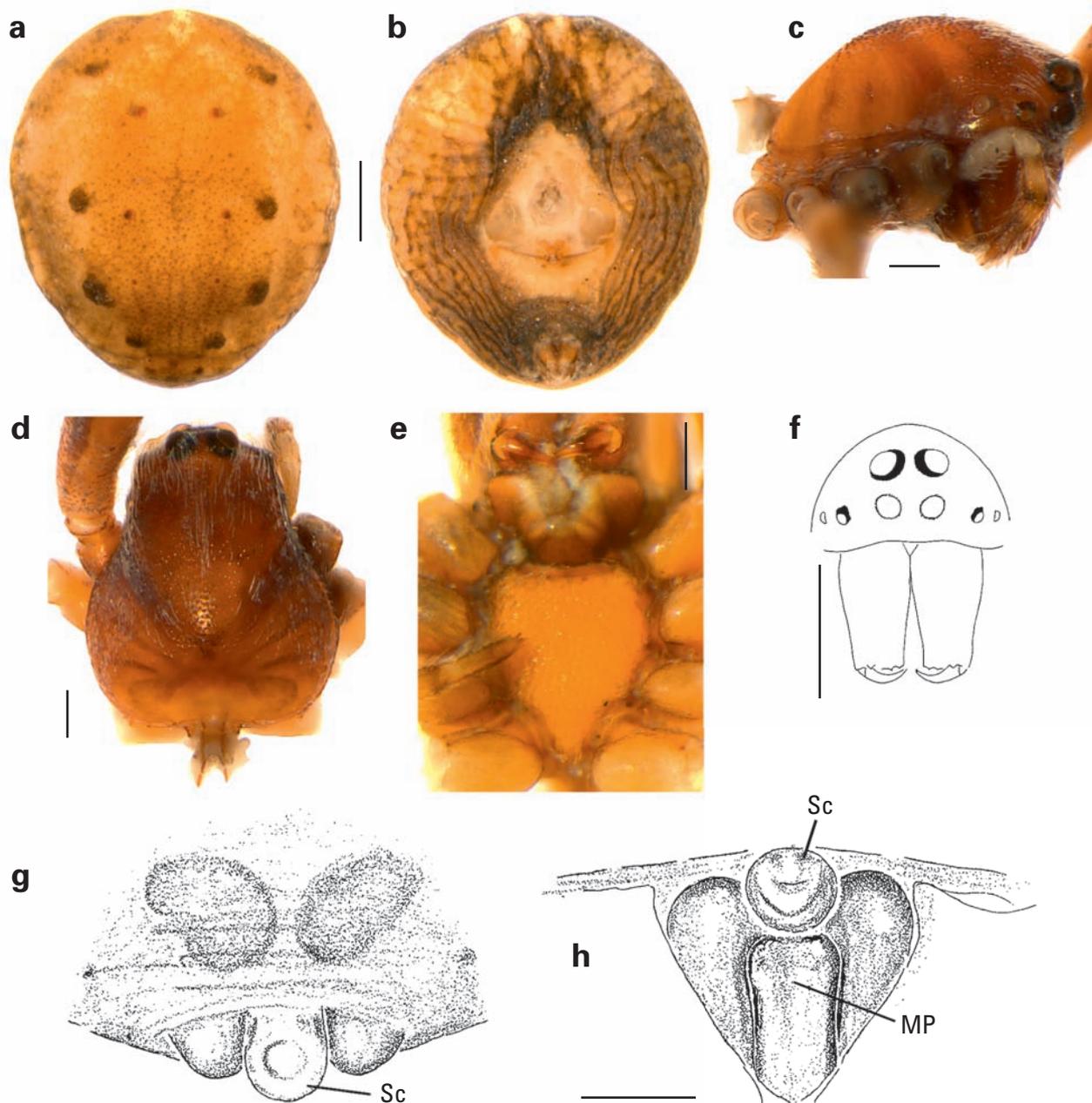
*Measurements.* Carapace range n/a. Total length n/a (parts separate); carapace length 1.38, width 1.08, height 0.50; abdomen length 2.40, width 2.13; sternum length 0.63, width 0.56; clypeus height 0.04. Eyes: AME 0.13; PME 0.13; ALE 0.10; PLE 0.09; ALE–PLE 0.10; AME–AME 0.06; PME–PME 0.11; AME–PME 0.04; AME–ALE 0.10. Limbs (femur + (patella–tibia) + metatarsus + tarsus = total): pedipalp 0.38 + 0.42 + – + 0.44 = 1.24; leg I 1.24 + 1.30 + 0.74 + 0.40 = 3.68; leg II 1.06 + 1.13 + 0.63 + 0.38 = 3.19; leg III 0.66 + 0.68 + 0.32 + 0.28 = 1.94; leg IV missing.

*Epigynum* (Fig. 5g,h). Posterior median plate with truncate ventral border and sides almost parallel; spermathecae kidney-shaped viewed through cuticle; internal genitalia structure not examined (risk of losing detached epigynum of unique specimen).

**Description, male.** Male unknown.

**Distribution.** Known only from the type locality in north-western New Guinea (Fig. 4).

**Type material.** HOLOTYPE: ♀, Wakobi [Papua, Indonesia] 16 iii 1903 [Wichmann Expedition] (MIZ 212316); examined by HWL 11 Feb. 1981; examined by HMS July 2009.



**Fig. 5.** *Micropoltys placenta* Kulczyński, 1911, female from Wakobi (holotype). **a,b**: abdomen: dorsal, ventral; **c–f**: cephalothorax: lateral, dorsal, ventral (sternum and mouthparts), frontal; **g, h**: epigyne: ventral, posterior view. Scale bars: a+b,f 0.5 mm; c–e 0.2 mm; g,h 0.1 mm. **Abbreviations**: MP = median plate; Sc = scape.

