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New unidentate jumping spider genera (Araneae: Salticidae) from Australia

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Abstract

The Australian fauna includes large numbers of undescribed, tiny, litter-living, jumping spiders. In this paper four monotypic new genera (*Ananeon howardensis* n. g. n. sp., *Barraina anfracta* n. g. n. sp., *Frewena maculata* n.g. n.s., and *Pungalina weiri* n.g. n.sp.) are described. Two species (*Neon taylori* n.sp. and *Neon australis* n. sp.) representing the two distinctive morphological patterns found in Australian species of this genus are also described. The former, similar in the morphology of the palp and genitalia to that found in many species from eastern Australia, is most similar in morphology to *N. sumatranus* Logunov 1998 from Indonesia and *N. kovblyuki* Logunov 2004 from the Crimea. The latter, and other similar species from South Australia and Western Australia, has palp morphology and fringing on L1 very similar to that seen in *N. nojimai* Ikeda 1995 from Japan.

Key words: *Ananeon* n. g., *Barraina* n. g., *Frewena* n. g., *Neon* Simon 1876, *Pungalina* n. g. new genera, new species

Introduction

The Museums and Art Galleries of the Northern Territory, Darwin and in the Australian National Insect Collection, CSIRO, Canberra hold examples of an extensive fauna of quite small unidentate species, mostly found in litter. These have not been previously studied other than to note in passing the presence of *Neon* Simon 1876 (Richardson and Zabka 2003). Of the many undescribed genera and species of small salticids, four are represented by examples of both sexes. These four new genera, *Ananeon* n. g., *Barraina* n. g., *Frewena* n. g. and *Pungalina* n. g. are described here. The Australian National Insect Collection also included at least eight species of the genus *Neon* from eastern Australia and three from South and Western Australia. Two of the species, representing two distinct groups of species with markedly different palp and genital morphologies, are also described. As well as these small, unidentate genera, some Australian pluridentate and fissentate genera (e.g. in *Jacksonoides*) include similarly small forms.

The five genera seem to have little in common when the structures of the male and female genitalia are compared, other than their small size and unidentate dentition. According to recent studies (Maddison and Hedin 2003; Maddison *et al.* 2008; Bodner and Maddison 2012), *Neon* probably belongs to a large Australian clade, the Astioida, that developed approximately 32mya. *Ananeon*, *Barraina* and *Frewena*, however, are provisionally placed in the Euophryinae, based on the general morphology of the palp and female genitalia. This clade is thought to have derived from an Afro-Eurasian radiation and would have reached Australia from Asia less than 15mya. Euophryines are quite common in Australia, being represented by many genera (e.g. *Maratus*). The placement of *Pungalina* is uncertain, it may be either an astioid or a member of the Hasarinae. As a consequence of their different origins, these genera of small litter-living spiders do not constitute a single evolutionary radiation within the litter habitat.

The purpose of this work was to describe several of the many unknown genera present in Australia as part of the preliminary work to the preparation of a LUCID key to the genera of Australian jumping spiders.

Material and methods

Material in the collections of ANIC (Australian National Insect Collection, CSIRO, Canberra) and MAGD (Museums and Art Galleries of the Northern Territory, Darwin), were used in the study. Institutional abbreviations follow Evenhuis (2009). Types of new species were deposited in these collections. Location information is given as on the sample label, latitudes and longitudes are given as decimal degrees and the material examined for each species is placed in north/south order within State or Territory. The distribution of each species is shown. Meristic characteristics were noted for each genus and species. As well, a series of measurements was taken (Fig. 1). The following abbreviations are used: AEW—anterior eye row width, AL—abdomen length, AMEW—anterior median eye row width, CL—cephalothorax length, CW—cephalothorax width, EFL—eye field length, PEW—posterior eye row width, L1–4—legs 1–4, P1+T1—tibia plus patella length of L1. The measurements for type specimens are given. Female genitalia were dissected, cleared using 50% lactic acid, and drawn using a camera lucida. Lateral and ventral views of the male palp and dorsal views of whole specimens were also drawn. Parts of illustrations that are heavily inked indicate more heavily sclerotised or darker areas.

The predicted distribution of *Neon taylori* was calculated using BIOCLIM (Nix, 1986) as compiled in BIOLINK (Richardson *et al.* 2006, Richardson and Gunter 2012). When sufficient specimens were available the conservation status was determined according to IUCN Red Listing Criteria (IUCN, 2001).

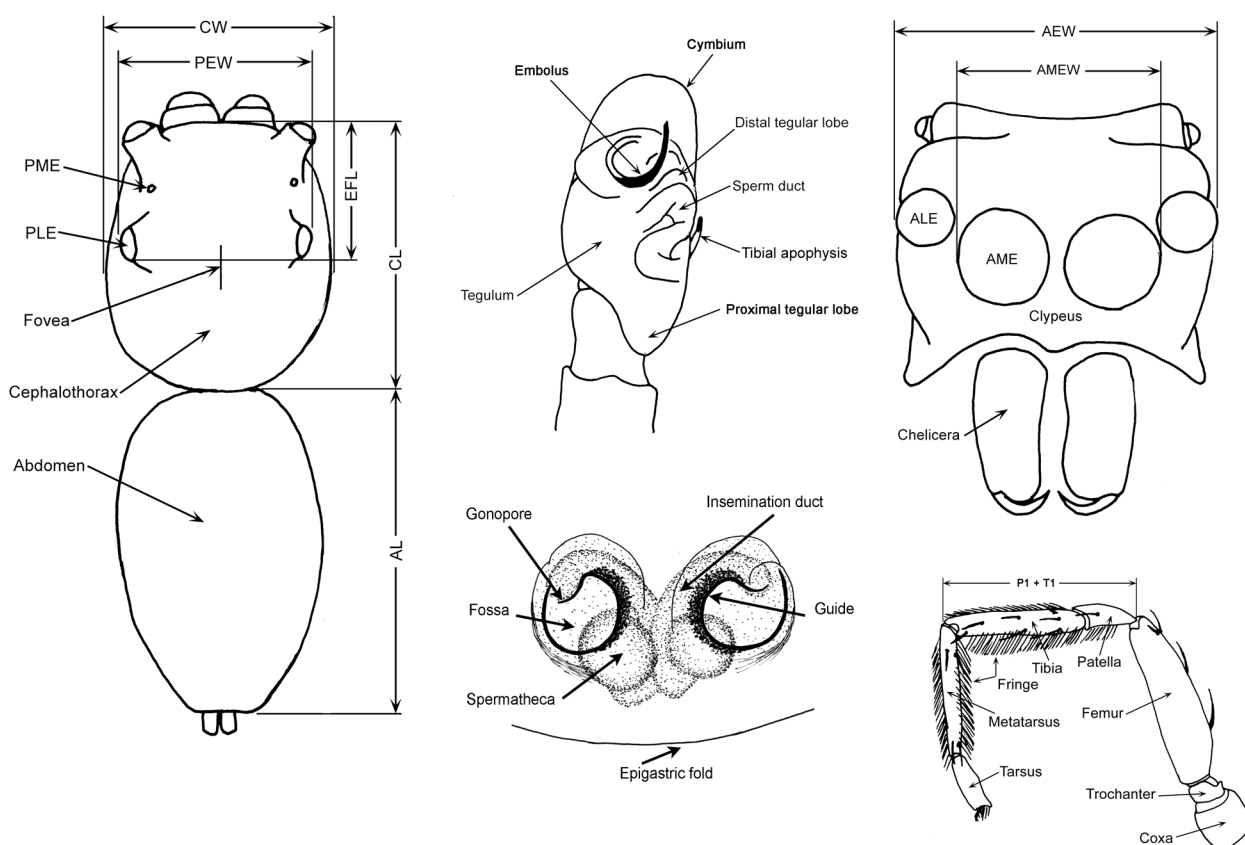


FIGURE 1. Morphological features and measurements used in descriptions. See Methods for abbreviations.

Taxonomy

Ananeon n. gen.

Type species. *Ananeon howardensis* sp. n.

Etymology. The name reflects the fact that it is not *Neon*, to be treated as male in gender.

