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The Australian Hersiliidae (Arachnida : Araneae): Taxonomy, Phylogeny, Zoogeography

Barbara Baehr and Martin Baehr

Zoologische Staatssammlung München, Münchhausenstr. 21, D-8000 München 60, West Germany.

Abstract

The Australian species of the spider family Hersiliidae are revised and compared in a key. *Hersilia australiensis*, sp. nov., is newly described, the first record of the genus *Hersilia* from Australia. For all other Australian species a new genus, *Tamopsis*, is erected and the species formerly included in the genus *Tama* Simon are transferred to it. Of the species so far recorded from Australia, only *T. eucalypti* (Rainbow) and *T. fickerti* (L. Koch) are recognised; *Tama novaehollandiae* (L. Koch) and *Tama brachyura* Simon are regarded as doubtful species, because the types are either juveniles or lost and the species are not recognisable from descriptions. For *T. eucalypti* (Rainbow) a lectotype and a paralectotype are designated; for *T. fickerti* (L. Koch) a neotype is designated from the material at hand. The following new species of *Tamopsis* are described: *T. platycephala*, sp. nov.; *T. amplithorax*, sp. nov.; *T. brachycauda*, sp. nov.; *T. tweedensis*, sp. nov.; *T. brisbanensis*, sp. nov.; *T. daviesi*, sp. nov.; *T. kochi*, sp. nov.; *T. centralis*, sp. nov.; *T. reevesbyana*, sp. nov.; *T. grayi*, sp. nov.; *T. darlingtoniana*, sp. nov.; *T. queenslandica*, sp. nov.; *T. raveni*, sp. nov.; *T. cooloolensis*, sp. nov.; *T. brevipes*, sp. nov.; *T. arnhemensis*, sp. nov.; *T. circumvidens*, sp. nov.; *T. tropica*, sp. nov.; *T. trionyx*, sp. nov.; *T. pseudocircumvidens*, sp. nov.; *T. leichhardtiana*, sp. nov.; *T. rossi*, sp. nov.; *T. perthensis*, sp. nov.; *T. occidentalis*, sp. nov.; *T. fitzroyensis*, sp. nov. The species of the genus *Tamopsis* are arranged in nine species-groups.

A character-state analysis of several characters is provided for all species, and the phylogenetic status of species-groups and of included species is derived. It is concluded that four main lineages exist in *Tamopsis*: a high-eyed lineage (*arnhemensis–circumvidens–tropica* groups, 11 species), and three low-eyes lineages, namely the *platycephala* group (two species), the *eucalypti* group (two species), and the *daviesi–queenslandica* groups (10 species). In addition, the *brachycauda* and *tweedensis* groups are very primitive, each consisting of one species of obscure relationships.

The origin of the genus *Tamopsis* is obscure, because no reliable information is available on the hersiliid fauna of neighbouring areas (New Guinea, south-eastern Asia). Phylogenetic and zoogeographical evidence, however, suggests that both high-eyed and low-eyed lineages originated in northern Australia. Perhaps the high-eyed lineage originated in or immigrated into northernmost Northern Territory, and the low-eyed lineages in northern Queensland. Within the *arnhemensis–circumvidens–tropica* lineage, as well as in the *daviesi–queenslandica* and the *platycephala* lineages, migration proceeded in a clockwise direction from the Northern Territory and northern Queensland respectively, through eastern Australia to south-western Australia and, in the *tropica* group, eventually to north-western Australia, where today the most derived *Tamopsis* species lives. The independent migration of species of different lineages probably explains the rich and diverse *Tamopsis* faunas in south-eastern Queensland and eastern New South Wales, as well as in south-western Australia. Both regions can be regarded as major centres for evolution of *Tamopsis*.

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Introduction

Hersiliidae constitute a small family of conspicuously long-legged, delicate spiders, characterised by extremely elongate posterior lateral spinnerets. Four genera are described, *Hersilia* Savigny & Audoin, *Hersiliola* Thorell, *Murricia* Simon, and *Tama* Simon. The family as a whole is distributed over the tropical and subtropical zones of the world. Only *Tama* has so far been recorded from Australia, but a species of *Hersilia*, *H. pernix* Kulczynsky, occurs in New Guinea.

The four Australian species so far recorded are *Tama fickerti* (L. Koch), *T. novaehollandiae* (L. Koch), both originally described under the generic name *Chalinura*, *T. eucalypti* Rainbow and *T. brachyura* Simon. The last species is from south-western Australia; all other species were described from New South Wales but are claimed to be widely distributed in eastern Australia. Although several museum specimens have been named by various determinators, most of the material at hand, particularly that from tropical Australia, is still unidentified. Because types of most Australian species are lost or are immature specimens, and as descriptions are incomplete, identification of species is practically impossible.

During November and December 1984 we had the opportunity to make extensive collections and observations of hersiliids in north-western Australia. It became evident that all the species we captured in this area were undescribed. Therefore, we undertook a general revision of the Australian Hersiliidae, studying all available material from Australian and foreign museums. Although the number of existing species proved to be very large, material of most species is at present very unsatisfactory and several species are known only from one sex.

Very little is known about the distribution, habits, and life histories of the Australian Hersiliidae. Rainbow (1900, 1904) and Main (1967) stated that all Australian species were captured from trees, especially from the trunks of *Eucalyptus*. Koch's specimens were also collected from 'shrubs and vegetation', partly by beating 'twigs and foliage' (Koch 1876). These habits are opposed to those of *Tama* spp. in other countries, where they live under stones or in rock fissures and construct an 'irregular pholcus-like web' (Simon 1892; Rainbow 1904; Smithers 1945). So far as we could observe, we never saw any Australian hersiliid in such a web.

Generally, juveniles are not considered in this revision. In several cases, however, juvenile specimens have been tentatively allocated to certain species, but always without being designated as paratypes. In some species identification of females is difficult, and females have been identified by association with males. Altogether, about 470 specimens have been considered for this revision.

Abbreviations of collections used in text:

AMS	Australian Museum, Sydney
BMNH	British Museum (Natural History), London
CAS	California Academy of Sciences, San Francisco
MNHN	Museum National d'Histoire Naturelle, Paris
NMV	Museum of Victoria, Melbourne
QM	Queensland Museum, Brisbane
SMF	Senckenberg Museum, Frankfurt-am-Main
WAM	Western Australian Museum, Perth
ZMH	Zoologisches Museum, Hamburg
ZSM	Zoologische Staatssammlung, München

Abbreviations of terms used in text:

Abd	abdomen
ALE	anterior lateral eye
AME	anterior median eye
bS	basal segment of posterior lateral spinneret
Ceph	cephalothorax
Ch	chelicerae
Cl	clypeus
DMP	dorsal musculature pits
Epi	epigyne
ID	insemination duct
juv	juvenile specimen
LA	lateral apophysis of palpus
LB	total length of body

LL	total length of legs	tS	terminal segment of posterior lateral spinneret
LSS	lancet-shaped stripe	V	vulva
MA	median apophysis of palpus	VMP	ventral musculature pits
Pa	palpus	I	1st leg
PLE	posterior lateral eye	II	2nd leg
PLS	posterior lateral spinneret	III	3rd leg
PME	posterior median eye	IV	4th leg
RS	receptaculum seminis		
St	sternum		

Measurements. Measurements were made under a stereo-microscope with an ocular micrometer with up to 160× magnification. Size of eyes is given as relative to AME.

Distribution Maps. These are based on label data of examined specimens only. Label data we were not able to localise are not indicated in the maps.

Characters

The most important character for separating species is the structure of the male Pa. The hersiliid Pa has two apophyses, the medio-ventral MA and the lateral (inner) LA which supports the embolus. The Pa of *Hersilia* is rather primitive. It has a simple, spoon-shaped MA, a very simple and short LA, and a free, strongly coiled embolus. In the other Australian hersiliids, Pa is differentiated in various ways. In all species LA is developed into a slide for the embolus, which in some species is free and penetrating ('Einführungsembolus' *sensu* Wiehle 1956). In most species, however, the embolus is completely hidden in the LA and functions as an attaching embolus ('Anlegeembolus' *sensu* Wiehle 1956). MA is also more sophisticated than in *Hersilia*: it is armoured with hook-shaped structures, or the tip is coiled in a complicated manner, or it is provided with a scopula-like organ. Only in some sister species is the Pa rather similar.

Epi of the female is generally fairly similar. In only a few species can Epi be used for differentiation of females without consideration of V. Epi may possess lateral slits or tubes for the insertion of certain fixing structures of the MA. With the exception of *Hersilia*, V is structurally fairly similar, consisting of from one to three RS (sometimes with an additional lateral glandular sac) and a more or less complexly coiled ID. In most species the structure of V provides good grounds for distinguishing species.

Colour is not very useful for identification, because it is rather variable. The basic pattern is a dark median LSS, and darker borders to the Abd. The legs may be annulate, but this varies according to the extension of the melanocytes. Special patterns are useful in the identification of some species, e.g. a black spot or black and white pattern on Ch and Cl, or blackish tarsi. In several species true melanotic forms occur.

Body shape, especially of Abd, is characteristic in some species. Sometimes relative size of Ceph, as compared with Abd, is also characteristic. In females Abd is generally wider than in males.

A good character is the relative height of the eye area, which may be flat and not surpassing dorsal surface of Ceph, or may be strongly raised to a conspicuous eye mound. Species-groups may be separated by the relative height of Cl, which varies from about 0·33 to about 1·25 of the height of the eye area.

The position of eyes is rather similar, but relative size, in particular of AME as compared with PME and PLE, varies. Both rows are recurved. ALE are always by far the smallest and are nocturnal; other eyes are diurnal.

Ch are toothed along their anterior border. Anteriorly, all species have a row of three large teeth (and sometimes an additional small one); from one to seven minute posterior teeth sit on a low ridge. The number of posterior teeth may be useful for distinguishing some species, but in most it varies rather too much.

DMP on Abd may be circular, elongate lentil-shaped, or falciform. In number, they vary from four to five.

The length of legs relative to the body length is characteristic in several species. I is the longest, followed by II and III, IV is by far shortest, only one-fifth to one-third times

as long as I. Female legs are about one-third shorter than male legs, except for III which is about one-seventh shorter. The relative length of segments is rather similar in most species. In I, II, and IV the femur is always slightly longer than the tibia, and the metatarsus is about 1·33 times as long as the femur. In *Hersilia*, however, the metatarsus is divided and in the male is up to 1·5 times as long as the femur. The length ratio of the divided metatarsus is about 1 : 0·54 in males and about 1 : 0·7 in females. The number and location of spines on the legs is rather similar.

PLS are always very elongate, but the relative length differs to a great extent between species.

Classification

Family **HERSILIIDAE**

For diagnosis see Simon (1892).

Key to Australian Genera of Family Hersiliidae

Metatarsus of I, II, and IV biarticulate. Pa with simple, spoon-shaped MA, LA simple, short. Embolus very elongate, coiled around MA (Figs 1*d*, 1*e*). Epi with large, trapezoid scapus (Fig. 2*d*) ..... *Hersilia* Savigny & Audoin

Metatarsus of I, II, and IV not biarticulate. Pa with more complicated MA, mostly armed with a hook or claw, LA more elongate, mostly differentiated. Embolus partly or fully hidden in LA. Epi without a large, trapezoid scapus *or* ID elongate, coiled ..... *Tamopsis*, gen. nov.

Genus **Hersilia** Savigny & Audoin

Hersilia Savigny & Audoin, 1827, p. 317.

For extensive synonymy see Bonnet, 1957, p. 2175.

No *Hersilia* has so far been identified from Australia, although *Hersilia pernix* Kulczinsky, 1911 was described from New Guinea. One new species is now described from the Northern Territory.

Hersilia australiensis, sp. nov.

(Figs 1, 2, 45)

Types

Holotype ♂, Northern Territory, 12°40′S.,132°30′E., South Alligator Inn, Nov. 1979, leg. R. Raven (QM). Paratypes: 1♂, 1♀, same locality and date (QM, ZSM); 1♂, 2♀, Northern Territory, 12°11′S.,132°16′E., West Alligator Mouth WA2, 12.xi.1979, leg. R. Raven (QM, ZSM).

Type locality: South Alligator River, Northern Territory.

Diagnosis

The single Australian species of *Hersilia*, characterised by strongly raised and laterally concave eye mound, strongly coiled embolus, and trapezoid scapus of Epi which is square posteriorly and has medially excised side plates. Epi totally different from that of *H. pernix* from New Guinea.

Male Holotype

Measurements. Length 6·4 mm. Ceph length 2·5 mm, width 2·5 mm. Abd length 3·9 mm, width 3·0 mm. Legs: I, 32·8 mm; II, 30·0 mm; III, 8·7 mm; IV, 25·4 mm. Ratio 1 : 0·91 : 0·27 : 0·77. Ratio LB/LL, 0·2. PLS 4·3 mm; bS 0·8 mm; tS 3·5 mm. Eyes 1 : 0·27 : 0·71 : 1.

Colour. Ceph yellow to greyish, lateral border and near eyes black. Ch anteriorly black. Abd greyish, spotted with white. LSS anteriorly brownish, posteriorly black. Lateral border black. Posteriorly some ill-defined black and white crossbars. Legs and PLS light yellow, broadly annulate.

Cephalothorax. Eye area strongly raised, lateral border concave. Cl about as high as eye area. Eyes: AME as large as PLE, distance AME–ALE slightly greater than distance PME–PME. Ch *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 7 minute teeth. St heart-shaped, anteriorly with some long bristles.

Abdomen. Oval to somewhat square, with 4 pairs of circular DMP. VMP in an elongate V-shaped arrangement. PLS slightly longer than Abd.

Legs. Measurements as above. Metatarsus divided, distal part *c.* $\frac{1}{2}$ as long as proximal part. Legs very elongate.

Palp. Cymbium with 4–5 apical spines. MA short, simple, spoon-shaped. Apex of embolus free, embolus spirally coiled around MA.

Female Paratype (No. 1, South Alligator Inn)

Measurements. Length 7·1 mm. Ceph length 2·8 mm, width 2·7 mm. Abd length 4·3 mm, width 3·5 mm. Legs: I, 23·1 mm; II, 22·7 mm; III, 7·5 mm; IV, 20·1 mm. Ratio 1 : 0·98 : 0·32 : 0·87. Ratio LB/LL, 0·31. PLS 5·2 mm; bS 0·9 mm; tS 4·3 mm. Eyes 1 : 0·4 : 1·12 : 1·12.

Colour. As in holotype, Abd slightly darker.

Cephalothorax. As in holotype, but PME and PLE slightly larger.

Abdomen. More circular than in male, but similar in other respects. PLS still more elongate, *c.* $1\frac{1}{3}\times$ as long as Abd.

Legs. Measurements as above. Shorter than in male, but still very elongate.

Epigyne. Lateral plates medially excised, median scapus trapezoid, apically square.

Vulva. Simple, with large median RS and elongate lateral RS, and with very short ID.

Variation

Little with respect to the material at hand.

Distribution (Fig. 45)

Arnhem Land, northernmost Northern Territory.

Material Examined

Eight specimens; apart from the type series, two juv from the type locality are tentatively allocated to this species.

Habits

Virtually unknown, all specimens collected in November.

Genus **Tamopsis**, gen. nov.

Chalinura Koch, 1876, p. 830 (pro parte).
Rhadine Simon, 1882, p. 255 (pro parte).
Tama Simon, 1882, p. 256 (pro parte); 1892, p. 447; Rainbow, 1900, p. 487; 1904, p. 325; Simon, 1908, p. 406; Rainbow, 1911, p. 152; Röwer, 1942, p. 383; Bonnet, 1959, p. 4236; Brignoli, 1983, p. 431 (all pro parte).

Type-species: *Tama eucalypti* Rainbow, 1900.

Diagnosis

Rather small to medium-sized species. Legs with inarticulate metatarsus. Ch always with 3 distinct teeth at anterior rim. PLS considerably shorter to slightly longer than Abd. Legs elongate, Pa with complicated MA, mostly with hook-shaped structure at tip, MA sometimes coiled, or with a scopula-like organ at apex. LA elongate, mostly highly complicated, providing a slide for the embolus. Embolus partly or completely hidden in LA, never coiled around MA. Epi with or without lateral openings. V with 1–3 RS on each side, which may be glandular outside, or with a separate glandular sac. ID short to

elongate, then sometimes complexly coiled. V with or without a median sclerotized bar or scapus. All species, so far known, arboricolous.

For a long time workers have followed the lead of Simon and classified the known Australian Hersiliidae in the widely distributed genus *Tama*, even though Koch (1876) had described the first two species under *Chalinura*. Having examined several species of *Tama* from different countries, and with reference to the most recent revisions (Smithers 1945; Sinka 1951; Carcavallo 1961), we feel sure that all the Australian species we studied belong to a genus different from *Tama*, as is shown especially by their much more complicated Pa. This idea is also supported by the general arboreal habit of all Australian species (Rainbow 1900, 1904), as compared with the terrestrial and web-producing habit of *Tama* species. We refrained from re-erecting Koch's old name *Chalinura*, because it was first used for a fossil species now included in *Hersilia*.

Key to the Australian Species of Genus *Tamopsis*

1. Males 2
   Females 20
2(1). DMP falciform, very elongate. Abd very elongate, nearly parallel. MA apically with large hook-like apophysis, LA with cap-like apex, embolus hidden (Figs 3, 4) ..... *platycephala* group. 3
   DMP lentil-shaped or circular. Abd shorter, wider. MA different; hook-like apophysis, if present, shorter. LA without cap-like apex 4
3(2). Ceph not much wider than Abd. Apophysis at apex of MA shorter. Basal part of LA much narrower (Fig. 4). Eastern central Queensland ..... *platycephala*, sp. nov.
   Ceph much wider than Abd. Apophysis at apex of MA longer, much surpassing lateral border of Pa. Basal part of LA very wide (Fig. 3). South-western Australia ..... *amplithorax*, sp. nov.
4(2). Eye area just slightly raised, Cl low, at most *c.* $\frac{2}{3}\times$ as high as eye area. MA apically not ring-shaped 5
   Eye area strongly raised, Cl as high as eye area or higher. MA apically ring-shaped 13
5(4). MA apically with large, acute, horizontal, hook-shaped apophysis (Figs 10, 12). Rather large species, >4 mm long ..... *eucalypti* group. 6
   MA apically without large, acute, hook-shaped apophysis. Medium-sized to small species, length <4 mm 7
6(5). MA without preapical scopula-like organ, apex of LA not excised, nor strongly hooked (Fig. 10). South-eastern Australia ..... *eucalypti* (Rainbow)
   MA with preapical scopula-like organ, apex of LA excised and with a strong hook (Fig. 12). Eastern Queensland, eastern New South Wales ..... *brisbanensis*, sp. nov.
7(5). Very small species, length <3 mm. PLS very short, *c.* $\frac{1}{2}$ as long as Abd. Pa dorsally with densely setose area (Fig. 6) ..... *brachycauda*, sp. nov.
   Larger species, length 3 mm or more. PLS longer, at least $\frac{3}{4}$ length of Abd or longer. Pa dorsally without densely setose area, sometimes with spinose area 8
8(7). Pa dorsally with spinose area. MA contorted, apex spoon-shaped. Legs and PLS very elongate, PLS longer than Abd (Fig. 8). Eastern Queensland, north-eastern New South Wales ..... *tweedensis*, sp. nov.
   Pa dorsally without spinose area. MA contorted, apex strongly excised, with a membranous area within. PLS less elongate, at most as long as Abd 9
9(8). AME not much smaller than PME, mostly larger. LA not deeply excised at apex 10
   AME considerably smaller than PME. LA deeply excised at apex (Fig. 23). South-eastern Queensland ..... *raveni*, sp. nov.
10(9). LA apically not much contorted. MA less deeply excised at apex, bent horizontally (Fig. 14). North-eastern Queensland ..... *daviesi*, sp. nov.
   LA apically strongly contorted. MA deeply excised at apex, bent obliquely (Figs 16, 17, 21) 11
11(10). MA very deeply and widely excised, LA deeply channelled at apex (Fig. 21). South-eastern Queensland, eastern New South Wales ..... *queenslandica*, sp. nov.
   MA less deeply excised, LA not conspicuously channelled at apex (Figs 16, 17) 12

12(11). Lateral-apical part of MA not swollen, without sharp edge. LA not much longer than MA, apex sharply bent, contorted (Fig. 16). South-western Australia ..... *kochi*, sp. nov.
Lateral part of MA swollen, with sharp edge. LA much longer than MA, apex not sharply bent, not much contorted (Fig. 17). Central Queensland ..... *centralis*, sp. nov.

13(4). MA without a scopula-like organ within apical membranous area. Apex of embolus freely projecting beyond LA (Figs 27, 29) 14
MA with a scopula-like organ within apical membranous area. Apex of embolus hidden in LA (Figs 31, 33, 37, 39, 41, 43) ..... *tropica* group. 15

14(13). Eye area moderately raised, oblique near top. MA with rather small apical hook-like process. LA very simple, without special features, embolus straight, apex free (Fig. 27). Northernmost Northern Territory and northern tip of Queensland ..... *arnhemensis*, sp. nov.
Eye area strongly raised, sides concave. MA with a strong hook-like process. Apex of LA trumpet-shaped, spirally coiled, embolus along apical rim of LA (Fig. 29). South-western Australia ..... *circumvidens*, sp. nov.

15(13). Medium-sized species, length <4 mm. MA not much contorted, base medially barely excavate. Apex without sharp, elevated lateral rim, median membranous area not deeply sunken (Figs 31, 33) 16
Large species, length $>4{\cdot}4$ mm. MA more strongly contorted, medially excavate. Apex with more or less elevated, sharp lateral rim, median membranous area deeply sunken (Figs 37, 39, 41, 43) 17

16(15). III relatively short. Apical apophysis of MA short, apex of LA barely excised (Fig. 31). North Queensland ..... *tropica*, sp. nov.
III more elongate. Apical apophysis of MA elongate, apex of LA very deeply excised, 3 elongate spines lateral to excision (Fig. 33). Southern central Queensland ..... *trionyx*, sp. nov.

17(15). PLS considerably shorter than Abd. Sharp lateral rim of MA not crenulate, apical apophysis entire (Figs 37, 39, 41) 18
PLS as long as or longer than Abd. Sharp lateral rim of MA crenulate, apical apophysis divided (Fig. 43). North-western Australia north of Great Sandy Desert ..... *fitzroyensis*, sp. nov.

18(17). Lateral rim of MA simple, not doubly excavate. LA (lateral view) enlarged at apex (Figs 37, 39) 19
Lateral rim of MA deeply incised and doubly excavate. LA (lateral view) not enlarged at apex (Fig. 41). North-western Australia south of Great Sandy Desert ..... *occidentalis*, sp. nov.

19(18). Lateral rim of MA with short cleft near dorsal apophysis. LA barely sinuate in middle, apex slightly enlarged. Legs shorter (Fig. 39). South-western Australia ..... *perthensis*, sp. nov.
Lateral rim of MA without cleft near dorsal apophysis. LA sinuate in middle, apex strongly enlarged. Legs more elongate (Fig. 37). South-eastern Australia ..... *fickerti* (L. Koch)

20(1). DMP falciform, very elongate. Abd very elongate, laterally with pockets. V with 1 circular RS, RS basally swollen and glandular (Fig. 4). Eastern central Queensland ..... *platycephala*, sp. nov.
DMP lentil-shaped or circular. Abd mostly shorter, without conspicuous pockets laterally 21

21(20). Eyes not much raised, Cl low, at most *c.* $\frac{2}{3}\times$ as high as eye area 22
Eye area strongly raised, Cl as high as eye area or higher 33

22(21). ID of V elongate, crossing RS, sometimes sharply bent laterally. Ventral RS always glandular outside. Epi laterally without openings (Figs 18–20, 22, 24) .... *queenslandica* group. 23
ID of V short, not crossing RS, not bent. V different, ventral RS not always glandular. Epi with or without openings laterally (Figs 7, 9, 11, 13, 25, 26) 27

23(22). Apparently only 1 large RS each side (Fig. 18). South Australia ..... *reevesbyana*, sp. nov.
Apparently 2 RS each side (Figs 19, 20, 22, 24) 24

24(23). ID sharply bent laterally, V without conspicuous V-shaped bridge in middle (Figs 20, 22, 24) 25
ID not sharply bent laterally, V with conspicuous V-shaped bridge in middle (Fig. 19). Eastern New South Wales ..... *grayi*, sp. nov.

25(24). AME nearly as large as PME. V with ID posteriorly sharply bent outwards and produced laterally (Fig. 22). South-eastern Queensland, eastern New South Wales ..... *queenslandica*, sp. nov.

AME considerably smaller than PME. V with ID posteriorly not bent outwards, nor produced laterally (Figs 20, 24) 26

26(25). PLS longer than Abd. Dorsal RS much smaller than ventral RS (Fig. 20). South-western Australia ..... *darlingtoniana*, sp. nov.

PLS shorter than Abd. Dorsal RS about as large as ventral RS (Fig. 24). South-eastern Queensland ..... *raveni*, sp. nov.

27(22). AME considerably smaller than PME. Large species, length 5 mm or more. V with 2 RS, lateral RS larger, somewhat sinuose, lobate, glandular along whole outer side. Epi posteriorly with sclerotised bar (Figs 11, 13) ..... *eucalypti* group. 28

AME about as large as PME or larger. Smaller species, length < 5 mm. V different, lateral RS neither lobate nor glandular along whole outer side (Figs 7, 9, 15, 25, 26) 29

28(27). PLS considerably shorter than Abd. Epi laterally without openings. RS approximated (Fig. 11). South-eastern Australia ..... *eucalypti* (Rainbow)

PLS as long as or longer than Abd. Epi with openings halfway laterally. RS widely separated (Fig. 13). Eastern Queensland, eastern New South Wales ..... *brisbanensis*, sp. nov.

29(27). Epi laterally with a tube-like or slit-shaped opening. Medium-sized species, length > 4 mm (Figs 15, 25, 26) 30

Epi without lateral opening. Rather small species, length < 4 mm. AME always very large (Figs 7, 9) 32

30(29). AME considerably larger than PME. Epi with tube-like opening at some distance from lateral border. V with 2 RS, lateral RS elongate and strongly coiled (Fig. 15). North-eastern Queensland ..... *daviesi*, sp. nov.

AME not larger than PME, mostly slightly smaller. V with 1 RS and with 1 or 2 differently shaped glandular sacs (Figs 25, 26) 31

31(30). PLS and legs elongate, PLS longer than Abd. Epi with tube-like opening at some distance from lateral border. V with 2 circular glandular sacs (Fig. 25). South-eastern Queensland ..... *cooloolensis*, sp. nov.

PLS and legs short, PLS shorter than Abd. Epi with a slit-shaped opening near lateral border. V with 1 partly divided glandular sac (Fig. 26). Eastern New South Wales ... . *brevipes*, sp. nov.

32(29). PLS and legs very short, PLS just $\frac{1}{2}$ as long as Abd. Abd dorsally with a conspicuous hump in middle. V compact, with 2 RS and a circular glandular sac (Fig. 7). Eastern Australia ..... *brachycauda*, sp. nov.

PLS and legs very elongate, PLS longer than Abd. Abd without dorsal hump. V widely separated, with 3, not wholly distinct RS, larger ones apically or laterally glandular (Fig. 9). Eastern Queensland, north-eastern New South Wales .... *tweedensis*, sp. nov.

33(21). Very small species, length < 3 mm. Eye area moderately raised, sides near top oblique. V with 2 elongate RS and a mushroom-shaped glandular, basal sac. Epi with funnel-shaped opening medially (Fig. 28). Northernmost Northern Territory, northern tip of Queensland ..... *arnhemensis*, sp. nov.

Larger species, length > 3·5 mm. Eye area strongly raised, not oblique near top. V different, without a mushroom-shaped sac. Openings of Epi more lateral (Figs 30, 32, 34–36, 38, 40, 42, 44) 34

34(33). Sides of eye area concave. Epi with a tubular opening at some distance from lateral border. RS very elongate, strongly coiled (Fig. 30). South-western Australia .... *circumvidens*, sp. nov.

Sides of eye area straight. Openings of Epi variable. RS not very elongate nor coiled (Figs 32, 34–36, 38, 40, 42, 44) 35

35(34). Apical section of inner RS conspicuously circular, with narrow duct (Figs 34–36) 36

Apical section of inner RS not conspicuously circular, not separated by a narrow duct (Figs 32, 38, 40, 42, 44) 38

36(35). V very wide and with a broad sclerotised bridge. Lateral RS nearly as long as median RS (Fig. 34). South-western Australia ..... *pseudocircumvidens*, sp. nov.

V narrower, with a narrow sclerotised bridge. Lateral RS considerably smaller than median RS (Figs 35, 36) 37

37(36). Smaller, wider species, *c.* 4·0–4·5 mm long. Legs and PLS rather stout. Lateral RS very small, horizontally directed. Bridge of V without approximated clasp-like process (Fig. 35). North-western Queensland ..... *leichhardtiana*, sp. nov.

Large, elongate, species, *c.* 5·5 mm long, legs and PLS rather elongate. Lateral RS larger, not horizontally directed. Bridge of V with approximated clasp-like process (Fig. 36). South-western Australia ..... *rossi*, sp. nov.

38(35). Medium-sized species, length <4 mm (Fig. 32). Northern Queensland, north-eastern Northern Territory ..... *tropica*, sp. nov.
Large species, length 5 mm or more 39

39(38). V with an entire, sclerotised bridge at posterior border. Ventral RS much more elongate than dorsal RS. Opening on Epi consisting of 2 slits, somewhat removed from lateral border (Fig. 44). North-western Australia north of Great Sandy Desert .... *fitzroyensis*, sp. nov.
V without an entire, sclerotised bridge at posterior border. Ventral RS just slightly larger than dorsal RS. Opening of Epi consisting of only 1 slit (Figs 38, 40, 42) 40

40(39). ID crossing base of RS, V with conspicuous triangular scapus in middle. Openings of Epi immediately at lateral border (Figs 38, 40) 41
ID not crossing base of RS. V without triangular scapus in middle. Openings of Epi far removed from lateral border (Fig. 42). North-western Australia south of Great Sandy Desert ..... *occidentalis*, sp. nov.

41(40). ID strongly swollen around base of RS, produced dorsomedially. Scapus separated laterally at base from anterior area (Fig. 38). South-eastern Australia ..... *fickerti* (L. Koch)
ID not swollen around base of RS, not produced dorsomedially. Scapus not separated at base (Fig. 40). South-western Australia ..... *perthensis*, sp. nov.

The *platycephala* Group

A distinctive group of two apparently very closely related species.

Tamopsis platycephala, sp. nov.

(Figs 4, 5, 45)

Types

Holotype ♂, Teewah Creek, Cooloola, Queensland, 14.ix.1973, coll. R. Raven, on single thread on dead scrub (QM). Paratypes: 2♀, Endfield Stn, 40 miles W. Westmar, south central Queensland, 10.i.1979 (QM, ZSM).

Type locality: Cooloola, south-eastern Queensland.

Diagnosis

Small, elongate species. Easily distinguished by shape of Abd, eye area virtually not raised, falciform, elongate DMP, and characteristic Pa. Distinguished from the following species by the relatively much smaller Ceph and the LA, which is far narrower at the base.

Male Holotype

Measurements. Length 4·6 mm. Ceph length 1·7 mm, width 1·6 mm. Abd length 2·9 mm, width 1·5 mm. Legs: I, 12·1 mm; II, 11·1 mm; III, 3·7 mm; IV, 9·7 mm. Ratio 1 : 0·92 : 0·31 : 0·8. Ratio LB/LL, 0·38. PLS length 3·3 mm; bS 0·5 mm; tS 2·8 mm. Eyes 1 : 0·3 : 0·8 : 0·88.

Colour. Ceph light brown, at eyes and near border darker, a median stripe behind eyes whitish. Ch brown. Abd white, slightly mottled with dark; LSS, DMP, and lateral border blackish; lateral border ill-defined. Legs yellow, apex of segments darker. Legs also conspicuously annulate. PLS yellow, slightly darkened laterally.

Cephalothorax. Rather small, as wide as Abd. Eye area virtually not raised, whole Ceph strongly depressed. Cl very low, just $\frac{1}{3}$ as high as eye area. Eyes: AME largest, distance of AME–AME and AME–ALE about equal to diameter of AME. Distance of PME–PME *c.* $\frac{2}{3}$ of diameter of PME, distance PME–PLE slightly greater than 1·5× diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly with 3–4 minute teeth. St heart-shaped, sparsely setose.

Abdomen. Very elongate, nearly parallel-sided, largest behind middle, with 3 pairs of elongate, falciform and 1 posterior pair of small, circular DMP. VMP in 2 almost parallel rows. PLS slightly longer than Abd.

Legs. Measurements as above. Rather short, III rather elongate, *c.* $\frac{1}{3}$ as long as I.

Palp. MA with very large, elongate, slightly depressed, and sharply bent hook-like apophysis at apex. LA moderately wide basally, with cup-shaped structure at apex which conceals the embolus completely.

Female Paratype (No. 1, Westmar)

Measurements. Length 5·0 mm. Ceph length 1·6 mm, width 1·5 mm. Abd length 3·4 mm, width 2·4 mm. Legs: I, 8·6 mm; II, 7·4 mm; III, 3·0 mm; IV, 7·1 mm. Ratio 1 : 0·86 : 0·35 : 0·83. Ratio LB/LL, 0·58. PLS length 3·1 mm; bS 0·6 mm; tS 2·5 mm. Eyes 1 : 0·6 : 0·8 : 0·8.

Colour. Similar to holotype, but Abd darker and legs more distinctly annulate.

Cephalothorax. Much like holotype.

Abdomen. More oval-shaped with a conspicuous pocket each side behind middle. PLS slightly shorter than Abd, tS relatively shorter.

Legs. Measurements as above, considerably shorter than in male.

Epigyne. Very simple, without conspicuous characters.

Vulva. Simple, with large RS which is basally swollen and glandular. ID very short.

Variation

Apart from conspicuous sexual differences in the shape of Abd, there is very little variation.

Distribution (Fig. 45)

South-eastern Queensland.

Material Examined

Only the type series (1♂, 2♀).

Habits

Unknown, one specimen from 'dead scrubs'. Individuals were captured in November and January.

Tamopsis amplithorax, sp. nov.

(Figs 3, 45)

Type

Holotype ♂, Toolbrunnup Camping area, Stirling Ranges, 34°01′S.,117°50′E., Western Australia, 18.v.1975, S. Slack-Smith (WAM Reg. No. 85/404).

Type locality: Stirling Ranges, southern Western Australia.

Diagnosis

Easily distinguished from most other species by parallel-sided Abd, elongate, falciform DMP, and distinctive Pa with strongly hooked MA; from related *T. platycephala* by much larger Ceph and distinctive Pa with larger apical hook of MA and basally much wider LA.

Male Holotype

Measurements. Length 4·9 mm. Ceph length 2·1 mm, width 2·0 mm. Abd 2·8 mm, width 2·1 mm. Legs: I, 13·6 mm; II, 12·3 mm; III, 4·1 mm; IV, 10·8 mm. Ratio 1 : 0·9 : 0·3 : 0·79. Ratio LB/LL, 0·36. PLS length 3·15 mm; bS 0·55 mm; tS 2·6 mm. Eyes 1 : 0·43 : 0·71 : 0·86.

Colour (specimen dried out). Ceph very dark, especially at borders and near eyes. Ch brownish. Abd yellow, with large LSS and with borders black. Abd anteriorly mottled with black, posteriorly with various irregular black crossbars. Legs yellow, apex of segments darker. PLS dark outside.

Cephalothorax. Large, circular, considerably wider than Abd. Eyes virtually not raised, Cl very low, *c.* $\frac{1}{3}$ as high as eye area. Whole Ceph much depressed. Eyes: AME largest, distance AME–AME and AME–ALE $\frac{2}{3}$ diameter of AME. Distance PME–PME slightly

$>\frac{1}{2}$ diameter PME; distance of PME–PME about equal to diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly without teeth. St heart-shaped, sparsely setose.

Abdomen. Elongate, parallel-sided, laterally somewhat folded, with 3 pairs of elongate falciform DMP and a posterior small circular DMP, anterior pits very elongate. VMP in almost parallel rows. PLS slightly longer than Abd.

Legs. Measurements as above. Legs moderately elongate, III slightly $<\frac{1}{3}$ of length of I.

Palp. MA with very elongate, large, strongly bent hook-like apophysis at apex. LA basally wide, with cup-shaped structure at apex which completely conceals the embolus.

Female

Unknown.

Distribution (Fig. 45)

Southernmost Western Australia.

Material Examined

Only the holotype.

Habits

Unknown; holotype captured in May.

The *brachycauda* Group

The group consists of the single species *T. brachycauda*, a rather polymorphic species, in particular with regard to the shape of Pa.

Tamopsis brachycauda, sp. nov.

(Figs 6, 7, 46)

Types

Holotype ♂, Spear Creek, W. Mt Molloy, Queensland, beating, ident. R.R., V.E.D., 3–10.xi.1975, NvF Site 37, det. *Tama novaehollandiae* (QM). Paratypes: 1♂, 2♀, same data (QM, ZSM); 1♂, Mt Nebo, Queensland, pit trap, A. Rosefeld's, 16.x.1978, mixed sclerophyll, det. *Tama* sp. (QM); 1♂, Minnamurra Falls, nr Kiama, New South Wales, 24.ix.1967, coll. R. Mascord, 509 (AMS KS 15853).