#### 4.3. *Micropoltys baitetensis* new species

Figs. 4, 6a–e, 7a–f

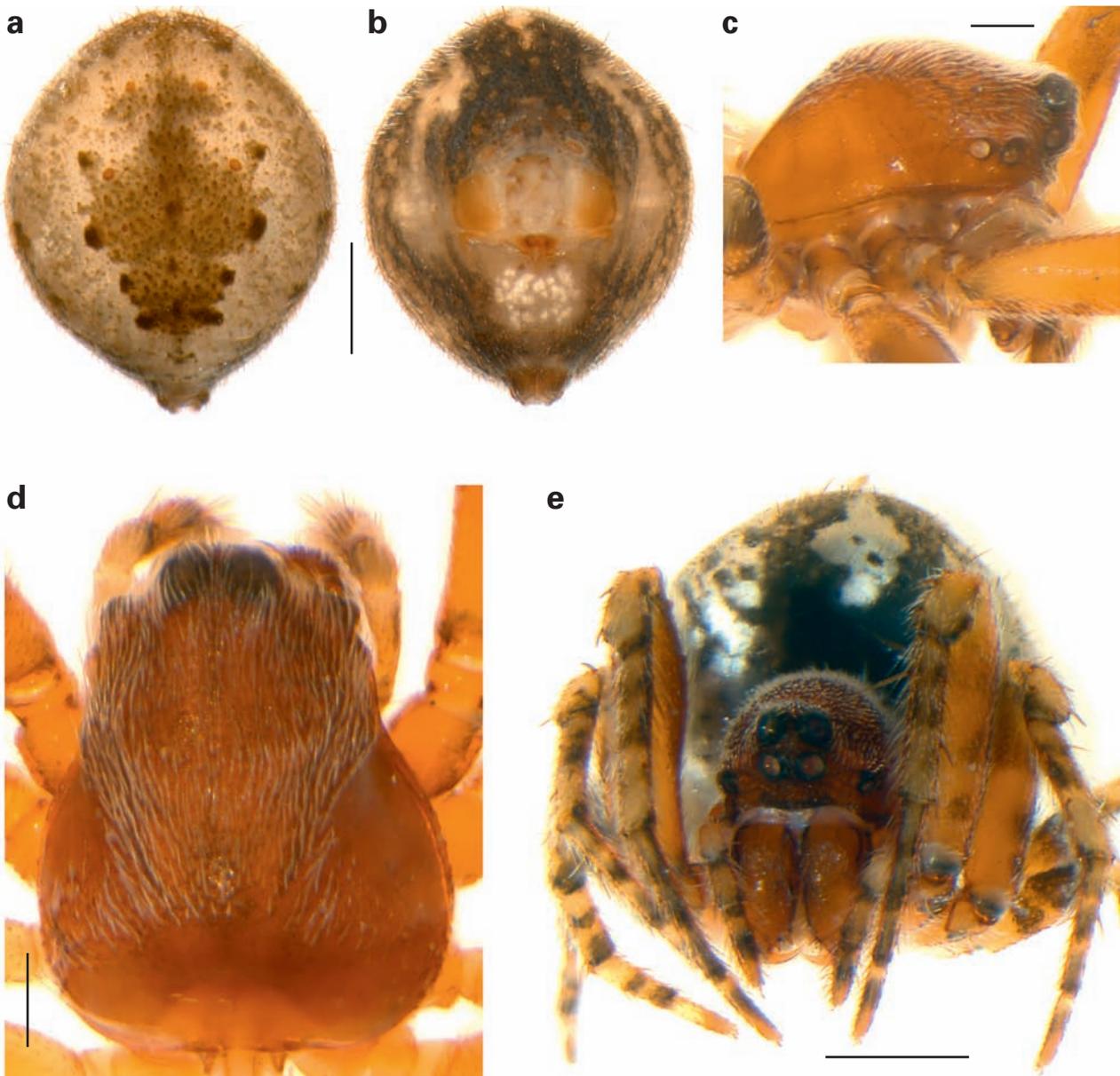
**Etymology.** The species name is taken from the type locality, Baiteta forest.

**Diagnosis.** Either sex can be distinguished from all other species by the separation of the lateral eyes, which is  $0.5 \times$  an ALE diameter or less (Fig. 6c). Females are also separated from all other species by the lack of a clearly differentiated ventral border on the median plate of the epigynum in posterior view (Fig.

7b). Males differ from *M. debakkeri* and *M. heatherae* by the shape of the subterminal apophysis, which has two long, separate prongs (Fig. 7d,e).

**Description, female (holotype).** *Coloration.* Abdomen, ventrally (Fig. 6b) with white square posterior to genital groove, epigastric area with small white patches adjoining book lungs, area anterior to pedicel dark with white diamond (Fig. 6e).

*Morphology.* Carapace (Fig. 6c,d) smoothly arched but with dip behind PME, which are slightly thrust forward of clypeus, carapace highest at coxa I, hirsute. Abdomen (Fig. 6a) rounded anteriorly.



**Fig. 6.** *Micropoltys baitetensis* sp.nov. ex Baiteta Forest, female. **a,b:** abdomen (sample AR60): dorsal, ventral; **c,d:** cephalothorax (holotype): lateral, dorsal; **e:** habitus frontal (holotype). Scale bars: b,e 0.5 mm; c,d 0.2 mm.

**Measurements.** Carapace range 1.14–1.34. Total length 2.53; carapace length 1.14, width 0.90, height 0.58; abdomen length 1.80, width 1.45; sternum length 0.50, width 0.45; clypeus height 0.10. Eyes: AME 0.10; PME 0.11; ALE 0.06; PLE 0.07; ALE–PLE 0.04; AME–AME 0.07; PME–PME 0.12; AME–PME 0.04; AME–ALE 0.13. Limbs (femur + (patella–tibia) + metatarsus + tarsus = total): pedipalp 0.30 + 0.35 + – + 0.30 = 0.95; leg I 1.10 + 1.14 + 0.64 + 0.34 = 3.22; leg II 0.92 + 1.00 + 0.54 + 0.32 = 2.78; leg III 0.56 + 0.58 + 0.32 + 0.26 = 1.72; leg IV 0.76 + 0.80 + 0.42 + 0.30 = 2.28.

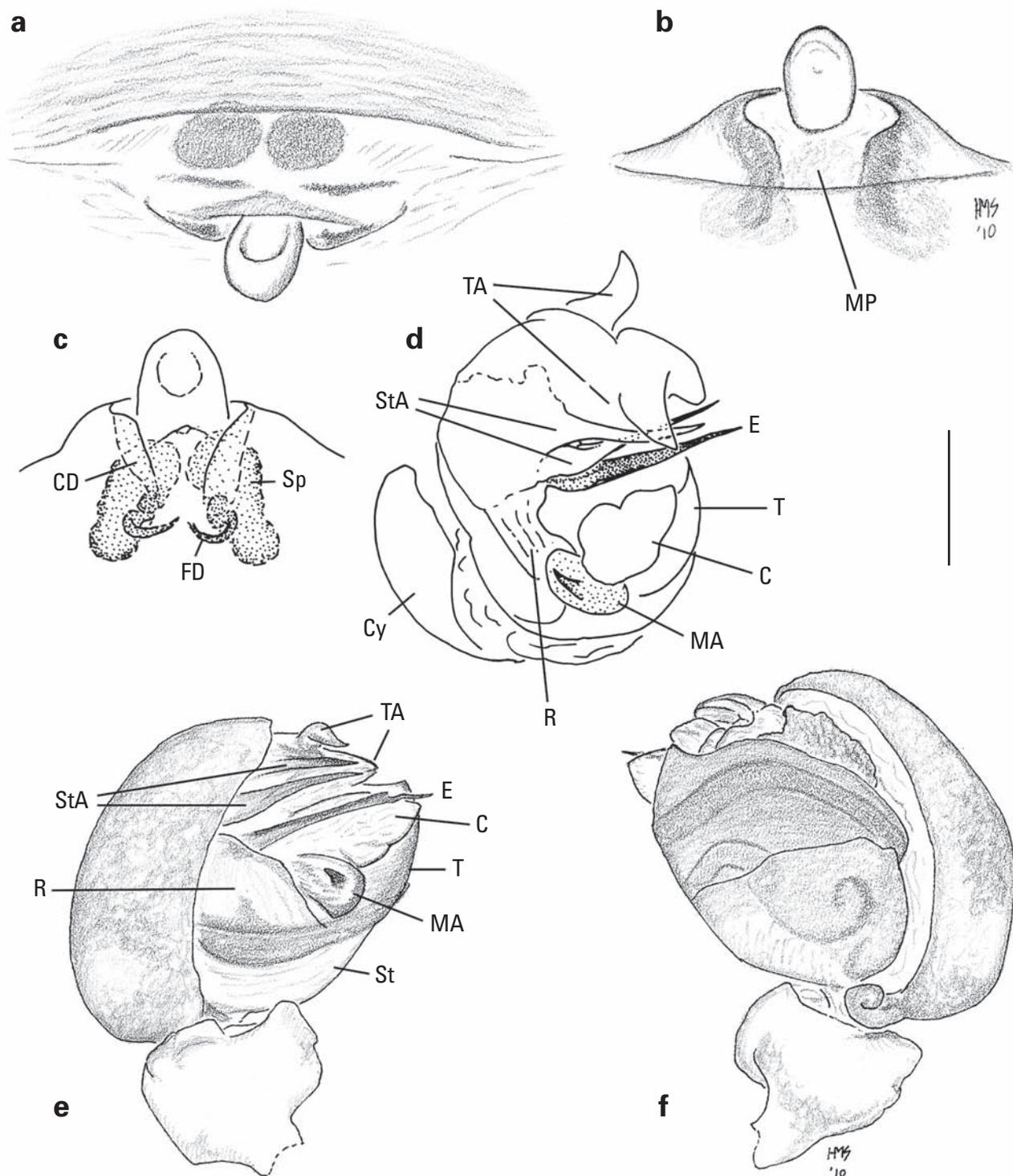
**Epigynum** (Fig. 7a–c). Posterior median plate without clearly defined ventral margin, lateral edges almost parallel; internal genitalia, copulatory path between epigynal plates relatively short and open, main

spermathecal bulb extended into second lobe by rather lumpy (glandular?) area.

