THE SPIDER FAUNA (ARANEIDA) OF DECIDUOUS ORCHARDS IN THE AUSTRALIAN CAPITAL TERRITORY

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Summary

A total of 38 species of spiders were collected as suspected predators of the light brown apple moth, *Epiphyas postvittana* (Walk.), in the Australian Capital Territory. In all, 16 of these are re-described, and three are described as new species, while seven new synonyms are proposed: Theridiidae; *Achaearanea veruculata* (Urquhart). Araneidae *Arachnura feredayi* (Koch); *Cyclosa fuliginata* (Koch), comb. nov.; *Araneus transmarinus* (Keyserling) = *A. viridis* (Keyserling), syn. nov. = *A. thyridotus* (Thorell), syn. nov.; *Araneus heroine* (Koch) = *A. annulatus* (Keyserling), syn. nov.; *Araneus psittacinus* (Keyserling); *Araneus ginninderranus*, sp. nov.; *Phonognatha graeffei* (Keyserling); *Phonognatha melania* (Koch), comb. nov.; *Gasteracantha minax* Thorell. Tetragnathidae; *Tetragnatha quadridens*, sp. nov. Clubionidae; *Chiracanthium gracile* Koch; *Chiracanthium mordax* Koch = *C. diversum* Koch, syn. nov. = *C. gilvum* Koch, syn. nov.; *Clubiona canberrana*, sp. nov. Thomisidae; *Diaea cruentata* (Koch), comb. nov. = *D. elegans* Koch, syn. nov.; *Diaea pilula* (Koch) = *Xysticus daemeli* Koch, syn. nov.; *Diaea inornata* (Koch), comb. nov. Amaurobiidae; *Badumna inornata* (Koch); *Ixeuticus candidus* (Koch). The genus *Singotypa* Simon, 1894 is proposed as a junior synonym of *Phonognatha* Simon, 1894.

INTRODUCTION

Spiders have attracted attention as predators of crop pests in several countries during the past decade. Most of the published work has dealt with the species compositions and densities of populations in deciduous orchards (Chant 1956; Dondale 1956, 1958; LeRoux 1960; Specht and Dondale 1960; Hukusima 1961; Hukusima and Kondô 1963; Legner and Oatman 1964). Kayashima (1960) made initial attempts to increase the spider population in cole crops to enhance pest control, and Putman (1965) demonstrated the use of paper chromatography in detection of peach mite protein in the spider's gut.

The spiders discussed here were collected during a study of predation on the light brown apple moth, *Epiphyas postvittana* (Walk.), by Mr. C. R. MacLellan in the Australian Capital Territory. The paper provides up to date names and identification characters for 19 species with some or all of the following points of interest: (1) species believed to prey extensively on *E. postvittana*; (2) species found in unusual abundance in orchards and on associated plants; (3) species of special taxonomic interest. A further 19 species, taken only rarely during the study, are listed by name only.

Identification of Australian spiders is generally acknowledged to be a difficult task, but a number of research aids have become available in recent years that greatly

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facilitate such work. The large type collection of taxa described by Koch (1866, 1867, 1871–81) and Keyserling (1865, 1881–90) in the Zoologisches Museum, Hamburg, has now been restored to useful condition and catalogued by Rack (1961). Araneologists also have two world catalogues at their disposal, namely those of Bonnet (1945–61) and Roewer (1942–54). Finally, a guide to Australian spiders has appeared (Main 1964), in which keys and definitions are provided for most of the families and for many of the common genera and species. Main's book also contains some natural history information and a glossary of anatomical terms.

The classification used here is that of Simon (1892–1903) which was modified by Petrunkevitch (1928, 1933). A few categories are further modified in keeping with modern practice, e.g. the family name Attidae is replaced by Salticidae, and several terms borrowed earlier from insect anatomy such as head, thorax, and maxilla are replaced by the arachnological ones favoured by Snodgrass (1948, 1952). The term spine, as usually applied to the erectile leg setae of spiders, is replaced by Schick's (1965) term spiniform seta, and the term clypeus is rejected as referring to an anterior part of the arachnid carapace and replaced by the term front.

The bulk of the material upon which the conclusions are based is deposited in the Australian National Insect Collection, Canberra (ANIC), or the Canadian National Collection of Insects in Ottawa (CNC). Many of the types were seen in the Zoologisches Museum, Hamburg (ZMH) or the British Museum (Natural History), London (BM). Some identified reference specimens have been deposited in the Museum of Comparative Zoology, Harvard University (MCZ), the American Museum of Natural History, New York (AMNH), and the Australian Museum, Sydney (AM).

Taxonomy

Family **THERIDIIDAE**

Achaearanea veruculata (Urquhart)

Figs. 1*A*–1*F*

Theridion veruculatum Urquhart, 1885, p. 188, pl. 7, fig. 1. Female syntype from Te Karaka, Auckland, N.Z. in the Otago Museum, Dunedin, N.Z. (Merrett and Rowe 1961, p. 89).

Male

One specimen from Canberra measured 2·1 mm in total length, with carapace 1·0 mm long and 0·9 mm wide. Carapace elongate ovoid in dorsal view, slightly convex over top in lateral view; dorsal groove a shallow, circular depression; glabrous except for several setae in eye area and along midline to dorsal groove; brownish yellow to brownish orange, mottled with grey along sides and behind eye area. Median ocular area approximately as long as wide, slightly wider in front than behind; anterior row of eyes recurved; posterior row straight; anterior medians largest; laterals of each side contiguous. Legs yellow-orange, with segments palest basally and darkest apically; I longest, III shortest; tibiae with 2 dorsal spiniforms; patellae with 1 dorsal spiniform. Abdomen nearly as high as long, without dorsal tubercle; heart mark grey to black, margined with white; dorsum with several thin,

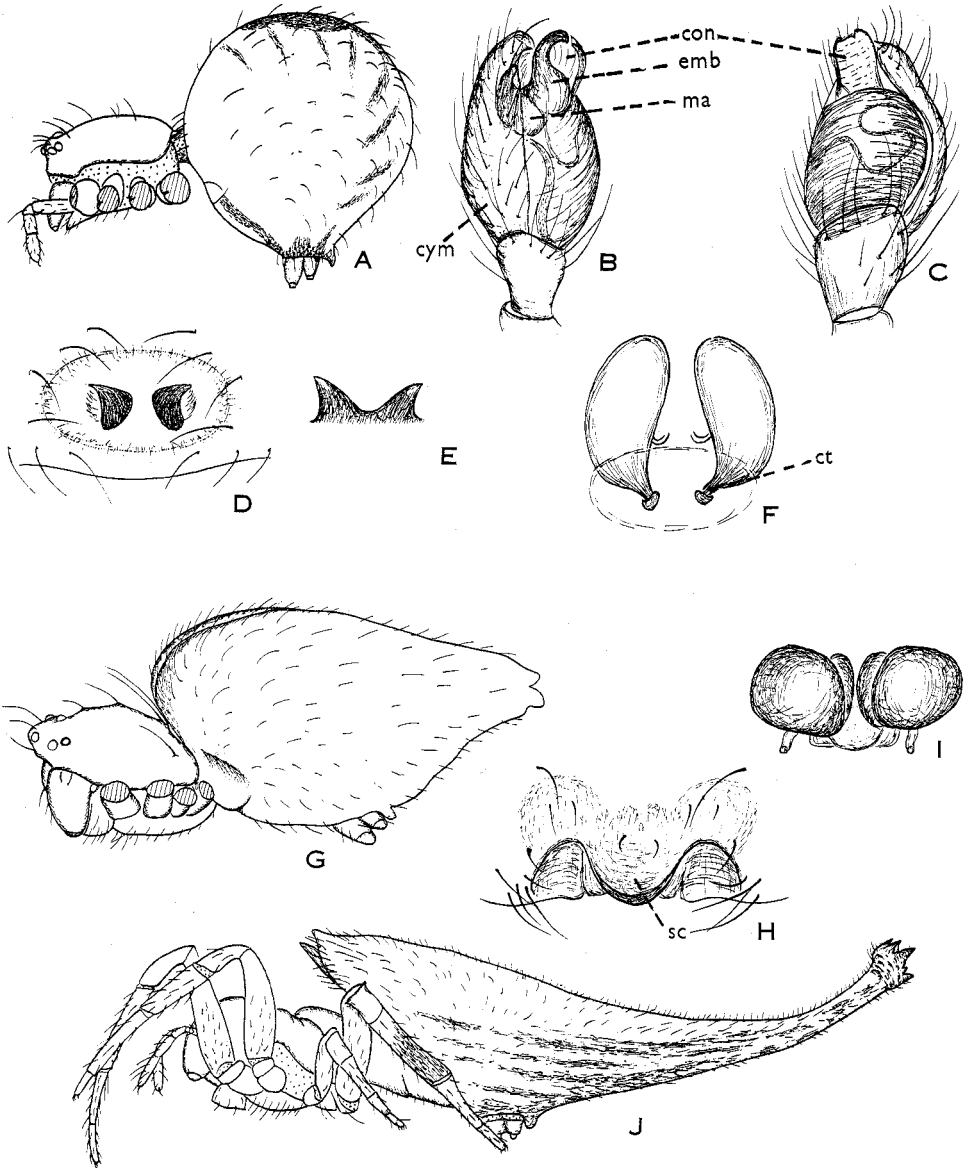

Fig. 1.—*A–F*, *Achaearanea veruculata* (Urquhart): *A*, female, lateral; *B*, *C*, male palpus; *B*, ventral; *C*, retrolateral; *D*, *E*, epigynum; *D*, ventral; *E*, posteroventral; *F*, spermathecae. *G–J*, *Arachnura feredayi* (Koch): *G*, early-instar spiderling; *H*, epigynum; *I*, spermathecae; *J*, female. Key to lettering used in Figures 1–9: *con*, conductor; *cp*, cymbial prong; *ct*, copulatory tube; *cym*, cymbium; *emb*, embolus; *h*, hood; *ma*, median apophysis; *ms*, median septum; *ra*, retrolateral apophysis; *sc*, scape; *ta*, terminal apophysis; *teg*, tegulum; *tib*, tibia; *va*, ventral apophysis.

black chevrons, which are parted at midline by white longitudinal band; sides sometimes partly reddish; venter with conspicuous white spot flanked by pair of black longitudinal bands that merge at spinnerets. Spinnerets encircled by dark band, which is flanked by pair of white spots. Chelicerae orange-brown, with 2 small teeth on prolateral margin of fang furrow, none on retrolateral margin; venom glands extending three-fifths length of cephalothorax. Sternum brownish to yellowish, paler mesally; convex and hairy. Cymbium of palpus slender; embolus short, broad at base, smoothly hooked apically; conductor rather thin, hollowed on prolateral side, terminating in 2 blunt points; median apophysis angular, almost entirely hidden by cymbium, broadly united at base with embolus (Figs. 1*B*, 1*C*).

Female

A total of 10 specimens from Canberra measured 2·4–3·0 mm (mean 2·7 mm) in total length, with carapace 1·0–1·1 mm long and 0·8–1·0 mm wide, the outline as shown in Figure 1*A*. Carapace, as compared with that of the male is relatively wide behind, less convex at sides, more constricted toward front. Structure and colour otherwise essentially as in the male. Epigynum composed of paired, dark, pointed projections set in shallow, elliptical depression with sloping sides and without rim (Figs. 1*D*, 1*E*). Spermathecae kidney-shaped, situated close to midline (Fig. 1*F*); copulatory tubes short.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: from apple, plum, quince, *Acacia*, *Veronica*, *Euonymus*, *Pyracantha*, 18.xii.1962–7.iii.1963, 8♂, 8♀ (CNC); 2♂, 2♀ (MCZ); 2♂, 2♀ (AMNH); 2♂, 2♀ (AM); 6.v.1964, 27 specimens (ANIC). ENGLAND: Tresco, Isles of Scilly, 1♂, 1♀ (BM).

Comments

Achaearanea veruculata is apparently one of the most abundant plant-dwelling spiders in the Australian Capital Territory, occurring on many wild plants as well as on apple and other deciduous fruit trees. This is the first record of the species in Australia, though it has been known for some time in New Zealand, the country from which it was first described (Urquhart 1885). Recently, *A. veruculata* was discovered on the Scilly Isles in England, where it was almost certainly introduced with plant materials (Merrett and Rowe 1961).

The species is similar in general appearance to the cosmopolitan *A. acoreensis* (Berland), recently described by Levi (1955, p. 20) as *A. geochares*, a name later reduced to synonymy (Levi 1963, p. 220). *Achaearanea veruculata* differs from *A. acoreensis* by the former's dark, angular heart mark, white venter, separate epigynal openings, and distinctive male embolus and conductor.

Family **ARANEIDAE**

ARACHNURA FEREDAYI (Koch)

Figs. 1*G*–1*J*

Epeira feredayi Koch, 1872, p. 122, plate 11, figs. 2, 2*a*. Female type from Canterbury, N.Z., not located in Koch collections in the Zoologisches Museum, Hamburg, or the British Museum (Natural History), or in the O. Picard-Cambridge collection at Oxford. Species identified from original description and illustrations.

Arachnura feredayi Simon, 1895, p. 777.

Male

Unknown.

Female

A total of 10 specimens from Canberra measured 10·0–15·5 mm (mean 13·5 mm) in total length, with carapace 2·0–3·0 mm (mean 2·7 mm) long and 1·9–2·7 mm (mean 2·5 mm) wide. Carapace with grey lateral areas and median stripe; slightly longer than wide, widest at level of coxa II; generally flattened, but highest at two points, namely, immediately behind posterior median eyes and behind dorsal groove; dorsal groove transverse, its ends turned posterolaterally. Eyes small, approximately equal in size; anterior medians on small prominence; median ocular area longer than wide, its sides nearly parallel; laterals of each side almost in contact with each other; both rows recurved. Legs pale yellowish, with brown areas at tips of basitarsi and distitarsi, sometimes with greyish longitudinal bands; tibia IV dark brown in distal two-thirds; with weak spiniforms; hair bases dark; I, II, and IV approximately equal in length and thickness, III distinctly shorter (Fig. 1*J*). Abdomen cleft at midline in front, the two divisions drawn out like nipples; elongated behind like a tail, terminating in dark, sclerotized, and hairy piece bearing 5 short, tapered prominences of which the middle one is largest (Fig. 1*J*); off-white to pale yellow dorsally, mottled or lined with dirty yellow below; with coat of fine, pale, erect hair. Chelicerae convex in front, with boss; prolateral margin of fang furrow with 3 teeth, retrolateral margin with 3. Sternum fused to lower lip, set with several black bristles which have dark spots at bases and are longest in anterior fourth of sternum. Epigynum with short, broad, concave scape that is flanked by pair of semi-membranous areas (Fig. 1*H*). Spermathecae convex in dorsal view, ovoid to nearly conical in outline, with relatively smooth surfaces; set apart at midline (Fig. 1*I*).