Type locality: Mt Molloy, north Queensland.

Diagnosis

A very small, short-legged species, with a low eye area, distinguished by the extremely short PLS and by the shoehorn-like MA which bears at its base a horizontal, hooked apophysis.

Male Holotype

Measurements. Length 2·6 mm. Ceph length 1·2 mm, width 1·2 mm. Abd length 1·4 mm, width 1·4 mm. Legs: I, 6·82 mm; II, 6·99 mm; III, 2·48; IV, 5·86 mm. Ratio 1 : 1·02 : 0·36 : 0·82. Ratio LB/LL, 0·38. PLS length 0·75 mm; bS 0·25 mm; tS 0·5 mm. Eyes 1 : 0·64 : 0·7 : 0·9.

Colour. Ceph yellow to brownish, darkened towards lateral borders. Behind eyes a conspicuous white stripe. Ch yellow, dark-edged medially. Abd whitish, LSS and borders grey to blackish. Posteriorly some ill-defined dark crossbars. DMP yellow. Legs light yellow, broadly annulate. PLS whitish with 2 dark lateral spots.

Cephalothorax. Circular, slightly narrower than Abd. Eye area just slightly raised, Cl low, *c.* $\frac{1}{2}$ as high as eye area. Eyes: AME largest, distance AME–AME less than AME–ALE. Distance PME–PME *c.* $\frac{1}{2}$ diameter of PME. Distance PME–PLE $\frac{3}{4}$ diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly with 3 minute teeth. St rather densely setose.

Abdomen. Slightly trapezoid, widest posteriorly, with 5 pairs of circular DMP. VMP in a V-shaped arrangement. PLS *c.* $\frac{1}{2}$ as long as Abd, tS slightly more than twice as long as bS.

Legs. Measurements as above. Rather short, III slightly longer than $\frac{1}{3}$ of I; II slightly longer than I.

Palp. With a densely setose, scopula-like area on dorsal side of Pa. MA basally with a horizontal, hook-like apophysis. Apex of MA elongate, shoehorn-like, apex of LA elongate, flattened, apex of embolus free.

Female Paratype (No. 1, Spear Creek)

Measurements. Length 2·9 mm. Ceph length 1·2 mm, width 1·2 mm. Abd length 1·7 mm, width 1·8 mm. Legs: I, 5·89 mm; II, 6·07 mm; III, 2·41 mm; IV, 5·08 mm. Ratio 1 : 1·03 : 0·4 : 0·86. Ratio LB/LL, 0·49. PLS length 0·9 mm; bS 0·25 mm; tS 0·65 mm. Eyes 1 : 0·56 : 0·8 : 1.

Colour. Darker than holotype, especially on Abd which bears a dark, V-shaped area on posterior half. Annulation of legs more distinct.

Cephalothorax. Similar to male. PLE slightly larger, about as large as AME.

Abdomen. Wide, *c.* 1·5× as wide as Ceph, wider than long, distinctly trapezoid. Dorsally in middle with a conspicuous hump. PLS slightly longer than in male.

Legs. Measurements as above. Slightly shorter than in male, III *c.* $\frac{2}{5}$ as long as I. II slightly longer than I.

Epigyne. Widely separated, without any conspicuous features.

Vulva. With 2 RS and a large glandular sac. ID very short.

Variation

Apart from sexual variation in the shape of the Abd, there is some geographical variation in the male Pa. The specimen from Mt Nebo in southern Queensland has a stouter Pa than do those from northern Queensland. The basal apophysis of MA is without a distinct hook at the apex, and the terminal part is wider and stouter, less thin. The base of LA is much stouter and the terminal part is also wider. The single specimen from New South Wales is in most respects intermediate. The species is polytypic and may contain several subspecies. Because so few specimens are available, no subspecies are described.

Distribution (Fig. 46)

North-east and south-east Queensland, eastern New South Wales.

Material Examined

Eight specimens; apart from the type series (4♂, 2♀), two immature individuals from the type locality are tentatively allocated to this species.

Habits

One specimen was apparently beaten from foliage or twigs. The species has been captured in September, October and November.

The *tweedensis* Group

A single, very distinctive species.

Tamopsis tweedensis, sp. nov.

(Figs 8, 9, 47)

Types

Holotype ♂, Stott's I., Tweed River, New South Wales, 17–19.xi.1978, leg. I.C.,

G.C., R.R. (QM). Paratypes: 1♀, same data (QM); 1♂, L. Euromoo, nr Yungaburra, Queensland, 12.ix.1976, coll. and ident. R. Mascord 1034, (AMS KS 15858).

Type locality: Tweed River, northern New South Wales.

Diagnosis

A small, very long-legged species, with very elongate PLS, characterised by a large spinose area on dorsal side of Pa, and by coiled, spoon-shaped MA.

Male Holotype

Measurements. Length 3·6 mm. Ceph length 1·6 mm, width 1·5 mm. Abd length 2·0 mm, width 1·9 mm. Legs: I, 19·4 mm; II, 18·1 mm; III, 4·2 mm; IV, 15·6 mm. Ratio 1 : 0·93 : 0·22 : 0·8. Ratio LB/LL, 0·19. PLS length 2·7 mm; bS 0·6 mm; tS 2·1 mm. Eyes 1 : 0·33 : 0·67 : 0·8.

Colour. Ceph yellow with white spots at lateral borders and behind eyes. Eyes bordered with black. Ch light yellow. Abd whitish, LSS, DMP, and lateral border beige. Legs yellowish, PLS white, very vaguely annulate.

Cephalothorax. Eye area very slightly raised, Cl *c.* $\frac{1}{2}$ as high as eye area. Eyes: AME largest, distance AME–AME and AME–ALE *c.* $\frac{1}{2}$ diameter of AME. PME slightly smaller than PLE, distance PME–PME *c.* $\frac{1}{2}$ diameter of PME, distance PME–PLE $<\frac{1}{2}$ diameter of PLE. Ch *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 3 minute teeth. St heart-shaped, anteriorly with some long bristles.

Abdomen. About circular, with 5 pairs of rather lentiform DMP. VMP in V-shaped arrangement. PLS considerably longer than Abd.

Legs. Measurements as above. Very elongate, III very short.

Palp. Pa dorsally with a densely spinose area. Ma spoon-shaped, strongly coiled. Apex of LA 3-pointed.

Female Paratype (No. 1, Stott's I.)

Measurements. Length 3·7 mm. Ceph length 1·6 mm, width 1·6 mm. Abd length 2·1 mm, width 2·6 mm. Legs: I, 12·7 mm; II, 12·2 mm; III, 4·2 mm; IV, 11·2 mm. Ratio 1 : 0·96 : 0·33 : 0·88. PLS length 2·65 mm; bS 0·55 mm; tS 2·1 mm. Eyes 1 : 0·33 : 0·7 : 0·8.

Colour. Similar to holotype, but legs somewhat more distinctly annulate.

Cephalothorax. Much like holotype. Ch posteriorly with 3–4 minute teeth.

Abdomen. Wider than in male, but similar in other respects. PLS slightly shorter.

Legs. Measurements as above. Very elongate, though *c.* $\frac{1}{3}$ shorter than in male. III relatively longer.

Epigyne. Without conspicuous features.

Vulva. Wide, low, parts widely separated. RS with several pocket-like, glandular areas, ID short, curved inwards.

Distribution (Fig. 47)

Extreme north-eastern New South Wales and north-eastern Queensland.

Material Examined

Only the type series (2♂, 1♀).

Habits

Unknown; specimens were collected in September and November.

The *eucalypti* Group

Two closely related species.

Tamopsis eucalypti (Rainbow)

(Figs 10, 11, 48)

Tama eucalypti Rainbow, 1900, p. 487; 1904, p. 325; 1911, p. 152; Röwer, 1942, p. 384; Bonnet, 1959, p. 4236.

Type locality: Balmoral, New South Wales.

Types

Lectotype ♂, syntype B, mature, Balmoral, New South Wales, *Tama eucalypti* Rainbow (AMS KS 6699). Paralectotype, 1, juv. syntype C, ♀, Balmoral, N.S.W., *Tama eucalypti* immature Rainbow (AMS KS 6698). Lectotype and paralectotype by designation.

Diagnosis

Rather long-legged species with low eye area, best characterised by small AME, with MA excised and strongly hooked, but LA not hooked. Valuable characters for separating *T. eucalypti* from the following species are: legs mottled and less annulate; tarsi and tip of metatarsi of I, II, IV dark; Cl densely clothed with white hairs; Epi without lateral openings.

Male Lectotype

Measurements. Length 5 mm. Ceph length 1·9 mm, width 1·9 mm. Abd length 3·1 mm, width 1·9 mm. Legs: I, 16·8 mm; II, 16·4 mm; III, 5·0 mm; IV, 13·8 mm. Ratio 1 : 0·98 : 0·3 : 0·82. Ratio LB/LL, 0·3. PLS length 2·7 mm; bS 0·6 mm; tS 2·1 mm. Eyes 1 : 0·75 : 1·4 : 1·67.

Colour. Ceph light brown, borders indistinctly lighter. Ch light. Cl density clothed with whitish hairs. Abd mottled, at base with 2 large white spots. LSS and borders brownish. Posteriorly some ill-defined dark and white crossbars. DMP yellow. Legs and PLS light yellow, legs with small brown spots at position of long spines. Tarsi and tip of metatarsi I, II, and IV dark.

Cephalothorax. Circular, about as wide as Abd. Eye area only slightly raised, Cl low, *c.* $\frac{1}{2}$ as high as eye area. Eyes: PLE largest, AME small. Distance AME–AME less than diameter of AME, distance AME–ALE >2× diameter of AME. Distance PME–PME $\frac{1}{2}$ diameter of PME, distance PME–PLE less than diameter of PLE. Ch *c.* 1·5× as long as wide, posteriorly with 3 minute teeth. St very sparsely setose.

Abdomen. Rather elongate, laterally behind base somewhat excised, with 5 pairs of circular DMP. VMP in a V-shaped arrangement. PLS distinctly shorter than Abd.

Legs. Measurements as above. Rather elongate, III $<\frac{1}{3}$ of I.

Palp. Apical part of MA oblique, with a hollowed terminal piece and a long, conspicuous hook at tip. LA elongate, apex band-like, without any special features.

Female (Braemar, Qld, QM)

Measurements. Length 6·6 mm. Ceph length 2·3 mm, width 2·2 mm. Abd length 4·3 mm, width 3·3 mm. Legs: I, 16·3 mm; II, 15·7 mm; III, 5·3 mm; IV, 13·8 mm. Ratio 1 : 0·96 : 0·33 : 0·85. Ratio LB/LL, 0·4. PLS length 3·3 mm; bS 0·6 mm; tS 2·7 mm. Eyes 1 : 0·64 : 1·4 : 1·6.

Colour. Darker than lectotype, especially on Abd. Dark spots on legs more distinct, larger, legs and PLS dark-spotted, but not completely annulate.

Cephalothorax. Similar to male, AME slightly larger than in lectotype.

Abdomen. Much wider than Ceph, rather square, sides anteriorly conspicuously folded. PLS distinctly shorter than Abd.

Legs. Measurements as above. Slightly shorter than in male, III *c.* $\frac{1}{3}$ as long as I.

Epigyne. Simple, without lateral openings.

Vulva. Simple, with 2 RS, lateral RS with outer side bulbous and glandular. ID short, curved inwards.

Variation

Little variation except for some sexual variation in size and shape of Abd.

Distribution (Fig. 48)

South-eastern Queensland, eastern New South Wales, Victoria and South Australia (probably eastern S.A. only).

Material Examined

47 specimens. **South Australia:** 1♂, 1♀, 5 km S. of Mylor (AMS KS 10553, 10554). **New South Wales:** 5♂, 11♀, 2 juv, Balmoral, lectotype (AMS KS 6698, 6699, 15808, 15809, 15810, 15827, 15830, 15831, 15832, ZSM); 2♂, 7♀, 3 juv, Currawong (AMS KS 15811, 15840, 15841, 15842, 15846); 1♀, Lane Cove, National Park (AMS KS 15778); 2♀, Pittwater, Currawong, on scribbly gum (AMS KS 15819, 15820); 1♂, 2♀, 1 juv, Royal National Park, nr Audley (AMS KS 15826, 15856); 1♂, Terry Hills (AMS KS 15782); 1♀, Vaucluse, Sydney (AMS KS 15789); 1♀, Waterfall (AMS KS 15854). **Queensland:** 1♀, Braemar, nr Chinchilla, State Forest, 27°13′S.,150°50′E. (QM); 1♂, Teviot Bay, nr Killarney (QM).

Three other juv are tentatively appointed to *T. eucalypti*: **South Australia**, 1 juv ♀, Whyalla (NMV); **Victoria**, 1 juv ♀, Merrijig (NMV); **New South Wales**, 1 juv ♀, Narrabeen (AMS KS 15791).

Habits

According to labels, specimens were found on grass and on treetrunks, in New South Wales especially on *Angophora*. So far the species has been captured from October to June, and in August.

Tamopsis brisbanensis, sp. nov.

(Figs 12, 13, 49)

Types

Holotype ♂, Indooroopilly, Brisbane, Queensland, inside house, 21.vii.1985, ident. R. J. Raven, det. *Tama* sp. (QM).

Paratypes. **Queensland:** 1♂, 1♀, Percy Is, coll. White, det. *Tama novaehollandiae* (QM, ZSM); 1♂, Taringa Rd, Brisbane, 2.ix.1978, ident. R. Raven, det. *Tama eucalypti* (QM); 1♂, Hendra, Brisbane, 26.i.1982, ident. C. Beales, det. *Tama* sp. (QM); 1♀, L. Euramoo, nr Yungaburra, 12.ix.1976, coll. and ident. R. Mascord 1034 (AMS KS 15857); 1♀, Fig Tree Pocket, Brisbane, V. E. Davies, 15.xi.1976 (QM); 1♀, Nob Creek, Byfield (QM GM 80 B/1). **New South Wales:** 1♀ + egg sac, Cremorne Park, Sydney, 24.xii.1982, C. Hopwood, on trunk (AMS KS 10500); 1♀, 1 km S. of Bonny Hills, 8.xii.1981, Gray and Horseman (AMS KS 10168); 1♀, Brooklana, E. Dorrigo, W. Heron, June 1929 (AMS KS 15781); 1♀, The Basin, Pittwater, Jan. 1967, on low fern (AMS KS 15852); 1♂, Currawong, on *Erythria*, May 1965; 1♂, Pittwater, Sept. 1963, bark of tree (AMS KS 15825); 1♂, Royal National Park, nr Audley, 15.xii.1966 (AMS KS 15855); 1♀, Rookwood Cemetery, 29.viii.1969, coll. D. Grant (AMS KS 15839).

Type locality: Brisbane, Queensland.

Diagnosis

Long-legged, dark-coloured species with low eye area, distinguished by small AME, excised and hook-shaped apex of LA, and horizontally directed MA with preapical scopula-like organ and apical hook-like process. Best distinguished from *T. eucalypti* by: tarsi and tip of metatarsi light, Cl not densely clothed with white hairs, leges annulate, and Epi with lateral openings.

Male Holotype

Measurements. Length 4·0 mm. Ceph length 1·7 mm, width 1·7 mm. Abd length 2·3 mm, width 1·9 mm. Legs: I, 13·66 mm; II, 12·34; III, 4·13; IV, 10·84. Ratio 1 : 0·9 : 0·3 : 0·79. Ratio LB/LL, 0·29. PLS length 2·4 mm; bS 0·4 mm; tS 2 mm. Eyes 1 : 0·64 : 1·2 : 1·4.

Colour. Ceph rather dark brown to grey, only some yellow spots behind eyes and laterally above leg bases present. Ch dark. Abd overall dark, spotted with white, at base 2 large white spots. LSS indistinct. Posteriorly some ill-defined dark and white crossbars. DMP yellow. Legs and PLS light yellow, conspicuously widely annulate.

Cephalothorax. Circular, considerably narrower than Abd. Eye area just slightly raised, Cl low, *c.* $\frac{1}{2}$ as high as eye area. Eyes: PLE largest, AME small. Distance AME–AME about equal to diameter of AME, distance AME–ALE greater. Distance PME–PME $\frac{1}{2}$ diameter of PME, distance PME–PME greater than diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly with 3 minute teeth. St rather densely setose.

Abdomen. Rather circular, large, with 5 pairs of circular DMP. VMP in a short and wide V-shaped arrangement. PLS just slightly longer than Abd.

Legs. Measurements as above. Rather elongate, III *c.* $\frac{1}{3}$ as long as I.

Palp. Apex of MA horizontal, somewhat contorted, with sharp hook at tip and a preapical scopula-like area. LA elongate, apex excised, with a sharply bent hook.

Female Paratype (No. 1, Percy Is)

Measurements. Length 5·0 mm. Ceph length 1·9 mm, width 2·0 mm. Abd length 3·1 mm, width 3·0 mm. Legs: I, 14·3 mm; II, 13·92 mm; II, 5·31 mm; IV, 12·63 mm. Ratio 1 : 0·97 : 0·37 : 0·88. Ratio LB/LL, 0·35. PLS length 3·1 mm; bS 0·6 mm; tS 2·5 mm. Eyes 1 : 0·6 : 1·4 : 1·6.

Colour. Similar to but somewhat lighter than holotype.

Cephalothorax. Similar to male. AME still smaller, distance PME–PME smaller.

Abdomen. More circular than in male. PLS just as long as Abd, tS comparatively shorter than in holotype.

Legs. Measurements as above. Rather elongate, III slightly $>\frac{1}{3}$ of I.

Epigyne. Anterolaterally with a tube-shaped opening halfway along each side which opens medially.

Vulva. With 2 RS, lateral RS larger, glandular basally on outer surface. ID very short, curved.

Variation

Little variation; colour in some individuals lighter; LSS on Abd more distinct.

Distribution (Fig. 49)

North-eastern and south-eastern Queensland, also offshore on Percy Is, and eastern New South Wales, south to Sydney. The record from north Queensland is rather surprising; the locality might have been confounded, but as we know little about the real distribution of most species, *T. brisbanensis* may indeed be widely distributed in eastern Queensland.

Material Examined

Apart from the type material (7♂, 9♀), two other females which had dried out, and two juveniles are also allocated to this species: **New South Wales:** 2♀, Royal Park, nr Audley (AMS KS 15784); 1 juv ♀, Gladesville, on paling fence at night (AMS KS 15818); **Queensland:** 1 juv, Nob Creek, Byfield (QM GM 80 B/1).

Habits

The holotype was caught inside a house, and other specimens on fern, on bark of a tree and on a treetrunk. Captures are recorded from May to September and from November to January.

The *daviesi* Group

A single species fairly closely related to the following group.

Tamopsis daviesi, sp. nov.

(Figs 14, 15, 50)

Types

Holotype ♂, Mt Finlay, site No. 29, Queensland, ident. R.M., J.C., V.E.D., 2.xii.1975, night coll., det. *Tama novae-hollandiae* (QM). Paratypes: **Queensland:** 1♂, top of Lomond Hill, R.R., V.E.D., 28.vi.1976, beating, det. *Tama novae-hollandiae* (QM); 1♂, Helenvale, 15°43′S.,145°14′E., rainforest site 28, 153 M, Nov. 1975, M. Gray (AMS KS 0409); 1♀, Mt Cook, Cooktown, site 34, R.R., V.E.D., 15.xi.1975 (QM); 1♀, Badu I., Torres Strait, H. Heatwole, 19.xii.1976 (QM).

Type locality: Mt Finlay in north-eastern Queensland.

Diagnosis

Small species with low eye area, medium-sized PLS, and a characteristically bent MA, with apex slightly excised but not very contorted.

Male Holotype

Measurements. Length 3·5 mm. Ceph length 1·5 mm, width 1·5 mm. Abd length 2·0 mm, width 1·7 mm. Legs: I, 9·87 mm; II, 9·87 mm; III, 3·55 mm; IV, 9·27 mm. Ratio 1 : 1 : 0·36 : 0·94. Ratio LB/LL, 0·35. PLS length 1·87 mm; bS 0·35 mm; tS 1·52 mm. Eyes 1 : 0·7 : 1 : 1·2.

Colour. Ceph dirty yellow, laterally dark. Eye area black, a whitish stripe behind eyes. Ch yellow. Abd yellowish, LSS dark, lateral borders ill-defined dark. Legs and PLS indistinctly annulate with dark.

Cephalothorax. Circular, nearly as wide as Abd. Eye area slightly raised. Cl low, *c.* $\frac{1}{2}$ as high as eye area. PLE largest, ALE conspicuously large. Distances AME–AME and AME–ALE equal, slightly less than diameter of AME. Distance PME–PME $<\frac{1}{2}$ diameter of PME. Distance PME–PLE 1·5× diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly with 3 minute teeth. St sparsely setose.

Abdomen. Circular, but slightly longer than wide, about as wide as Ceph. With 5 pairs of circular–oval DMP. VMP in a V-shaped arrangement. PLS slightly shorter than Abd.

Legs. Measurements as above. Medium-sized, III *c.* $\frac{1}{3}$× as long as I.

Palp. Terminal part of MA bent horizontally, apex slightly excised, with a small membranous area within. MA not very contorted. LA slightly contorted, excised at apex.

Female Paratype (No. 1, Lomond Hill)

Measurements. Length 4·2 mm. Ceph length 1·7 mm, width 1·7 mm. Abd length 2·5 mm, width 2·6 mm. Legs: I, 10·52 mm; II, 10·21 mm; III, 4·3 mm; IV, 9·83 mm. Ratio 1 : 0·97 : 0·41 : 0·93. Ratio LB/LL, 0·4. PLS length 2·7 mm; bS 0·43 mm; tS 2·27 mm. Eyes 1 : 0·63 : 0·87 : 1·25.

Colour. Much as in holotype, but slightly darker, more vividly coloured. Legs and PLS distinctly annulate.

Cephalothorax. Similar to male. PLE slightly larger than in male, Ch posteriorly with 4 minute teeth.

Abdomen. Circular, slightly wider than long, much wider than Ceph. PLS slightly longer than Abd.

Legs. Measurements as above. Rather short, III *c.* 0·4× as long as I.

Epigyne. Anterolaterally with a tube-like opening which opens proximo-medially.

Vulva. Parts rather closely approximated. With 2 large RS, lateral RS very elongate and strongly coiled. ID short, simple.

Variation

Only some variation in colour.

Distribution (Fig. 50)

North-eastern Queensland to Torres Strait.

Material Examined

Only the type series (3♂, 2♀).

Habits

Some specimens were probably collected by beating foliage. So far this species has been captured in June, November and December.

The *queenslandica* Group

A group of seven closely related species. Two other species, of which the males are not yet known, are tentatively placed in this group.

Tamopsis kochi, sp. nov.

(Figs 16, 50)

Types

Holotype, ♂, 24 miles W. Madura, Western Australia, 31°50′S.,127°01′E., K. Williamson, 21.iv.1973, det. *Tama* sp. (WAM reg. No. 85/401).

Type locality: Madura in south-eastern Western Australia.

Diagnosis

Medium-sized, short-legged, rather vividly coloured species with a low eye area, best characterised by the PA, which has MA more contorted and excised at apex than foregoing species, and has also more contorted LA.

Male Holotype

Measurements. Length 3·5 mm. Ceph length 1·5 mm, width 1·4 mm. Abd length 2·0 mm, width 1·6 mm. Legs: I, 8·87 mm; II, 8·87 mm; III, 3·54 mm; IV, 8·42 mm. Ratio 1 : 1 : 0·4 : 0·95. Ratio LB/LL, 0·39 mm. PLS length 1·85 mm; bS 0·4 mm; tS 1·45 mm. Eyes 1 : 0·5 : 0·83 : 1.

Colour. Ceph light brownish, only laterally slightly darker. Eye area widely blackish. Ch yellow. Abd white, lateral borders dark, with conspicuously dark LSS. Posteriorly with some ill-defined crossbars. Legs yellow, conspicuously annulate. PLS yellow, faintly striped with dark laterally.

Cephalothorax. Broadly circular, not sinuate near eyes. Eye area just slightly raised, Cl low, *c.* $\frac{1}{2}$ as high as eye area. AME large, about as large as PLE. Distances AME–AME and AME–ALE less than diameter of AME. Distance PME–PME $\frac{1}{2}$ diameter of PME. Distance PME–PLE equal to diameter of PLE. Ch *c.* 1·5× as long as wide, posteriorly with 1 small tooth. St sparsely setose.

Abdomen. Slightly wider than Ceph, rather elongate, oval. With 5 circular–oval DMP. VMP in a wide, V-shaped arrangement. PLS slightly shorter than Abd.

Legs. Measurements as above. Rather short. III *c.* $\frac{2}{5}$ length of I.

Palp. MA oblique, rather contorted, best seen in contorted membranous area. Apex of MA rather deeply excised, with a large membranous area within. LA also contorted, especially near apex.

Female

Unknown.

Distribution (Fig. 50)

South-eastern Western Australia.

Material Examined

Only the holotype.

Habits

Unknown; holotype collected in April.

Tamopsis centralis, sp. nov.

(Figs 17, 50)

Types

Holotype ♂, Winton, Queensland, 12.iv.1912, coll. Higgins (QM) (dried, most legs lost).

Type locality: Winton in central Queensland.

Diagnosis

Small species with low eye area, large AME and short PLS, distinguished by Pa, which is rather similar to Pa of *T. kochi*, but differs in the more deeply incised MA with sharp lateral rim, and in the more elongate LA.

Male Holotype

Measurements. Length 3·1 mm. Ceph length 1·5 mm, width 1·5 mm. Abd length 1·6 mm, width 1·4 mm. Legs: most broken; III, 3·52 mm; IV, 8·9 mm. Ratio LB/LL, presumably *c*. 0·35. PLS length 1·5 mm; bS 0·4 mm; tS 1·1 mm. Eyes 1 : 0·4 : 0·8 : 1.

Colour. Not well preserved, because type was dried. Ceph with light, elongate spot behind eyes and with circular spots near border. LSS elongate, Abd mottled with dark, posteriorly with light crossbars. Legs and PLS annulate.

Cephalothorax. Circular, eye area low, Cl *c*. $\frac{1}{2}$ as high as eye area. AME about as large as PLE, distinctly larger than PME. Distance AME–AME $>\frac{1}{2}$ diameter of AME, distance AME–ALE about equal to diameter of AME. Distance PME–PME greater than diameter of PME, distance PME–PLE *c*. $\frac{2}{3}$ diameter of PME. Ch elongate, *c*. $1\frac{3}{4}\times$ as long as wide. Teeth at posterior border of Ch not discernible. St heart-shaped, with some bristles anteriorly.

Abdomen. Somewhat shrivelled, slightly longer than wide. With 5 pairs of circular DMP. VMP in a wide, V-shaped arrangement. PLS apparently shorter than Abd.

Legs. Perhaps about medium-sized, only 2 legs complete.

Palp. MA contorted, deeply excised at apex, inner part of excision slender, outer part convex, laterally with sharp edge. LA also contorted, elongate, apex square, base laterally with a lamella.

Female

Unknown.

Distribution (Fig. 50)

Central Queensland.

Material Examined

Apart from the holotype, two juv are tentatively placed in this species, because the Pa of the male juv is rather similar to that of the holotype. **No locality:** 1♂ juv, 1♀ juv, Godeffroy coll. 14634, recd. 25.ii.1888 (NMV). Although no locality is recorded, we think it possible that these specimens are actually from Peak Downs in central Queensland, because Koch (1876) stated that specimens of his *Chalinura novaehollandiae* from the Godeffroy Collection came from Peak Downs.

Habits

Unknown; holotype captured in April.

Tamopsis reevesbyana, sp. nov.

(Figs 18, 50)

Types

Holotype ♀, Reevesby I., South Australia, Dec. 1936, J. Clark (NMV).
Type locality: Reevesby I. off Eyre Peninsula, South Australia.

Diagnosis

Small, low-eyed, very short-legged species with short PLS; female characterised by its V with a single RS and complicately coiled ID.

Female Holotype

Measurements. Length 3·6 mm. Ceph length 1·5 mm, width 1·45 mm. Abd length 2·1 mm, width 2·25 mm. Legs: I, 6·82 mm; II, 6·82 mm; III, 3·0 mm; IV, 6·72 mm. Ratio 1 : 1 : 0·44 : 0·98. Ratio LB/LL, 0·53. PLS length 1·4 mm; bS 0·3 mm; tS 1·1 mm. Eyes 1 : 0·58 : 1·08 : 1·25.

Colour. Greyish brown, eye area and borders blackish, behind eyes an elongate light yellow spot, and near lateral borders some circular light yellow spots. Ch yellow. Abd whitish, slightly mottled with dark. LSS and lateral border broadly dark, near apex some irregular white crossbars. Legs and PLS distinctly annulate.

Cephalothorax. Circular. Eye area low, Cl *c.* $\frac{1}{2}$ as high as eye area. AME slightly smaller than PME, PLE largest. Distance AME–AME *c.* $\frac{2}{3}$ diameter of AME, distance AME–ALE greater than diameter of AME. Distance PME–PME *c.* $\frac{1}{2}$ diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly with 3 minute teeth. St nearly triangular, anteriorly sparsely setose.

Abdomen. Much wider than Ceph, wider than long. With 5 pairs of circular DMP. VMP in a short and widely separated, V-shaped arrangement. PLS very short, much shorter than Abd.

Legs. Measurements as above. Very short. I only twice as long as body. III nearly $\frac{1}{2}$ as long as I.

Epigyne. Without any conspicuous features. Parts of V adjacent.

Vulva. Apparently only 1 large RS present, RS glandular along whole outer surface. ID long, complicately coiled around RS.

Male

Unknown.

Distribution

Reevesby I. off coast of Eyre Peninsula, South Australia.

Material Examined

Only the holotype.

Habits

Unknown; holotype collected in December.

Tamopsis grayi, sp. nov.

(Figs 19, 50)

Type

Holotype ♀, with cocoon, Mooney Mooney Creek, New South Wales, 22.i.1967 (AMS KS 15783).
Type locality: Mooney Mooney Creek, near Gosford, New South Wales.

Diagnosis

Very small, low-eyed, rather short-legged species, characterised by extremely large PME, by Epi with anterolateral openings, and complicated V with 2 RS and strongly coiled ID.

Female Holotype

Measurements. Length 3·0 mm. Ceph length 1·4 mm, width 1·5 mm. Abd length 1·6 mm, width 1·9 mm. Legs: I, 7·8 mm; II, 7·9 mm; III, 3·35 mm; IV, 7·51 mm. Ratio 1 : 1·01 : 0·43 : 0·96. Ratio LB/LL, 0·38. PLS length 1·6 mm; bS 0·4 mm; tS 1·2 mm. Eyes 1 : 0·7 : 1·6 : 1·4.

Colour. Ceph greyish brown, eye area and lateral border darker. Behind eye area an elongate white stripe, near lateral border some circular white spots. Ch yellow. Abd strongly mottled, LSS inconspicuous. Apical part with several conspicuous black and white crossbars. Legs and PLS annulate.

Cephalothorax. Circular, eye area low, Cl slightly $>\frac{1}{2}$ as high as eye area. AME small, much smaller than PME and PLE. PME largest. Distance AME–AME equal to diameter of AME. Distance AME–ALE much greater than diameter of AME. Distance PME–PME very small, distance PME–PLE less than diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly with 1 or 2 minute teeth. St heart-shaped, sparsely setose anteriorly.

Abdomen. Wider than Ceph, considerably wider than long. With 5 pairs of circular DMP, median pits rather transverse. VMP in a wide, V-shaped arrangement. PLS rather short, just about as long as Abd.

Legs. Measurements as above. Rather short, III *c.* $\frac{2}{5}$ as long as I.

Epigyne. Anterolaterally with an opening each side, parts of V closely adjacent.

Vulva. With 2 compact, low RS, ventral RS glandular along whole outer surface. ID complexly coiled around RS.

Egg sac (Fig. 19*f*). Globular, covered with a thick layer of silk and fixed on a long stalk. Diameter 3·5×2·8 mm, length of stalk 6 mm.

Male

Unknown.

Distribution (Fig. 51)

Eastern New South Wales.

Material Examined

Only the holotype.

Habits

Unknown; holotype collected in January.

Tamopsis darlingtoniana, sp. nov.

(Figs 20, 51)

Type

Holotype ♀, Darlington, Western Australia, source G. H. Lowe, 1970–74 (WAM reg. No. 85/390).

Type locality: Darlington in south-western Australia.

Diagnosis

Medium-sized, low-eyed species with fairly elongate PLS and small AME, further distinguished by the V with very closely adjacent RS and elongate, coiled ID.

Female Holotype

Measurements. Length 3·8 mm. Ceph length 1·8 mm, width 1·8 mm. Abd length 2 mm,

width 2 mm. Legs: I, 10·32 mm; II, 10·21 mm; III, 4·25 mm; IV, 9·9 mm. Ratio 1 : 0·99 : 0·41 : 0·96. PLS length 2·4 mm; bS 0·6 mm; tS 1·8 mm. Eyes 1 : 0·69 : 1·38 : 1·54.

Colour. Light-coloured. Ceph light brown, Cl yellow, an elongate spot behind eye and some circular spots near lateral border white, Ch yellow, laterally near base darker. Abd yellow, slightly mottled with dark. LSS light grey, some indistinct dark crossbars near apex. Legs and PLS faintly annulate.

Cephalothorax. Circular. Eye area moderately low, Cl *c.* $\frac{2}{3}$ as high as eye area. AME rather small, PLE largest. Distance AME–AME *c.* $\frac{3}{4}$ diameter of AME, distance AME–ALE much greater than diameter of AME. Distance PME–PME very short, distance PME–PLE slightly shorter than diameter of PME. Ch *c.* 1·5 × as long as wide, posteriorly with 3 minute teeth. St heart-shaped, anteriorly sparsely setose.

Abdomen. Just slightly wider than Ceph, about as long as wide, nearly circular. With 5 pairs of circular DMP. VMP in a widely separated, V-shaped arrangement. PLS elongate, considerably longer than Abd.

Legs. Measurements see above. Medium-sized, III *c.* $\frac{2}{5}$ as long as I.

Epigyne. Without any conspicuous features, parts of V rather closely adjacent.

Vulva. RS very large, ventral RS laterally bulbous and glandular. ID coiled around RS.

Male

Unknown.

Distribution (Fig. 51)

South-western Australia.

Material Examined

Only the holotype.

Habits

Unknown.

Tamopsis queenslandica, sp. nov.

(Figs 21, 22, 51)

Types

Holotype ♂, buildings, L. Broadwater via Dalby, Queensland, M. Bennie, 20.x.1984, det. *Tama* sp. (QM). Paratype ♀, Binnaway, N.S.W., mud wasp nest (S. *formosum*) No. 3, 8.i.1975, A. Smith (AMS KS 15780).

Type locality: Lake Broadwater in south-eastern Queensland.

Diagnosis

Medium-sized, dark-coloured species with low eye area, relatively large AME, characterised by a strongly contorted MA with deeply excised apex, and by the V with 2 RS and coiled and laterally bent ID.

Male Holotype

Measurements. Length 4·0 mm. Ceph length 1·75 mm, width 1·7 mm. Abd length 2·25 mm, width 1·9 mm. Legs: I, 10·64 mm; II, 10·54 mm; III, 4·12 mm; IV, 10·32 mm. Ratio 1 : 0·99 : 0·39 : 0·97. Ratio LB/LL, 0·37. PLS length 1·95 mm; bS 0·43 mm; tS 1·52 mm. Eyes 1 : 0·66 : 1·06 : 1·16.

Colour. Ceph dark grey, blackish towards borders, only centre light. Elongate spot behind eyes and circular spots near border white. Ch anteriorly dark. Abd mostly dark, whitish areas between LSS and lateral border densely mottled with black. Base with 2 large whitish spots. Legs conspicuously annulate, outer surface of femora almost black. PLS strongly annulate.

Cephalothorax. Circular, somewhat transverse, border not sinuate near eyes. Eye area

moderately low, Cl low, *c.* $\frac{2}{3}$ as high as eye area. PLE largest, just slightly larger than AME. Distance AME–AME slightly less than diameter of AME, distance AME–ALE about equal to diameter of AME. Distance PME–PME very small, distance PME–PLE more than diameter of PLE. Ch *c.* 1·5× as long as wide, posteriorly with 3 minute teeth. St rather sparsely setose.

Abdomen. Elongate-oval, slightly wider than Ceph. With 5 pairs of circular-oval DMP. VMP in a wide, V-shaped arrangement. PLS slightly shorter than Abd.

Legs. Measurements as above. Rather short, III *c.* $\frac{2}{5}$ as long as I.

Palp. MA oblique, strongly contorted, apex deeply excised and with a large membranous area within. Apical part of LA channelled for reception of embolus and somewhat contorted. Inner side with a hump. Base of MA with conspicuous, knob-like protuberance.

Female Paratype

Measurements. Length 4·7 mm. Ceph length 1·8 mm, width 1·8 mm. Abd length 2·9 mm, width 3·1 mm. Legs: I, 9·82 mm; II, 9·4 mm; III, 3·85 mm; IV, 9·12 mm. Ratio 1 : 0·96 : 0·39 : 0·93. Ratio LB/LL, 0·48. PLS length 2·5 mm; bS 0·5 mm; tS 2·0 mm. Eyes 1 : 0·47 : 1·2 : 1·27.

