

A new genus of neonine jumping spiders (Araneae: Salticidae: Neonini) from Australia

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ABSTRACT. The Neonini is a tribe of small (1–5 mm) jumping spiders found in the Holarctic, East Asia and Australasia. They are very common in Australia where they make up the smallest sized salticids in the litter fauna. A new genus of neonine jumping spiders is described from the wetter parts of south-eastern Australia. *Australoneon* **n. gen.** is very common and includes five new species, namely, *Australoneon christineae* **n. sp.**, *A. keyserlingi* **n. sp.**, *A. kochi* **n. sp.**, *A. wanlessi* **n. sp.**, and *A. zabkai* **n. sp.** *Neon taylori* Richardson 2013 is also transferred to the new genus as *Australoneon taylori* **n. comb.** All species are found in litter or moss and with a strong preference for *Nothofagus* forest.

Introduction

The Neonini is a tribe of jumping spiders found in the Holarctic, East Asia and Australasia (Maddison, 2015). They are small (1–5 mm) salticids, the cephalothorax has vertical sides, similar to those found in euophryines, and is rectangular to rhomboid-shaped in plan. The embolus arises on the prolateral or dorsal-terminal side of the palp beside the tegulum and may pass directly along the distal edge of the tegulum (e.g. Richardson, 2013, fig. 35) or form a spiral first (e.g. Richardson 2013, fig. 27). Worldwide, the tribe includes less than forty described species presently placed in two genera. The genus *Neon* Simon, 1876 is found in the Holarctic and Oriental Regions, as well as Australia. It includes two subgenera, *Neon* (*Neon*) found in the northern hemisphere and *Neon* (*Dicroneon*) Lohmander, 1945 (Logunov, 1998) found in the northern hemisphere and Australia (Richardson, 2013). The second genus, *Papuaneon* Maddison, 2016, is found in New Guinea and Australia (Maddison, 2016, Richardson, 2022).

Neonine jumping spiders are very common in Australia where they make up the smallest sized salticids in the litter fauna. As well as the very common, small (1–2 mm)

Neon (*Dicroneon*) species, the Australasian fauna includes two genera of relatively larger animals (2.5–5.5 mm); one described genus, *Papuaneon*, and an undescribed genus. The latter, *Australoneon* **n. gen.** and five new species belonging to this genus were discovered during the present, larger scale study of Australian neonine salticids, and are described here. As well, a previously described species, *Neon taylori* Richardson 2013 is transferred to the new genus.

Taxonomists should be unambiguous in their taxonomic publications by reporting, for example, the species hypothesis they have used and the degree to which their species constructs were integrative (e.g. Bond *et al.*, 2021). Here, the same approach has been used as in the previous study of *Papuaneon* (Richardson, 2022).

Material and methods

Material in the collections of AMS (Australian Museum, Sydney), ANIC (Australian National Insect Collection, CSIRO, Canberra), MVMA (Museum of Victoria, Melbourne), QMB (Queensland Museum, Brisbane), SAMA (South Australian Museum, Adelaide), TMAG

Keywords: BIOCLIM, *Neon*, *Dicroneon*, *Papuaneon*

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(Tasmanian Museum and Art Gallery, Hobart) and WAMP (Western Australian Museum, Perth), were used in the study. Location information and collecting information are given as on the sample label, latitudes and longitudes are given as decimal degrees and, in the lists of specimens examined, States are placed in north/south order, as are specimens within State or Territory. The following abbreviations are used: AL — abdomen length, ALEW — anterior lateral eye width, AMEW — anterior median eye width, CL — cephalothorax length, CW — cephalothorax width, EFL — eye field length, PEW — posterior lateral eye width, L1–4 — legs 1–4 (illustrated in Richardson & Gunter, 2012). The character states used are illustrated in Richardson *et al.* (2019). Following description of the type species, the remainder are placed in alphabetical order.

The anatomical terms used for the female epigyne, and

the male palp morphology are illustrated in Figures 1–5. Recessed surfaces in the epigyne that include the copulatory openings are here called atria ('an open-roofed entrance hall'), elsewhere they have been called fossae or windows. While the copulation pores are placed in the ventral surface of the atria, the insemination ducts first move inward and then return steeply to the surface shortly before connecting to the seminal vesicles (Fig. 1). In all but one species there is a round surface pocket (Fig. 1) placed in the midline between the atria or the insemination ducts. When present, it can vary in size, position, and level of sclerotization of its edges (compare Figs 11 and 37). A further variable descriptor used here is 'insemination duct gland' (Fig. 1), elsewhere it may be called 'accessory gland' or 'glandular duct'. The embolus in the male arises from a variably shaped bulb. This can be a simple bulge (Fig. 3) or in the form of a

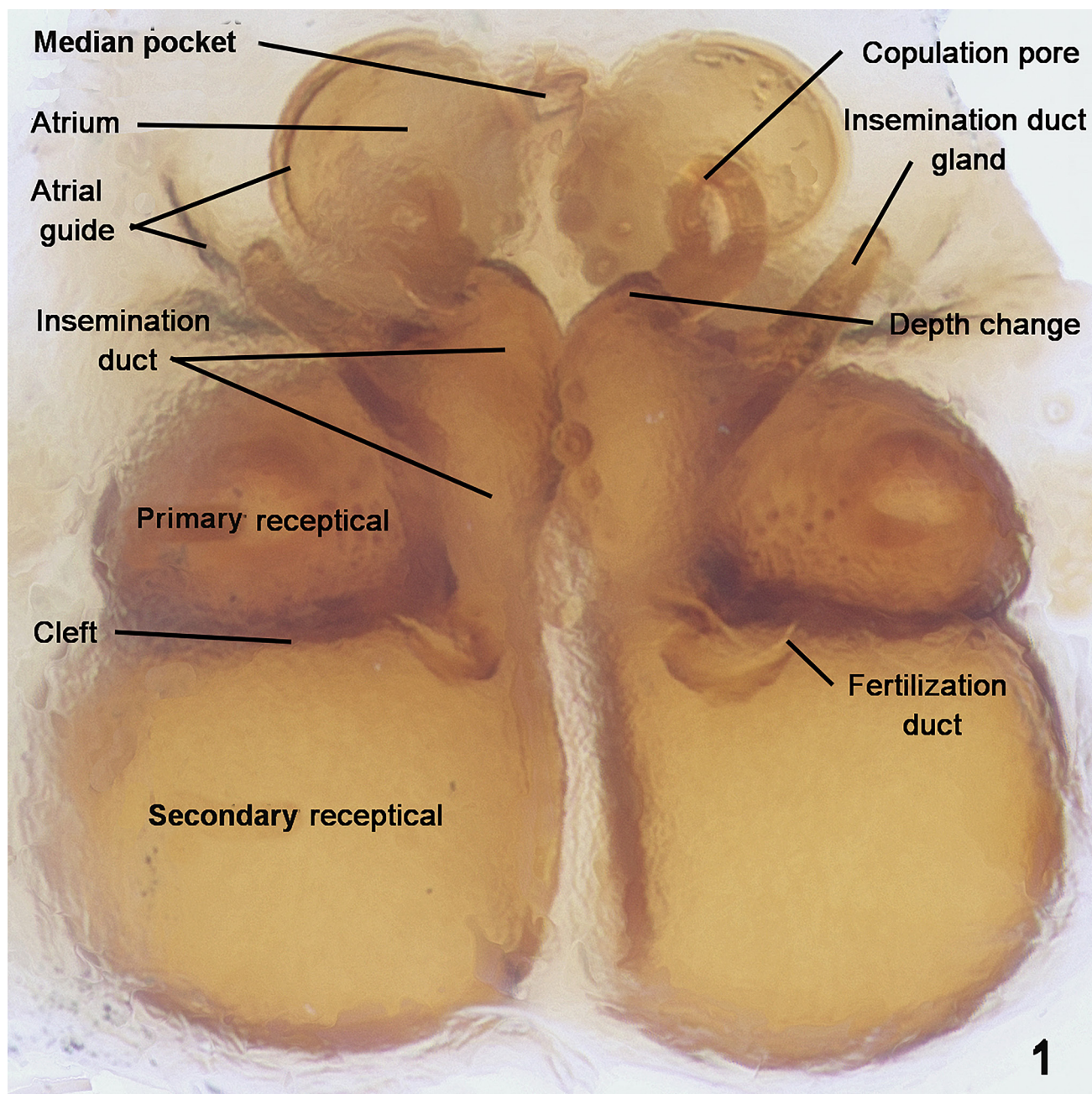
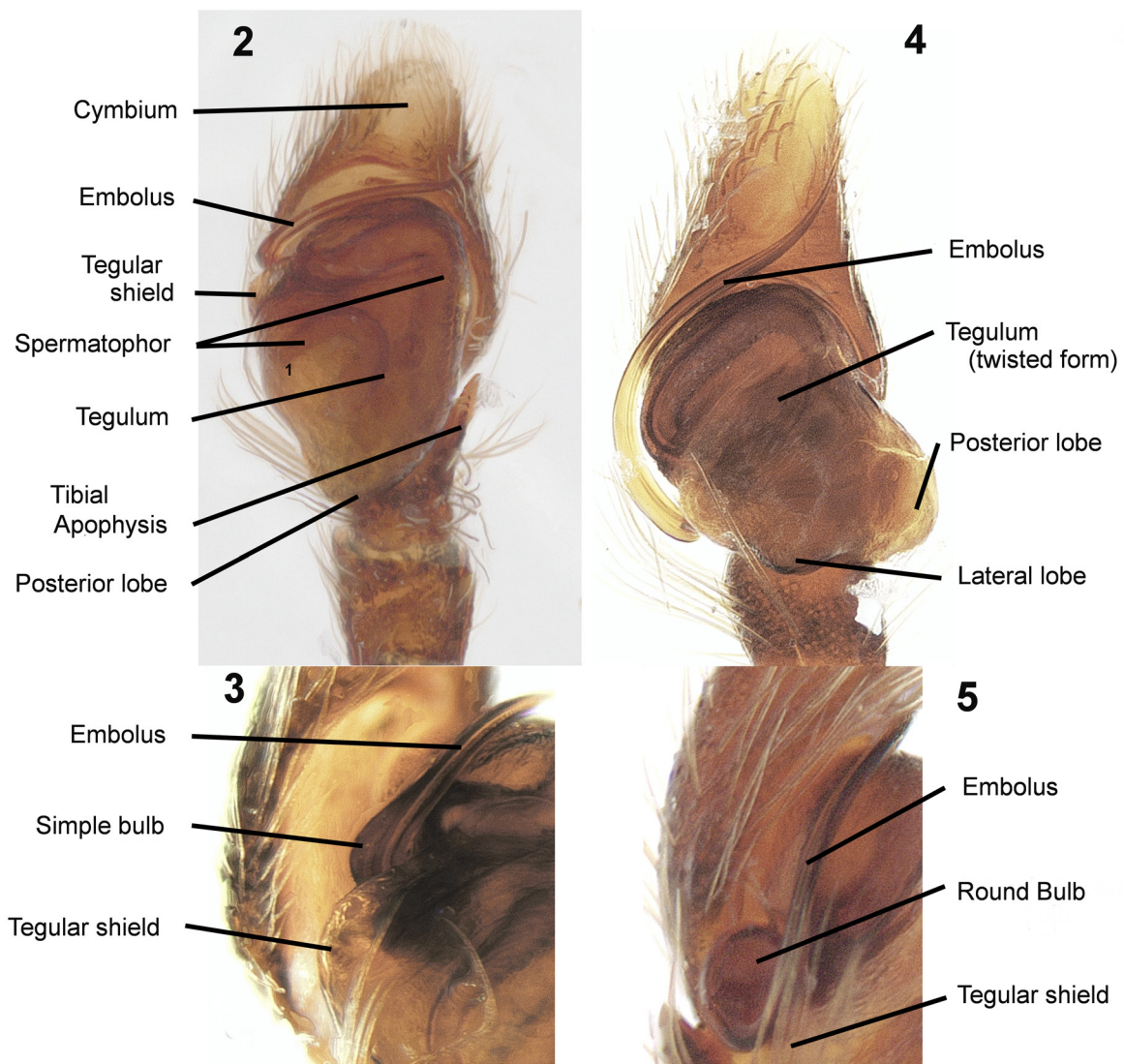


Figure 1. A dorsal view of the epigyne of a female *Australoneon*, illustrating the overall descriptive terms used.



Figures 2–5. The morphology of the palp of a male *Australoneon* illustrating the overall descriptive terms used. 2. A ventral view. 3. A more detailed view showing the bulb at the base of the embolus and associated morphology; note the absence of spicules and the shield passing below the simple bulb, unlike the situation in other species where it may cover all or part of the bulb. 4. A view of a species with the tegulum twisted in an anticlockwise direction, showing examples of a well-developed lateral lobe and a posterior lobe. 5. A more detailed view of the embolus of a species showing a bulb with a round shape, the partial covering of setae is too close to obtain a clearer photograph of the bulb.

flat, round disc, as found in *Neon* (Loganov, 1998). It may be partially covered by a ‘tegular shield’. This consists of a unsclerotized membrane that crosses the tegulum (Fig. 2). Female genitalia were dissected, cleared using 50% lactic acid, then photographed and drawn. A paratype rather than the holotype was normally dissected so as to maintain the integrity of the holotype. Parts of illustrations that are heavily inked indicate more heavily sclerotized or darker areas. The thatched areas represent less sclerotized areas. The male dorsal habitus is not illustrated as it is identical with that of the female. Specimens were photographed using a Leica M205C microscope, DFC500 camera and the Leica Application Suite with montage. Sizes can be obtained from the measurements in the descriptions as the same specimens are used. The distribution of each species is shown. For the genus and each species, the predicted distribution was calculated using BIOCLIM (Nix, 1986; Booth *et al.*, 2014) as compiled in BIOLINK (Richardson *et al.*, 2006; Richardson & Gunter,

2012) and the conservation status determined according to IUCN Red Listing Criteria (IUCN, 2001).

Results

Whilst sorting the Australian collections of material presently placed in *Neon*, it became apparent that there was a set of specimens that differed from the usual *Neon* forms. They were larger and lacked the patch of dark hairs found on the anterior dorsal surface of the abdomen on *Neon*. Closer examination showed other differences as well, and the group of larger animals could be further separated into two genera, *Papuaneon* and *Australoneon* n. gen. The new genus could be separated from both *Neon* and *Papuaneon* by the presence of a large gland in the insemination duct (Fig. 1) and a median pocket (Fig. 1) in the epigyne (Fig. 2), characters absent in the other two genera. Other differences were apparent between the similar sized *Papuaneon* and *Australoneon* n.

gen. genera, In the females, the epigyne differed from that in *Papuaneon*, as the double receptacles were divided by a cleft between the receptacles that was placed transversally (Fig. 1) rather than longitudinally (e.g. Richardson, 2022, fig. 12). As well, the curved edges of the atrial guides were sclerotized and the area surrounding the copulatory pore less so, unlike *Papuaneon* (Richardson, 2022, fig. 2). In the males, the base of the embolus was placed behind the mid-lateral side (Figs 3 and 5), rather than on the anterior edge of the tegulum as found in the *Papuaneon* (e.g. Richardson, 2022, fig. 17).

In the genus *Neon*, morphology is highly variable. In the type species and most included species, the cephalothorax has a short, wide, rhomboid shape with the normal posterior section effectively absent and the posterior lateral eyes and presumably internal organs pushed to the sides where the eyes overlap the sides (see Metzner 2025, Richardson unpubl.). Clearly *Australoneon* **n. gen.** differs completely from this pattern and, in association with the absence of the gland and pocket discussed above, belongs in a different genus.

A further, behavioural difference between *Australoneon* **n. gen.** and *Papuaneon* relates to the sex ratios in the two sample sets. Though most of the material was collected using the same methods at the same localities, times and in the same microhabitats (i.e. as part of diversity surveys), only 16 of 296 *Papuaneon* samples contained males, while 199 tubes of 428 samples contained *Australoneon* **n. gen.** males. All were collected in south-eastern Australia (Fig. 6) unlike the situations in *Neon* (continent-wide) and *Papuaneon* (eastern Australia and New Guinea). There was variation in other characters consistent with the presence of several species. Several useful characters and states are summarized in Table 1.

There is some variation in size, colour patterns and epigyne morphology within several of the proposed species. The males sometimes show specific differences in cymbium shape and tibial apophysis morphology. However, several species show only marginal differences between species and are difficult to distinguish. Consequently, species have been differentiated largely on the basis of the female epigyne. It is possible that molecular studies will show there are more than single species in some of the forms described here. Care has been taken therefore to select the type series from a limited area and include specimens that show only a restricted range of any within-species variation.

Taxonomy

Order Araneae Clerck, 1757

Family Salticidae Blackwall, 1841

Subfamily Salticinae Blackwall, 1841

Tribe: Neonini Maddison 2015

Australoneon Richardson **n. gen.**

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Type species. *Australoneon zabkai* Richardson **n. sp.**

Etymology. A combination of *australis* (southern) and *Neon*. Grammatically masculine.

Diagnosis. The genus is distinguished from the other two neonine genera, i.e. *Neon* and *Papuaneon*, by the following set of character states: the presence of a large gland in the insemination duct (Fig. 1) and a median pocket (see Fig. 1, 23, 35) in the epigyne, characters absent in the other two genera; the primary and secondary receptacles of the spermathecae separated by transverse or oblique clefts rather than longitudinal clefts or convoluted tubes. The curved edges of the atrial guides are sclerotised, the area surrounding the copulatory pore less so unlike *Papuaneon* (Richardson, 2022, fig. 2), the insemination ducts join the distal edges of the spermathecae, the cymbium is long and pear-shaped. and the width of the tegulum is two-thirds its length, the base of the embolus is placed behind the mid-lateral side of the tegulum and may be hidden behind a shield, a lateral lobe can be found on the side of the tegulum. (See Figs 2–4.) The head-body length of *Australoneon* **n. gen.** (2.5–5.5 mm) is as long as, or longer than is found in *Papuaneon* and, so, consistently larger than found for Australian *Neon* species (1.5–2.8 mm). The patch of long black setae on the anterior dorsal edge of the abdomen found on *Neon* species is absent in *Papuaneon* and *Australoneon* **n. gen.** Other distinctive characteristics usually found in *Neon* species, namely the bulging posterior lateral eyes that overlap the sides of the short and shield-shaped cephalothorax are missing in *Australoneon* **n. gen.**, as they are in *Papuaneon*. In the males, the embolus arises from a bulb placed on the mid-lateral side beside the tegulum (Figs 3 and 5), not at the antero-lateral corner as in *Papuaneon*. The bulb is without the visible spicules found in *Neon* (*Neon*) Simon, 1876 (Loganov, 1998). It may be partially or entirely hidden behind the tegular shield (Fig. 3).

Description. In the female, the spermathecae are divided into pairs of anterior and secondary receptacles that vary in size (Fig. 1). The anterior, and often smaller, primary receptacles bear the entrance to the fertilization ducts with their position on the dorsal surface varying between species. Unlike *Papuaneon*, the areas around the copulation pores in the atria are not heavily sclerotised, here only the curved edge of the guide is sclerotised. The insemination ducts join the distal edge of the spermatheca. In all but one species there is a round surface pocket (Fig. 1) placed in the midline between the atria or the insemination ducts. When present, it can vary in size, position, and level of sclerotization of its edges (compare Figs 11 and 37).

When it can be seen, the embolus emerges from a simple (Fig. 3) or round (Fig. 5) bulb and appears from behind the edge of the tegulum near the distal corner and curves away distally from the distal edge of the tegulum. The long, thick outer coils of the spermatophore form two loops in the centre of tegulum, rather than the one seen in *Papuaneon*. It then narrows sharply before moving distally to enter the bulb. A lateral, variously sized, lobe may be found surrounded by the loop (Figs 4, 16).

Remarks. A previously described neonine species, *Neon taylori* Richardson, 2013, originally placed in *Neon* (*Dicroneon*) Lohmander 1945 by Richardson (2013) fits the definition of this new genus rather than that of *Neon* (*Dicroneon*) and, accordingly, is here re-described and

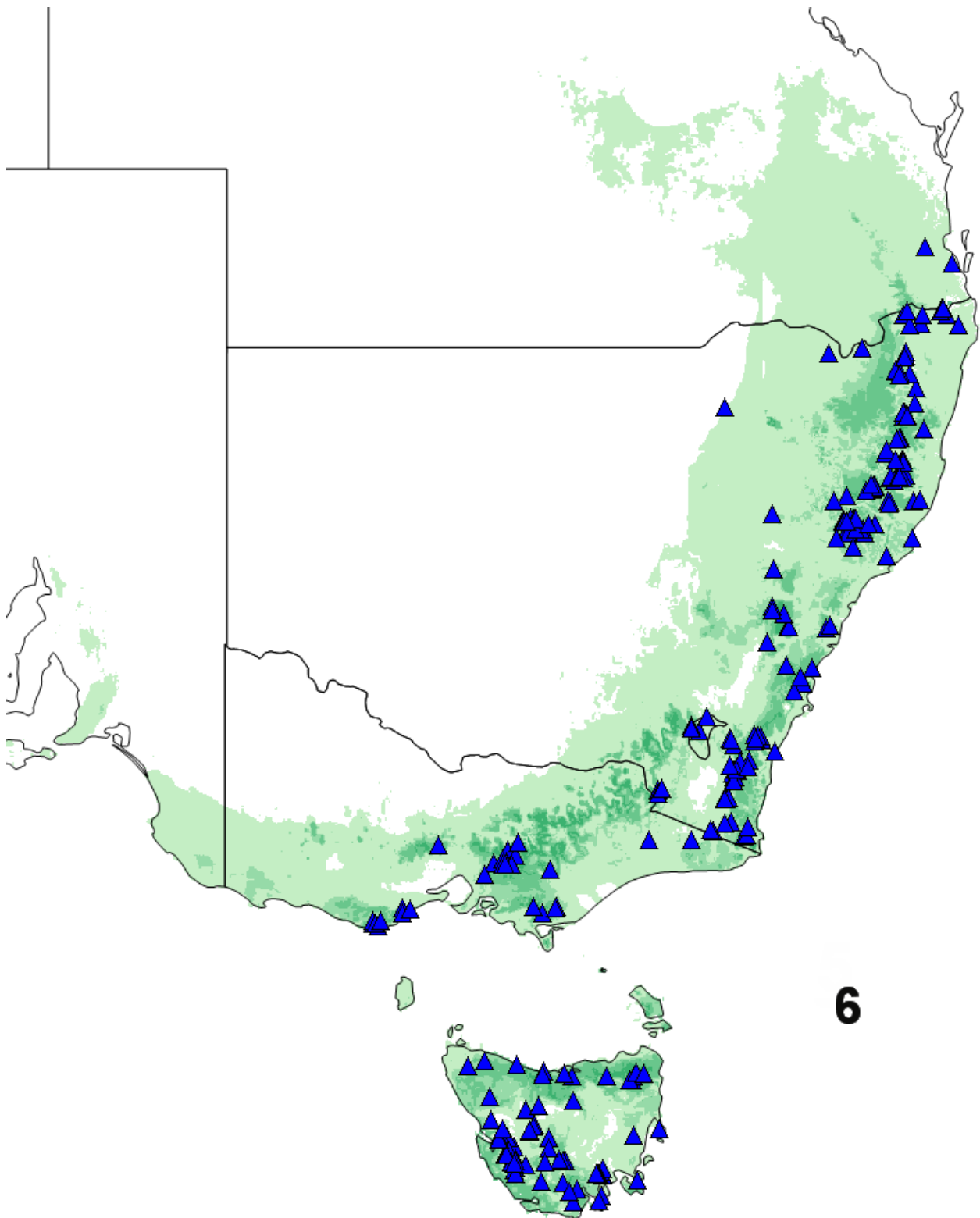
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Figure 6. Map showing the distribution of specimens examined during this study and the BIOCLIM–predicted distribution of *Australoneon* in Australia. The darker the colour, the more likely the genus will be found.