Immature Stages

In very young specimens (approximately 1·5 mm long), spinnerets situated at approximately one-half length of abdomen, the latter only shallowly cleft in front, rather flat above, and with the terminal prominences poorly defined (Fig. 1*G*). Carapace convex above, showing no trace of dorsal groove; bearing several long, pale setae.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, *Acacia*, *Pyracantha*, pine, apricot, clover, 8.iii–15.v.1963, 8♀ (CNC); 2♀ (MCZ); 2♀ (AMNH); 2♀ (AM); 2♀ (ANIC). NEW SOUTH WALES: Sydney, from *Acacia*, 3.ii.1963, 1♀ (CNC). Wilton, from apple, 28.ii.1963, 1♀ (CNC). TASMANIA: Launceston, 3♀ (BM).

Comments

Koch (1872) described two species of *Epeira* that were subsequently transferred to the genus *Arachnura* Vinson. These were *A. feredayi* from Canterbury, N.Z., and *A. higginsi* from Darling Downs, Qld. Koch stated that the two species are extremely similar but his illustrations clearly show *feredayi* to have the middle prominence at the abdominal tip only slightly longer than the other four (Koch 1872, plate 11, fig. 2), while *higginsi* has the middle prominence distinctly larger than the others (Koch 1872, plate 11, figs. 1, 1*b*; Simon 1895, pp. 775–7; McKeown 1952). Main (1964), however, identifies the small-prominence form as *higginsi*. The curvature of the anterior

nipple-like prominences was mentioned by Koch as a separating character for the two species, but this appears rather to have been an artifact attributable to the breaking of his vials in shipment from the donor, O. Picard-Cambridge, which possibly caused the specimens to reach Koch in a dried condition. The Canberra material contains specimens with both incurved and outcurved prominences, yet on all other available characters is identifiable as *A. feredayi*. In recent years specimens of both species have been collected in Australia [in the British Museum (Natural History) there are several females and immatures of *A. higginsi* from Albany, W.A.]. Only *feredayi* was represented in the Australian Capital Territory orchard collection.

McKeown (1952) mentions a communal species of *Arachnura* in Tasmania, but this would seem to be neither *feredayi* nor *higginsi* on present knowledge. A revision of the genus, which should take the males into account, is needed. Males are tiny and little known at present. Rainbow (1909, p. 218) defined the genus, but apparently recognized only *A. higginsi* in Australia.

CYCLOSA FULIGINATA (Koch), comb. nov.
Figs. 3*G*–3*J*

Epeira fuliginata Koch, 1872, p. 106, plate 8, fig. 7. Female holotype from Sydney, N.S.W., in the Naturhistorisches Museum, Vienna, labelled "Sammlung Reimoser, *Aranea fuliginata* (Koch), Australien: Sydney".

Araneus fuliginatus Simon, 1895, p. 804.

Male

A total of 11 specimens from Canberra measured 3·5–5·0 mm (mean 4·3 mm) in total length. Carapace brownish, paler anteriorly, with coat of shiny, recumbent hair; in dorsal view, moderately convex at sides, strongly narrowed at level of coxa I; in lateral view, highest at dorsal groove, sloping gently to posterior eye row; dorsal groove shallow. Both eye rows strongly recurved; individual eyes encircled by black rings; median ocular area situated on rounded prominence; lateral eyes not situated on prominence. Legs slender, brownish to yellowish, paler at bases of femora and on coxae; distal segments with indistinct dark rings at tips; coxa I with ventral spur, femur II with prolateral ridge at base; spiniforms long, slender, erect, longest on tibiae (except leg II). Abdomen broadly oval, lacking distinct prominences though rather swollen behind; dorsum with long, pale, erect setae and with grey folium with serrated lateral margins on off-white background; venter nearly black mesally, with pair of white lateral bands that widen posteriorly. Palpal patella with 1 dorsal spiniform; median apophysis curved and thick, bluntly pointed at tip, bearing 1 tooth at middle (Fig. 3*G*); terminal apophysis thin and flat, lacking pointed tip; apparent embolus blade-like, lacking filament.

Female

A total of 20 specimens from Canberra measured 5·0–11·0 mm (mean 7·9 mm) in total length. Carapace reddish brown, widest behind middle, only slightly narrowed at level of coxa I, gently rounded over top from dorsal groove to posterior eye row; otherwise as in male. Legs reddish brown to yellowish with relatively short, stout, dark spiniforms; otherwise as in male. Abdomen oval in dorsal view, with low,

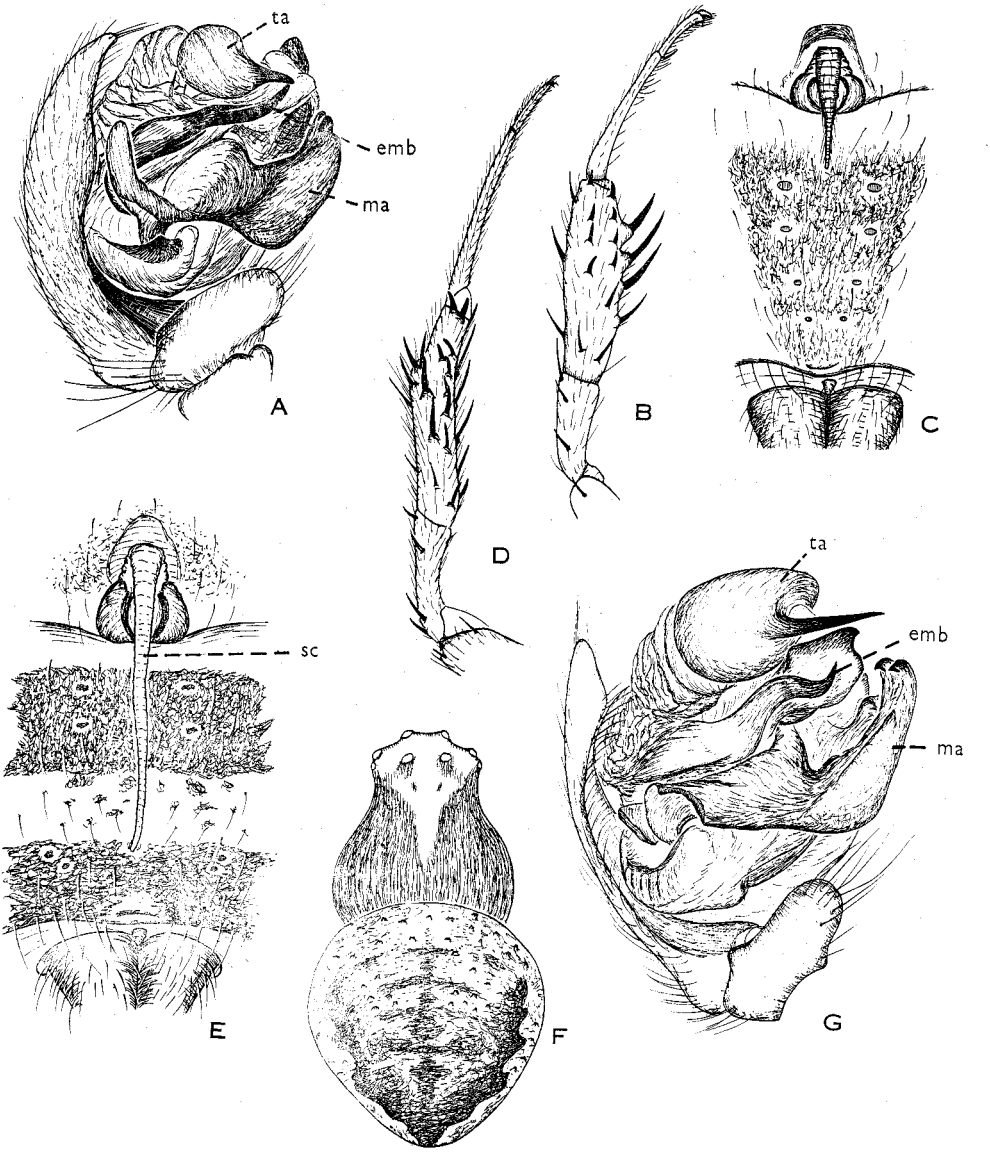

Fig. 2.—*A–C*, *Araneus heroine* (Koch): *A*, male palpus, ventral; *B*, male leg II, prolateral; *C*, epigynum and venter of female. *D–G*, *Araneus transmarinus* (Keyserling): *D*, male leg II, prolateral; *E*, epigynum and venter of female; *F*, early-instar spiderling; *G*, male palpus, ventral.

angular posterior prominence at midline; rarely with narrow, grey median band flanked by pair of off-white bands rather than grey folium; otherwise as in male. Epigynum with short, tapered scape arising from almost flat plate containing paired openings (Figs. 3*H*, 3*I*).

Immature Stages

Newly hatched individuals (Fig. 3*J*) with black and brownish yellow carapace, pale legs, smooth abdomen with nearly black median pattern that extends around tip and anteriorly over venter; dark area of venter flanked by pair of distinct white spots; sternum black. At approximately 2·5 mm total length, immature males with slightly swollen palpi, and both sexes with brownish carapace, the abdominal patterns resembling that of adult; immature female carapace rather squarish in front, often with slight angularity at posterior end of abdomen.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, *Acacia*, clover, *Pyracantha*, 9.ix.1962–9.iv.1963, 5♂, 7♀ (CNC); 1♂, 2♀ (MCZ); 1♂, 2♀ (AMNH); 1♂, 2♀ (AM); 3♂, 7♀, 2 imm. (ANIC). NEW SOUTH WALES: Sydney, 3♀ (ZMH). VICTORIA: Tyabb, from apple, 21.iv.1964, 1 imm. (ANIC); from capeweed, 12.viii.1964, 1 imm. (ANIC).

Comments

Cyclosa fuliginata occurred in large numbers in the Australian Capital Territory orchard collections. Newly hatched individuals resemble the same stage of *Araneus transmarinus*, which are found in the orchard at about the same time; points of difference between them are noted under *A. transmarinus*. *Cyclosa fuliginata* has usually been placed in the large genus *Araneus* (= *Epeira*). It is now transferred to the genus *Cyclosa* for the following reasons: (1) The posterior abdominal prominence is similar to that found in *C. conica* (Pallas), the type species of the genus, being angular, relatively simple, and more prominent in females than in males. (2) The carapace of the male is low and is broadly convex at the sides but strongly narrowed at the level of coxa I, as in other species of *Cyclosa*. (3) The eye arrangement is that of *Cyclosa*. (4) The body colours are like those of *Cyclosa*. (5) The male and female genitalia, including the enlarged tegulum, slender and concave median apophysis, and short, pointed scape, resemble *Cyclosa* more than *Araneus*. The species is, however, larger than most species of *Cyclosa*, and the carapace of the female is hairy as well as wide and angular in front, thus bearing a resemblance to most species of *Araneus* rather than to those of *Cyclosa*. Further comparative work on the problem is desirable.

ARANEUS TRANSMARINUS (Keyserling)

Figs. 2*D*–2*G*

Epeira transmarina Keyserling, 1865, p. 814, plate 18, figs. 15 and 16. Female syntype from New South Wales, in the Zoologisches Museum, Hamburg (Rack 1961, p. 25).

Epeira viridis Keyserling, 1865, p. 812, plate 18, figs. 11 and 12. Female holotype (?) from Upolu, Samoa, in the Zoologisches Museum, Hamburg (Rack 1961, p. 25). Syn. nov.

Epeira producta Koch, 1867, p. 178. Female syntype (?) from Brisbane, Qld., in the Zoologisches Museum, Hamburg (Rack 1961, p. 24).

Epeira thyridota Thorell, 1870, p. 367. One male and one immature female syntype from "Celeberrimo R., Nova Hollandia, Coll. Dom Pessler". Present whereabouts of these specimens unknown. Syn. nov., based on study of original description and of Koch's (1871, p. 52) redescription of Thorell's types.

Epeira biapicata Koch, 1871, p. 54, plate 4, fig. 4. Female holotype from Australia, originally deposited in the Naturhistorisches Museum, Stuttgart where it was destroyed; one immature female paratype from Ovalau, Fiji Is., in the Zoologisches Museum, Hamburg (Rack 1961, p. 21).

Epeira capitalis Koch, 1871, p. 58, plate 5, fig. 1. Female holotype from Ovalau, Fiji Is., in the Zoologisches Museum, Hamburg (Rack 1961, p. 22).

Male

Four specimens from Canberra measured 12–17 mm in total length. Carapace uniformly reddish brown. Ocular quadrangle on rounded prominence. Lateral eyes of each side set on small, pointed prominence. Femur I with only a few inconspicuous, paired spiniforms ventrally in distal half. Coxae I and II with stout spur ventrally; femur II with deep pit dorsally near base. Tibia II swollen prolaterally, armed with stout spiniforms as follows: 3–5 (usually 4) dorsals; 6 ventrals; usually 5 prolaterals; 6, 9, 9, 11 lower prolateroventrals (4♂) (Fig. 2*D*). Embolus sinuous; median apophysis armed with 1 tooth near middle and 2 at tip (Fig. 2*G*). Palpal patella with 1 stout dorsal seta.

Female

A total of 30 specimens from Canberra measured 14–22 mm (mean 17·1 mm) in total length. Carapace reddish brown to orange-brown; highest in front of dorsal groove, with dense coat of pale hair anteriorly. Legs reddish brown to orange-brown, with black infusions from tips of femora distad; black hairs mingled with white; spiniforms with dark bases, paler distally. Abdomen broadest anteriorly, bluntly pointed posteriorly, with 2 pointed prominences anterolaterally and 2 posteriorly at midline; dorsal pattern greyish with serrated margins, widening and breaking up into small patches in front of anterior prominences, varying to nearly black or off-white on mottled background; occasional specimens with white band, approximately 1 mm wide, from end to end. Venter black, usually traversed by a white band (Fig. 2*E*). Epigynum with strongly sclerotized basal plate and long scape reaching at least halfway to bases of spinnerets (Fig. 2*E*).