Colour. Ceph brown, eye area and lateral border blackish. Ch yellow, base laterally darker. Abd rather dark, vividly coloured, strongly mottled with black, LSS and lateral borders widely black, apex with some conspicuous light crossbars. Legs and PLS as in holotype.

Cephalothorax. Similar to male, AME slightly smaller. Ch posteriorly with 2–3 minute teeth.

Abdomen. Much wider than Ceph, considerably wider than long. PLS rather short, distinctly shorter than Abd.

Legs. Measurements as above. Short, just twice as long as body. III *c.* $\frac{2}{5}$ as long as I.

Epigyne. With a narrow opening at lateral border. Parts of V closely adjacent.

Vulva. With 2 RS of same size, ventral RS glandular along whole outer surface. ID elongate, coiled, laterally sharply bent.

Distribution (Fig. 51)

South-eastern Queensland and northern New South Wales; in both states west of the Great Dividing Range.

Material Examined

Only the type specimens (1♂, 1♀).

Habits

Unknown, but the holotype was apparently caught inside a building, and the paratype in a 'mud wasp nest'. Captures are recorded from October and January.

The female is associated with the male on the following grounds: dark colour; similar eye size; short legs and PLS; and, most important, because the female genitalia are very similar to those of the female of *T. raveni*, which is certainly very closely related to *T. queenslandica*, as the male Pa of both species are extremely similar.

Tamopsis raveni, sp. nov.

(Figs 23, 24, 52)

Types

Holotype ♂, Braemar State Forest, Queensland, 27°13′S.,150°50′E., cypress and brigalow, 15–19.x.1979, R. Raven and Q.M., *Callitris pyrethrin*, det. *Tama* sp. (QM). Paratypes: 1♂, 2♀, same data (QM, ZSM); 1♀, same locality and date, on tree trunks at night (QM).

Type locality: Braemar State Forest in south-eastern Queensland.

Diagnosis

Medium-sized, vividly coloured species with low eye area, distinguished from preceding species by structure of LA and by slightly different V.

Male Holotype

Measurements. Length 3·5 mm. Ceph length 1·5 mm, width 1·5 mm. Abd length 2·0 mm, width 1·5 mm. Legs: I, 10·07 mm; II, 9·87 mm; III, 3·9 mm; IV, 9·52 mm. Ratio 1 : 0·98 : 0·39 : 0·95. Ratio LB/LL, 0·35. PLS length 1·75 mm; bS 0·37 mm; tS 1·38 mm. Eyes 1 : 0·7 : 1·2 : 1·5.

Colour. Ceph brownish, laterally darker, eye area dark, behind eyes a white stripe, near base and near lateral border some circular white spots. Ch anteriorly black. Abd white, but LSS and borders black, pattern conspicuous. Posteriorly some dark crossbars. DMP yellowish. Legs and PLS conspicuously annulate, femora black beneath.

Cephalothorax. Circular, about as wide as Abd. Eye area moderately low, Cl low, nearly $\frac{2}{3}$ as high as eye area. AME rather small, PLE large. Distance AME–AME less than, distance AME–ALE slightly greater than diameter of AME. Distance PME–PME slightly $>\frac{1}{2}$ diameter of PME, distance PME–PLE about equal to diameter of PLE. Ch *c.* 1·5× as long as wide, posteriorly with 2 minute teeth. St rather sparsely setose.

Abdomen. Elongate oval, lateral border somewhat sinuate, Abd about as wide as Ceph. With 5 pairs of circular–oval DMP, VMP in a V-shaped arrangement. PLS shorter than Abd.

Legs. Measurements as above. Medium-sized, III *c.* $\frac{2}{5}$ as long as I.

Palp. Very similar to preceding species, especially MA, which is oblique and apically deeply excised, with a large membranous area within. LA less stout, apically strongly contorted and deeply excised, inner side straight. Base of MA with just a small knob.

Female Paratype

Measurements. Length 3·9 mm. Ceph length 1·7 mm, width 1·7 mm. Abd length 2·2 mm, width 2·2 mm. Legs: I, 8·97 mm; II, 8·87 mm; III, 3·5 mm; IV, 8·42 mm. Ratio 1 : 0·99 : 0·39 : 0·94. Ratio LB/LL, 0·43. PLS length 1·77 mm; bS 0·4 mm; tS 1·37 mm. Eyes 1 : 0·7 : 1·2 : 1·4.

Colour. Pattern as in holotype, colour also rather light.

Cephalothorax. As in male, but PLE slightly smaller. Cl slightly higher.

Abdomen. Trapezoidal, about as long as wide, much wider than Ceph. PLS slightly shorter.

Legs. Measurements as above. Rather short, III *c.* $\frac{2}{5}$ as long as I.

Epigyne. Without conspicuous characters. Parts of V closely adjacent.

Vulva. Two RS, dorsal RS with long duct, ventral RS glandular along whole outer surface. ID coiled, but not elongated lateroposteriorly.

Variation

Colour in some specimens darker and pattern more vivid.

Distribution (Fig. 52)

South-eastern Queensland.

Material Examined

Apart from the type series (2♂, 3♀), 1 juv from type locality.

Habits

The species was collected from different trees and treetrunks, in September.

The following two species are tentatively appointed to the *queenslandica* group. Their real relationships are rather obscure.

Tamopsis cooloolensis, sp. nov.

(Figs 25, 52)

Types

Holotype ♀, Speary's Scrub, Cooloola National Park, Queensland, R.R., V.E.D., 3–8.ii.1976 (QM).

Type locality: Cooloola in south-eastern Queensland.

Diagnosis

Medium-sized, lightly coloured, low-eyed species with rather elongate legs and PLS, characterised by Epi with lateral openings and by complicated V, with an additional sac at base of RS and with stalked dorsal RS.

Female Holotype

Measurements. Length 4·4 mm. Ceph length 1·9 mm, width 1·9 mm. Abd length 2·5 mm, width 2·4 mm. Legs: I, 14·32 mm; II, 14·1 mm; III, 5·25 mm; IV, 12·61 mm. Ratio 1 : 0·98 : 0·37 : 0·88. Ratio LB/LL, 0·31. PLS length 2·75 mm; bS 0·45 mm; tS 2·3 mm. Eyes 1 : 0·67 : 1·33 : 1·67.

Colour. Light, type not fully coloured. Ceph light brown, eye area darker. Behind eyes and near lateral border white spots present. Ch with indistinct dark spot. Abd light, LSS and lateral border darker. Legs and PLS distinctly annulate.

Cephalothorax. Circular. Eye area moderately low, Cl *c.* $\frac{2}{3}$ as high as eye area. AME considerably smaller than PME, PLE by far largest. Distance AME–AME less than diameter of AME, distance AME–ALE slightly greater. Distance PME–PME extremely short, distance PME–PLE less than diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly with 3–4 minute teeth. St sparsely setose anteriorly.

Abdomen. About circular, wider than Ceph. With 5 pairs of circular DMP, median pits rather transverse. VMP in a V-shaped arrangement. PLS rather elongate, longer than Abd.

Legs. Measurements as above. Rather elongate. III $<\frac{2}{5}$ of I.

Epigyne. With an opening laterally and somewhat anteriorly, which opens laterally.

Vulva. With 2 rather different RS and an accessory sac at base of ventral RS. Dorsal RS small, with a long duct, ventral RS glandular along whole outer surface. ID short, curved inside.

Male

Unknown.

Distribution (Fig. 52)

Coastal in south-eastern Queensland.

Material Examined

Only the holotype.

Habits

The holotype was captured in February.

Tamopsis brevipes, sp. nov.

(Figs 26, 52)

Types

Holotype ♀, 3506, '*Tama novae Hollandiae*' L.K., Sydney (L.K.) (MNHN doc. No. 694).

Type locality: Sydney, New South Wales.

Diagnosis

Medium-sized, low-eyed species with very short legs and very distinctive Epi, with strongly sclerotised, slit-shaped lateral openings and a compact V.

Female Holotype

Measurements. Length 4·8 mm. Ceph length 1·8 mm, width 1·8 mm. Abd length 3·0 mm, width 2·9 mm. Legs: I, 10 mm; II, 9·92 mm; III, 4·03 mm; IV, 9·4 mm. Ratio 1 : 0·99 : 0·4 : 0·94. Ratio LB/LL, 0·48. PLS length 1·65 mm, tip broken, total length *c.* 2·3–2·4 mm; bS 0·55 mm; tS 1·1 mm, total length *c.* 1·8 mm. Eyes 1 : 0·47 : 1·06 : 1·17.

Colour. Ceph light brown, eye area and lateral border black. Ch yellow, Abd white, mottled with dark, LSS and wide lateral border dark, but also somewhat mottled. Posterior crossbars rather distinctive. Legs and PLS inconspicuously annulate, ventral surface of legs striped black.

Cephalothorax. Circular, rather wide. Eye area low, Cl *c.* $\frac{1}{2}$ as high as eye area. AME slightly smaller than PME, PLE largest. Distance AME–AME $\frac{1}{2}$ diameter of AME, distance AME–ALE about equal to diameter of AME. Distance PME–PME $\frac{1}{3}$ diameter of PME, distance PME–PLE $\frac{3}{5}$ diameter of PME. Ch *c.* $1\frac{2}{3}\times$ as long as wide, posteriorly with 3 minute teeth. St about triangular, rather sparsely setose.

Abdomen. Much wider than Ceph, transverse. With 5 pairs of circular DMP, median pit somewhat transverse. VMP in a wide, V-shaped arrangement. PLS (presumably) rather short, certainly considerably shorter than Abd.

Legs. Measurements as above. Very short, III *c.* $\frac{2}{5}$ as long as I.

Epigyne. With a slit-shaped opening near lateral border, covered by a large, sclerotised plate.

Vulva. Small, compact, parts very closely adjacent, with 2 RS, ventral RS laterally incised and glandular along whole outer surface. ID sharply bent inwards.

Male

Unknown.

Distribution (Fig. 52)

Eastern New South Wales.

Material Examined

Only the holotype.

Habits

Unknown.

The *arnhemensis* Group

A single species, perhaps related to the following groups.

Tamopsis arnhemensis, sp. nov.

(Figs 27, 28, 53)

Types

Holotype ♂, Northern Territory, 12°12′S.,132°13′E., West Alligator River mouth WA1, Monteith and D. Cook, 22–24.vii.1979 (QM). Paratypes: 2♀, same data (QM); 1♀, 12°11′S.,132°16′E., West Alligator River mouth WA2, Northern Territory, 12.xi.1979, R. Raven (ZSM); 1♀, Murray I., Torres Strait, Queensland, beach on roadside of island, H.H., E.C., 20.vii.1974, ? beating foliage (QM).

Type locality: mouth of West Alligator River, Northern Territory.

Diagnosis

Very small, light-coloured species with large AME, raised but conspicuously slanted eye

tubercle, very elongate legs, characterised by ring-shaped apex of MA with a membranous area within, by simple LA with free tip of embolus, and by V with mushroom-like lateral sac.

Male Holotype

Measurements. Length 2·44 mm. Ceph length 1·12 mm, width 1·02 mm. Abd length 1·32 mm, width 1·15 mm. Legs: I, 8·87 mm; II, 8·35 mm; III, 2·85 mm; IV, 7·47 mm. Ratio 1 : 0·94 : 0·32 : 0·84. Ratio LB/LL, 0·28. PLS length 1·02 mm; bS 0·27 mm; tS 0·75 mm. Eyes 1 : 0·31 : 0·56 : 0·62.

Colour. Light. Ceph yellowish grey, sides narrowly bordered with black. Eye area dark brown, behind eyes a conspicuous serrate white spot. Ch yellowish. Abd white. LSS narrow, not reaching to apex, black, also lateral border narrowly black, dark colour medially projecting behind base. DMP inconspicuous. Posteriorly some ill-defined crossbars. Legs and PLS whitish, widely and inconspicuously annulate.

Cephalothorax. Circular, rather narrow, not as wide as Abd. Eye area raised, eye mound conspicuously slanted at top, Cl high, nearly as high as eye area. AME by far largest. Distance AME–AME $<\frac{1}{2}$ diameter of AME, distance AME–ALE very short. Distance PME–PME *c.* $\frac{1}{2}$ diameter of PLE, distance PME–PLE about equal to diameter of PLE. Ch *c.* 1·5× as long as wide, posteriorly with 3 minute teeth. St rather densely pilose.

Abdomen. Circular, slightly longer than wide, wider than Ceph. DMP difficult to detect, apparently 5 pairs of circular DMP present. VMP in a widely separated, somewhat V-shaped arrangement. PLS rather short, shorter than Abd.

Legs. Measurements as above. Elongate, III *c.* $\frac{1}{3}$ as long as I.

Palp. Apex of MA closed to a ring with a membranous area within, apically with a small hook-like process. LA very simple, short, embolus freely projecting.

Female Paratype (No. 1, West Alligator Mouth)

Measurements. Length 2·72 mm. Ceph length 1·17 mm, width 1·0 mm. Abd length 1·55 mm, width 1·5 mm. Legs: I, 8·34 mm; II, 7·9 mm; III, 2·99 mm; IV, 7·32 mm. Ratio 1 : 0·94 : 0·36 : 0·88. Ratio LB/LL, 0·33. PLS length 1·57 mm; bS 0·37 mm; tS 1·2 mm. Eyes 1 : 0·33 : 0·66 : 0·8.

Colour. Very similar to holotype, slightly lighter.

Cephalothorax. Similar to male, PLE slightly greater. Ch posteriorly with 4 minute teeth.

Abdomen. Elongate trapezoid, about as long as wide. PLS longer than in holotype, about as Abd.

Legs. Measurements as above. Shorter than in male, though rather elongate, III longer than in male.

Epigyne. With a tube-like opening each side, rather near to middle, which opens medially. Parts of V closely adjacent.

Vulva. Compact. With 2 RS of different sizes, lateral RS very elongate. Basally with a mushroom-like, glandular sac. ID short, simple, not coiled.

Variation

Very little; slight sexual variation in shape of Abd.

Distribution (Fig. 53)

Northernmost Northern Territory, northern tip of Queensland.

Material Examined

Only the type series (1♂, 4♀).

Habits

Unknown; specimens were collected in July and November.

The *circumvidens* Group

A single, peculiar species, perhaps closely related to the following group.

Tamopsis circumvidens, sp. nov.

(Figs 29, 30, 53)

Types

Holotype ♂, 5 km E. of Coolgardie, Western Australia, B. Muir, 4.i.1972 (WAM reg. No. 85/389). Paratypes: **Western Australia:** 1♀, Kathleen Valley, T. Moriarty, 10.v.1965 (WAM reg. No. 85/399) (specimen dried out, somewhat damaged); 1♂, Mt Ragged (night light), A. M. and M. J. Douglas, 29.i.1977, ABGF (ZSM); 1♂, nr Mullamullang Cave, surface u/Rock, 12.i.1972, M. Gray (AMS KS 15779).

Type locality: Coolgardie in south-western Australia.

Diagnosis

Medium-sized to fairly large, long-legged species with strongly raised and laterally concave eye tubercle, further characterised by conical, spirally coiled apex of LA, freely ending embolus, and by very elongate, strongly coiled RS.

Male Holotype

Measurements. Length 4·0 mm. Ceph length 1·8 mm, width 1·6 mm. Abd length 2·2 mm, width 1·6 mm. Legs: I, 16·02 mm; II, 15·04 mm; III, 4·87 mm; IV, 15·02 mm. Ratio 1 : 0·94 : 0·3 : 0·94. Ratio LB/LL, 0·25. PLS length 3·0 mm; bS 0·5 mm; tS 2·5 mm. Eyes 1 : 0·29 : 0·62 : 0·83.

Colour. Ceph brown, lateral border narrowly darker, with some dark radial lines, also eye area dark. Behind eyes and near base whitish spots. Cl medially black, laterally contrastingly white. Ch anteriorly yellow, otherwise black. LSS and lateral borders of Abd indistinctly darker, at base and near border some large white spots. Posteriorly some ill-defined crossbars. DMP yellow. Legs and Pa yellowish, indistinctly annulate. PLS with conspicuous dark rings near base and at last third of terminal segment.

Cephalothorax. Circular, slightly longer than wide, narrower than Abd. Eye area strongly raised, eye tubercle laterally concave. AME largest. Distance AME–AME $\frac{1}{2}$ diameter of AME, distance AME–ALE $<\frac{1}{3}$ diameter of AME. Distance PME–PME $\frac{1}{2}$ diameter of PME, distance PME–PLE slightly greater than diameter of PME. Ch rather elongate, *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 1 minute tooth. St rather densely setose.

Abdomen. Fairly elongate and somewhat square, but sides and base with irregular bosses, Abd wider than Ceph. With 5 pairs of circular DMP. VMP in a short, V-shaped arrangement. PLS elongate, longer than Abd, tS very elongate.

Legs. Measurements as above. Very elongate.

Palp. MA strongly contorted, apex closed to a ring with a membranous area within. Apex with a long, strongly bent hook. LA also contorted, apical part conspicuously conical and spirally coiled. Embolus coiled inside apex of LA, but its end free.

Female Paratype

Measurements. Length 4·9 mm. Ceph length 2·2 mm, width 2·0 mm. Abd length 2·7 mm, width 2·6 mm. Legs: most legs lost; III, 5·52 mm. PLS length 3·0 mm; bS 0·6 mm; tS 2·4 mm. Eyes 1 : 0·38 : 0·81 : 0·98.

Colour. Not well recognisable, because specimen dried out. Darker than holotype. Eye area dark, Cl and Ch as in holotype.

Cephalothorax. Very similar to male. Cl *c.* $1\frac{1}{4}\times$ as high as eye area. Ch elongate as in holotype, posteriorly without teeth. AME about as large as PLE. Distances as in male, but PME slightly more approximated.

Abdomen. Rather creased, DMP and VMP as in holotype. PLS slightly shorter, but in life about as long as or perhaps slightly longer than Abd.

Legs. Mostly lost, apparently rather elongate.

Epigyne. With a large, funnel-shaped opening in middle between lateral border and V, which opens medially.

Vulva. Parts of V widely separated, medially with a sclerotised bridge. RS very elongate and complicately, spirally coiled. Posteriorly 2 sharply bent ducts.

Variation

With the exception of colour and pattern, which are darker and more vivid in the male paratypes, there is little variation.

Distribution (Fig. 53)

South-western Australia.

Material Examined

Only the type series (3♂, 1♀).

Habits

Unknown; specimens captured in January and May.

The female paratype is associated with the males especially on account of the form of the eye tubercle, the relative length of PLS, and the elongate and strongly coiled RS of V, which matches very well with the spirally coiled LA and elongate, coiled embolus.

The *tropica* Group

Several closely related species from all States.

Tamopsis tropica, sp. nov.
(Figs 31, 32, 54)

Types

Holotype ♂, Prince of Wales I., Torres Strait, savannah woodland, H.H., E.C., 2.ii.1975, in web in bark crevices (QM). Paratypes: 1♀, same data (QM); **Queensland:** 1♀, Oak Forest, N. Clyde Coleman, 2.iv.1972 (QM); 1♀, Edmonton, N. Clyde Coleman, 3.iii.1972 (ZSM); 1♀, Baird I., Great Barrier Reef, R. Buckley, 19.xii.1979 (QM); 1♀, Townsville, sea level, 13.xi.1962, E. S. Ross and D. Q. Cavagnaro (CAS); 1♀, Coen, Oke, 14.v.1951 (NMV); 1♂, Fitzroy I., 30.ix.1971, R. Mascord (AMS KS 15862); 1♀, Edmonton, 9.ix.1976, R. Mascord 1034 (AMS KS 15860); **Northern Territory:** 1♂, Top Spring, Kilgour R., 1.ix.1911, G. F. Hill (NMV).

Type locality: Prince of Wales I., Torres Strait, north Queensland.

Diagnosis

Medium-sized, very long-legged species with strongly raised eye area, very large AME, distinguished from other species of this group by the simple, apically channelled but not excised, LA and by simple MA without a sharp lateral rim at apex.

Male Holotype

Measurements. Length 3·7 mm. Ceph length 1·7 mm, width 1·4 mm. Abd length 2·0 mm, width 1·5 mm. Legs: I, 16·42 mm; II, 15·1 mm; III, 4·67 mm; IV, 12·53 mm. Ratio 1 : 0·92 : 0·28 : 0·76. Ratio LB/LL, 0·22. PLS length 2·0 mm; bS 0·5 mm; tS 1·5 mm. Eyes 1 : 0·28 : 0·59 : 0·71.

Colour. Ceph light brown, border narrowly black, eye area dark brown, behind eyes a white stripe. Ch laterally dark. Abd white, mottled with black, LSS and borders conspicuously black, posteriorly some blackish crossbars. Legs and PLS indistinctly annulate, lower surface of femora of I and II widely black.

Cephalothorax. Circular, but rather elongate, about as wide as Abd. Eye area strongly raised, with straight sides. Cl high, slightly higher than eye area. AME by far largest. Distance AME–AME *c.* $\frac{1}{2}$ diameter of AME, distance AME–ALE $<\frac{1}{3}$ diameter of AME. Distance PME–PME $<\frac{1}{2}$ diameter of PME, distance PME–PLE equal to diameter of PME. Ch *c.* 1·5× as long as wide, posteriorly with 4 minute teeth. St rather densely setose.

Abdomen. Elongate oval, about as wide as Ceph. With 5 pairs of circular DMP in a more or less straight line, VMP in a widely separated, V-shaped arrangement. PLS moderately elongate, about as long as Abd.

Legs. Measurements as above. Very elongate. III slightly $>\frac{1}{4}$ of I.

Palp. MA strongly contorted with ring-shaped apex and a membranous area within. Near centre of that membrane a conspicuous scopula-like organ. Dorsal rim of apex with a broad, rather tooth-like process. LA elongate, just slightly contorted, apex barely excised. Embolus hidden.

Female Paratype (Prince of Wales I.)

Measurements. Length 3·8 mm. Ceph length 1·7 mm, width 1·5 mm. Abd length 2·1 mm, width 2·0 mm. Legs: I, 11·62 mm; II, 10·91 mm; III, 3·97 mm; IV, 9·84 mm. Ratio 1 : 0·94 : 0·34 : 0·84. Ratio LB/LL, 0·33. PLS length 2·2 mm; bS 0·6 mm; tS 1·6 mm. Eyes 1 : 0·33 : 0·69 : 0·83.

Colour. Pattern as in holotype, but colour darker and more vivid, in particular Abd darker, and legs and PLS more annulate.

Cephalothorax. Very similar to holotype. AME relatively smaller, Cl slightly higher. Ch posteriorly with 2 and 6 minute teeth.

Abdomen. Elongate oval, PLS about as long as Abd.

Legs. Measurements as above. Elongate, though shorter than in male. III *c.* $\frac{1}{3}$ as long as I.

Epigyne. With an opening immediately at lateral border, covered by a small rounded plate. Parts of V closely adjacent.

Vulva. With 2 RS each side, which are bulbous at base. Lateral RS glandular only basally. ID strongly bent and produced outwards.

Variation

Little variation, confined to colour and some sexual variation in shape.

Distribution (Fig. 54)

North Queensland to tip of Cape York Peninsula, and north-eastern Northern Territory near the Queensland border.

Material Examined

Apart from the type series (3♂, 7♀), two juv are tentatively placed in this species: 1 juv ♂, 1 juv ♀, Edmonton, Queensland (AMS KS 15861).

Habits

Unknown. Some specimens were captured in web in bark crevices of treetrunks; from February to June and in September, November and December.

Tamopsis trionyx, sp. nov.

(Figs 33, 54)

Type

Holotype ♂, Altonvale Stn, 40 miles W. Westmar, Queensland, in spinifex, T. Adams, R.R., 10.i.1979, det. *Tama* sp. (QM).

Type locality: Westmar in southern central Queensland.

Diagnosis

Medium-sized species with high eye area and large AME. Characterised by MA with large, spoon-shaped, hooked apophysis, and by LA with deeply excised apex and strongly elongate and somewhat hook-like lateral processes of excision.

Male Holotype

Measurements. Length 3·3 mm. Ceph length 1·5 mm, width 1·5 mm. Abd length 1·8 mm, width 1·4 mm. Legs: I, 10·55 mm; II, 9·32 mm; III, 4·07 mm; IV, 9·31 mm. Ratio 1 : 0·88 : 0·38 : 0·88. Ratio LB/LL, 0·31. PLS length 1·7 mm; bS 0·35 mm; tS 1·35 mm. Eyes 1 : 0·26 : 0·79 : 0·79.

Colour. Ceph light brown, border narrowly black, some radial spots dark. Eye area dark brown, behind eyes an indistinct white spot. Ch medially dark. Abd mottled dark and white, laterally darker. LSS conspicuous, posteriorly some conspicuous dark cross-bars. Legs and PLS broadly annulate, femora widely black ventrally.

Cephalothorax. Circular, slightly narrower than Abd. Eye area strongly raised, Cl slightly higher than eye area. AME much the largest, PME and PLE about equal-sized. Distance AME–AME $<\frac{1}{2}$ diameter of AME, distance AME–ALE still less. Distance PME–PME $\frac{1}{3}$ diameter of PME, distance PME–PLE slightly less than diameter of PME. Ch *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 3 minute teeth. St densely setose.

Abdomen. Elongate oval, wider than Ceph. With 5 pairs of circular DMP in a rather straight line, VMP in a widely separated, V-shaped arrangement. PLS slightly shorter than Abd.

Legs. Measurements see above. Moderately elongate, III nearly $\frac{2}{5}$ as long as I.

Palp. MA rather strongly contorted, apex with wide, membranous area within, and with a large, spoon-shaped, hooked apophysis. Membranous area with a scopula-like organ within. LA also contorted, apex deeply excised, lateral parts of excision elongate, slender, somewhat hook-shaped.

Female

Unknown

Distribution (Fig. 54)

Southern central Queensland.

Material Examined

Only the holotype.

Habits

Unknown; holotype collected in January.

Tamopsis pseudocircumvidens, sp. nov.

(Figs 34, 54)

Type

Holotype ♀, Buningonia Spring, 5 km SE. of (BSR 2) [Well], 31°26′S.,123°33′E., Western Australia, 18–25.xi.1978, T. F. Houston *et al.* (WAM reg. No. 85/388).

Type locality: Buningonia Spring, near Kalgoorlie in southern Western Australia.

Diagnosis

Medium-sized species with high eye area and rather elongate legs, best distinguished by the simply coiled RS of V.

Female Holotype

Measurements. Length 4·3 mm. Ceph length 1·7 mm, width 1·5 mm. Abd length 2·6 mm,

width 2·0 mm. Legs: I, 12·92 mm; II, 12·2 mm; III, 4·57 mm; IV, 11·83 mm. Ratio 1 : 0·94 : 0·35 : 0·92. Ratio LB/LL, 0·33. PLS length 2·07 mm; bS 0·52 mm; tS 1·55 mm. Eyes 1 : 0·33 : 0·73 : 1.

Colour. Light coloured. Ceph yellowish to light brownish, centre behind eyes light yellow. Eye area and lateral borders narrowly black. Cl medially and Ch anteriorly black, Cl laterally contrastingly white. Abd light, slightly mottled, with white spots at base and near lateral border. LSS indistinct. Legs and Pa narrowly annulate, PLS in front of apex with a conspicuous black spot.

Cephalothorax. Slightly longer than wide, though circular. Eye area strongly raised, sides not concave. Cl a little higher than eye area. Eyes rather small, AME larger than PME, about as large as PLE. Distance AME–AME slightly less than diameter of AME, distance AME–ALE *c.* $\frac{2}{3}$ diameter of AME. Distance PME–PME $>\frac{1}{2}$ diameter of PME, distance PME–PLE equal to diameter of PLE. Ch rather elongate, *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly without teeth. St widely heart-shaped, densely setose.

Abdomen. Rather elongate, slightly wider than Ceph, with 5 pairs of circular DMP. VMP in a V-shaped arrangement. PLS rather short, considerably shorter than Abd.

Legs. Measurements as above. Elongate, III *c.* $\frac{1}{3}$ as long as I.

Epigyne. With a funnel-shaped opening near lateral border, which opens medially. Parts of V widely separated, with a wide, sclerotised bridge in middle.

Vulva. Low and wide, with two RS and a basal lobe or sac. RS glandular only at base. ID conspicuously bent and produced posteriorly.

Male

Unknown.

Distribution (Fig. 54)

Southern Western Australia.

Material Examined

Only the holotype.

Habits

Unknown; holotype collected in November.

Tamopsis leichhardtiana, sp. nov.

(Figs 35, 55)

Type

Holotype ♀, Leichhardt R. Crossing, nr Floraville Stn, Queensland, R. Kokhout, H. Godhelp, M. Archer, 18.x.1976 (QM).

Type locality: Leichhardt River near Floraville in north central Queensland.

Diagnosis

Medium-sized species with raised eye area and large AME, short PLS and fairly short legs, distinguished by V with circular, separated, apical part of dorsal RS, and horizontal ventral RS.

Female Holotype

Measurements. Length 4·2 mm. Ceph length 1·7 mm, width 1·5 mm. Abd length 2·5 mm, width 2·1 mm. Legs: I, 9·95 mm; II, 9·55 mm; III, 3·6 mm; IV, 8·56 mm. Ratio 1 : 0·96 : 0·36 : 0·86. Ratio LB/LL, 0·42. PLS length 1·72 mm; bS 0·52 mm; tS 1·2 mm. Eyes 1 : 0·46 : 0·86 : 0·86.

Colour. Ceph yellowish, eye area and lateral borders dark brown, also some radial stripes dark. A narrow stripe behind eyes white, centre whitish to light yellow. Ch basally dark.

Abd (apparently just before moulting) light, LSS and lateral borders darker. Legs and PLS indistinctly annulate, ventral surface of legs darkened.

Cephalothorax. Circular, though slightly longer than wide. Eye area strongly raised, sides straight. Cl *c.* $1\frac{1}{4}\times$ as high as eye area. AME largest. Distance AME–AME *c.* $\frac{2}{3}$, distance AME–ALE nearly $\frac{1}{2}$ diameter of AME. Distance PME–PME $<\frac{1}{2}$ diameter of PME, distance PME–PLE more than diameter of PME. Ch elongate, *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 3 minute teeth. St about circular, rather densely setose.

Abdomen. Elongate oval, wider than Ceph. With 5 pairs of circular DMP in a more or less straight line. VMP in a narrow, slightly V-shaped arrangement. PLS short, much shorter than Abd.

Legs. Measurements as above. Short, III slightly $<\frac{2}{5}$ of length of I.

Epigyne. With a tube-like opening, somewhat removed from lateral border, which opens medially.

Vulva. With conspicuous, circular, separated, apical part of dorsal RS and horizontal ventral RS. ID short, conspicuously bent.

Male

Unknown.

Distribution (Fig. 55)

Northern central Queensland.

Material Examined

Only the holotype.

Habits

Unknown; holotype collected in October.

This species could perhaps be taken for the unknown female of the preceding species, *T. trionyx*, but the colour, the length of PLS, and the different geographical range renders this supposition rather unlikely.

Tamopsis rossi, sp. nov.

(Figs 36, 55)

Type

Holotype ♀, 20 miles N. Broad Arrow, 325 m, Western Australia, 17.ix.1962, E. S. Ross and D. Q. Cavagnaro (CAS).

Type locality: Broad Arrow in southern Western Australia.

Diagnosis

A very large, elongate, light-coloured species, with large AME and raised eye area, further distinguished by large V with conspicuous, circular dorsal RS.

Female Holotype

Measurements. Length 5·7 mm. Ceph length 2·1 mm, width 2·0 mm. Abd length 3·6 mm, width 2·3 mm. Legs: I, 15·33 mm; II, 14·72 mm; III, 4·91 mm; IV, 14·0 mm. Ratio 1 : 0·96 : 0·32 : 0·91. Ratio LB/LL, 0·37. PLS length 2·9 mm; bS 0·6 mm; tS 2·3 mm. Eyes 1 : 0·33 : 0·81 : 0·86.

Colour. Very light, pattern indistinct. Ceph largely yellowish, eye area and Cl antero-medially dark, also some radial spots dark. Behind eyes a cross-shaped white spot, Ch with dark spot near base. Abd whitish, lateral border yellow, just slightly darker. LSS light brown, short, just surpassing median DMP. Surface neither mottled nor with distinct crossbars. Median DMP rather conspicuous, brown. Legs and PLS not perceptibly annulate, but anterior and posterior surface of legs striped with dark.

Cephalothorax. Circular, rather wide. Eye area raised, CI slightly higher than eye area. AME largest. Distance AME–AME $<\frac{1}{2}$, distance AME–ALE $\frac{1}{3}$ diameter of AME. Distance PME–PME nearly $\frac{1}{2}$, distance PME–PLE slightly less than diameter of PME. Ch elongate, *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 1 and 3 minute teeth. St rather heart-shaped, densely setose.

Abdomen. Very elongate, much longer than wide, slightly wider than Ceph. With 5 pairs of circular DMP in a straight line, VMP in 2 nearly parallel rows. PLS rather elongate, though distinctly shorter than Abd.

Legs. Measurements as above. Moderately elongate, III *c.* $\frac{1}{3}$ of I.

Epigyne. With a tube-like opening, covered by a plate, near lateral border. It opens medially.

Vulva. Ventral RS with conspicuous, circular, separated, apical part, lateral RS small. ID strongly curved. V medially with sclerotised bridge.

Male

Unknown.

Distribution (Fig. 55)

Southern Western Australia.

Material Examined

Only the holotype.

Habits

Unknown; holotype collected in September.

Tamopsis fickerti (L. Koch)

(Figs 37, 38, 56)

Chalinura fickerti L. Koch, 1876, p. 830.
Rhadine fickerti Simon, 1882, p. 255.
Tama fickerti Simon, 1893, p. 447; Rainbow, 1904, p. 325; 1911, p. 152; Röwer, 1942, p. 384; Bonnet, 1959, p. 4236.

Type locality: Sydney, New South Wales.

Types

According to Koch's description the female type specimen was in the collection of Bradley, which was later transferred to the museum of Breslau (Wroclaw). According to Dr Wesolowska the type does not exist there and it is most likely lost. *T. fickerti* is a species which has been quite often identified and even figured (e.g. in Mascord 1970). Since it is quite easy to recognise it by the very long legs and the peculiar triangular plate of the female Epi, and as no similar species apparently exist within its known range, we do not hesitate to recognise this species among our material. Since the type is lost, we designate a neotype from the material at hand, choosing a male specimen because most new species are founded preliminarily on the male Pa.

Neotype ♂, Braemar, via Chinchilla, Queensland, State Forest, 27°13′S.,150°50′E., R. Raven and Q.?., 15–19.x.1979, on treetrunks (QM).

Diagnosis

A large, long-legged, vividly or dark-coloured species, distinguished by high eye area, MA with sharp outer edge at apex; LA more robust, more contorted, and apex more deeply excised than in the very similar following species, and V with strongly swollen ID.

Male Neotype

Measurements. Length 5·2 mm. Ceph length 2·1 mm, width 1·9 mm. Abd length 3·1 mm, width 2·0 mm. Legs: I, 23·61 mm; II, 21·4 mm; III, 6·12 mm; IV, 19·72 mm. Ratio 1 : 0·9 : 0·26 : 0·83. Ratio LB/LL, 0·22. PLS length 2·9 mm; bS 0·6 mm; tS 2·3 mm. Eyes 1 : 0·38 : 0·65 : 0·83.

Colour. Very dark. Ceph light brown, borders, radial spots, and eye area blackish, behind eyes a white spot. Ch brown, reddish to tip. Abd whitish, with broad, grey to brown LSS and blackish brown lateral border, which strongly contrast with the narrow white areas between them. Posteriorly conspicuously mottled and with some dark crossbars. Legs and PLS annulate.

Cephalothorax. Circular, narrower than Abd. Eye area strongly raised, sides straight, Cl high, slightly higher than eye area. AME largest. Distance AME–AME *c.* $\frac{1}{2}$ diameter of AME, distance AME–ALE *c.* $\frac{1}{4}$ diameter of AME. Distance PME–PME *c.* $\frac{1}{2}$, distance PME–PLE about equal to diameter of PME. Ch elongate, *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 6 minute teeth. St rather densely setose.

Abdomen. Elongate oval, much longer than wide. With 5 pairs of circular DMP in straight line, median pit very conspicuous. VMP in a short, V-shaped arrangement. PLS nearly as long as Abd.

Legs. Measurements as above. Very elongate, III just about $\frac{1}{4}$ as long as I.

Palp. MA short, slightly contorted, apex with a wide membranous area and a scopula-like organ within. Lateral rim with sharp edge, dorsally with an excavate process which is hooked at tip. LA stout, strongly contorted, apex deeply excised, tips of lateral parts slightly hooked.

Female (Cudgen, N.S.W., QM)

Measurements. Length: 4·8 mm. Ceph length 1·9 mm, width 1·8 mm. Abd length 2·9 mm, width 2·1 mm. Legs: I, 14·52 mm; II, 14·02 min; III, 4·82 mm; IV, 13·13 mm. Ratio 1 : 0·96 : 0·33 : 0·9. Ratio LB/LL, 0·33. PLS length 2·55 mm; bS 0·45 mm; tS 2·1 mm. Eyes 1 : 0·32 : 0·73 : 0·8.