Table 1. Summary of some characters and states useful in identification. *View is along the length of the epiphysis so just shows cross section. **Describes the shape of the bulb (See Figs 3, 5)

Species	Character and State				
	Tibial Apophysis				Embolus
Male	Direction	Length	Shape viewed ventrally	Shape viewed laterally	Origin shape**
<i>Australoneon zabkai</i>	distad	medium	needle shaped, pointed	needle shaped, pointed	simple
<i>Australoneon christineae</i>	laterad	medium	tapering with hooked end	appears square, blunt*	round
<i>Australoneon keyserlingi</i>	laterad	short	tapering with blunt end	appears square, blunt*	simple
<i>Australoneon kochi</i>	distad	medium	needle shaped, pointed	curves outwards, tapers to point	simple
<i>Australoneon taylori</i>	laterad	short	tapering to a rounded end	appears square, blunt*	simple
<i>Australoneon wanlessi</i>	laterad	very blunt	short, blunt with rounded end	appears square, blunt*	simple
Female	Epigyne				
	Median pocket position	Pocket size	Guides relative to spermathecae	Spermathecal cleft	
<i>Australoneon zabkai</i>	near anterior edge of atria	small	reach edge of spermatheca	oblique	—
<i>Australoneon christineae</i>	between spermathecae and atria	large	distal to edge of spermatheca	transverse	—
<i>Australoneon keyserlingi</i>	between atria	large	distal to edge of spermatheca	oblique	—
<i>Australoneon kochi</i>	near anterior edge of atria	small	reach edge of spermatheca	oblique	—
<i>Australoneon taylori</i>	absent	absent	reach edge of spermatheca	transverse	—
<i>Australoneon wanlessi</i>	between atria	small	overlap spermatheca	oblique	—

transferred to the new genus. While it has the size, shape, gland and cleft expected, it lacks the median pocket seen in the other species. The second species described by Richardson (2013), *Neon australis* Richardson, 2013,

remains in *Neon* (*Dicroneon*) rather than *Neon* (*Neon*) (Logunov, 1998) along with many other, undescribed, Australian species.

Key: Females

1. Epigyne median pocket absent *A. taylori* **n. com.** (Figs 60–66)
- Epigyne median pocket present 2
2. Epigyne median pocket placed between the spermatheca and the atria *A. christineae* **n. sp.** (Figs 19–26)
- Epigyne pocket placed between the two atria 3
- Epigyne pocket placed near, or anterior to, the anterior edge of the atria 4
3. Pocket large and atrial guides well separated *A. keyserlingi* **n. sp.** (Figs 33–39)
- Pocket small and atrial guides close together *A. wanlessi* **n. sp.** (Figs 72–78)
4. Well sclerotised, longitudinal atrial guides reaching proximally to the anterior edge of the spermathecae. *A. zabkai* **n. sp.** (Figs 7–13)
- Lightly sclerotised, transverse atrial guides placed well in advance of the primary receptacle. *A. kochi* **n. sp.** (Figs 45–51)

Key: Males

Unlike the females, the males in some cases are quite difficult to distinguish as the variation between species is minor (couplets 4 and 5). The key was developed using material where males and females were collected together.

- 1 Lateral lobe of large or medium size 2
- Lateral lobe slight or absent 3
2. Tegulum twisted 45° anticlockwise, so proximal and lateral mounds displaced, lateral mound large and pyramidal *A. christineae* **n. sp.** (Figs 27–32)
- Tegulum aligned with cymbium and tibia, lateral mound of medium size *A. zabkai* **n. sp.** (Figs 14–17)
3. Without a clearly demarked posterior tegular lobe, (simply having a broad rounded posterior edge) 4
- With an obvious posterior tegular lobe 5
4. Total length 3.5–5.5 mm, paturon length is >3× its width *A. keyserlingi* **n. sp.** (Figs 40–43)
- Total length 2.5–3.5 mm, paturon length is <3× its width *A. wanlessi* **n. sp.** (Figs 79–83)
5. Total length 2.5–3.5 mm, dorsal cephalothorax often frosted. The tibial apophysis moves in a lateral direction *A. taylori* **n. com.** (Figs 67–70)
- Total length 3.5–5.5 mm, paturon often with variously shaped projections. The needle-shaped and pointed tibial apophysis moves in a distal direction *A. kochi* **n. sp.** (Figs 52–58)

Australoneon zabkai n. sp.

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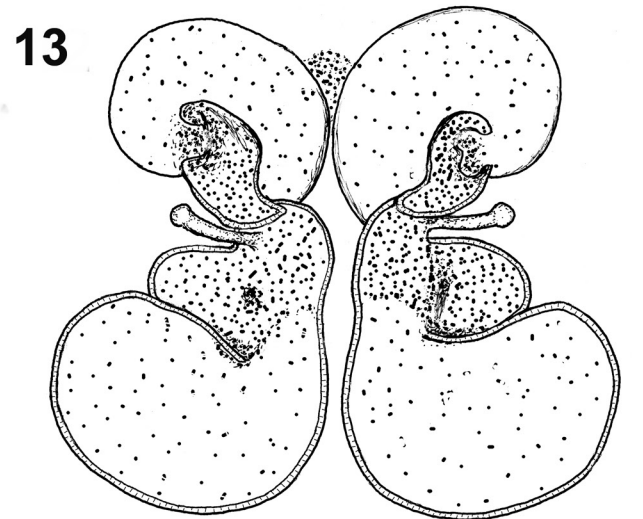
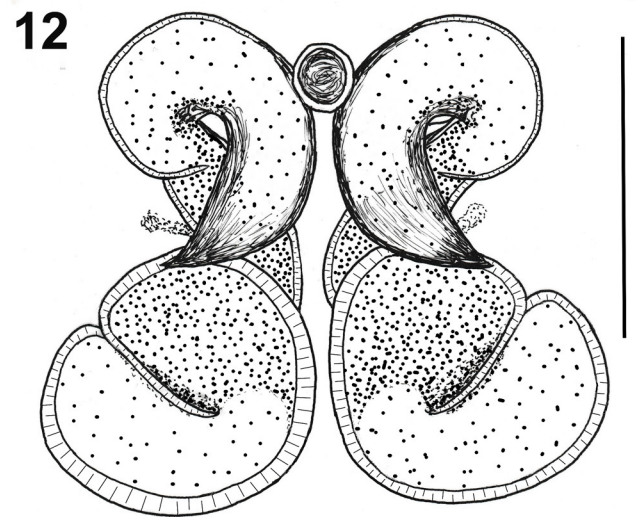
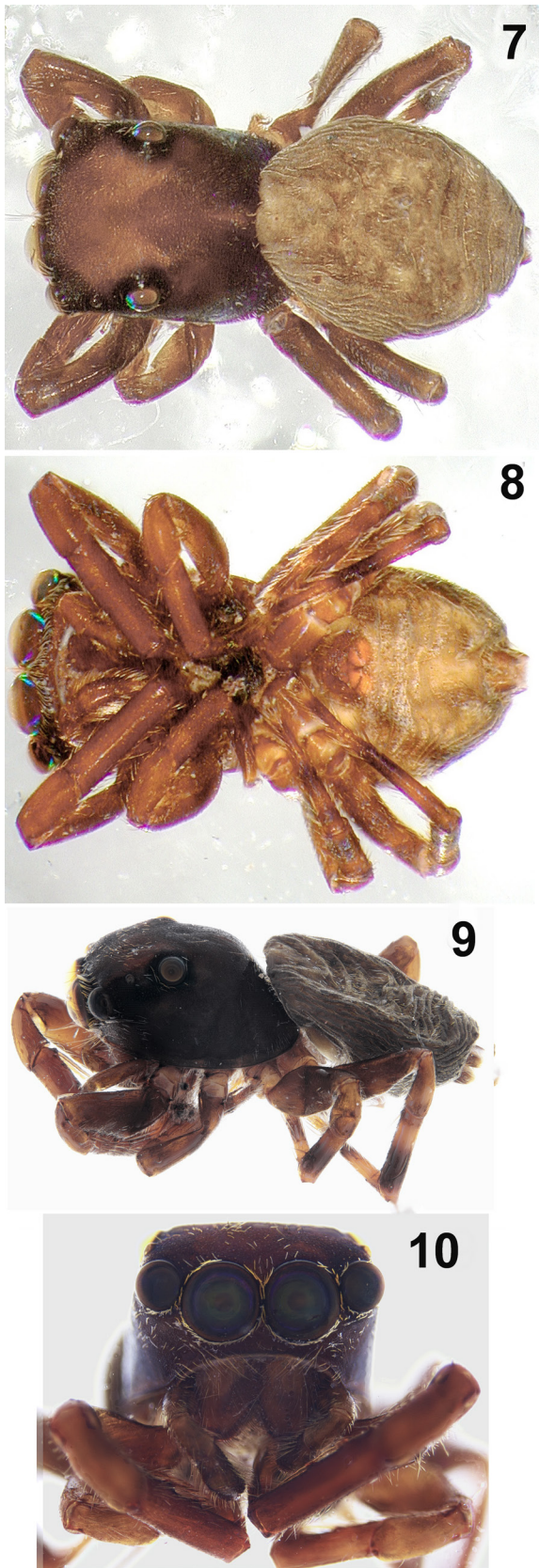
Figs 7–18

Etymology. Named in honor of Professor Marek Żabka (Siedlce, Poland) who, through his extensive work sorting all the Australian museum collections, describing many genera and species, plus preparing a very effective key to the genera of Australian salticids (Taylor & Żabka, 1989), established our basic understanding of the nature of the Australian fauna and laid a foundation for all future workers (see Richardson and Żabka 2023 for list of his Australian publications).

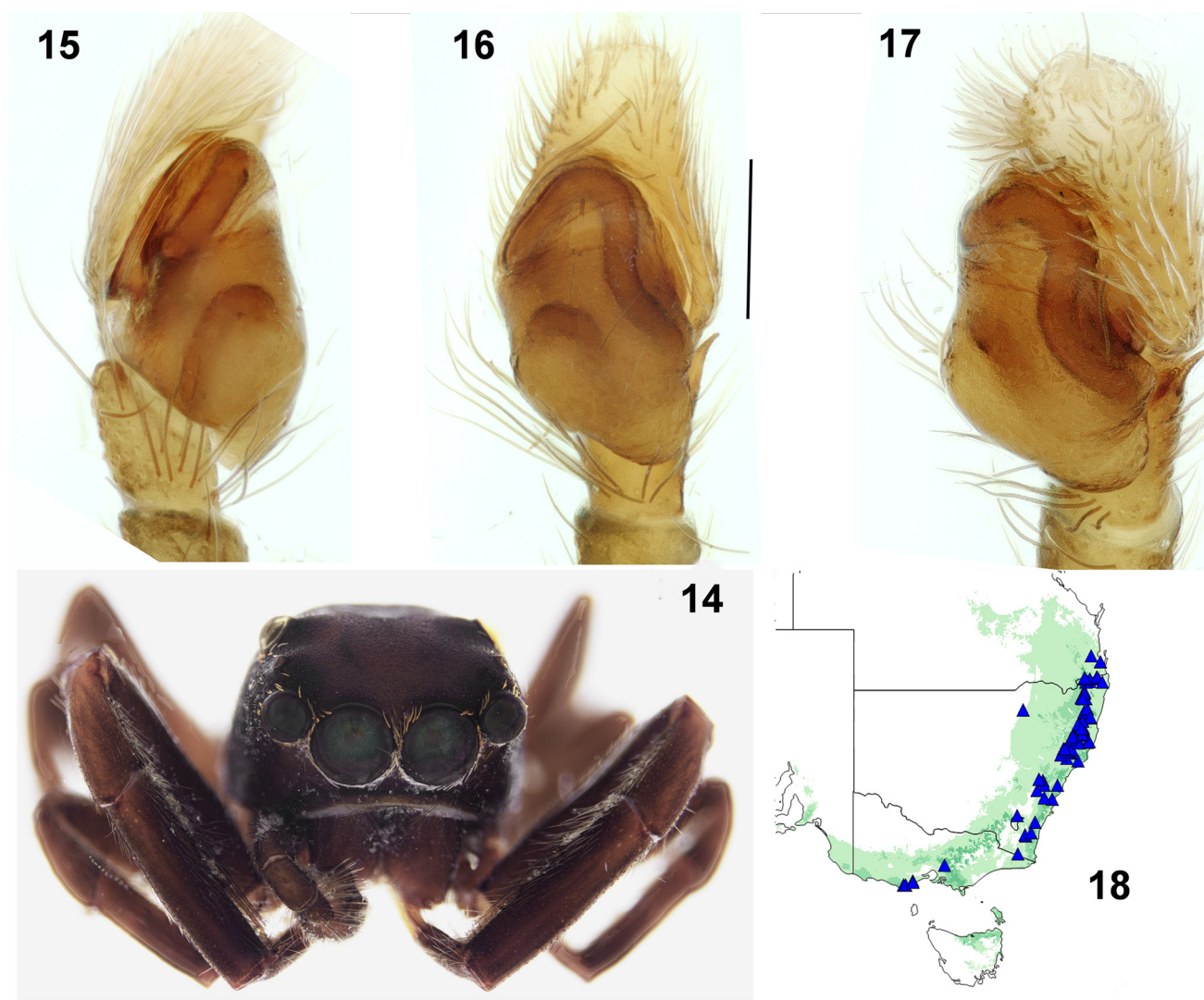
Type material. Holotype: 1♀, Werrikimbe NP, new site, 152.17°E, 31.20°S, E. Tasker, 2 Dec. 1997, (AMS, KS 121200). **Paratypes:** 1♂. As for holotype (AMS, KS 121200); Queensland); 1♀, Banda Banda Beech Reserve Mt Boss SF NW of Wauchope, 152.43°E, 31.17°S, GA Webb Forestry Commission, 1 Oct. 1980, (AMS, KS 42823); 1♂, Banda Banda Beech Reserve Mt Boss SF NW of Wauchope, 152.43°E, 31.17°S, GA Webb Forestry Commission, 1 Oct. 1980, (AMS, KS 42824); 1♂, Werrikimbe National Park, Werrikimbe Trail, 152.17°E, 31.18°S, E. Tasker, 2 Dec. 1997, (AMS, KS 121003); 1♀, Mt Boss SF, North Plateau Rd, 152.33°E, 31.18°S, M Gray & G Cassis, 18 Feb. 1993, (AMS, KS 42171); 1♀, Mt Boss SF, North Plateau Rd, 152.33°E, 31.18°S, M Gray & G Cassis, 18 Feb. 1993, (AMS, KS 42172); 1♀, Mt Boss SF, North Plateau Rd, 152.33°E, 31.18°S, M Gray & G Cassis, 18 Feb. 1993, (AMS, KS 42173); 1♀, Mt. Boss SF 17, small gully near Plateau Beech Picnic area, end of Plateau Rd., 152.32°E, 31.18°S, G.A. Cassis, M.R. Gray, 4 Feb. 1993, (AMS, KS 43068); 1♂, 1♀, 1 imm, Mt. Boss SF 17, N Plateau Rd, 1.5km by track from Plateau Beech Picnic Area., 152.33°E, 31.18°S, G.A. Cassis, M.R. Gray, 4 Feb. 1993, (AMS, KS 43071); 2♂, Werrikimbe NP, new site, 152.17°E, 31.20°S, E. Tasker, 2 Dec. 1997, (AMS, KS 121024); 1♀, Werrikimbe NP, new site, 152.17°E, 31.20°S, E. Tasker, Jan. 1998, (AMS, KS 121162); 1♀, Werrikimbe NP, new site, 152.17°E, 31.20°S, E. Tasker, Jan. 1998, (AMS, KS 121167); 1♀, Werrikimbe NP, new site, 152.17°E, 31.20°S, E. Tasker, Jan. 1998, (AMS, KS 121175); 1♂, Werrikimbe NP, new site, 152.17°E, 31.20°S, E. Tasker, 2 Dec. 1997, (AMS, KS 121194); 2♀, Werrikimbe NP, new site, 152.17°E, 31.20°S, E. Tasker, Jan. 1998, (AMS, KS 121204); 1♂, Mt Boss SF (Easy Creek), 152.40°E, 31.20°S, G Webb, 1 Oct. 1980, (AMS, KS 17676); 1♂, Mt Boss SF (Cock), 152.40°E, 31.20°S, GA Webb Forestry Commission, 1 Oct. 1980, (AMS, KS 42839); 1♀, Werrikimbe N.P, Cobcroft Camp, NSW, 152.23°E, 31.25°S, J. Doyen, 12 Nov. 1982, (ANIC, 42 000987); 1♀, Enfield State Forest, 151.85°E, 31.32°S, I. Oliver, Jan. 1993, (AMS, KS 89999); 2♂, 1♀, Enfield SF, Daisy Patch Flora Reserve, 151.92°E, 31.35°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 39252); 1♂, Daisy Patch Flora Reserve; Daisy Patch Rd, 3.7km south of Enfield Rd, Enfield State Forest, 151.92°E, 31.37°S, M.R. Gray, 4 Feb. 1993, (AMS, KS 39253); 1♀, Enfield SF, Dodds Fire Tr, 2km from Enfield Rd on Scrubby Ck, 151.87°E, 31.38°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38937); 1♀, Enfield SF, Dodd's Fire Trail, 3km from Enfield Rd, 151.87°E, 31.40°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 39490); 1♂, 3♀, Riamukka SF, 151.80°E, 31.40°S, I. Oliver, 1 Jan. 1993, (AMS, KS 74697); 1♂, Riamukka State Forest, 151.77°E,

31.43°S, I. Oliver, Jan. 1993, (AMS, KS 127934).

Other material examined: Queensland: 1♂, Mount Glorious, 152.77°E, 27.33°S, 24 Dec. 2009, (ANIC, 42 002217); 1♀, Miala NP, Qld, 152.77°E, 27.33°S, J. Kohout, 13 Mar. 1973, (ANIC, 42 001441); 1♀, Mount Glorious, Qld, 152.77°E, 27.33°S, T. Hiller, 6 Mar. 1998, (AMS, KS 118978); 1♀, Michaelson's Farm, Mount Cotton, 153.22°E, 27.62°S, V. Gallon, 4 Sep. 1983, (QM, S 104984); **New South Wales:** 1♂, Yabbyra Scrub, Yabbyra State Forest, 152.50°E, 28.63°S, Smith, Hines, Pugh & Webber, 14 Dec. 1988, (AMS, KS 56339); 1♀, Border Ra. N.P, Bridle Ck. Rd, 153.05°E, 28.37°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38153); 1♀, Border Ranges N.P, Brindle Ck Rd, 153.07°E, 28.37°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38160); 1♀, Border Ranges NP, Tweed Range Rd, 153.02°E, 28.40°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37745); 1♀, Beaury SF, N along Wallaby Ck Rd, 152.45°E, 28.40°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 59280); 2♀, Beaury SF, ?km from top end of Tucker Box Rd, 152.40°E, 28.47°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37933); 1♀, Tweed Range, 153.13°E, 28.47°S, Smith Hines Pugh Webber, 12 Nov. 1989, (AMS, KS 48915); 1♂, Dome Mountain, Richmond Range & Yabbyra State Forest, 152.72°E, 28.47°S, Smith, Hines, Pugh & Webber, 12 Nov. 1988, (AMS, KS 56426); 1♀, Richmond Range SF, Tunners Rd, 152.70°E, 28.62°S, M. Gray & G. Cassis, 18 Feb. 1993, (AMS, KS 59281); 1♂, 2♀, Red Scrub Flora Reserve N of Lismore, 153.32°E, 28.63°S, M Gray C Horseman, 1 Apr. 1976, (AMS, KS 9460); 1♀, Ewingar SF Elkhorn Rd, 152.43°E, 29.10°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 42014); 1♀, Ewingar SF Ewingar Ck Elkhorn Rd, 152.43°E, 29.10°S, M Gray G Cassis, 4 Feb. 1993, (AMS, KS 42106); 1♀, Ewingar SF Ewingar Ck Elkhorn Rd, 152.43°E, 29.10°S, M Gray G Cassis, 4 Feb. 1993, (AMS, KS 42124); 1♀, Ewingar SF Elkhorn Rd, 152.43°E, 29.10°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 42125); 1♀, Ewingar SF 11, Tributary of Grass tree Ck. Junction with Nogrigar Rd. 152.42°E, 29.13°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 41950); 1♀, Ewingar SF Nogrigar Rd, 152.43°E, 29.15°S, M Gray & G Cassis, 18 Feb. 1993, (AMS, KS 42196); 1♀, Ewingar SF Lionsville Rd, 152.42°E, 29.18°S, M Gray & G Cassis, 18 Feb. 1993, (AMS, KS 42182); 1♀, Washpool NP, upper reaches of Eagle Hawk Ck, 152.27°E, 29.40°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38304); 1♀, Washpool NP, Washpool Forest Way, 152.27°E, 29.42°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38247); 2♀, Washpool National Park, track off Cedar Trail, 152.35°E, 29.47°S, M Gray, P Croft, 9 Mar. 1992, (AMS, KS 38076); 1 imm, Washpool National Park, track off Cedar Trail, 152.35°E, 29.47°S, M. Gray, P. Croft, 22 Feb. 1992, (AMS, KS 38079); 1♂, Yabbyra Scrub, Yabbyra State Forest, 152.50°E, 29.47°S, Smith, Hines, Pugh & Webber, 14 Dec. 1988, (AMS, KS 56491); 1♀, Boundary Ck SF Shannon Ck Shannon Ck Rd, 152.58°E, 29.95°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 42335); 1♀, Boundary Ck SF Shannon Ck Shannon Ck Rd, 152.58°E, 29.95°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 42337); 1♂, Coolangubra State Forest, near Waratah Creek, 149.40°E, 30.02°S, G. A. Webb, Jan. 1985, (AMS, KS 116016); 1♀, 1 imm, Marengo SF, 0.5km N along Foamy Ck Rd from Cheelundi Rd, 152.40°E, 30.12°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37561); 1♀, Marengo SF, Big Bull Ck, 2.7km along Foamy Ck Rd from, 152.42°E, 30.12°S, M Gray G Cassis, (AMS, KS 37542); 1♂, Mt Hyland Nat Res, Obeloe Ck, 2km SW along Obeloe Rd from, 152.45°E, 30.15°S, M Gray G Cassis, 1 Feb. 1993, (AMS, KS 37510); 3♂, 4♀, Mt Hyland Nat Res, 0.9km S along Cheelundi Rd from, 152.45°E, 30.15°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37528); 1♀, Mount Boss SF, 152.40°E, 30.17°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 42969); 1♀, Wonga Walk, small stream below Tristiana Falls (adjacent to stream). Dorriggo NP, 152.73°E, 30.38°S, G.A. Cassis and M.R. Gray, 4 Feb. 1993, (AMS, KS 37639); 2♀, Dorriggo-Bellingen Rd, 19.5km NW of Bellingen, 152.73°E, 30.40°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37647); 2♀, Styx River SF, off Cunawarra Trail, 152.33°E, 30.53°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37968); 1♀, Styx River SF, Cliffs Trail, 3.8km NE of Oxley Rd, 152.35°E, 30.55°S, G.A. Cassis and M.R. Gray, 4 Feb. 1993, (AMS, KS 37655); 4♀, Styx R SF, Cliffs Trail, 2.8km from Oxley Rd, 152.35°E, 30.55°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37663); 3♀, Off Cunawarra Trail, 800m N of Cunawarra Ck. Styx River SF, 152.33°E, 30.55°S, G.A. Cassis, M.R. Gray, 4 Feb. 1993, (AMS, KS 37944); 1♀, Styx River State Forest, Big Hill, 152.12°E, 30.73°S, I. Oliver, Jan. 1993, (AMS, KS 89898); 1♂, 1♀, NE facing slope above Kunderang Stn Ck, 152.10°E, 30.80°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 40228); 1♀, Carrai SF Fifes Knob Rd about 4km fr Fifes Fire Trail, 152.37°E, 30.90°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 43172); 1♂, Carrai State Forest: North side of Cochrane Rd 1.8 km north-west of Daisy Plains Hut. Part of compartment 12, 152.27°E, 30.92°S, E. Tasker, (AMS, KS 120389); 1♀, Carrai SF Copper Ck Rd, 152.38°E, 30.95°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 43169); 1♂, Bulls Ground State Forest, 152.68°E, 31.58°S, A. York, 1999, (AMS, KS



Figures 7–13. *Australoneon zabkai* n. sp. Female holotype (KS 121200): 7 dorsal, 8 ventral, 9 lateral, 10 anterior views of the whole animal. Paratype (KS121167), ventral epigyne 11 external epigyne, semi-diagrammatic views of a dissected and cleared epigyne, 12 dorsal, 13 ventral. Scale: 0.2 mm.