Immature Stages

Newly hatched individuals with carapace mainly black except for yellow area around eyes and mesally in anterior half (Fig. 2*F*); several long, semi-erect, white hairs set along highest part of carapace. Abdomen roughly triangular, with black pattern as in Figure 2*F*; anterior prominences present though small; posterior prominences not yet visible. Femora pale with black tips; remaining leg segments pale with irregular black spots and rings. Sternum black. Venter black, bordered with white. At about 3 mm length, immatures essentially as above but black area of carapace now faded to dark grey, and one or both posterior prominences visible. Half-grown individuals with black areas of carapace, legs, and abdomen largely changed to brownish; eyes, carapace hair, leg spiniforms, abdominal prominences, and colour pattern essentially as found in mature females.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, *Acacia*, pine, clover, and *Pyracantha*, 5.ii.–15.v.1963, 1♂, 6♀ (CNC); 1♀ (MCZ); 1♀ (AMNH); 1♀ (AM); 1♂, 2♀, 30 imm. (ANIC). NEW SOUTH WALES: 1♀ syntype (?) of *Epeira transmarina* (ZMH). Gilbert River, Riverina, 5♀ (BM). Peak Downs, 2♀ (BM). Blue Mountains, 1♀ (BM). Sydney, 2♂, 2♀ (BM), 1♀,

1 imm. ♀ (ZMH); 5♀ (CNC). QUEENSLAND: Rockhampton, 2♀ (BM), 2♂, 2♀ (ZMH). Without specific locality, 1♀ (ZMH). Brisbane, 1♀, syntype (?) of *Epeira producta* (ZMH). Bowen, 2♀, 1 imm. (ZMH). WESTERN AUSTRALIA: Darling Range, 2 imm. ♂, 2♀ (BM). LOYALTY ISLANDS: Lifu, 1♂, 4♀ (BM). FIJI ISLANDS: Ovalau, ♀ holotype of *Epeira capitalis* (ZMH); 1 subad. ♀ paratype of *Epeira biapicata* (ZMH). SAMOA: Upolu, ♀ holotype (?) of *Epeira viridis* (ZMH).

Comments

Araneus transmarinus is both common and abundant in orchard trees, and occurs as well on plants such as *Acacia, Pyracantha,* clover, and pine trees. It commonly inhabits parks and backyards (Main 1964), and thus appears to be the Australasian equivalent of the Eurasian species *A. diadematus* Clerck, which also now occurs widely in North America. *A. transmarinus* is widespread in eastern, central, and southern Australia, New Guinea, and the South Pacific islands, but whether or not this is partly due to human transport is unknown.

The species is separable from other large representatives of the genus by the presence of 2 median prominences [not one, as stated by Main (1964)] posteriorly on the abdomen, by the structure of the male palpus, and by the extremely long epigynal scape. The abdominal pattern is variable, as recognized by Rainbow (1916, p. 97), Chrysanthus (1960), and Main (1964). The black area of the venter is nearly always subdivided by a white transverse band. Small immature specimens may be confused with the young of *Cyclosa fuliginata* (Koch), another abundant orchard spider, but the latter have a narrow, dark band, which tapers anteriorly, on the abdominal dorsum (Fig. 3*J*) rather than the broad one found in *A. transmarinus* (Fig. 2*F*).

Synonymy between *transmarinus* and *productus* was first recognized by Keyserling (1886, p. 141). Chrysanthus (1960), who studied the early literature in relation to New Guinea material, listed several potential separating characters, but has since (personal communication) agreed on the synonymy. The relative width of the epigynal scape at its middle is perhaps the most interesting character cited in Chysanthus' list. In *transmarinus* (and in *capitalis* as well) the scape was believed to taper smoothly from base to tip, whereas in *productus* it was noticeably more slender in the basal half than at the middle, though it tapered from middle to tip. Examination of the types of these species and of a large series of females of various ages has convinced me that the broader scape is always found in specimens only recently moulted to maturity (and therefore probably unmated) and the more slender one in older females who probably had mated. Whether or not the act of mating can result in thinning the scape has, however, not been determined experimentally.

The name *transmarinus* is here chosen for use over the simultaneously published *viridis* because the former has been used much more than the latter and because it is considered the more appropriate (International Code of Zoological Nomenclature, 2nd Ed., Art. 24 and Recommendation 24A).

ARANEUS HEROINE (Koch)

Figs. 2*A*–2*C*

Epeira heroine Koch, 1871, p. 51, plate 4, fig. 2. Female holotype from undesignated locality in Australia, originally deposited in Naturhistorisches Museum, Stuttgart, Germany; believed to have been destroyed (Dr. Gisela Rack, Zoologisches Museum, Hamburg, personal communication). Species identified from original description and illustration.

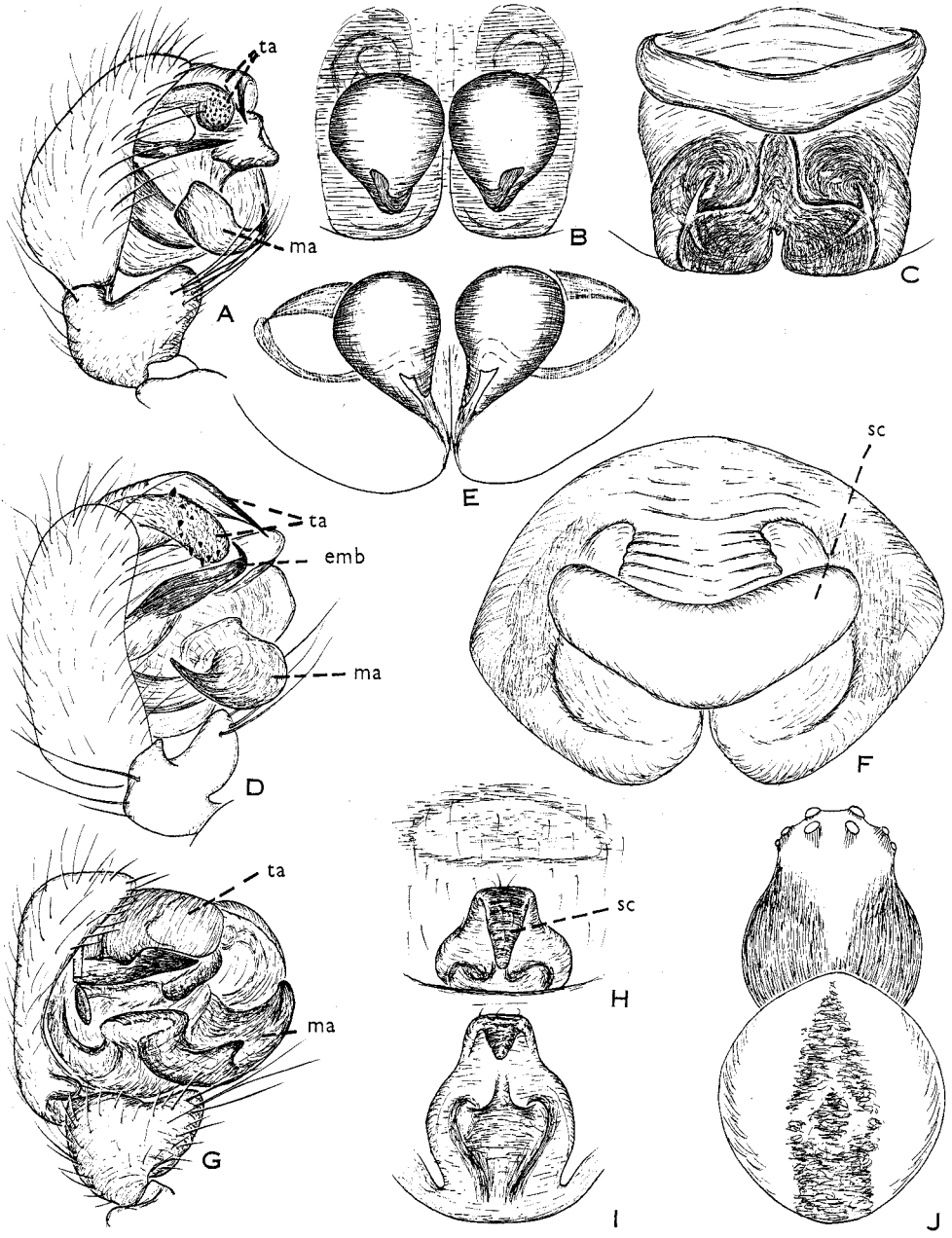

Fig. 3.—*A–C*, *Araneus ginninderranus*, sp. nov.: *A*, male palpus, ventral; *B*, spermathecae; *C*, epigynum. *D–F*, *Araneus psittacinus* (Keyserling): *D*, male palpus, ventral; *E*, spermathecae; *F*, epigynum. *G–J*, *Cyclosa fuliginata* (Koch): *G*, male palpus, ventral; *H*, *I*, epigynum; *H*, ventral; *I*, posteroventral; *J*, newly hatched.

Epeira annulata Keyserling, 1886, p. 141. Name based on syntype series of females from Bowen, Qld., in the Zoologisches Museum, Hamburg (see Rack 1961, p. 21). Syn. nov.

Male

Three specimens from Canberra measured 7·5, 8·0, and 9·0 mm in total length. Carapace reddish brown with indistinct blackish streaks radiating from dorsal groove; lateral margins set with broad bands of white recumbent hair. Median ocular area on low, rounded prominence; lateral eyes of each side set on small, pointed prominence. Coxa I with spur ventrally; femur II with deep pit dorsally near base. Tibia II swollen prolateroventrally, armed with stout spiniforms as follows: dorsally 3; ventrally 4–5 (on enlarged bases); prolaterally 5; prolateroventrally 6–7 (Fig. 2*B*). Femur I with 11–15 slender spiniforms ventrally, 2–5 of them paired. Embolus relatively flat; median apophysis armed with 2 teeth at tip, none at middle, produced at base into thin blade (Fig. 2*A*). Palpal patella with 1 dorsal spiniform.

Female

A total of 17 specimens from Canberra measured 10–18 mm (mean 14·6 mm) in total length. Carapace orange-yellow, with 3 reddish to black streaks behind the eyes and pair of broad, curved bands of similar colour on lateral areas; highest immediately in front of dorsal groove; with dense coat of silvery, recumbent hair. Legs orange-yellow to reddish, with broad, dark encircling bands; spiniforms pale, often darker at extreme tip. Abdomen broadly rounded anteriorly, bluntly pointed posteriorly; with 2 pointed prominences anterolaterally and 1 at midline behind; dorsum marbled with brown and white, the white area forming bands that run down sides. Venter with broad, dark band (Fig. 2*C*). Epigynum with strongly sclerotized basal plate; scape short, tapered in distal three-fifths (Fig. 2*C*), bent ectad near middle.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, *Pyracantha*, pine, *Acacia*, clover, January–April 1963, 4♂, 6♀, 2 imm. (CNC); 1♂, 2♀, 1 imm. (ANIC); 1♀ (MCZ); 1♀ (AMNH); 1♀ (AM). NEW SOUTH WALES: Sydney 1♀ (BM), 4♀ (ZMH). QUEENSLAND: 1♀ Rockhampton (BM). Bowen 2♀ (ZMH). WESTERN AUSTRALIA: Darling Range 2♀ (BM). SOUTH AUSTRALIA: Goolwa 1♀ (BM). Blakiston, Little Hampton 1♀ (BM). Magill 1♀ (BM). NEW ZEALAND: Lyttelton Harbour 1♀ (BM). "CAYGAN": 3♀ (BM).

Comments

Araneus heroine was not abundant in the orchard collection from the Australian Capital Territory, but it is included here because of the possibility of confusion with *A. transmarinus*. The abdomen bears only one posterior prominence at the midline; the ventral dark area is never subdivided; the carapace bears dark longitudinal streaks rather than being of one colour; coxa I bears a ventral spur (not both I and II); the tibial armature of leg II and the palpus of the male differ; and the epigynal scape is short and angular rather than long and slender.

Rainbow (1909, pp. 221–3) described the web (which may be very large), the silken retreat, and the egg sacs.

ARANEUS PSITTACINUS (Keyserling)

Figs. 3*D*–3*F*

Epeira psittacina Keyserling, 1887, p. 173, plate 14, fig. 7. Male and female syntypes from Sydney, N.S.W., deposited in the Zoologisches Museum, Hamburg (Rack 1961, p. 24).

Araneus psittacinus Hogg, 1900, p. 74.

Male

One specimen from Canberra measured 3·0 mm in total length, with carapace 1·9 mm long and 1·5 mm wide. Carapace pale orange-yellow, with thin coat of pale, recumbent hair; with a few stout spiniforms in eye area; in dorsal view, gradually tapered at sides in anterior half to width of median ocular area; in lateral view, highest at dorsal groove, which is a longitudinal slit. Both eye rows strongly recurved; median ocular area as long as wide, wider in front than behind; anterior medians largest; laterals on each side set close together on low prominence. Legs pale yellowish, I longest, III shortest, II longer than IV; set with numerous long, dark, sub-erect spiniforms, those on tibia II unusually long; tibia II not swollen; coxa I with minute spur on ventral side, and femur II with small dorsal groove at base. Abdomen roughly triangular in dorsal view, with low prominence behind at midline; lacking distinct dorsal pattern; set with numerous long, pale setae. Chelicerae with 3 teeth on prolateral margin of fang furrow, 3 on retrolateral margin. Tibia of palpus with 1 spiniform seta dorsally; palpal patella with 2 similar setae; cymbium with flattened hook at base; embolus flat, hooked at tip (Fig. 3*D*); median apophysis cylindrical, pointed and bent at tip (Fig. 3*D*); terminal apophysis in two parts, a slender pointed piece and a flattened lobe bearing about 10 minute denticles (Fig. 3*D*).

Female

One specimen from Canberra measured 5·2 mm in total length, with carapace 2·1 mm long and 1·9 mm wide. Colour and structure essentially as in male, but carapace less narrowed anteriorly, dorsal groove shallower, legs stouter and lacking male sexual modifications. Epigynum with short, broad, strongly rebordered scape (Fig. 3*F*); openings situated laterad of two large excavations. Copulatory tubes forming loops; spermathecae smooth, set near midline (Fig. 3*E*).

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from *Acacia*, 8.i.1963, 1♂ (CNC), from apple, 21.i.1963, 1♂ (ANIC), from *Acacia*, 21.i.1963, 1♀ (CNC).

Comments

Araneus psittacinus strongly resembles *A. ginninderranus*, sp. nov. but differs from the latter as stated in the comments on that species. *Araneus psittacinus* also resembles several other Australian species in general characters, e.g. carapace shape, eye arrangement, kind of sexual modification in male leg II, epigynum, and abdominal shape. These characters are found in such species as *A. nigropunctatus* Koch and *A. fastidiosus* (Keyserling), which in turn bear a strong resemblance to the New World genus *Eustala*. The New Guinea species *A. granti* Hogg (Chyrsanthus 1960) appears to be intermediate between the typical species of *Araneus* and those grouped with *A. psittacinus*.

ARANEUS GINNINDERRANUS, sp. nov.