Colour. Slightly darker than neotype. Pattern similar.

Cephalothorax. Similar to male, Cl slightly higher, PME more closely approached, Ch posteriorly with 3 minute teeth.

Abdomen. Distinctly longer than wide, slightly wider than Ceph. PLS shorter than in male.

Legs. Measurements as above. Shorter than in male, though rather elongate, III *c.* $\frac{1}{3}$ as long as I.

Epigyne. With an opening, covered by a rounded plate, immediately at lateral border. Epi medially with an oval to triangular plate which is laterally separated at base.

Vulva. With 2 RS of equal size, ID coiled around base of RS, this part of ID strongly swollen.

Variation

There is some variation of size and body shape, especially of the abdomen which is wider in females. Colour varies to a considerable degree. There are fairly light-coloured specimens with two conspicuous light stripes on Abd; others are nearly entirely dark, without any white on the abdomen. This is the 'dark phase', which Mascord (1966) takes for a morphotype adapted to live on burnt treetrunks. We think, however, that extreme dark and white forms, at least of western Australian species, are adapted to and live particularly on dark- or white-barked trees, respectively, or even on different-coloured places on the same tree.

Distribution (Fig. 56)

South-eastern Queensland, eastern New South Wales, and perhaps also eastern Victoria. There is also a specimen labelled 'Darwin, N.T.', which is presumably a confounded locality.

Material Examined

57 specimens. **New South Wales:** 1♂, The Basin, Pittwater (AMS KS 15837); 1♀, Cudgen, det. *Tama eucalypti* (QM); 8♂, 12♀, Currawong (AMS KS 15812, 15813, 15815–17, 15822, 15824, 15834, 15843–45, ZSM); 2♂, 2♀, 1 subad. ♂, Currawong, Broken Bay (AMS KS 15793, 15795, 15796, 15797, 15798); 1♀, Currawong, Pittwater (AMS KS 15823); 1♀, Flat Rock Creek, Royal Natl Park, nr Audley (AMS KS 15850); 1♂, 6 km S. of Forster (AMS KS 10207); 1♀, Gordon (AMS KS 8658); 1♀, Rivatt's Creek (AMS KS 15794); 1 juv ♂, Ryde (AMS KS 15847); 1♀, Smokey Hollow, Coonabarabran (AMS KS 7550). **Queensland:** 1♂, neotype, Braemar, nr Chinchilla (QM); 1♀, Emerald district (NMV); 1♀, Fraser I. (AMS KS 15777); 1♀, Kroombit Tops, 45 km SSW. Calliope (QM); 2♂, 1♀, Rockhampton, Emu Park (QM, ZSM). **Northern Territory:** Darwin (erroneous locality) (NMV).

Another 15 juv from different localities are tentatively appointed to this species. **Victoria:** 1 juv ♀, Cockatoo (NMV); 1 juv ♀, Bemm River (NMV). **New South Wales:** 4 juv, Cudgen (QM); 1 juv ♂, Broken Bay (AMS KS 15799); 1 juv, Currawong, Broken Bay (AMS KS 15795); 3 juv, Currawong (AMS KS 15845); 1 juv ♀, Narrabeen (AMS KS 15790); 1 juv ♂, Royal Natl Park, nr Audley (AMS KS 15785); 1 juv ♀, Ryde (AMS KS 15848).

Habits

Specimens have been collected on trunks of different trees, under bark, also on rocks. Records are from September to February, and from April to June.

Tamopsis perthensis, sp. nov.

(Figs 39, 40, 56)

Types

Holotype ♂, Greenmount, Western Australia, G. H. Lowe, 13.xii.1979 (WAM reg. No. 85/395). Paratypes: **Western Australia:** 1♀, Perth, City, 16.xii.1984, on bark of *Ficus*, B. and M. Baehr (ZSM); 1♂, Kings Park, M. W. Fuller (WAM reg. No. 85/400); 1♂, Glen Forest, 31.xi.1975, S. M. Postmus (WAM reg. No. 85/394); 1♂, Darlington, S. M. Wade, 9.xi.1972, under jarrah (bark dead) on Darlington Rd (WAM reg. No. 85/391); 6♂, 5♀, Perth, 93.1.4.47.100, H. W. G. Jurner (BMNH, ZSM); 1♀, Busselton, 1899, A. M. Lea (AMS KS 15788); 1♀, 16 km E. of Dwellingup on Murray Rd, 25.i.1979, M. Gray, on blackbutt trunk (AMS KS 5934).

Type locality: Greenmount in south-western Australia.

Diagnosis

A large, rather long-legged, dark-coloured species with characteristic Abd pattern and raised eye area, distinguished by the triangular median plate of V and ID being not swollen.

Male Holotype

Measurements. Length 4·8 mm. Ceph length 1·9 mm, width 1·6 mm. Abd length 2·9 mm, width 1·8 mm. Legs: I, 17·63 mm; II, 16·51 mm; III, 5·52 mm; IV, 14·6 mm. Ratio 1 : 0·93 : 0·32 : 0·83. Ratio LB/LL, 0·27. PLS length 2·15 mm; bS 0·55 mm; tS 1·6 mm. Eyes 1 : 0·3 : 0·75 : 0·8.

Colour. Rather dark. Ceph dark brown, base and a narrow stripe behind eyes light. Ch brown, tip reddish. Abd dark, slightly mottled, laterally with a conspicuous black band, which widens behind 1st third and becomes lighter towards sides. LSS inconspicuous. Legs and Pa very dark, narrowly annulate with yellow. Terminal segment of PLS entirely black.

Cephalothorax. Circular, longer than wide, slightly narrower than Abd. Eye area strongly raised, sides straight, Cl high, slightly higher than eye area. AME largest. Distance AME–AME *c.* $\frac{1}{3}$ diameter of AME, distance AME–ALE even less. Distance PME–PME $\frac{1}{3}$ diameter of PME, distance PME–PLE *c.* $\frac{2}{3}$ diameter of PME. Ch elongate, *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 3 minute teeth. St rather densely setose.

Abdomen. Elongate oval, slightly wider than Ceph. With 5 pairs of circular DMP in a fairly straight line. VMP in a short, V-shaped arrangement. PLS considerably shorter than Abd.

Legs. Measurements as above. Rather elongate. III *c.* $\frac{1}{3}$ as long as I.

Palp. MA strongly contorted. Apex with a large membranous area and a scopula-like organ within. MA laterally with sharp edge, dorsally with a short, excavate process with somewhat hooked tip. LA also contorted, moderately elongate, rather slender, excised at apex.

Female Paratype (No. 1, Perth)

Measurements. Length 6·8 mm. Ceph length 2·6 mm, width 2·5 mm. Abd length 4·2 mm, width 3·5 mm. Legs: I, 18·92 mm; II, 18·4 mm; III, 6·55 mm; IV, 16·63 mm. Ratio 1 : 0·97 : 0·35 : 0·88. Ratio LB/LL, 0·36. PLS length 3·6 mm; bS 0·8 mm; tS 2·8 mm. Eyes 1 : 0·28 : 0·69 : 0·75.

Colour. Lighter than in holotype, pattern more vivid. Ceph dark yellow. Abd conspicuously mottled, base white. Dark lateral stripe well defined on inner side, fading outside. LSS indistinct. DMP conspicuous. Legs and PLS more yellow than dark, but conspicuously annulate.

Cephalothorax. Similar to male, AME slightly larger, Cl slightly higher.

Abdomen. Circular, though longer than wide, considerably wider than Ceph. PLS relatively shorter, shorter than Abd.

Legs. Measurements as above. Moderately elongate, III slightly $>\frac{1}{3}$ of I.

Epigyne. With an opening, covered by a rounded plate, immediately at lateral border. Medially with a conspicuous triangular plate which is not separated laterally at base. Parts of V closely adjacent.

Vulva. With 2 rather similar RS, outer RS globular only at base. ID coiled around base of RS, but not swollen.

Variation

The size and shape of the abdomen are rather variable, depending on sex. There is, apparently, also some sexual variation in colour, most males being very dark and females in general lighter.

Distribution (Fig. 56)

South-western corner of Western Australia.

Material Examined

Apart from the type series (10♂, 8♀) 5 juv are tentatively placed in this species: **Western Australia:** 1 juv, Perth, City (ZSM); 1 juv ♂, 105 Glengariff, Floreat Park (WAM reg. No. 85/393); 1 juv ♂, Sth Stirlings (WAM reg. No. 85/403); 1 juv ♀, Katanning, 12 miles NE. (WAM reg. No. 85/398); 1 juv ♀, King's Park, Perth (CAS).

A further three juv, one a syntype of *Tama brachyura* Simon, could also belong to this species on the basis of their colour; but see p. 392.

Habits

Two specimens have been collected on bark of *Ficus* in a city park of Perth, sitting motionless in small crevices where they are extremely difficult to see. Other specimens are from jarrah trees, *Eucalyptus marginata*, and blackbutt, *E. patens*. Individuals have been collected in January, March, April, September–December.

Tamopsis occidentalis, sp. nov.

(Figs 41, 42, 56)

Types

Holotype ♂, Fortescue River, 137 km SW. of Roeburne, Western Australia, 5,6.xii.1984, at trunks of river eucalypts, B. and M. Baehr (WAM).

Paratypes: **Western Australia:** 9♂, 14♀, same data as holotype (ZSM); 2♀, De Grey R., 80 km NE. of Port Hedland, 27,28.xi.1984, at trunks of river eucalypts, B. and M. Baehr (ZSM); 2♂, 7♀, 65 km SSE. of Port Hedland, at new road to Wittenoom, 28,29.xi.1984, at trunks of *Eucalyptus*, B. and M. Baehr (ZSM); 2♀, Bea Bea Creek, 12 km S. of White Springs, Chichester Range, 29.xi.1984, at trunk of river eucalypt, B. and M. Baehr (ZSM); 6♂, 5♀, Dales Gorge, 60 km SE. of Wittenoom, Hamersley Range, 29,30.xi.1984, at trunks of river eucalypts, B. and M. Baehr (ZSM); 1♂, 1♀, nr Joffre Falls, 70 km SE. of Wittenoom, Hamersley Range, 1.xii.1984, at trunk of eucalypt, B. and M. Baehr (ZSM); 1♀, Python Pool, Chichester Range, 75 km NE. of Millstream, 5.xii.1984, at trunk of river eucalypt, B. and M. Baehr (ZSM); 1♀, 95 km NNE. of Millstream, Chichester Range, nr road to Roeburne, 5.xii.1984, at trunk of river eucalypt, B. and M. Baehr (ZSM); 1♂, 3♀, Maitland R., 25 km SSW. of Karratha, 5.xii.1984, at trunks of river eucalypts, B. and M. Baehr (ZSM); 1♂, Robe R., 42 km SW. of crossing of Fortescue R., 6.xii.1984, at trunk of river eucalypt, B. and M. Baehr (ZSM); 12♂, 9♀, Ashburton R. at Nanutarra Roadhouse, 6,7.xii.1984, at trunks of river eucalypts, B. and M. Baehr (ZSM); 11♂, 37♀, Minilya R., 142 km N. of Carnarvon, 11, 12.xii.1984, at trunks of river eucalypts and of other eucalypts, B. and M. Baehr (AMS, BMNH, NMV, QM, WAM, ZSM); 5♂, 15♀, 20 km N. of Carnarvon, 12–14.xii.1984, at trunks of diverse eucalypts and on mulga, B. and M. Baehr (ZSM); 2♂, 5♀, Gascoyne R. Crossing, 15 km N. of Carnarvon, 13.xii.1984, at trunks of river eucalypts, B. and M. Baehr (ZSM).

Type locality: Fortescue River Crossing, Western Australia.

Diagnosis

A large, rather long-legged, vividly coloured species with raised eye area, large AME, and MA at apex with 2 excavate areas laterally.

Male Holotype

Measurements. Length 4·8 mm. Ceph length 2·0 mm, width 1·8 mm. Abd length 2·8 mm, width 2·2 mm. Legs: I, 18·82 mm; II, 17·71 mm; III, 5·2 mm; IV, 16·39 mm. Ratio 1 : 0·94 : 0·28 : 0·87. Ratio LB/LL, 0·25. PLS length 2·25 mm; bS 0·5 mm; tS 1·75 mm. Eyes 1 : 0·25 : 0·62 : 0·75.

Colour. Very light. Ceph yellowish, border and radial stripes just faintly darker. Eye area dark, behind eyes a white cross-shaped spot. Cl medially with a reddish stripe. Abd conspicuously white, near lateral border a faint dark line, LSS yellow to grey. Yellowish DMP strongly contrasting. Legs and PLS whitish, indistinctly annulate with light brown. Lower surface of I and II femora with elongate, dark stripe.

Cephalothorax. Circular, sides anteriorly not very convex, considerably narrower than Abd. Eye area strongly raised, Cl high, slightly higher than eye area. AME by far largest. Distance AME–AME slightly $>\frac{1}{2}$ diameter of AME, distance AME–ALE slightly more than diameter of ALE. Distance PME–PME *c.* $\frac{1}{2}$ diameter of PME, distance PME–PLE equal to diameter of PME. Ch elongate, *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 2 minute teeth. St sparsely setose.

Abdomen. Elongate oval, with 5 pairs of circular DMP, median pit very conspicuous. AMP in a V-shaped arrangement. PLS considerably shorter than Abd.

Legs. Measurements as above. Elongate, III slightly $>\frac{1}{4}$ of I.

Palp. MA strongly contorted. Apex circular with a wide membranous area and a scopula-like organ within, and with a hooked and excavate apophysis. Lateral rim with sharp, strongly raised edge, edge twice excavate laterally. LA contorted, apex moderately excised.

Female Paratype (No. 1, Fortescue R.)

Measurements. Length 5·9 mm. Ceph length 2·3 mm, width 2·2 mm. Abd length 3·6 mm, width 3·3 mm. Legs: I, 16·12 mm; II, 15·4 mm; III, 4·91 mm; IV, 14·38 mm. Ratio 1 : 0·96 : 0·3 : 0·89. Ratio LB/LL, 0·36. PLS length 3·1 mm; bS 0·63 mm; tS 2·47 mm. Eyes 1 : 0·27 : 0·69 : 0·83.

Colour. Much like holotype.

Cephalothorax. Similar to male. AME slightly smaller, Cl slightly higher. Ch posteriorly with 1 minute tooth.

Abdomen. More circular, considerably wider than Ceph. PLS slightly longer than in holotype.

Legs. Measurements as above. Rather elongate, III nearly $\frac{1}{3}$ as long as I.

Epigyne. With a slit-like opening, covered by an acute plate, at some distance from lateral border.

Vulva. With 2 slightly different RS, ID conspicuously bent inside.

Egg sac (Fig. 42*f*). A roundish to slightly oval disk, somewhat cone-shaped, but strongly flattened.

Variation

There is considerable variation in colour, from nearly white, as in the holotype, to rather uniformly black. Some individuals show a contrasting pattern on the abdomen, with white ground colour and dark brown pattern. The type of pattern is, however, generally similar in all specimens. Epi and V show some variation, as lateral RS may be more slender and longer than median RS, or both may be rather stout and of equal size. It is not certain whether this variation is geographical, because in some localities females of both types occur. But there are indications of ecological separation, because in most areas females with short and stout RS occur mainly inland, away from water, and females with longer and thinner lateral RS mainly on river eucalypts along the course of larger rivers.

Distribution (Fig. 56)

Western Australia south of the Great Sandy Desert, south at least to Gascoyne River and inland to at least Chichester Range and Hamersley Range.

Material Examined

Apart from the numerous type specimens (51♂, 102 ♀), there are about 80 additional juv, partly from localities where adults have also been collected, partly from the following localities: Wittenoom Gorge, 10 km S. of Wittenoom, Hamersley Range (ZSM); Hooley Creek, 68 km NW. Wittenoom (ZSM); Millstream, bed of Fortescue R. (ZSM); all collected on river eucalypts, Dec. 1984, B. and M. Baehr. All juv are tentatively allotted to this species.

Habits

All specimens were captured on the trunks of eucalypts, mainly *E. camaldulensis*. During the day they sit motionless on the outer surface of the bark, often in small hollows, and because of their light colour they are extremely difficult to locate. Females, and sometimes also males, usually sit on or near their egg sac (Fig. 42*f*), which is attached to the bark. They often build a rather long, ladder-like, very delicate, perpendicular web along the trunk, and sit in it. Their colour apparently corresponds to the background, as specimens living on the white bark of river eucalypts are usually white, and those taken on darker areas or on darker bark of other trees tend to be darker coloured. On river eucalypts the species can be rather numerous. Sometimes up to 10 specimens are detectable on a single tree and in the basal 2–3 m. Specimens were collected in November and December. The large numbers of juv found in some areas (in the Hamersley Range, for example, most specimens were juv) and the number of cocoons, suggest that mating time is perhaps just before the onset of summer.

Tamopsis fitzroyensis, sp. nov.

(Figs 43, 44, 56)

Types

Holotype ♂, Fitzroy R. near Willare, Western Australia, 24,25.xi.1984, at trunks of river eucalypts, B. and M. Baehr (WAM). Paratypes: **Western Australia:** 2♀, same data (ZSM); 5♀, Mary R., 115 km WSW. Halls Creek, 17,18.xi.1984, on trunks of river eucalypts, B. and M. Baehr (AMS, QM, WAM, ZSM); 1♂, Fitzroy R. near Fitzroy Crossing, 18–20.xi.1984, on trunk of river eucalypt, B. and M. Baehr (ZSM); 2♂, Windjana Gorge, Napier Range, 150 km E. of Derby, 21–23.xi.1984, on trunks of river eucalypts, B. and

M. Baehr (ZSM); 1♂, 1♀, 26 km E. of Napier Downs, 23,24.xi.1984, on trunks of eucalypts, B. and M. Baehr (ZSM).

Type locality: Fitzroy River near Willare in north-western Australia.

Diagnosis

A large, very light-coloured, long-legged species with raised eye area, characterised by crenulate lateral border of MA, divided plate covering opening of Epi, and by V with conspicuous, sclerotised bridge posteriorly.

Male Holotype

Measurements. Length 4·4 mm. Ceph length 2·0 mm, width 1·8 mm. Abd length 2·4 mm, width 1·9 mm. Legs: I, 20·02 mm; II, 18·41 mm; III, 5·28 mm; IV, 17·33 mm. Ratio 1 : 0·92 : 0·26 : 0·87. Ratio LB/LL, 0·22. PLS length 2·6 mm; bS 0·6 mm; tS 2 mm. Eyes 1 : 0·31 : 0·54 : 0·79.

Colour. Very light. Ceph light yellow, border and radial stripes very slightly darker, eye area brown, Ch infuscate to apex. Behind eyes a conspicuous cross-like white spot. Abd white, lateral border and LSS light grey. Laterally with a faint, darker border line, curved inwards at anterior third. DMP conspicuously greyish. Legs and PLS whitish, very faintly annulate. Lower surface of I and II femora with faint elongate darker stripes.

Cephalothorax. Circular, slightly narrower than Abd. Eye area strongly raised, sides straight, Cl high, slightly higher than eye area. AME by far largest. Distances AME–AME and AME–ALE $<\frac{1}{3}$ diameter of AME, distance PME–PME $<\frac{1}{2}$ diameter of PME, distance PME–PLE about equal to diameter of PME. Ch elongate, *c.* $1\frac{3}{4}\times$ as long as wide, posteriorly with 3 minute teeth. St rather densely setose.

Abdomen. Elongate oval, wider than Ceph. With 5 pairs of circular DMP, median pit very conspicuous. VMP in a V-shaped arrangement. PLS elongate, slightly longer than Abd.

Legs. Measurements as above. Very elongate, III *c.* $\frac{1}{4}$ as long as I.

Palp. MA strongly contorted, apex circular, with a wide, membranous area and a small scopula-like organ within. Dorsally with a strongly hooked, excavate apophysis which is divided near base. Lateral border of MA strongly raised, with sharp edge, edge crenulate, and with a deep cleft. LA strongly contorted, apex excised.

Female Paratype (No. 1, Willare)

Measurements. Length 5·6 mm. Ceph length 2·2 mm, width 2·2 mm. Abd length 3·4 mm, width 3·3 mm. Legs: I, 16·42 mm; II, 16·1 mm; III, 5·13 mm; IV, 14·18 mm. Ratio 1 : 0·98 : 0·31 : 0·86. Ratio LB/LL, 0·34. PLS length 3·4 mm; bS 0·7 mm; tS 2·7 mm. Eyes 1 : 0·28 : 0·68 : 0·86.

Colour. Much like holotype, border line of Abd slightly more distinct.

Cephalothorax. Similar to male; AME slightly smaller, Cl slightly higher.

Abdomen. Circular, about as long as wide, much wider than Ceph. PLS slightly shorter than in male, about as long as Abd.

Legs. Measurements as above. Elongate, III *c.* $0\cdot3\times$ as long as I.

Epigyne. Openings somewhat removed from lateral border, covered by a divided plate. V posteriorly joined by a sclerotised bar.

Vulva. With 2 very dissimilar RS. ID elongate, not coiled around RS.

Egg sac. A roundish to oval, disc-like cone, laterally not crenulate.

Variation

There is slight variation in colour, some individuals being slightly darker with a more distinct pattern, especially on the abdomen and on legs. There is also some sexual variation of size and of shape of the abdomen.

There are three very dark female specimens from Napier Range which have a striking pattern, slightly different V with somewhat shorter lateral RS, and with an egg sac con-

spicuously crenulate outside (Fig. 44*f*). All specimens were collected on eucalypts with a dark, very rough bark (blackbutt). It is at present not possible to decide whether these specimens belong to a separate taxon, or if they represent only an ecotype, adapted to life on a particular eucalypt. Because no males are available, we refrain from giving a separate name to them.

Distribution (Fig. 56)

Kimberley division, especially eastern and southern border, north-western Australia.

Material Examined

Light form: apart from the type series (5♂, 8♀), 11 juveniles from localities where adults have also been collected are tentatively allotted to this species.

Dark form: **Western Australia:** 2♀, Windjana Gorge, Napier Range, 150 km E. of Derby, 21–23.xi.1984, on trunks of blackbutt eucalypts, B. and M. Baehr (ZSM); 1♀, Napier Downs, 135 km E. of Derby, on trunk of blackbutt eucalypt, 24.xi.1984, B. and M. Baehr (ZSM).

Habits

All specimens were collected on trunks of eucalypts, mostly of the river eucalypt *E. camaldulensis*, where they match the white bark very closely and are extremely difficult to detect. Some females were observed near their egg sacs, which are rather similar to those of proceding species. All records are from November. As in *T. occidentalis*, mating may take place just before the onset of the wet season.

Doubtful Species

Two of the four described Australian species remain doubtful, for different reasons. Either types are lost and descriptions are not detailed enough to enable us to decide which of the various existing species they actually refer to, or the type specimen is a juvenile which cannot be allocated to any one species. As male and female genitalia were not described, only very indeterminate characters such as colour, size and shape can be used. Those characters, however, vary to a considerable degree within and between species, and in some species are virtually useless for determination. For example, several specimens in the material before us were determined as *Tama novaehollandiae* by various workers, but they belong to several different species.

Tama novaehollandiae (L. Koch)

Chalinura novae-hollandiae L. Koch, 1876, p. 828.
Rhadine Novae-Hollandiae, Simon, 1882, p. 255.
Tama novae-hollandiae, Simon, 1892, p. 447; Rainbow, 1904, p. 325; 1911, p. 153; Röwer, 1942, p. 384; Bonnet, 1959, p. 4237.

Type locality: Sydney, New South Wales.

Types

According to Koch's description the type specimen was in the Museum Godeffroy in Hamburg. Later this collection came into possession of the Zoologisches Museum, Hamburg. Other specimens were from Bradley's collection, which was later given to the Museum of Breslau (Wroclaw). We saw two specimens from the Hamburg Museum, both juveniles, which, however, cannot be types because Koch described only the female. Dr Rack (Hamburg) informed us that no other specimens exist in Hamburg. The museum in Wroclaw does not possess any *Tama novaehollandiae* (Dr Wezolowska, personal communication). Probably all type specimens of this species are lost. This assumption is quite credible, as both museums were badly damaged during World War II. Because several species could compete for recognition as *T. novaehollandiae*, and as Koch's figures add nothing to the description, this species will probably remain doubtful for ever.

Tama brachyura Simon

Tama brachyura Simon, 1908, p. 406; Rainbow, 1911, p. 152; Röwer, 1942, p. 384; Bonnet, 1959, p. 4236.

Type locality: Geraldton, Western Australia.

Types

T. brachyura was described from material of the 'Hamburger Südwestaustralienexpedition' of 1905. We saw one syntype from that material, labelled 'Station 112, Karrakutta, 28.v.1905, Hamburger S.W. Aust. Exped., W. Michelsen leg., E. Simon publ. 1908', which is, however, a juvenile female. We saw another juvenile female from the same expedition, which was not published and which is therefore not a type. From the description and from inspection of the type we are not sure what *T. brachyura* is. It could perhaps be identical with our *T. perthensis*. However, as the description is based only on juvenile specimens, we cannot be sure that this synonymy is correct and we don't want to stabilise an uncertain synonymy. We are strengthened in our view by the presence of several rather similar species in south-western Australia, and by the possibility that more species remain to be discovered in this area, which would make the synonymy still more doubtful.

Phylogenetic Status of the Australian Hersiliidae

The relationships of the Hersiliidae as a whole are rather obscure. This is perhaps due to their great number of special adaptations to the environment. Lehtinen (1967) placed Hersiliidae near to Urocteidae (see discussion of this problem in Lehtinen, p. 305), but there are not many arguments in favour of that placement. However, placement within other family groups is still less reasonable.

The genera occurring in Australia are, perhaps, rather derivative by comparison with the other genera, particularly *Hersiliola*. *Hersilia* is characterised by extremely elongate legs and PLS, which are certainly adaptations to arboreal life on treetrunks. A further apomorphic character is the secondarily divided metatarsus. With regard to the structure of the male palp, however, *Hersilia* is rather primitive. A basically similar palp, with coiled embolus, occurs in African and Asian species of *Tama*. As no complete study of the genus *Hersilia* exists, we do not know the phylogenetic status of *H. australiensis*, especially as the New Guinean fauna is not satisfactorily known.

In the structure of the male palp, *Tamopsis* is certainly more derivative than other hersiliid genera. However, there are some differences within the genus, and in some species the palp is rather primitive. The following characters provide justification for genus *Tamopsis*: structure of the male palp and the tree-living habits of all Australian species, without construction of a complicated web.

Reconstruction of faunal history is primarily based on the history of acquisition of adaptations, that is the history of characters, since analysis of ancestral or derivative status of characters is the only way to reconstruct phylogeny. As Hennig (1966) demonstrated, only derivative (apomorphic) characters are useful in such a phylogenetic classification, because they enable us to recognise monophyletic taxa and to establish sister-group relationships by use of synapomorphic characters. As a first step to phylogenetic classification and to analysing history of the fauna, we attempt to determinate the plesiomorphic and apomorphic states of various characters. The non-Australian hersiliid fauna is rather poorly known, so for some characters this is rather arbitrary. Moreover, several characters very probably evolved convergently, and they can be used only with great caution.

A summary of the state of characters used and their states is given in Tables 1 and 2; it is subsequently used to construct the phylogenetic diagram of Fig. 57. Table 1 lists and numbers characters and character states; Table 2 gives the apomorphic character states for each species.

(1) Large body size is always connected with some other apomorphic characters: apomorphic. Perhaps very small size could also be derivative, as species of other genera

are mostly larger. However, the two smallest species possess so many plesiomorphic characters, and are certainly the most generalised species of *Tamopsis*, that their minute size seems to be plesiomorphic as well.

(2) Extremely wide cephalothorax: certainly apomorphic.

(3) Eye area slightly raised: most common, perhaps plesiomorphic, because a strongly raised eye area and a completely depressed eye area both occur only in groups whose species are very closely related by several synapomorphic characters.

(4) Concave sides of eye area: apomorphic, occurring in only one species which is also peculiar in other characters. A similar shape of eye area, however, occurs convergently in *Hersilia*.

(5) AME larger than PME: the assumption that large AME are plesiomorphic is based on the occurrence of this character state in the most ancestral species. It occurs predominantly in species living on treetrunks. As habits of most species are unknown, the status of this character is fairly unsettled.

(6) Shape of ALE: circular shape is plesiomorphic by comparison.

(7) Number of teeth at posterior rim of Ch: a high number, as in *Hersilia*, is perhaps plesiomorphic; reduction, however, may be convergent.

(8) Shape of abdomen: a circular to transverse shape is plesiomorphic by comparison with *Hersilia*.

(9, 10) Special features, such as dorsal or lateral humps on female abdomen: presence is apomorphic.

(11) Pattern of abdomen: a largely unicolorous, white or black abdomen is perhaps apomorphic, due to adaptation to different colours of bark.

(12) Number of DMP: reduction is perhaps apomorphic. As *Hersilia* has also only four DMP, reduction is convergent in *Tamopsis*.

(13) Shape of DMP: circular or elliptical is plesiomorphic by comparison.

(14, 15) Size of PLS and of legs: short legs and short PLS are perhaps plesiomorphic by comparison with the non-arboricolous genus *Hersiliola*. Elongate PLS probably evolved with the acquisition of arboreal habits, but could have done so several times independently.

(16) Spinose or setose areas on the dorsal surface of the male palp: presence apomorphic by comparison with other genera.

(17, 18) Free and penetrating embolus: plesiomorphic by comparison. Apomorphic state 17*c* may well be convergent.

(19) Torsion of LA: a simple, not contorted LA plesiomorphic. Torsion has evolved independently in several species-groups or even species.

(20) LA, structure of apex: special structures apomorphic.

(21) MA, structure of apex: spoon- or finger-shaped apex plesiomorphic, but both structures must go back to an even simpler structure. The several apomorphic structures are independently evolved states.

(22) Size of hook at apex of MA: larger size may be apomorphic.

(23) Scopula-like organ on apex of MA: presence is apomorphic.

(24, 25) Increasing excision and torsion of apex of MA: this is a morphocline: apomorphic.

(26, 27) Dorsal apophysis at apex of MA: increasing size and division of the apophysis are apomorphic by comparison and with regard to other morphoclinal changes in the apex of MA. Characters 26–32 are aspects of one complex character.

(28) Scopula-like organ within apex of MA: presence apomorphic.

(29–32) MA, lateral rim of apex: characters are a clear morphocline.

(33) Sclerotised bridge on epigyne: presence is apomorphic by comparison.

(34, 35) Scapus of epigyne: absence is plesiomorphic, basal separation of scapus is probably apomorphic.

(36) Lateral opening on epigyne: presence is apomorphic by comparison, but independently evolved in different species-groups. Its presence corresponds to the presence of corresponding fixing structures on MA of the male palp.

(37) Form of lateral opening on epigyne: without covering plate perhaps plesiomorphic, because structure is simpler.

Table 1. Character states used in the construction of phylogenetic relationships of the Australian species of *Tamopsis*

Different apomorphic states are distinguished by lower-case letters

No.	Character	Plesiomorphic state	Apomorphic state
1.	Body size	Very small, 3 mm	Medium-sized: 1a Large, 5 mm: 1b
2.	Ceph size	Narrower than Abd	Wider than Abd: 2
3.	Eye area	Slightly raised	Raised, oblique at top: 3a Strongly raised: 3b Completely depressed: 3c
4.	Sides of eye area	Straight	Concave: 4
5.	AME: size	Larger than PME	As large as or smaller than PME: 5
6.	ALE: shape	Circular	Slightly transverse: 6
7.	Ch: teeth at posterior rim	Numerous (6–3)	Few (1–0): 7
8.	Abd: shape	♂ circular, ♀ transverse	♂ elongate; ♀ circular–oval: 8a ♂ very elongate, parallel; ♀ elongate: 8b
9.	Abd: dorsal hump	Absent	Present: 9
10.	Abd: lateral bosses	Absent	Present: 10
11.	Abd: colour and pattern	Vivid, contrasting	Rather uniform, white or black: 11
12.	DMP: number	5	4: 12
13.	DMP: shape	Circular or elliptical	Falciform: 13
14.	PLS: size	Short	Elongate: 14
15.	Legs: size	Short	Elongate: 15
16.	♂ Pa	Without special features	With densely setose area dorsally: 16a With spinose area dorsally: 16b
17.	LA: embolus	Free	Hidden in a spiral sheet: 17a Hidden in a funnel-shaped cup: 17b Otherwise hidden: 17c
18.	LA: embolus	With penetrating embolus	With attaching embolus: 18
19.	LA	Not contorted	More or less contorted: 19
20.	LA: apex	Not excised, without spines or hooks	Excised, with hook: 20a Excised, with spines: 20b Excised, spines very long: 20c

21.	MA: apex	Simple, spoon-shaped or finger-shaped	Laterally with strong hook: 21a Apically produced in a huge hook: 21b Widened, contorted and excised: 21c Ring-like, with a membrane within and dorsally with a hook: 21d
22.	MA: vertical hook at apex	Shorter	More elongate: 22
23.	MA: scopula-like area at apex	Absent	Present: 23
24.	MA: excision of apex	Less deep	Very deep: 24
25.	MA: torsion	Slight	Strong: 25
26.	MA: process on dorsal rim of apex	Small	Strong: 26
27.	MA: process on dorsal rim of apex	Entire	Divided: 27
28.	MA: scopula-like organ within apex	Absent	Present: 28
29.	MA: lateral edge of apex	Rounded	Sharp: 29
30.	MA: incision on lateral edge of apex	Absent	Present: 30
31.	MA: degree of incision at edge of apex	Slight	Deeply incised, lateral edge doubly excavate: 31
32.	MA: form of lateral rim of apex	Not crenulate	Crenulate: 32
33.	Epi: sclerotised bridge	Absent	Present, medial to RS: 33a Present, posterior to V: 33b
34.	Epi: median triangular scapus	Absent	Present: 34
35.	Epi: base of triangular scapus	Not separated	Laterally separated: 35
36.	Epi: lateral opening	Absent	Present, opens medially: 36a Present, opens laterally: 36b
37.	Epi: covering of lateral opening	Open	Covered by sclerotised plate: 37
38.	Epi: plate covering lateral opening	Entire	Divided: 38
39.	RS: separate glandular sac	Present	Absent, only sides of RS glandular: 39
40.	RS: extension of glandular surface	Whole lateral surface	Only on top: 40a Only on base: 40b
41.	RS: apical part of RS	Not modified	Circular, on a narrow stalk-like duct: 41
42.	RS: shape	Average	RS elongate, somewhat coiled: 42a RS very elongate, strongly coiled: 42b
43.	ID: size	Very short	Elongate: 43
44.	ID: shape and course	Simple	Crossing RS: 44a Coiled around RS: 44b Crossing RS at base: 44c
45.	ID: lateral bend	Simple	Crossing RS and bent laterally: 45
46.	ID: swollen area at base of RS	Absent	Present: 46

(38) Form of covering plate of lateral opening on epigyne: divided state is apomorphic, corresponding with a divided apophysis on MA of the male palp.

(39) Glandular sac in vulva: perhaps plesiomorphic, because separation of glands and RS is probably the simpler state.

(40) Extension of glandular area: glands over whole lateral surface is perhaps plesiomorphic, reduction of glandular surface apomorphic. Reduction is independently evolved in different species-groups.

(41) Modification of apical part of RS: separation is presumably apomorphic, because intermediate states occur.

(42) Elongate, coiled RS: apomorphic, but states 42a and 42b are independently evolved.

(43–45) Length of ID: short ID is plesiomorphic by comparison with *Hersilia*, and an elongate and coiled ID apomorphic, but certainly independent in different species-groups.

(46) Swollen ID on base of RS: apomorphic.

In the construction of a phylogenetic tree the species-groups that share combinations of apomorphic characters are treated as evolutionary units. Nine groups are recognised, but some species are perhaps insufficiently grouped and some groups consist of only one species. These are rather primitive and very distinct species with obscure relationships.

The *platycephala* group. A very distinct group with several peculiar synapomorphic characters. The relationships of this group are very obscure; in several characters it differs from the rest of species to such an extent that classification as a separate subgenus might be justified. *T. amplithorax* is perhaps more derivative than *T. platycephala*.

The *brachycauda* group. The single species is one of the most generalised of the whole genus, particularly with regard to its small size, the structure of the male palp and that of the female epigyne. It shows remarkable similarities with the *arnhemensis* group, without being closely related to it.

The *tweedensis* group. A rather generalised group with regard to the structure of male palp and female epigyne, but in some respects the single species is very distinct. Its relationships are obscure.

The *eucalypti* group. A well defined group of two closely related 'sister-species'. The relationships of the group, however, are obscure. *T. brisbanensis* is certainly more derivative than *T. eucalypti*.

The *daviesi* group. The single species is more primitive in some respects than the *queenslandica* group, to which it may be rather closely related, but it also possesses some apomorphic characters.

The *queenslandica* group. A rather homogeneous group with several synapomorphic characters. As several species are known only from females, the boundaries of the group and the phylogenetic sequence within it are obscure. The position of *T. cooloolensis* and of *T. brevipes*, for example, will remain obscure until males are known; both species may not really belong to this group. With respect to the structure of the male palp, a morphocline exists from *T. kochi* and *T. centralis* to *T. queenslandica* and eventually to *T. raveni*, the most derivative species. *T. kochi*, *T. centralis* and *T. grayi* also seem rather closely related. The relationships of the whole group are obscure, with exception of a close relationship to the *daviesi* group.