Diagnosis. This Australian genus of very small unidentate spiders can be distinguished from other genera by the morphology of the heavily built embolus which lies across the palp and has an anticlockwise curve. There is a distal tegular lobe and a bifurcate medium sized apophysis. The fossae are large, with strongly delineated guides and the gonopores are centrally placed. The insemination canals lie across the ventral surfaces of the spermathecae giving the appearance of diverticula externally, however, unlike *Neon* and *Frewena*, the origin is on the lateral edge of the spermatheca. The spermathecae are subdivided internally, though this is not apparent externally. The fertilization canals are relatively long and distinct and are placed anterior to the insemination canals. PLE and ALE are situated on separate prominences on the cephalothorax. On the basis of its morphology, the genus is referred provisionally to the subfamily Euophryinae.

***Ananeon howardensis* n. sp.**

Figs 2–10

Type material. Holotype: M, Howard Springs, N.T., 131.05°E, 12.45°S, Aug.1993, M. Healy, (MAGD BJR1196). Paratypes: 1M, 3F, details same as holotype (MAGD BJR1197).

Etymology. The name is a random combination of letters reflecting in part the name of the type locality.

Diagnosis. As for the genus.

Description. *Male:* Cephalothorax mid to dark orange. Surrounds of ALE, PME and PLE, black. PLE and ALE+PME placed on separate prominences (Fig 6). PME relatively large and closer to ALE. Pars thoracica almost vertical. Mat of long white pennate hairs around the sides and rear of the cephalothorax. Clypeus narrow, mid-brown, with a sparse fringe of long white hairs. Chelicerae mildly geniculate, mid-brown. Two promarginal teeth and one large, unidentate, sharp, retromarginal tooth. Endites and labium mid-brown. Sternum mid-brown. Dorsal abdomen yellow with a pattern of dark brown markings. Spinnerets brown. Ventral abdomen yellow. Legs mid-brown, L1 and L2, more strongly built than L3 and L4 and with enlarged and vertically flattened femurs. Palps brown with numerous long white hairs. *Palp:* yellow, cymbium covered with white hairs, tibia with bifurcate medium sized sharp apophyses. The tegula are long with medium-sized proximal lobes. Each embolus forms a lateral, anticlockwise, half circle, distal to the tegulum. Dimensions: CL 1.4, EFL 0.8, CW 1.3, AEW 1.2, AMEW 0.7, PEW 1.2, AL 1.9, P1+T1 1.5, L1 3.6 (1.1+0.6+0.9+0.6+0.4), L2 2.5 (0.9+0.4+0.5+0.4+0.4), L3 2.4 (0.7+0.4+0.4+0.4+0.4), L4 2.9 (1.0+0.6+0.6+0.5+0.4).

Female: As for the male. *Epigynum:* The epigyne includes a pair of oval-shaped fossae adjoining in the midline. The copulatory openings are placed within the fossae. The insemination ducts join the lateral edge of the rounded spermatheca, which is divided into two sub-chambers. The spermathecae are partially posterior to the fossae. Fertilization ducts are placed anterior to the insemination canals, are long and fold back on themselves. They connect to the lateral edges of the spermathecae. *Dimensions:* CL 1.7, EFL 0.9, CW 1.5, AEW 1.3, AMEW 1.0, PEW 1.4, AL 2.0, P1+T1 1.5, L1 3.5 (1.1+0.7+0.9+0.5+0.4), L2 (missing), L3 2.6 (0.9+0.4+0.5+0.5+0.4), L4 2.7 (0.9+0.6+0.4+0.4+0.4).

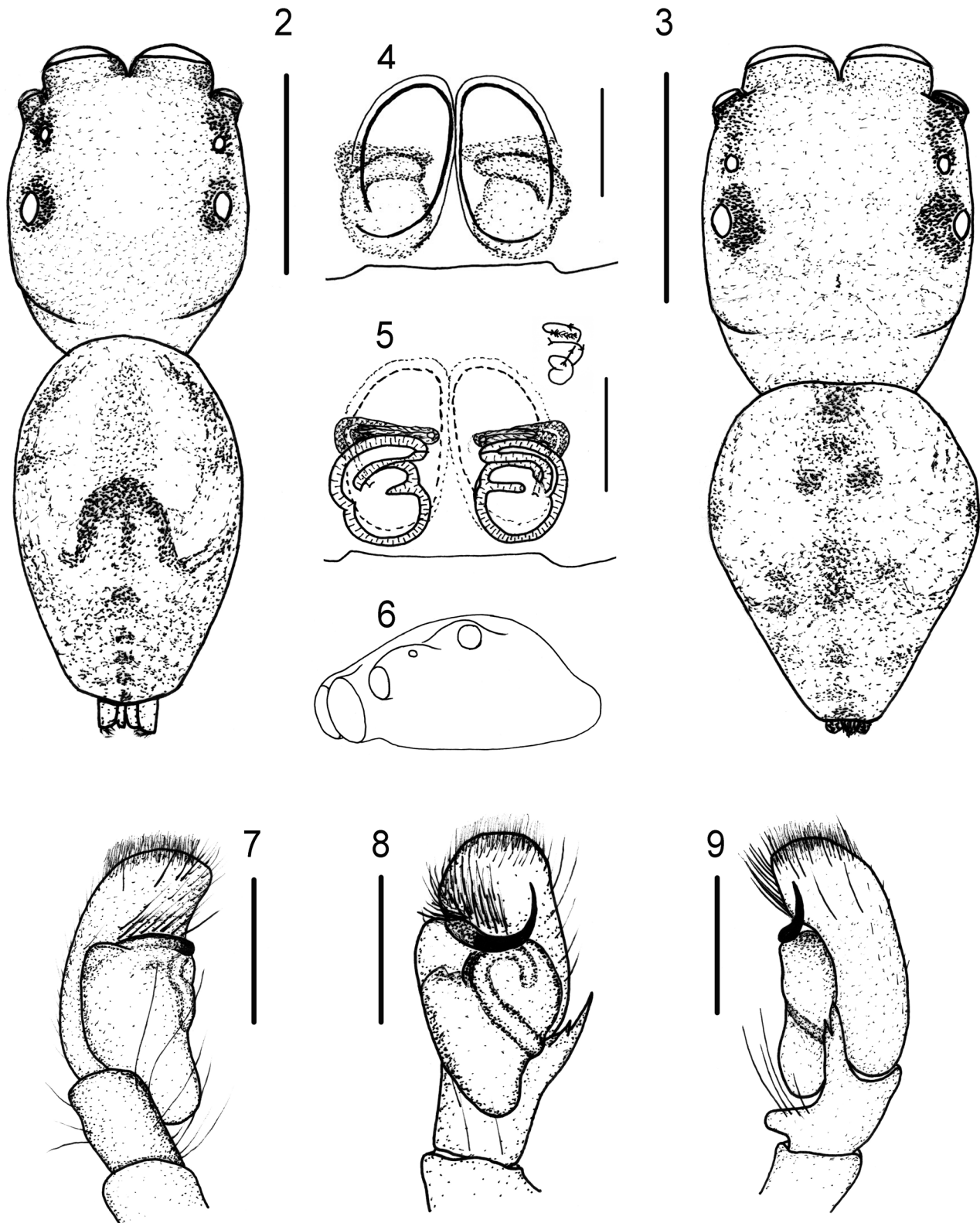
Distribution and biology. Known only from the type locality (fig. 10).

***Barraina* n. gen.**

Type species. *Barraina anfracta* sp. n.

Etymology. The name is derived from the Ngajan name for the type locality, to be treated as female in gender.

Diagnosis. This unidentate Australian genus of very small spiders can be distinguished from other genera by the clockwise corkscrew form of the embolus and the presence of a distal tegular lobe. The fossae are small, with strongly delineated guides and the entrances to the insemination canals are centrally placed. The fertilization canals are relative long and distinct. The spermatheca is not subdivided. Provisionally it should be placed in the Euophryinae on the basis of the anticlockwise curve and position of the embolus and the presence of paired fossae.