Figures 14–18. *Australoneon zabkai* n. sp. Male paratype, (KS 121024): 14 anterior view; palp: (paratype, KS 39253) 15 retrolateral, 16 ventral, 17 prolateral, 18 map showing known and predicted distributions. It is also predicted at low probability for two small areas on the south coast of Western Australia. Scale: 0.2 mm.

85750); 1♀, Kerewong SF near Lorne site 108(2), 152.57°E, 31.60°S, D Milledge, 20 Nov. 1978, (AMS, KS 16147); 1♀, Ben Halls Gap State Forest, 151.22°E, 31.60°S, I. Oliver, Jan. 1993, (AMS, KS 89911); 3♀, Bulga SF, Bobbin Fire Trail 100m fr Padmans Rd, 152.17°E, 31.62°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 42747); 1♂, 2♀, Rowleys Rock, 40km NW of Taree, 152.15°E, 31.65°S, D.M. Bray, 22 Apr. 2010, (AMS, KS 120587); 1♂, Barrington Tops State Forest, opposite Moppy Picnic Area, 151.57°E, 31.90°S, G.A. Milledge, A.D. Hegedus, L.M. Kampen, 15 Nov. 2007, (AMS, KS 102188); 1♂, 1♀, Barrington Tops State Forest, 0.8km E of Moppy Picnic area, 151.57°E, 31.90°S, G.A. Milledge, H.M. Smith, 30 Apr. 2008, (AMS, KS 104214); 1♀, Barrington Tops National Park, Cobark Picnic Area, 151.60°E, 31.90°S, G.A. Milledge, H. M. Smith, 3 Apr. 2017, (AMS, KS 126717); 1♀, Thunderbolt's Lookout, Barrington Tops, NSW, 151.52°E, 31.92°S, A.A. Calder, 18 Nov. 1981, (ANIC, 42 000969); 2♀, Barrington Tops National Park, Quarry Rd turnoff, 151.52°E, 31.92°S, G. A. Milledge, A. D. Hegedus, 18 Dec. 2007, (AMS, KS 102010); 1♀, Barrington Tops National Park, Quarry Rd turnoff, 151.52°E, 31.92°S, G.A. Milledge, H.M. Smith, 14 Nov. 2007, (AMS, KS 104637); 1♂, Stewarts Brook State Forest, Pollblue Ridge Rd, 0.2km N of Barrington Tops Forest Rd, 151.40°E, 31.95°S, G. A. Milledge, R. E. Hegedus, 18 Mar. 2008, (AMS, KS 103958); 1♀, Stewarts Brook SF, 151.38°E, 31.95°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 42914); 1♀, Copeland SCA, start of Broadbents Trail, 151.82°E, 31.98°S, G. A. Milledge, H. M. Smith, 28 Nov. 2016, (AMS, KS 126527); 1♀, Barrington Tops National Park, Gloucester Tops Rd, 12.3km W by road from Gloucester River Campground, 151.60°E, 32.07°S, G. A. Milledge, A. D. Hegedus, L.M. Kampen, 13 Nov. 2007,

(AMS, KS 101914); 1♂, Barrington Tops National Park, Gloucester Tops Rd, 12.3km W by road from Gloucester River Campground, 151.60°E, 32.07°S, G. A. Milledge, A. D. Hegedus, 19 Dec. 2007, (AMS, KS 102040); 1♀, Barrington Tops National Park, Gloucester River Campground, NSW, 151.68°E, 32.07°S, G. A. Milledge, H. M. Smith, 24 Mar. 2014, (AMS, KS 122551); 2♀, Chichester SF, Karuah River Rd, 151.72°E, 32.08°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38871); 3♀, Chichester SF, 2.3km N of Karuah River on Karuah River Rd, 151.72°E, 32.08°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38890); 1♂, Chichester SF, Karuah R crossing, Karuah R Rd, 151.70°E, 32.10°S, G. A. Cassis and M. R. Gray, 4 Feb. 1993, (AMS, KS 38872); 1♀, Chichester S.F, Lumeah Rd, 1.7 km from Mt Allyn Rd, 151.43°E, 32.10°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38929); 1♂, 1♀, Chichester SF, Karuah R crossing, Karuah R Rd, 151.70°E, 32.10°S, G. A. Cassis and M. R. Gray, 4 Feb. 1993, (AMS, KS 38957); 1♀, Chichester SF, Karuah R crossing, Karuah R Rd, 151.70°E, 32.10°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38959); 1♀, Chichester SF, Allyn River Forest Rd, 151.47°E, 32.13°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38881); 1♀, Mountain Trail, 2.1km S from intersection with Kunungra Rd, 151.75°E, 32.13°S, M Gray & G Cassis, 18 Feb. 1993, (AMS, KS 40600); 1♂, Tuglo, 151.27°E, 32.23°S, B Day & L Torr, 17 Mar. 1991, (AMS, KS 27909); 1♀, Upper Allyn River nr Eccleston, NSW, 151.55°E, 32.38°S, Taylor, Brooks, 11 Dec. 1967, (ANIC, 42 001410); 1♀, Nerang SF, 152.12°E, 32.52°S, M Gray & G Cassis, 18 Feb. 1993, (AMS, KS 42179); 1♀, Newnes State Forest, along Mine Road, 150.20°E, 33.43°S, G. A. Milledge, L.M. Kampden & J. Tarnawski, 27 Oct. 2005, (AMS, KS 92957); 1♂, 1♀, Mt Wilson Waterfall picnic area trail, 150.38°E, 33.50°S, C Horseman, 28 Jan.

1979, (AMS, KS 19477); 1♂, 2♀, 1 imm, Mt Wilson Waterfall picnic area trail, 150.38°E, 33.50°S, C Horseman, 28 Nov. 1978, (AMS, KS 2162); 1♀, Hazelbrook Railway Pde, 150.45°E, 33.72°S, AMBS, 10 Mar. 1996, (AMS, KS 51654); 1♀, Fox Valley Wahroonga, 151.10°E, 33.73°S, B. Henke, 7 Nov. 1979, (AMS, KS 5591); 1♀, Kanangra-Boyd N.P., Echo Head Falls, NSW, 150.10°E, 33.98°S, L. Hill, 3 Oct. 1982, (ANIC, 42 000918); 1♂, Mount Flora, nr Mittagong, NSW, 150.43°E, 34.37°S, R. Sadlier, 15 Apr. 1976, (ANIC, 42 000967); 1♂, Mt Keira Fauna Reserve Scout Camp, 150.85°E, 34.40°S, C Horseman, 1 Mar. 1979, (AMS, KS 19484); 1♀, Corn Fire Trail, Buckenbowra State Forest, 150.00°E, 35.55°S, J. Tarnawski & S. Lassau, 16 Mar. 1999, (AMS, KS 58816); 1♂, Coomerang Rd, approx 1 km N from junction with Short Cut Fire Trail, Dampier SF, 149.78°E, 36.07°S, L. Wilkie, R. Harris, (AMS, KS 58782); 1♀, Burkes Rd, Badja SF, 149.52°E, 36.17°S, J. Tarnawski & S. Lassau, 13 Mar. 1999, (AMS, KS 68058); 1♂, Bumberry Creek Fire trail, Wadbilliga NP, 149.53°E, 36.25°S, L. Wilkie, R. Harris & H. Smith, 13 Mar. 1999, (AMS, KS 58787); 1♂, Bondi SF South of Bombala Woodlot 1, 149.15°E, 37.13°S, G. Gowing *et al.*, 28 Nov. 1980, (AMS, KS 17985); *Australian Capital Territory*: 1♀, Kaleen, A.C.T., 149.10°E, 35.23°S, R.E. Leech, 10 Apr. 1994, (ANIC, 42 001439); *Victoria*: 1♀, Coranderrk Reserve, Healesville, 145.52°E, 37.68°S, Harvey, M.S., 5 Mar. 1979, (WAMP, T150434); 1♂, 3♀, 2 imm, Otway Ranges 6.5 km SSE Beech Forest, 143.97°E, 38.45°S, Latrobe Uni Otway Survey, 18 May 1975, (AMS, KS 50817); 1♂, Lorne, 143.97°E, 38.53°S, C. Oke, Jan. 1941, (AMS, KS 129783); 1♂, 1♀, Beauchamp Falls, 3.6 km ESE of Beech Forest, Vic, 143.60°E, 38.65°S, G. Milledge, C. McPhee, 20 Feb. 1992, (MVMA, K13551); 1♂, Otway Ranges, Young Creek Rd, Vic, 143.48°E, 38.67°S, G. Milledge, 11 Apr. 1995, (MVMA, K5408); 1♂, Phillips Track, Youngs Creek Crossing, 0.6 km N Triplet Falls, Vic, 143.48°E, 38.67°S, G. Milledge, C. McPhee, 16 Apr. 1992, (MVMA, K13546); *Tasmania*: 1♀, Freycinet National Park, Tas, 148.30°E, 42.15°S, I.J. Boulton, 27 May 1996, (TMAG, J6212); 1♂, SW Tasmania, 145.82°E, 42.72°S, L. Hill, 3 Feb. 1978, (AMS, KS 26961); 1♀, SW Tasmania, 145.83°E, 42.72°S, C. Howard *et al.*, 2 Aug. 1977, (AMS, KS 27324); 4♂, 6♀, Track from Hartz Mts hut to Kermandie Plains, W of Taylors Ridge, 146.78°E, 43.22°S, J. L. Hickman, 24 Aug. 1993, (AMS, KS 107386); 1♀, Track from Hartz Mts hut to Kermandie Plains, head of Arve River, W of Taylors Ridge, 146.78°E, 43.22°S, J. L. Hickman, 24 Aug. 1973, (AMS, KS 107499);

Diagnosis. The females of this species can be distinguished from all but *A. kochi* n. sp. by the presence of a small median pocket in the epigyne that lies immediately anterior to the atria. *Australoneon zabkai* n. sp. can be distinguished from *A. kochi* n. sp. as its guides are longitudinal and approach the anterior edge of the spermathecae (Fig. 12), while in *A. kochi* n. sp., the guides are transverse and well forward of the anterior edges of the spermathecae (Fig. 50). In *A. zabkai* n. sp. the anterior spermathecal receptacles are almost the same size while in *A. kochi* n. sp. the primary receptacle is much smaller than the secondary receptacle. Female can reach 5 mm is total length.

The male of *A. zabkai* n. sp. can be separated from all the other species except *A. christineae* n. sp. by the presence of a well-developed lateral lobe on the ventral surface of the tegulum and a longer and narrower tip to the cymbium. The lateral lobe is a different shape (Fig. 16) to that found in *A. christineae* n. sp. (Fig. 29) and the tegulum is aligned with the cymbium and not turned out of alignment as in *A. christineae* n. sp. The source of the embolus is a simple bulb, not round as in *A. christineae* n. sp.

Description. *Female*: Body morphology: The total length is between 2 mm and 5 mm. The cephalothorax dorsal surface is smooth. The cephalothorax silhouette is high, and the rear edge steep. The dorsal cephalothorax median stripe is weak. The clypeus is narrow and the clypeal fringe absent. The single retromarginal tooth is small and pointed. Any promarginal teeth were not apparent. The palp can be brown/black, light brown or light brown with a white tip. The abdomen has an oval shape and there is

lacey patterning over the dorsal surface. Leg morphology: L1 is the longest leg. It is strongly built, with strong tibial spines but no fringe. Epigyne: The cleft in the spermatheca is oblique or almost transverse, and the receptacles of similar sizes. The atrium guides are hooded with either a 'C' shape or diagonal 'C' shape. There is a median pocket anterior to the atria. Dimensions: (Holotype): CL 2.0, EFL 0.75, AL 2.05, CW 1.5, ALEW 1.45, AMEW 0.8, PEW 1.5 L1 3.7 (1.25+0.5+0.1+0.45+0.5), L2 3.15 (1.0+0.5+0.7+0.45+0.5), L3 3.75 (1.15+0.5+1.0+0.6+0.5), L4 4.6 (1.5+0.6+1.0+0.5+0.5).

Male: As for the female but for the following characters. Body morphology: There is a yellow subcutaneous patch on the dorsal abdomen. The clypeus is narrow, with a strong white clypeal fringe. There is no paturon spike. There are two promarginal teeth. Leg morphology: L1 is the longest leg. It is strongly built, fringed, and with strong tibial spines. Male Palp: The pointed tibial apophysis points distally. The palp, which has a long, tapered tip, can be brown/black, light brown or light brown with a white tip. There is a narrow proximal tegular lobe and a posterolateral tegular lobe. A tegular shield partially covers the simple bulb which is placed near the proximal corner of the tegulum. The thin embolus curves distally away from the tegulum. Dimensions: (Paratype): CL 2.25, EFL 1.0, AL 2.0, CW 1.9, ALEW 1.1, AMEW 1.7, PEW 1.6, L1 5.6 (1.75+1.0+1.45+0.75+0.65), L2 4.3 (1.4+0.7+0.9+0.75+0.55), L3 4.6 (1.5+0.65+0.9+0.9+0.65), L4 5.0 (1.5+0.7+1.1+1.15+0.55).

Remarks. Specimens of this species vary in total length and include the largest individuals (>5 mm) in the genus. There is much variation in colour patterns and form, and they vary from forms that are smaller, with light colours and a gracile build, to larger, darker, more robust individuals. However no coordinated patterns could be identified, as intermediate or mosaic patterns were often found, nor were consistent differences observed in the genitalia or distribution.

Distribution and Biology. Found in litter in rainforest and *Nothofagus* forest from Tasmania to south-eastern Queensland (Fig. 18), as a consequence, likely IUCN Red List Category LC. The predicted distribution shows marginally suitable conditions occur in South Australia and two small areas on the southern coast of Western Australia. The single inland specimen in northern New South Wales significantly affects the predicted distribution, careful checking shows that the specimen has been correctly identified, and the location is correct for the locality information on the label.

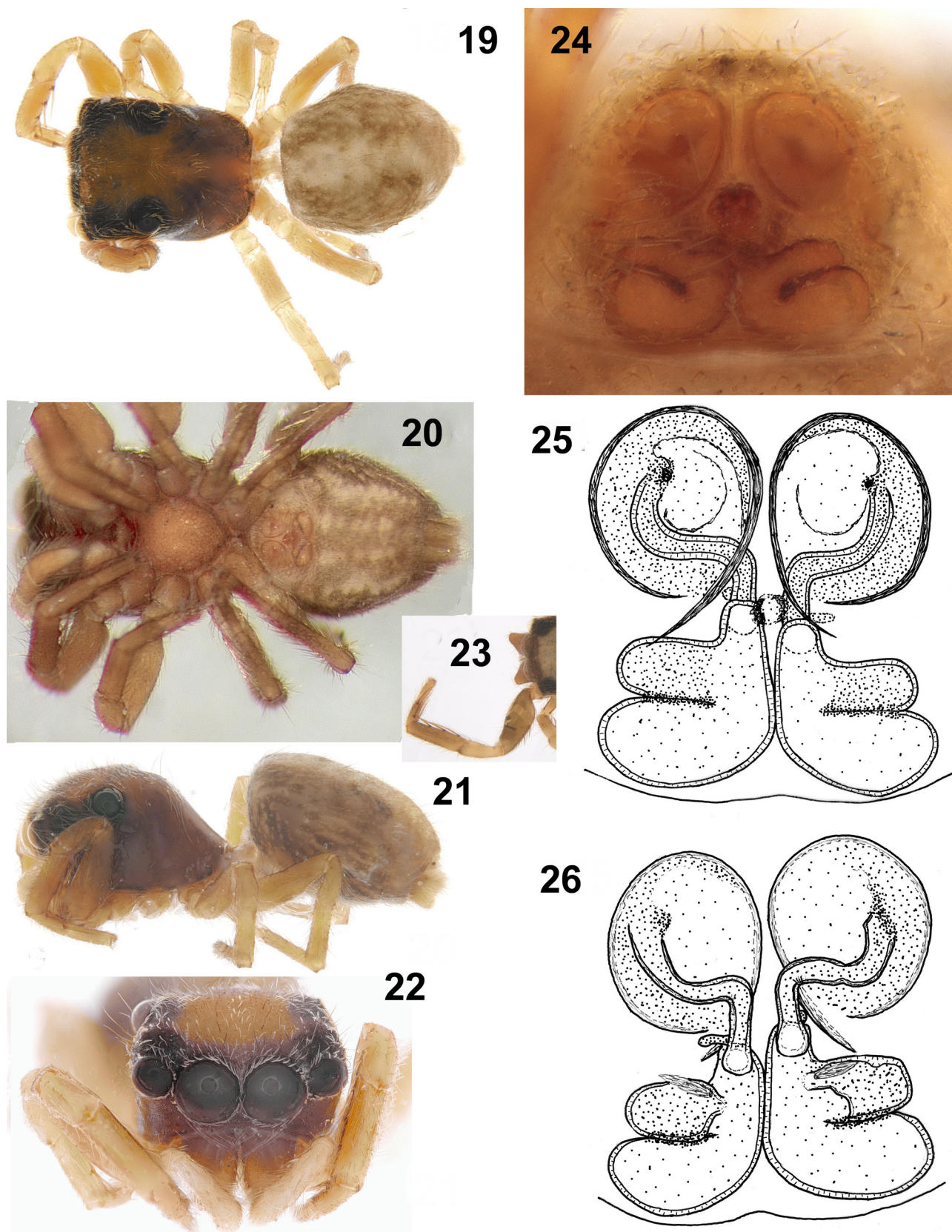
Australoneon christineae n. sp.

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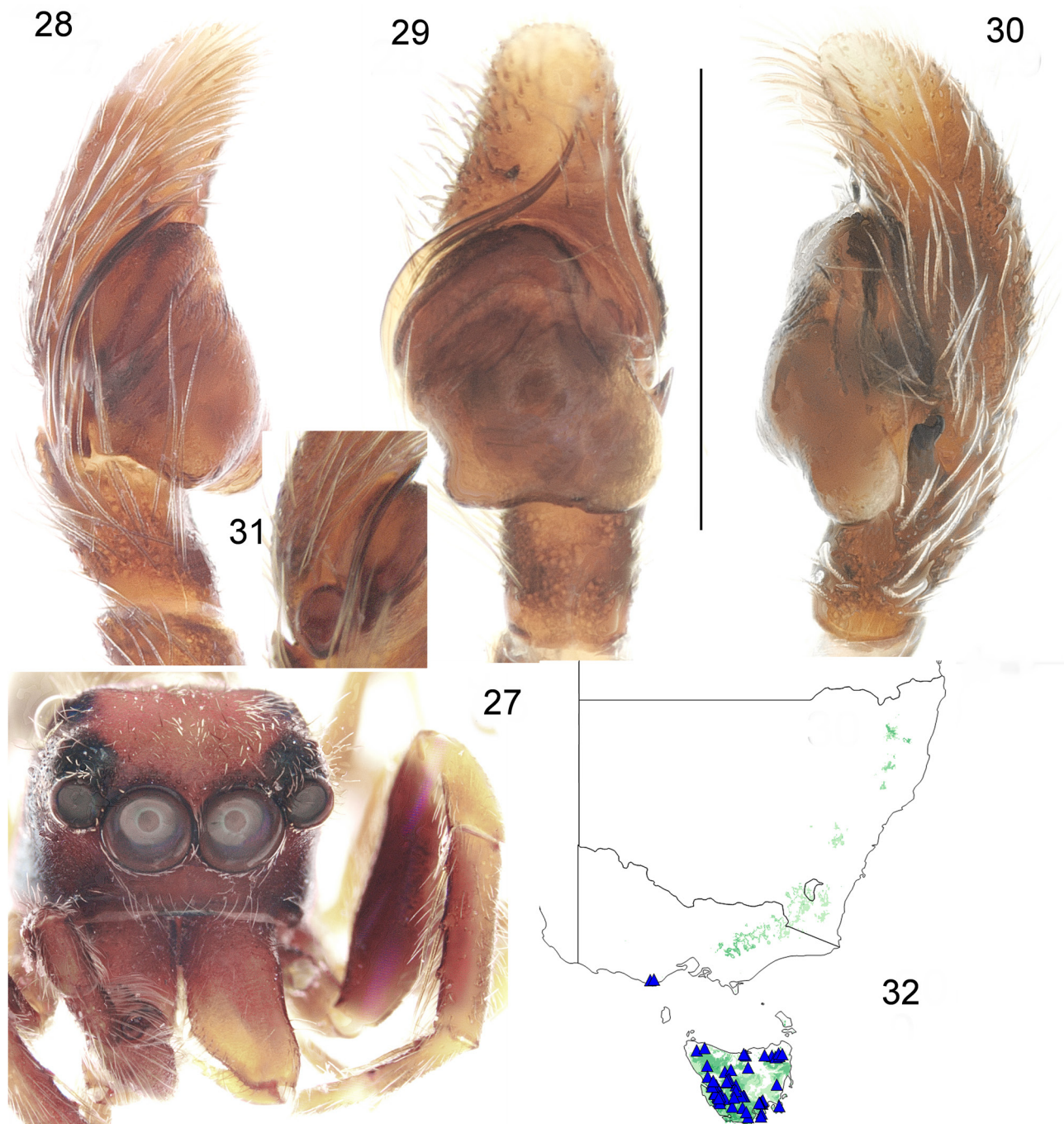
Figs 19–32

Etymology. Named in honor of my wife, Christine Richardson, for, amongst everything else, her support and skills over 50 years, in fieldwork, editing and plate preparation.