The *arnhemensis* group. A single species with several plesiomorphic characters. It is one of the most primitive species within *Tamopsis* and shows several similarities to the *brachycauda* group. The *arnhemensis* group is certainly most closely related to the *circumvidens* and *tropica* groups.

The *circumvidens* group. The single species possesses several peculiar apomorphic characters. It is most closely related to the *tropica* group but in some respects is more primitive than that group, and is probably an early offshoot of the ancestor of the *tropica* group.

The *tropica* group. A well defined unit, whose males show a clear morphocline in structure of the palp from *T. tropica*→*T. trionyx*→*T. fickerti*→*T. perthensis*→*T. occidentalis*→*T. fitzroyensis*, the most derived species. *T. fickerti* and *T. perthensis*, and *T. occidentalis*

and *T. fitzroyensis*, respectively, seem to represent phylogenetic units and are perhaps sister species. With regard to the female vulva, *T. pseudocircumvidens*, *T. leichhardtiana* and *T. rossi* could be rather closely related. *T. tropica* is certainly the most primitive member of this group. The group as a whole is closely related to the *circumvidens* group, which has a similar, though more primitive male palp.

On the basis of these considerations it is perhaps possible to (re)construct the 'grundplan' of *Tamopsis*, especially with regard to the male palp and female epigyne. The (presumably) most plesiomorphic characters have a mosaic distribution in several species, particularly in *T. brachycauda* and *T. arnhemensis*. A supposed ancestor of the modern species of *Tamopsis* (in Australia) presumably possessed the following characters:

Size very small;
Eye area not much raised, rather wide;
AME fairly large;
PLS and legs rather short;
Male palp dorsally without spinose or setose areas;
LA simple, not contorted, nor with any hooks or spines;
Embolus free, penetrating embolus;
LA perhaps much like LA of *T. arnhemensis*;
MA simple, perhaps not contorted, perhaps without a hook-like process at base or apex;
Female epigyne without lateral openings;
Female epigyne without a sclerotised bridge in middle;
Vulva with two RS which are perhaps somewhat unequal in size;
Vulva with a glandular sac at base of ventral RS;
ID simple, short;
Epigyne and vulva perhaps much like those of *T. brachycauda* and *T. arnhemensis*.

Table 2 and Fig. 57 clearly show that from a rather generalised ancestor several divergent lineages arose, resulting in the evolution of the *arnhemensis–circumvidens–tropica* groups, the *platycephala* group, the *daviesi–queenslandica* groups, and the more generalised *brachycauda*, *tweedensis* and *eucalypti* groups, respectively, each with obscure relationships.

Zoogeography

Distribution of Species and Species-groups within Australia

Before attempting to draw zoogeographical conclusions from phylogenetic status and from distribution, we want to stress once more that knowledge of both the phylogeny and the distribution of most species is rather poor at present, because several species are known from only one sex or from one or two specimens. This insufficient knowledge is certainly due to the extremely cryptic body shape and colour of these spiders, and also to their habit of sitting motionless in hollows on treetrunks or on twigs, which makes them extremely difficult to observe. As a result most collections seem to be more or less accidental. However, as demonstrated by our collection of more than 250 specimens in north-western Australia, careful searching may result in much more adequate material. In the open forests of eastern Australia, however, hersiliids may be less numerous as individuals than on the scattered river gums on the banks of creeks and rivers in the north-west. In dense tropical rainforest Hersiliidae may be still more difficult to detect. It is worth noting that we have at least one additional species from the rainforest of north Queensland, which we did not describe because it is a juvenile. Thus we can be sure that still more species exist in Australia, and we think they will most probably be discovered in north Queensland, in the northern parts of the Northern Territory, and in the interior. For this reason, our zoogeographical conclusions are by no means final.

The individual species-groups are distributed as follows (Figs 58–61):

Genus *Hersilia*: northernmost tip of the Northern Territory;
The *platycephala* group: south-east Queensland, south-western Australia;
The *brachycauda* group: eastern Queensland and eastern New South Wales;

Table 2*a*. Character states of Australian species of *Tamopsis*, numbered as in Table 1: Nos 1–23

– Plesiomorphic state. ? Unknown

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
platycephala	1a	–	3c	–	–	–	–	8b	–	10	–	12	13	14	–	–	17b	18	–	–	21b	–	–
amplithorax	1a	2	3c	–	–	–	–	8b	?	?	–	12	13	14	–	–	17b	18	–	–	21b	22	–
brachycauda	–	–	–	–	–	–	–	–	9	–	–	–	–	–	–	16a	–	–	–	–	–	–	–
tweedensis	1a	–	–	–	–	–	–	–	–	–	11	–	–	14	15	16b	17c	18	–	20b	–	–	–
eucalypti	1a	–	–	–	5	–	–	–	–	–	–	–	–	14	15	–	17c	18	–	–	21a	–	–
brisbanensis	1a	–	–	–	5	–	–	–	–	–	–	–	–	14	–	–	17c	18	–	20a	21a	–	23
daviesi	1a	–	–	–	–	–	–	–	–	–	–	–	–	14	–	–	17c	18	19	–	21c	–	–
kochi	1a	–	–	–	5	–	7	–	?	?	–	–	–	14	–	–	17c	18	19	–	21c	–	–
centralis	1a	–	–	–	5	–	7	–	?	?	–	–	–	–	?	–	17c	18	19	–	21c	–	–
reevesbyana	1a	–	–	–	5	–	–	–	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?
grayi	1a	–	–	–	5	–	7	–	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?
darlingtoniana	1a	–	–	–	5	–	–	–	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?
queenslandica	1a	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	17c	18	19	–	21c	–	–
raveni	1a	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	17c	18	19	20a	21c	–	–
cooloolensis	1a	–	–	–	5	–	–	–	–	–	–	–	–	14	15	?	?	?	?	?	?	?	?
brevipes	1a	–	–	–	5	–	–	–	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?
arnhemensis	–	–	3a	–	–	–	–	–	–	–	11	–	–	–	15	–	–	–	–	–	21d	–	–
circumvidens	1a	–	3b	4	–	6	7	8a	–	–	11	–	–	–	15	–	17a	–	19	–	21d	–	–
tropica	1a	–	3b	–	–	6	–	8a	–	–	–	–	–	14	15	–	17c	18	–	–	21d	–	–
trionyx	1a	–	3b	–	–	6	–	8a	?	?	–	–	–	14	15	–	17c	18	19	20c	21d	–	–
pseudocircumvidens	1a	–	3b	–	–	6	7	8a	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?
leichhardtiana	1a	–	3b	–	–	6	–	8a	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?
rossi	1b	–	3b	–	–	6	–	8a	–	–	11	–	–	14	–	?	?	?	?	?	?	?	?
fickerti	1b	–	3b	–	–	6	–	8a	–	–	–	–	–	14	15	–	17c	18	19	20b	21d	–	–
perthensis	1b	–	3b	–	–	6	–	8a	–	–	–	–	–	–	15	–	17c	18	19	20b	21d	–	–
occidentalis	1b	–	3b	–	–	6	7	8a	–	–	11	–	–	14	15	–	17c	18	19	20b	21d	–	–
fitzroyensis	1b	–	3b	–	–	6	–	8a	–	–	11	–	–	14	15	–	17c	18	19	20b	21d	–	–

Table 2*b*. Character states of Australian species of *Tamopsis*: Nos 24–46

Species	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
platycephala	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	39	–	–	–	–	–	–	–
amplithorax	–	–	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?	?	?	?	?	?	?
brachycauda	–	–	–	–	–	–	–	–	–	–	–	–	36a	–	–	–	–	–	–	–	–	–	–
tweedensis	–	25	–	–	–	–	–	–	–	–	–	–	–	–	–	39	40b	–	–	–	–	–	–
eucalypti	–	25	–	–	–	–	–	–	–	–	–	–	–	–	–	39	–	–	–	–	–	–	–
brisbanensis	–	25	–	–	–	–	–	–	–	–	–	–	36b	–	–	39	40a	–	–	–	–	–	–
daviesi	–	–	–	–	–	–	–	–	–	–	–	–	36a	–	–	39	–	–	42a	–	–	–	–
kochi	24	25	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?	?	?	?	?	?	?
centralis	24	25	–	–	–	–	–	–	–	?	?	?	?	?	?	?	?	?	?	?	?	?	?
reevesbyana	?	?	?	?	?	?	?	?	?	–	–	–	–	–	–	39	–	–	–	43	44a	45	–
grayi	?	?	?	?	?	?	?	?	?	–	–	–	–	–	–	39	–	–	–	43	44a	–	–
darlingtoniana	?	?	?	?	?	?	?	?	?	–	–	–	–	–	–	39	–	–	–	43	44a	45	–
queenslandica	24	25	–	–	–	–	–	–	–	–	–	–	–	–	–	39	–	–	–	43	44a	45	–
raveni	24	25	–	–	–	–	–	–	–	–	–	–	–	–	–	39	–	–	–	43	44a	45	–
cooloolensis	?	?	?	?	?	?	?	?	?	–	–	–	36b	–	–	39	–	–	–	–	–	–	–
brevipes	?	?	?	?	?	?	?	?	?	–	–	–	36a	–	–	39	–	–	–	–	–	–	–
arnhemensis	–	–	–	–	–	–	–	–	–	–	–	–	36a	–	–	–	–	–	–	–	–	–	–
circumvidens	–	–	26	–	–	–	–	–	–	33a	–	–	36a	–	–	39	40a	–	42b	43	–	–	–
tropica	–	–	26	–	28	–	–	–	–	–	–	–	36a	37	–	39	40a	–	–	43	–	–	–
trionyx	–	25	26	–	28	–	–	–	–	?	?	?	?	?	?	?	?	?	?	?	?	?	?
pseudocircumvidens	?	?	?	?	?	?	?	?	?	33a	–	–	36a	–	–	39	40a	41	–	43	–	–	–
leichhardtiana	?	?	?	?	?	?	?	?	?	33a	–	–	36a	–	–	39	40a	41	–	43	–	–	–
rossi	?	?	?	?	?	?	?	?	?	33a	–	–	36a	37	–	39	40a	41	–	43	–	–	–
fickerti	–	25	26	–	28	29	–	–	–	–	34	35	36a	37	–	39	40a	–	–	43	44b	–	46
perthensis	–	25	26	–	28	29	30	–	–	–	34	–	36a	37	–	39	40a	–	–	43	44b	–	–
occidentalis	–	25	26	–	28	29	30	31	–	33b	–	–	36a	37	–	39	40a	–	–	43	44c	–	–
fitzroyensis	–	25	26	27	28	29	30	31	32	33b	–	–	36a	37	38	39	40a	–	–	43	44c	–	–

The *tweedensis* group: north-east Queensland and the north-eastern tip of New South Wales;

The *eucalypti* group: north-east and south-east Queensland, eastern New South Wales, eastern Victoria, southern South Australia;

The *daviesi* group: north-east Queensland;

The *queenslandica* group: south-east and central Queensland, eastern New South Wales, southern South Australia, southern Western Australia;

The *arnhemensis* group: northernmost Northern Territory, northern tip of Queensland;

The *circumvidens* group: south-western Australia;

The *tropica* group: eastern Northern Territory, northern, north-eastern, and south-eastern Queensland, eastern New South Wales, southern, western, and northern Western Australia.

The distribution and concentration of species-groups differs characteristically between States (Table 3).

Table 3. Distribution of species-groups and species of Hersilidae among the Australian States

State	No. of species-groups	No. of species
Northern Territory	3	3
Queensland	8	15
North-east Queensland only	6	6
New South Wales	5	10
Victoria	1	1
South Australia	2	2
Western Australia	4	9
North of Western Australia only	1	2

By far the most species of all species-groups, with the exception of genus *Hersilia* and the *circumvidens* group, occur in Queensland; but north-eastern Queensland has only six described species from six groups (*brachycauda*, *tweedensis*, *eucalypti*, *daviesi*, *arnhemensis* and *tropica* groups).

New South Wales is also rich in species, but less rich in groups. Only members of the *brachycauda*, *tweedensis*, *eucalypti*, *queenslandica* and *tropica* groups occur.

Victoria has only one species, the widespread *T. eucalypti*.

South Australia is also poor in species, with only two species, representing the *eucalypti* and *queenslandica* groups.

Western Australia is rich in species, but rather poor in species-groups, having the *platycephala*, *queenslandica*, *circumvidens* and *tropica* groups. Most species and groups live only in the south-western corner of the State, with only two species, both of the *tropica* group, in the rest of it.

The Northern Territory is also poor in species and has three groups, genus *Hersilia*, the *arnhemensis* group and the *tropica* group.

With regard to phylogenetic status of the groups or species, respectively, Queensland as a whole has a mixed fauna of primitive and advanced species. North-eastern Queensland, however, has only primitive groups (*brachycauda*, *tweedensis*, *eucalypti*, *daviesi* and *arnhemensis* groups) and the most primitive species (*T. tropica*) of the more advanced *tropica* group. The same is true in the Northern Territory, where only primitive species live: *Hersilia australiensis*, *T. arnhemensis* and *T. tropica*. Surprisingly, no low-eyed species occurs in the Northern Territory.

The fauna of New South Wales is rather mixed; some primitive species are present, being shared with the whole of eastern Queensland (*T. brachycauda* and *T. tweedensis*), but most species are rather derivative.

The faunas of Victoria and of South Australia are impoverished and clearly of northern origin. They consist of species which either have migrated from New South Wales or are closely related to eastern species.

In Western Australia only rather derivative species-groups, and derivative members of these groups, occur. In the northern parts of the State the fauna is very impoverished, restricted to the most derived members of the *tropica* group, perhaps the most derived species of the whole genus *Tamopsis*.

Within species-groups some peculiar sister-groups exist, most of them geographically extremely separated.

T. platycephala–T. amplithorax: the more primitive *T. platycephala* lives in eastern Queensland, the more derivative *T. amplithorax* in south-western Australia.

T. eucalypti–T. brisbanensis: both species occur in eastern Australia, the more generalised *T. eucalypti* having a slightly more southern range. Due to their rather generalised phylogenetic state these species are perhaps fairly old and sufficiently separated to occur sympatrically.

T. kochi–T. centralis: the former from southern Western Australia and the latter from central Queensland. Judged on the male palp they are very closely related, though *T. centralis* seems slightly more derived.

T. fickerti–T. perthensis: very closely related species, living in south-eastern and south-western Australia respectively; *T. perthensis* is slightly more derived.

T. occidentalis–T. fitzroyensis: rather closely related species, the more generalised *T. occidentalis* occurring south of the Great Sandy Desert, the more derived *T. fitzroyensis* north of it.

Faunal Provinces of Australia and Distribution of Hersiliidae within them

From the time of Spencer (1896), followed by Keast (1959), Mackerras (1970) and others, three or four faunal provinces have been recognised within Australia: a northern, humid tropical or subtropical Torresian province; a southern temperate Bassian province, which is sometimes divided into south-eastern Bassian and South-western (Bassian) provinces; and the dry Eyrean province of the centre and the west. Much simplified, the Torresian province – besides an 'old tropical' faunal element – is dominated by a 'younger tropical' or 'oriental' faunal element, which invaded Australia after the continent came into contact with the south Asian insular belt during the Miocene. The Bassian province contains a mixture of an old, southern, 'Gondwanan' faunal element and of the 'younger northern' faunal element which penetrates into the Bassian province from the north (Darlington 1961; Mackerras 1970). The fauna of the Eyrean province is an impoverished mixture of old indigenous faunal elements, mainly in the south, and of northern elements adapted to more arid conditions, in the north.

Hersiliidae are by far most diverse and numerous in the eastern parts of the Torresian province, from which many of them penetrate south into the warm temperate parts of the eastern Bassian province. However, they are very rare in the southern parts of that province. The South-western province is comparatively rich in species and also much more diverse than the southern, cool temperate parts of the eastern Bassian province. The fauna of the Eyrean province is very poor.

Origin of Australian Hersiliidae

Obviously, Hersiliidae is a family of pantropical spiders, which is certainly part of the younger northern faunal element in Australia. That means that the family did not arrive on this continent before the Miocene. Generally, most of the younger northern faunal element immigrated into Australia via New Guinea and the Cape York Peninsula (see e.g. Darlington 1961, 1971; Freitag 1979). But direct immigration from the north-west to the Northern Territory or north-western Australia is also possible. For reconstructing the immigration pathway of Hersiliidae into Australia, comparison with the faunas of adjacent countries, particularly New Guinea and the south Asiatic insular belt, is desirable. So far as we can tell, very little is known about the Indo-Pacific Hersiliidae. From the islands only three species of *Hersilia* and one of *Murricia*, from New Guinea only a single species of *Hersilia*, are recorded; this is certainly just a small portion of the existing fauna. Thus comparison

with extra-Australian faunas is at present impossible. The only criteria we can use are the present distribution of species in Australia, and their phylogenetic status.

Genus *Hersilia*

The single species of *Hersilia* is perhaps a rather recent invader into Australia. The species, with range limited to northern Arnhem Land, has a distribution pattern in Australia much like several other species from different animal groups. Most of these species have close affinities with south Asian species. Perhaps the absence of *Hersilia* from northern Queensland is evidence of an independent and recent immigration directly to Arnhem Land. As we have no idea to which extra-Australian species *H. australiensis* is most closely related, this assumption is at present unsettled. However, it seems not unlikely that careful searching might discover *Hersilia* in the Cape York Peninsula.

Genus *Tamopsis*

As mentioned above, the geographic origin of *Tamopsis* or of its ancestor is obscure. Nevertheless, the distribution pattern, with the most generalised species in the Northern Territory and in northern Queensland, is evidence of the northern origin of the genus. Because the fauna of south-eastern Australia is by far the most diverse and richest in species, migration has probably been southward, eventually resulting in evolution of several new lineages and species in this area. Southern Queensland and north-eastern New South Wales are apparently a major centre of evolution of this genus, where considerable radiation took place. A minor centre of evolution is situated in south-western Australia, although the fauna is less diverse and primitive species are lacking. Southern and north-western Australia are poor in species and do not show any characteristic species radiation.

The history of the main evolutionary lineages may be described as follows:

(1) The *arnhemensis–circumvidens–tropica* lineage may have originated—if the origin was not extra-Australian—in northern Australia, where the most generalised species, *T. arnhemensis*, still occurs. This lineage migrated to the east and south, as shown by the gradual acquisition of derived characters during migration. Starting either in the Northern Territory or at the tip of Cape York Peninsula (Fig. 58), the first step in the migration was to north Queensland (*T. tropica*), and subsequent ones to eastern Queensland (*T. trionyx*), to New South Wales and Victoria (*T. fickerti*), to south-western Australia (*T. perthensis*), and eventually northwards to Western Australia south of the Great Sandy Desert (*T. occidentalis*); finally, a species of this lineage crossed the Great Sandy Desert and colonised the Kimberley Division (*T. fitzroyensis*). This presumed migration route is clearly indicated by a chain of species which gradually evolved more derived characters, here demonstrated mainly on the male palp. Today the chain of species forms an almost complete circle around Australia, with the most primitive species in Arnhem Land and Cape York Peninsula and the most derived species in the Kimberley Division (Fig. 58). Certainly, the probable *Tamopsis* fauna of the area between the ends of this chain should be of great interest. It is worth mentioning that the geographically most widely separated species, *T. fickerti* and *T. perthensis*, are more similar and perhaps more closely related to each other than are *T. perthensis* and *T. occidentalis*, or even *T. occidentalis* and *T. fitzroyensis*. This is evidence of more rapid evolution in *T. occidentalis* and *T. fitzroyensis*, due to their occurrence in rather inhospitable, dry environments, than in either *T. fickerti* or *T. perthensis* in their more temperate habitats.

(2) The *daviesi–queenslandica* lineage has its most generalised species (*T. daviesi*) in north-east Queensland, but no species in the Northern Territory (Fig. 59). The most diverse fauna and the main centre of evolution of this lineage are in south-east Queensland, with a less diverse fauna in south-western Australia. South-eastern Australia (New South Wales and Victoria) and South Australia have only single species, and the lineage is absent from north-western Australia. Perhaps migration took place from north to south and then to south-west, as in the *tropica* group, but the lineage did not reach the northern parts of Western Australia and close the circle.

(3) The older *eucalypti* lineage (Fig. 60) and the most generalised *brachycauda* and *tweedensis* lineages (Fig. 61) occur only in eastern Australia. All species have remarkably extensive ranges and, as a rule, the more primitive the species the more extensive its range. In north Queensland, however, only the most generalised species occur. These lineages were apparently unable to cross the Nullarbor Plain and colonise south-western Australia.

(4) The *platycephala* lineage occurs in eastern Queensland and south-western Australia (Fig. 61); with the more derived species in the south-west. The relationships of this group are very obscure, but it may also have originated in the (north)-east and migrated to the south-west.

In conclusion, all lineages probably migrated from the north or north-east southwards through eastern Australia, and most groups crossed the Nullarbor Plain to south-western Australia. The *tropica* group eventually reached north-western Australia. Evidently only species of the derived groups migrated over longer distances, and the most derived species covered the greatest distances.

This migration pattern is rather surprising, especially as concerns the presumed origin of the *arnhemensis–tropica* lineage in the Northern Territory and the colonization of northern Western Australia from the south rather than the north. This direction of migration is opposite to that in other animal groups, e.g. several beetles (Freitag 1979; Baehr 1985*a*, 1985*b*).

The present distribution of *Tamopsis* also reflects the geographical and climatic history of Australia, and the extemely diverse ecological conditions in different parts of Australia at the present day. It is possible to describe the history of *Tamopsis* as colonisation of ecologically favourable refugia in times of wetter climate, with subsequent isolation when the climate became drier, and of rapid evolution and radiation within these refugia. When such 'refugia' are large, favourable and ecologically rich, such as south-eastern Queensland with its multitude of forest types and its altitudinal zonation, or the similarly structured (but less complex) south-western region of Australia, a lineage radiated to fill the numerous ecological niches. In poor, rather homogeneous and fairly inhospitable refugia, such as the Hamersley Range or the Kimberley Division, probably only one species of each lineage could survive, and no radiation occurred. The Hamersley Range and Kimberley Division may be examples of refugia where ecological *and* zoogeographical reasons have prevented colonisation by more species, because the *tropica* lineage, which was the first to immigrate, has filled the niche of the bark-inhabiting hersiliid, and species of those lineages which may live, on the whole, on branches or twigs were probably not able to cross the barrier of arid country. In other areas where members of two or more main lineages occur, the different habits of species of different lineages could have favoured speciation.

Given the truth of the rather vague assumption that the high-eyed *arnhemensis–circumvidens –tropica* lineage has its most generalised species in the Northern Territory and in north Queensland and that the other, flat-eyed lineages originated in north Queensland, the genus *Tamopsis* as a whole may not have originated in Australia, but have immigrated (presumably twice). As mentioned above, its country of origin and immigration route are completely obscure. Be that as it may, within Australia several lineages evolved and undertook independent migrations, all using the same route but perhaps at different times.

Because the time of origin of the genus as a whole, and of its arrival in Australia, as well as that of the several lineages, is completely obscure for the reasons given, the migration and speciation are difficult to fix in terms of absolute time. We can neither ascertain a Tertiary origin for the main lineages, nor be sure that most migrations of derived lineages took place during the Pleistocene. However, during the Pleistocene a moderately wet and fertile corridor developed across the Nullarbor Plain (Kemp 1981), which could provide a bridge for migration into south-western Australia. At the same time, similar corridors opened between parts of Western Australia which are today ecologically separated, but these may have been less suitable for migrations. These corridors had not existed during the Pliocene, and closed again after the end of the last glaciation. The Nullarbor Plain corridor probably narrowed or closed entirely during warm interglacials, so that multiple migrations to south-western Australia and within Western Australia were possible, and actually occurred.

A further argument for a Pleistocene origin of at least the south-western fauna is that Western Australia contains no old, primitive, or ancestral species which are very distinctive and do not show close affinities. All western species are derived, and are obviously closely related to each other or to eastern species. Thus the western fauna must be rather young compared with the eastern fauna. Moreover, today the most derived species occur far north in Western Australia, having certainly evolved very late, perhaps not before the last or the penultimate glaciation. This would imply a rather rapid speciation, which proceeded at least as rapidly as the evolution of, for instance, the Australian Cicindelidae, described by Freitag (1979).

To conclude, the Australian hersiliid fauna is very rich and diverse, but its origin is at present obscure. Diversity is the result of migrations of several independent lineages with, presumably, different habits. The migration started from the north and proceeded in a clockwise direction around Australia, with subsequent evolution of new species in various refugia. Species radiation, however, occurred only in structurally diverse refugia, such as south-eastern Queensland and south-western Australia.

Acknowledgments

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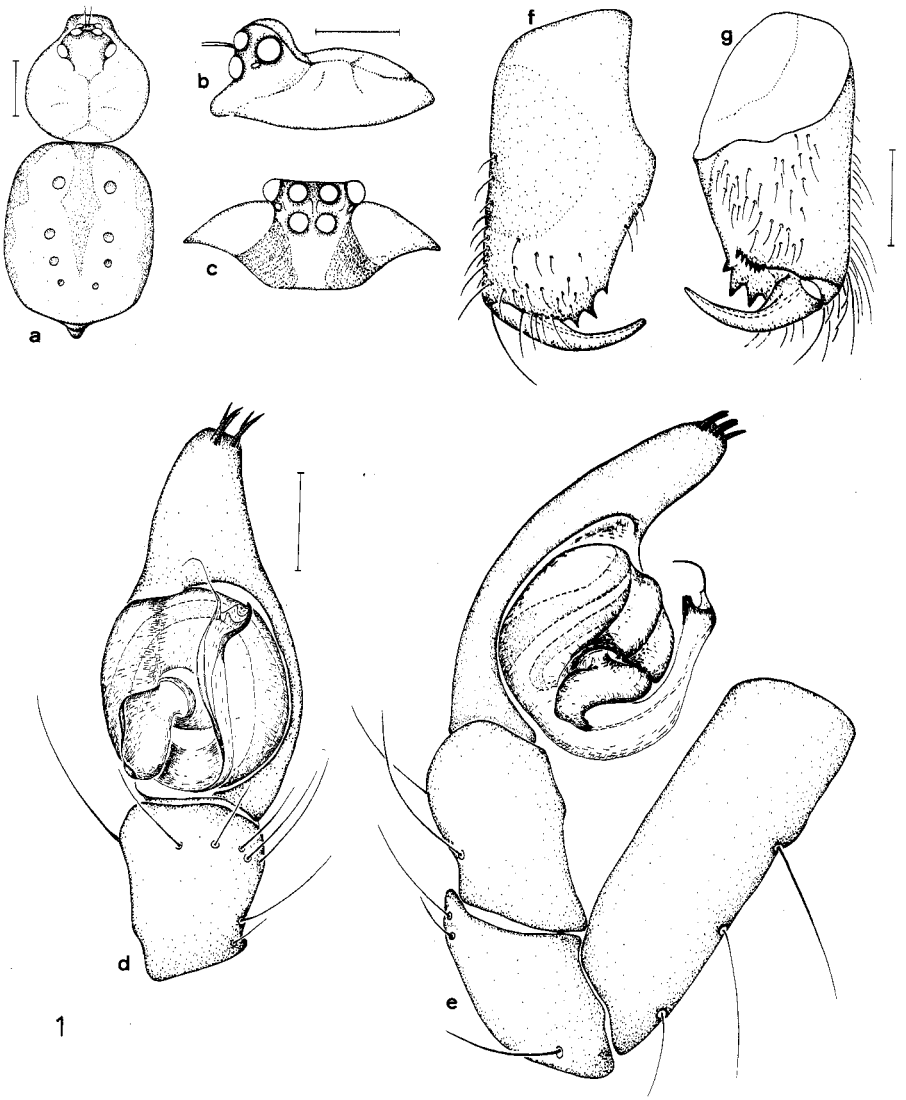


Fig. 1. *Hersilia australiensis*, sp. nov., male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax, lateral (*b*) and anterior (*c*) views; (*d*, *e*) palp, ventral (*d*) and lateral (*e*) views; (*f*, *g*) chelicera, anterior (*f*) and posterior (*g*) views. Scale lines: *a–c*, 1 mm; *d–g*, 0·25 mm.

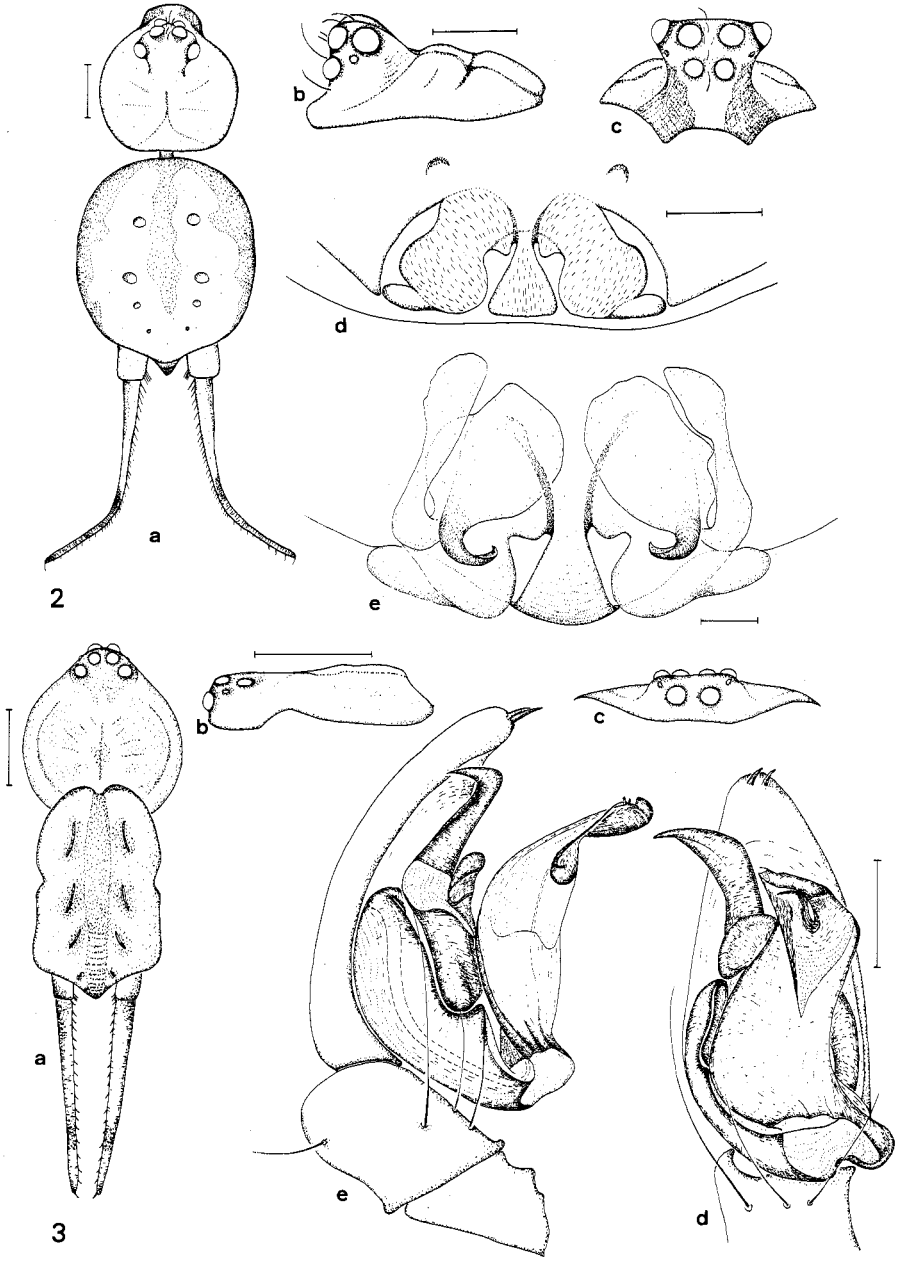
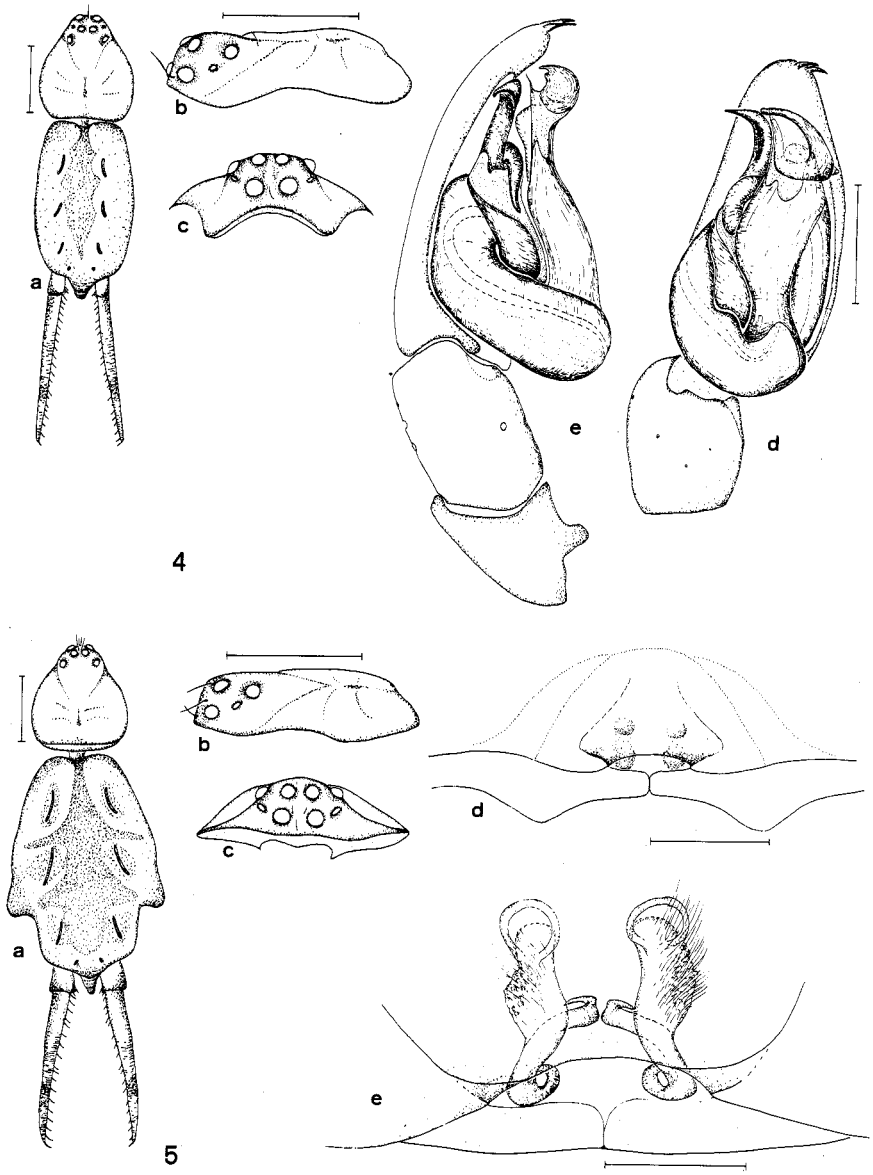
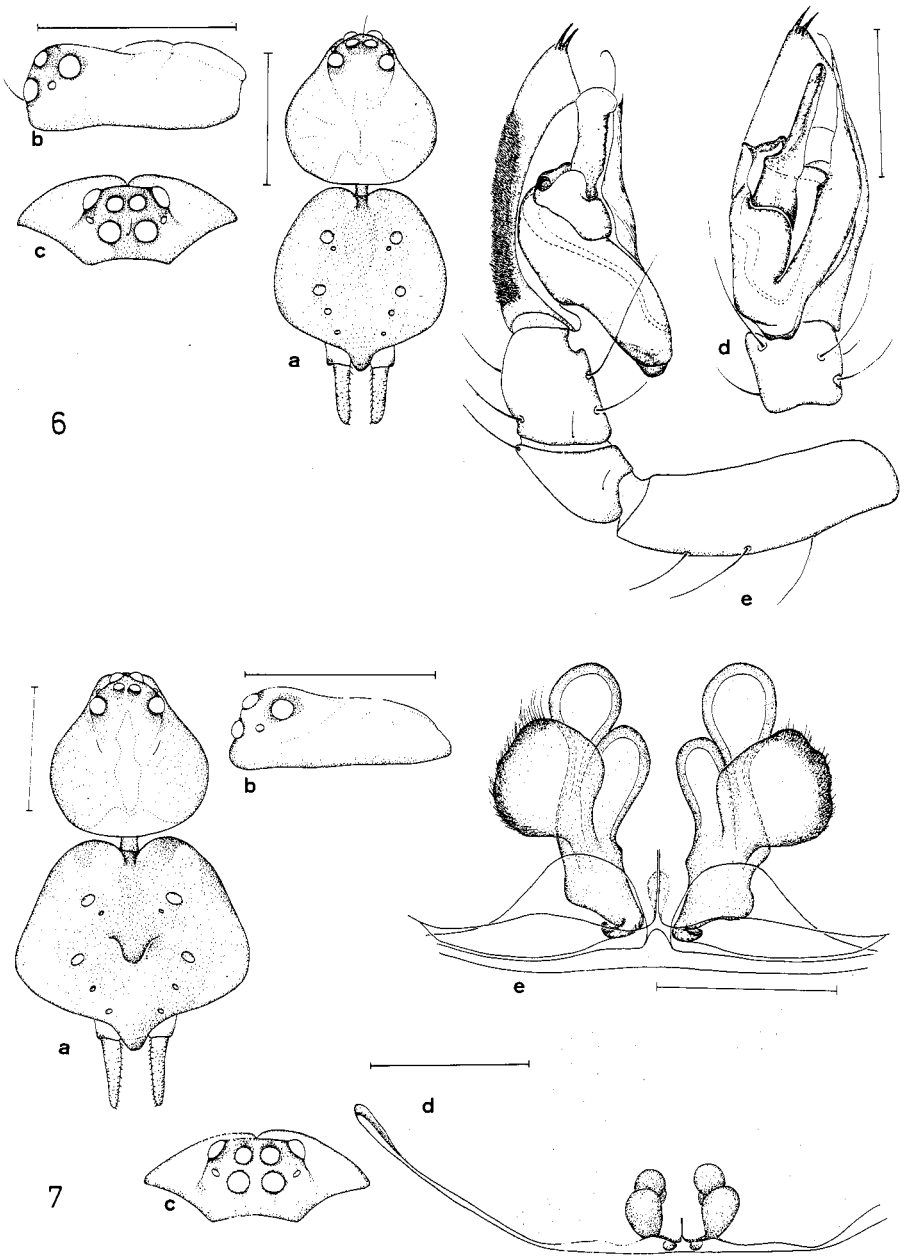


Fig. 2. *Hersilia australiensis*, sp. nov., female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax, lateral (*b*) and anterior (*c*) views; (*d*) epigyne, ventral view; (*e*) vulva, ventral view. Scale lines: *a–c*, 1 mm; *d*, 0·25 mm; *e*, 0·1 mm.

