

Revision of Australasian *Trissolcus* Species (Hymenoptera : Scelionidae)

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Abstract

The species of *Trissolcus* Ashmead of the Australasian region (including New Guinea, the Bismark Archipelago and the Solomon Islands to Tahiti and New Zealand) are revised. *Trissolcus ancon*, *T. arctatus*, *T. cirrosus*, *T. maori*, *T. personatus*, *T. setifer*, *T. sipioides* and *T. strigis* are described as new. *Trissolcus eetion* (Dodd), *T. egeria* (Dodd), *T. ephyra* (Dodd), *T. euander* (Dodd), *T. flaviscapus* Dodd, *T. latisulcus* (Crawford), *T. mitsukurii* (Ashmead), *T. oedipus* (Dodd), *T. oeneus* (Dodd), *T. oenone* (Dodd), *T. ogyges* (Dodd) and *T. painei* (Ferrière) are redescribed. *Trissolcus basalis* (Wollaston) is a widely introduced Afrotropical species found throughout this region. The following new synonymies are proposed: *Trissolcus coriaceus* Dodd, 1915 = *T. egeria* (Dodd), 1914; *T. oecleus* (Dodd), 1913, *T. darwinensis* (Dodd), 1914, *T. erigone* (Dodd), 1914, *T. banksi* (Gahan), 1921 and *T. priapus* (Nixon), 1938 = *T. latisulcus* (Crawford), 1913; *T. oecleoides* (Dodd), 1914 = *T. mitsukurii* (Ashmead), 1904; *T. obliterated* (Dodd), 1914, *T. otho* (Dodd), 1914, *T. biproruli* (Girault), 1926b and *T. wilsoni* (Dodd), 1930 = *T. oenone* (Dodd), 1913; *T. oreas* (Dodd), 1913, *T. orontes* (Dodd), 1914, *T. atriscapus* (Girault), 1926a and *T. beenleighi* (Girault), 1932 = *T. ogyges* (Dodd), 1913.

Introduction

The genus *Trissolcus* comprises a heterogeneous grouping of species, generally worldwide in distribution, all of which are parasites of the eggs of Pentatomomorpha (Hemiptera : Heteroptera). Species of this genus have been described under a variety of other generic names, the most common being *Microphanurus* Kieffer and *Asolcus* Nakagawa. *Trissolcus* species, as a rule, have the following combination of characters: female antennal clava 6-merous, frons sculptured throughout, frons with preocellar pit located below the median ocellus, scutellum with surface sculpture, second metasomatic tergite (T2) wider than long, and eyes glabrous. Most, perhaps even all, of these characters appear to be plesiomorphic at the level of the subfamily. Thus it is not surprising that there are a number of species that clearly are not *Trissolcus* (in the sense that the genus traditionally has been understood in the Holarctic region) but have one or more of these characters. Probably the best means of distinguishing *Trissolcus* species (females) is the combination of the 6-merous clava and the presence of the preocellar pit; those few other telenomines that also have these features have T2 distinctly elongate. The species *Phanuromyia rufobasalis* Dodd and its relatives are particularly abundant in the Australasian region and have bare eyes and sculptured frons and scutellum; again, T2 is noticeably elongate and the clava is compact and 5-merous.

My objective in this paper is to revise the species concepts of *Trissolcus* for the Australasian region and to investigate their interrelationships. I am following the definition

of the Australasian region as outlined by Brown (1973), i.e. including New Guinea, the Bismarck Archipelago, Solomon Islands, the rest of Melanesia, Micronesia, Polynesia and New Zealand. My primary concern at the species level is to make these species concepts identifiable and thereby usable by other workers. Thus, I have tried to avoid the temptations to recognise fine distinctions among specimens and rather have opted for somewhat broad concepts that often encompass a wide range of morphological variation.

The material for this study was borrowed from the following institutions (with abbreviations of collections used in text following Arnett & Samuelson 1986):

AEIC	American Entomological Institute, Gainesville, Florida
ANIC	Australian National Insect Collection, CSIRO, Canberra
BMNH	The Natural History Museum, London
BPBM	Bernice P. Bishop Museum, Honolulu, Hawaii
CNCI	Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa
NSWA	New South Wales Department of Agriculture, Biological and Chemical Research Institute, Sydney
NZAC	New Zealand Arthropod Collection, Entomology Division, DSIR, Auckland
QDPI	Queensland Department of Primary Industries, Brisbane
QM	Queensland Museum, Brisbane
SAMA	South Australian Museum, Adelaide
TPNG	Department of Primary Industry, Port Moresby, Papua New Guinea
USNM	U.S. National Museum of Natural History, Washington, DC
WARI	Waite Agricultural Research Institute, Adelaide

Morphological terminology follows that in Masner (1979, 1980) and Johnson (1984a, 1984b). Label data for specimens are cited only for the type series of new species. For other species I cite the numbers of specimens examined and indicate their general geographic distribution by means of computer-generated maps.