**Description, male** (first listed paratype). **Coloration.** Similar to female.

**Morphology.** Carapace, similar to female but less arched.

**Measurements.** Carapace range 0.96–1.08. Total length 2.03; carapace length 0.96, width 0.80, height 0.50; abdomen length 1.26, width 1.06; sternum length 0.50, width 0.44; clypeus height 0.08. Eyes: AME 0.10; PME 0.10; ALE 0.08; PLE 0.07; ALE–PLE 0.03; AME–AME 0.05; PME–PME 0.13; AME–PME 0.03; AME–ALE 0.09. Limbs (femur + (patella–tibia) + metatarsus + tarsus = total): pedipalp 0.24 + 0.20 + – + 0.28 = 0.72; leg I 1.01 + 1.08 + 0.61 + 0.30 = 3.00;

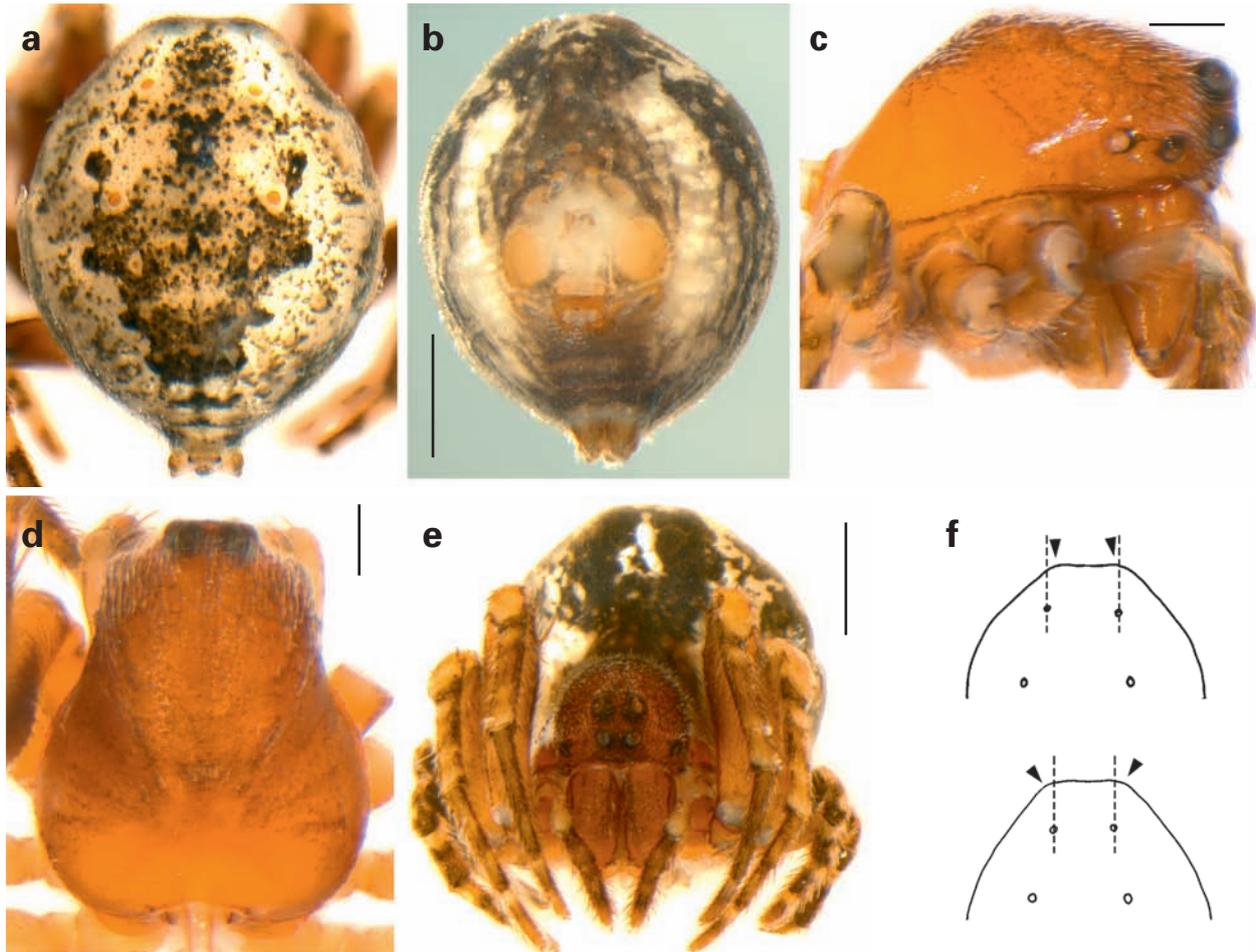


**Fig. 7.** *Micropoltys baitetensis* sp. nov. ex Baiteta Forest, genitalia. **a–c:** Female: **a,b:** ventral, posterior view (sample AR60); **c:** internal genitalia (sample AR3), posterodorsal. **d–f:** Male: **d:** pedipalp expanded, apicoventral view (sample AR67); **e,f:** pedipalp (described paratype): ventral, dorsal. Scale bar: 0.1 mm. **Abbreviations:** C = conductor; CD = copulation duct; Cy = cymbium; E = embolus; FD = fertilisation duct; MA = median apophysis; MP = median plate; R = radix; Sp = spermatheca; St = subtegulum; StA = subterminal apophysis; T = tegulum; TA = terminal apophysis.

leg II  $0.88 + 0.86 + 0.50 + 0.29 = 2.53$ ; leg III  $0.55 + 0.51 + 0.29 + 0.24 = 1.59$ ; leg IV  $0.64 + 0.66 + 0.38 + 0.25 = 1.93$ .

*Pedipalp* (Fig. 7d–f). Tegulum highest retrolaterally, remaining broad on dorsal face; median apophysis with a narrow pointed process; terminal apophysis

compact compared to other species, small basal bulb, only apical flap and terminal fleshy point discernable in unexpanded pedipalp; subterminal apophysis forking basally into two long pointed arms; embolus longer and more slender than other species, slightly jagged distally.



**Fig. 8.** *Micropollys debakkeri* sp.nov. ex Baiteta Forest, female: **a,b**: abdomen: dorsal (holotype), ventral (sample AR39); **c,d**: cephalothorax (sample AR39): lateral, dorsal; **e**: habitus, frontal (holotype). **f**: Diagram showing difference in anterior abdominal width between *M. debakkeri* (above) and *M. heatherae* (below): dorsal view, dotted lines show width of anterior apodemes, arrows indicate outer corners of abdomen. Scale bars: b,e 0.5 mm; c,d 0.2 mm.

**Biology.** All recorded specimens were collected from the tree canopy of mixed lowland tropical forest. Some records are from samples that also contained *M. debakkeri* specimens.

**Distribution.** Known only from the type locality at Baiteta Forest, north-eastern Papua New Guinea (Fig. 4).

**Type material.** HOLOTYPE: ♀, Papua New Guinea, Madang Province, Baiteta forest, 05°01'S 145°45'E, 22.vi.1994, canopy fogging *Pometia pinnata*, sample code T2" (RBINS). – PARATYPES (all Papua New Guinea, Baiteta forest, canopy fogging, as above but tree species unknown): described ♂, 28.vii.1996 (ex sample code AR67); 1 ♂, 28.vii.1996 (sample code AR67); 1 ♀, 27.vi.1996 (sample code AR60). All types registered under I.G. 31531 (RBINS).