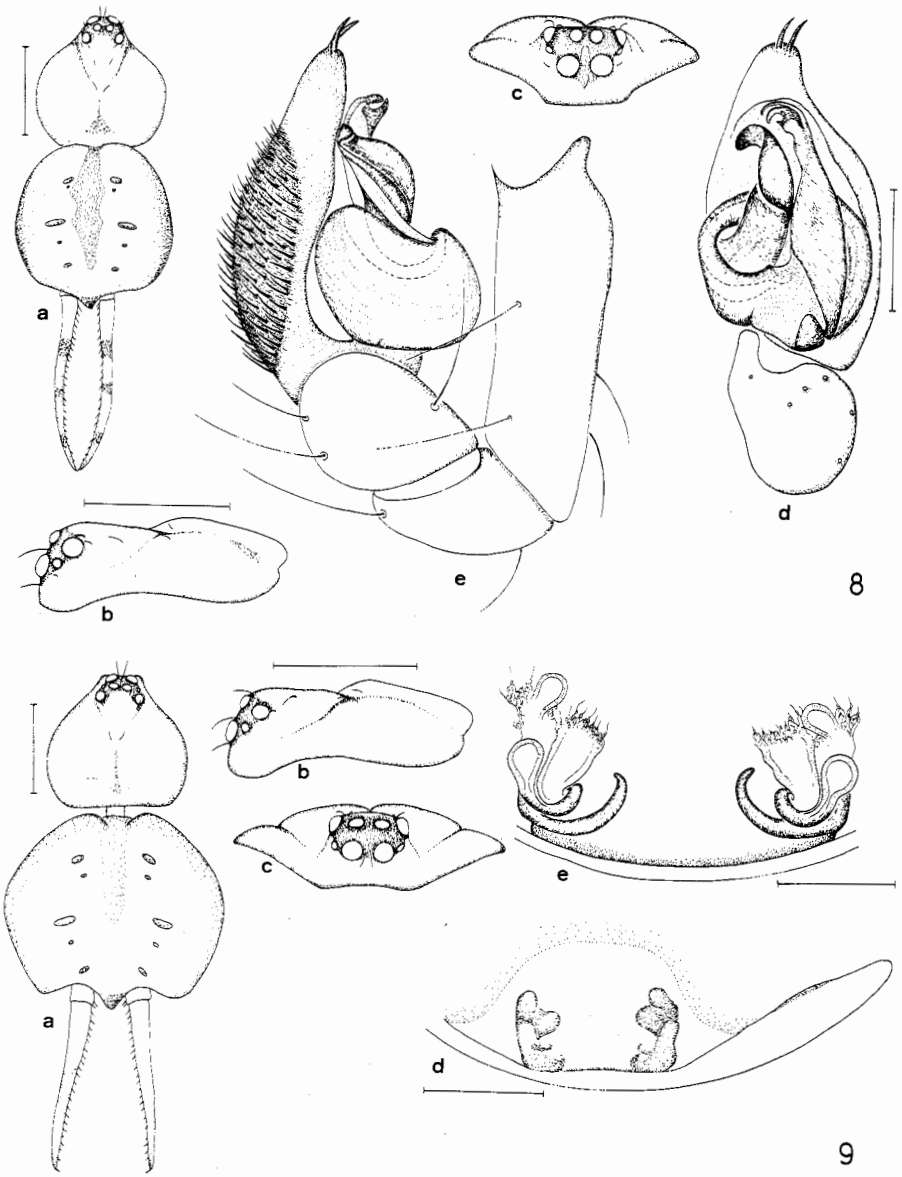
Fig. 3. *Tamopsis amplithorax*, sp. nov., male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. Scale lines as in Fig. 1.



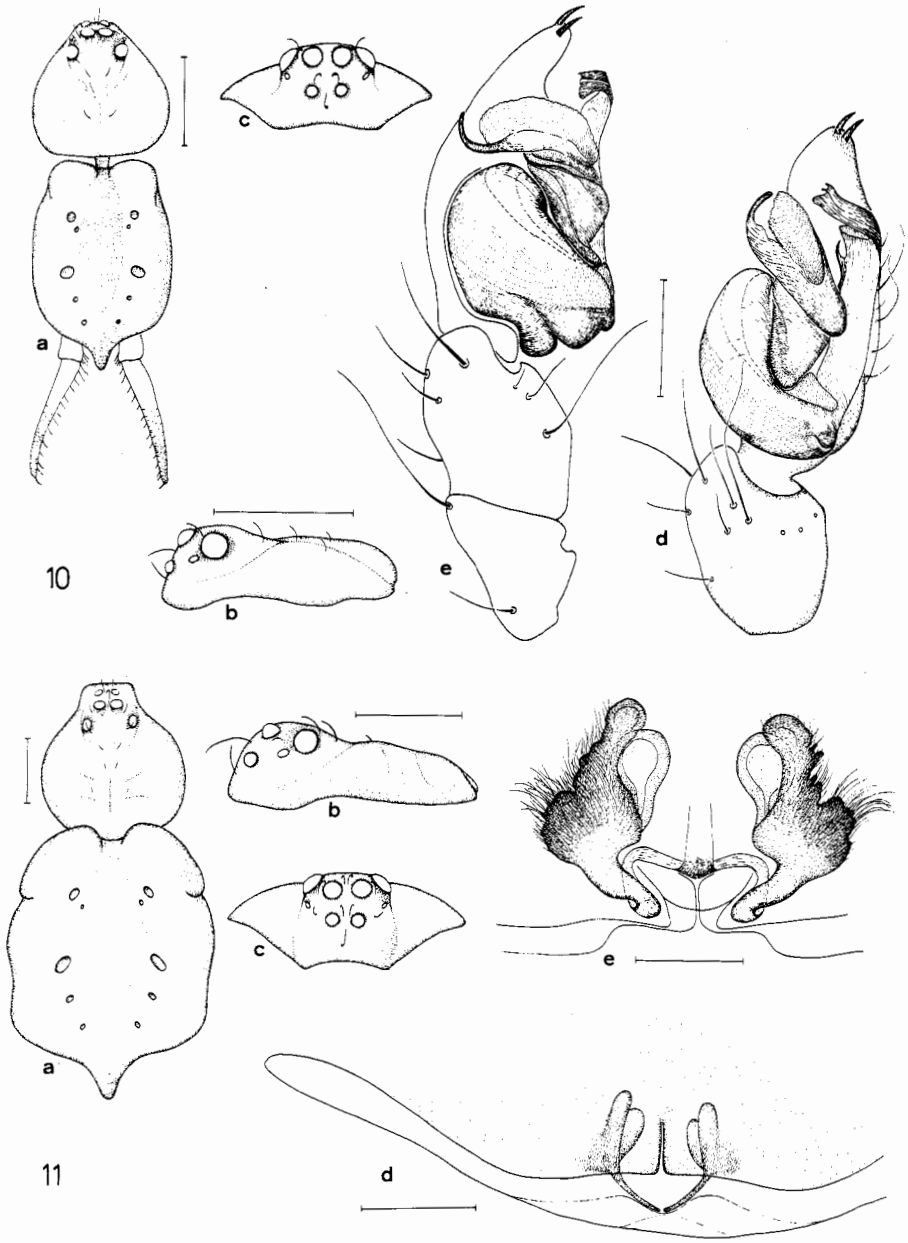
Figs 4, 5. *Tamopsis platycephala*, sp. nov. *4*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *5*, Female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



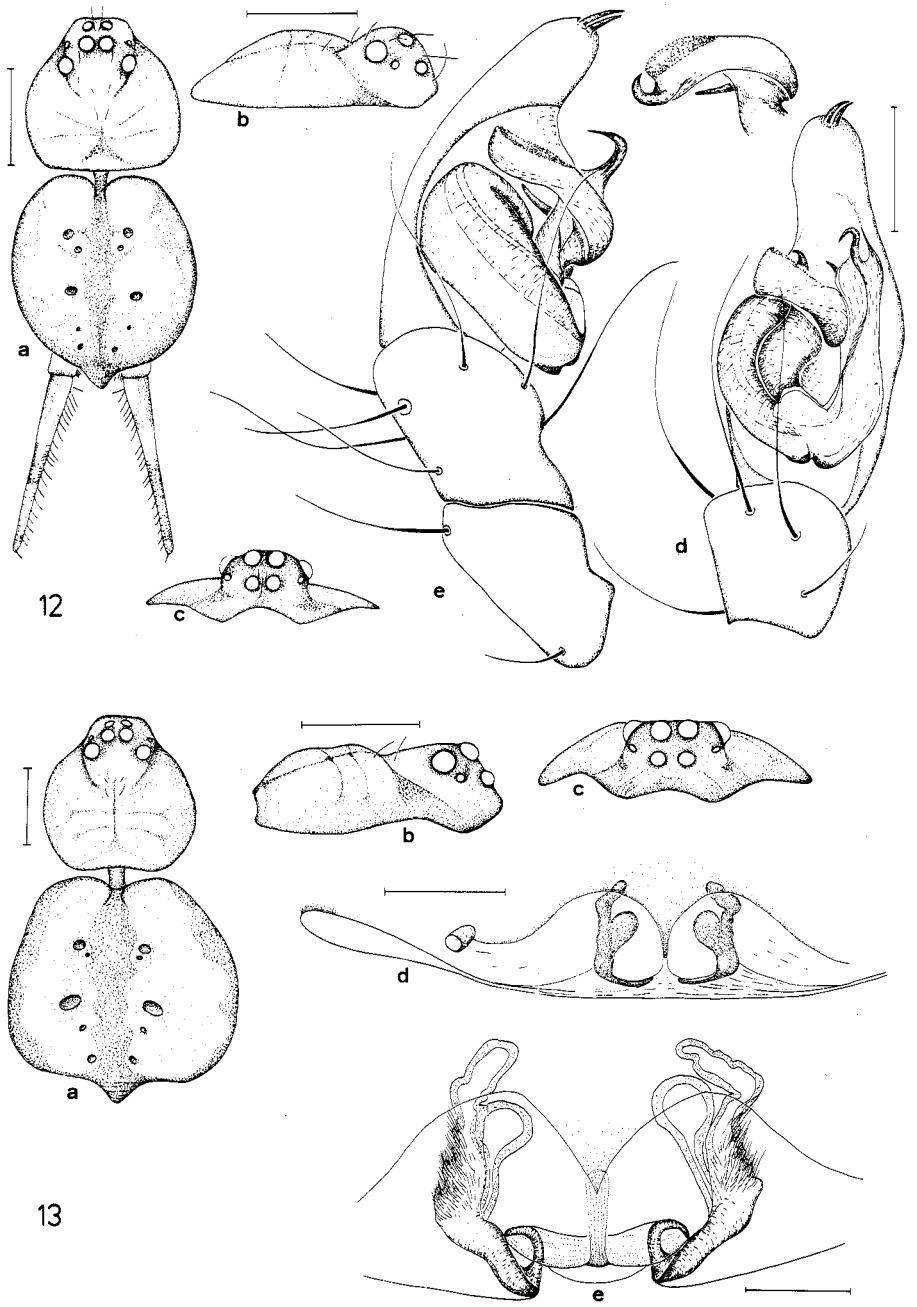
Figs 6, 7. *Tamopsis brachycauda*, sp. nov. *6*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *7*, Female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



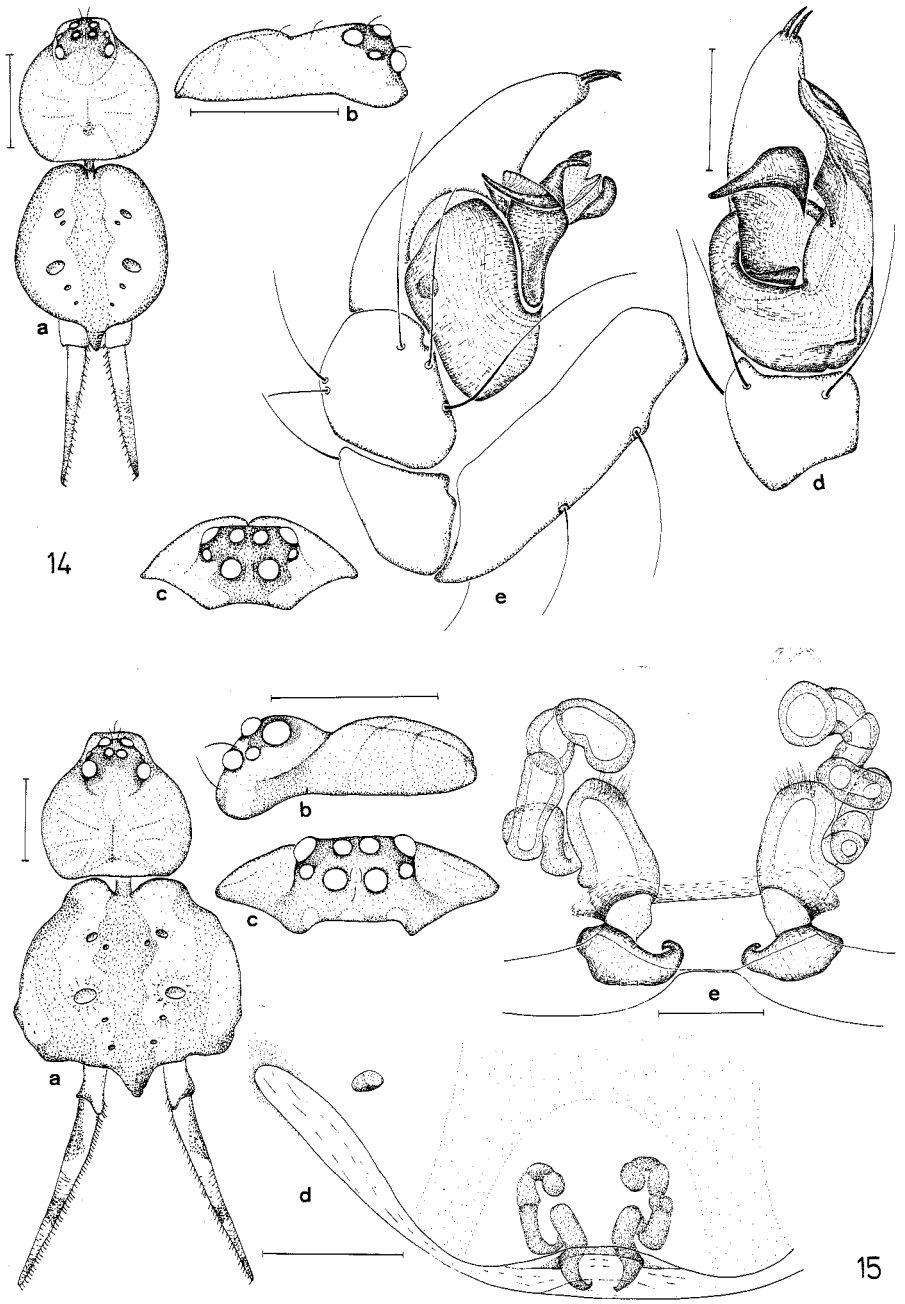
Figs 8, 9. *Tamopsis tweedensis*, sp. nov. *8*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *9*, Female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



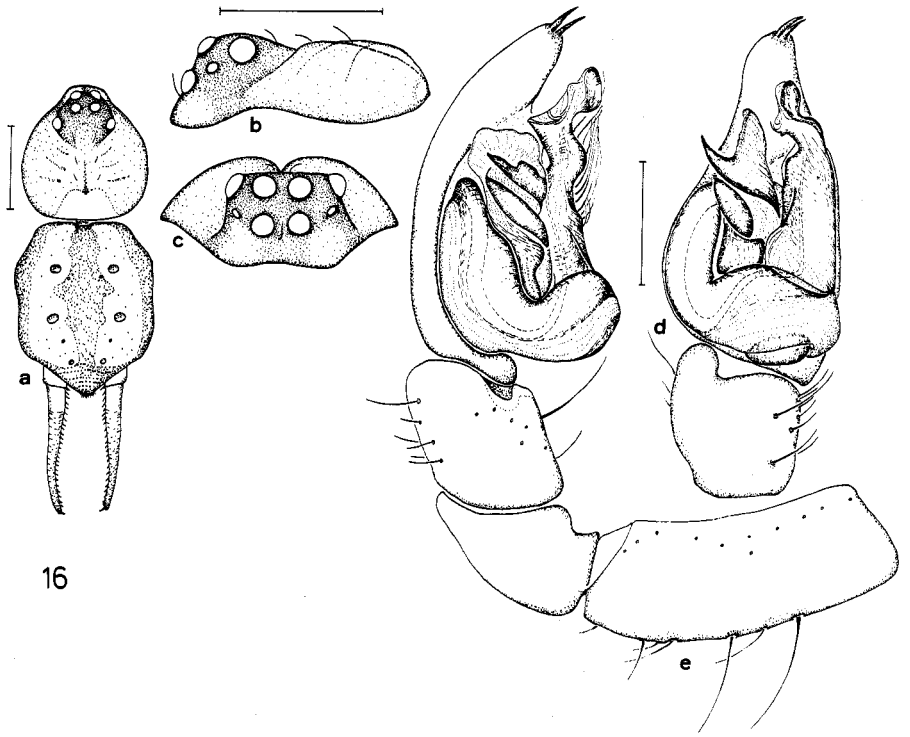
Figs 10, 11. *Tamopsis eucalypti* (Rainbow). *10*, Male lectotype (AMS): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *11*, Female, Braemar, Qld (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



Figs 12, 13. *Tamopsis brisbanensis*, sp. nov. *12*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *13*, Female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



Figs 14, 15. *Tamopsis daviesi*, sp. nov. *14*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *15*, Female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*f*) vulva. Scale lines as in Figs 1, 2.



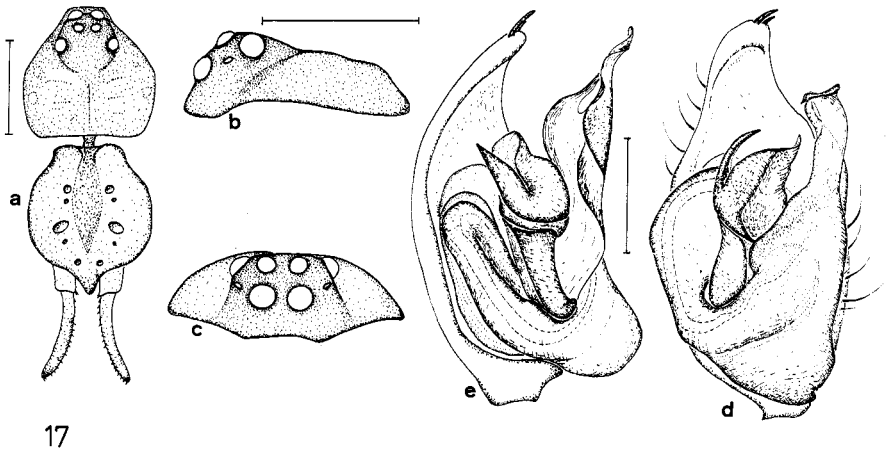
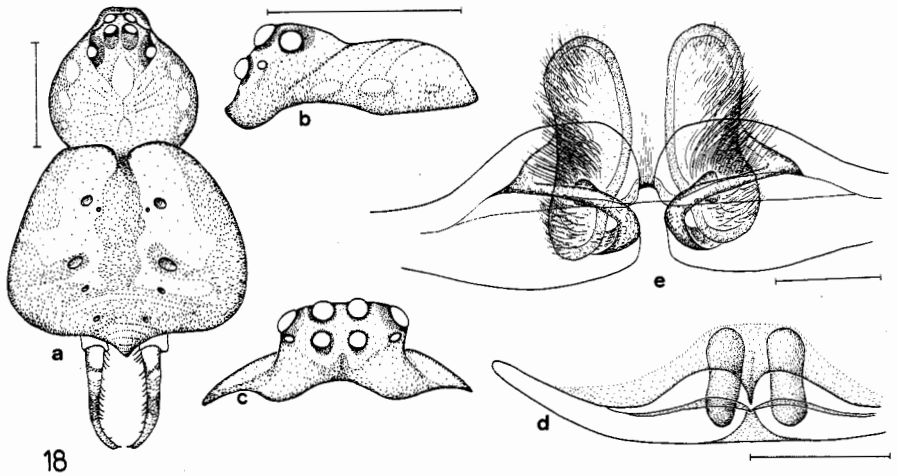


Fig. 16. *Tamopsis kochi*, sp. nov., male holotype (WAM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera.
Fig. 17. *Tamopsis centralis*, sp. nov., male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera.
Scale lines as in Fig. 1.

Fig. 18. *Tamopsis reevesbyana*, sp. nov., female holotype (NMV): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva.
Fig. 19. *Tamopsis grayi*, sp. nov., female holotype (AMS): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva; (*f*) cocoon (scale line, 2 mm).
Fig. 20. *Tamopsis darlingtoniana*, sp. nov., female holotype (WAM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva.
Scale lines as in Fig. 2.



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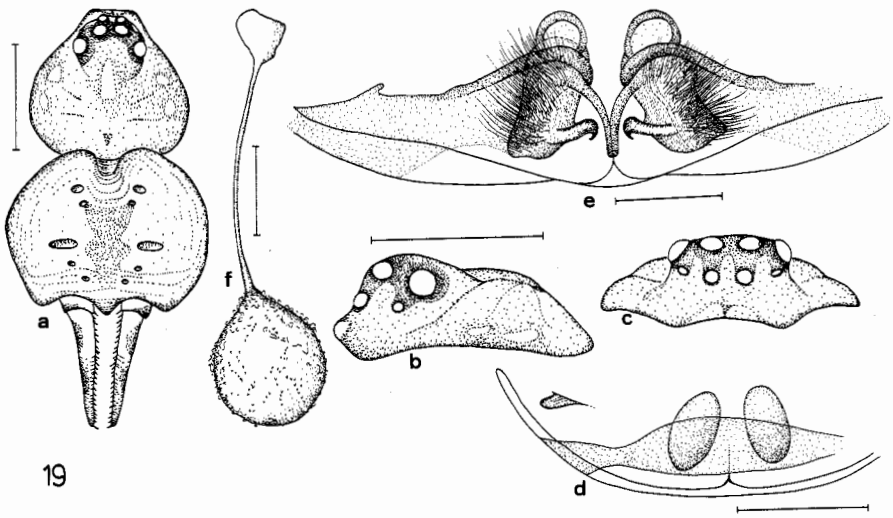

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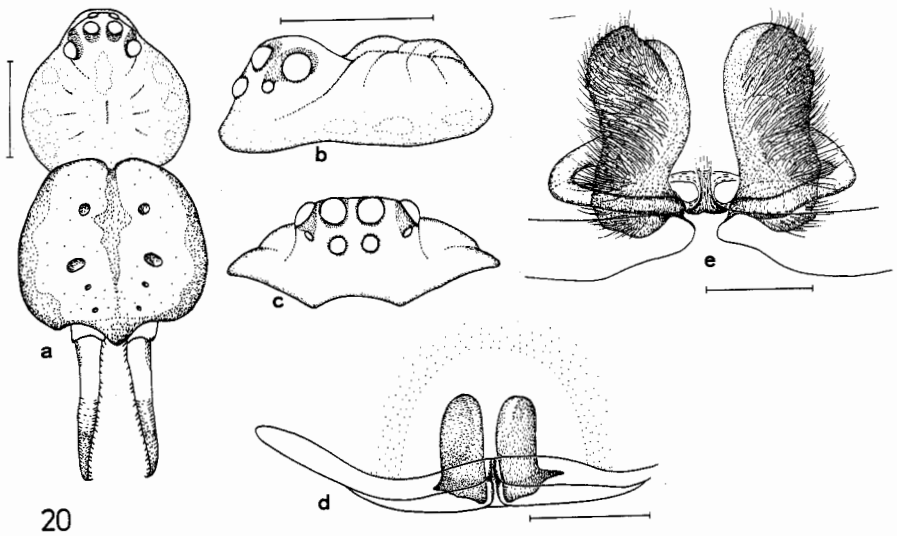

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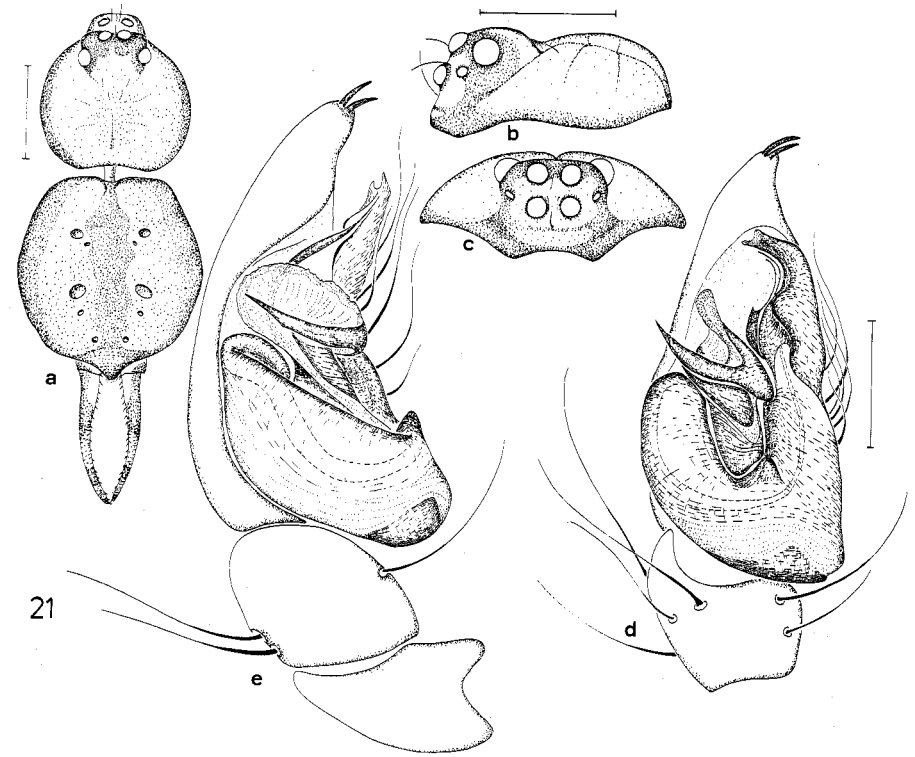
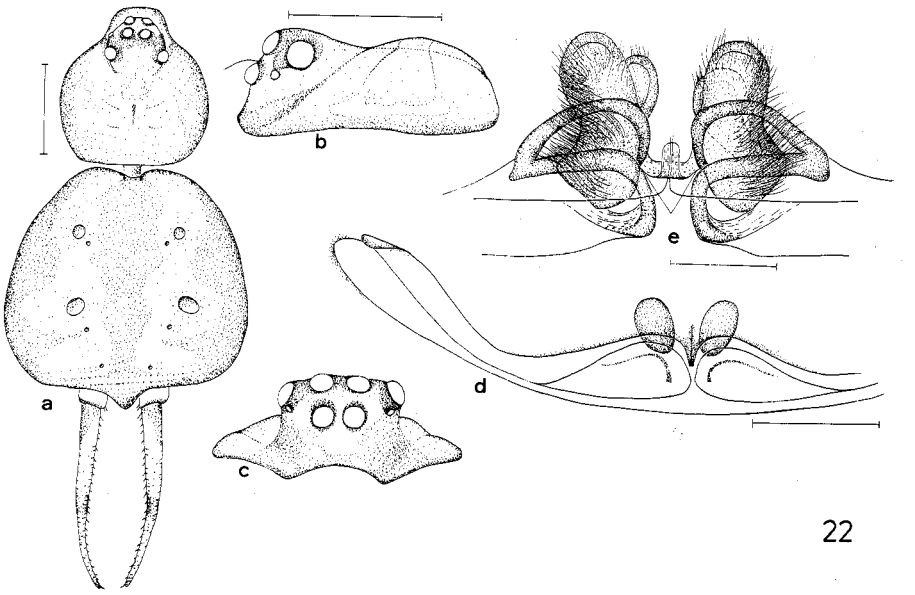
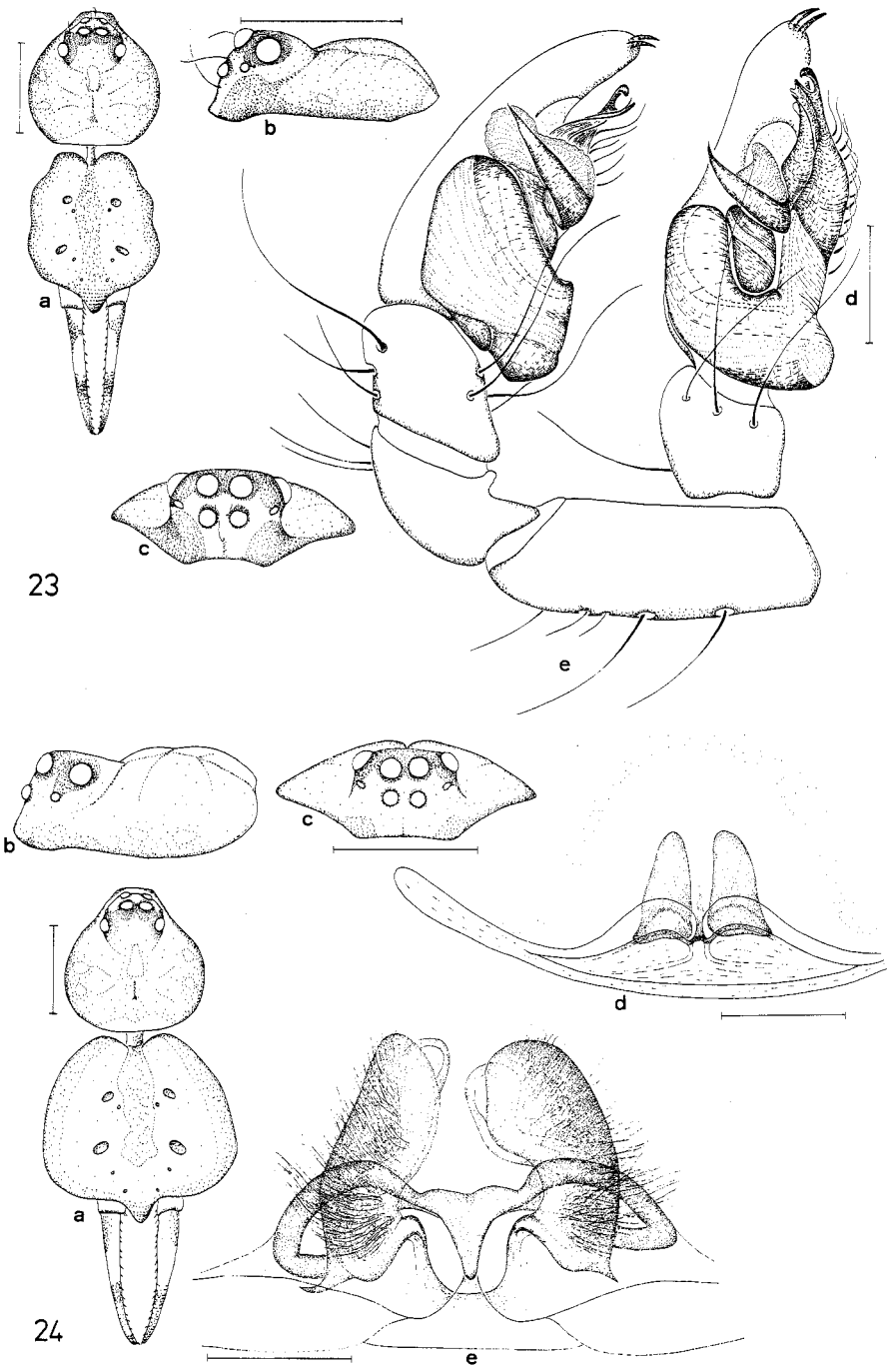
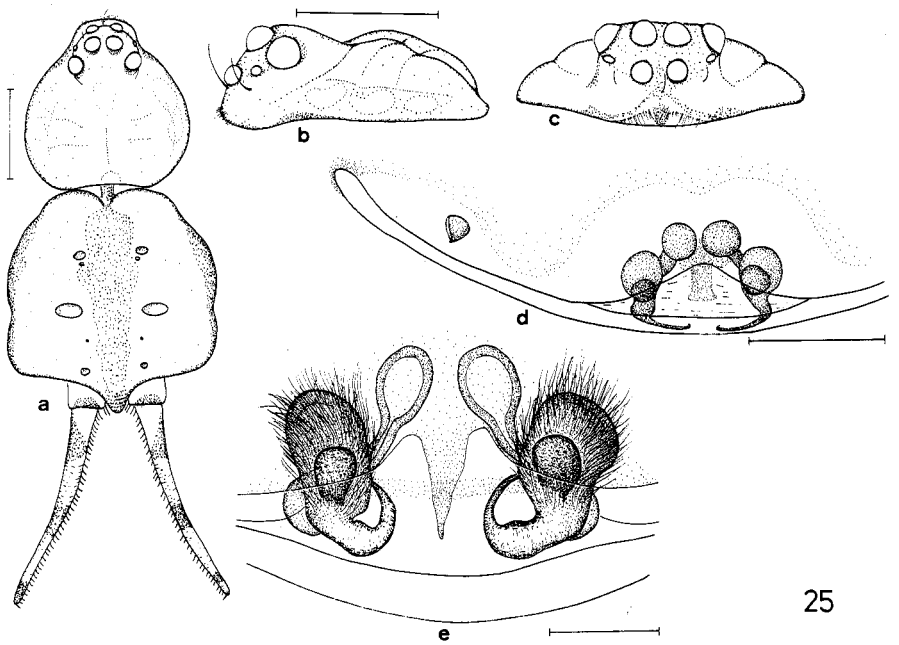




Figs 21, 22. *Tamopsis queenslandica*, sp. nov. *21*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *22*, Female paratype (AMS): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



Figs 23, 24. *Tamopsis raveni*, sp. nov. *23*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *24*, Female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