Genus *Trissolcus* Ashmead

Trissolcus Ashmead, 1893: 161.

Type species: *Telenomus brochymenae* Ashmead, 1881, by original designation.

Key to Australian Species of *Trissolcus*

1. Scape light in colour (yellow to yellowish-brown), radicle dark brown to black, sharply contrasting 2
- Radicle concolorous with or lighter than scape, both usually yellow 7
- 2(1). Lower portions of metapleuron and lateral face of propodeum setose; Queensland
..... *T. cirrosus*
- Lower portions of metapleuron and lateral face of propodeum glabrous 3
- 3(2). T2 with lateral margins densely setose and finely striolate; widespread *T. eetion*
- Lateral margins of T2 sparsely setose, smooth 4
- 4(3). Mesopleural and genal carina absent; mesopleural scrobe smooth 5
- Mesopleural and genal carinae present; mesopleural scrobe with crenulae extending posteriorly from mesopleural carina or with a distinct line of foveae extending dorsally toward mesopleural pit 6
- 5(4). Mesosoma strongly flattened; dorsellum smooth and shining; northern Queensland
..... *T. sipioides*
- Mesosoma distinctly convex; dorsellum rugulose; widespread, introduced species
..... *T. basalis*
- 6(4). Toruli flanked by distinct carina, this sometimes raised into a flange; N. Queensland
..... *T. painei*
- Lower portion of frons laterad of toruli rugulose, without flanking keel; widespread
..... *T. oenone*
- 7(1). Lower portions of metapleuron and lateral face of propodeum setose; Queensland
..... *T. arctatus*
- Lower portions of metapleuron and lateral face of propodeum glabrous 8
- 8(7). Scutellum coarsely sculptured, areolate to rugulose 9
- Scutellum smooth or with shallowly incised reticulate sculpture 16

- 9(8). Mesopleural carina absent, anterior margin of mesopleural scrobe broadly rounded; eastern Australia *T. mitsukurii*
 Mesopleural carina present 10
- 10(9). Frons with well developed, deep setigerous punctures 11
 Frons without such well defined punctures, rugulose 12
- 11(10). Notauli present, short; wings hyaline; southeastern Australia *T. oeneus*
 Notauli absent; stigmal vein in forewing enveloped in faint fuscous cloud; southeastern Australia *T. strigis*
- 12(10). Upper portion of scrobal cavity on frons with rugulae oriented dorsoventrally 13
 Scrobal rugulae transverse 15
- 13(12). Lower portion of orbital furrow distinctly widened; scutellum evenly and strongly convex; eastern Australia *T. personatus*
 Lower portion of orbital furrow constricted 14
- 14(13). Antennae entirely dark, base of scape just above radicle often somewhat lighter in colour; scutellum evenly convex; widespread *T. oenone*
 First antennal segment entirely yellow; scutellum sometimes excavate posteriorly; eastern Australia *T. latisulcus*
- 15(12). Eyes very large, head distinctly widened; stigmal vein of forewing enveloped in fuscous cloud; southeastern Australia *T. strigis*
 Eyes and head of normal proportions; forewing hyaline; eastern Australia *T. ephyra*
- 16(8). Hyperoccipital carina present; widespread *T. euander*
 Hyperoccipital carina absent 17
- 17(16). Scutellum coarsely rugulose; frons with well defined round setigerous punctures; vertex angled behind lateral ocelli, depressed and rounded medially; southeastern Australia *T. oeneus*
 Scutellum coriaceous, reticulate or smooth; frontal sculpture variable; vertex usually rounded medially, but not depressed 18
- 18(17). Notauli entirely absent; head, mesonotum, T2 with well developed coriaceous sculpture throughout; anterior portion of laterotergite 2 with distinct patch of setae; widespread *T. egeria*
 Notauli present, if sometimes shallow, body sculpture variable; laterotergite 2 with few (usually <15) widely spaced setae 19
- 19(18). T2 with well developed longitudinal striae extending beyond basal costae over at least half length of sclerite; eyes distinctly setose; southwestern Western Australia, eastern Australia, especially Tasmania *T. oedipus*
 T2 either smooth or with reticulate or coriaceous sculpture beyond basal costae; eyes usually with, at most, few short setae visible 20
- 20(19). Frons with medial longitudinal groove extending from median ocellus ventrad; T2 distinctly wider than long, smooth beyond basal costae; widespread *T. flaviscapus*
 Frons without furrow below median ocellus; T2 with sculpture beyond basal costae ... 21
- 21(20). Notauli shallow, sometimes indistinct; T2 with shallowly incised reticulate microsculpture; fore and mid coxae distinctly separated; widespread and very common *T. ogyges*
 Notauli deep and distinct; T2 distinctly coriaceous; fore and mid coxae usually closely approximated, with intercoxal space largely occluded; widespread, this form very rare *T. egeria*