Type material. *Holotype*: 1♀, Nr Tyndalls, N of Henty River Camp, 145.47°E, 42.00°S, 29 Mar. 1975, (AMS, KS 66119). *Paratypes*: 1♂, as for holotype 1♂, 1♀, Kelly Basin



Figures 19–26. *Australoneon christineae* n. sp. Female holotype (KS 66119): 19 dorsal, 20 ventral, 21 lateral, 22 anterior, 23 dorsal view showing long L1 and paturons stretching forwards. 24 anterior view of external epigyne. Paratype (KS 110928), semi-diagrammatic views of a dissected and cleared epigyne, 25 dorsal, 26 ventral. Scale: 0.2 mm.



Figures 27–32. *Australoneon christineae* n. sp. Male paratype (KS66119): 27 anterior view, male palp; 28 retrolateral, 29 ventral, 30 prolateral; 31 closer view of the round bulb, the partial covering of setae is too close to obtain a clearer photograph of the bulb; 30 map showing known and predicted distributions. Scale: 0.2 mm.

Rd, 3.4km from Franklin River Rd, 145.60°E, 42.33°S, T. Friend, 18 Mar. 1974, (AMS, KS 110816); 1♀, Kelly Basin Rd, 3.4km from Franklin River Rd, 145.60°E, 42.33°S, T. Friend, 18 Mar. 1974, (AMS, KS 110834); 1♀, Kelly Basin Rd, 3.4km from Franklin River Rd, 145.60°E, 42.33°S, T. Friend, 18 Mar. 1974, (AMS, KS 110835); 1♂, Kelly Basin Rd, 3.4km from Franklin River Rd, 145.60°E, 42.33°S, T. Friend, 18 Mar. 1974, (AMS, KS 110848); 1♀, Kelly Basin Rd, 2.3km from Franklin River Rd, 145.60°E, 42.33°S, T. Friend, 18 Mar. 1974, (AMS, KS 110872); 1♂, Kelly Basin Rd, 2.3km from Franklin River Rd, 145.60°E, 42.33°S, T. Friend, 18 Mar. 1974, (AMS, KS 110882); 1♀, Kelly Basin

Rd, 2km from Franklin River Rd, 145.62°E, 42.33°S, T. Friend, 17 Mar. 1974, (AMS, KS 110928); 1♂, Kelly Basin Rd, 2.9km from Franklin River Rd, 145.60°E, 42.33°S, S. Evans, 17 Mar. 1974, (AMS, KS 110943); 1♀, Kelly Basin Rd, 6.2mls from Lyell Hwy, 145.65°E, 42.15, L. Chang, 19 Mar. 1974, (AMS, KS 110902); 1♀, Kelly Basin Rd, 6.2mls from Lyell Hwy, 145.65°E, 42.15, L. Chang, 19 Mar. 1974, (AMS, KS 110902); 1♀, Kelly Basin Rd, just N of Waterfall Ck on Mule track, 145.62°E, 42.2°S 3, P. Nally, 17 Mar. 1974, (AMS, KS 111144).

Other material examined: *Victoria*: 1♀, Booti Booti NP, 152.53°E,

32.23°S, L. Wilkie, 10 Sep. 1997, (AMS, KS 58797); 1♂, Beauchamp Falls, 3.6km ESE of Beech Forest, 143.60°E, 38.65°S, G. Milledge, P. Lilywhite, 21 Jan. 1992, (MVMA, K13544); 1♂, Phillips Track, Youngs Creek Crossing, 0.6 km N Triplett Falls, 143.48°E, 38.67°S, G. Milledge, C. McPhee, 18 Mar. 1992, (MVMA, K13554); 2♂, 1♀, Maits Rest, 10km W of Apollo Bay, Vic, 143.57°E, 38.75°S, G. Milledge, C. McPhee, 18 Mar. 1992, (MVMA, K13547); *Tasmania*: 1♂, Dip River Forest, 145.35°E, 41.02°S, C.J. Binks, B. Knott, 23 Feb. 1974, (AMS, KS 107798); 1♀, South bank of Arthur River, road in from Trowutta, 145°E.08°E, 41.10°S, J.L. Hickman, 10 Dec. 1973, (AMS, KS 111483); 2♂, 1♀, Weldborough Pass 2.5km from top of Pass, 147.90°E, 41.20°S, P. Suter, 18 Jun. 1974, (AMS, KS 111607); 1♂, 1♀, eastern slope of Dazzler Range, 146.70°E, 41.22°S, J.L. Hickman, 21 Jul. 1974, (AMS, KS 111897); 1♂, south western slope of Dazzler Range, 146.70°E, 41.22°S, J.L. Hickman, 21 Jul. 1974, (AMS, KS 111911); 1♀, 1km N of Lottah, 148.03°E, 41.23°S, D. Alty, 29 Aug. 1972, (AMS, KS 73037); 1♂, The Sideling, SW of Scottsdale, 147.42°E, 41.27°S, G. S. Hunt, 26 Oct. 1988, (AMS, KS 56370); 3♂, 3♀, E slope of Holwell Gorge picnic area, 146.77°E, 41.27°S, J. L. Hickman, 20 Jul. 1974, (AMS, KS 111934); 1♂, St Columba Falls Area, 147.92°E, 41.28°S, P. Suter, 18 Jun. 1974, (AMS, KS 111546); 1♂, NE Tasmania, 147.67°E, 41.28°S, J. Madden *et al.*, 7 Feb. 1974, (AMS, KS 26058); 1♂, 1♀, NE Tasmania, 147.67°E, 41.28°S, J. Madden *et al.*, 2 Jul. 1974, (AMS, KS 26085); 1♂, 4♀, Myrtle Creek, North of Mathinna, NE, 147.80°E, 41.33°S, J.L. Hickman, 15 Jul. 1973, (AMS, KS 111682); 1♀, Mt Victoria, 147.83°E, 41.33°S, G. Cassis, 26 Feb. 1990, (AMS, KS 62677); 2♀, North side of Pieman Rd, 18km from Murchison Hwy, 145.45°E, 41.62°S, J. L. Hickman, 31 Jan. 1981, (AMS, KS 56422); 1♂, Liffey, 146.85°E, 41.68°S, Hickman, 14 May 1953, (AMS, KS 129764); 1♂, Liffey, 146.85°E, 41.68°S, Hickman, 9 Feb. 1947, (AMS, KS 30970); 1♂, 1♀, East Bank of Fish River, track to Walls of Jerusalem, 146.27°E, 41.77°S, J. L. Hickman, 1 Nov. 1981, (AMS, KS 56420); 1♀, East Bank of Fish River, track to Walls of Jerusalem, 146.27°E, 41.77°S, J. L. Hickman, 1 Nov. 1981, (AMS, KS 56473); 2♀, Pelion Hut, 3km S Mount Oakleigh, Tas, 146.05°E, 41.83°S, Calder, Dressler, 12 Feb. 1991, ANIC, 42 0009462♀, Cradle Mountain, Lake Saint Clare National Park, 146.20°E, 42.08°S, I.J. Boulton, 18 May 1996, (TMAG, J6208); 1♂, 2♀, Cradle Mountain, Lake Saint Clare National Park, Woodland Nature Walk, 146.17°E, 42.12°S, I.J. Boulton, 17 May 1996, (TMAG, J6209); 1♂, End of Rufus Canal Rd, 146.12°E, 42.17°S, J.L. Hickman, 23 Feb. 1987, (AMS, KS 127299); 1♂, 2♀, East King William Saddle south side Lyell Hwy, 146.12°E, 42.20°S, J.L. Hickman, 19 Mar. 1974, (AMS, KS 111063); 1♀, King William Saddle, 146.12°E, 42.20°S, L. Hill, 12 Nov. 1981, (AMS, KS 127346); 1♂, W side of T.P.F.H. Rd, from near Little Swanport, 147.85°E, 42.27°S, J.L. Hickman, (AMS, KS 129768); 1♀, Andrew R Caves area Western Heritage area, 145.75°E, 42.30°S, MR Gray & S Eberhard, 1 Mar. 1988, (AMS, KS 20916); 13♂, 21♀, 7 imm, Tarraleah, 146.43, 42.30°S, Hickman, 1 May 1952, (AMS, KS 31047); 1♂, Tarraleah, 146.43°E, 42.30°S, Hickman, 26 Dec. 1952, (AMS, KS 310481♀, Acheron R caves area Western Heritage area, 145.85°E, 42.45°S, MR Gray & S Eberhard, 24 Mar. 1989, (AMS, KS 21218); 1 imm, Florentine River at 'Pagoda' hut crossing, 146.43°E, 42.48°S, L. Hill, 20 Dec. 1979, (AMS, KS 127088); 3♂, 2♀, Franklin area near Kutikina cave F34 Western Heritage area, 145.75°E, 42.50, M. R. Gray & S. Eberhardt, 23 Mar. 1989, (AMS, KS 21117); 1♂, SW, 145.77°E, 42.52°S, L. Hill, 9 Jan. 1978, (AMS, KS 26821); 1♀, SW, 145.77°E, 42.52°S, C L Howard, 19 Jan. 1978, (AMS, KS 27169); 1♀, 2 imm, SW, 145.75°E, 42.52°S, C.L. Howard, 19 Jan. 1978, (AMS, KS 59284A); 1♂, SW, 145.70°E, 42.57°S, (AMS, KS 27585); 1♂, SW, Lower Gordon River region, 145.70, 42.58°S, C. Howard *et al.*, 29 Jan. 1976, (AMS, KS 127381); 1♀, South West, Lower Gordon River region, 145.70°E, 42.58°S, C. Howard *et al.*, 31 Jan. 1976, (AMS, KS 26227); 1♂, SW, 145.72°E, 42.58, C. Howard *et al.*, 29 Jan. 1976, (AMS, KS 26287); 1♀, SW, 145.70°E, 42.58°S, C. Howard *et al.*, 29 Jan. 1976, (AMS, KS 26722); 1♂, SW, 145.88°E, 42.65, C L Howard *et al.*, 23 Jan. 1978, (AMS, KS 26956); 2♂, Lake Fenton National Park, 146.62°E, 42.67°S, Hickman, 27 Mar. 1932, (AMS, KS 30983); 3♀, Mount Field National Park, Lake Dobson Rd, 146.68°E, 42.68, I.J. Boulton, 21 May 1996, (TMAG, J6252); 3♀, 1 imm, Mount Field National Park, between Russell and Horseshoe Falls, 146.72°E, 42.68, I.J. Boulton, 25 Jun. 1996, (TMAG, J6253); 2♂, SW, 145.88°E, 42.68°S, C. Howard *et al.*, (AMS, KS 25534); 1♂, SW, Gordon River, 145.80°E, 42.68°S, C L Howard, P J Suiter, 13 Feb. 1976, (AMS, KS 27452); 4♂, 6♀, National Park, 146.72°E, 42.68°S, V.V. Hickman, 20 Jan. 1964, (AMS, KS 31082); 1♀, Mt. Field NP, Russell Falls, 146.70°E, 42.68°S, D. Bickel, 2 Apr. 1989, (AMS, KS 56366); 1♀, 1 imm, Mt Field NP, Tas, 146.72°E, 42.68°S, J. Lawrence, T. Weir, 4 Nov. 1980, ANIC, 42 001436); 1♀, Scotts Peak Rd, between Huon and Florentine Rivers, 146.37°E, 42.72°S, J.L. Hickman *et al.*, 3 May 1973, (AMS, KS 107766); 1♂, SW, 145.85°E, 42.73°S, C. Howard, 26 Jan. 1978, (AMS, KS 111032); 1♀, SW, 145.85°E, 42.73°S, C. Howard, (AMS, KS 111040); 1♀, SW,

Strathgordon, 146.05°E, 42.77°S, J L Hickman, 25 Apr. 1978, (AMS, KS 27298); 1♀, SW, 145.87°E, 42.80°S, L Hill *et al.*, 3 Apr. 1977, (AMS, KS 25173); 1♀, SW, 145.88°E, 42.80°S, L Hill *et al.*, 3 Jan. 1977, (AMS, KS 26510); 1♂, SW, 145.87°E, 42.80°S, L Hill *et al.*, 3 Jan. 1977, (AMS, KS 27192); 2♂, Risdon, 147.35°E, 42.82°S, V.V. Hickman, 16 Jul. 1976, (AMS, KS 107334); 1♀, East Risdon, 147.35, 42.83°S, V.V. Hickman, 9 Oct. 1963, (AMS, KS 64644); 1♀, 1 imm, SW, 145.85°E, 42.85°S, C Howard *et al.*, 18 Feb. 1976, (AMS, KS 26535A); 1♀, Queens Domain, Hobart, 147.32°E, 42.87, Hickman, 1 Dec. 1966, (AMS, KS 31020); 1♂, Mt Wellington Circle Track, 147.23°E, 42.90°S, J.L. Hickman, Dec. 1963, (AMS, KS 30996); 1♂, Mt Wellington, Betts Vale, 147.23°E, 42.90°S, Hickman, 13 Jan. 1953, (AMS, KS 30999); 1♂, 1♀, Mt Wellington, 147.23°E, 42.90°S, Hickman, 31 Jan. 1940, (AMS, KS 59282); 1♀, Mt Wellington, 147.23°E, 42.90°S, L. Hill, 27 Dec. 1978, (AMS, KS 65984); 1♀, SW, 145.88°E, 42.92°S, C. Howard *et al.*, 22 Feb. 1977, (AMS, KS 26390); 3♂, O'Grady Falls, 147.25°E, 42.92°S, Hickman, 21 Jan. 1948, (AMS, KS 30934); 2♂, 1♀, Fern Tree, 147.27°E, 42.92°S, Hickman, 28 Sep. 1957, (AMS, KS 31074); 1♂, 3♀, Mount Nelson, 147.33°E, 42.93°S, I.J. Boulton, (TMAG, J6255); 1♂, E slope of hill behind "Fairfield", Eaglehawk Neck, 147.92°E, 43.02°S, J.L. Hickman, 14 Aug. 1973, (AMS, KS 111643); 1♀, Banks of Huon River, Scotts Peak Rd, W side of bridge, 146.30°E, 43.03°S, J.L. Hickman, 3 May 1973, (AMS, KS 107755); 1♂, Warra LTER site, 146.67°E, 43.07°S, R. Bashford, 20 Mar. 2003, (TMAG, J6206); 1♂, Warra LTER site, 146.67°E, 43.07°S, R. Bashford, 20 Mar. 2003, (TMAG, J6207); 1♀, Track from Hartz Mts hut to Kermadie Plains, head of Arve River, W of Taylors Ridge, 146.78°E, 43.22, J.L. Hickman, 24 Aug. 1973, (AMS, KS 107388); 1♂, Track from Hartz Mts hut to Kermadie Plains, head of Arve River, W of Taylors Ridge, 146.78°E, 43.22, J.L. Hickman, 24 Aug. 1973, (AMS, KS 107471); 2♂, 1♀, Bruny Island, 147.32°E, 43.27°S, G. Cassis, 23 Feb. 1990, (AMS, KS 62835); 1♂, Bruny Is, Mt Mangana, 147.28°E, 43.37°S, R. Mawbey, D. Coleman, 18 Jun. 1974, (AMS, KS 111555); 1♂, Near Hastings Caves, 146.85°E, 43.38, V.V. Hickman, 9 Dec. 1952, (AMS, KS 30987).

Diagnosis. The females of this species can be distinguished by the presence of a median pocket in the epigyne that lies between the spermathecae and the atria (Fig. 25). Also, unlike the other species, the atria have well marked guides forming a wide, almost complete, sometime strongly sclerotized circle around the copulatory opening. The guides are entirely distal to the spermatheca. The latter consists of long narrow spermathecal receptacles divided by a cleft that may be transverse or slightly oblique. The receptacles are joined by a wide link. The fertilization duct arises near the distal edge of the primary receptacle, unlike the other species.

The male palp is also distinctive when compared to the other species. The cymbium is pear-shaped with a long narrow tip. The tegulum is turned anticlockwise a quarter of a turn out of alignment with the cymbium (Fig. 29). As a consequence, the posterior lobe extends in a 4 o'clock direction and the large lateral lobe in a 7 o'clock direction, meaning the latter could be inadvertently interpreted as the posterior lobe. Also, because of this twist, the origin of the embolus is in a posterolateral position rather than the usual distolateral position and is round in this species rather than the simple bulb found in the other species.

Description. *Female:* Body morphology: The total length is 2 mm or 3 mm. The cephalothorax dorsal surface is smooth, often with guanine subsurface areas. The cephalothorax silhouette is high, the rear edge steep. The dorsal cephalothorax median stripe is weak and blurred. The clypeus is narrow and the grey clypeal fringe sparse. The single retromarginal tooth is medium sized. There are two promarginal teeth. The palp can be either white or pale brown. The abdomen has an oval shape and there is lacey patterning on either side of a clearer median section on the dorsal surface. Leg morphology: L1 and L4 are of similar lengths. L1 is of a similar build to the other legs, with strong tibial spines but no fringe. Epigyne: The cleft in the

spermatheca is oblique or transverse, and the posterior/lateral receptacle the largest. The atrium guides are 'C' shaped and sharply delineated. There is a median pocket between the atria and spermathecae. Dimensions: (Holotype): CL 1.25, EFL 0.9, AL 1.75, CW 1.5, ALEW 1.4, AMEW 0.85, PEW 1.25, L1 2.3 (0.8+0.3+0.55+0.3+0.35), L2 2.15 (0.6+0.35+0.55+0.3+0.35), L3 2.05 (0.6+0.35+0.4+0.35+0.35), L4 2.78 (0.9+0.35+0.53+0.6+0.4).

Male: As for the female but for the following characters. There is a yellow subcutaneous patch on the dorsal abdomen. There is no paturon spike. The clypeus is narrow and the grey clypeal fringe weak. Leg morphology: L1 is the longest leg with a build similar to the other legs. It is weakly fringed, and with strong tibial spines. Male Palp: The tibial apophysis, is needle shaped or with small terminal hook and points in a lateral direction. The brown palp has a long, tapered tip, can be brown/black, light brown or light brown with a white tip. There is a large proximal tegular lobe and a large lateral tegular lobe. The tegular shield does not cover the round bulb which is placed in the proximal corner beside the tegulum. The thick embolus curves distally away from the tegulum. Dimensions (Paratype): CL 1.5, EFL 0.85, AL 1.6, CW 1.25, ALEW 1.35, AMEW 1.0, PEW 1.3, L1 3.35 (1.0+0.5+0.7+0.6+0.55), L2 3.15 (1.0+0.55+0.65+0.35+0.45), L3 2.95 (1.0+0.5+0.65+0.35+0.45), L4 3.45 (1.0+0.45+0.65+0.6+0.75).

Remarks. Specimens from the central highlands of Tasmania are larger and darker than those found further south and west. Eastern lowland specimens are also larger, but lighter and with marginal shape changes in the spermatheca. In some specimens, the guides can be strongly sclerotized, though in other respects they do not differ from the remainder of the species. Unlike the other species, the males can be larger than the females.

Distribution and Biology. Found in litter and moss in forest in Tasmania and the Otway area of Victoria. It is predicted but has not been found elsewhere in Victoria or in New South Wales where it is replaced by *Australoneon taylori* n. com. The distribution of *A. christineae* n. sp. seems to be closely related to the distribution of *Nothofagus cunninghamii*, which is also restricted to Tasmania and the Otway Ranges in southwestern Victoria (Busby, 1986). In Tasmania it is predicted to be found in the wetter parts of the State but not in the drier grasslands of, for example, the central river valleys (Fig. 32). It is widespread in protected areas, so IUCN Red List classification LC.