FIGURES 2–9. *Ananeon howardensis* n. sp. 2–3 dorsal view (2 female, 3 male); 4–5 female genitalia (4 ventral view of external characteristics, 5 dorsal view of cleared specimen); 6 lateral view of cephalothorax, 7–9 male palp (7 posterior lateral view, 8 ventral view, 9 anterior lateral view). Scale: total body 1 mm; remainder 0.2 mm.

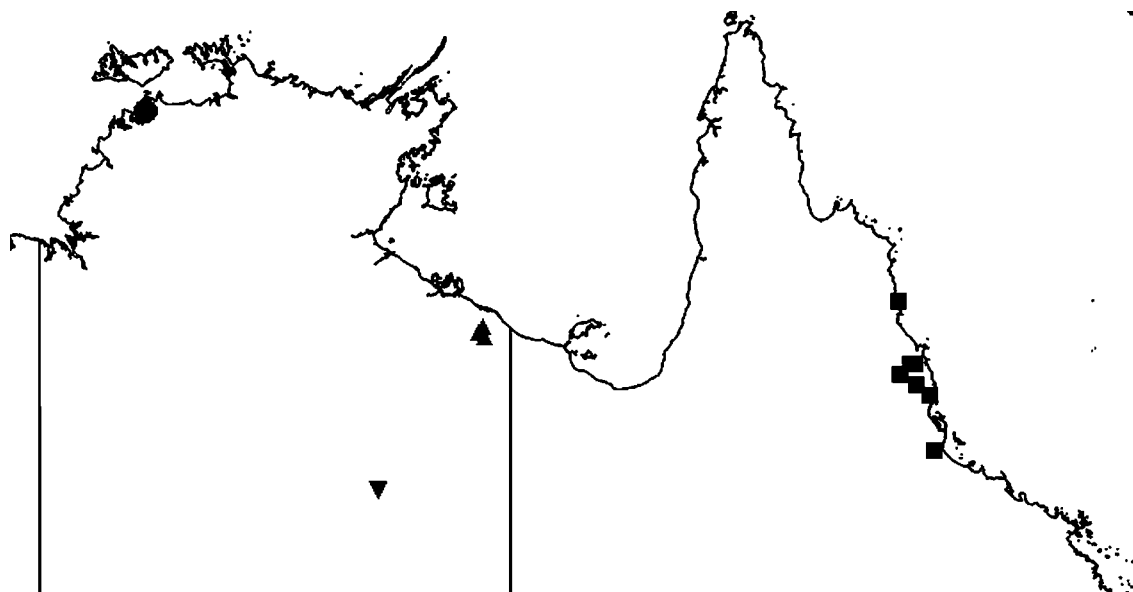


FIGURE 10. Map showing the geographical origins of the specimens studied for *Ananeon howardensis* (●), *Barraina anfracta* (■), *Frewena maculata* (▼) and *Pungalina weiri* (▲).

***Barraina anfracta* n. sp.**

Figs 10–17

Type material. Holotype: M, 4km E of Lake Barine, Qld, 145.68°E, 17.27°S, R. Taylor, J. Feehan, 1 Aug.1971 (ANIC 42 000915).

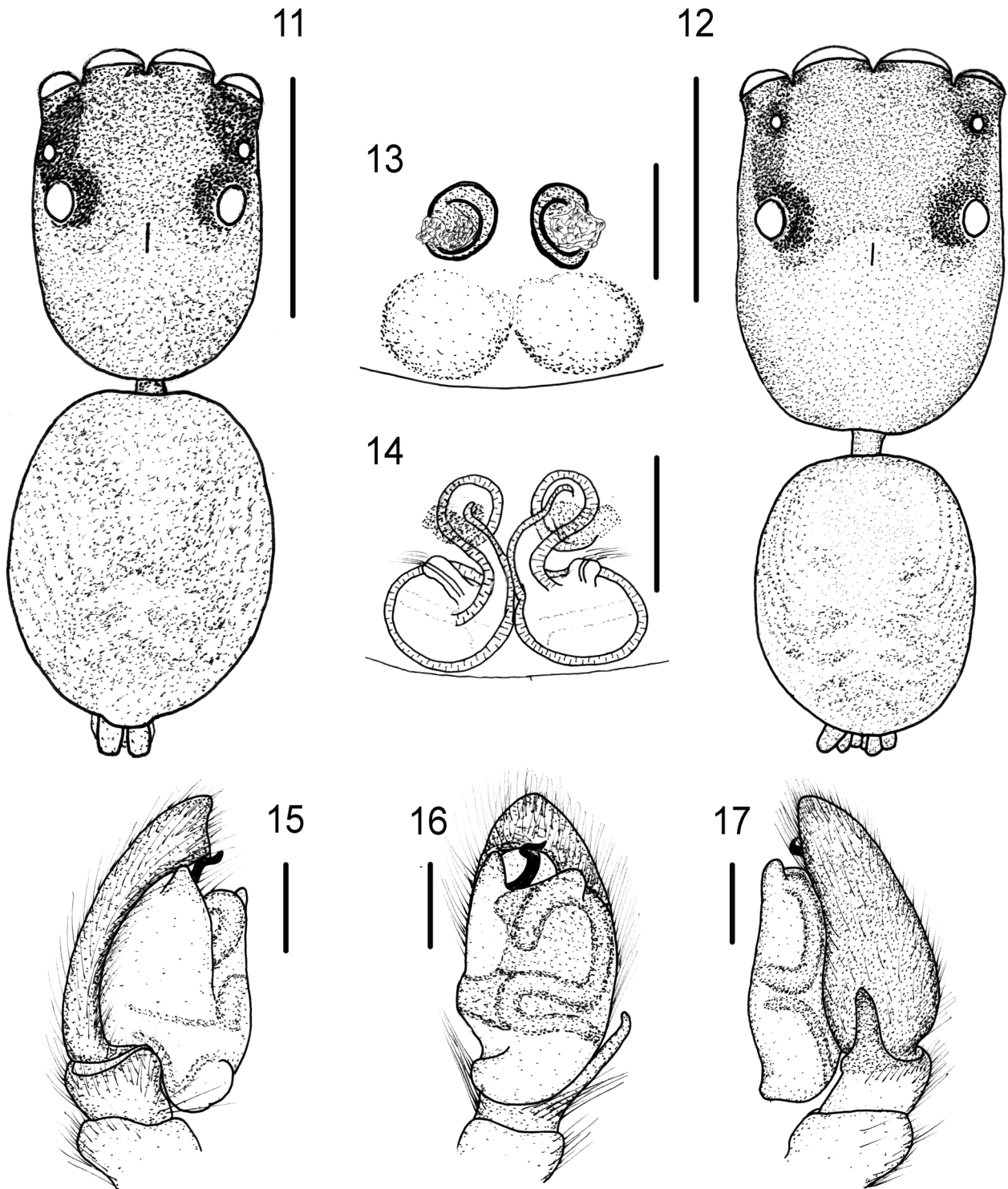
Paratypes: 2F, details same as holotype.

Other material examined. 1M, 1 imm., Mt Spec, Qld, 146.15°E, 18.92°S, M. Cermak, 4 Nov 95, (ANIC, 42 000897); 1M, Mission Beach, Qld, 146.07°E, 17.87°S, M. Cermak, 29 Jan 96, (ANIC, 42 000896); 1M, same locality, M. Cermak, 1 Apr 96, (ANIC, 42 000901); 1M, same locality, M. Cermak, 29 Jan 96, (ANIC, 42 000868); 1M, same locality, M. Cermak, 1 Apr 96, (ANIC, 42 000903); 1M, same locality, M. Cermak, 29 Jan 96, (ANIC, 42 000876); 1M, same locality, M. Cermak, 29 Jan 96, (ANIC, 42 000877); 1M, same locality, M. Cermak, 1 Apr 96, (ANIC, 42 000899); 1M, McNamsee Creek, Qld, 145.80°E, 17.67°S, R. Taylor, J. Feehan, 8 Jul 71, (ANIC, 42 000706); 2M, McNamsee Creek, Qld, 145.80°E, 17.67°S, R. Taylor, J. Feehan, 8 Jul 71, (ANIC, 42 000710); 1M, Longlands Gap, Qld, 145.48°E, 17.47°S, P. Zborowski, 6 Mar 95, (ANIC, 42 000843); 1M, Upper Murgave R, Qld, 145.78°E, 17.27°S, R. Taylor, J. Feehan, 19 Jun 71, (ANIC, 42 001458); 1M, 2km WSW Cape Tribulation, Qld, 145.45°E, 16.08°S, L. Umback, 5 Dec 95, (ANIC, 42 000885); 2M, 1km WNW Cape Tribulation, Qld, 145.47°E, 16.07°S, L. Umback, 1 Feb 96, (ANIC, 42 000832); 1M, same location, L. Umback, 4 Jan 96, (ANIC, 42 000826); 1M, same location, L. Umback, 5 Oct 95, (ANIC, 42 000898).