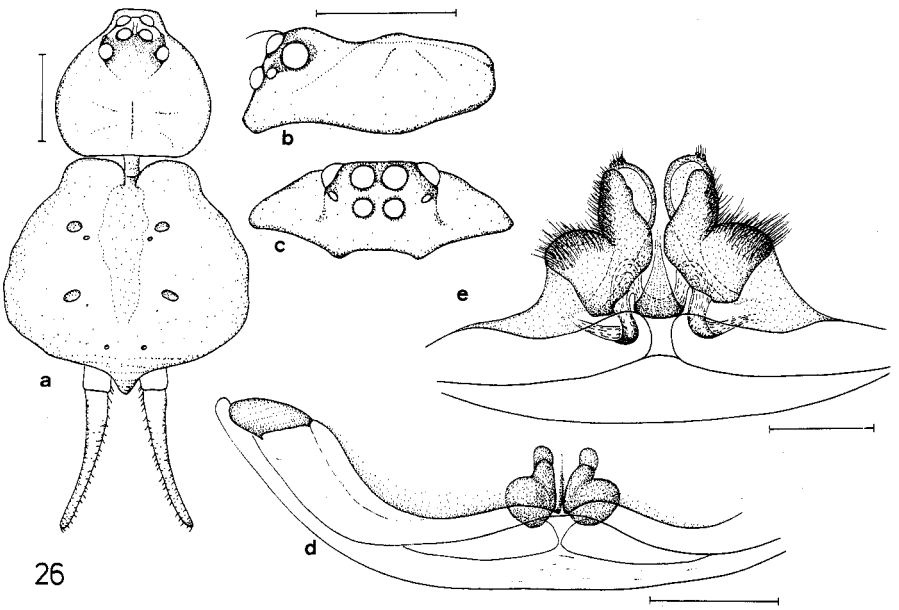
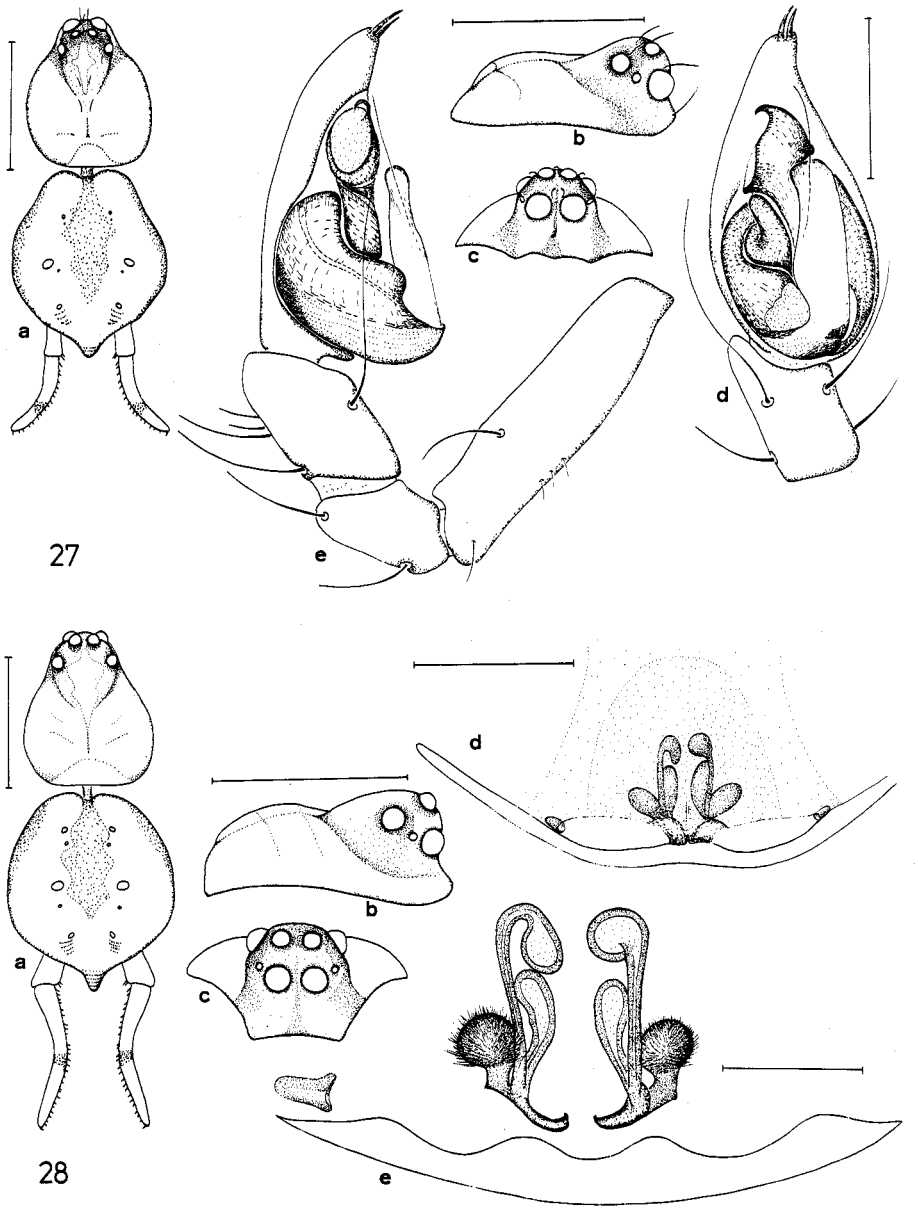


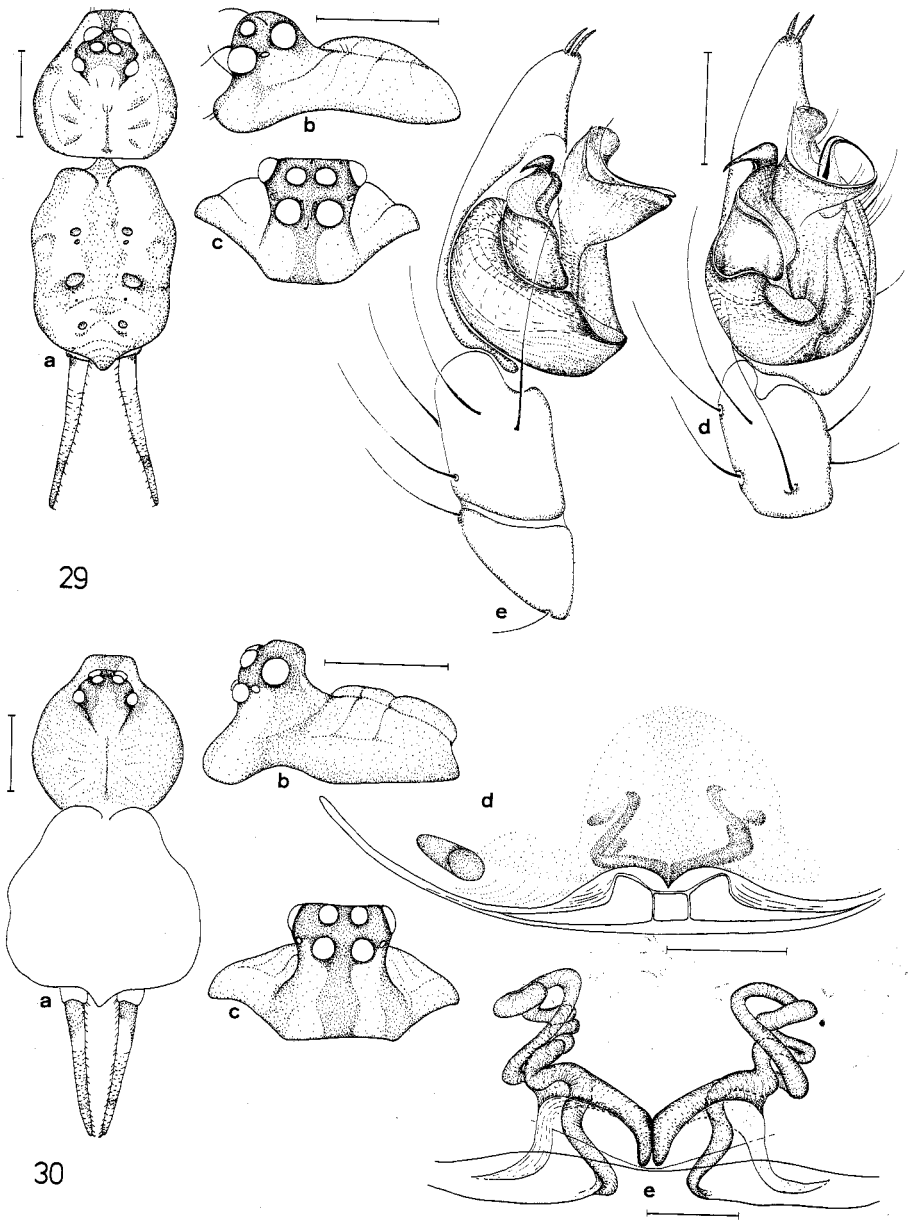
Fig. 25. *Tamopsis cooloolensis*, sp. nov., female holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva.

Fig. 26. *Tamopsis brevipes*, sp. nov., female holotype (MNHN): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva.

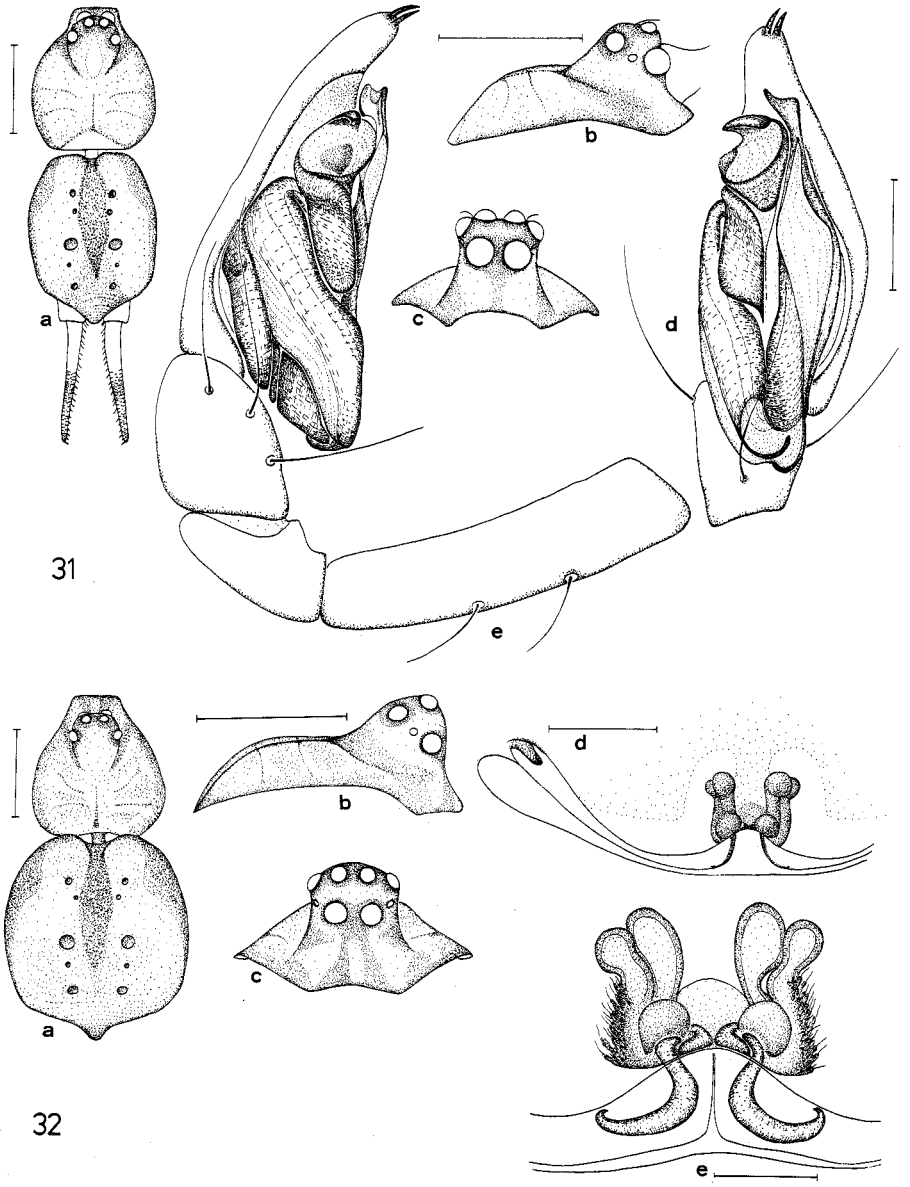
Scale lines as in Fig. 2.



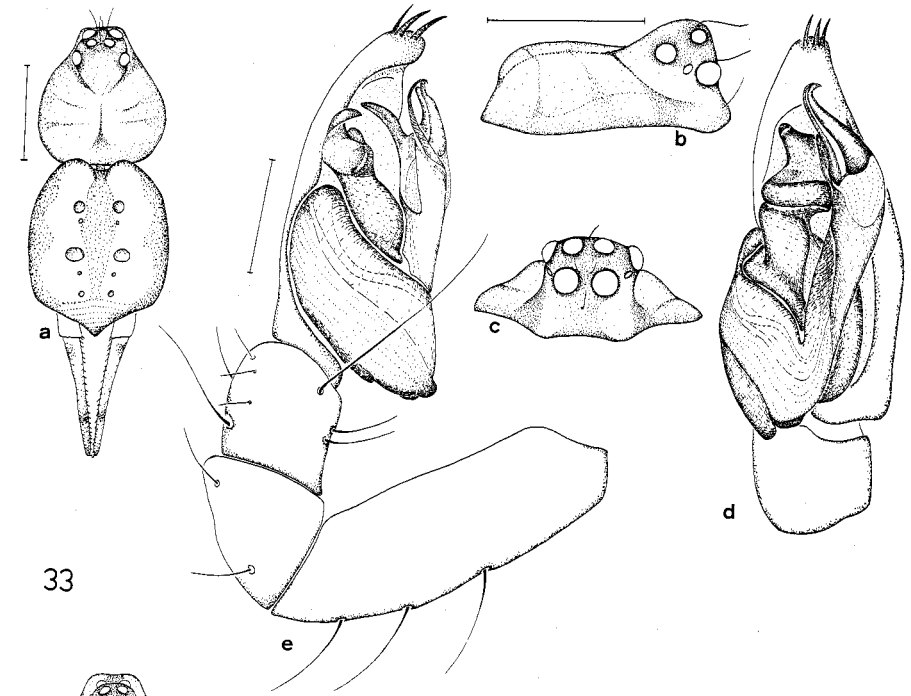
Figs 27, 28. *Tamopsis arnhemensis*, sp. nov. *27*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *28*, Female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



Figs 29, 30. *Tamopsis circumvidens*, sp. nov. *29*, Male holotype (WAM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *30*, Female paratype (WAM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



Figs 31, 32. *Tamopsis tropica*, sp. nov. *31*, Male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *32*, Female paratype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



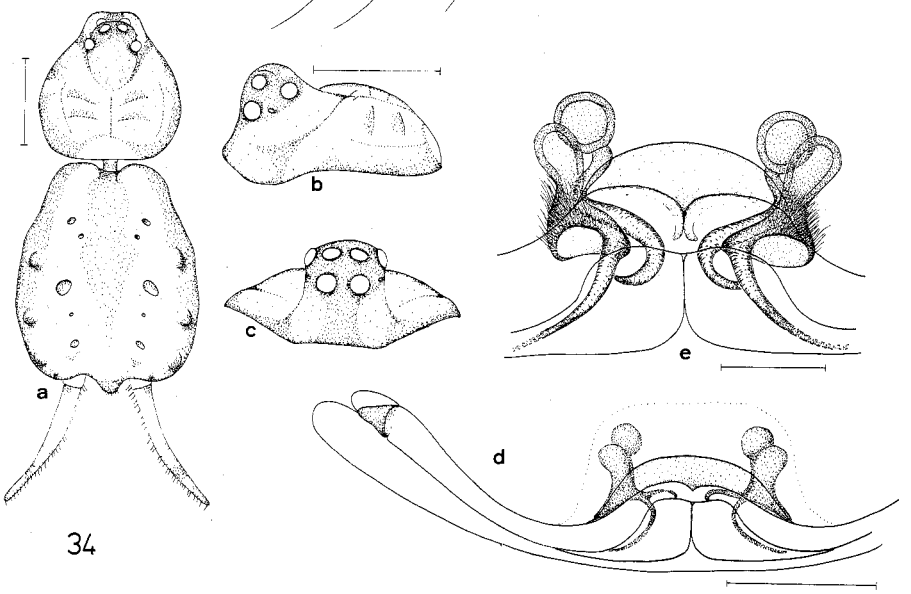
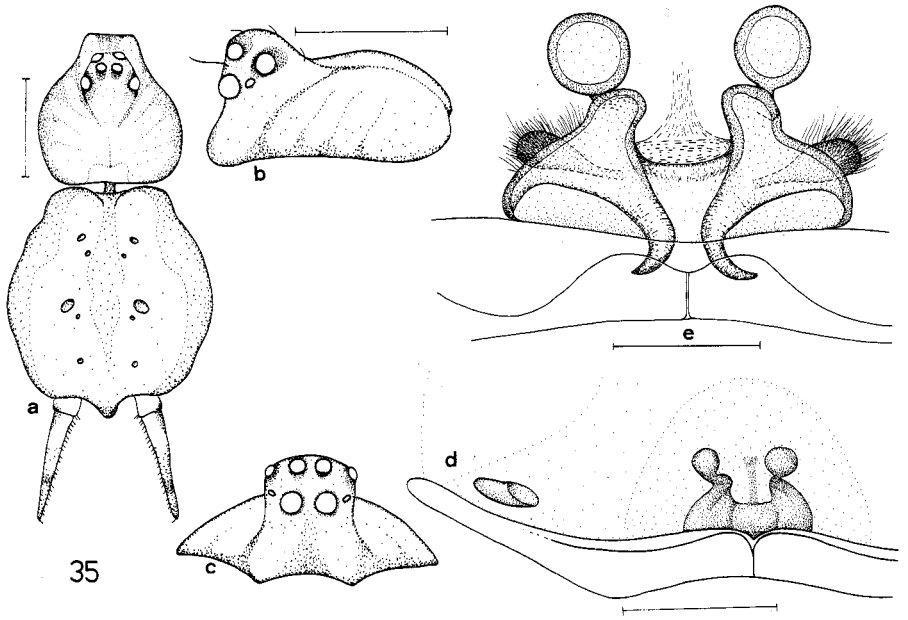


Fig. 33. *Tamopsis trionyx*, sp. nov., male holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera.
Fig. 34. *Tamopsis pseudocircumvidens*, sp. nov., female holotype (WAM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva.
Scale lines as in Figs 1, 2.



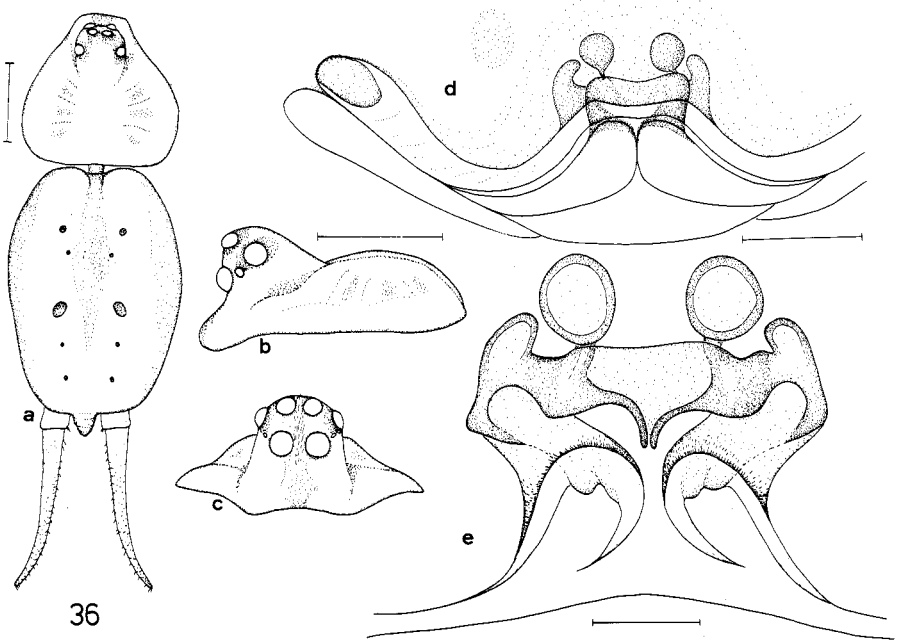
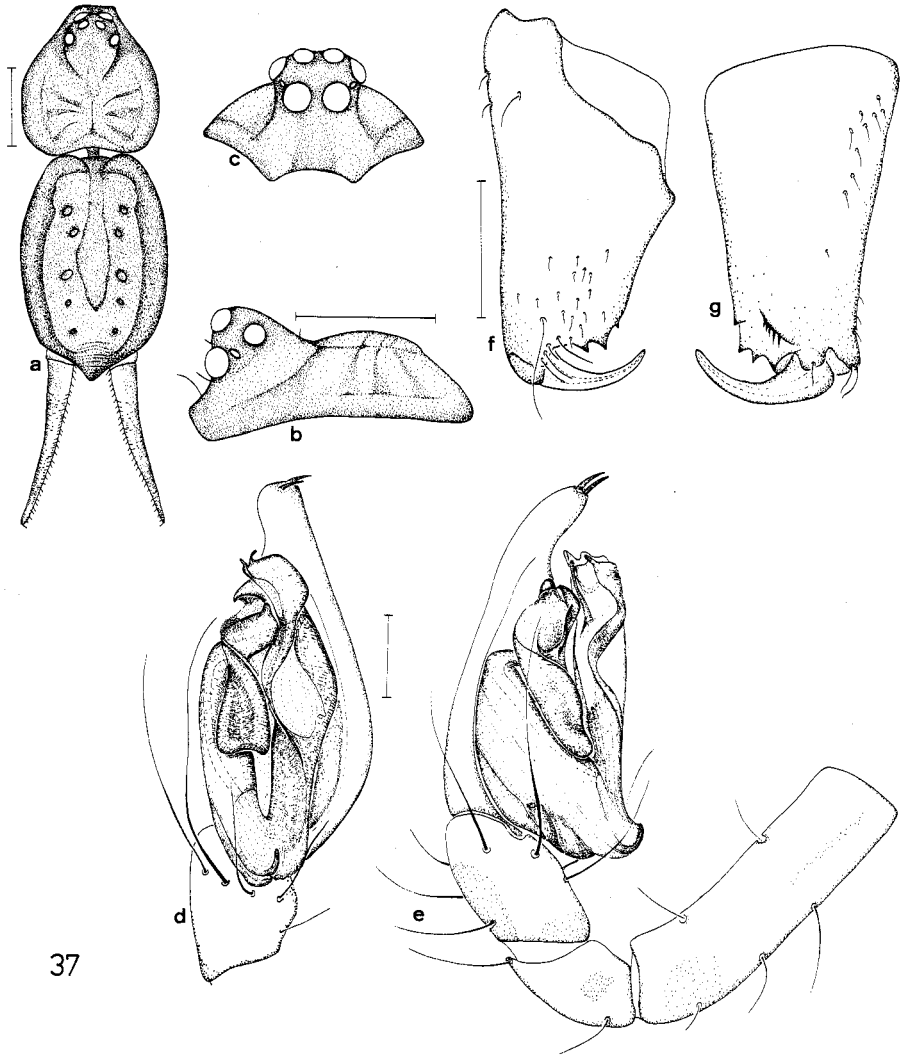
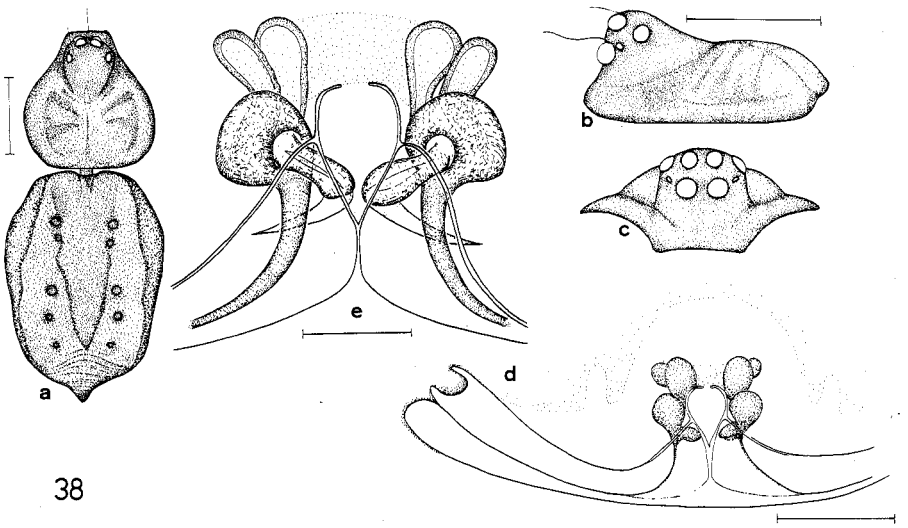


Fig. 35. *Tamopsis leichhardtiana*, sp. nov., female holotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva.
Fig. 36. *Tamopsis rossi*, sp. nov., female holotype (CAS): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva.
Scale lines as in Fig. 2.



37



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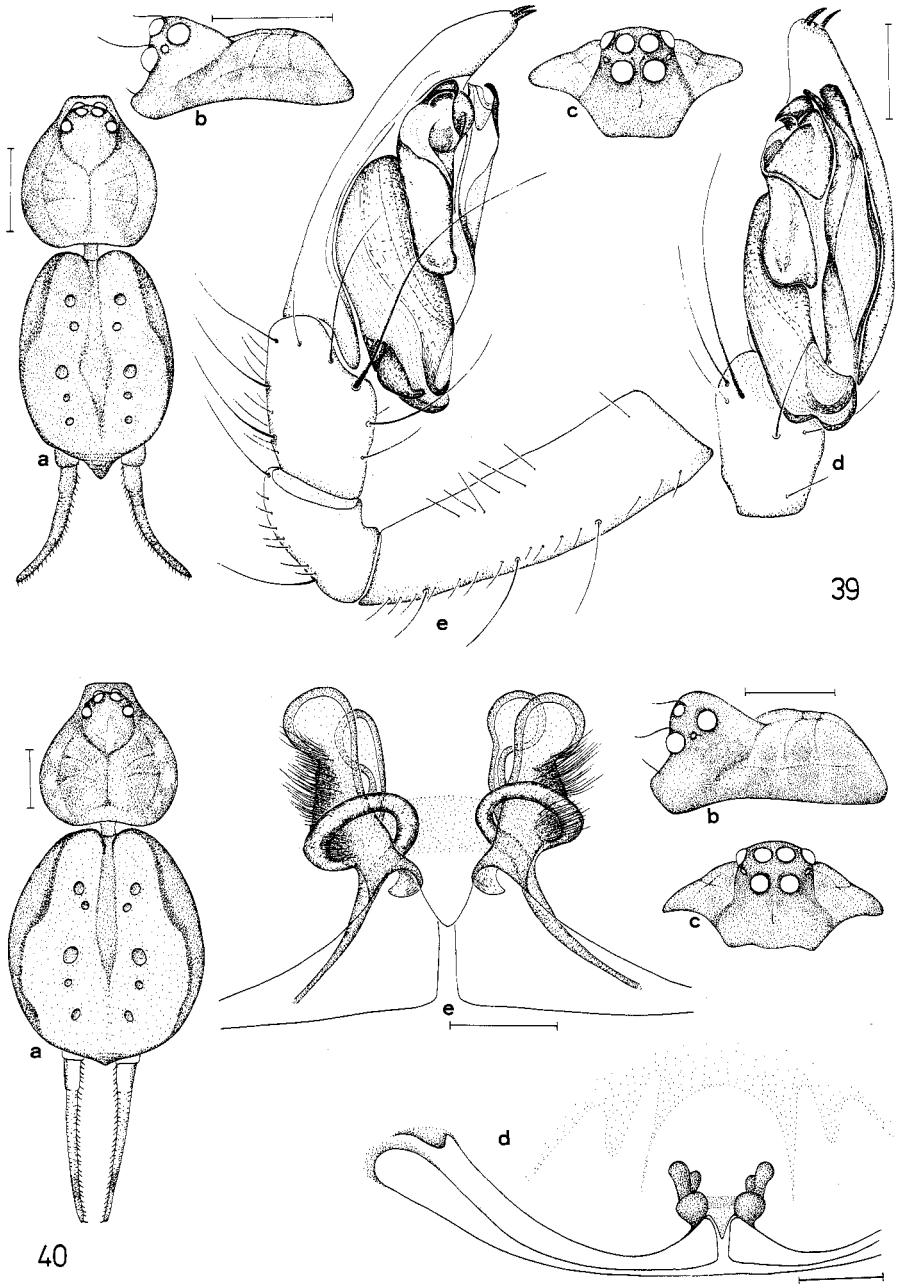
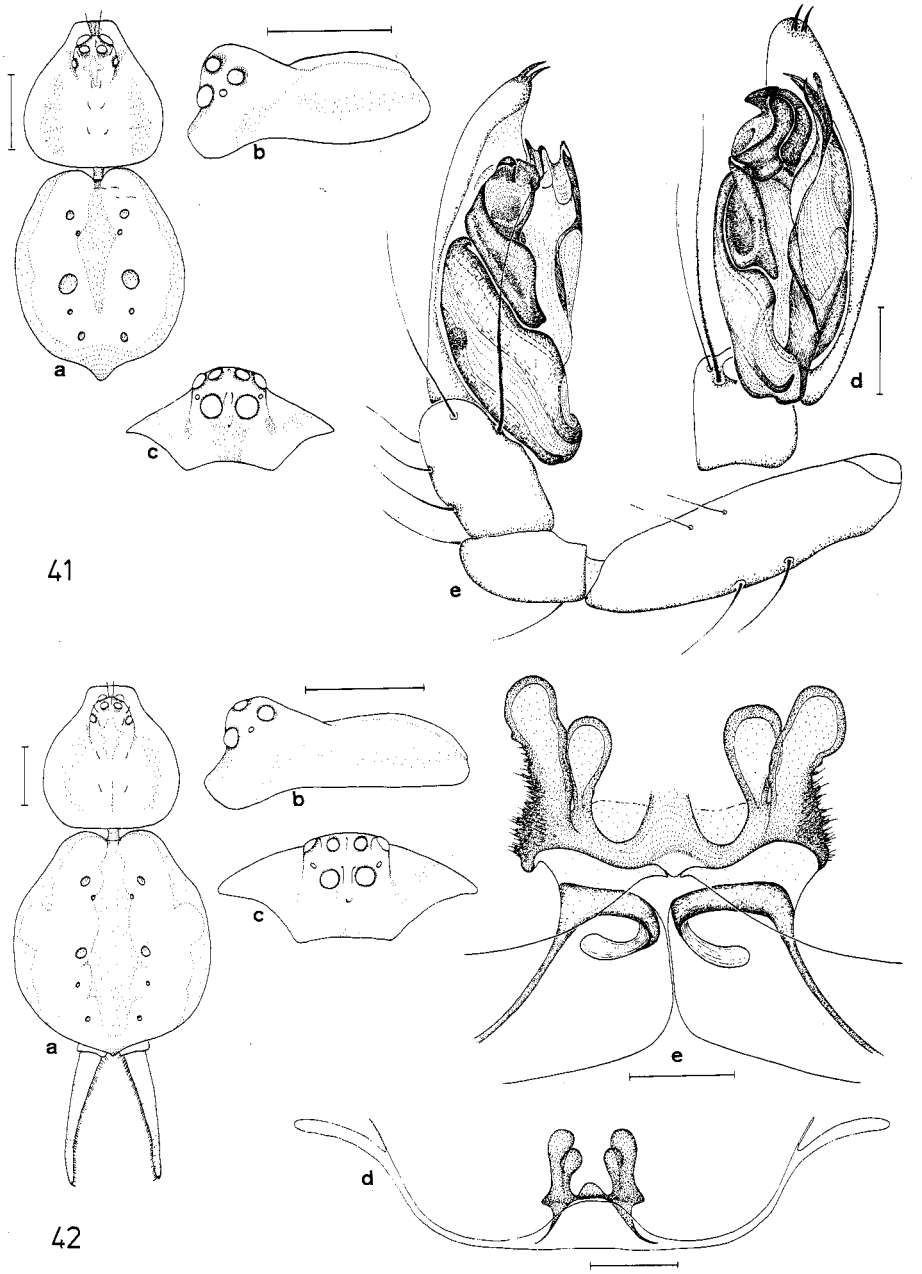


Figs 39, 40. *Tamopsis perthensis*, sp. nov. *39*, Male holotype (WAM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *40*, Female paratype (ZSM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.

Figs 37, 38. *Tamopsis fickerti* (L. Koch). *37*, Male neotype (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *38*, Female, Cudgen, N.S.W. (QM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.



Figs 41, 42. *Tamopsis occidentalis*, sp. nov. *41*, Male holotype (WAM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *42*, Female paratype (ZSM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva. Scale lines as in Figs 1, 2.

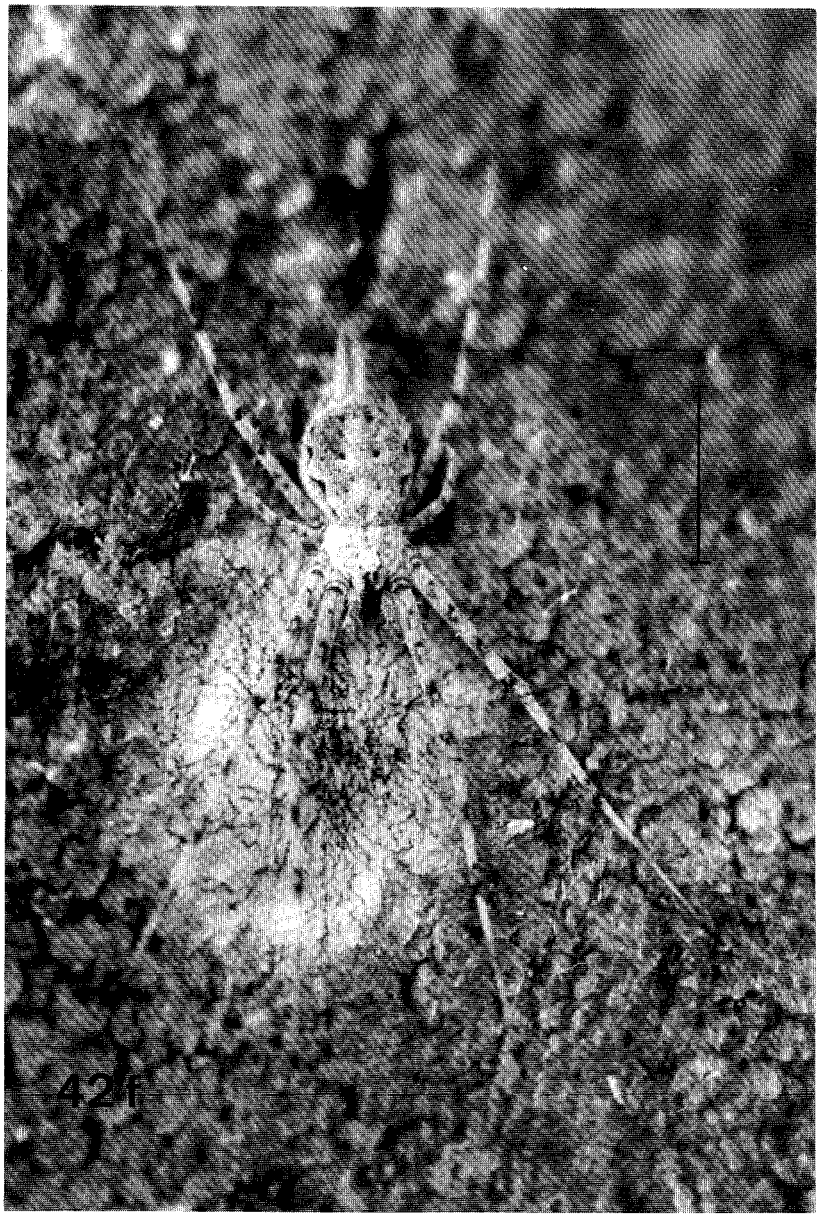
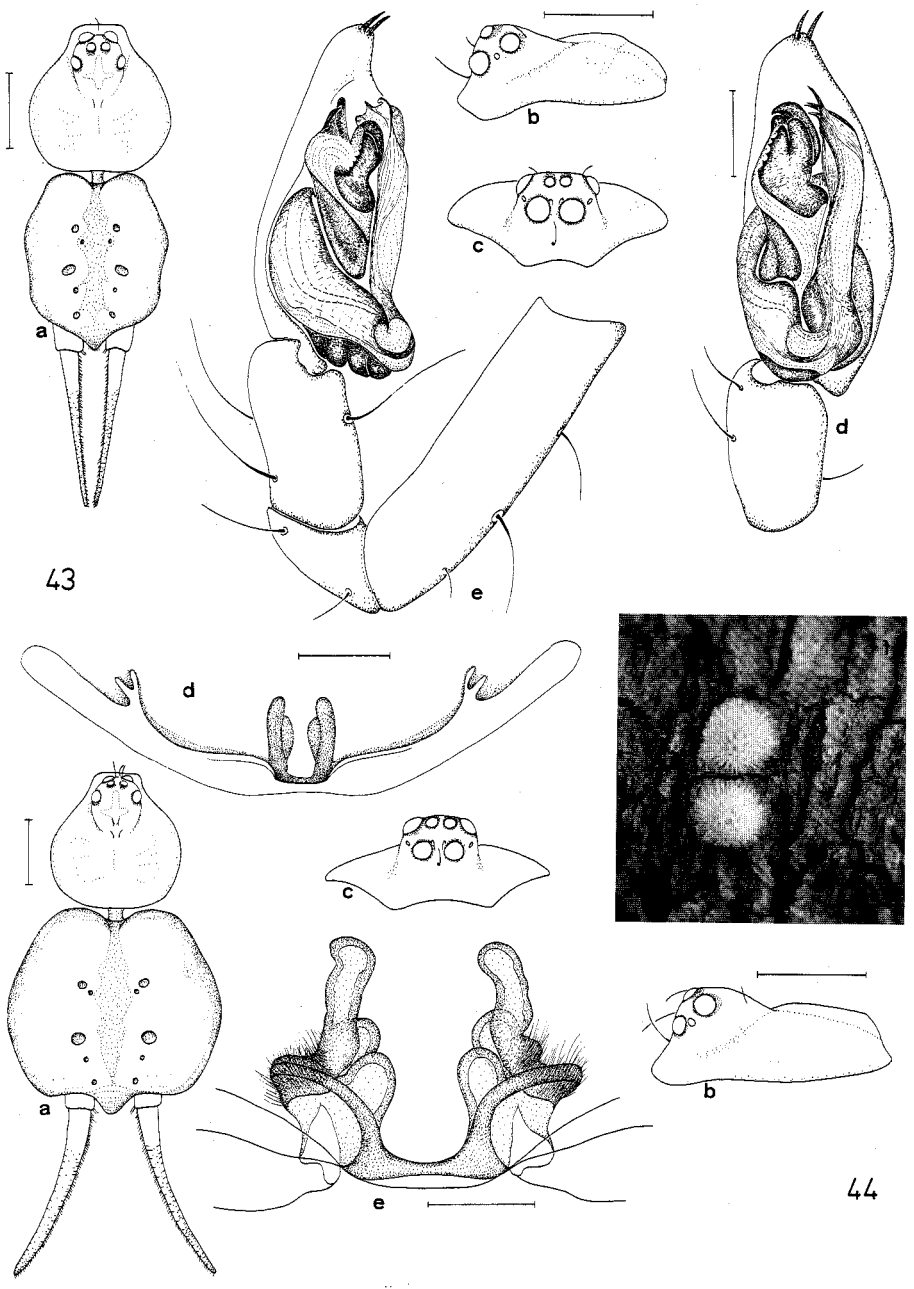
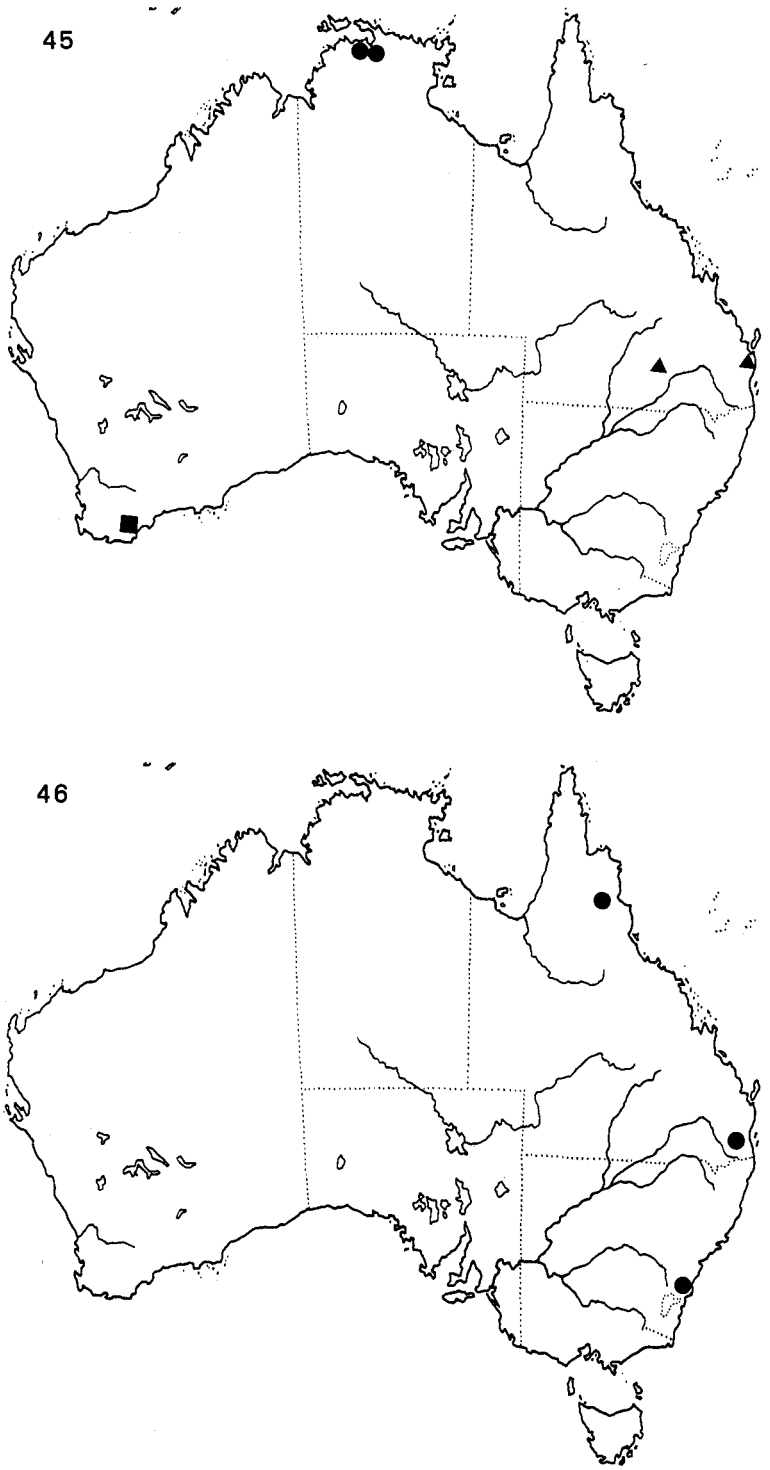