Australoneon keyserlingi n. sp.

urn:lsid:zoobank.org:act:E7C69F2E-3552-4979-A7BE-D85B33C10B5F

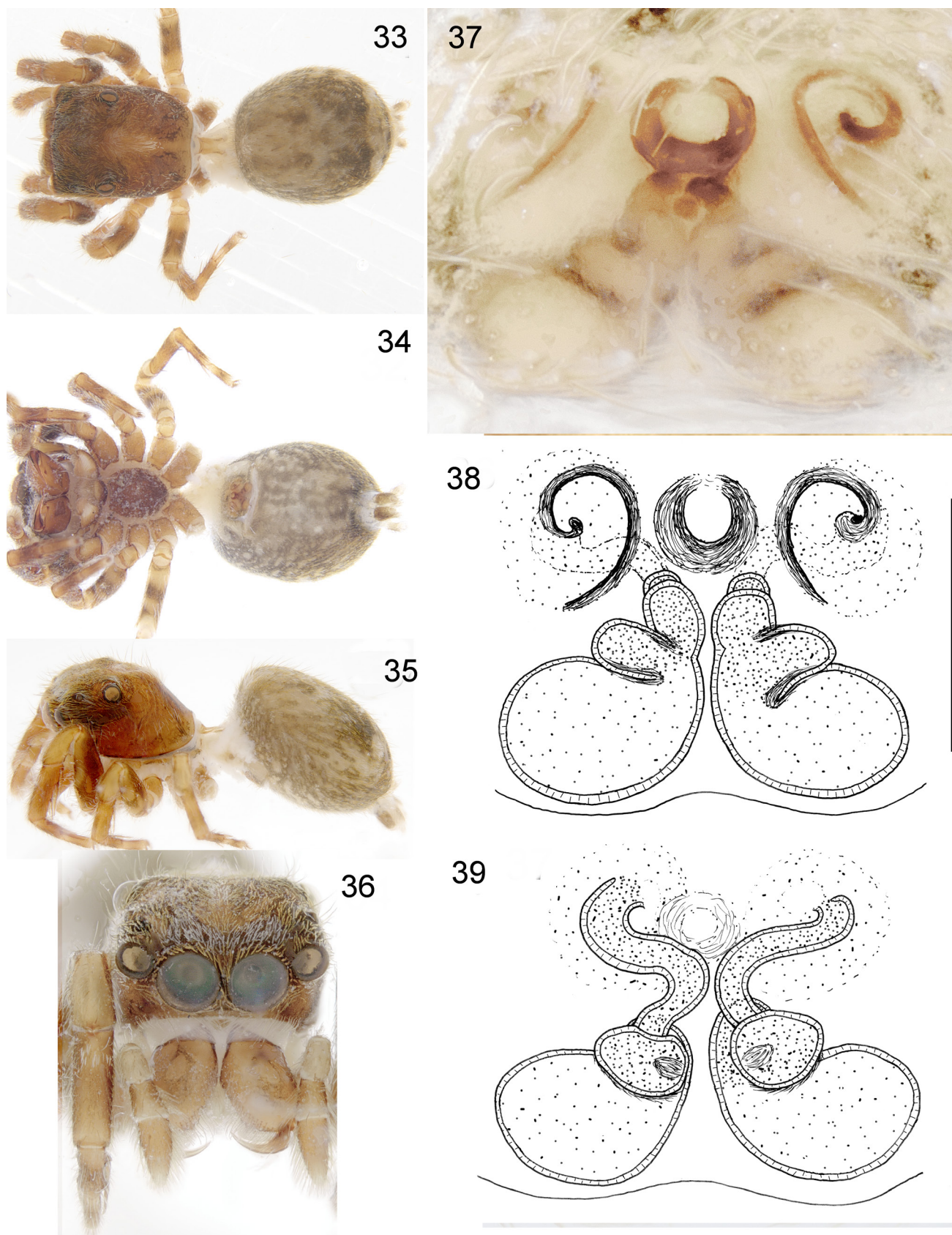
Figs 33–44

Etymology. Named in recognition of Graf E. Keyserling (1832–1889) who, in association with Dr L. Koch, described many Australian jumping spiders and produced the first compendium of information on the then known Australian fauna (Koch, 1879; Keyserling, 1883).

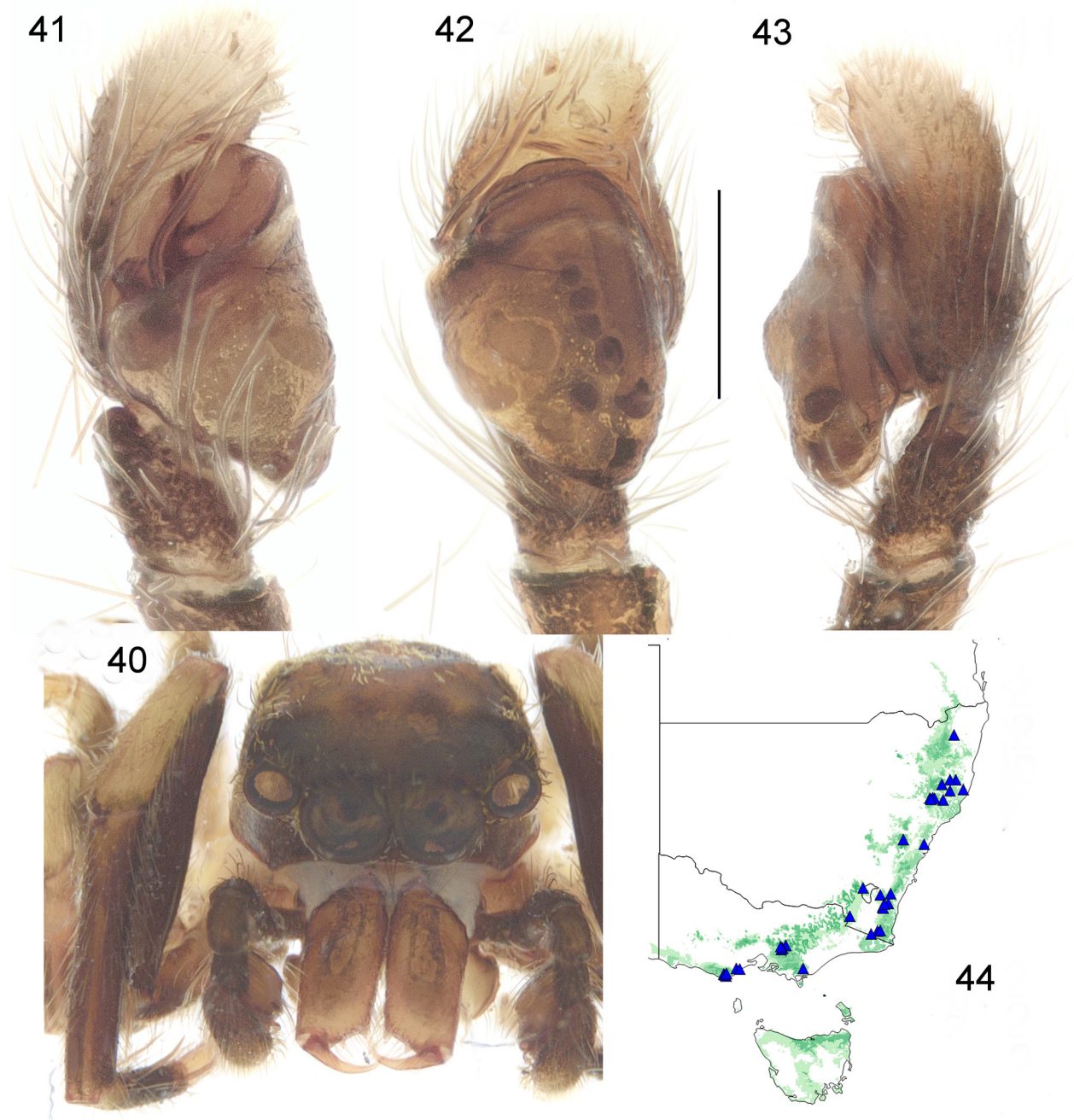
Type material. **Holotype:** 1♀, Otway Ranges, Aire Crossing Tk, 143.52°E, 38.70°S, G. Milledge, 6 Sep. 1994, (MVMA, K5366); **Paratypes:** 1♀, Otway Ranges, Beauchamp Falls,

143.60°E, 38.65°S, G. Milledge, 15 Nov. 1994, (MVMA, K5364); 1♀, Phillips Track, 0.5km N of Triplet Falls, Vic, 143.48°E, 38.67°S, K. Walker, C. McPhee, 24 Mar. 1992, (MVMA, K13543); 2♂, 2♀, Otway Ranges, Young Creek Rd, Vic, 143.48°E, 38.67°S, G. Milledge, 5 Sep. 1994, (MVMA, K5359); 1♀, Otway Ranges, Young Creek Rd, Vic, 143.48°E, 38.67°S, G. Milledge, 15 Nov. 1994, (MVMA, K5362); 1♀, Phillips Track, 0.5km N of Triplet Falls, Vic, 143.48°E, 38.67°S, G. Milledge, 31 Jan. 1995, (MVMA, K5363); 1♂, Otway Ranges, Young Creek Rd, Vic, 143.48°E, 38.67°S, G. Milledge, 15 Nov. 1994, (MVMA, K5399A).

Other material examined: *New South Wales:* 1♂, Cedar Ck, Cedar Trail. Washpool NP, 152.33°E, 29.48°S, G. A. Cassis and M. R. Gray, 4 Feb. 1993, (AMS, KS 38280); 2♂, Werrikimbe NP, new site, 152.17°E, 31.20°S, E. Tasker, 2 Dec. 1997, (AMS, KS 121027); 1♂, Mt Boss SF (Kota), 152.40°E, 31.20°S, G A Webb Forestry Commission, 1 Oct. 1980, (AMS, KS 43555); 2♂, Enfield SF, Dodds Fire Tr, 2km from Enfield Rd on Scrubby Ck, 151.87°E, 31.38°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 38938); 1♂, 1♀, Bulls Ground State Forest, 152.68°E, 31.58°S, A. York, . 1999, (AMS, KS 89848); 1♂, Bulga SF Bobbin Fire Trail 100m fr Padmans Rd, 152.17°E, 31.62°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 42743); 1♀, Barrington Tops Reserve, Nth Branch Rd. 0.4km from Pheasant Ck Rd, 151.50°E, 31.88°S, G. A. Milledge, A. D. Hegedus, 18 Mar. 2008, (AMS, KS 103314); 1♂, Barrington Tops State Forest, 0.8km E of Moppy Picnic area, 151.57°E, 31.90°S, G. A. Milledge, H. M. Smith, 14 Nov. 2007, (AMS, KS 104667); 1♂, Stewarts Brook SF, 0.25km S of jct of Tubrabucca & Omadale, 151.40°E, 31.92°S, G. A. Cassis and M. R. Gray, 9 Apr. 1993, (AMS, KS 42955); 1♀, Barrington Tops Reserve, Barrington Trail, 151.45°E, 31.95°S, G. A. Milledge, H. M. Smith, 14 Nov. 2007, (AMS, KS 104731); 1♂, 2♀, Barrington Tops site 4, 151.92°E, 31.98°S, (AMS, KS 98561); 2♂, Mt Wilson Cathedral of Ferns area, 150.38°E, 33.50°S, C. Horseman, (AMS, KS 17911); 1♂, Mt Wilson Waterfall picnic area trail, 150.38°E, 33.50°S, C. Horseman, 28 Mar. 1979, (AMS, KS 19478); 4♂, 6♀, Mt Wilson Waterfall picnic area trail, 150.38°E, 33.50°S, C. Horseman, 28 Jan. 1979, (AMS, KS 2630); 2♂, 3♀, Mt Wilson Waterfall picnic area trail, 150.38°E, 33.50°S, C. Horseman, 28 Mar. 1979, (AMS, KS 2829); 2♂, Iimm, Ku-ring-gai Chase NP, track E of The Sphinx, 151.17°E, 33.68°S, G. A. Milledge, H. M. Smith, 11 Apr. 2009, (AMS, KS 111704); 1♀, Jamberoo Mountain, 150.72°E, 34.67°S, J. Noble, 10 Mar. 1999, (AMS, KS 662341); 1♂, Monga SF, opposite junction of McCarthys Rd & Burma Rd, 149.90°E, 35.58°S, L. Wilkie, R. Harris, 23 Feb. 1999, (AMS, KS 58785); 1♀, Bendethera Fire Trail, Deua NP, 149.80°E, 35.95°S, J. Tarnawski & S. Lassau, 3 Nov. 1999, (AMS, KS 58818); 1♀, Deua NP. Minuma Range Fire Trail, approx 1.5km ENE of apex of Dampier Mt, 149.65°E, 35.98°S, J. L. Tarnawski, S. A. Lassau, 11 Mar. 1999, (AMS, KS 68065); 2♂, 1♀, Wiola Creek Fire Trail, Badja State Forest, 149.58°E, 36.08°S, J. Tarnawski & S. Lassau, 13 Mar. 1999, (AMS, KS 58840); 1♀, Badja State Forest; Wiola Creek Fire Trail, about 3.4km ESE from junction with Falcon Rd, 149.61°E, 36.12°S, J. Tarnawski, S. A. Lassau, 20 Feb. 1999, (AMS, KS 58819); 1♂, Kosciuszko National Park, Charlotte Pass, 148.33°E, 36.43°S, D. R. Britton, A. D. Hegedus, 5 Mar. 2008, (AMS, KS 104547); 1♂, Coolangubra SF, 149.50°E, 37.00°S, G A Webb Forestry Commission, 1 Jan. 1985, (AMS, KS 99170); 1♂, Coolangubra State Forest, near Waratah Creek, 149.38°E, 37.02°S, G. A. Webb, 2 Aug. 2001, (AMS, KS 79648); 1♀, Bondi SF South of Bombala Woodlot 1, 149.15°E, 37.13°S, G. Gowing et al., 28 Nov. 1980, (AMS, KS 503000); *Australian Capital Territory:* 1♂, Blundells Creek, 3km E Piccadilly Circus, ACT, 148.83°E, 35.37°S, Weir, Lawrence, Johnson, Mar. 1985, (ANIC, 42 001547); *Victoria:* 5♂, Central Highlands, The Big Culvert, 2.5km ENE of Mt Observation, 145.87°E, 37.57°S, G. Milledge, 21 Feb. 1996, (MVMA, K5483); 1♂, White Hill Track no. 2, c. 7 km S. of Acheron Way, c. 15 km ENE. of Healesville, 145.67°E, 37.62°S, D. Black, 4 Mar. 1990, (WAMP, T150441); 4♂, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 21 Feb. 1996, (MVMA, K5471); 3♂, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 23 Apr. 1996, (MVMA, K5472); 2♂, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 28 Dec. 1995, (MVMA, K5475A); 1♂, 1♀, Central Highlands, Acheron Gap, 6km NE Mt Donna Buang, 145.73°E, 37.68°S, G. Milledge, 25 Jun. 1996, (MVMA, K5480); 3♂, Central Highlands, Cement Creek Reserve, 2.2km ESE of Mt Donna Buang, 145.70°E, 37.72°S, G. Milledge, 29 Nov. 1994, (MVMA, K5484); 3♂, 18♀, Central Highlands, Cement Creek Reserve, 2.2km ESE of Mt Donna Buang, 145.70°E, 37.72°S, G. Milledge, 29 Nov. 1994, (MVMA, K5485); 1♀, Otway Ranges, 143.97°E, 38.45°S, MR Gray, 31 Mar. 1978,



Figures 33–39. *Australoneon keyserlingi* n. sp. Female holotype (K5366): 33 dorsal, 34 ventral, 35 lateral, 36 anterior views, 7 external epigyne; Paratype (K5364) semi-diagrammatic views of a dissected and cleared epigyne, 38 dorsal, 39 ventral. Scale: 0.2 mm.



Figures 40–44. *Australoneon keyserlingi* n. sp. Male paratype (K5399A): 40 anterior view; male palp: 41 retrolateral, 42 ventral, 43 prolateral, 44 map showing known and predicted distributions. Scale: 0.2 mm.

(AMS, KS 45370); 1♂, 3♀, Tarra-Bulga National Park, 0.2km W of Tarra Valley Picnic Area, Vic, 146.53°E, 38.45°S, G. Milledge, 14 Nov. 1995, (MVMA, K5557); 3♀, Tarra-Bulga National Park, 0.2km W of Tarra Valley Picnic Area, Vic, 146.53°E, 38.45°S, G. Milledge, 10 Jan. 1996, (MVMA, K5558); 1♀, Aireys Inlet, 144.10°E, 38.47°S, M. S. Harvey, M. E. Blossfeld, 13 Nov 1992, (WAMP, T150431); *Tasmania*: 1♀, Sherrills Cave E201 Eugenana Caves, 146.33°E, 41.25°S, S. Eberhard & J. Jackson, (AMS, KS 29565); 3♂, 1♀, Arve Forest, 146.92°E, 43.17°S, Hickman, 12 Jan. 1955, (AMS, KS 31083).

Diagnosis. The females of this species can be distinguished from all but *A. wanlessi* n. sp. by the presence of a median pocket in the epigyne that lies between the atria. It can be distinguished from *A. wanlessi* n. sp. by the large size of the pocket and the widely separated guides in *A. keyserlingi* n. sp. (Fig. 37) compared to the small size of the pocket and

close placement of the guides in *A. wanlessi* n. sp. (Figs 76–77). Also, unlike all the other species, the atria in *A. keyserlingi* n. sp. have guides with spiral shapes. These are wider apart than the primary receptacles. They move in a transverse direction and so do not extend posteriorly as far as the primary receptacle. This is unlike the situation in *A. wanlessi* n. sp. where the guides are longitudinal and overlap the primary receptacles (Fig. 77). The latter consist of rounded spermathecal receptacles divided by an oblique cleft. The secondary receptacle is much larger than the primary receptacle. The receptacles are joined by a wide link. Unlike the other species, the insemination ducts extend forwards from the primary receptacles just under the ventral surface. They almost reach the atria before moving Inwards.

As a consequence, they can be clearly seen under the ventral surface without dissection (Fig. 37). The fertilization duct arises near the center of the primary receptacle, as in *A. zabkai* n. sp. and *A. wanlessi* n. sp.

Australoneon keyserlingi n. sp. males can be distinguished from the other species except, *A. wanlessi* n. sp. by the absence of an obvious posterior lobe. *Australoneon keyserlingi* n. sp. (TL 3.6–5.5 mm) is larger than *A. wanlessi* n. sp. (TL 2.3–3.4 mm). The paturon length is $>3\times$ the width and ‘projects forwards’ in *A. keyserlingi* n. sp. (Fig. 36) but $<3\times$ the width and ‘near vertical’ in *A. wanlessi* n. sp. (Fig. 79).

Description: *Female:* Body morphology: The total length is 2 mm to 3 mm. The cephalothorax dorsal surface is smooth. The cephalothorax silhouette is high and the rear edge steep or gentle. The dorsal cephalothorax median stripe is strong. The clypeus is narrow and the clypeal fringe absent. The single retromarginal tooth is medium sized. There are two promarginal teeth. The palp is brown with a white tip. The abdomen has an oval shape and there is a transverse pattern of stripes or lacey patterning on the dorsal surface. Leg morphology: L4 is the longest leg. L1 has a build similar to the other legs, no fringe and strong tibial spines. Epigyne: The spermatheca cleft is transverse and the posterior/lateral receptacle largest. The atrium guides are sharp and either “” shaped or spiral. There is a median pocket between the atria. Dimensions: (Holotype): CL 1.7, EFL 0.85, AL 2.0, CW 1.35, ALEW 1.2, AMEW 0.75, PEW 1.25, L1 3.4 (1.02+0.6+0.85+0.45+0.5), L2 2.85 (0.85+0.35+0.55+0.7+0.35+4), L3 2.5 (1.0+0.5+0.55+0.45+0.4), L4 3.5 (1.05+0.4+0.75+0.8+0.5).

Male: As for the female but for the following characters. Body morphology: The total length is between 2 mm and 4 mm. The cephalothorax dorsal median stripe is weak and the cephalothorax rear edge steep. There is no dorsal yellow subcutaneous patch on the abdomen. There is no paturon spike. Leg morphology: L1 is the longest leg. It is strongly built, weakly fringed, with weak tibial spines. Male Palp: The short, tibial apophysis points laterally. The brown/black palp has a rounded, lighter, tip. There is a large proximal tegular lobe and a small posterolateral tegular lobe. A tegular shield covers part of the simple bulb, which is placed near the distal corner of the tegulum. The thin embolus curves distally away from the tegulum. Dimensions: (Paratype): CL 1.5, EFL 0.75, AL 1.6, CW 1.2, ALEW 1.1, AMEW 0.7, PEW 1.05, L1 4.3 (1.4+0.7+1.1+0.6+0.5), L2 2.95 (1.0+0.4+0.6+0.5+0.45), L3 3.05 (1.0+0.5+0.5+0.6+0.45), L4 3.25 (1+0.35+0.8+0.7+0.4).

Distribution and Biology. Found in litter in rainforest from southern Tasmania to northern New South Wales. (Fig. 44), as a consequence, likely IUCN Red List Category LC. It is also predicted to be found in southern Queensland and, marginally, in South Australia.

Australoneon kochi n. sp.

urn:lsid:zoobank.org:act:C96B3F9-05AF-449E-BDBE-4012F3B4C7B6

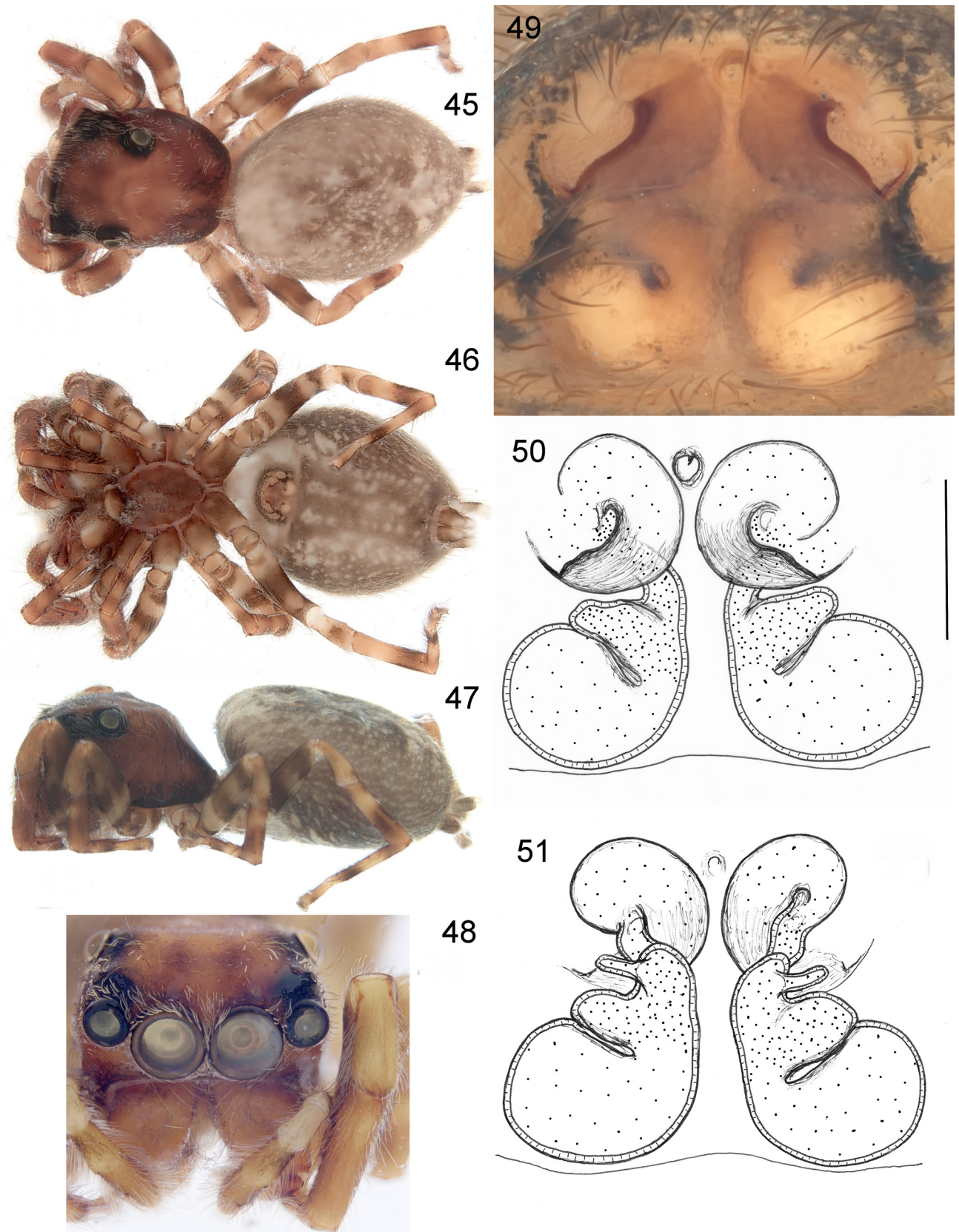
Figs 45–59

Etymology: Named in recognition of Dr L. Koch (1825–1908) who, in association with Graf E. Keyserling, described