Etymology. From the Latin; winding or sinuous, reflecting the shape of the embolus.

Diagnosis. As for genus.

Description. *Male:* Cephalothorax mid to dark orange with pars cephalica somewhat darker. Surrounds of ALE, PME and PLE, black. Clypeus narrow, tan, without a fringe of hairs. Chelicerae weakly geniculate, tan with narrow black lateral edge. Two promarginal teeth and one medium sized, unidentate blunt retromarginal tooth. Endites and labium tan. Sternum yellow. Dorsal abdomen yellow with a pair of longitudinal black patches. Spinnerets yellow. Ventral abdomen brown. Legs dark brown with strong spines, L1 more robust and larger than other legs, without a fringe on patella and tibia. *Palp:* dark brown, cymbium mid-brown, tibia dark brown, with single medium sized blunt apophysis. The tegulum are long with a small proximal lobe. Each embolus follows an anticlockwise spiral and lies in the midline between two distal lobes. Dimensions: CL 1.5, EFL 0.8, CW 1.2, AEW 1.2, AMEW 0.7, PEW 1.1, AL 1.2, P1+T1 1.2, L1 3.4 (1.2+0.4+0.8+0.6+0.4), L2 2.7 (0.8+0.4+0.6+0.6+0.3), L3 3.0 (1.0+0.5+0.6+0.6+0.3), L4 2.8 (0.9+0.4+0.6+1.7+0.3).



FIGURES 11–17. *Barraina anfracta* n. sp. 11–12 dorsal view (11 female, 12 male); 13–14 female genitalia (13 ventral view of external characteristics, 14 dorsal view of cleared specimen); 15–17 male palp (15 posterior lateral view, 16 ventral view, 17 anterior lateral view). Scale: total body 1 mm; remainder 0.2 mm.

Female: Cephalothorax mid to dark orange with pars cephalica somewhat darker. Surrounds of ALE, PME and PLE, black. Clypeus narrow, mid-brown, without a fringe of hairs. Chelicerae straight, mid-brown. Two promarginal teeth and one medium sized, unidentate blunt retromarginal tooth. Endites and labium mid-brown. Sternum yellow. Dorsal abdomen yellow with a pair of lateral black markings. Spinnerets yellow. Ventral abdomen yellow. Legs mid-brown with strong spines, L1 slightly larger than other legs, without a fringe on patella and tibia.

Epigynum: The epigyne includes a pair of small dark brown oval-shaped fossae. The copulatory openings are placed within the fossae. The insemination ducts join the median edge of the rounded spermatheca. The spermathecae are posterior to the fossae and the posterior edge of the spermathecae abut the epigastric fold. Fertilization ducts are on the anterior dorsal edge of the spermathecae. *Dimensions*: CL 1.4, EFL 0.7, CW 1.0, AEW 0.9, AMEW 0.6, PEW 0.9, AL 1.5, P1+T1 0.9, L1 2.5 (0.8+0.4+0.5+0.4+0.2), L2 2.1 (0.6+0.3+0.5+0.4+0.2), L3 2.4 (0.9+0.3+0.5+0.5+0.2), L4 2.6 (0.8+0.3+0.5+0.6+0.4).

Distribution and biology. Occurs widely in litter in northern Queensland rainforests (Fig. 10). Widespread in National Parks, likely IUCN Red List Category LC.

Frewena n. gen.

Type species. *Frewena maculata* Richardson 2013.

Etymology. The name is derived from the name of the type locality and is to be treated as female in gender.

Diagnosis. This Australian genus of very small unidentate spiders can be distinguished from other euophryine genera by the shape of the spermatheca. This is subdivided into two compartments placed one on top of the other and with a well-formed long narrow diverticulum off the ventral compartment. The paired fossae are separated by a distinct septa and include two S-shaped guides. The male has a long embolus forming an anticlockwise spiral. From its morphology, the genus should be placed in the Euophryinae.

Frewena maculata n. sp.

Figs 10, 18–24

Type material. Holotype: M, Frewena, N.T., 135.40°E, 19.43°S, 1 Oct.1976 (MAGD, BJR1264). Paratypes: 1F, 2M, 2 imm., details same as holotype (MAGD, BJR1265)

Etymology. The name is from the Latin for spotted.

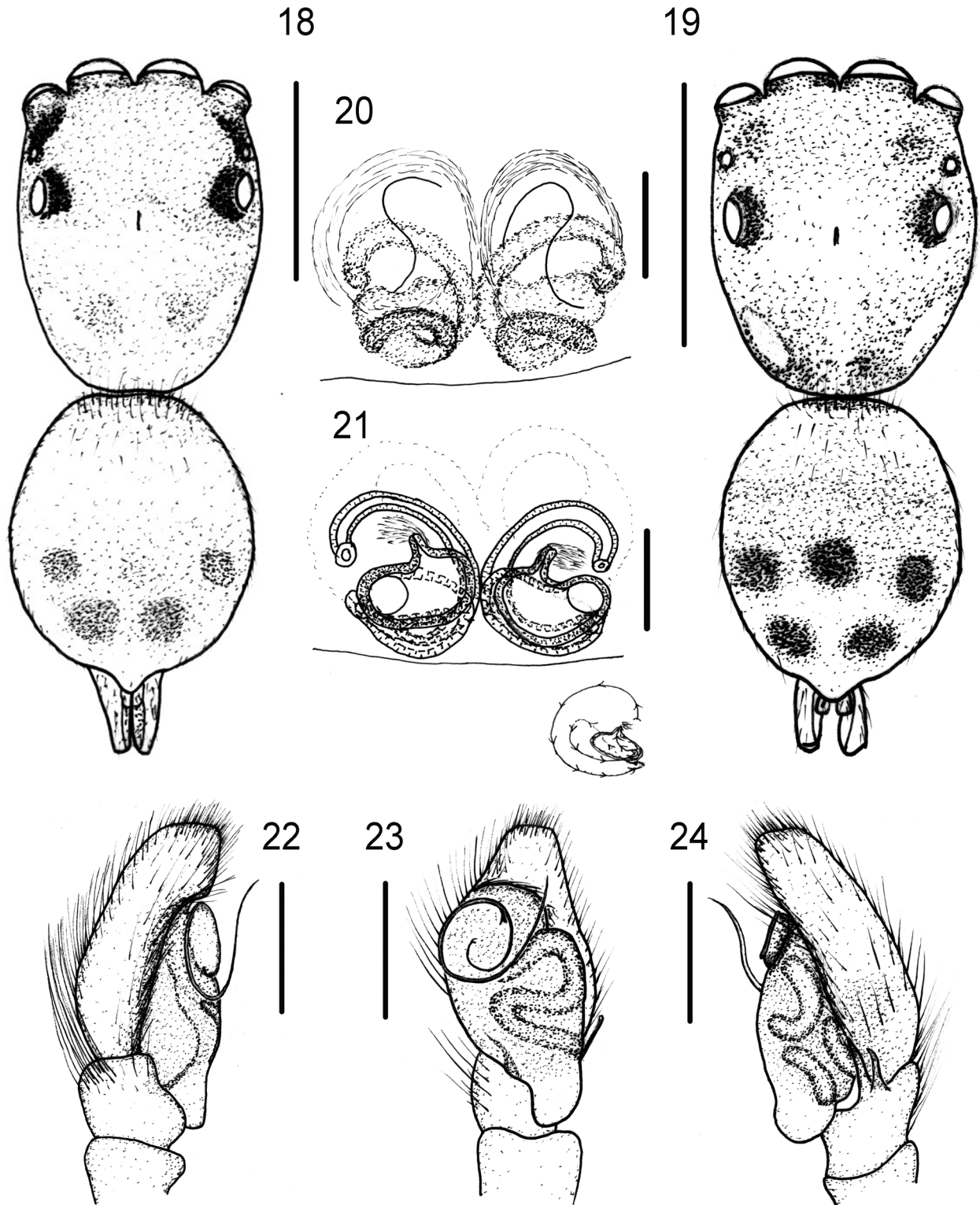
Diagnosis. As for genus.