Figs. 3*A*–3*C*

Male holotype "Canberra. A.C.T, Ginninderra, *Acacia*, 8 Jan. 1963, C. R. MacLellan", deposited in the Australian Museum, Sydney. Female allotype "Canberra, A.C.T. Ginninderra, *Acacia*, 7 Jan. 1963, C. R. MacLellan", deposited in the Australian Museum, Sydney.

Male

Four specimens from Canberra measured 3·8–4·4 mm (mean 4·0 mm) in total length, with carapace 2·1 mm long and 1·6–1·8 mm (mean 1·7 mm) wide. Carapace pale yellowish, with median dark stripe from dorsal groove almost to posterior eye row; with thin coat of pale setae; pear-shaped in dorsal view, strongly narrowed at level of coxa I, tapering to width of median ocular quadrangle in front; highest at dorsal groove, sloping gradually toward front; dorsal groove a deep, longitudinal cleft. Both eye rows strongly recurved; median ocular area as long as wide, wider in front than behind; anterior medians largest; laterals on each side close together on low prominence; 3–6 strong spiniforms on each side of midline in eye area. Legs pale yellowish, set with numerous long, dark, suberect spiniforms; I longest, III shortest, II longer than IV; tibia II not swollen but with 8–11 unusually long spiniforms; coxa I with minute spur ventrally, and femur II with small groove dorsally at base. Abdomen roughly triangular in dorsal view, with low swelling behind at midline; dorsum with greyish to greenish, diffuse pattern on pale background, sometimes with pair of black or reddish patches anterolaterally, set with numerous long, erect setae. Chelicerae with 3 teeth on prolateral margin of fang furrow, 3 on retrolateral margin. Palpal patella with 2 long spiniforms dorsally; tibia with 1 dorsally; cymbium with flattened hook at base; embolus long, slender, nearly straight (Fig. 3*A*); median apophysis short, U-shaped, flattened basally, pointed distally (Fig. 3*A*); terminal apophysis in two parts, a slender pointed piece and a lobe bearing several minute denticles (Fig. 3*A*).

Female

Three specimens from Canberra measured 5·0–5·5 mm (mean 5·1 mm) in total length, with carapace 2·3–2·6 mm (mean 2·5 mm) long and 2·0–2·4 mm (mean 2·1 mm) wide. Colour and structure essentially as in male, but carapace less narrowed in front, legs stouter and with shorter spiniforms, tibia II lacking male sexual modifications. Epigynum and spermathecae as in Figures 3*B* and 3*C*.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, ♂ holotype, ♀ allotype (AM); from apple and *Acacia*, 7.i.–27.ii.1963, 4♂; 1♀ (CNC).

Comments

This species is very similar to *A. psittacinus*, but differs from the latter in having a wider carapace, in the male, both in front and behind, in having a colour pattern on the abdominal dorsum, and in the palpus and epigynum (compare Figs. 3*A* and 3*D*, 3*C* and 3*F*, 3*B* and 3*E*).

Genus PHONOGNATHA Simon

Phonognatha Simon, 1894, p. 748. Type species *Epeira graeffei* Keyserling, 1865.
Singotypa Simon, 1894, p. 749. Type species *Epeira melania* Koch, 1871. Syn. nov.

Simon (1894) proposed three genera for Australian orb-weaving spiders bearing a superficial resemblance to the American and European species of *Meta* and *Zygiella*. The three were *Phonognatha*, *Singotypa*, and *Deliochus*, in all of which the legs are very long, slender, and possessed of relatively few, weak spiniform setae; the web is built

in a vertical or slightly inclined plane among vegetation not far above the ground; the spider sits in a nest composed of a rolled leaf at or near the web's centre; the sexes are approximately the same size; the male's leg II is not sexually modified in size or setation; and the palpus lacks a paracymbium.

There is no character or combination of characters that clearly separates *Phonognatha* and *Singotypa*. The characters given by Simon were the relative prolongation of the abdomen posterior to the spinnerets and the number of teeth on the retrolateral margin of the cheliceral fang furrow. Neither character applies well to males, and there are at least two species of *Phonognatha*, namely *P. melanopyga* (Koch) and *P. vicitra* Sherriffs, in which the female's abdominal prominence is intermediate between that of *P. graeffei* (Keyserling) and *P. melania* (Koch), respectively the species upon which Simon erected the genera *Phonognatha* and *Singotypa*. For these reasons I propose synonymy between the two genera.

The genus *Deliochus* appears to be a valid genus distinct from *Phonognatha*. A study of the type species and at least one additional species of each of the two genera indicates that in *Phonognatha* the male palpus and legs are long and slender, the embolus and conductor are much elongated, the retrolateral margin of the female cheliceral fang furrow carries 3 teeth, and the epigynum has a low median septum. In *Deliochus*, the legs are short and stout, the embolus and conductor are short, the retrolateral margin of the female's fang furrow has 4 teeth, and the epigynal septum is very prominent.

PHONOGNATHA GRAEFFEI (Keyserling)

Figs. 5*A*–5*G*

Epeira graeffei Keyserling, 1865, p. 811, plate 19, figs. 12 and 13. Female syntype from "Wollongong", N.S.W., in the British Museum (Natural History).

Phonognatha graeffei Simon, 1894, p. 747.

Epeira wagneri Rainbow, 1896, p. 325, plate 19, fig. 2. Male and female syntypes from Sydney, N.S.W., deposited in the Australian Museum, Sydney, labelled "*Epeira wagneri*, type sp. K1902." Syn. nov.

Phonognatha wagneri Dalmas, 1917*b*, p. 434.

Male

Five specimens from Canberra measured 4·5–5·5 mm (mean 5·0 mm) in total length, with carapace 1·9–2·8 mm (mean 2·6 mm) long and 1·4–2·0 mm (mean 1·9 mm) wide. Carapace dark orange, paler posteriorly but suffused with grey; smooth, with few hairs; in dorsal view, with sides smoothly rounded toward front, abruptly narrowed at level of palpal coxae; in lateral view, highest at level of palpal coxae; dorsal groove a simple, shallow depression. Both rows of eyes moderately recurved, anterior row more so than posterior; anterior medians largest, set on median prominence; median ocular area approximately as wide as long, distinctly wider in front than behind; lateral eyes on each side close together on small prominence. Legs dark orange, with segments paler at bases; with short, pale setae; leg II unmodified sexually; I longest, III shortest; basitarsus I as long as, or slightly longer than, tibia I; distitarsus I one-quarter length of tibia I; femur I with 2–4 dorsal spiniforms, 2 prolaterals; tibia I with 2–4 pairs ventral spiniforms (some pairs may be reduced to

a single spiniform), 2–3 prolaterals, 1 retrolateral. Abdomen broadly ovate in dorsal view, with little or no prominence posterior to spinnerets (Fig. 5*C*); dorsum with broad pale median area flanked by 7 pairs of connected, dark grey patches (Fig. 5*E*). Chelicerae relatively long and slender; with prominent boss; roughened and setose prolaterally; prolateral margin of fang furrow with 3 teeth, retrolateral margin with 2. Fang bent near base, with swelling followed by light constriction near middle. Cymbium of palpus slightly longer than tibia (Fig. 5*A*); conductor lying in coil on tegulum, extending nearly to tip of cymbium, carrying slender embolus, which originates near base of tegulum (Figs. 5*A* and 5*B*).

Female

A total of 10 specimens from Canberra measured 7·0–10·0 mm (mean 7·9 mm) in total length, with carapace 2·5–3·9 mm (mean 3·2 mm) long and 2·0–3·0 mm (mean 2·3 mm) wide. Structure and colour essentially as in male, but chelicerae shorter and stouter, not roughened or conspicuously setose anteriorly. Abdomen as in Figure 5*G*. Epigynum as in Figure 5*F*, and spermathecae as in Figure 5*D*.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, plum, *Euonymus*, *Pyracantha*, *Acacia*, 14.ii.–15.v.1963, 5♂, 11♀ (CNC); 1♂, 2♀, 1 imm. (ANIC); 1♂, 1♀ (MCZ); 1♂, 1♀ (AMNH); 1♂, 1♀ (AM). NEW SOUTH WALES: Sydney, 1♂, 9♀ (BM); 2♀ (CNC); syntypes of *Epeira wagneri* (AM). Wollongong, ♀ syntype of *Epeira graeffei* (BM). Wilton, from apple, 18.iv.1963, 1♀ (CNC).

Comments

Phonognatha graeffei is a moderately large orb-weaving spider of shrubs and trees. It occurred in abundance in and near the Australian Capital Territory orchards. Its long, slender legs and abdominal shape and colour pattern distinguish it from other species of the genus. Rainbow (1896, p. 335; 1909, p. 223) noted that the web is an incomplete orb, with the spider sitting within a rolled or folded, silk-lined leaf nest at the centre. He also observed the spider mating in January and February, and commented (1897, p. 536) on the relative size of leaf utilized in relation to the degree of the spider's maturity.

PHONOGNATHA MELANIA (Koch), comb. nov.

Figs. 5*H*–5*O*

Epeira melania Koch, 1871, p. 100, plate 8, fig. 3. Two syntype females from Bowen, Qld., in the Zoologisches Museum, Hamburg (Rack 1961, p. 23).

Singotypa melania Simon, 1894, p. 749.

Male

One specimen from Canberra measured 6·0 mm in total length, with carapace 2·5 mm long and 1·9 mm wide. Carapace dark orange, paler posteriorly but lightly suffused with grey; smooth, with little hair; in dorsal view, smoothly rounded at sides toward front, abruptly narrowed at level of palpal coxa; in lateral view, highest at level of coxa I; dorsal groove a simple, shallow depression. Both eye rows moderately recurved, the anterior row more so than the posterior; anterior medians largest; median ocular area approximately as wide as long, distinctly wider in front than behind; laterals of each side close together on small prominence. Legs dark

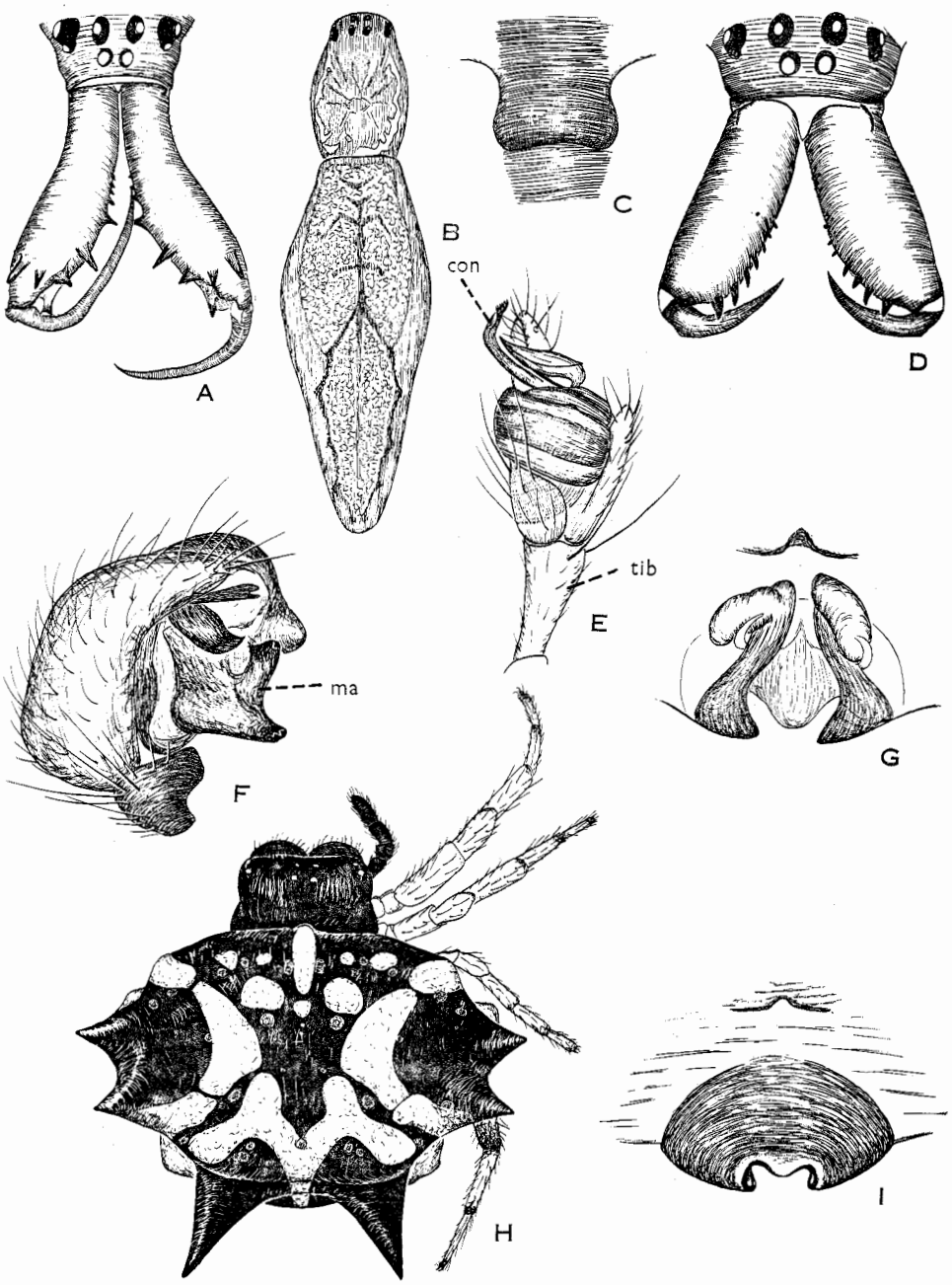

Fig. 4.—*A–E*, *Tetragnatha quadridens*, sp. nov.: *A*, male eyes and chelicerae, anterior; *B*, female, dorsal; *C*, genital groove of female; *D*, female eyes and chelicerae; *E*, male palpus, retrolateral. *F–I*, *Gasteracantha minax* Thorell: *F*, male palpus, ventral; *G*, spermathecae; *H*, female; *I*, epigynum.

orange, paler basally; with short, pale setae; leg II unmodified sexually; I longest, III shortest; femur I with 1–2 weak dorsal spiniforms, 1–2 prolaterals (near tip); tibia I with 4–5 pairs of ventral spiniforms (some pairs may be reduced to single spiniforms). Abdomen ovate in dorsal view, distinctly expanded posteriorly beyond level of spinnerets (Fig. 5*J*); dorsum with broken, median dark band and 4–5 pairs dark patches (darkest posteriorly) (Fig. 5*M*). Chelicerae dark orange; with strong boss; lightly roughened and setose prolaterally; prolateral margin of fang furrow with 3 teeth, retrolateral margin with 2; fang strongly bent near base, with mesal swelling followed by constriction near middle. Cymbium of palpus shorter than tibia (Fig. 5*H*); conductor a hollow tube lying on tegulum and carrying embolus, which arises basally on tegulum, to its tip (Figs. 5*H*, 5*I*).