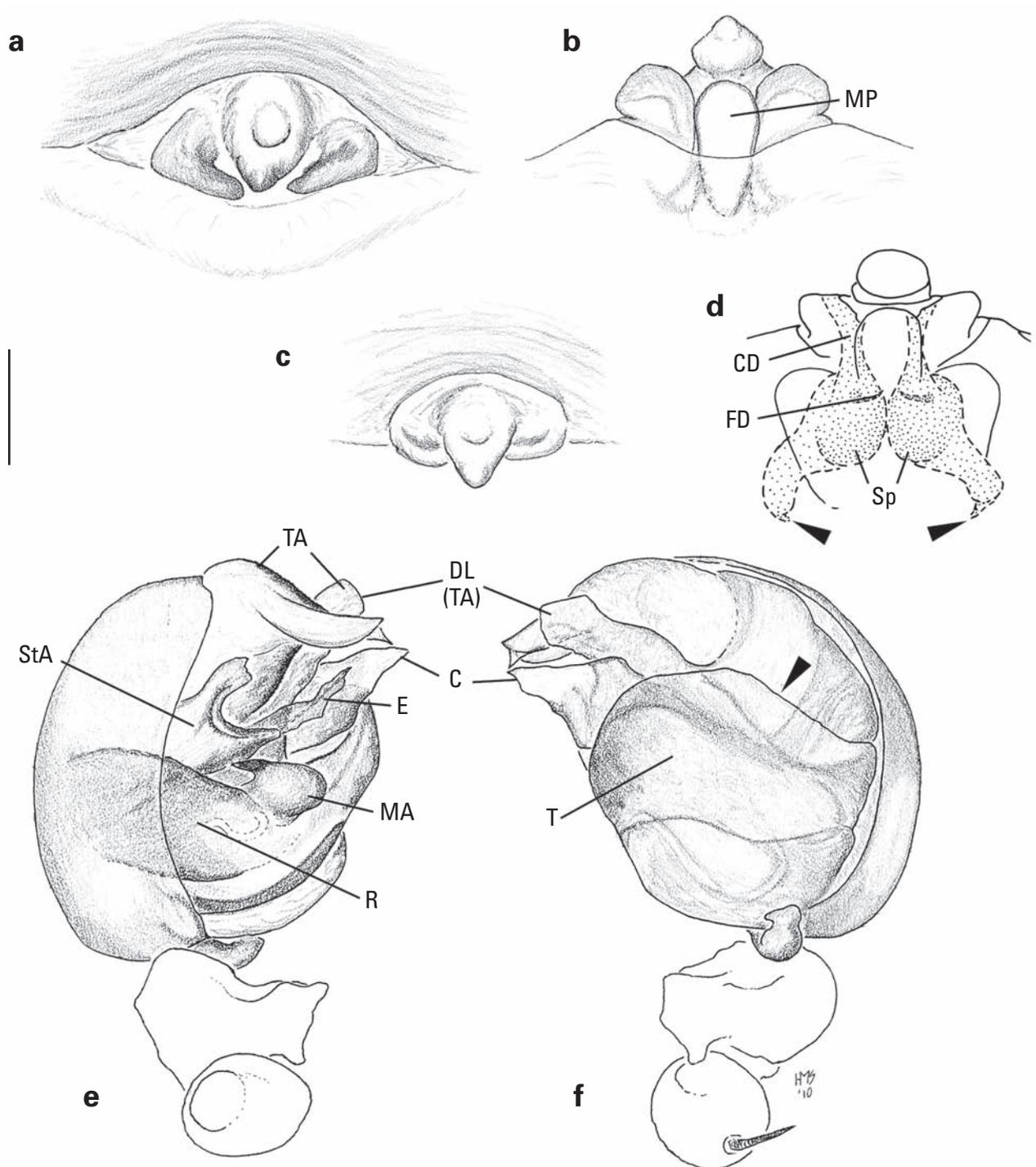
**Other material.** Papua New Guinea, Madang Province: 1 ♂, Baiteta forest, 05°01'S 145°45'E, 18.vi.1996, canopy fogging, sample code AR58 (RBINS); 1 ♂, as above but 25.v.1995, *Planchonella thysoidis* (Sapotaceae), sample code AR8 (no abdomen) (RBINS); 1 ♀, as above but 04.v.1995, *Dysoxylum patigravianum* (Meliaceae), sample code AR3 (RBINS).

#### 4.4. *Micropollys debakkeri* new species

Figs. 1a – b, 4, 8a – f, 9a – f

**Etymology.** This name is a patronym in honour of Domir De Bakker, who brought the specimens from the Baiteta survey to our attention.

**Diagnosis.** The coloration of the underside of the abdomen, with white lateral bars and no white patch behind the epigastric groove, distinguishes this species from *M. placenta* and *M. baitetensis* (Fig. 8b cf. Fig. 5b, 6b). Separated from the similarly coloured *M. heatherae* as follows. Females: In posterior view median plate of epigynum with broadly rounded ventral border and sides gently converging towards dorsum (Fig. 9b); in females of the shape variant with truncate or humped anterior abdomen the anterior width is narrower than in *M. heatherae*, exterior corners about level with anterior apodemes (Fig. 8f). Males: Median apophysis tooth narrower than in *M. heatherae*, distal part of terminal apophysis differentiated and slightly reflexed in ventral



**Fig. 9.** *Micropoltys debakkeri* sp. nov. ex Baiteta Forest, genitalia. **a–d:** Female: **a,b:** epigyne (holotype): ventral, posterior view; **c:** epigyne contracted (sample M1”); **d:** internal genitalia, posterior, arrows indicate lamellae (sample M7). **e,f:** Male: pedipalp (sample AR70), ventral, dorsal, arrow indicates edge of tegulum. Scale bar: 0.1 mm. **Abbreviations:** C = conductor; CD = copulation duct; DL = dorsal lamina of TA; E = embolus; FD = fertilisation duct; MA = median apophysis; MP = median plate; R = radix; Sp = spermatheca; StA = subterminal apophysis; T = tegulum; TA = terminal apophysis.

view (Fig. 9e), in dorsal view tegulum high, overlapping base of terminal apophysis (arrow in Fig. 9f).

**Description, female** (holotype). *Coloration.* Abdomen, ventrally (Fig. 8b) black from genital groove to spinnerets, epigastric area with lateral white bands, area anterior to pedicel dark with white inverted “Y” (Fig. 8e).

*Morphology.* Carapace (Figs. 1a, 8c,d) slightly angular with apex between coxae I and II, hirsute. Abdomen (Fig. 8a) anteriorly narrowly truncate with slight humps.

*Measurements.* Carapace range 1.10–1.24. Total length 2.59; carapace length 1.12, width 0.76, height 0.56; abdomen length 1.80, width 1.50; sternum length

0.49, width 0.50; clypeus height 0.08. Eyes: AME 0.10; PME 0.10; ALE 0.07; PLE 0.07; ALE–PLE 0.10; AME–AME 0.06; PME–PME 0.11; AME–PME 0.06; AME–ALE 0.16. Limbs (femur + (patella–tibia) + metatarsus + tarsus = total): pedipalp 0.30 + 0.32 + + 0.34 = 0.96; leg I 1.10 + 1.14 + 0.64 + 0.36 = 3.24; leg II 0.94 + 1.00 + 0.46 + 0.44 = 2.84; leg III 0.56 + 0.58 + 0.30 + 0.28 = 1.72; leg IV 0.72 + 0.80 + 0.44 + 0.28 = 2.24.