Description. *Male*: Cephalothorax mid orange with darker sides and rear surface. Surrounds of PME and PLE, dark brown. Sides of the cephalothorax and the dorsal surface of the pars cephalica covered with fine grey hairs. Clypeus narrow, brown, with a fringe of fine grey hairs. Chelicerae straight, brown with narrow black lateral edges. One medium sized, unidentate, sharp retromarginal tooth. Endites, labium and sternum yellow. Dorsal abdomen yellow overlaid with brown patina. Terminal half of the abdomen with a row of three and then a row of two large dark brown spots. Spinnerets yellow. Ventral abdomen yellow. Legs yellow with strong spines on L1 which is more robust than the other legs and without a fringe on patella and tibia. Patella and tibia of L3 darker and fringed, much longer than other legs. *Palp*: yellow, tibia with long thick fringe of long strong yellow hairs, and a small fine apophysis. The tegulum is long with a small proximal lobe. The embolus follows a large anticlockwise spiral and lies on the median edge of the tegulum. *Dimensions*: CL 1.4, EFL 0.6, CW 1.2, AEW 1.1, AMEW 0.7, PEW 1.1, AL 1.5, P1+T1 1.8, L1 2.3 (0.7+0.4+0.4+0.4+0.3), L2 2.2 (0.7+0.4+0.4+0.4+0.3), L3 3.2 (1.1+0.5+0.6+0.6+0.4), L4 2.7 (0.8+0.3+0.5+0.6+0.5).

Female: Cephalothorax yellow with scattered darker patches. Surrounds of ALE, PME and PLE, dark brown. Sides of the cephalothorax and the dorsal surface of the pars cephalica covered with fine grey hairs. Clypeus narrow, brown, with a fringe of fine grey hairs. Chelicerae straight, brown with narrow black lateral edges. Two promarginal teeth and one medium sized, unidentate, sharp retromarginal tooth. Endites, labium and sternum yellow. Dorsal abdomen yellow overlaid with brown patina. Terminal half of the abdomen with a row of three and then a row of two large dark brown spots. Spinnerets yellow. Ventral abdomen yellow. Legs yellow with strong spines on L1 which is more robust than the other legs. L3 much longer than the other legs. *Epigynum*: The epigyne includes a pair of faintly delineated oval-shaped fossae. The copulatory openings are placed just within the lateral edges of the fossae. The insemination ducts are long and pass around the median and proximal sides of the spermathecae before joining the lateral edge of the spermatheca. The ducts are continuous with the relatively long and narrow spermatheca. These underlie the posterior edge of the fossae. The spermathecae continue past the exit

of the fertilization duct as short wide diverticula. The fertilization ducts are on the anterior dorsal edge of the spermathecae. *Dimensions*: CL 1.5, EFL 0.6, CW 1.2, AEW 1.1, AMEW 0.7, PEW 1.1, AL 1.4, P1+T1 0.8, L1 2.4 (0.8+0.4+0.4+0.3+0.4), L2 2.3 (0.8+0.4+0.4+0.4+0.3), L3 3.1 (1.1+0.5+0.6+0.5+0.4), L4 2.8 (0.9+0.4+0.5+0.6+0.4).

Distribution and biology. Known only from type locality (fig. 10).



FIGURES 18–24. *Frewena maculata* n. sp. 18–19 dorsal view (18 female, 19 male); 20–21 female genitalia (20 ventral view of external characteristic s, 21 dorsal view of cleared specimen); 22–24 male palp (22 posterior lateral view, 23 ventral view, 24 anterior lateral view). Scale: total body 1 mm; remainder 0.2 mm.

Neon Simon, 1876

Type species: *Salticus reticulatus* (Blackwall, 1835).

Diagnosis. As in Logunov (1998). The genus can be distinguished from other Australian genera of tiny unidentate salticids by the presence of a large diverticulum forming the posterior part of the spermatheca and separated from it by a lateral groove when viewed externally (fig. 33).

Remarks. Logunov (1998) redefined the genus and comments on the two presently recognised sub-genera, *Neon* and *Dicroneon* Lohmander 1945. *Neon* is distinguished by the presence of a finely speculated lobe at the embolic base. This is not found in *Dicroneon*, though single spicules representing an undeveloped or reduced lobe are present (Logunov 1998). The Australian species described here are clearly not members of the subgenus *Neon* as they lack the speculated lobe and should be presently placed in the sub-genus *Dicroneon*. In the material available at least two different groups based on morphology are present. The first, including many species from eastern Australia and represented here by *N. taylori* n. sp., is most similar in morphology to *N. sumatranus* Logunov 1998 from Indonesia and *N. kovblyuki* Logunov 2004 from the Crimea and elsewhere. The second, represented by *N. australis* and undescribed species from South Australia and Western Australia, has palp morphology and fringing on L1 very similar to that seen in *N. nojimai* Ikeda 1995 from Japan. In the absence of female specimens of *N. nojimai* or *N. australis*, they have been left in *Neon* for the present, though they may well belong in a new genus.

The molecular phylogeny of the Salticidae developed by Maddison and co-workers places *Neon* in the Astioidea and most closely related to the Australian based Astiae radiation. It is possible as a consequence, that *Neon* is an originally Australian genus that has spread to other regions. However the only species of this genus sequenced (Maddison and Hedin 2003; Bodner and Maddison 2012), *N. nelli*, belongs within the subgenus *Neon*, unlike all the presently known Australian species that are more similar to members of the subgenus *Dicroneon* from the oriental region.

The genus is common and widespread in litter throughout Australia, from the highlands of Tasmania through the hot, dry inland to the wet tropics and includes many undescribed species.

Neon australis n. sp.

Figs 25–30

Type material. *Holotype*: M, Kuitpo, S.A., 138.70°E, 35.17°S, P.J.M. Greenslade, 20 Apr.1977 (ANIC 42 001208).