Female

A total of 10 specimens from Canberra measured 7·0–9·0 mm (mean 7·7 mm) in total length, with carapace 2·5–3·1 mm (mean 2·9 mm) long and 1·9–2·1 mm (mean 2·0 mm) wide. Structure and colour essentially as in male except for the following: chelicerae relatively shorter and stouter, not roughened or conspicuously setose anteriorly; dorsum of abdomen with paired black stripes anteriorly and large dark patch covering most of posterior prominence, which is large (Figs. 5*L*, 5*O*). Epigynum with broad median septum, at sides of which lie the openings, with fringe of long setae arising on plate (Fig. 5*N*); spermathecae as in Figure 5*K*.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple and *Pyracantha*, 11.ii.–15.v.1963, 1♂, 8♀ (CNC); 1♀ (ANIC); 1♀ (MCZ); 1♀ (AMNH); 1♀ (AM).

Comments

Phonognatha melania is distinguished from *P. graeffei* by the former's greater abdominal prominence and different abdominal pattern in the female, and in several details of the genitalia of both sexes as mentioned under *P. graeffei*.

GASTERACANTHA MINAX Thorell

Figs. 4*F*–4*I*

Gasteracantha minax Thorell, 1859, p. 303. Whereabouts of type female from Australia unknown. Identified from original description and from Koch's (1871, p. 10) redescription.

Gasteracantha flavomaculata Keyserling, 1865, p. 801, plate 18, figs. 8 and 9. Holotype female from Sydney, N.S.W., originally deposited in the Zoologisches Museum, Hamburg, now missing (Rack 1961, p. 27).

Isacantha minax Keyserling, 1886, p. 94, plate 7, fig. 4.

Male

One specimen from Canberra measured 4·4 mm in total length, with carapace 2·1 mm long and 1·8 mm wide. Carapace dark reddish brown to black, with metallic blue sheen; thinly covered with fine white setae; angular anterolaterally; convex above in anterior half, broadly overhung by abdomen posteriorly; sides approximately parallel. Anterior eye row slightly recurved, posterior row slightly procurved; median ocular area approximately square, set on low, rounded prominence; lateral eyes of each side set close together on pointed prominence. Legs mainly black basally, brownish distally; I, II, and IV approximately equal in length, III shorter; tibia I

with 3 prolateral spiniforms and 5–7 stout pairs ventrally. Abdomen slightly wider than long, flattened dorsally; with 3 pairs of blunt projections at sides, all with metallic blue tips; with coriaceous surface; blue to black, with pattern of yellow spots or bands as in female (Fig. 4*H*), and with pattern of sigilla; thinly covered with fine, erect, black or white hair. Sternum convex; black with ovoid yellow patch at middle and narrow yellow band posteriorly. Patella of palpus without dorsal spiniforms; cymbium with flattened hook at base on dorsal side; tegulum and subtegulum much expanded, lying exposed on retrolaterodorsal side; median apophysis flattened in ventral view, bearing 2 blunt processes, each with 1 or more minute points (Fig. 4*F*).

Female

A total of 10 specimens from Canberra measured 6·7–9·0 mm (mean 8·4 mm) in total length, with carapace 2·7–3·0 mm (mean 2·9 mm) long and 2·5–3·0 mm (mean 2·8 mm) wide. Structure and colour essentially as in male, except as follows: legs mainly tan, with darker coxae and trochanters, and with dark rings at tips of most segments; spiniforms on legs slender; abdominal projections longer and directed dorsolaterally (Fig. 4*H*). Dorsal groove of carapace consisting of paired, elongate pits in posterior half. Chelicerae with 4–6 small teeth on prolateral margin of fang furrow, 3–4 on retrolateral margin. Venom gland approximately 1 mm long, slender, lying at base of paturon. Epigynum a smooth, convex plate overhanging genital groove (Fig. 4*I*); openings near midline, extending anteriorly as long slits in dorsal side of plate; with sclerotized notch a short distance anterior to epigynal plate. Spermathecae oblong, heavily sclerotized, asymmetrical (Fig. 4*G*).

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, pine, *Pyracantha*, *Acacia*, clover, *Euonymus*, 9.i–19.iv.1963, 1♂, 9♀ (CNC); 1♀, 1 imm. (ANIC); 1♀ (MCZ); 1♀ (AMNH); 1♀ (AM).

Comments

Gasteracantha minax is a distinctive black and yellow web-builder inhabiting many kinds of plants. The 6 abdominal prominences and body colour pattern separate it from other species of *Gasteracantha*. Rainbow (1898, p. 150) called it "a most abundant species", later (1909, p. 226) describing the web and egg sac. The Canberra collection contained none of the forms treated as colour "varieties" of *G. minax* by Hogg (1900, p. 79; 1914, p. 79).

Family **TETRAGNATHIDAE**

TETRAGNATHA QUADRIDENS, sp. nov.

Figs. 4*A*–4*E*

Male holotype "Ginninderra, Canberra, A.C.T., apple, 8 Feb. 1963, C. R. MacLellan", deposited in the Australian Museum, Sydney. Female allotype "Ginninderra, Canberra, A.C.T., *Acacia*, 7 Jan. 1963, C. R. MacLellan", deposited in the Australian Museum, Sydney. Female paratype "Ginninderra, North Paddock, Canberra, A.C.T., 14 Feb. 1963, C. R. MacLellan", deposited in the Canadian National Collection of Insects, Ottawa.

Male

Holotype male measured 4·3 mm in total length, with carapace 1·8 mm long and 1·0 mm wide. Carapace yellow-brown, darker mesally and in eye region, lightly mottled with off-white near lateral margins (much as in female, see Fig. 4*B*); in dorsal view somewhat angulate at sides, widest at level of coxa II; in lateral view, generally low but highest at level of posterior row of eyes. Eyes broadly encircled with black; both rows recurved, the anterior more than the posterior; median ocular area slightly longer than wide, narrower in front than behind; laterals of each side closer together than anterior medians are to posterior medians (Fig. 4*A*). Legs long, slender; pale yellowish, darker at spiniform bases; I longest, III shortest, II and IV approximately equal in length; basitarsus I 5–6 times as long as distitarsus I. Abdomen slender, without prominences, not noticeably extended posteriorly beyond spinnerets; dorsum with pale reddish pattern on silvery background, and with 5–6 pairs dark patches in posterior half (essentially as in female, see Figure 4*B*). Chelicera with 4 prominent teeth distally on anterior surface (Fig. 4*A*); auxiliary guide tooth present in retrolateral row; paturon shorter than carapace. Tibia of palpus distinctly longer than patella; conductor passing around tip of cymbium, flattened and strongly bent near tip (Fig. 4*E*).

Female

Two specimens from Canberra measured 6·0 mm and 6·8 mm in total length, with carapace 2·0 and 2·1 mm long and 1·1 and 1·3 mm wide. Structure and colour as in male except as follows: abdomen of mature specimens with swelling near middle (Fig. 4*B*); chelicerae with approximately 7 teeth, evenly spaced and increasing in size distally, on prolateral margin, and approximately 6 similar teeth on retrolateral margin (Fig. 4*D*); auxiliary guide teeth absent. Genital groove as in Figure 4*C*.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, male holotype and female allotype (AM); female paratype (CNC); from apple, plum, *Pyracantha*, *Acacia*, 18.xii.1962–24.x.1963, 7 imm. (CNC). WESTERN AUSTRALIA: Swan River, 1♀ (MCZ).

Comments

Tetragnatha quadridens, sp. nov. is similar to *T. macilenta* Koch, *T. demissa* Koch, and *T. panopea* Koch, in all of which the male has 4 teeth distally on the anterior surface of the chelicera. In none of these other species, however, is there such a prominent and strongly bent palpal conductor as in *T. quadridens*.

Rainbow (1907, p. 333) discussed the webs, habitats, and behaviour typical of the Australian Tetragnathidae.

Family **CLUBIONIDAE**

CHIRACANTHIUM GRACILE Koch

Figs. 6*A*–6*E*

Chiracanthium gracile Koch, 1873, p. 402, plate 31, fig. 4. Male holotype from Brisbane, Qld., in the Zoologisches Museum, Hamburg (Rack 1961, p. 15).

Male

One specimen from Wilton, N.S.W., measured 6·0 mm in total length, with carapace 2·4 mm long and 1·7 mm wide. Carapace lacking dorsal groove, widest at

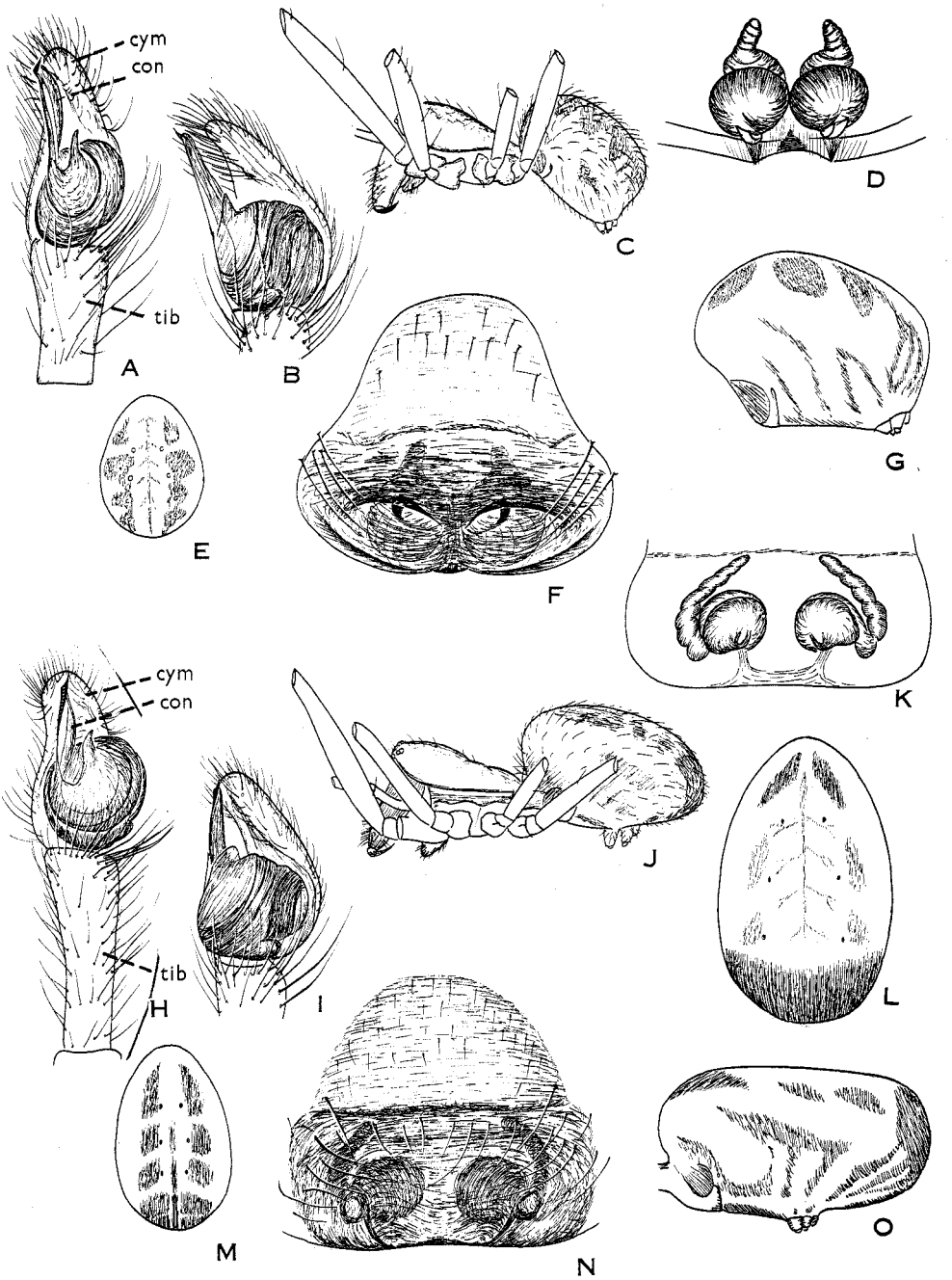

Fig. 5.—*A–G*, *Phonognatha graeffei* (Keyserling): *A*, *B*, male palpus; *A*, ventral; *B*, retrolateral; *C*, male, lateral; *D*, spermathecae; *E*, male abdomen; *F*, epigynum; *G*, female abdomen. *H–O*, *Phonognatha melania* (Koch): *H*, *I*, male palpus; *H*, ventral; *I*, retrolateral; *J*, male, lateral; *K*, spermathecae; *L*, female abdomen, dorsal; *M*, male abdomen; *N*, epigynum; *O*, female abdomen, lateral.

level of coxa II but abruptly narrowing at level of coxa I; front convex (from above); in lateral view, slightly convex immediately behind eyes; generally yellowish, with greyish streak along midline branching toward coxa I. Eyes all approximately equal in size; medians of both rows slightly closer to each other than to laterals; median ocular area approximately square, slightly narrower in front than behind; anterior row slightly recurved; posterior row approximately straight. Legs long, slender, and pale; I longest, III shortest; femur I with 2 prolateral spiniforms; tibia I with 2 pairs of ventral spiniforms, none prolaterally. Abdomen slender, widest near anterior end, tapered behind; with reddish heart mark, and suffused with reddish posteriorly on pale background, Chelicera as in Figure 6*A*. Tibia of palpus as long as cymbium; retrolateral apophysis minutely bifid at tip (Fig. 6*C*); cymbial prong longer than cymbium, curved and slender (Fig. 6*B*); tegulum giving rise to 2 lightly sclerotized processes associated with embolus, the latter taking $1\frac{1}{4}$ turns around tegulum (Fig. 6*C*).

Female

One specimen from Wilton, N.S.W., measured 4·7 mm in total length, with carapace 2·1 mm long and 1·6 mm wide. Structure and colour essentially as in male, except as follows: tibia I with 1 pair and 2 unpaired spiniforms ventrally; chelicerae not extended anteriorly, relatively thicker than in male. Epigynum and spermathecae as in Figures 6*D* and 6*E*.

Specimens examined.—QUEENSLAND: Brisbane, male holotype of *Chiracanthium gracile* (ZMH). NEW SOUTH WALES: Wilton, from apple, 18.iv.1963, 1♂, 1♀, 2 imm. (CNC); 1 imm. (ANIC).

Comments

C. gracile has not been taken to date from the orchards in the Australian Capital Territory, but only from localities near the coast. It differs from *C. mordax* as noted under that species.