*Epigynum* (Fig. 9a–d). Posterior median plate with broadly rounded ventral border and sides converging towards dorsum; internal genitalia copulatory path between epigynal plates moderately long, spermatheca with main bulb and wing-like extension with terminal lamina (arrows in Fig. 9d), rather like a winged seed in side view.

**Description, male** (first listed paratype). *Coloration*. Similar to female.

*Morphology*. Carapace (Fig. 1b) smoothly arched, lower than female.

*Measurements*. Carapace range 0.98–1.08. Total length 1.98; carapace length 1.04, width 0.84, height 0.50; abdomen length 1.30, width 1.04; sternum length 0.52, width 0.43; clypeus height 0.06. Eyes: AME 0.11; PME 0.09; ALE 0.06; PLE 0.07; ALE–PLE 0.07; AME–AME 0.06; PME–PME 0.09; AME–PME 0.05; AME–ALE 0.12. Limbs (femur + (patella–tibia) + metatarsus + tarsus = total): pedipalp 0.22 + 0.21 + + 0.32 = 0.75; leg I 1.04 + 1.08 + 0.60 + 0.30 = 3.02; leg II 0.90 + 0.90 + 0.52 + 0.30 = 2.62; leg III 0.52 + 0.52 + 0.26 + 0.20 = 1.50; leg IV 0.64 + 0.68 + 0.34 + 0.24 = 1.90.

*Pedipalp* (Fig. 9e,f). Tegulum high on dorsal face, to level of laminar lobe of terminal apophysis; median apophysis with a short, narrow pointed process; terminal apophysis croissant-like in dorsal view, apical part differentiated and slightly reflexed, dorsal lamina (Fig. 9f) longer than other species and slightly angular; subterminal apophysis broadly U-shaped process with truncated arms; embolus jagged and blade like.

**Variation**. Abdominal shape of females from Baiteta varies with some specimens rounded and others, as the holotype, narrowly truncate anteriorly, sometimes forming slight humps. The appearance of the epigyne is significantly altered by the state of tumescence. Some specimens appear to have much larger and more spread genitalia than others, with the posterior plates often exposed. In the unexpanded specimens the lateral and anterior epigyne is hidden behind folds of cuticle around the scape. In males there is variation in the size of the median apophysis and the robustness of the median apophysis tooth; the terminal apophysis shape is also dependent upon expansion.

**Biology**. Most recorded specimens from mainland New Guinea were collected from the canopy of mixed lowland tropical forest. Tree species and family varied, as did height from ground and estimated canopy area. Canopy fogging samples from several other eastern New Guinea localities did not contain *Micropoltys* specimens (Kitching material, in ANIC).

**Distribution**. Known from eastern Papua New Guinea and far northern Australia (Fig. 4).

**Type material**. HOLOTYPE: ♀, Papua New Guinea, Madang Province, Baiteta forest, 05°01'S 145°45'E, 12.iv.1994, canopy fogging *Ficus nodosa* (Moraceae), sample code XK (RBINS). – PARATYPES (all Papua New Guinea, Baiteta forest, canopy fogging, as above): described ♂, 08.vi.1993, *Pometia pinnata*, ex sample code T9; 1 ♀, 29.vi.1994, *Dracontomelum doa*, sample M1"; 1 ♂, 29.vi.1995, *Celtis philippinensis* (Ulmaceae), sample code AR21; 1 ♂, 22.vi.1994, *Pometia pinnata*, sample code T2"; 2 ♂♂, 2 ♀♀, 08.vi.1993, *Pometia pinnata*, sample code T9; all above types registered under I.G. 31530 (RBINS); 1 ♂, 1 ♀, 25.vii.1996, no tree species known, sample code AR70 (AM KS110746 (ex RBINS)).

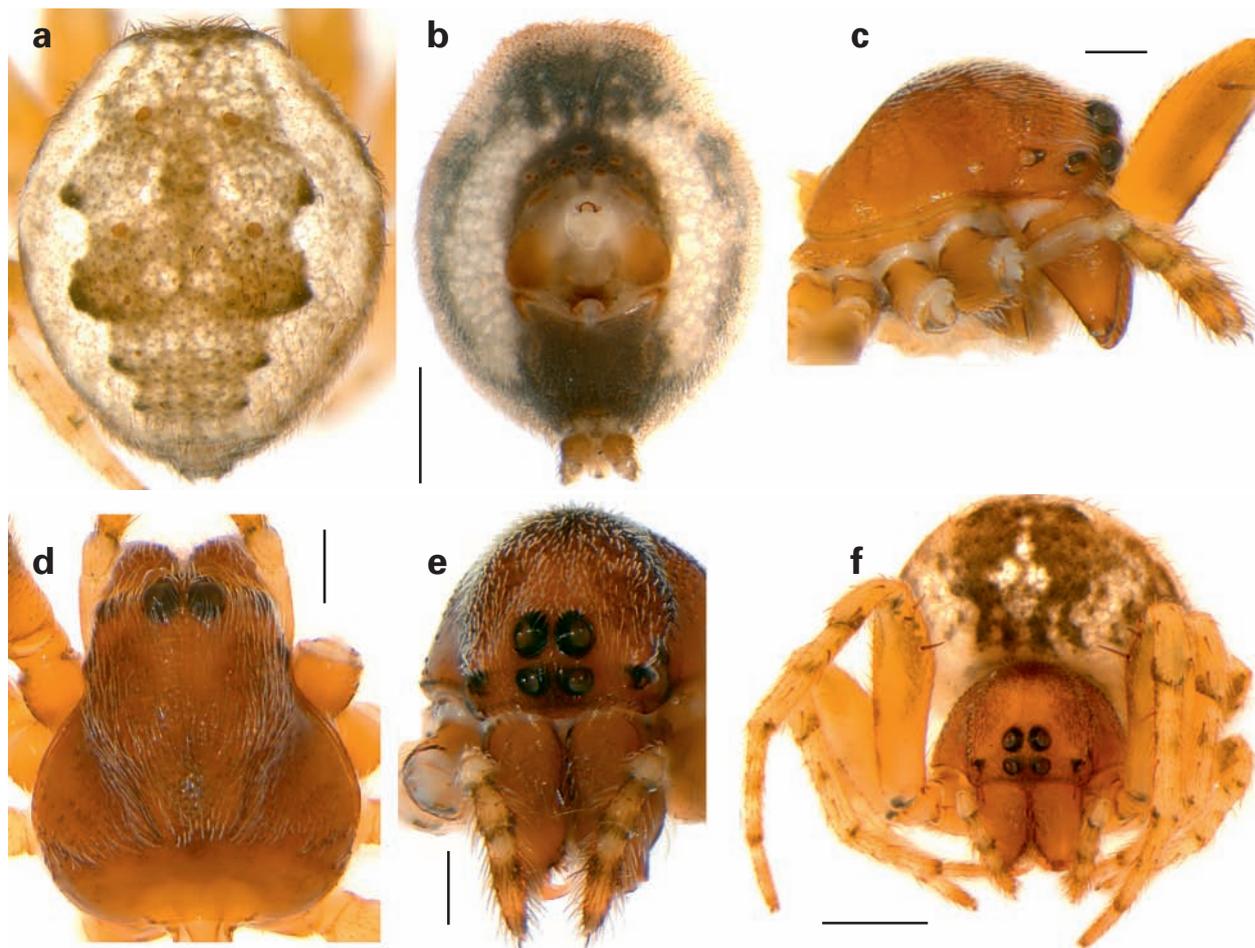
**Other material**. *Papua New Guinea, Madang Province*: 32 ♂♂, 27 ♀♀, Baiteta forest, 05°01'S 145°45'E, 16.iii.1993–28.vii.1996, canopy fogging various tree species (RBINS). *Australia, Queensland*: 3 ♂♂, 2 ♀♀, Gordon Creek, Iron Range, 12°46'S 143°19'E (no other data) (QM S83471). Australian specimens on loan to N. Scharff, identified by HMS from photographs and confirmed by NS using figures from draft manuscript.