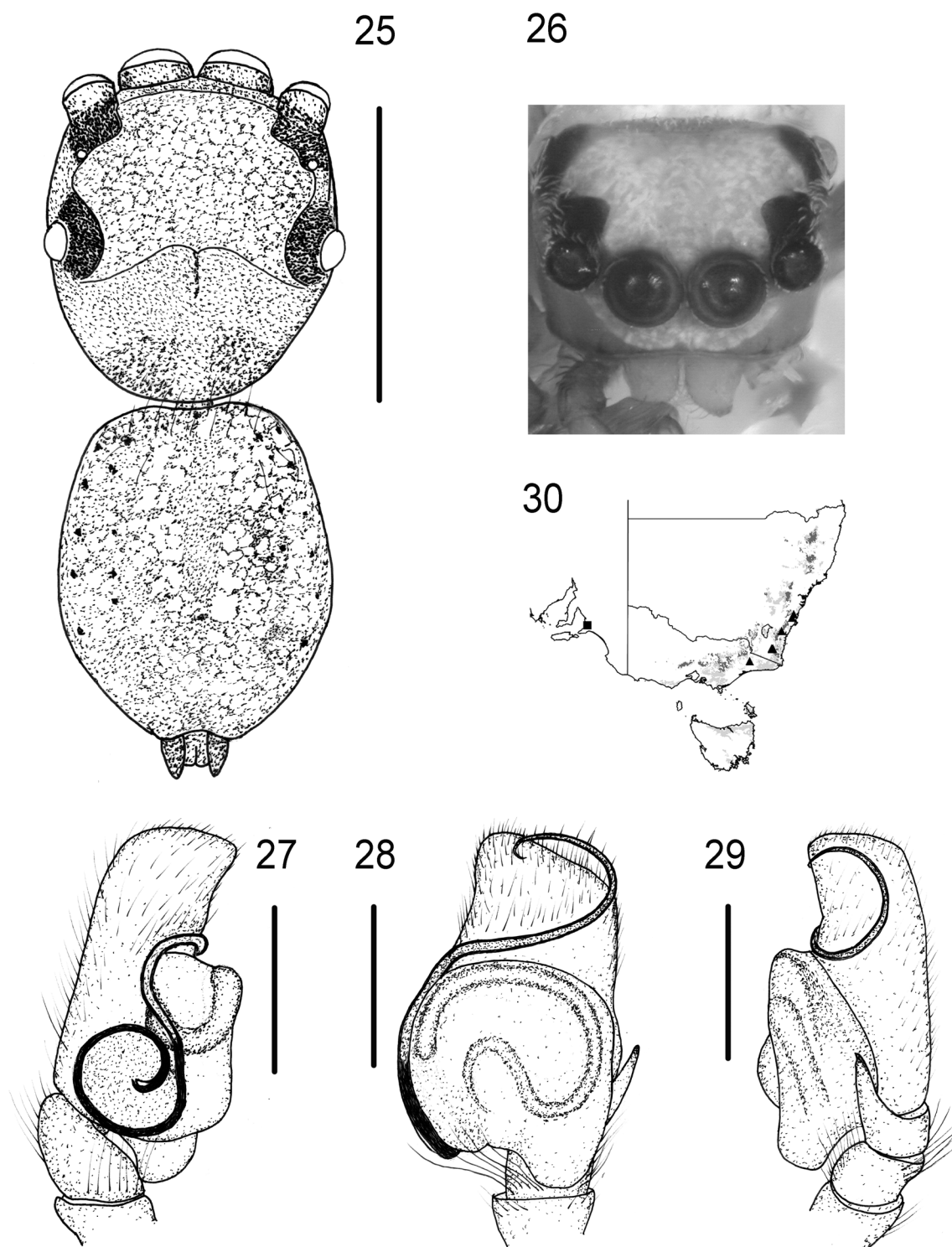
Etymology. Reflects the southern distribution of the species.

Diagnosis. The long, thin embolus has an origin as an anticlockwise spiral on the posterior side of the palp. It then passes laterally across the distal edge of the tegulum before moving distally to finish in a partial anticlockwise spiral near the distal end of the cymbium. This pattern differentiates the species from all *Neon* species but *N. najimai*. The tip-shape and direction of the apophysis in *N. australis* differs from that of *N. najimai*. The clupeus, cephalothorax and abdomen covered with clearly defined patches of white guanine (fig. 26) also differentiate it from *N. najimai*.

Description. *Male*: Cephalothorax mid orange with a strongly edged central area of the pars cephalica covered with patches of white guanine. ALE, PME and PLE placed on distinct black-edged shields. PME much nearer ALE than to PLE. White pennate hairs along sides and back of the cephalothorax and around AME and PME. Clypeus wide, orange but covered with white patches of guanine similar to pars cephalica (fig. 26), without a fringe of hairs. Chelicerae orange and straight. One medium sized, unidentate sharp retromarginal tooth, no apparent promarginal teeth. Endites and labium orange grading to yellow distally. Sternum yellow. Dorsal abdomen orange with a pattern of small dark spots and white patches of guanine. Thin dark longitudinal stripes on the sides. Spinnerets orange. Ventral abdomen similar in colour and guanine pattern to the dorsal abdomen. Legs yellow without markings, femurs flattened vertically and spines only on the tibia, tarsi and metatarsi. L1 is a little more robust and larger than the other legs with strong fringes on the dorsal surfaces of the femur, patella and tibia, plus strong ventral fringes on the patella, tibia, and tarsus. *Palp*: yellow, tibia with single long strongly built apophysis. The tegulum is oval with a medium sized, proximal lobe. The long, thin embolus has a spiral lateral origin and moves sideways across the

distal edge of the tegulum before moving distally to finish near the end of the cymbium. Dimensions: CL 1.1, EFL 0.7, CW 1.0, AEW 0.9, AMEW 0.5, PEW 1.0, AL 1.0, P1+T1 1.1, L1 2.5 (0.8+0.4+0.6+0.4+0.3), L2 1.9, (0.6+0.3+0.4+0.3+0.2), L3 2.3, (0.8+0.3+0.4+0.6+0.2), L4 2.3, (0.7+0.3+0.5+0.5+0.3).

Distribution and biology. Known only from the type locality (fig. 30).



FIGURES 25–30. *Neon. Neon australis* n. sp. 25 dorsal view (male); 26 anterior view of face showing cypelal ‘moustache’ of guanine crystals; 27–29 male palp (27 posterior lateral view, 28 ventral view, 29 anterior lateral view); 30 map showing the geographical distribution of *Neon australis* (■) and *Neon taylori* (▲). The predicted distribution of *N. taylori* is also shown. Scale: total body 1 mm; remainder 0.2 mm.

Neon taylori n. sp.

Figs 30–37

Type material. *Holotype*: M, Brown Mountain, NSW, 149.26°E, 36.60°S, R.W. Taylor and C. Brooks, 9 Dec.1967 (ANIC 42 000711).

Paratypes: 1F, Brown Mountain, NSW, 149.26°E, 36.38°S, R.W. Taylor, 5 Jan. 1967 (ANIC 42 000931); 1M, Brown Mountain NSW, 149.37°E, 36.60°S, R.W. Taylor and R. Bartell, 11 Apr.1967 (ANIC 42 001268); 15M&F, 6imm., Rutherford Creek, Brown Mountain, NSW, 149.42°E, 36.60°S, M. Upton, 9 Jan.1968 (ANIC 42 000929); 1M, 1imm., Rutherford Creek, Brown Mountain, NSW, 149.42°E, 36.60°S, R.W. Taylor and C. Brooks, 9 Dec.1967 (ANIC 42 001728); 10M&F, 3 imm., Rutherford Creek, Brown Mountain, NSW, 149.42°E, 36.60°S, S.R. Curtis, 15 Jan.1969 (ANIC 42 000702); 8M&F, 4 imm., Glenborg State Forest, Brown Mountain, NSW, Rutherford Creek, Brown Mountain, NSW, 149.38°E, 36.58°S, S. Cameron, K. Domes, 8 Nov.2007 (ANIC 42 001195); 6F, 10 imm., Brown Mountain, 2700ft, NSW, 149.47°E, 36.58°S, R.W. Taylor, 5 Jan.1967 (ANIC 42 001418).

Other material examined. 1M Macquarie Falls, NSW, 150.66°E, 34.57°S, I.D. Naumann, 6 Feb.1986 (ANIC 42 001422); 3F, 1 imm., Cambewarra Mountain, NSW, 150.57°E, 34.78°S, E. Britton, M. Upton, 5 May.1969 (ANIC 42 000961); 1F,1 imm., Clyde Mountain, NSW, 149.95°E, 35.55°S, E.F. Riek, 14 Apr.1970 (ANIC 42 000965); M, Bendoc Bonang State Forest, Bonang Hwy, 50km NNE Orbost, Vic., 148.12°E, 37.30°S, C. Lambkin, N. Starick, 11 Jan.2005 (ANIC 42 001295); 1M, 1F, Cumberland Valley Reserve, Vic., 145.75°E, 37.47°S, R.W. Taylor, R. Bartell, 4 Nov. 1970 (ANIC 42 001424).

Etymology. Named for Dr R.W. Taylor, the type collector and active participant in the CSIRO program to collect litter faunas from as many habitats as possible.