Key to New Zealand Species of *Trissolcus*

1. Lower portions of metapleuron and lateral face of propodeum setose; radicle and scape concolorous, usually yellow; notauli well developed *T. maori*
 Metapleuron and lateral face of propodeum glabrous; radicle black, usually darker than remainder of scape; notauli absent 2
- 2(1). Frons rugulose; genal carina and mesopleural carina well developed *T. oenone*
 Frons coriaceous, with scattered setigerous punctures; genal carina and mesopleural carina absent *T. basalis*

Key to *Trissolcus* Species of Southwest Pacific, exclusive of New Zealand and Australia

1. Radicle concolorous with, or lighter than, scape 2
 Radicle darker than scape, contrasting in colour 4
- 2(1). Notauli well developed; scutellum coriaceous; New Caledonia *T. flaviscapus*
 Notauli absent or obscured by longitudinal sculpture of mesoscutum; scutellum rugulose
 3
- 3(2). Scape entirely dark brown to black; T2 sparsely setose laterally; New Guinea, New Caledonia,
 Vanuatu, Fiji, Tahiti *T. personatus*
 Scape yellow; T2 densely setose laterally; New Britain, Manus Island *T. setifer*
- 4(1). Mesopleural scrobe transversely striate; mesopleural carina and genal carina well developed
 5
 Mesopleural scrobe smooth; mesopleural and genal carinae absent; widespread ... *T. basalis*
- 5(4). Antennal insertions with flanking keel 6
 Antennal insertions without keel; Philip Island *T. oenone*
- 6(5). T2 elongate; New Britain *T. ancon*
 T2 transverse; New Guinea, Solomon Islands *T. painei*

***Trissolcus ancon*, sp. nov.**

(Fig. 13)

Material Examined*Holotype.* ♀, **Papua New Guinea:** New Britain, Keravat, 31.vii.1963 (Dun) (ANIC).*Paratypes.* 16♀, 3♂ with same locality data as holotype, collected 8.vi.1963, 31.vii.1963, i.1964, (Dun) (ANIC, USNM).**Description**

Length 1.67–1.98 mm ($n=20$); hyperoccipital carina absent; lateral ocelli contiguous with inner orbits; preocellar pit present, very large, subequal in diameter to median ocellus; vertex and frons outside of antennal scrobe rugulose, with granulose microsculpture present or sometimes background smooth, antennal scrobe transversely keeled; orbital furrow present, narrow; eyes glabrous, relatively small; genal carina present, extending from mandible to or beyond level of lower margin of eye, crenulate anteriorly; gena covered by extensions of crenulae flanking anterior margin of occipital carina; mandibles broad, clasping, teeth deeply incised, acute; radicle black, scape, A2–A6 yellow, radicle expanded medially; antennal insertions flanked by well developed keel; notauli absent; mesoscutum rugulose to areolate-rugulose, longitudinally rugulose posteriorly, with granulose microsculpture; scutellum rugulose to areolate-rugulose, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum rugulose; mesopleural carina present; surface of mesopleural scrobe longitudinally striate; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with no sublateral setae; laterotergite 1 glabrous; T2 longitudinally striate beyond basal half of sclerite, sparsely setose laterally; metasoma distinctly elongate, T2 longer than wide.

Host*Austromalaya* sp. (Hemiptera : Pentatomidae).**Remarks**

Trissolcus ancon is very similar to *T. painei*; the former species is generally much larger, the keels flanking the antennal bases are very large and conspicuous, and the metasoma is much more elongate.