CHIRACANTHIUM MORDAX Koch

Figs. 6*F*–6*J*

Chiracanthium mordax Koch, 1866, p. 262, plate 11, fig. 167. Male type from Samoa not located in the Zoologisches Museum, Hamburg or the British Museum (Natural History). Species identified from original description and Koch's (1873, p. 403, plate 31, fig. 5) specimens deposited in both these museums.

Chiracanthium diversum Koch, 1873, p. 396, plate 32, fig. 2. Male holotype from Upolu, Samoa in the Zoologisches Museum, Hamburg (Rack 1961, p. 14). Syn. nov.

Chiracanthium gilvum Koch, 1873, p. 410, plate 32, figs. 5 and 6. One male syntype from Bowen, Qld., and three female syntypes from Upolu, Samoa in the Zoologisches Museum, Hamburg (Rack 1961, p. 14). Two male and one female syntype from Upolu, Samoa in the British Museum (Natural History). Syn. nov.

Male

One specimen from Canberra measured 5·3 mm in total length, with carapace 2·2 mm long and 1·8 mm wide. Carapace lacking dorsal groove; widest at level of coxa II; in lateral view, rounded gently over top, highest at level of coxa I; yellow-orange; with dense coat of short, colourless hair. Eyes approximately equal in size; anterior row slightly recurved; posterior row approximately straight; medians of both rows closer to each other than to laterals; median ocular area slightly narrower anteriorly than posteriorly; laterals of each side set on small, contiguous prominences.

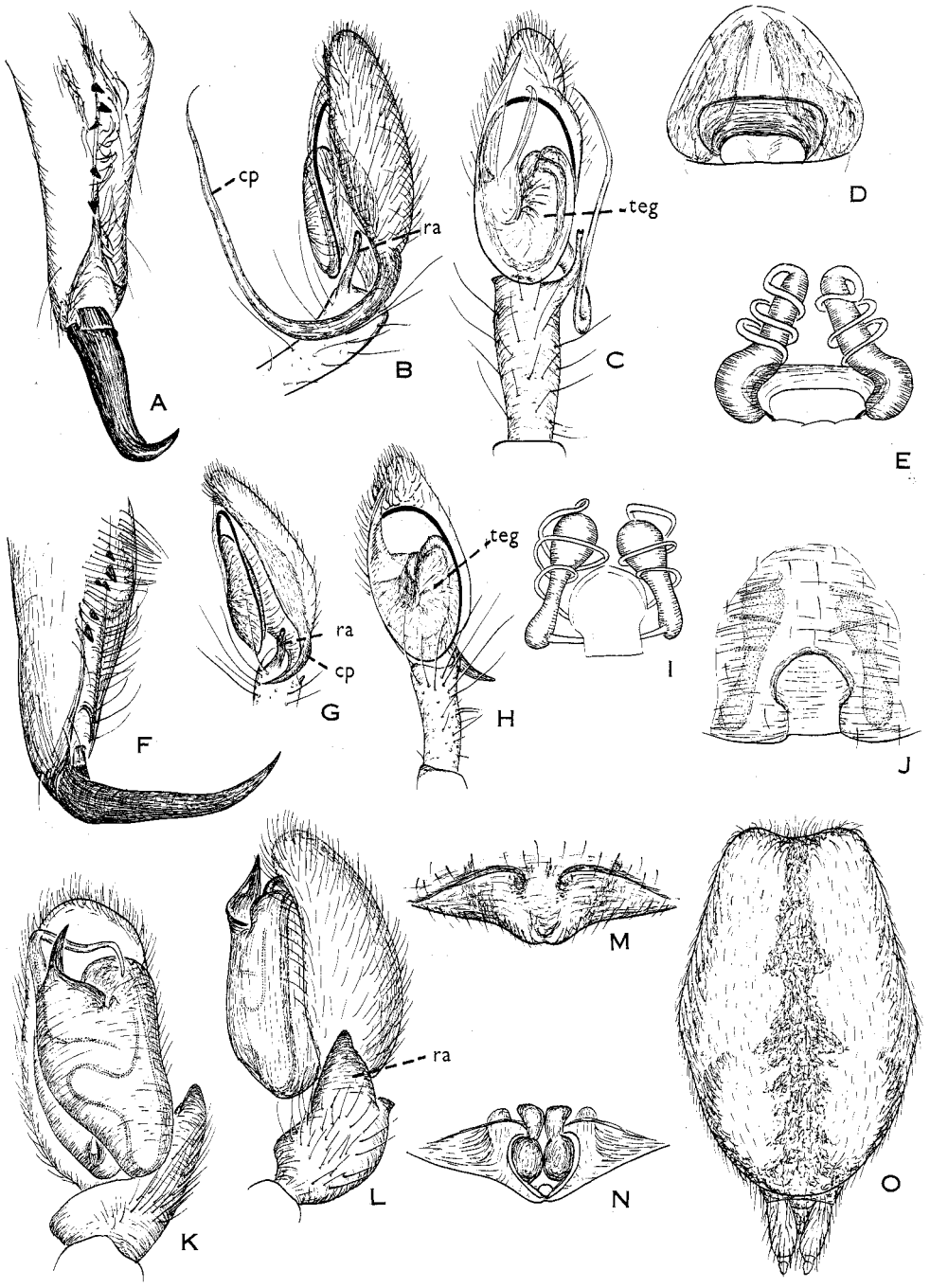

Fig. 6.—*A–E*, *Chiracanthium gracile* Koch: *A*, male chelicera; *B*, *C*, male palpus; *B*, retrolateral; *C*, ventral; *D*, epigynum; *E*, spermathecae. *F–J*, *Chiracanthium mordax* Koch: *F*, male chelicera; *G*, *H*, male palpus; *G*, retrolateral; *H*, ventral; *I*, spermathecae; *J*, epigynum. *K–O*, *Clubiona canberrana*, sp. nov.: *K*, *L*, male palpus; *K*, ventral; *L*, retrolateral; *M*, epigynum; *N*, spermathecae; *O*, abdomen.

Legs yellowish; long and slender; I longest, III shortest; femur I with only 1 spiniform (on prolateral surface); tibia I with 2 pairs of ventral spiniforms. Abdomen off-white, with yellowish heart mark and coat of short, colourless hair. Chelicera as in Figure 6*F*. Retrolateral apophysis of palpal tibia curved, bifid at tip (Fig. 6*G*); cymbial prong relatively short, slender, deeply grooved, the groove continuous with broad channel in retrolateral margin of cymbium; embolus long and thin, lying in oval loop at periphery of tegulum and terminating under conductor near tip of cymbium (Fig. 6*H*).

Female

Two specimens from Canberra measured 8·1 and 7·0 mm in total length, with carapace 3·0 and 2·8 mm long and 2·6 and 2·3 mm wide. Structure and colour as in male except as follows: femur I and tibia I armature reduced to 1 or 0 spiniforms. Chelicerae relatively short and stout. Epigynum with concave median plate that is bounded anteriorly by thin rim (Fig. 6*J*). Spermathecae constricted near middle (Fig. 6*I*.)

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, *Acacia*, *Pyracantha* 23.i.–15.v.1963, 1♂, 2♀ (CNC); 27.ii.–2.x.1963, 4 imm. (CNC); 7.i.1963, 1♀ (ANIC); 19.viii.1963, 1 imm. (ANIC). QUEENSLAND: Bowen, ♂ syntype of *gilvum* (ZMH); Port Mackay, 1♂, 1♀ (BM). SAMOA: Viti, 1♂ (ZMH); Upolu, 1♂, 1♀ (*mordax*) (BM); 3♀ syntypes of *gilvum* (ZMH); 2♂, 1♀ syntypes of *gilvum* (BM); ♂ holotype of *diversum* (ZMH). NEW HEBRIDES: Tanna, 1♀ (BM). SOLOMON ISLANDS: Tulagi, 5♂, 4♀ (BM).

Comments

Chiracanthium mordax is a widespread spider of Australia and Polynesia. Main (1964) notes that it frequents houses and is capable of inflicting a toxic bite. Suman (1964) summarizes the known localities and bite records for the Hawaiian Is.

Examination of the syntypes of *gilvum* and the holotype of *diversum* shows that a single, somewhat variable species is represented. There is apparent variation, for example, in the number of teeth on the margins of the cheliceral fang furrow and in the degree of constriction of the epigynal median plate, but the male palpus and spermathecae appear stable. *Chiracanthium mordax* is distinguished from *C. gracile* by the former's greater size, yellow rather than reddish heart mark, and by several details of the genitalia.

CLUBIONA CANBERRANA, sp. nov.

Figs. 6*K*–6*O*

Male holotype "Ginninderra, Canberra, A.C.T., *Acacia*, 6 May 1964, C. R. MacLellan", deposited in the Australian Museum, Sydney. Female allotype "Ginninderra, Canberra, A.C.T., *Acacia*, 6 May 1964", deposited in the Australian Museum, Sydney. One male, one female paratype, same data, deposited in the Canadian National Collection, Ottawa.

Male

The holotype measured 3·0 mm in total length, with carapace 1·4 mm long and 1·0 mm wide. Carapace off-white; widest at level between coxae II and III, smoothly rounded at sides; highest just in front of dorsal groove. Eyes with narrow black rings; anterior row slightly recurved; posterior row slightly procurved; median

ocular area slightly narrower anteriorly than posteriorly; anterior medians smallest, remainder subequal; medians of both rows slightly closer to laterals than to each other. Legs pale; IV longer than I; femur I with 3 dorsal and 1 prolateral spiniform; tibia I (and II) with 2 pairs of ventral spiniforms; basitarsus I (and II) with 1 pair ventral spiniforms. Abdomen with median reddish band that passes forward a short distance at sides of dorsum. Retrolateral apophysis of palpal tibia undivided (Fig. 6*L*); embolus relatively short, angular, with strong spine at base (Fig. 6*K*).

Female

Seven specimens from Canberra measured 3·4–4·8 mm (mean 4·0 mm) in total length. Structure and colour essentially as in male. Abdomen as in Figure 6*O*. Epigynum with openings usually united at midline near posterior extremity of plate (Fig. 6*M*); spermathecae touching each other at midline (Fig. 6*N*).

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, ♂ holotype, ♀ allotype (AM); 1♂, 1♀ paratype (CNC); from apple, plum, *Pyracantha*, *Acacia*, 7.i.–28.iii.1963, 12.viii.1963–6.v.1964, 4♀ (CNC); from *Acacia*, 7.iii.1963, 1 imm. (ANIC). NEW SOUTH WALES: Wilton, from apple, 28.iii.1963, 1 imm. (CNC).

Comments

Clubiona canberrana, sp. nov. is strikingly different from the previously known species of *Clubiona* by its reddish abdominal pattern (Fig. 6*O*) and the stout spine at the base of the male's embolus.

Family **THOMISIDAE**

DIAEA CRUENTATA (Koch), comb. nov.

Figs. 7*A*–7*C*, 8*A*, 8*B*

Xysticus cruentatus Koch, 1874, p. 558, plate 43, fig. 1. Three syntype females from Sydney and Peak Downs, N.S.W., deposited in the Zoologisches Museum, Hamburg (Rack 1961, p. 59). Koch, 1875, p. 607, plate 48, fig. 1.

Diaea elegans Koch, 1876, p. 815, plate 70, fig. 4. Two male syntypes from Sydney, N.S.W., deposited in the Zoologisches Museum, Hamburg (Rack 1961, p. 18). Syn. nov.

Male

Three specimens from Canberra measured 3·2–3·5 mm in total length, with carapace 1·7–1·8 mm long and 1·6–1·8 mm wide. Carapace approximately as wide as long; front vertical; evenly rounded at sides; moderately convex dorsally; with several long setae in eye area and on pale median area, but lacking fine setae; orange-yellow, with pair of curved, greyish, brownish, or greenish bands extending from posterior lateral eyes nearly to posterior margin. Both rows of eyes recurved, the anterior more than the posterior; anterior laterals largest; median ocular area longer than wide, narrower anteriorly than posteriorly; all set on white prominences, the lateral prominences largest and only slightly separated. Legs pale; femora I and II speckled with red, and tibiae, basitarsi, and distitarsi with encircling reddish band at tips; femur I with 4–5 dorsal spiniforms, 5–7 prolaterals, 0–2 retrolaterals; tibia I with 0–2 dorsal spiniforms, 2–3 prolaterals, 3–4 pairs ventrals, 3 retrolaterals; tarsal claws with 6–8 teeth. Abdomen widest near middle, bluntly pointed posteriorly; dorsum white with pair of curved, dark reddish brown, longitudinal bands, which are sometimes broken into spots near middle; venter with pair of reddish longitudinal

bands. Retrolateral apophysis of palpal tibia long and thin, grooved along ventral margin, with flat lobe on lateral surface near base (Fig. 7*B*); ventral apophysis of tibia erect, curved toward tegulum (Figs. 7*A*, 7*B*); embolus arising at about 275° on tegulum (Fig. 7*A*).

Female

Four specimens from Canberra measured 3·7–4·5 mm (mean 4·2 mm) in total length, with carapaces 1·8–2·1 mm (mean 1·9 mm) long and 1·6–2·1 mm (mean 1·8 mm) wide. Structure and colour as in male except as follows: carapace lacking coloured longitudinal bands (Fig. 7*C*); femur I with 1–2 dorsal spiniforms, 3–5 prolaterals, 0 retrolateral; tibia I with 2 dorsal spiniforms, 0 prolateral, 3–4 pairs ventrals, 0 retrolateral. Epigynum with arched hood overhanging deep atrium with grooved floor (Fig. 8*A*). Spermathecae subdivided into slender anterior piece and sac-like posterior piece (Fig. 8*B*).

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, *Acacia*, *Euonymus*, 3–24.xii.1962, 8.i.–24.x.1963, 4♂, 5♀ (CNC); 1♂, 1♀, 1 imm. (ANIC). NEW SOUTH WALES: Sydney, 2♂ syntypes of *Diaea elegans* (ZMH); 2♀ syntypes of *Xysticus cruentatus* (ZMH). Peak Downs, 1♀ syntype of *Xysticus cruentatus* (ZMH). VICTORIA: Tyabb, from apple, 21.iv.1964, 1 imm. (ANIC).

Comments

Diaea cruentata is a relatively large, brightly coloured crab spider. It resembles *D. inornata* (Koch) in size and structure, but can be separated from it by the former's pale (rather than dark reddish brown) front legs and lack of an abdominal scutum in the male, by the relatively distinct abdominal pattern (dorsal and ventral) in the female, and by the genitalia of both sexes.