#### 4.5. *Micropoltys heatherae* new species

Figs. 2a–j, 3a–e, 4, 8f, 10a–f, 11a–f, 12a–f

**Etymology**. This name is a patronym in honour of the senior author's sister, Heather Sheppard.

**Diagnosis**. The coloration of the underside of the abdomen, with white lateral bars and no white patch behind the epigastric groove, distinguishes this species from *M. placenta* and *M. baitetensis* (Fig. 10b cf. Figs. 5b, 6b). Separated from the similarly coloured *M. debakkeri* as follows. Females: In posterior view median plate of epigyne with clearly differentiated, narrowly rounded ventral border and sides diverging towards dorsum (Fig. 11b). The slight humps of the anterior abdomen are broader than in similarly shaped specimens of *M. debakkeri*, exterior corners wider than anterior apodemes (Fig. 8f). Males: Median apophysis tooth broad-acute, distal part of terminal apophysis straight in ventral view (Figs. 11e, 12c), in dorsal view tegulum low, only slightly overlapping base of terminal apophysis (arrow in Fig. 11f).



**Fig. 10.** *Micropoltys heatherae* sp.nov., female: **a,b**: abdomen, dorsal (holotype ex Cape Kimberley Rd), ventral (AM KS57876 ex Cooktown); **c–e**: cephalothorax (AM KS57876): lateral, dorsal, frontal; **f**: habitus, frontal (holotype). Scale bars: b,f 0.5 mm; c–e 0.2 mm.

**Description, female** (holotype, AM KS57850). *Coloration.* Abdomen, ventrally (Fig. 10b) black from genital groove to spinnerets, epigastric area with lateral white bands, area anterior to pedicel dark with white inverted “Y” (Fig. 12f).

*Morphology.* Carapace (Fig. 10c–e) smoothly arched, highest at coxa I, hirsute. Abdomen (Fig. 10a) anteriorly broadly truncate.

*Measurements.* Carapace range 1.14–1.27. Total length 2.34; carapace length 1.16, width 1.04, height 0.53; abdomen length 1.90, width 1.53; sternum length 0.54, width 0.56; clypeus height 0.06. Eyes: AME 0.09; PME 0.11; ALE 0.06; PLE 0.07; ALE–PLE 0.12; AME–AME 0.07; PME–PME 0.09; AME–PME 0.04; AME–ALE 0.12. Limbs (femur + (patella–tibia) + metatarsus + tarsus = total): pedipalp 0.29 + 0.30 + – + 0.33 = 0.92; leg I 1.10 + 1.16 + 0.62 + 0.34 = 3.22; leg II 0.96 + 1.00 + 0.54 + 0.23 = 2.73; leg III 0.56 + 0.59 + 0.29 + 0.26 = 1.70; leg IV 0.82 + 0.84 + 0.44 + 0.30 = 2.40.

*Epigynum* (Fig. 11a–c, 12a,b). Posterior median plate with narrowly rounded ventral border and sides diverging towards dorsum; internal genitalia with long straight ducts along plate seams and into spermathecae,

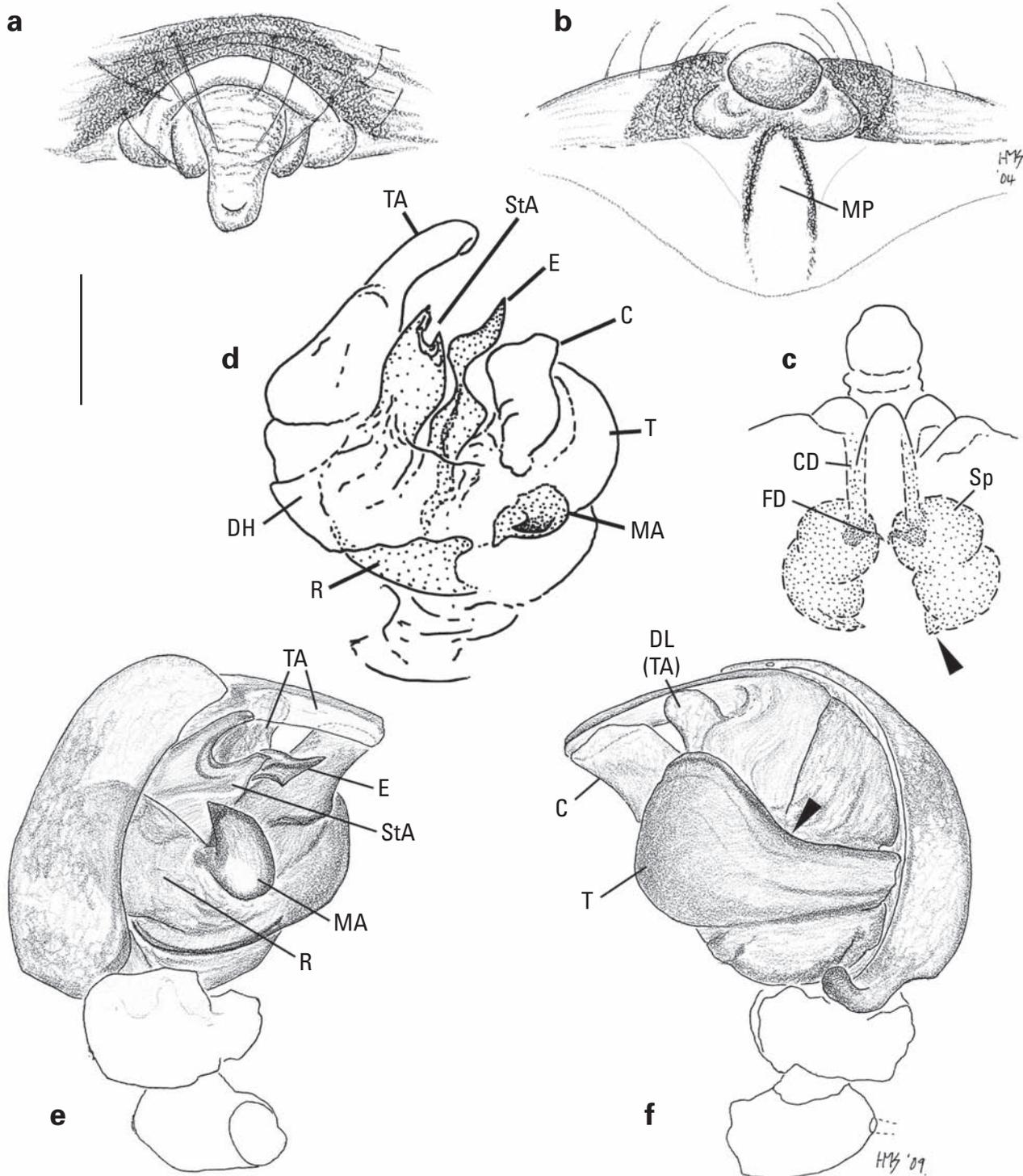
spermathecae reniform with terminal lamina (arrow Fig. 11c; cleared specimen KS57841).

**Description, male** (Paratype, AM KS86252). *Coloration.* Abdomen, similar to female, white “Y” absent from anterior.

*Morphology.* Carapace (Fig. 2a) similar to female but slightly flatter arch.