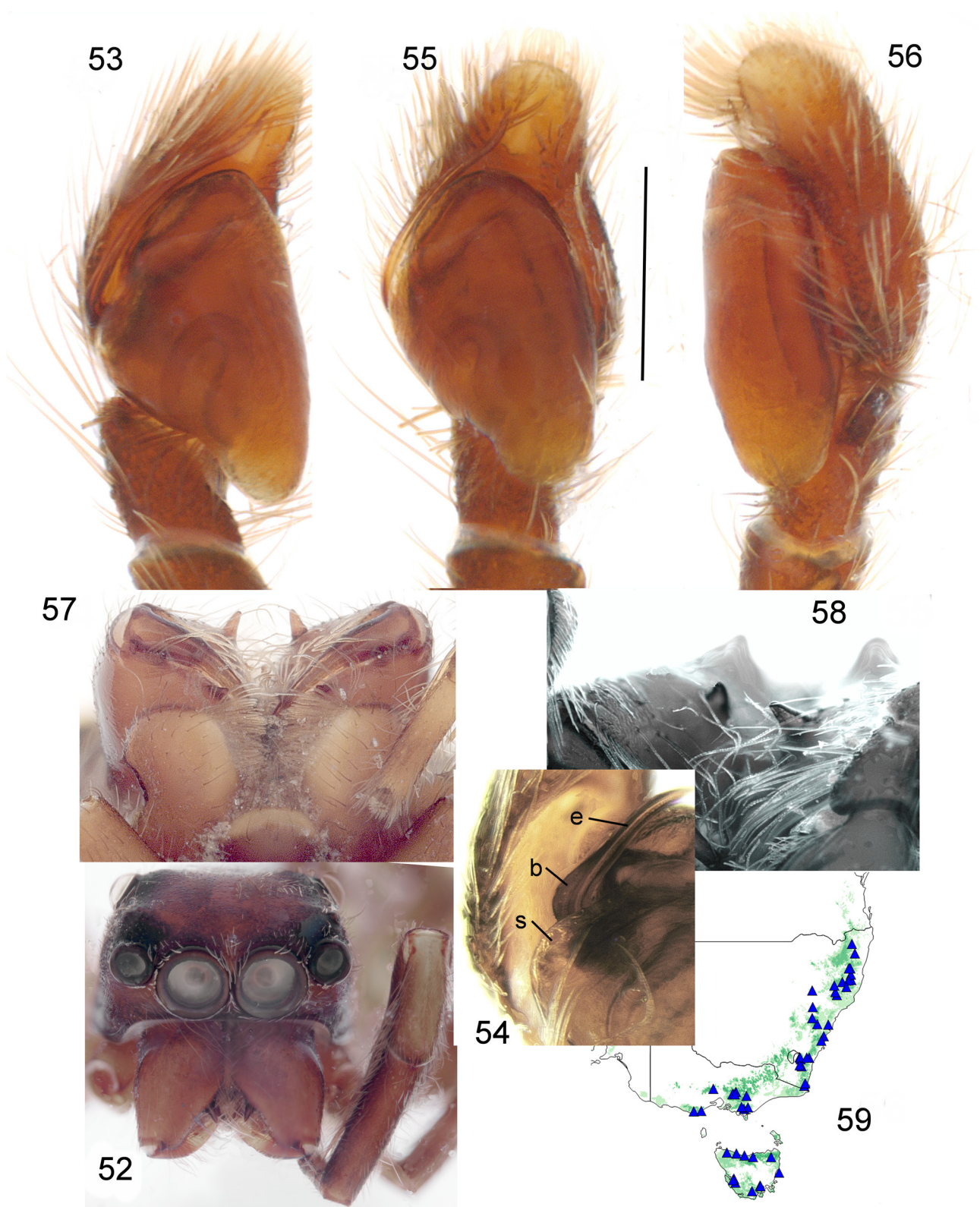
many Australian jumping spiders and prepared the first compendium of information on the then known Australian fauna. (Koch, 1879).

Type material. Holotype: 1♀, Mt Boss SF (Kota), 152.40°E, 31.20°S, G Webb, 1 Oct. 1980, (AMS, KS 17680). **Paratypes:**, as for holotype, 2♀, (AMS, 17680); Tuggolo State Forest, 151.45°E, 31.52°S, I. Oliver, Jan. 1993, (AMS, KS 89907); 3♀, 1♀, Styx River SF, 152.17°E, 30.34°S, I. Oliver, (AMS, KS 74687); 1♀, Styx River SF, off Cunawarra Trail, 152.33°E, 30.53°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37969); 1♀, Styx R SF, Cliffs Trail, 2.8km from Oxley Rd, 152.35°E, 30.55°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 37665); 2♀, Branch Ck Tributary, 152.38°E, 30.90°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 43157); 1♀, Werrikimbe N.P., NSW, 152.23°E, 31.25°S, R. Kitching, Jan. 1994, (ANIC 42 002208), 1♂, 1♀, Tuggolo State Forest, 151.45°E, 31.52°S, I. Oliver, Jan. 1993, (AMS, KS 89928); 1♂, Wild Cattle Creek, Bulga State Forest, NSW, 152.13°E, 31.60°S, G. A. Cassis and M. R. Gray, 4 Feb. 1953, (AMS, KS 59279); 1♂, Coolah Tops NP, Breeza Lookout., 150.18°E, 31.82°S, M. Gray, G. Milledge & H. Smith, 25 Nov. 2001, (AMS, KS 75415); 2♂, 1♀, Barrington Tops Reserve, Nth Branch Rd. 0.4km from Pheasant Ck Rd, 151.50°E, 31.88°S, G. A. Milledge, A. D. Hegedus, 18 Dec. 2007, (AMS, KS 102068); 1♀, Barrington Tops National Park, Gloucester Tops Rd, 12.3km W by road from Gloucester River Campground., 151.60°E, 32.07°S, G. A. Milledge, H. M. Smith, 13 Nov. 2007, (AMS, KS 102952); 1♂, Barrington Tops National Park, Gloucester Tops Rd, 12.3km W by road from Gloucester River Campground., 151.60°E, 32.07°S, G. A. Milledge, H. M. Smith, 13 Nov. 2007, (AMS, KS 102975);

Other material examined: *New South Wales:* 1♀, Ewingar SF Salferina Ck Track off Lionsville Rd, 152.43°E, 29.17°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 41941); 1♀, Ramornie SF track off Mt Tindal Rd, 152.62°E, 29.70°S, M Gray G Cassis, 18 Feb. 1993, (AMS, KS 43052); 1♀, 200m from Cocks Creek Rd and 8km east of Cocks Creek, Nullo Mtn State Forest, 150.22°E, 32.75°S, J. R. Gollan, M. A. Ashcroft, 9 Jan. 2012, (AMS, KS 122743); 1♀, Newnes State Forest, Sunnyside Rd, NSW, 150.18°E, 33.37°S, G. A. Milledge, M. Beatson, 6 Mar. 2006, (AMS, KS 94708); 1♀, Woodford, Ridge Street, 150.47°E, 33.72°S, AMBS, 30 Sep. 1996, (AMS, KS 56386); 1♀, Wahroonga Fox Valley Res, 151.10°E, 33.73°S, B. Henke, 1 Sep. 1979, (AMS, KS 5371); 1♀, Mt Keira Fauna Reserve Scout Camp, 150.85°E, 34.40°S, C. Horseman, 31 Jan. 1979, (AMS, KS 19476); 1♀, Barren Grounds Nat Res, 14km NW Jamberoo, Illawarra Escarp, 150.70°E, 34.67°S, L. Gibson, 2 Oct. 1999, (AMS, KS 63424); 1♀, Barren Grounds Nat Res, 14km NW Jamberoo, Illawarra Escarp, 150.70°E, 34.67°S, L. Gibson, 20 Feb. 1999, (AMS, KS 63428); 1♀, Rocky Pic Rd, Tallaganda State Forest, 149.48°E, 35.60°S, J. Tarnawski & S. Lassau, 15 Mar. 1999, (AMS, KS 58832); 1♂, 1♀, Rocky Pic Rd, Tallaganda State Forest, 149.50°E, 35.62°S, J. Tarnawski & S. Lassau, 15 Mar. 1999, (AMS, KS 58841); 1♀, Cabbage Tree Fire Trail, Buckenbowra State Forest, 150.02°E, 35.62°S, L. Wilkie, R. Harris & H. Smith, 15 Mar. 1999, (AMS, KS 58817); 1♀, Macquarie Rd, Buckenbowra State Forest, 149.88°E, 35.63°S, L. Wilkie, R. Harris & H. Smith, 16 Mar. 1999, (AMS, KS 58829); 1♀, South Forest Way, Tallaganda State Forest, 149.53°E, 35.70°S, J. Tarnawski & S. Lassau, 15 Mar. 1999, (AMS, KS 58815); 1♀, South Forest Way, Tallaganda State Forest, 149.53°E, 35.70°S, J. Tarnawski & S. Lassau, 15 Mar. 1999, (AMS, KS 58833); 1♂, Rocky Range Fire Trail, 3.75 km N from junction with Pollys Gully Rd, Badja SF., 149.48°E, 36.05°S, J. L.T. Tarnawski, S. A. Lassau, 14 Apr. 1999, (AMS, KS 68037); 1♀, Wiola Ck Fire Trail, 1.4km SSE from junction with Badja Fire Trail, Badja SF., 149.58°E, 36.10°S, J.L.T. Tarnawski, S.A. Lassau, 13 Mar. 1999, (AMS, KS 68067); 1♀, Nullica State Forest, 149.78°E, 37.08°S, 25 Oct. 1999, (AMS, KS 105094); 1♀, East Boyd State Forest, Anteaters Road, NSW, 149.72°E, 37.22°S, C. Lambkin, N. Starick, 9 Mar. 2005, (ANIC, 42 001414); 5♀, 1 imm., Mt Macedon Forest Pk, 144.58°E, 37.38°S, M R Gray, 4 May 1978, (AMS, KS 45557); *Victoria:* 1♂, 2♀, Central Highlands, The Big Culvert, 2.5km ENE of Mt Observation,



Figures 45–51. *Australoneon kochi* n. sp. Female holotype (KS 17680): 45 dorsal, 46 ventral, 47 lateral, 48 anterior views. Paratype (KS102952), ventral epigyne 49 external epigyne, semi-diagrammatic views of dissected and cleared epigyne 50 dorsal, 51 ventral. Scale: 0.2 mm.



Figures 52–59. *Australoneon kochi* n. sp. Male paratype (KS 56330): 52 anterior view; palp: 53 retrolateral, 54 detail view of the simple bulb (e embolus, b bulb, s shield), 55 ventral; 56 prolateral: 57 ventral view showing spikes near the anterior edge of the paturon 58 a second specimen (KS 111530) showing spikes and 'lumps' in the middle of the paturon face. (Other specimens lack either one or both of these character states): 59 map showing known and predicted distributions. Scale: 0.2mm.

145.87°E, 37.57°S, G. Milledge, 26 Oct. 1995, (MVMA, K5481); 1♀, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 28 Dec. 1995, (MVMA, K5476A); 1♀, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 28 Dec. 1995, (MVMA, K5470); 1♂, Central Highlands, Myrtle Gully Reserve, 3.4 km WSW of Mt Donna Buang, 145.80°E, 37.72°S, G. Milledge, 21 Jan. 1995, (MVMA, K5454); 2♂, Central Highlands, Road 26, 145.65°E, 37.72°S, G. Milledge, 21 Jan. 1995, (MVMA, K5456); 1♀, Central Highlands, Road 26, 145.65°E, 37.72°S, G. Milledge, 7 Apr. 1995, (MVMA, K5457); 1♀, Central Highlands, Road 26, 145.65°E, 37.72°S, G. Milledge, 29 Nov. 1994, (MVMA, K5455); 1♀, Avon River, near Valencia Creek, 146.45°E, 37.80°S, V. W. Framenau, 28 Feb. 1997, (WAMP, T150432); 1♀, Separation Creek, M. S. Harvey, M. E. Blossfelds, 21 Sept. 1989, (WAMP, T150440A); 1♀, Grand Ridge Road, 146.17°E, 38.42°S, I. R. Macaulay, 22 Feb. 2016, (ANIC, 42 002231); 1♂, 1♀, Strzelecki Ranges, Tarra-Bulga N.P. 0.2km W of Tarra Valley Picnic Area, 146.53°E, 38.45°S, G. Milledge, 10 Jan. 1996, (MVMA, K5546); 2♀, Strzelecki Ranges, Tarra-Bulga N.P. 0.2km W of Tarra Valley Picnic Area, 146.53°E, 38.45°S, G. Milledge, 10 Jan. 1996, (MVMA, K5554); 1♀, 1 imm., Strzelecki Ranges, Tarra-Bulga N.P. 0.2km W of Tarra Valley Picnic Area, 146.53°E, 38.45°S, G. Milledge, 6 Mar. 1996, (MVMA, K5555); 1♀, Strzelecki Ranges, Tarra-Bulga N.P., 0.5km NNE of Tarra Valley Picnic Area, 146.55°E, 38.45°S, G. Milledge, 14 Nov. 1995, (MVMA, K5556); 2♀, 1 imm., Strzelecki Ranges, Gunyah-Toora Rd, 2km SSW Gunyah Gunyah, 146.32°E, 38.53°S, G. Milledge, 14 Nov. 1995, (MVMA, K5544); 1♂, Strzelecki Ranges, Gunyah-Toora Rd, 2km SSW Gunyah Gunyah, 146.32°E, 38.53°S, G. Milledge, 10 Jan. 1996, (MVMA, K5545); 1♀, Otway Ranges, Young Creek Rd, Vic, 143.48°E, 38.67°S, G. Milledge, 15 Nov. 1994, (MVMA, K5399); *Tasmania*: 1♂, Dip River Forest, 145.35°E, 41.02°S, C. J. Binks, B. Knott, 23 Feb. 1974, (AMS, KS 111530); 1♂, Burnie, 145.90°E, 41.07°S, ALM, 21 May 1928, (AMS, KS 59278); 1♀, Don Reserve, along Don River, Davenport, Tas., 146.35°E, 41.18°S, I. J. Boulton, 25 Nov. 1999, (TMAG, J6243); 1♂, 1♀, Flowery Gully, 146.82°E, 41.27°S, G. S. Hunt, 25 Oct. 1988, (AMS, KS 56330); 1♀, ca 6km SE of Tooms Lake, 147.87°E, 41.27°S, J. L. Hickman, 1 Jun. 1972, (AMS, KS 107524); 1♂, Franklin area near Kutikina cave F34 Western Heritage area, 145.75°E, 42.50°S, M. R. Gray & S. Eberhard, 23 Mar. 1989, (AMS, KS 21117A); 1♀, SW Tasmania, Lower Gordon River region, 145.70°E, 42.58°S, C. Howard *et al.*, 29 Jan. 1976, (AMS, KS 26708); 1♀, Mt Wellington, 147.23°E, 42.90°S, Hickman, 27 May 1939, (AMS, KS 30997); 1♂, Fern Tree, 147.27°E, 42.92°S, V. V. Hickman, 3 Apr. 1964, (AMS, KS 31072); 1♀, Mount Wellington, Fern Tree, Tas., 147.25°E, 42.92°S, I. J. Boulton, 10 Jun. 1996, (TMAG, J6210); 1♀, Track from Hartz Mts hut to Kermadie Plains, head of Arve River, W of Taylors Ridge, 146.78°E, 43.22°S, J. L. Hickman, 24 Aug. 1973, (AMS, KS 107463).

Diagnosis. The females of this species can be distinguished from all but *A. zabkai* n. sp. by the presence of a small median pocket in the epigyne that lies immediately anterior to the atria. *Australoneon zabkai* n. sp. can be distinguished from *A. kochi* n. sp. as the guides in *A. zabkai* n. sp. are longitudinal and approach the anterior edge of the spermathecae (Fig. 11), while in *A. kochi* n. sp. the guides are transverse and well forward of the anterior edges of the spermathecae (Fig. 49). In *A. zabkai* n. sp. the anterior spermathecal receptacles are almost the same size as the secondary receptacles while in *A. kochi* n. sp. the primary receptacle is much smaller. Unlike the situation in other species, the position of the entrance to the fertilization duct could not be found. Males associated with *A. kochi* n. sp. females may or may not have projections on the front face of the paturon (Figs 57, 58).

The males of *A. kochi* n. sp. have a narrow tapering posterior tegular lobe as in *A. taylora* n. com., not found in the other species. *Australoneon kochi* n. sp. can be distinguished from *A. taylora* n. com. by the simple bulb being placed on the postero-proximal edge of the bulla and partially covered by a shield. In *A. taylora* n. com. it is on the postero-distal corner and not covered by a shield. They are also larger (>3.5 mm) than *A. taylora* n. com. (<3.5 mm).

Description. *Female*: Body morphology: The total length varies between 2 mm and 4 mm. The cephalothorax dorsal surface is smooth. The cephalothorax silhouette is high,

the rear edge steep. The dorsal median cephalothorax median stripe is weak and blurred. The clypeus is narrow and without a fringe. The single retromarginal tooth is small and pointed. No promarginal teeth could be seen. The palp can be brown/black, light brown or light brown with a white tip. The abdomen has an oval shape and there is a lacey pattern unevenly distributed across the dorsal surface. Leg morphology: L1 is longer and more strongly built than the other legs. It has strong tibial spines. Epigyne: The cleft in the spermatheca is transverse and the receptacles of a similar size. The atrial guides are hooded and either 'C' shaped or forming a diagonal 'C'. The median pocket is anterior to the atria. Dimensions: (Holotype): CL 2.0, EFL 1.15, AL 2.1, CW 1.25, ALEW 1.5, AMEW 1.05, PEW 1.5, L1 4.55 (1.5+ 0.75+1.2 +0.65+ 0.45), L2 3.05 (1.0+ 0.4+ 0.65+ 0.5+0.5), L3 3.65 (1.1+ 0.5+ 0.75 +0.8+ 0.5), L4 4.65 (1.35+0.55+ 1.05+1.05+0. 65).

Male: As for the female but for the following characters. Body morphology: The total length is 3 mm to 4 mm. There is a yellow subcutaneous patch on the dorsal abdomen. The clypeus is narrow, and a white clypeal fringe is not present. A spike of varying shape may be present on the anterior face of the paturon. There were two promarginal teeth. Male Palp: The tibial apophysis is needle-shaped and directed distally. The brown palp has a short, tapering tip. There is a narrow proximal tegular lobe but no lateral tegular lobe. The tegular shield partially covers the simple bulb and the embolus origin is in the proximal corner. The thin embolus curves distally away from the tegulum. Dimensions: (Paratype): CL 2.0, EFL 0.9, AL 1.95, CW 1.6, ALEW 0.8, AMEW 1.4, PEW 1.4, L1 4.3 (1.5+0.7+1.0+0.60 +0.5), L2 3.15 (1.05 +0.55+ 0.65+0.5 +0.4), L3 3.4 (0.85+0.6 +0.9+ 0.5+0.55), L4 4.2 (1.25+0.6+0.9+0.85+0.6).

Remarks. While the morphology of the females is clear and consistent, the males show polymorphic variation in paturon shape (fig 57). They may, or may not, have a spike and/or a mound projecting from the face of the paturon (Fig. 58). Males associated with *A. kochi* n. sp. females can show any of these character states and the states are distributed throughout the geographical range of the species.

Distribution and Biology. Found in litter in rainforest from southern Tasmania to northern New South Wales. (Fig. 59), as a consequence, likely IUCN Red List Category LC. It is also predicted to be found in south-eastern Queensland and, marginally, in South Australia.

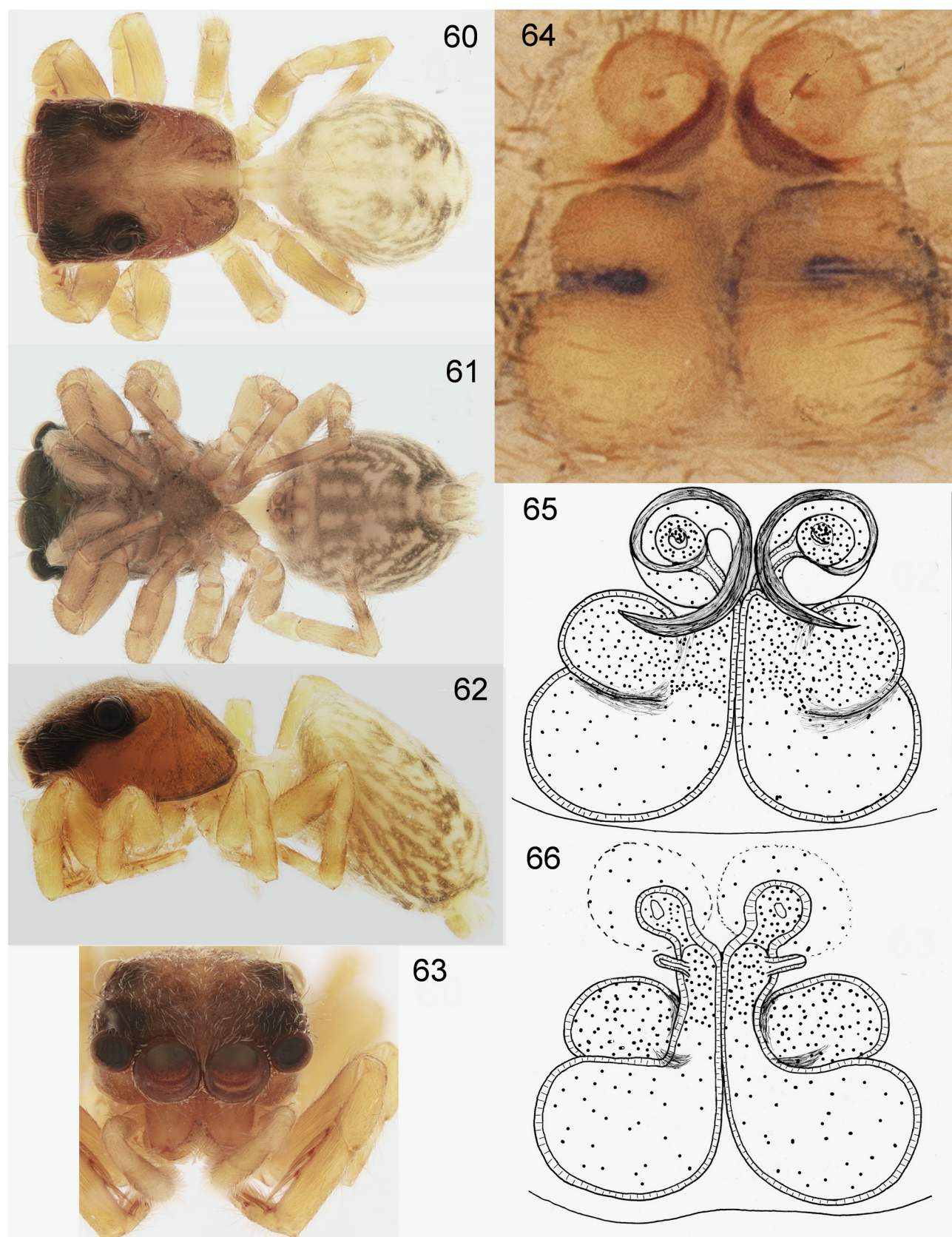
Australoneon taylora

(Richardson, 2013) n. com.