Male and female of *D. cruentata* are here associated for the first time. Koch's placement of the male in the genus *Diaea* and the female in *Xysticus* indicates a confusion about the genera of the Thomisinae that still partly exists. The diagnostic characters given by Simon (1895, p. 1029ff.), however, appear to be pertinent to the two genera in question. In *Diaea*, he showed, the median ocular area is longer than wide; the integument of the carapace is smooth and shiny; and the colour patterns are composed of yellows, greens, violet, and red. In *Xysticus*, on the other hand, the median ocular area is square or is wider than long; the integument is invested with fine, short hair; and the predominant colours are yellows, browns, and reddish brown. To these may be added two more characters: in *Diaea* the abdomen is usually widest near the middle and bluntly pointed posteriorly, and the retrolateral apophysis of the male palpal tibia is relatively elaborate. In *Xysticus*, the abdomen is usually widest behind the middle and broadly rounded posteriorly, while the tibial apophysis is a relatively short and simple point.

DIAEA PILULA (Koch)

Figs. 7*D*–7*F*, 8*C*, 8*D*

Xysticus pilula Koch, 1867, p. 212. Female holotype from Brisbane, Qld., deposited in the Zoologisches Museum, Hamburg, now missing (Rack 1961, p. 59). Species identified by original description and Koch's (1874, p. 563, plate 43, fig. 4) specimens deposited in the Zoologisches Museum, Hamburg.

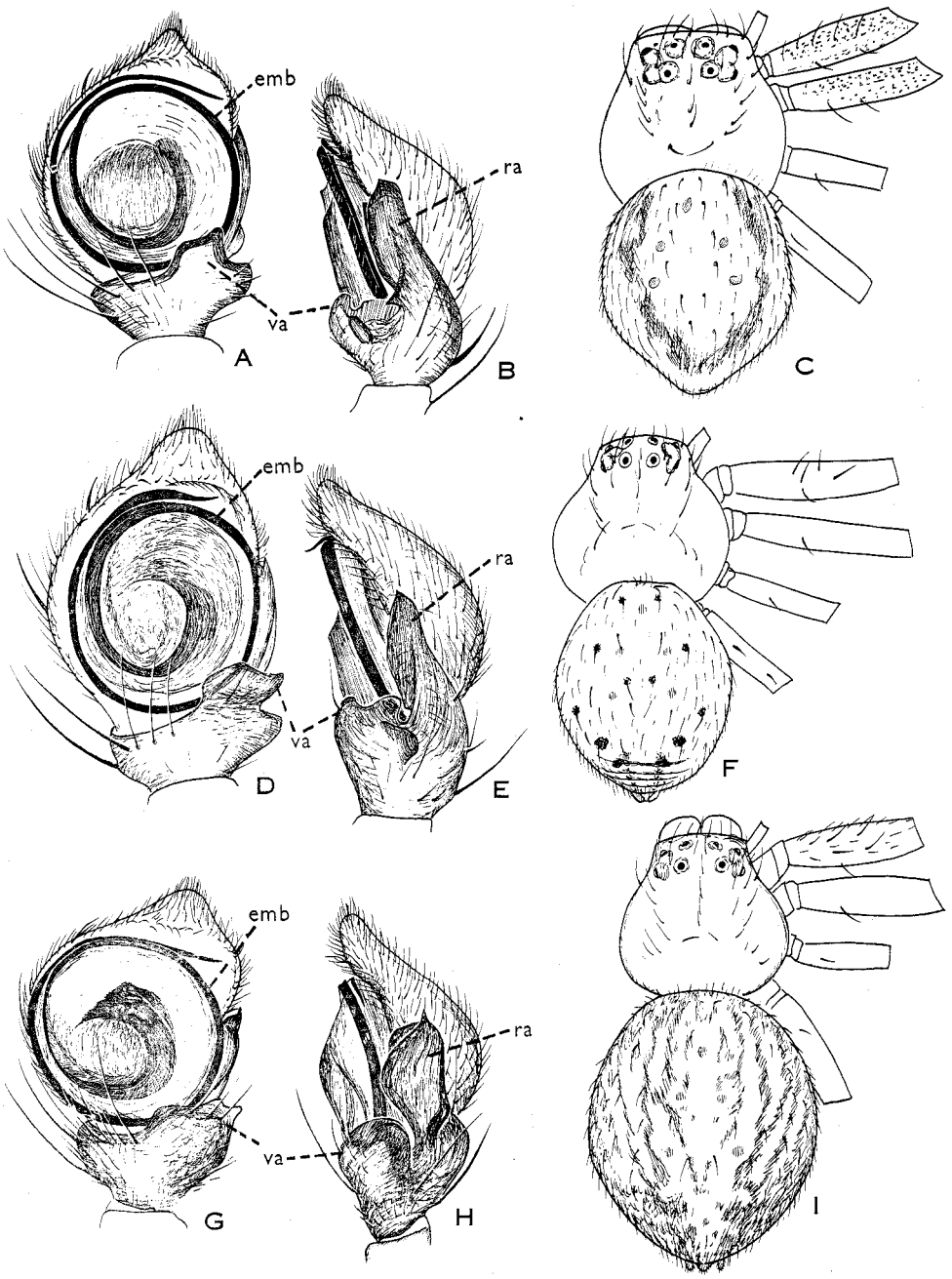

Fig. 7.—*A–C, Diaea cruentata* (Koch): *A, B,* male palpus; *A,* ventral; *B,* retrolateral; *C,* female. *D–F, Diaea pilula* (Koch): *D, E,* male palpus; *D,* ventral; *E,* retrolateral; *F,* female. *G–I, Diaea inornata* (Koch): *G, H,* male palpus; *G,* ventral; *H,* retrolateral; *I,* female.

Xysticus daemeli Koch, 1874, p. 561, plate 43, fig. 3. Male holotype from Sydney, N.S.W., in the Zoologisches Museum, Hamburg (Rack 1961, p. 59). Syn. nov.

Diaea pilula Koch, 1876, p. 813.

Male

Four specimens (one from Canberra and three from Sydney) measured 2·4–3·0 mm (mean 2·7 mm) in total length, with carapace 1·1–1·4 mm (mean 1·3 mm) long and 1·1–1·4 mm (mean 1·3 mm) wide. Carapace orange-yellow, unbanded; with several long, black setae in eye area and on front and pale median area, but without fine hair; broadly rounded at sides; moderately convex over top; approximately as long as wide; front vertical. Both rows of eyes recurved, the anterior more than the posterior; anterior laterals largest; median ocular area longer than wide, with sides parallel or nearly so. Legs with femora I and II dark brownish, II darker than I; tibiae and basitarsi with extensive reddish areas at both ends; III and IV yellow-orange; tarsal claws with about 7 teeth; femur I with 4–5 dorsal spiniforms, 4–5 prolaterals, 0 retrolaterals; tibia I with 2 dorsal spiniforms, 2–3 prolaterals, 3 pairs ventrals, 3 retrolaterals. Abdomen widest near middle, bluntly pointed posteriorly; dorsum with shiny surface; dark reddish brown, with 4–5 pairs black spots at sides in posterior half; sides white; venter with broad median reddish area. Retrolateral apophysis of palpal tibia long, blade-like (Fig. 7*E*); embolus arising near 360° on tegulum, thickened near tip (Fig. 7*D*).

Female

Five specimens from New South Wales measured 2·9–4·0 mm (mean 3·4 mm) in total length, with carapaces 1·2–1·5 mm (mean 1·3 mm) long and 1·2–1·4 mm (mean 1·3 mm) wide. Structure and colour of body essentially as in male, except as follows: femora I and II not brownish, but yellow-orange, lightly speckled with red ventrally, and with dark encircling bands on tibiae and basitarsi. Femur I with 1–2 dorsal spiniforms, 4 prolaterals, 0 retrolaterals; tibia I with 1–2 dorsal spiniforms, 0–1 prolaterals, 3 pairs of ventrals (plus 1–2 unpaired), 0 retrolaterals. Abdominal dorsum yellowish with pattern of black spots (Fig. 7*F*). Epigynum with extremely thin-walled hood anterior to openings (Fig. 8*C*). Spermathecae as in Figure 8*D*.

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, 21.ii.1963, 1♂ (CNC); 1♂ (ANIC); from apple and *Acacia*, May 1964, 2 imm. (ANIC). NEW SOUTH WALES: Wilton, from apple, 18.iv.1963, 1♀ (CNC); 1♀ (ANIC). Peak Downs, 1♀ (*pilula*) (ZMH). Sydney, 1♂, 1♀ (CNC); 2♂, 3♀ (MCZ); ♂ holotype of *Xysticus daemeli* (ZMH); 2♀ (*pilula*) (ZMH).

Comments

Diaea pilula is a small, distinctive crab spider with a broad, reddish mid-ventral band on the abdomen. The female's abdominal dorsum is marked with relatively few, well-spaced black spots. The thickened embolus and nearly round spermathecae also distinguish it from the other known species of *Diaea*.

DIAEA INORNATA (Koch), comb. nov.

Figs. 7*G*–7*E*, 8*E*, 8*F*

Xysticus inornatus Koch, 1876, p. 811, plate 70, fig. 2. Female holotype from Sydney, N.S.W., deposited in the Zoologisches Museum, Hamburg (Rack 1961, p. 59).

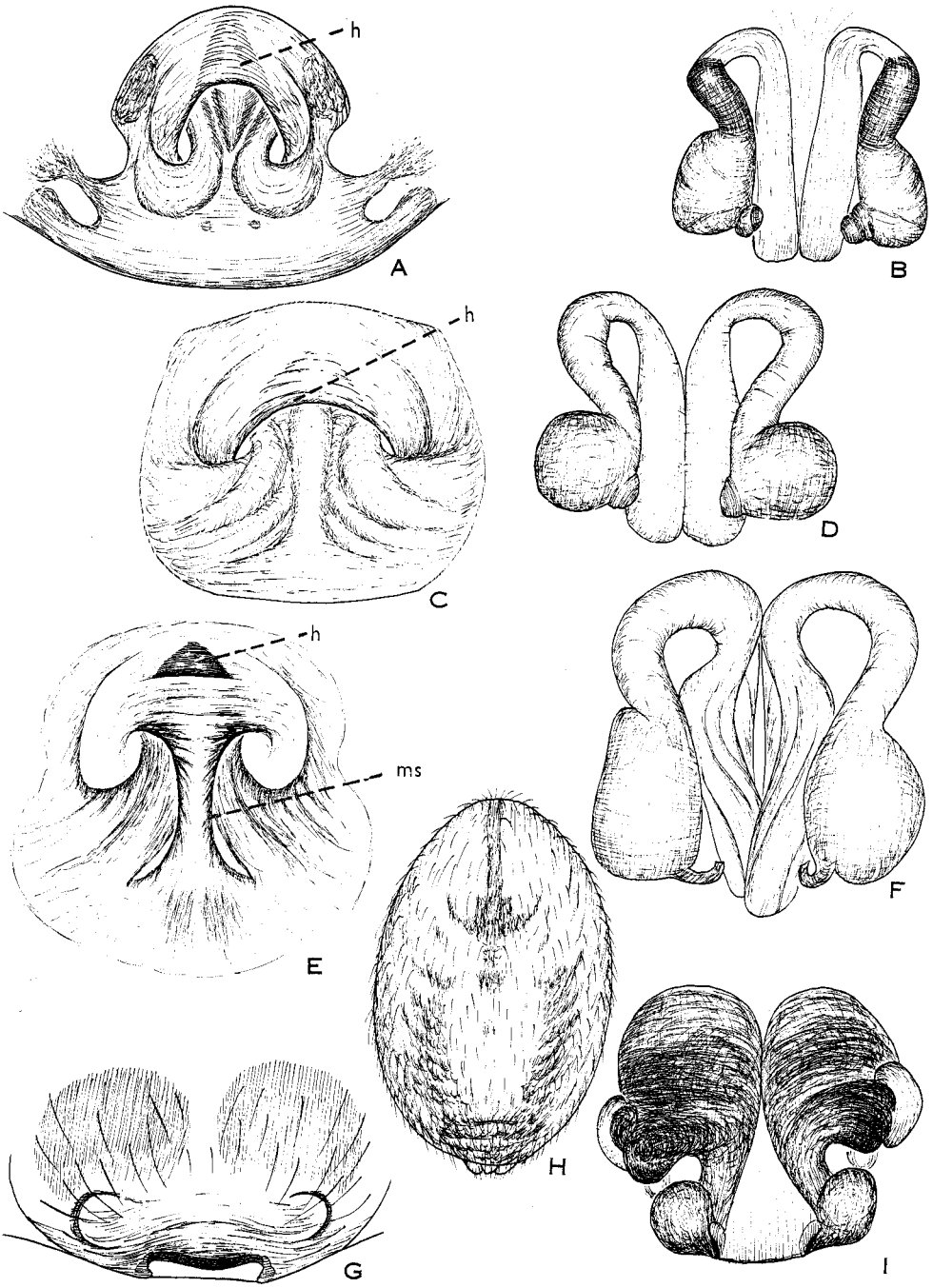

Fig. 8.—*A–B*, *Diaea cruentata* (Koch): *A*, epigynum; *B*, spermathecae. *C–D*, *Diaea pilula* (Koch): *C*, epigynum; *D*, spermathecae. *E–F*, *Diaea inornata* (Koch): *E*, epigynum; *F*, spermathecae. *G–I*, *Badumna inornata* (Koch): *G*, epigynum; *H*, female abdomen; *I*, spermathecae.

Male

One specimen from Canberra measured 3·9 mm in total length, with carapace 1·9 mm long and 1·9 mm wide. Carapace evenly rounded at sides, as wide as long; front vertical; moderately convex dorsally; smooth and shiny, with several long setae in eye area and on pale median area; orange-yellow, with paired, indistinct, broad reddish bands extending from posterior eye row nearly to posterior margin. Both rows of eyes recurved, the anterior more than the posterior; anterior laterals largest; median ocular area longer than wide, slightly narrower anteriorly than posteriorly. Legs I and II dark reddish brown; femora I and II finely speckled with black ventrally; legs III and IV yellowish basally, darker distally; femur I with 4 dorsal spiniforms, 4 prolaterals, 0 retrolaterals; tibia I with 2 dorsal spiniforms, 2 prolaterals, 4 pairs ventrals, 2 retrolaterals; tarsal claws with about 7 teeth. Abdomen widest near middle, bluntly pointed posteriorly; dorsum with thin, shiny, orange-yellow scutum over pale background, and with pattern of reddish streaks and spots on lateral parts; venter pale, sparsely speckled with reddish brown. Retrolateral apophysis of palpal tibia unusually broad (Fig. 7*H*); embolus arising at about 270°, not thickened near tip (Fig. 7*G*).