***Trissolcus arctatus*, sp. nov.**

(Fig. 3)

Material Examined*Holotype.* ♂, **Australia:** Queensland: Luster Ck, 8 km W. by N. Mt. Molloy, 21–22.v.1980 (Naumann, Cardale) (ANIC).

Description

Length 0.83 mm; hyperoccipital carina absent, vertex abruptly angled onto occiput; lateral ocellus separated from inner orbit, connected to it by short sulcus; lower portion of frons above antennae transversely rugose, elsewhere, with confused rugulose sculpture, scrobe very flat, frons without keel flanking torulus; orbital furrow absent; eyes glabrous; genal carina present, reaching ventral margin of compound eye; gena coriaceous; mandibles tridentate, teeth acute; radicle, scape yellow, remainder of antenna brown; notauli absent; mesoscutum rugulose, with short longitudinal elements posteriorly, abruptly declivous anteriorly; scutellum coriaceous, with setal bases pustulate; metapostnotum exposed; anteroventral portion of mesepisternum smooth, fore and mid coxae closely approximated, intercoxal space occluded; mesopleural carina present, weak; mesopleural scrobe smooth; metapleural extension long, reaching beyond ventral margin of mesopleuron; lower portions of metapleuron and lateral face of propodeum setose; metapleural pit recessed; T1 with 1 pair of sublateral setae; laterotergite 1 glabrous; T2 smooth beyond basal costae, sparsely setose laterally.

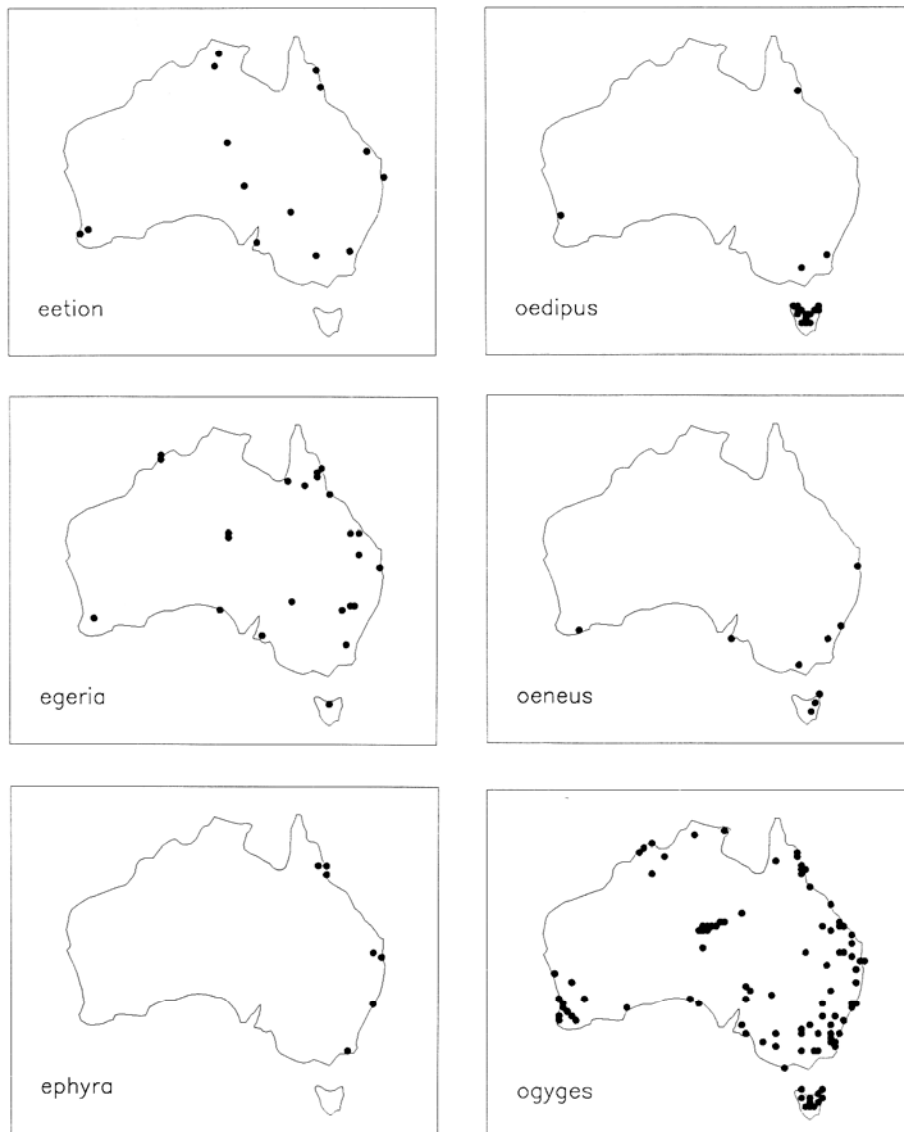


Fig. 1. General geographic distributions of species of *Trissolcus* known only from Australia.