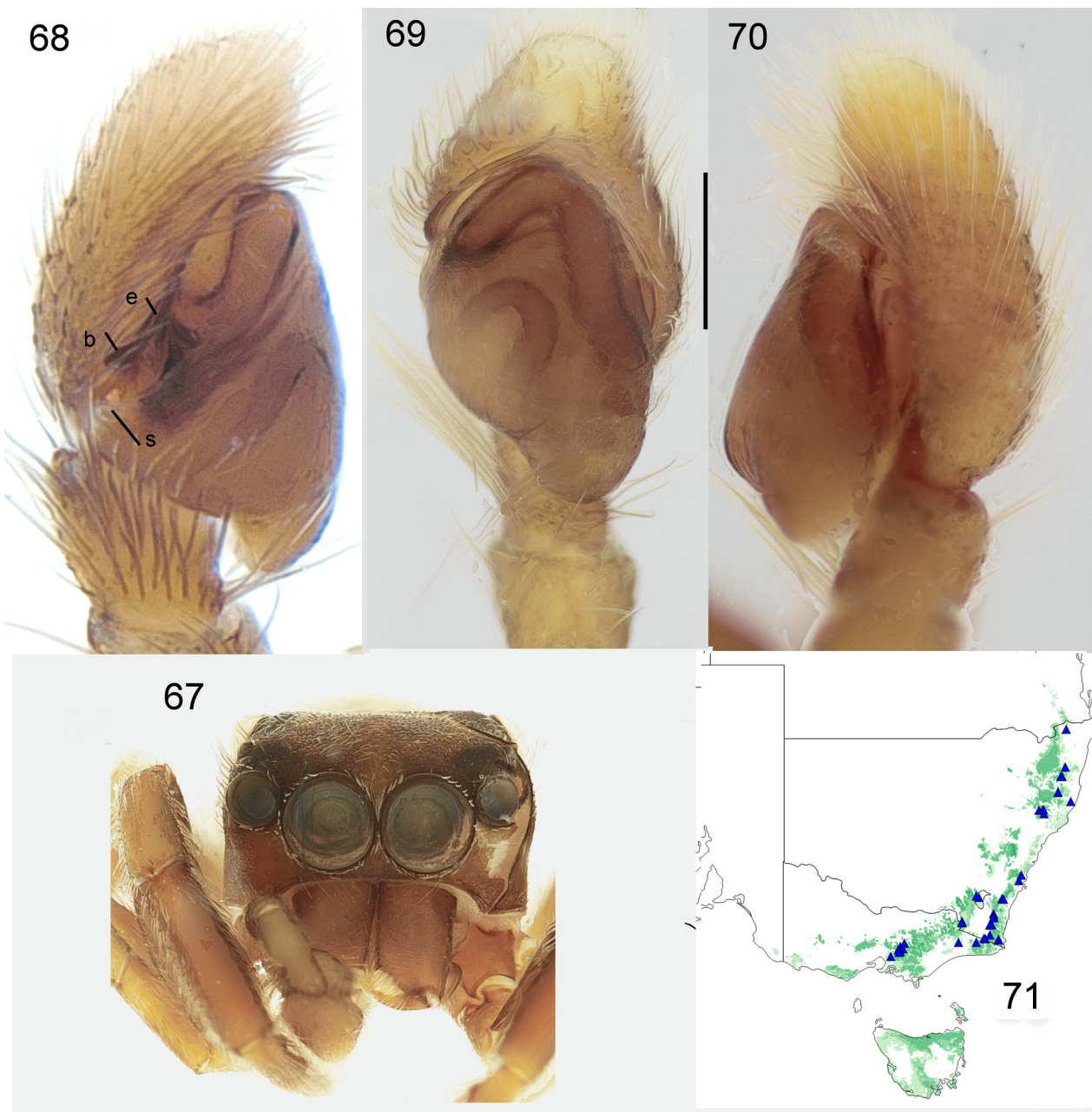
Figs 60–71

Neon taylora Richardson, 2013: 470, figs 31–37.

Type material: *Holotype*: ♂, Brown Mountain, 149.26°E, 36.60°S, R.W. Taylor and C. Brooks, 9 Dec.1967 (ANIC 42 000711). *Paratypes*: 1♀, Brown Mountain, 149.26°E, 36.38°S, R.W. Taylor, 5 Jan. 1967 (ANIC 42 000931); 1♂, Brown Mountain 149.37°E, 36.60°S, R.W. Taylor and R. Bartell, 11 Apr.1967 (ANIC 42 001268); 15♂&♀, 6imm, Rutherford Creek, Brown Mountain, 149.42°E, 36.60°S, M.



Figures 60–66. *Australoneon taylora* n. comb. Female paratype (42 000929):60 dorsal, 61 ventral, 62 lateral, 63 anterior views, 64 external epigyne. Paratype (42 000931) semi-diagrammatic views of a dissected and cleared epigyne 65 dorsal, 66 ventral. Scale: 0.2 mm.



Figures 67–71. *Australoneon taylori* n. comb. Male paratype (42 000711): 67 anterior view; palp: 68 retrolateral, 69 ventral, 70 prolateral; 71 map showing known and predicted distributions. Scale: 0.2mm.

Upton, 9 Jan. 1968 (ANIC 42 000929); 1♂, 1imm, Rutherford Creek, Brown Mountain, 149.42°E, 36.60°S, R.W. Taylor and C. Brooks, 9 Dec. 1967 (ANIC 42 001728); 10♂&♀, 3 imm, Rutherford Creek, Brown Mountain, 149.42°E, 36.60°S, S.R. Curtis, 15 Jan. 1969 (ANIC 42 000702); 8♂&♀, 4 imm, Glenborg State Forest, Brown Mountain, Rutherford Creek, Brown Mountain, 149.38°E, 36.58°S, S. Cameron, K. Domes, 8 Nov. 2007 (ANIC 42 001195); 6♂, 10 imm, Brown Mountain, 2700ft, 149.47°E, 36.58°S, R.W. Taylor, 5 Jan. 1967 (ANIC 42 001418).

Other material examined: *New South Wales*: 1♂, Yabba Scrub, Yabba SF, 152.50°E, 28.63°S, Smith, Hines, Pugh & Webber, 14 Dec. 1988, (AMS, KS 51057); 2♂, Yabba Scrub, Yabba State Forest, 152.50°E, 28.63°S, Smith, Hines, Pugh & Webber, 12 Dec. 1988, (AMS, KS 56334); 1♀, Obeloe Ck, 2.0km SW along Obeloe Rd. from Chaelundi Rd. Mt. Hyland NR 3/11,

152.47°E, 30.17°S, G. A. Cassis and M. R. Gray, 4 Feb. 1993, (AMS, KS 37511); 1♂, 800m N of Cunnawarra Ck, 152.33°E, 30.55°S, G. A. Cassis, M. R. Gray, 4 Feb. 1993, (AMS, KS 42907); 1♀, Styx River State Forest, 152.28°E, 30.57°S, I. Oliver, (AMS, KS 74676); 1♀, Werrikimbe National Park, Werrikimbe Trail, 152.17°E, 31.18°S, E. Tasker, Jan. 1998, (AMS, KS 120978); 1♂, Werrikimbe National Park, Cobcroft Creek, 152.17°E, 31.20°S, D. Bickel, 18 Nov. 1998, (AMS, KS 56335); 1♂, Bulls Ground State Forest, 152.68°E, 31.58°S, A. York, Nov. 2000, (AMS, KS 78238); 1♀, Barrington Tops, Moppy Lookout, 151.55°E, 31.90°S, A. Calder, 18 Nov. 1981, (ANIC, 42 000923); 1♀, Barrington Tops State Forest, 0.8km E of Moppy Picnic area, 151.57°E, 31.90°S, G. A. Milledge, A. D. Hegedus, 18 Dec. 2007, (AMS, KS 102057); 1♂, Stewarts Brook SF, above Tubbrabucca Rd, 151.38°E, 31.93°S, G. A. Cassis, M. R. Gray, 9 Apr. 1993, (AMS, KS 42949); 1♀, Barrington Tops National Park, Gloucester Tops Rd, 12.3km W by road from Gloucester River Campground, 151.60°E, 32.07°S, G. A. Milledge, H. M. Smith, 6 Dec. 2006, (AMS, KS 98601); 1♂, Macquarie Falls, 150.67°E, 34.57°S, I.D. Naumann, 6 Feb. 1986, (ANIC, 42 001422); 3♀, 1 imm, Cambewarra Mt, 150.57°E, 34.78°S, Britton, Upton, 5 May 1969, (ANIC, 42 000961); 1♂, Northern Fire Trail, Monga State Forest,

149.88°E, 35.53°S, L. Wilkie, R. Harris & H. Smith, 16 Mar. 1999, (AMS, KS 58781); 1♂, Clyde Mt, 149.95°E, 35.55°S, R. W. Taylor, (ANIC, 42 000070); 1♀, 1 imm, Clyde Mt, 149.95°E, 35.55°S, E. F. Riek, 14 Apr. 1970, (ANIC, 42 000965); 1♂, Badja Fire Trail, approx 3.5km S from junction with Falcon Rd, Badja SF, 149.53°E, 36.13°S, J. Tarnawski & S. Lassau, 13 Mar. 1999, (AMS, KS 58784); 2♀, Badja Fire Trail, approx 3.5km S from junction with Falcon Rd, Badja SF, 149.53°E, 36.13°S, J. Tarnawski & S. Lassau, 13 Mar. 1999, (AMS, KS 58821); 1♀, Badja Fire Trail, approx 3.5km S from junction with Falcon Rd, Badja SF, 149.53°E, 36.13°S, J. Tarnawski & S. Lassau, 13 Mar. 1999, (AMS, KS 68062); 1♀, Wadbilliga National Park: 10.3km North on Bumberry Creek Fire Trail, starts 800m inside entrance to Park, 149.57°E, 36.23°S, L. Wilkie, R. Harris, 13 Mar. 1999, (AMS, KS 58837); 2♂, 15km SE of Countegany, nr Two River Plain, Wadbilliga Trail/NP, 149.55°E, 36.30°S, C.A. Car, 17 Mar. 2006, (AMS, KS 101150); 1♂, Kosciuszko NP, 148.27°E, 36.43°S, M. Žabka, 5 Apr. 1988, (AMS, KS 44656); 1♀, Kosciuszko National Park, Dead Horse Gap, 148.27°E, 36.52°S, D. R. Britton, D. J. Smith, P. W. Hinton, 11 Dec. 2007, (AMS, KS 109217); 6♀, 10 imm, Brown Mountain, 2700ft, 149.47°E, 36.58°S, R. W. Taylor, 5 Jan. 1967, (ANIC, 42 001418); 4♀, 4 imm, Glenbog State Forest, Brown Mountain, 149.38°E, 36.58°S, S. Cameron, K. Domes, 8 Nov. 2007, (ANIC, 42 001195); 1♀, 1 imm, Rutherford Creek, Brown Mtn, 149.42°E, 36.60°S, S.R. Curtis, 15 Jan. 1969, (ANIC, 42 000702); 1♂, Brown Mtn, 149.38°E, 36.60°S, Taylor, Brooks, 9 Dec. 1967, (ANIC, 42 000711); 11♀, 6 imm, Brown Mountain, Rutherford Creek, 149.42°E, 36.60°S, M. Upton, 9 Jan. 1968, (ANIC, 42 000929); 1♀, Brown Mountain, 3200 ft, 149.38°E, 36.60°S, R.W. Taylor, 5 Jan. 1967, (ANIC, 42 000931); 1♂, Brown Mtn, 149.38°E, 36.60°S, R.W. Taylor and R. Bartell, 11 Apr. 1967, (ANIC, 42 001268); 1♂, Brown Mountain nr Nimitibel, 149.38°E, 36.60°S, R.W. Taylor and R. Bartell, 16 May 1970, (ANIC, 42 001452); 1♂, 1 imm, Brown Mountain, Rutherford Creek, 149.42°E, 36.60°S, R.W. Taylor, C. Brooks, 9 Dec. 1967, (ANIC, 42 001728); 1♀, Coolangubra State Forest, near Waratah Creek, 149.38°E, 37.02°S, G. A. Webb, 1 Jan. 1984, (AMS, KS 79647); 1♀, Coolangubra S. F, near Waratah Creek, 149.38°E, 37.02°S, G. A. Webb, Jan. 1984, (AMS, KS 112957); 1♂, Coolangubra State Forest, near Waratah Creek, 149.38°E, 37.02°S, G. A. Webb, Jan. 1992, (AMS, KS 115510); 1♂, Coolangubra State Forest, Waratah Creek Catchment, 149.38°E, 37.02°S, G. A. Webb, Jan. 1985, (AMS, KS 96714); 1♂, Bondi State Forest, woodlot 3, 149.15°E, 37.13°S, G. Gowing *et al.*, 29 Mar. 1981, (AMS, KS 108390); 1♂, Bondi State Forest, 149.20°E, 37.15°S, M. Žabka, 6 Apr. 1988, (AMS, KS 44646); 1♀, East Boyd State Forest, Anteaters Road, 149.76°E, 37.21°S, C. Lambkin, N. Starick, 6 Dec. 2004, (ANIC, 42 001294); 1♂, East Boyd State Forest, Anteaters Road, 149.72°E, 37.22°S, G. Gowing *et al.*, 17 Dec. 1980, (AMS, KS 116414); *Australian Capital Territory*: 1♀, Bendora Rd, Brindabella Range, ACT, 148.83°E, 35.42°S, R. W. Taylor and R. Bartell, 18 Mar. 1967, (ANIC, 42 001271); 1♀, Tidbinbilla Ra Gibraltar Falls 1km SW on Corin Dam Rd, 148.95°E, 35.47°S, M Gray, 1 Jan. 1978, (AMS, KS 19480); *Victoria*: 1♀, Cobb Hill, 14km SE Bonang, Conneric Ra, Vic, 148.83°E, 37.30°S, J. Lawrence, 24 Nov. 1985, (ANIC, 42 000917); 1♂, Bendoc Bonang SF, Bonang Hwy, 50km NNE Orbest, 148.12°E, 37.30°S, C. Lambkin, N. Starick, 11 Jan. 2005, (ANIC, 42 001295); 1♀, Rubicon State Forestxvvh, 145.92°E, 37.35°S, M. R. Gray, 7 Apr. 1978, (AMS, KS 45625); 1♂, 1♀, Cumberland Val. Reserve, Vic, 145.75°E, 37.47°S, R.W. Taylor and R. Bartell, 4 Nov. 1970, (ANIC, 42 001424); 1♂, 4♀, Central Highlands, The Big Culvert, 2.5kmENE of Mt Observation, 145.87°E, 37.57°S, G. Milledge, 21 Feb. 1996, (MVMA, K5482); 1♀, Central Highlands, The Big Culvert, 2.5kmENE of Mt Observation, 145.87°E, 37.57°S, G. Milledge, 21 Feb. 1996, (MVMA, K5483A); 2♂, 3♀, 1 imm, White Hill Track no. 2, c. 7 km S. of Acheron Way, c. 15 km ENE, of Healesville, 145.67°E, 37.62°S, D. Black, 4 Mar. 1990, (WAMP, T150442); 2♂, 10♀, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 26 Oct. 1995, (MVMA, K5468); 1♂, 6♀, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 28 Dec. 1995, (MVMA, K5469); 3♂, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 21 Feb. 1996, (MVMA, K5471A); 1♀, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 26 Oct. 1995, (MVMA, K5473); 7♂, 1♀, 2 imm, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 26 Oct. 1995, (MVMA, K5474); 2♂, 3♀, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 28 Dec. 1995, (MVMA, K5475); 1♂, 1♀, Central Highlands, 0.7km N of Acheron Gap, 145.73°E, 37.67°S, G. Milledge, 28 Dec. 1995, (MVMA, K5476); 1♀, Acheron Gap, 145.75°E, 37.67°S, D Bickel, 12 Feb. 1994, (AMS, KS 45016); 1♂, 1♀, Central Highlands, Acheron Gap, 6km NE Mt Donna Buang, 145.73°E, 37.68°S, G. Milledge, 23 Apr. 1996, (MVMA, K5477); 2♂, 2♀, Central Highlands, Acheron Gap, 6km NE Mt Donna Buang, 145.73°E, 37.68°S, G. Milledge, 23 Apr. 1996, (MVMA, K5479); 2♂, Clement Creek, 5km N Warburton, 145.70°E, 37.72°S, J.

Lawrence, T. Weir, (ANIC, 42 002859); 1♀, Central Highlands, Cement Creek Reserve, 2.2km ESE of Mt Donna Buang, 145.70°E, 37.72°S, G. Milledge, 29 Nov. 1994, (MVMA, K5484A); 9♂, 4♀, Central Highlands, Cement Creek Reserve, 2.2km ESE of Mt Donna Buang, 145.70°E, 37.72°S, G. Milledge, 21 Jan. 1995, (MVMA, K5486); 1♀, Sherbrook Forest Reserve, Vic, 145.37°E, 37.88°S, M.R. Gray, 10 Apr. 1978, (AMS, KS 45346); 1♂, 1♀, 1kmN of Kallista, 145.37°E, 37.88°S, D. Black, 11 Feb. 1990, (WAMP, T150436).

Diagnosis. The females of this species have the size, insemination duct glands and transverse clefts typical of this genus but can be distinguished from all other species by the absence of a median pocket in the epigyne (Fig. 65). Also, unlike all the other species, the atria have sclerotized guides placed in transverse/oblique positions. These are either very close to or overlap the anterior edge of the primary receptacles of the spermatheca. The latter consists of rounded spermathecal receptacles divided by transverse clefts. The secondary receptacles are larger than the primary receptacles. The receptacles are joined by a broad link. The fertilization duct arises near the posterior edge of the primary receptacle unlike the situation in the other species.

The males have a distinct small posterior lobe that is round, not tapering. This separates them from all species except *A. zabkai* n. sp. and *A. christineae* n. sp. However both of these species have large lateral lobes on the tegulum, while *A. taylora* n. com. has either no or only a slight lateral lobe.

The dorsal surface of the cephalothorax is often frosted in appearance, unlike the situation in the other species.

Description. Female: Body morphology: The total length ranges from 2 mm to 4 mm. The cephalothorax dorsal surface of the cephalothorax can be either smooth or frosted. The cephalothorax silhouette is high, with a steep rear edge. The clypeus is narrow and without a fringe., There a single, small, pointed retromarginal tooth. The palp can be white, or brown with either a white tip or patella. The abdomen is oval shaped. Leg morphology: L1 has a weak fringe and the patella is light brown, The build of L1 same as others and the spine strength strong, L4 is the longest leg. posterolateral receptacle largest. The atrium guides are 'C' shaped and sharply delineated. There is no median pocket. Dimensions: (Holotype) CL1.3, EFL 0.7, AL 1.7, CW 1.0, ALEW 1.0, AMEW 0.7. PEW 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).

Male: As for the female but for the following characters. Body morphology: The is no abdominal yellow subcutaneous patch. There are two promarginal teeth. Leg morphology: L1 is longest and only a little stronger than the others. Male Palp: The laterally directed, tibial apophysis is short. The palp is brown with a short, white, tapering tip. The posterolateral tegular lobe is small. The tegular shield does not cover the simple bulb and the embolus origin is in the distal corner. The thin embolus lies along the distal edge of the tegulum. Dimensions: (Paratype): CL 1.6, EFL 0.8, AL 1.6, CW 1.2, ALEW 1.1, AMEW 0.8, PEW 1.1, 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).

Remarks. As this previously described species (Richardson 2013) fits the definition of this genus rather than that of *Neon* (*Dicroneon*), it is here transferred to the new genus. For completeness, the species is re-described following the same pattern as used for the other, new, species. The original

description showed a secondary compartmental wall within the secondary receptacle not found in the new species (Fig. 34, Richardson 2013). Examination of further *A. taylori* **n. com.** specimens shows this to have been simply a very deep surface crease across the receptacle of the cleared specimen illustrated. New drawings have been made to match the other species.

Inconsistent distributions of within-species variation in this species, for example a frosted or unfrosted surface on the cephalothorax, may imply that two species are included here, though there was no coordinated pattern of this with either other variation or with distribution. No matching minor differences in the epigyne and the male palp could be discerned.

Distribution and Biology. Found in litter in rainforest from Victoria to northern New South Wales (Fig. 71), as a consequence, likely IUCN Red List Category LC. The BIOCLIM prediction includes Tasmania, where it has not been found, and very marginally, in eastern South Australia and southeastern Queensland. It seems to be replaced by *A. christineae* in Tasmania and the Otway region of south-west Victoria.

Australoneon wanlessi **n. sp.**

urn:lsid:zoobank.org:act:1CE54670-568E-43EC-BBE4-4CD2B49076C4

Figs 72–84

Etymology. Named in recognition of Dr F. R. Wanless (1940–2017) who described, and clarified the relationships of, many Australian genera and species (see Richardson and Żabka 2023) for list of relevant publications).