*Measurements.* Carapace range 0.78–1.02. Total length 1.80; carapace length 1.02, width 0.80, height 0.49; abdomen length 1.22, width 1.04; sternum length 0.47, width 0.42; clypeus height 0.04. Eyes: AME 0.10; PME 0.10; ALE 0.06; PLE 0.07; ALE–PLE 0.08; AME–AME 0.06; PME–PME 0.07; AME–PME 0.04; AME–ALE 0.10. Limbs (femur + (patella–tibia) + metatarsus + tarsus = total): pedipalp 0.20 + 0.17 + – + 0.28 = 0.65; leg I 0.92 + 0.98 + 0.51 + 0.30 = 2.71; leg II 0.80 + 0.84 + 0.46 + 0.28 = 2.38; leg III 0.50 + 0.49 + 0.24 + 0.22 = 1.45; leg IV 0.62 + 0.63 + 0.32 + 0.24 = 1.81.

*Pedipalp* (Figs. 11d–f, 12c–f). Tegulum high retrolaterally, narrowing to a band dorsally; median apophysis with a broadly based anteriorly directed hook;



**Fig. 11.** *Micropolitys heatherae* sp.nov. genitalia. **a–c:** Female: **a,b:** epigyne (holotype), ventral, posterior view; **c:** internal genitalia, posterior, arrow indicates lamella (AM KS57841, ex Cooktown). **d–f:** Male: **d:** pedipalp expanded (AM KS86252, ex Cape Kimberley), modified from fig. 28 (SMITH 2005); **e,f:** pedipalp (AM KS86251, ex Cape Kimberley), ventral, dorsal, arrow indicates edge of tegulum. Scale bar: 0.1 mm. **Abbreviations:** C = conductor; CD = copulation duct; DH = distal haematodocha; DL = dorsal lamina of TA; E = embolus; FD = fertilisation duct; MA = median apophysis; MP = median plate; R = radix; Sp = spermatheca; STA = subterminal apophysis; T = tegulum; TA = terminal apophysis.

terminal apophysis similar to *M. debakkeri* basally but terminally with long finger-like process, dorsal lamina shorter; subterminal apophysis broadly U-shaped process with truncated arms, under SEM appears as formed by scrolled lamina; embolus jagged and blade-

like under light microscope, flattened tube with flared terminal aperture visible under SEM.

**Variation.** Abdominal shape of all female specimens examined by HMS has been similar, with the anterior

truncate or forming two low humps. The sample size for *M. heatherae* is far smaller than for *M. debakkeri*, and it is possible that specimens with round-fronted abdominal shape may also occur.

**Biology.** Most hand-collected specimens were found on shrubs or foliage growing along rainforest margins or in clearings, often on dead twigs, and males collected at night were hanging from a silk line. Specimens were also recorded from canopy fogging samples and under bark. Web observations were not recorded or lost (HMS field notebook missing).

**Distribution.** Recorded from north-east Queensland north of the Daintree River, including islands of the Great Barrier Reef and in the Torres Strait.

**Type material.** HOLOTYPE: ♀, Australia, Queensland, Cape Kimberley Rd 3.6 km from Cape Tribulation Rd, 16°16'15"S 145°28'01"E, G. Milledge & H. Smith, 20.v.2000, beating (AM KS57850). – PARATYPES: 2 ♂♂, Cape Kimberley, track to lookout W of caravan park, 16°16'28"S 145°28'05"E, G. Milledge & H. Smith, 21.ix.2003, on lines at night (AM KS86251–52); 2 ♀♀, Cape Tribulation Rd ca 100 m N of turn-off to Cape Kimberley, 16°15'35"S 145°26'11"E, G. Milledge & H. Smith, 20.v.2000, beating dead twigs in an open rocky area (AM KS86739, AM KS57890); 1 ♂, 1 ♀, Cape Tribulation, 16°07'30"S 145°26'30"E, ex R. Kitching, Jan–Feb 1991, canopy fog (ANIC); 1 ♂, Cape Tribulation, 16°05'S 145°26'E, 28.viii.1988, J. Gallon, rainforest (QM S88161).

**Other material.** *Australia, Queensland:* 1 ♂, Cape Tribulation Rd ca 100 m N of turn-off to Cape Kimberley, 16°15'35"S 145°26'11"E, G. Milledge & H. Smith, 20.v.2000, beating in open rocky area, specimen dried out, used for SEM (AM KS86740); 1 ♀, Cooktown, base of track to Mt Cook, Mt Cook NP, 15°29'11"S 145°15'40"E, G. Milledge & H. Smith, 16.v.2000, used for SEM (AM KS57876); 2 ♀♀, Cooktown Botanical Gardens, 15°28'18"S 145°15'30"E, G. Milledge & H. Smith, 16.v.2000, night coll. (AM KS57841, AM KS57889); 1 ♂, Fritz Creek N of Bloomfield, 15°52'S 145°21'E, M. Gray, December 1975, on foliage (AM KS446); 2 ♂♂, Cape Tribulation, 16°07'30"S 145°26'30"E, ex R. Kitching, Jan–Feb 1991, canopy fog (ANIC); 1 ♀, Binstead I., Great Barrier Reef, 13°12'S 143°34'E, R. Buckley, 11.xii.1979 (QM S42626); 1 ♀, Hannibal I., Great Barrier Reef, 11°35'S 142°56'E, R. Buckley, 18.xii.1979 (QM S42625); (1 ♂, 1 ♀), (4 ♀, 5 juv.), Yam Island, Torres Strait, 09°53'S 142°55'E, 28.xi.–02.xii.1986, J. Gallon, under bark (QM S88162, QM S88163; specimens identified by N. Scharff using figures from draft manuscript); 2 ♀♀, no data except "Q3050" (QM).

## 5. Discussion

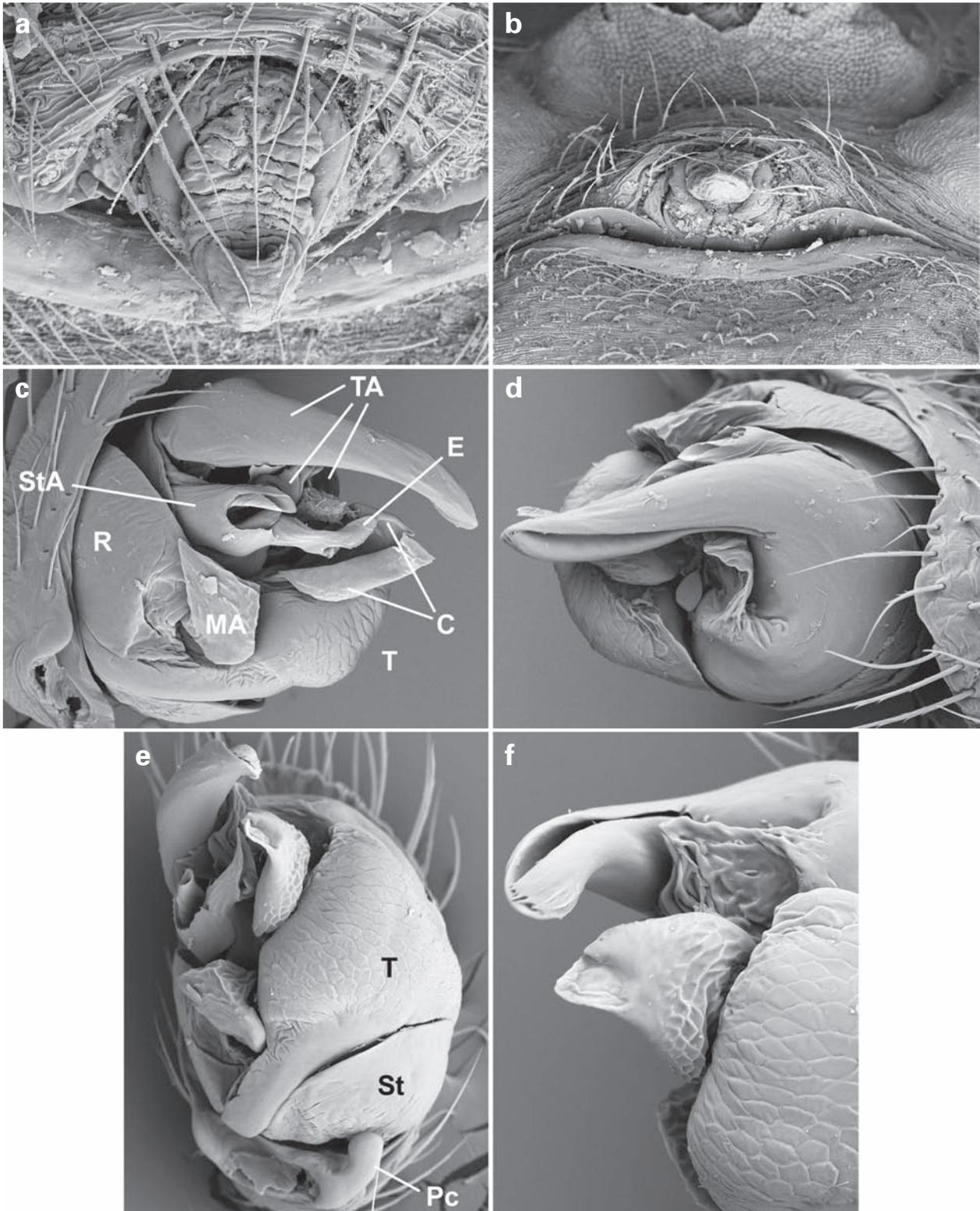
**Phylogenetic relationships.** The relationships of *Micropoltys* are unclear. SMITH (2005) added four of the genera previously placed together in the "Poltyini" to the data matrix of Araneidae (SCHARFF & COD-