Host

Unknown.

Remarks

Only two other species from the Australasian region are known to me that possess setae on the lower portion of the metapleuron: *T. maori* and *T. cirrosus*. *Trissolcus arctatus* is distinguishable from the latter in that the antennal radicle is yellow and concolorous with the remainder of the scape; in *T. cirrosus* the radicle is black. *Trissolcus maori* has well developed notauli and has the fore and mid coxae distinctly separated; the notauli in *T. arctatus* are lacking and the intercoxal space is largely occluded.

Trissolcus basalis (Wollaston)

I have earlier redescribed and provided a bibliography for other taxonomic works for this species (Johnson 1985b). It is primarily, but not exclusively, a parasite of the eggs of *Nezara viridula* L. (Hemiptera: Pentatomidae) and has been widely introduced as a biological control agent. Within Australia a number of other species of *Trissolcus* may be reared on occasion from the eggs of *Nezara*. These include *T. mitsukurii* (Ashmead), *T. oenone* (Dodd) and *T. ogyges* (Dodd). *Trissolcus basalis* may be recognised by the combination of the black radicle (the scape is usually yellow), the lack of both the mesopleural carina and genal carina, the typical robust habitus of this genus, and the absence of setae on the lower portion of the metapleuron. I have examined specimens from Australia, Papua New Guinea, New Caledonia, Fiji, the Cook Islands, Tonga Islands, Society Islands and Hawaiian Islands (ANIC, BMNH, BPBM, CNCI, NSW, QDPI, TPNG, WARI).

Trissolcus cirrosus, sp. nov.

(Fig. 5)

Material Examined

Holotype. ♀, **Australia**: 26°53'S., 151°37'E., Queensland: Russell Park nr Mt Mowbullian, 7.x.1984 (Naumann, Cardale) (ANIC).

Description

Length 0.85 mm; hyperoccipital carina absent, vertex rounded throughout; lateral ocellus slightly separated from inner orbit, connected to it by broad depression; frons coriaceous, without keel flanking torulus; orbital furrow absent; eyes glabrous; genal carina present, short, meeting malar sulcus below lower margin of compound eye; gena coriaceous; mandibular teeth shallowly incised; radicle black, antennae almost entirely dark, base of scape lighter, contrasting with radicle; notauli absent; mesoscutum, scutellum coriaceous; metapostnotum invaginated; anteroventral portion of mesepisternum coriaceous; mesopleural carina absent; mesopleural scrobe smooth; metapleural extension short, not reaching beyond ventral margin of mesopleuron; lower portions of metapleuron and lateral face of propodeum setose; metapleural pit recessed; T1 with 1 pair of sublateral setae; laterotergite 1 setose; T2 with very weak longitudinal striae, nearly smooth beyond basal costae, without reticulations, sparsely setose laterally.

Host

Unknown.

Remarks

The black antennal radicle of *Trissolcus cirrosus* will distinguish it from all other Australasian species with the setose metapleuron (*T. maori* and *T. arctatus*). There is another undescribed species known from southeast Asia (Nepal to peninsular Malaysia) that has this combination of characters. It has a grossly enlarged female antennal clava and will be easily distinguishable from *T. cirrosus* if their distributions are eventually found to overlap.