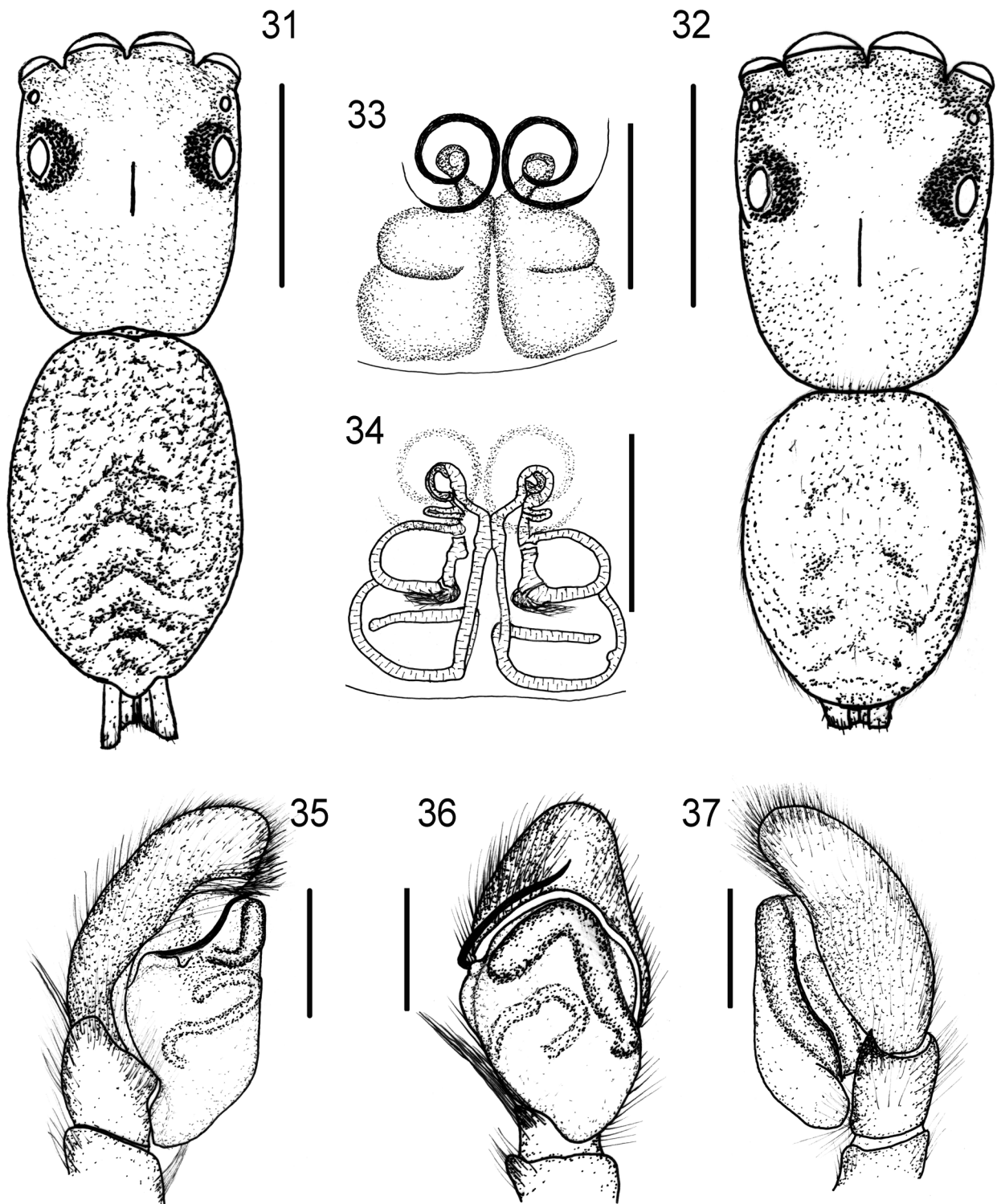
Diagnosis. The long, thin embolus has an origin behind a posterior distal tegular lobe and then passes laterally across the distal edge of the tegulum before moving distally unlike the complex pattern in *N. australis*. As well, there are no patches of guanine on either the dorsal cephalothorax, abdomen or clypeus as found in *N. australis*. The spermatheca is externally subdivided into two parts by a strongly marked crease starting on the lateral edge and moving towards the midline. Internally however the spermatheca is divided into three chambers with the fertilization duct coming off the first side chamber. The species bears some similarity to *N. sumatranus* and *N. kovblyuki*. It differs from the former in having a very short blunt apophysis rather than a long thin one and in the round shape of the tegulum. It also has short rather than long insemination ducts and a differently structured shape to the three chambered spermatheca. The rounded shape of the tegulum and the structuring of the second and third chambers of the spermatheca also differ from those found in *N. kovblyuki*.

Description. *Male*: Cephalothorax mid orange with central area somewhat lighter. Surrounds of ALE, PME and PLE, black. Clypeus narrow, orange, without a fringe of hairs. Chelicerae orange, strong and straight. One medium sized, unidentate, sharp retromarginal tooth, no apparent promarginal teeth. Endites and labium orange grading to yellow distally. Sternum orange. Dorsal abdomen yellow with a brown pattern. Spinnerets yellow. Ventral abdomen similar in colour pattern to the dorsal abdomen. Legs yellow without markings, femurs flattened vertically and spines only on the tarsi and metatarsi, without fringes on patella or tibia of any leg. L1 is a little more robust and larger than the other legs, *Palp*: yellow, cymbium mid-brown, tibia yellow, with single short blunt apophysis. The brown tegulum is oval with a medium sized, proximal lobe. The thin embolus has a lateral origin and moves sideways across the distal edge of the tegulum finishing in the mid line. Dimensions: CL 1.6, EFL 0.8, CW 1.2, AEW 1.1, AMEW 0.8, PEW 1.1, AL 1.6, P1+T1 1.5, L1 3.6 (1.1+0.7+0.9+0.5+0.4), L2 2.4, (0.8+0.4+0.5+0.4+0.3), L3 2.9, (0.8+0.5+0.7+0.6+0.3), L4 3.1, (1.0+0.5+0.7+0.7+0.3).

Female: As for the male except L1 no more robust than other legs and shorter than L4. *Epigynum*: There are no discrete fossae. The copulatory openings are obvious and placed in the centre of each spiral guide. The spermathecae are posterior to the guides. The insemination ducts move posteriorly and there is a small diverticulum or gland immediately behind the copulatory opening followed by median narrow ducts leading to the spermathecae. The insemination ducts then move on to form a two chambered diverticulum. Fertilization ducts are on the posterior median corner of the spermathecae. *Dimensions*: CL1.3, EFL 0.7, CW 1.0, AEW 1.0, AMEW 0.7, PEW 1.0, AL 1.7, P1+T1 1.0, L1 2.4 (0.8+0.4+0.5+0.4+0.3), L2 2.1 (0.7+0.4+0.4+0.3+0.3), L3 2.1 (0.7+0.4+0.4+0.5+0.2), L4 2.7 (0.8+0.4+0.6+0.7+0.3).

Distribution and biology. Occurs widely in litter in south eastern NSW and Victorian rainforests (Fig. 30).

Predicted to also occur at higher altitudes in northern NSW. Widespread in National Parks, likely IUCN Red List Category LC.



FIGURES 31–37. *Neon taylori* n. sp. 31–32 dorsal view (31 female, 32 male); 33–34 female genitalia (33 ventral view of external characteristics, 34 dorsal view of cleared specimen); 35–37 male palp (35 posterior lateral view, 36 ventral view, 37 anterior lateral view). Scale: total body 1 mm; remainder 0.2 mm.

Pungalina n. gen.

Type species: *Pungalina weiri* Richardson 2013.

Etymology. The name reflects the name of the type locality, Pungalina Station, and is to be treated as female in gender.