Female

One specimen from Canberra measured 5·5 mm in total length, with carapace 2·0 mm long and 2·0 mm wide. Structure and colour as in male, except as follows: carapace lacking coloured longitudinal bands (Fig. 7*I*); legs I and II not darker than III and IV; patellae and tibiae with indistinct reddish bands at tips; femur I with 1 dorsal spiniform, 4 prolaterals, 0 retrolaterals; tibia I with 2 dorsal spiniforms, 2–3 prolaterals, 4 pairs ventrals, 0–1 retrolateral; abdomen lacking scutum. Epigynum with small hood anterior to openings (Fig. 8*E*). Spermathecae elongate-ovoid (Fig. 8*F*).

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, 22.i.1963, 1♂ (CNC); from pine, 13.ii.1963, 1♀ (CNC); 1♀ (ANIC). NEW SOUTH WALES: Sydney, ♀ holotype of *Xysticus inornatus* (ZMH).

Comments

The abdominal colour pattern, consisting merely of reddish streaks and small spots, separate *D. inornata* from the other known species of *Diaea*. The male palpal tibia and the female genitalia are also distinctive.

Family **AMAUROBIIDAE**

Many araneologists of the present day choose to treat the family Amaurobiidae as a subfamily of the Dictynidae. This trend is symptomatic of a deeper problem that also involves the ecribellate family Agelenidae. For present purposes, the presence or absence of a cribellum and calamistrum will be taken as rather less fundamental than formerly held, and species possessing these structures as well as a dorsal row of trichobothria on the distitarsi will be treated as amaurobiids. Dictynidae have a cribellum and calamistrum but not the rowed distitarsal trichobothria, while Agelenidae have (normally) no cribellum or calamistrum, but possess the trichobothrial character.

Genus BADUMNA Thorell

Badumna Thorell, 1890, p. 322.

Type species *Badumna hirsuta* Thorell, 1890.

The genus *Badumna* was erected for two species of cribellate spiders from Java. Subsequent authors added four others (Bonnet 1955), but the genus needs re-definition so that the Australian species can be confirmed or rejected as congeners of the Java species, and so that the differences, if any, between *Badumna* and other cribellate genera, e.g. *Ixeuticus* Simon, can be determined.

BADUMNA INORNATA (Koch)

Figs. 8*G*–8*I*, 9*F*, 9*G*

Amaurobius (?) *inornatus* Koch, 1872, p. 325, plate 26, fig. 2. Female holotype from Rockhampton, Qld., deposited in the Zoologisches Museum, Hamburg (Rack 1961, p. 8).

Badumna inornata Simon, 1892, p. 238.

Male

One specimen from Canberra measured 2·8 mm in total length, with carapace 1·5 mm long and 1·2 mm wide. Carapace dark brown to grey, paler submarginally at sides and posteriorly; sparsely covered with short pale setae, those on front, eye area, and in front of dorsal groove longest; dorsal groove a simple, longitudinal fold; in dorsal view, smoothly rounded at sides, constricted at level of coxa I; in lateral view, smoothly arched over top, highest at level of coxa I. Anterior eye row essentially straight; posterior row procurved; all approximately equal in size; laterals on each side set close together; median ocular area slightly wider than long, distinctly narrower anteriorly than posteriorly. Legs yellowish brown, incompletely ringed with black at end and near middle of most segments; femur I with 1–2 dorsal spiniforms, 1–2 prolaterals, 0 retrolaterals; tibia I with 0 dorsal spiniforms, 1 prolateral, 0 retrolateral, 2 pairs ventrals (of which 1 or both of the apical pair may be absent); calamistrum uniserial, extending most of tibia length, sparse. Abdomen dark greyish, with black heart mark and several pairs of indistinct black spots; venter pale grey with diffuse darker areas mesally and in front of cribellum; cribellum indistinctly divided. Chelicerae fang furrow armed with 3 small teeth prolaterally and 2 retrolaterally. Palpal tibia with ventral ridge that extends to retrolateral side and terminates in low, thin apophysis; stout bifid apophysis arising basally (Figs. 9*F*, 9*G*); embolus sinuous, terminating near tip of cymbium (Fig. 9*G*); cymbium much thickened dorsoventrally (Fig. 9*F*).

Female

One specimen from Canberra measured 3·2 mm in total length, with carapace 1·5 mm long and 1·2 mm wide. Structure and colour essentially as in male, but calamistrum more compact. Abdominal dorsum as in Figure 8*H*. Atrium of epigynum broad and shallow, with openings at sides; transverse lip overhanging posterior cavity (Fig. 8*G*). Spermathecae composed of large anterior lobe and smaller posterior one; copulatory tube entering anterior lobe (Fig. 8*I*).

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, 8.i.1963, 1♀ (CNC); from *Acacia*, 18.v.1964, 1♂ (CNC); from *Acacia*, May 1964, several immatures (ANIC). QUEENSLAND: Rockhampton, ♀ holotype of *Amaurobius inornatus* (ZMH).

Comments

This species was placed in the genus *Badumna* by Simon (1892, p. 238). The male palpus has the same basic structure as that of species of *Ixeuticus*, though the main tibial apophysis is stout and bifid rather than undivided. The cymbium also is much thickened dorsoventrally rather than slender, and the median ocular area is narrowed anteriorly rather than parallel-sided. There are other differences in leg spiniformation, body size, colour pattern, and cheliceral armature.

Genus IXEUTICUS Dalmas

Ixeuticus Dalmas, 1917*a*, p. 329.

Type species *Amaurobius martius* Simon, 1899.

This genus was erected for a cribellate spider, *I. martius* (Simon), found in New Zealand. Marples (1959) and Forster (1964) have recently suggested that *martius* is of Australian origin, and that the New Zealand population probably arrived by human transport. They also indicate that the species has been similarly carried to the west coast of North America, where it was described as *Hesperauximus sternitzkii* Gertsch (Gertsch 1937).

Revision of the heterogeneous assemblage of species placed in the genus *Ixeuticus* has recently been initiated by Forster (1964).

IXEUTICUS CANDIDUS (Koch)

Figs. 9*A*–9*E*

Amaurobius candidus Koch, 1872, p. 333, plate 26, fig. 6. Female holotype from Bowen, Qld., deposited in the Zoologisches Museum, Hamburg (Rack 1961, p. 8).

Ixeuticus candidus Roewer, 1954, p. 1368.

Male

Two specimens from Canberra measured 5·5 mm and 6·5 mm in total length, with carapace 2·9 mm and 3·2 mm long and 2·0 mm and 2·3 mm wide. Carapace dark brown, darkest on the front and eye area; with coat of short pale hair and several long setae toward front; in dorsal view, smoothly rounded at sides, constricted at level of coxa I; in lateral view, slightly depressed in front of dorsal groove, gently arched behind eyes; dorsal groove simple and longitudinal. Anterior row of eyes slightly recurved; posterior row procurved; anterior medians largest, posterior medians smallest; laterals on each side set close together; median ocular area as wide as long, with sides approximately parallel. Legs pale brown, darker at distal ends of most segments; I and II slightly longer than III and IV, but none much longer than others; femur I with 3 dorsal spiniforms, 2 prolaterals, 1–2 retrolaterals; tibia I with 0 dorsal spiniforms, 3 prolaterals, 2 retrolaterals, and 3 pairs of ventrals; distitarsi with dorsal row of trichobothria; calamistrum weak, uniserial. Abdomen grey-brown with dark heart mark and series of small, paired spots (Fig. 9*D*); widest near middle; with dense coat of fine pale hair mixed with darker, stouter ones; venter pale; cribellum divided. Chelicerae nearly black, with swollen, roughened surface and small boss; prolateral margin of fang furrow with 4 small teeth; retrolateral margin with 2. Tibia of palpus set with numerous long, fine setae and armed with strong ventral

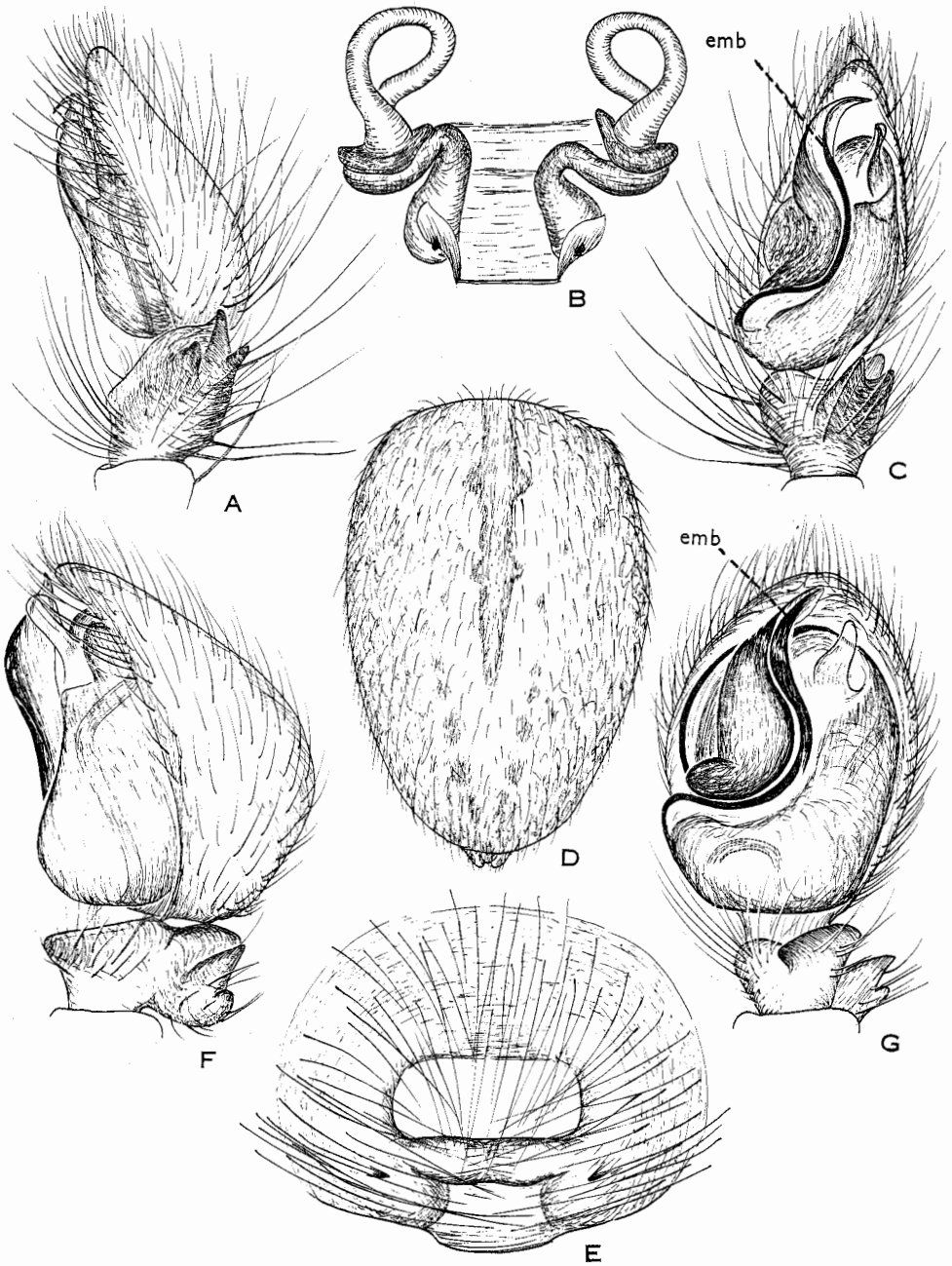

Fig. 9.—*A–E*, *Ixeuticus candidus* (Koch): *A*, male palpus, retrolateral; *B*, spermathecae of female; *C*, male palpus, ventral; *D*, abdomen; *E*, epigynum. *F*, *G*, *Badumna inornata* (Koch), male palpus: *F*, retrolateral; *G*, ventral.

ridge and three retrolateral apophyses (Figs. 9*A*, 9*C*); embolus sinuous, fine, lying in groove of conductor (Fig. 9*C*).

Female

One sub-adult specimen, taken shortly before it moulted, from Canberra measured 7·7 mm in total length, with carapace 2·9 mm long and 2·1 mm wide. Structure and colour essentially as in male, except that the calamistrum is firm and distinct. Epigynum with openings at sides of rectangular, low-rimmed atrium, and with transverse ridge and paired spines at sides (Fig. 9*E*). Spermathecae slender, strongly bent near middle; copulatory tubes thin walled, lying in open loop (Fig. 9*B*).

Specimens examined.—AUSTRALIAN CAPITAL TERRITORY: Canberra, from apple, 12.ii.1963, 1♂ (ANIC); 7.ii.1964, 1♀ (ANIC); from apple, plum, *Acacia*, 28.xii.1962–7.iii.1963, 2♂, 1♀, several immatures (CNC). NEW SOUTH WALES: Wilton, from apple, 28.iii.–18.iv.1963, 2 imm. (CNC). QUEENSLAND: Bowen, ♀ holotype of *Amaurobius candidus* (ZMH).

Comments

Ixeuticus candidus is apparently very similar to *I. martius* Simon, having the same general structure, colour, eye relations, leg spiniformation, and cheliceral tooth number as that species. *Ixeuticus candidus* is only slightly more than half as large as *martius*, however [compared with size data given by Gertsch (1937) and Marples (1959)]; the conductor of the male palpus is much more prominent in retrolateral view; the embolus is less hooked at the tip; the epigynal atrium is approximately rectangular rather than rounded; and the posterior lobes of the spermathecae are slender and bent near the middle rather than kidney-shaped.

RARE ORCHARD SPIDERS

The following species were taken in very small numbers from orchard trees or nearby plants or both, most of them as immatures or as females, and all except one [*Theridion pyramidale* (Koch)] in the Australian Capital Territory. Their importance as predators is probably small, though they are recorded here for the sake of completeness.

Theridiidae
- *Theridion pyramidale* (Koch). One specimen from Wilton, N.S.W.

Araneidae
- *Araneus dehaani* (Doleschall)
- *Araneus pustulosus* (Walckenaer)
- *Leucauge granulata* (Walckenaer)
- *Nephila edulis* (Labillardière)
- *Deliochus zelivira* (Keyserling)
- *Gea theridioides* (Koch)
- *Dolophones turrigera* (Koch)
- *Argyope trifasciata* (Forskoel)
- *Celaenia excavata* (Koch)

Clubionidae
- *Clubiona notabilis* Koch

Thomisidae
- *Diaea evanida* (Koch)
- *Diaea multipunctata* Koch
- *Diaea tenuis* Koch

Salticidae
- *Hypoblemum albovittatum* (Keyserling)
- *Opisthoncus polyphemus* (Koch)
- *Helpis respersa* (Koch)
- *Sandalodes albobarbatus* (Keyserling)
- *Cytaea grisea* Keyserling

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