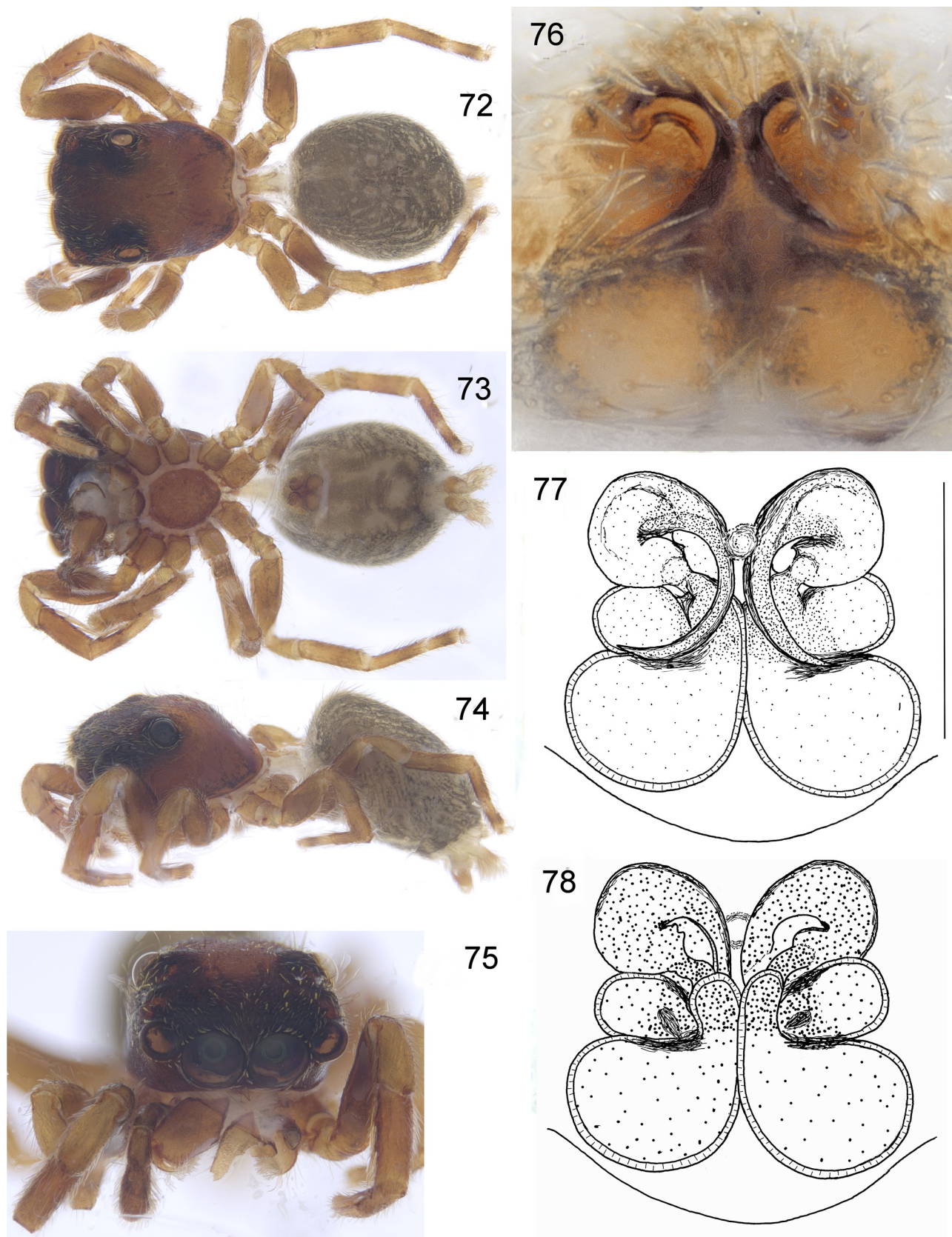
Type material. Holotype: 1♀, Otway Ranges, Aire Crossing Tk, 143.52°E, 38.70°S, G. Milledge, 31 Jan. 1995, (MVMA, K5355A); **Paratypes** 2♂, 3♀, as for Holotype (MVMA, K5355); 3♂, Otway Ranges, Beauchamp Falls, 143.60°E, 38.65°S, G. Milledge, 31 Jan. 1995, (MVMA, K5354); 1♀, Beauchamp Falls, 3.6km ESE of Beech Forest, Vic, 143.60°E, 38.65°S, K. Walker, C. McPhee, 24 Mar. 1992, (MVMA, K13534); 2♀, Beauchamp Falls, 3.6km ESE of Beech Forest, Vic, 143.60°E, 38.65°S, K. Walker, C. McPhee, 4 Dec. 1991, (MVMA, K13539); 2♀, Beauchamp Falls, 3.6km ESE of Beech Forest, Vic, 143.60°E, 38.65°S, K. Walker, T. New, 28 Jan. 1992, (MVMA, K13552); 1♂, 1♀, Beauchamp Falls, 3.6km ESE of Beech Forest, Vic, 143.60°E, 38.65°S, K. Walker, C. McPhee, 24 Mar. 1992, (MVMA, K13555); 3♀, Phillips Track, Youngs Creek Croosing, 0.6 km N Triplet Falls, Vic, 143.48°E, 38.67°S, G. Milledge, C. McPhee, 18 Mar. 1992, (MVMA, K13537); 1♂, Phillips Track, Youngs Creek Croosing, 0.6 km N Triplet Falls, Vic, 143.48°E, 38.67°S, G. Milledge, C. McPhee, K. Walker, T. New, 11 Dec. 1991, (MVMA, K13540); 2♂, Phillips Track, Youngs Creek Croosing, 0.6 km N Triplet Falls, Vic, 143.48°E, 38.67°S, K. Walker, C. McPhee, 4 Dec. 1991, (MVMA, K13541); 1♂, Phillips Track, 0.5km N of Triplet Falls, Vic, 143.48°E, 38.67°S, K. Walker, C. McPhee, 18 Mar. 1992, (MVMA, K13542); 2♂, 2♀, Phillips Track, Youngs Creek Croosing, 0.6 km N Triplet Falls, Vic, 143.48°E, 38.67°S, K. Walker, C. McPhee, 24 Mar. 1992, (MVMA, K13548); 1♂, Phillips Track, Youngs Creek Croosing, 0.6 km N Triplet Falls, Vic, 143.48°E, 38.67°S,

G. Milledge, C. McPhee, 18 Mar. 1992, (MVMA, K13553); 1♂, Otway Ranges, Young Creek Rd, Vic, 143.48°E, 38.67°S, G. Milledge, 11 Apr. 1995, (MVMA, K5361); 1♂, Otway Ranges, Young Creek Rd, Vic, 143.48°E, 38.67°S, G. Milledge, 11 Apr. 1995, (MVMA, K5360); 4♂, Otway Ranges, Aire Crossing Tk, 143.52°E, 38.70°S, G. Milledge, 11 Apr. 1996, (MVMA, K5356); 3♂, 3♀, Aire Crossing Track, 0.5km N of Aire River Crossing, Vic, 143.48°E, 38.70°S, G. Milledge, 31 Jan. 1995, (MVMA, K5357); 1♀, Maits Rest, 10km W of Apollo Bay, Vic, 143.57°E, 38.75°S, G. Milledge, C. McPhee, 20 Feb. 1992, (MVMA, K13533); 1♀, Maits Rest, 10km W of Apollo Bay, Vic, 143.57°E, 38.75°S, G. Milledge, C. McPhee, K. Walker, T. New, 21 Jan. 1992, (MVMA, K13536); 1♂, 1♀, Maits Rest, 10km W of Apollo Bay, Vic, 143.57°E, 38.75°S, K. Walker, C. McPhee, 24 Mar. 1992, (MVMA, K13538); 1♀, Maits Rest, 10km W of Apollo Bay, Vic, 143.57°E, 38.75°S, G. Milledge, P. Lillywhite, C. McPhee, B. van Praagh, 11 Dec. 1991, (MVMA, K13545); 1♀, Maits Rest, 10km W of Apollo Bay, Vic, 143.57°E, 38.75°S, K. Walker, C. McPhee, 4 Dec. 1991, (MVMA, K13549).

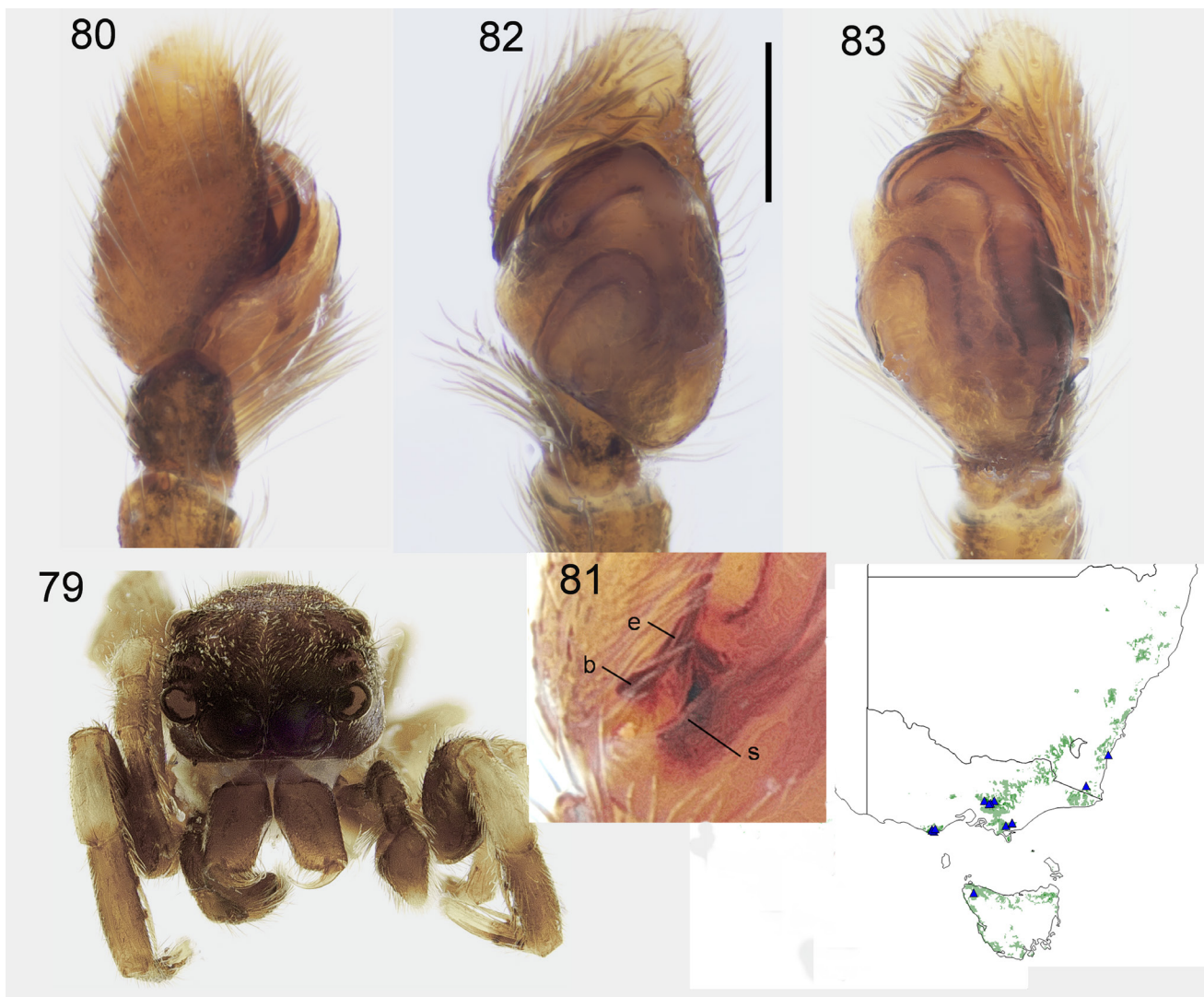
Other material examined: *New South Wales:* 1♀, Ewingar Rd, Ewingar SF, 152.42°E 29.13°S, M. Gray G. Cassis, 18 Feb. 1993, (AMS, KS 41948); 1♀, Rosedale, 150.23°E, 35.82°S, R.J. Moran, 20 Nov. 1983, (ANIC, 42 000983); 1♀, Coolangubra State Forest, near Waratah Creek, 149.40°E, 37.02°S, G.A. Webb, Jan. 1985, (AMS, KS 96717); *Victoria:* 2♀, Central Ranges, The Big Culvert, 2.5 km ENE of Mt Observation, 1♂, 2♀, G. Milledge, 26 Oct. 1995, (MVMA, K5431); 1 imm, Central Highlands, Acheron Gap, 6km NE Mt Donna Buang, 145.73°E, 37.68°S, G. Milledge, 23 Apr. 1996, (MVMA, K5478); 2♂, 2♀, 3 imm, near summit of Mt Donna Buang, c. 87 km NNW. of Warburton, 145.67°E, 37.70°S, D. Black, 27 May 1990, (WAMP, T150438); 1♀, Strzelecki Ranges, Tarra-ulga N.P., Bulga Picnic Area, 146.57°E, 38.42°S, G. Milledge, 7 May 1996, (MVMA, K5537); 1♂, Strzelecki Ranges, Tarra-Bulga N.P., 146.53°E, 38.45°S, G. Milledge, 5 Mar. 1996, (MVMA, K5536); 1♂, Strzelecki Ranges, Tarra-Bulga N.P., 146.53°E, 38.45°S, G. Milledge, 14 Sep. 1995, (MVMA, K5538); 1♂, 1♀, Strzelecki Ranges, Tarra-Bulga N.P., 146.53°E, 38.45°S, G. Milledge, 14 Sep. 1995, (MVMA, K5541); 1♀, Strzelecki Ranges, Tarra-Bulga N.P., 146.53°E, 38.45°S, G. Milledge, 5 Mar. 1996, (MVMA, K5542); 1♀, Strzelecki Ranges, Gunyah-Toora Rd, 2km SSW Gunyah Gunyah, 146.32°E, 38.53°S, G. Milledge, 10 Jan. 1996, (MVMA, K5534 *Tasmania:* 1♀, South bank of Arthur River, road in from Trowutta, 145.08°E, 41.10°S, J.L. Hickman, 10 Dec. 1973, (AMS, KS 111492); 2♀, W bank of Howell Gorge picnic area, 41.27°S, 146.77°E, J. L. Hickman, (AMS KS 111869); 2♀, Dip River Falls, 41.12°S, 145.37°E, 2 Sept. 1973, (AMS KS 66035).

Diagnosis. The females of this species can be distinguished from all but *A. keyserlingi* **n. sp.** by the presence of a pocket in the epigyne that lies between the atria. It can be distinguished from *A. keyserlingi* **n. sp.** by the small size of the pocket and close placement of the guides in *A. wanlessi* **n. sp.** (Figs 77, 78) compared to the large pocket and widely separated guides in *A. keyserlingi* **n. sp.** (Fig. 37). Also, unlike all the other species, the atria have strongly sclerotized guides with a 'C' shape that pass backwards over the primary receptacles as far as the cleft in the spermathecae. The latter consists of rounded spermathecal receptacles divided by a cleft that may be transverse or slightly oblique. The secondary receptacle is much larger than the primary receptacle. The receptacles are joined by a link of medium width. The fertilization duct arises near the center of the primary receptacle, as in *A. zabkai* **n. sp.** and *A. keyserlingi* **n. sp.**

The *A. wanlessi* **n. sp.** males can be distinguished from the other species except, *A. keyserlingi* **n. sp.** by the absence of an obvious posterior lobe on the tegulum (Fig. 82). *Australoneon wanlessi* **n. sp.** are smaller (TL 2.3–3.4) than



Figures 72–78. *Australoneon wanlessi* n. sp. Female holotype (K5355): 72 dorsal, 73 ventral, 74 lateral, 75 anterior views; 76 external epigyne; semi-diagrammatic views of a dissected and cleared epigyne 77 dorsal, 78 ventral. Scale: 0.2 mm.



Figures 79–84. *Australoneon wanlessi* n. sp. Male paratype (K5355): 79 anterior view; palp: 80 retrolateral, 81 bulb and surrounding area (e. embolus, b. bulb, s. shield). 82 ventral, 83 prolateral; 84 map showing known and predicted distributions. Scale: 0.2 mm.

A. keyserlingi n. sp. (TL 3.6–4.1). The paturon length is $<3\times$ its width in *A. wanlessi* n. sp. and ‘near vertical’, but $>3\times$ and ‘projecting forwards’ in *A. keyserlingi* n. sp. Otherwise, the males of these species can be difficult to distinguish.

Description. *Female:* Body morphology: This species has a total length of 2 mm or 3 mm and is much darker than the other species. The cephalothorax dorsal surface is frosted. The cephalothorax silhouette is high, cephalothorax rear edge steep. The clypeus is narrow and the clypeal fringe absent. There is one small pointed retromarginal tooth. There are two promarginal teeth. The palp is brown with a white tip. The abdomen is oval shaped and there is lacy patterning over the abdominal surface. Leg morphology: L4 is the longest leg. L1 is of a similar build to the other legs. It has strong tibial spines with sparse, light fringing. Epigyne: The cleft in the spermatheca is transverse and the secondary receptacle largest. The atrium guides have a sharply delineated ‘C’ shape. A median pocket is found between the atria. Dimensions: (Holotype): CL 1.3, EFL 0.55, AL 1.25, CW 0.95, ALEW 0.6, AMEW 0.95, PEW 0.9, L1 2.15 (0.75+0.5+0.75+0.33+0.33), L2 1.75 (0.6+0.25+0.4+

0.25+0.25), L3 2.0 (0.6+0.3+0.3+0.45+0.35), L4 2.3 (0.7+0.25+0.5+0.5+0.35).

Male: As for the female but for the following characters. Body morphology: There is a yellow subcutaneous patch on the dorsal abdomen. There is no paturon spike. Leg morphology: L1 is longest. Male Palp: The short, blunt tibial apophysis moves in a lateral direction. The palp is brown with a short, tapering, light tip. Proximal and posterotegular lobes are absent. The tegular shield partially or entirely covers the simple bulb. The origin of the embolus is in the distal corner. The thin embolus curves distally away from the tegulum. Dimensions: (Paratype): CL 1.35, EFL 0.5, AL 1.1, CW 1.05, ALEW 0.5, AMEW 0.95, PEW 0.95, L1 2.8 (0.75+0.5+0.8+0.4+0.35), L2 1.85 (0.5+0.35+0.45+0.25+0.25), L3 2.5 (0.65+0.5+0.65+0.45+0.25), L4 2.35 (0.75+0.3+0.4+0.5+0.4).

Distribution and Biology. Found in litter and moss in rainforest and *Nothofagus* forest from northwest Tasmania to southern New South Wales (Fig. 84). As a consequence, likely IUCN Red List Category LC. The limited number of localities allows only a very low value prediction of

distribution.

Discussion

Though a large collection of neonine specimens from across Australia were examined, the new genus and included species were all collected from south-eastern Australia (Fig. 6). A BIOCLIM prediction of the distribution of *Australoneon n. gen.* specimens shows (Fig. 6) that it is to be found in higher rainfall areas of south-eastern Australia, and, occasionally, on the inland side of the Great Dividing Range in New South Wales, the Australian Capital Territory and Victoria as well as in Tasmania. It is also found just over the border in Queensland in the Macpherson-Macleay Overlap area between temperate and subtropical regions (Burbidge, 1960). However, no specimens have been collected over the rest of Australia. It was also predicted, at low probability, to be present in small areas of South Australia (Fig. 6) and the south coast of western Australia (not shown). A further difference between *Australoneon* and *Papuaneon* relates to the sex ratios in the two sample sets. Though most of the material was collected using the same methods at the same localities, times and in the same microhabitats (i.e., as part of diversity surveys), only 16 of 296 *Papuaneon* samples contained males, while 199 tubes of 428 samples contained *Australoneon n. gen.* males.

Inspection of Fig. 6 shows, in biogeographical terms (Byrne *et al.*, 2011, Richardson 2020), that *Australoneon n. gen.* is 'Mesic' in distribution. It has been found in southeast Australia from Tasmania to the Macleay–MacPherson overlap zone (Burbidge 1960) between subtropical and temperate zones near the Queensland–New South Wales border. The genus has not been found in the wetter parts of South Australia or Western Australia. The prediction also shows that it is not expected to be present in the low rainfall areas of eastern central Tasmania, similar to the situation in inland mainland Australia. It is also not predicted from higher elevations in the Australian Alps in New South Wales and Victoria. However, little collecting has been done in what is an environmentally extreme area and so data points are absent from the training set. As a consequence, the predicted absence may be an artifact. The range of *Australoneon n. gen.* differs from that of *Papuaneon* whose range also includes southeastern Australia but continues further northward up the east coast of Queensland and on into New Guinea (Maddison, 2016). It also differs from that of *Neon* which is found right across Australia including the central arid, and northern monsoonal, areas.

Within southeast Australia, most *Australoneon* species are widespread and often sympatric in distribution. This is unlike the pattern observed with the related *Papuaneon* species where, except for one widespread species, they reside in a series of apparently allopatric ranges spread from Papua New Guinea to Tasmania and South Australia (Maddison, 2016; Richardson, 2022). The nature of the ecological factors separating *Australoneon n. gen.* species is unknown, however differences in overall size, the size and shape of the paturons and fangs, and the size and robustness of the L1 and its tibial spines, may point, in some cases, to differences in prey preference.

Most Australian endemic genera evolved during the late Oligocene/early Miocene, (Bodner & Maddison, 2012). One

might expect *Australoneon n. gen.* to be of a similar age and for it to range more widely across Australia; a pattern found in the related sub-genus, *Neon* (*Dicroneon*), which is found in the hotter drier, 'Sclerophyllous', and northern, 'Monsoonal', Regions of Australia as well as in the 'Mesic' Region. The *Australoneon n. gen.* pattern is similar to that found in many other endemic Australian genera with 'Mesic' distributions (Richardson, 2020). However, unlike other 'Mesic' genera, its preferred habitat is *Nothofagus* forest, with occasional specimens collected in other types of rainforest. In Australia, endemic genera make more effective use of the range of temperate mesic environments than do more recent arrivals from the north. Invading genera already adapted to tropic, mesic, environments have been able to successfully gain a foothold in these northern environments, but they have been far less successful in extending into the temperate; mesic environments (Richardson 2020) inhabited by *Australoneon n. gen.* Endemic genera in 'Mesic' biomes do seem to be resistant to such invasions, as predicted by Byrne *et al.* (2011); perhaps because the invaders are not preadapted to such areas. Their inability to successfully invade these habitats means that they do not have the opportunity to evolve so as to effectively compete with the already adapted, ecologically equivalent, endemic genera already there.

The date of origin of the neonines was estimated by Bodner and Maddison (2012) as 30 Mya, Interpolation of the molecular tree in Maddison (2016) with Bodner and Maddison (2012) places the divergence of *Neon* and *Papuaneon* at about 20–25 Mya in the early, wetter, Miocene, at about the same time as the evolution of the other endemic salticid genera within Australia (Richardson, 2020; Richardson *et al.*, 2013). *Australoneon n. gen.* could be predicted to have arisen at about the same time. Given the preference of both *Papuaneon* and *Australoneon n. gen.* for high rainfall closed forest, perhaps the neonines, like the euophryines (Zhang & Maddison, 2013), have Gondwanan origins in the cold, wet *Nothofagus* forests of the southern continents of the time. Unlike euophryines however, neonines have not been reported from these forests in South America.

All the many Australian neonine species (Richardson, unpubl.) are found in litter with only occasional single records from tree trunks or foliage. They are very common and constitute a significant part of the spider fauna found in litter, *Australoneon n. gen.* fits the pattern of microhabitat use by this tribe in Australia.

All the species are widespread with wide north-south geographical ranges probably protecting them from direct extinction due to changes in temperature range. However, they are subject to severe wildfire as these species are only known from areas of Australia that are subject to severe bushfires, for example, hot wildfires destroyed all the litter as well as the tree canopies in 78,000 sq. km of eastern Australian forest in 2019/20. However, because they are so widespread, they can be considered of least concern (LC) using the IUCN criteria.

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