Diagnosis. This Australian genus of small unidentate spiders most resembles the much larger '*Breda*' *jovialis*, a species erroneously placed in this central American genus, (Davies and Zabka 1989) and temporarily and incorrectly placed by Ruiz & Brescovit (2013) in a convenient Australian genus, *Ocrisiona* Simon 1901, awaiting further revision. In both species the spermathecae are partially divided into two compartments. These vesicles are close to the epigastric fold and there is a shallow median pouch in the fold. The insemination ducts begin anteriorly and move posteriorly, forming outward curves before joining the anterior edge of the spermathecae. There is a small diverticulum from the lateral side of the duct in '*Breda*' but not in *Pungalina*. The size and placement of the fertilization ducts also differ. In '*Breda*' the fertilization duct is almost as long as the long insemination duct, and finishes close to the gonopore. In *Pungalina* it is extremely short. The palp is of a generally similar form to that in '*Breda*' though the embolus is much longer and thinner. The cephalothorax is low and flat as in '*Breda*' and some other Australian forms however PLE and PME lie in an indentation (fig. 43) in the cephalothorax in *Pungalina*. The genus is found in litter unlike '*Breda*' which is found under bark or on foliage. Sub-familial placement is uncertain, though Astiae or Hasarinae are possibilities.

Pungalina weiri n. sp.

Figs 10, 39–46

Type material. *Holotype*: M, Pungalina Station, south of homestead on road to Cycad Camp, NT, 137.51°E, 16.55°S, 30 June 2012, T. Weir, (ANIC 42 001656).

Paratypes: 1F, details same as holotype; 1M, 1F, Pungalina Station, 6.8km north of homestead by road, NT, 137.41°E, 16.67°S, 30 June 2012, T. Weir, (ANIC 42 001660), 1imm. Pungalina Station, Lake Jabiru, NT, 137.53°E, 16.75°S, 29 June 2012, T. Weir, (ANIC 42 001666).

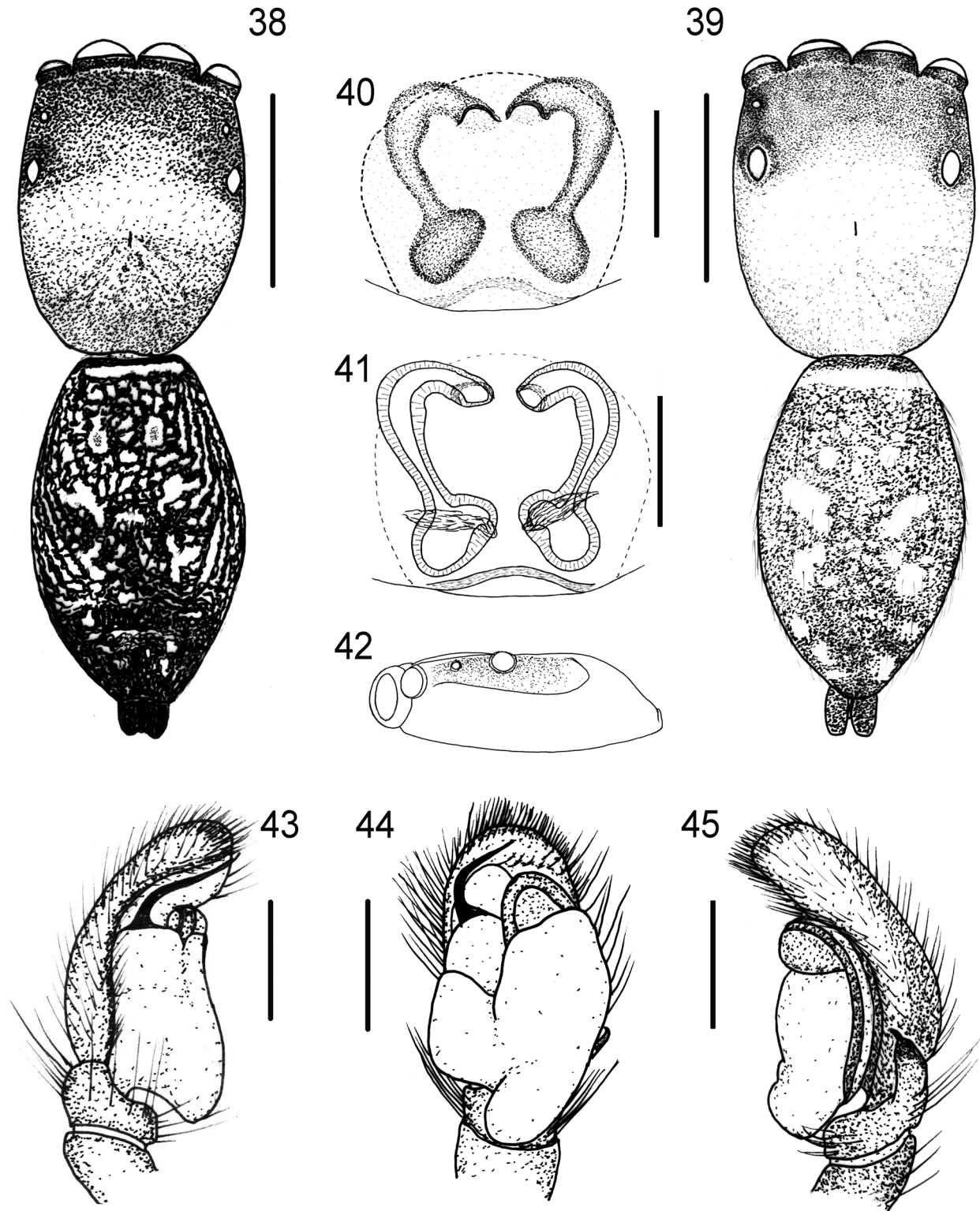
Etymology. Named for the collector of the type series, Mr Tom Weir.

Diagnosis. As for genus.

Description. *Male: Holotype.* Cephalothorax black or olive green with anterior part of the pars thoracica orange. PLE placed on dorsal edge of an indentation. Clypeus narrow, black, with a thick white fringe of hairs. Chelicerae straight, black grading to tan distally. Two low promarginal teeth and one small, unidentate retromarginal tooth. Endites and labium tan grading to orange distally. Sternum orange. Dorsal abdomen yellow covered with heavy black stripes and with several pairs of yellow patches of longer pennate hairs. Spinnerets black. Ventral abdomen black with a pair of longitudinal stripes consisting of yellow spots. Legs yellow with black femurs, femurs enlarged and vertically flattened, L1 more robust and longer than the other legs, without a fringe on patella and tibia. Femur of L2 also somewhat enlarged. *Palp*: black, with single heavily built apophysis suddenly narrowing to a short thin final section. The tegulum is broad with a large proximal lobe. The long thin embolus is placed distally to the tegulum. Dimensions: CL 1.6, EFL 0.7, CW 1.3, AEW 1.2, AMEW 0.7, PEW 1.3, AL 1.5, P1+T1 1.2, L1 2.8 (0.9+0.6+0.6+0.3+0.4), L2 2.2, (0.7+0.4+0.4+0.4+0.3), L3 2.2, (0.7+0.3+0.4+0.6+0.2), L4 2.6, (0.8+0.4+0.6+0.5+0.3).

Female: Paratype. As for the male except there is no white fringe on the clupeus and legs are a uniform orange colour. *Epigynum*: The epigyne is similar to that found in '*Breda*' *jovialis* in general form. It includes a pair of oval shaped fossae. The copulatory openings are large, placed in the posterior part of the fossae and face backwards. The insemination ducts move in a half circle and then posteriorly before joining the anterior edge of simple spermathecae. The spermathecae are within the posterior bounds of the fossae. Fertilization ducts are on the medial dorsal edge of the spermathecae. *Dimensions*: CL 1.6, EFL 0.7, CW 1.3, AEW 1.2, AMEW 0.7, PEW 1.3, AL 2.0, P1+T1 1.1, L1 2.5 (0.8+0.5+0.6+0.3+0.3), L2 2.2 (0.7+0.4+0.4+0.3+0.3), L3 2.0 (0.7+0.3+0.3+0.4+0.3), L4 2.7 (0.8+0.4+0.4+0.6+0.4).

Distribution and biology. Only known from the type localities (fig. 10). Found in litter.



FIGURES 38–45. *Pungalina weiri* n. sp. 38–39 dorsal view (38 female, 39 male); 40–41 female genitalia (40 ventral view of external characteristics, 41 dorsal view of cleared specimen); 42 lateral view of cephalothorax; 43–45 male palp (43 posterior lateral view, 44 ventral view, 45 anterior lateral view). Scale: total body 1 mm; remainder 0.2 mm.

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