DINGTON 1997) in a single analysis: *Cyphalonotus* Simon, 1895, *Ideocaira* Simon, 1903, *Micropoltys* and *Polty*. No clear placement was found for *Micropoltys*, although the results clearly suggested that the genus should be placed in the Araneinae, and that it was unlikely to be closely related to any of the other taxa previously associated through inclusion in the tribe Poltyini. As in SCHARFF & CODDINGTON'S (1997) original analysis, a strict consensus gave a "bush" in the araneines. However, an Adams consensus showed that *Micropoltys* most consistently appeared at the base of a clade containing *Alpaida* O.P. Cambridge, 1889, *Bertrana* Keyserling, 1884 and *Enacrosoma* Mello-Leitão, 1932, although examination of individual trees showed that many different taxa were also included in the clade or as sister groups in the various topologies (SMITH 2005).

In preparing the current manuscript some of the character codings used previously have been revised in the light of new information: these changes are noted in the generic section. Provisional reanalysis using *M. baitetensis* and *M. heatherae* with these updated characters (and using a matrix updated for nephilines as detailed by FRAMENAU et al. 2010) demonstrates the monophyly of *Micropoltys* and reinforces its placement in the Araneinae but otherwise does not produce any further information, hence is not presented here in detail (HMS unpublished data). For the time being, therefore, progress on the relationships of *Micropoltys* must await some new exploration of characters.

**Monophyly of *Micropoltys*.** In the aforementioned provisional analysis, the only character that consistently unites the two *Micropoltys* species whilst distinguishing the genus from other araneine taxa is the "gasteracanthine", or hooded form of the setal bases on the carapace (character 67). Characters that also support monophyly in some topologies are: male tibia II macrosetae similar to those on leg I (2), subterminal apophysis present (20), and scape with pocket (30). These features also apply to *M. debakkeri*, and the scape pocket is present in *M. placenta* but male characters for that species are unknown.

Some characters that do not appear in the original data set of SCHARFF & CODDINGTON (1997) are present in all the *Micropoltys* species described here and may further support monophyly of the genus. These include the anteriorly indented sternum, separation of the anterior and posterior lateral eyes, presence and form of the modified setal bases on the sternum and chelicerae, and bi-pronged subterminal apophysis of the male pedipalp (unknown for *M. placenta*). Nevertheless, as in some of the characters of the SCHARFF & CODDINGTON (1997) matrix, homoplasy or intra-generic variation may be found in these characters once they are better known. For instance, the indented



**Fig. 12.** *Micropoltys heatherae* sp.nov., SEM of genitalia. **a,b:** Female ex Cooktown (AM KS57876): ventral, posterior. **c–f:** Male ex Cape Tribulation Rd (AM KS86740, right pedipalp, images reversed): ventral, apical, retrolateral, dorsal. **Abbreviations:** C = conductor; E = embolus; MA = median apophysis; Pc = paracymbium; R = radix; St = subtegulum; StA = subterminal apophysis; T = tegulum; TA = terminal apophysis.

sternum certainly appears unusual; however, in small species this character is difficult to see with a light microscope unless specifically searched for. Therefore, it is possible it has been overlooked in other taxa. Lateral

eye separation also seems distinctive, but is an example where variation within the genus is known to occur and eye separation may be inappropriate as a generic character.

**Life history and distribution.** Little is known about the habits or life history of *Micropoltys* species. Males of *Poltys* spp. and *Micropoltys heatherae* look and behave very similarly at night (HMS pers. obs). As in many Araneidae, it would appear that an adult male does not build a web, but hangs on a silk line waiting to detect female pheromones on air currents. Females were only occasionally collected at night (any web records were lost in a missing field note book), and may have been overlooked by the senior author during night collecting because of the resemblance to juvenile *Poltys*, which were only collected at that size if the swollen pedipalps of a penultimate male were apparent. During the day, both males and females of *M. heatherae* were occasionally collected by beating dead twigs. However, the collecting bias of the author must be taken into account, meaning that living twigs were searched less frequently. Collecting methods of other collectors of *M. heatherae* included searching under bark, and canopy fog, while the other recently collected New Guinea *Micropoltys* specimens were all from canopy fog samples.

The distribution of the individual *Micropoltys* species is barely well-enough documented to comment on, but probably reflects the poor sampling of much of New Guinea. *Micropoltys heatherae* has only been recorded between the Daintree River and Cooktown on mainland Australia, but its occurrence on islands in the Torres Strait could indicate possible occurrence in similar lowland rainforest habitats in southern New Guinea. Similarly, *M. debakkeri* almost certainly occurs more widely, although currently only recorded in two localities. Both of these species' distributions, which span water barriers, make it likely that *Micropoltys* can disperse by ballooning. The great differences between the two sympatric species of *Micropoltys* that are here described from Baiteta Forest in comparison with the relative closeness of *M. debakkeri* and *M. heatherae*, hint that a richer *Micropoltys* fauna may remain undiscovered. There are huge unsampled tracts of potential *Micropoltys* habitat between these records in eastern New Guinea and Australia and the type locality for *M. placenta* in western Papua.

## 6. Acknowledgments

We are grateful to collection managers and curators who were most helpful in providing loans and advice on specimens and collections: Cate Lemann, Beth Mantle and Tom Weir (ANIC), Graham Milledge (AM), Laura Liebensperger (MCZ), Dominika Mierzwa (MIZ), Robert Raven and Owen Seeman (QM), Domir De Bakker and Léon Baert (RBINS); Marek Żabka twice helped with enquiries to MIZ; Sue Lindsay provided SEM operation and support; Volker Framenau prompted completion of this

work by sending records and photographs of additional specimens seen at QM; Volker Framenau and Graham Milledge made helpful comments on a draft of this manuscript; Nikolaj Scharff examined specimens on loan to him in Copenhagen. Specimens collected by the senior author in Queensland national parks were collected under permit #C6/000144/00/SAA. For the senior author this project started during her doctoral studies, hence we also thank the Australian Museum, the University of Sydney and the Linnean Society of New South Wales, which all provided grant assistance during the period of this work.

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