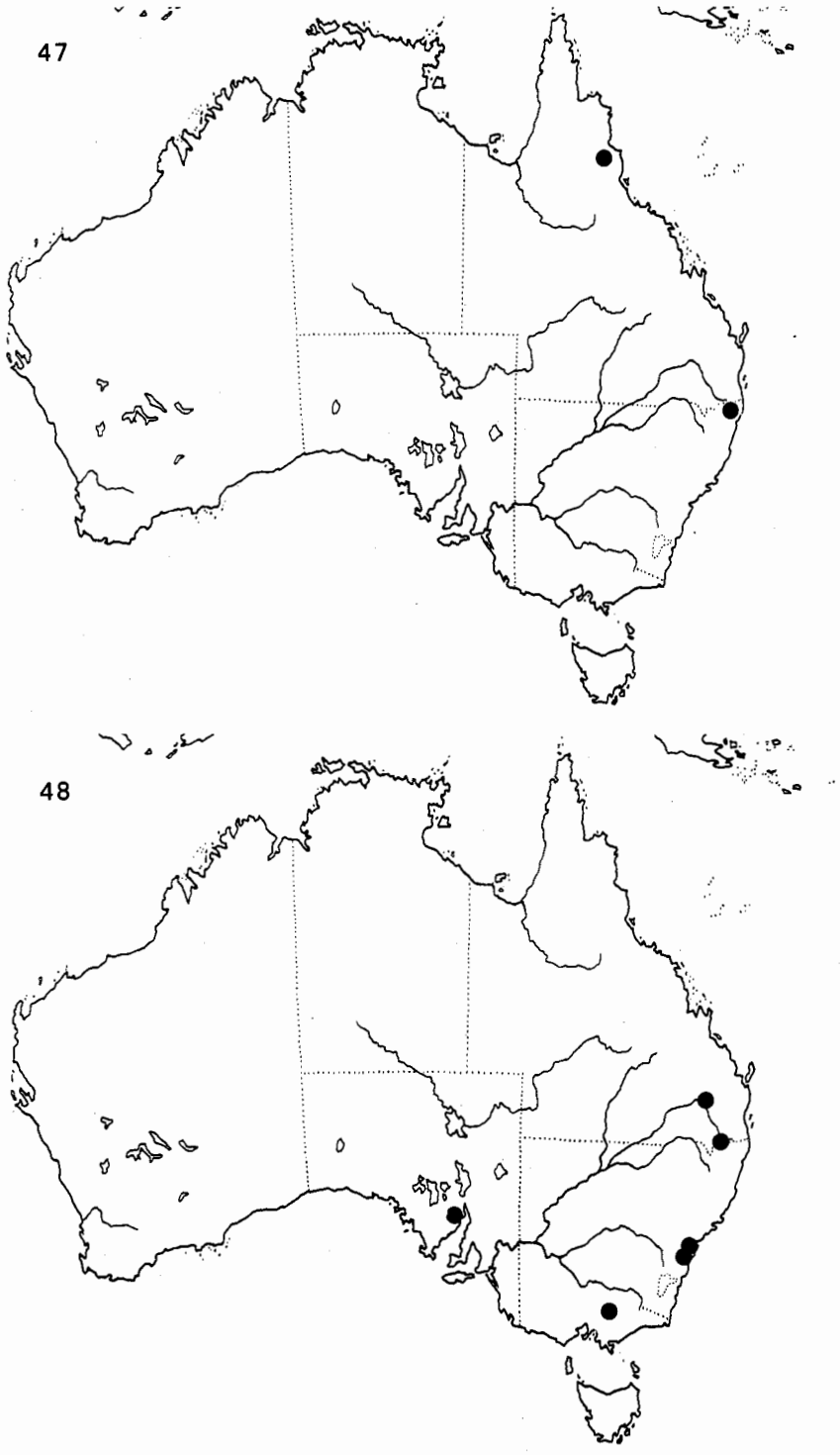
Fig. 42*f*. *Tamopsis occidentalis*, sp. nov., female with cocoon. Scale line, 5 mm.



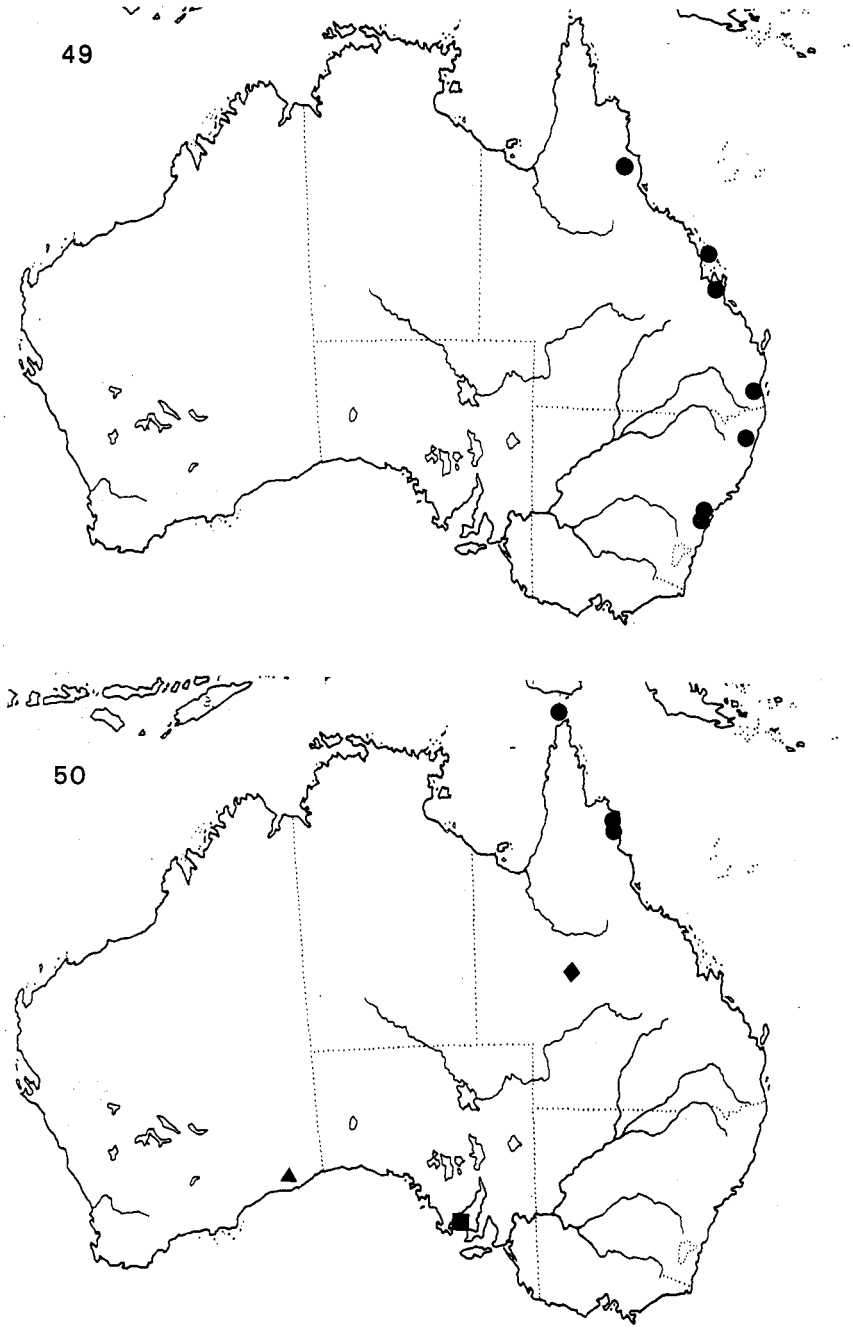
Figs 43, 44. *Tamopsis fitzroyensis*, sp. nov. *43*, Male holotype (WAM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*, *e*) palp; (*f*, *g*) chelicera. *44*, Female paratype (ZSM): (*a*) body shape; (*b*, *c*) cephalothorax; (*d*) epigyne; (*e*) vulva; (*f*) cocoon of dark form. Scale lines as in Figs 1, 2; 44*f*, 2 mm.



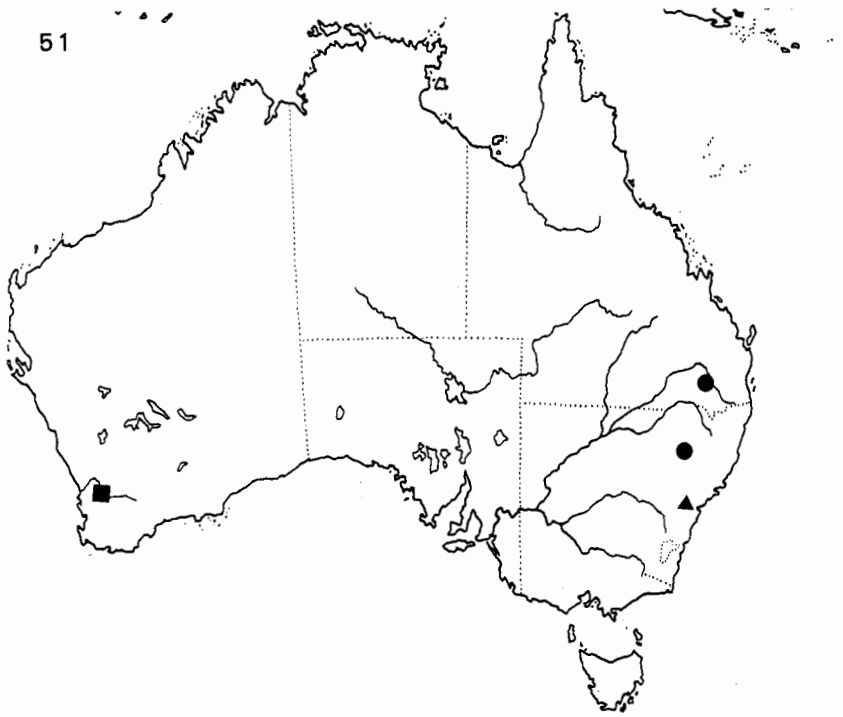
Figs 45, 46. Distributions of Australian species of Hersilidae: *45*, *Hersilia australiensis*, sp. nov. (●), *Tamopsis platycephala*, sp. nov. (▲) and *T. amplithorax*, sp. nov. (■); *46*, *T. brachycauda*, sp. nov.

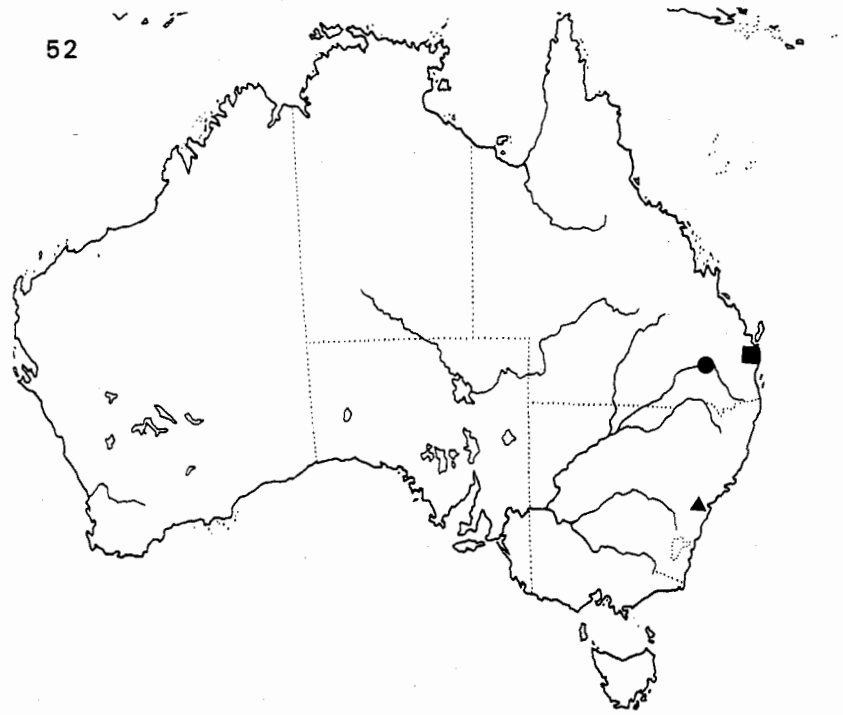


Figs 47, 48. Distributions of *Tamopsis* spp.: *47*, *T. tweedensis*, sp. nov.: *48*, *T. eucalypti* (Rainbow).

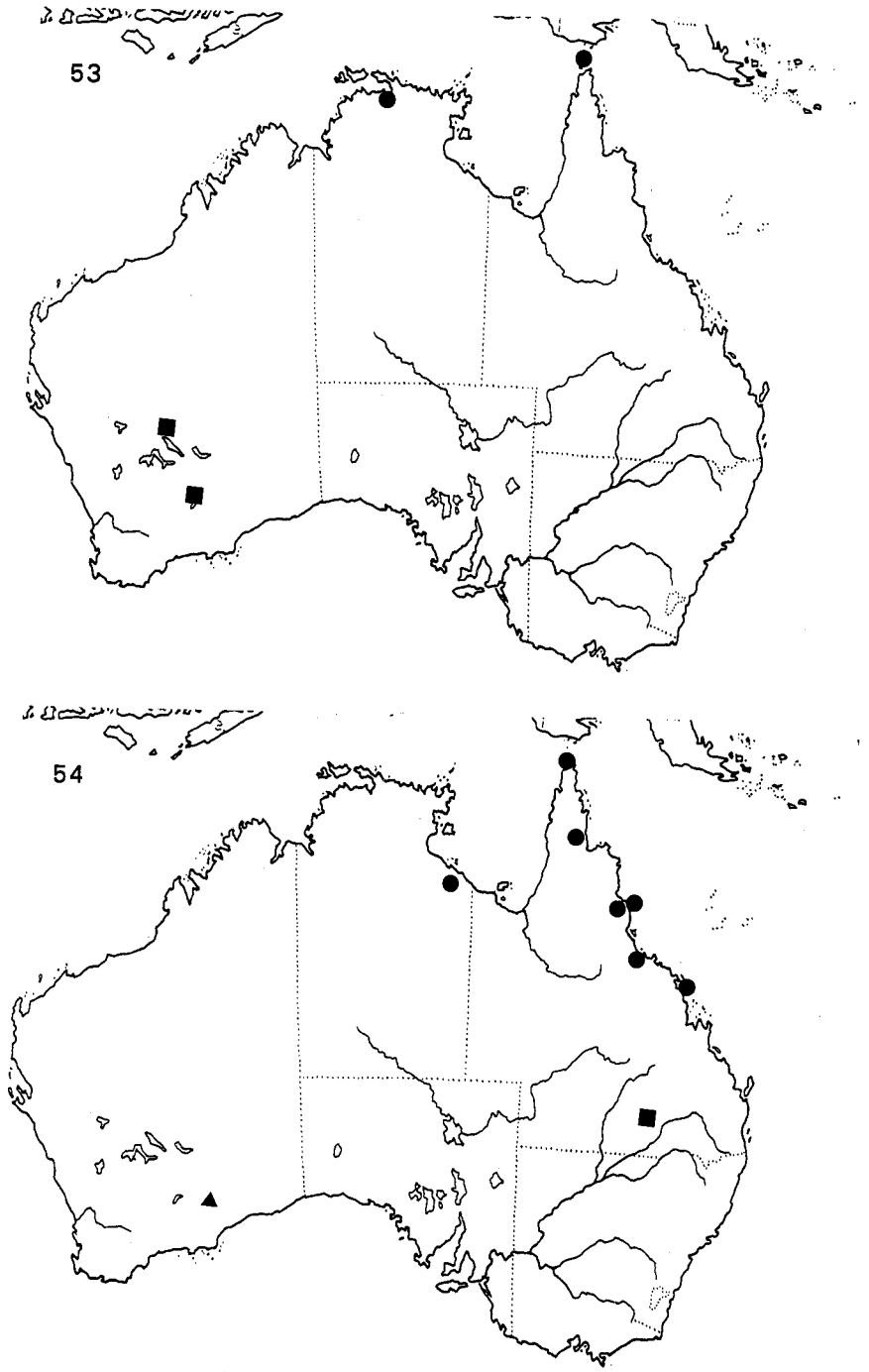


Figs 49, 50. Distributions of *Tamopsis* spp.: *49*, *T. brisbanensis*, sp. nov.; *50*, *T. daviesi*, sp. nov. (●), *T. kochi*, sp. nov. (▲), *T. centralis*, sp. nov. (◆) and *T. reevesbyana* (■).

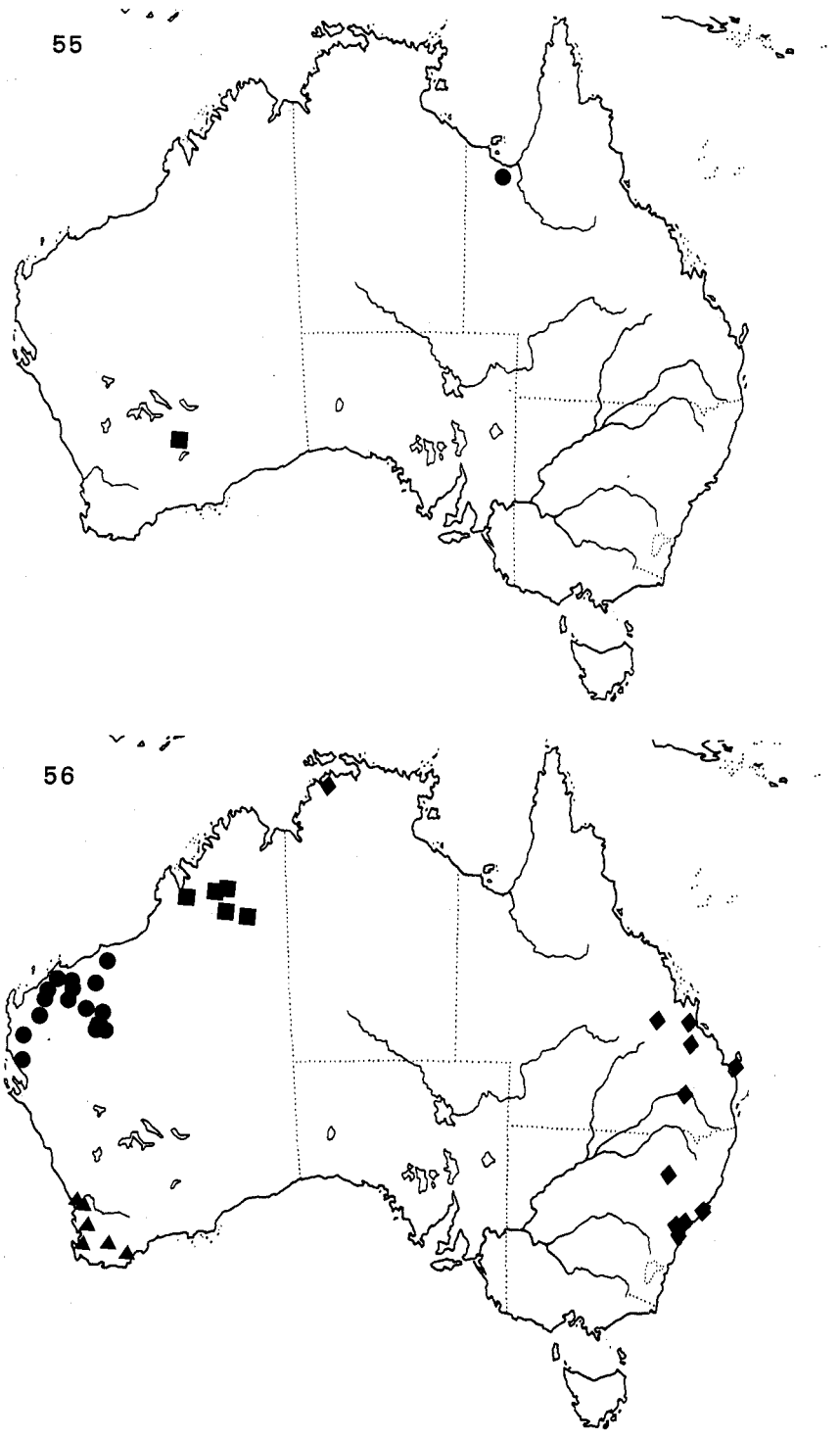




Figs 51, 52. Distributions of *Tamopsis* spp.: *51*, *T. darlingtoniana*, sp. nov. (■), *T. grayi*, sp. nov. (▲) and *T. queenslandica*, sp. nov. (●); *52*, *T. raveni*, sp. nov. (●), *T. cooloolensis*, sp. nov. (■) and *T. brevipes*, sp. nov. (▲).



Figs 53, 54. Distributions of *Tamopsis* spp.: *53*, *T. arnhemensis*, sp. nov. (●) and *T. circumvidens*, sp. nov. (■); *54*, *T. tropica*, sp. nov. (●), *T. trionyx*, sp. nov. (■) and *T. pseudocircumvidens*, sp. nov. (▲).



Figs 55, 56. Distributions of *Tamopsis* spp.: *55*, *T. leichardtiana*, sp. nov. (●) and *T. rossi*, sp. nov. (■); *56*, *T. fickerti* (L. Koch) (◆), *T. perthensis*, sp. nov. (▲), *T. occidentalis*, sp. nov. (●) and *T. fitzroyensis*, sp. nov. (■). ?Locality presumed to be erroneous.

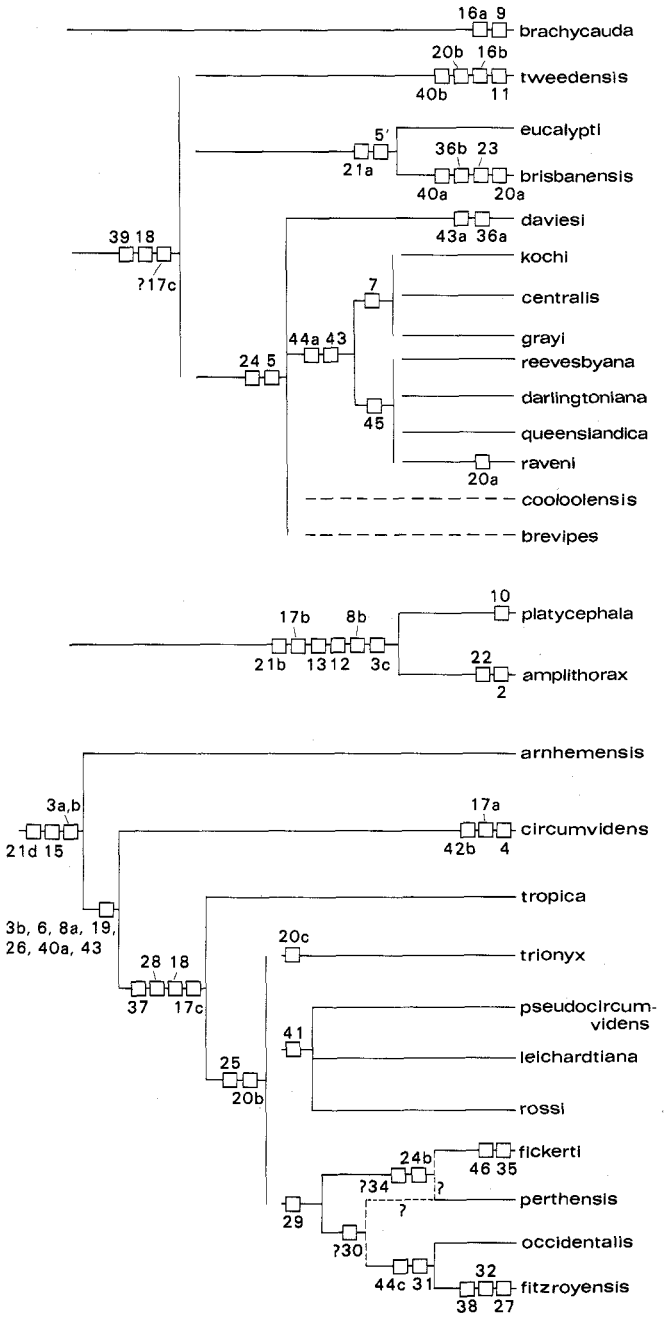


Fig. 57. Cladogram of the supposed relationships of the Australian species of *Tamopsis*. For explanation of character numbers see Tables 1 and 2, and text pp. 392–6.

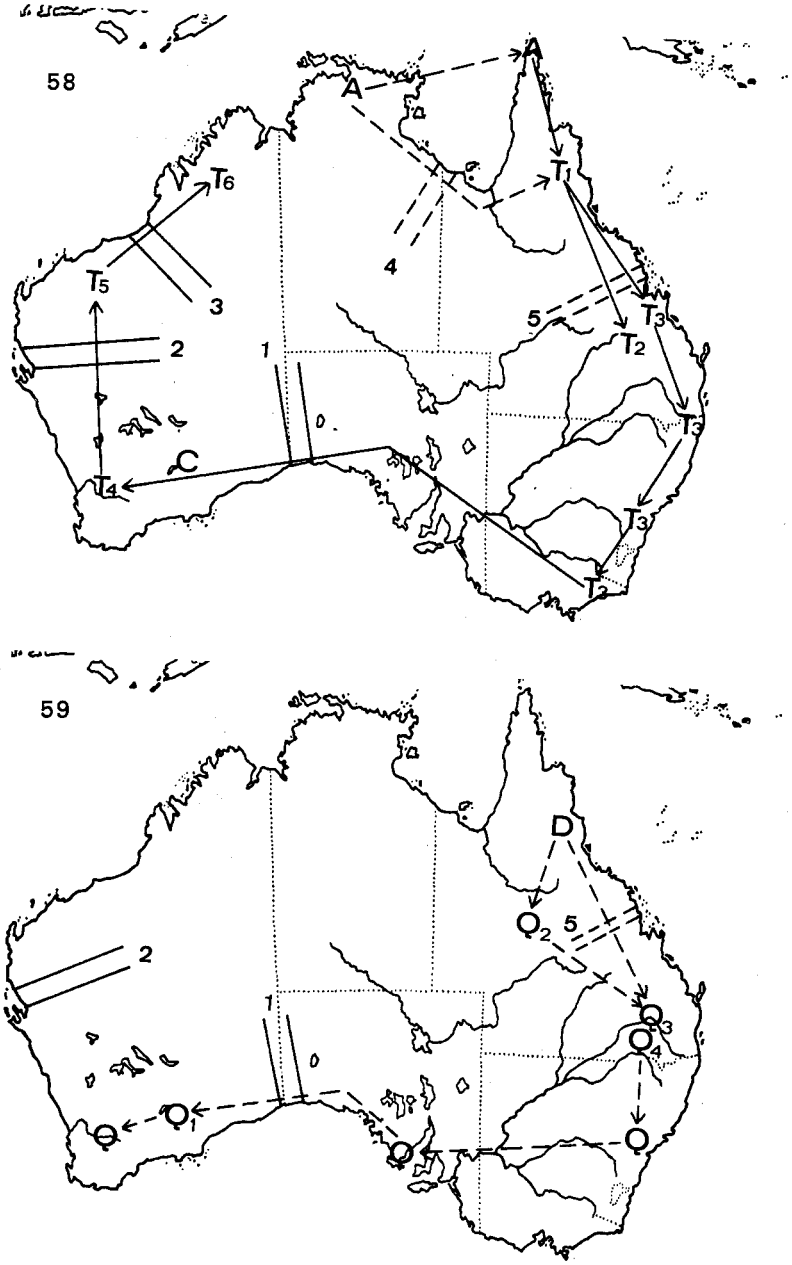
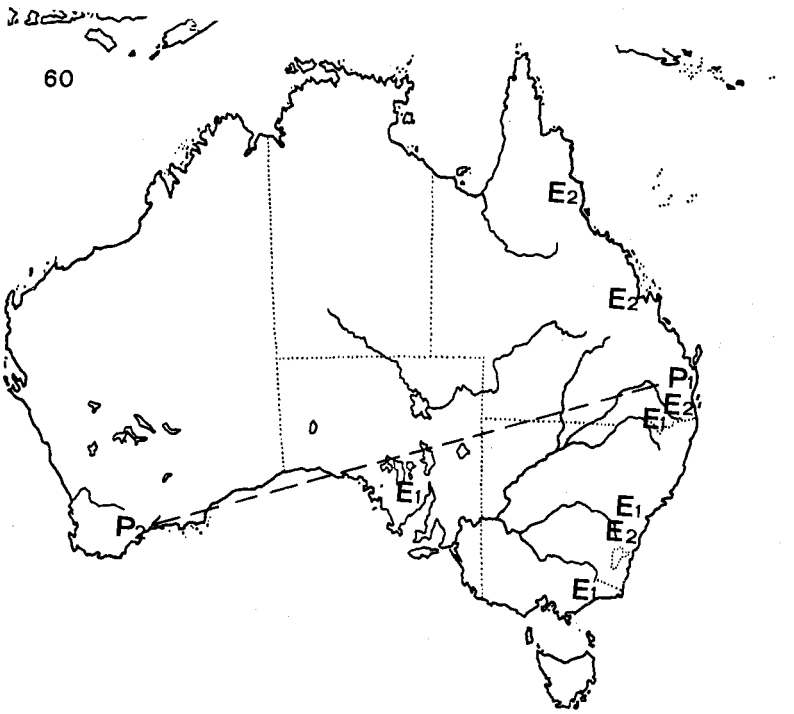


Fig. 58. Distribution of character states and migration routes within the *arnhemensis*, *circumvidens* and *tropica* groups: A, *T. arnhemensis*; C, *T. circumvidens*; T1–T6, the *tropica* group, morphocline numbered from most generalised to most derived character state, only species with known males considered; T1, *T. tropica*; T2, *T. trionyx*; T3, *T. fickerti*; T4, *T. perthensis*; T5, *T. occidentalis*; T6, *T. fitzroyensis*. Arrows indicate both increasingly derived state of character *and* supposed migration route of populations. *1–3*, Strong isolating barriers: *1*, Nullarbor Plain; *2*, semidesert north of Geraldton; *3*, Great Sandy Desert. *4, 5*, Weaker isolating barriers: *4*, steppe areas south of the Gulf of Carpentaria; *5*, dry open forests of central east Queensland.

Fig. 59. Distribution of character states and migration routes within the *daviesi* and *queenslandica* groups: D, *T. daviesi*; Q, *queenslandica* group, morphocline numbered from most generalised to most derived character state, only species with known males numbered: Q1, *T. kochi*; Q2, *T. centralis*; Q3, *T. queenslandica*; Q4, *T. raveni*. Arrows indicate supposed migration routes. Isolating barriers as in Fig. 58.



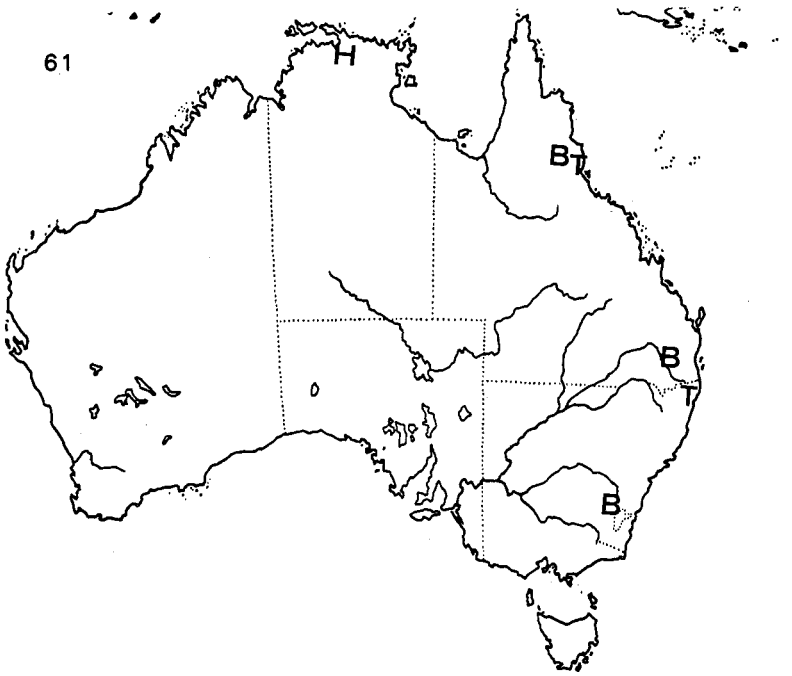


Fig. 60. Distribution of character states and migration routes within the *eucalypti* and *platycephala* groups, numbered from generalised to derivative status: E1, *T. eucalypti*; E2, *T. brisbanensis*; P1, *T. platycephala*; P2, *T. amplithorax*. Arrow indicates supposed direction of migration.
Fig. 61. Distribution of genus *Hersilia* and of the *brachycauda* and *tweedensis* groups within *Tamopsis*: H, *Hersilia*; B, *T. brachycauda*; T, *T. tweedensis*.