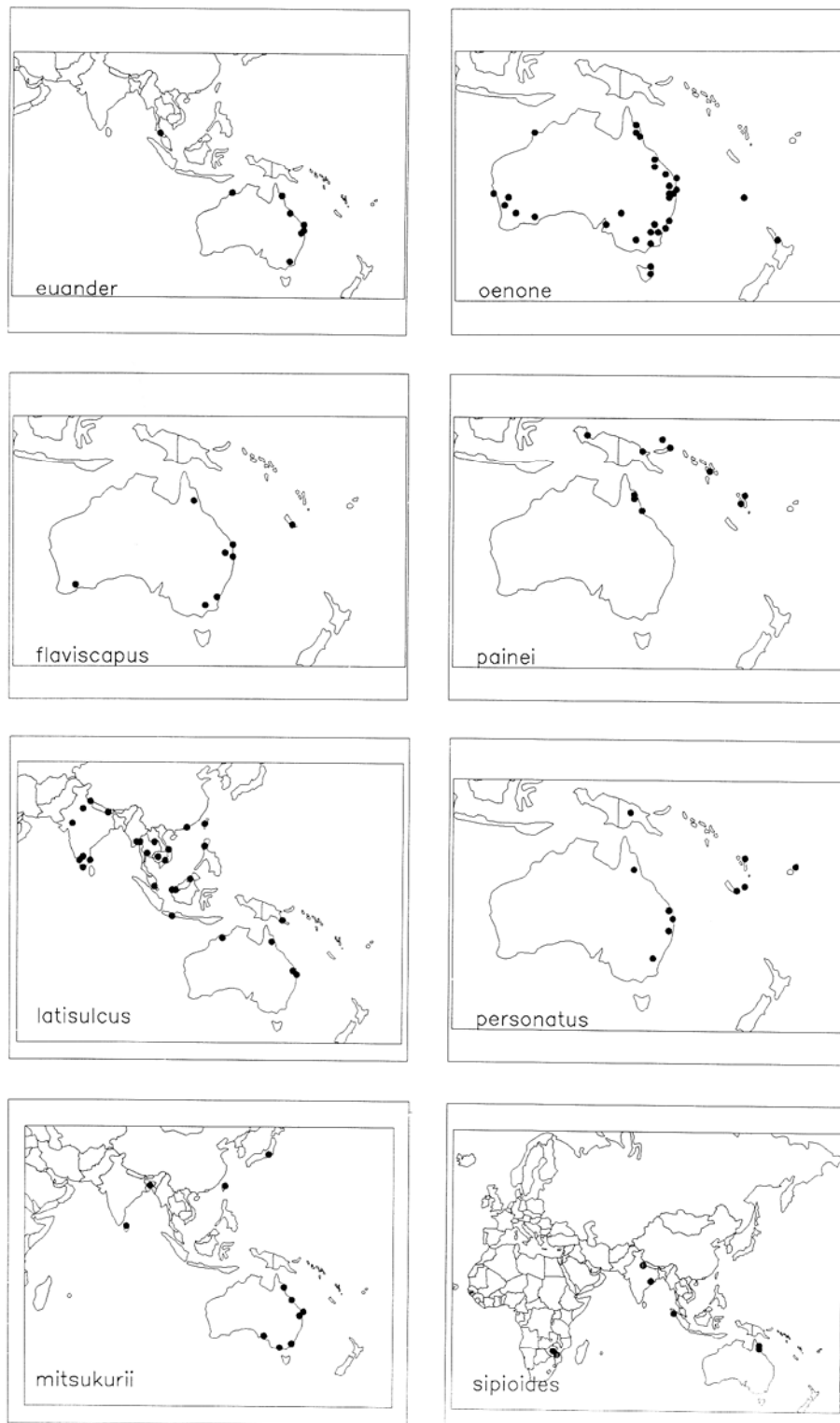


Fig. 2. General geographic distributions of Australasian species of *Trissolcus*.

Trissolcus eetion (Dodd)

(Figs 1, 18)

Telenomus eetion Dodd, 1914d: 3. Lectotype in SAMA.*Trissolcus eetion*.—Johnson, 1988: 239.*Material Examined*

31♀, 7♂ (AEIC, ANIC, QDPI).

Description

Length 1.78–2.35 mm ($n=20$); hyperoccipital carina absent, vertex rounded onto occiput; lateral ocellus separated from inner orbit, connected to it by broad furrow; preocellar pit present; vertex and frons outside of scrobe rugulose, with granulate microsculpture, scrobe transversely rugose on smooth background; orbital furrow present, narrow; eyes glabrous; genal carina present, extending near lower margin of eye, crenulate anteriorly; mandibles moderately broad, teeth shallowly incised; radicle black; scape yellow, flagellum infuscate; notauli absent; mesoscutum rugulose to reticulate, with granulate microsculpture, with short longitudinal rugae posteriorly; scutellum with same sculpture as disc of mesoscutum, evenly convex; metapostnotum invaginated; anteroventral portion of mesepisternum rugulose; mesopleural carina present; surface of mesopleural scrobe coriaceous to longitudinally striate; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with 1 pair of sublateral setae; laterotergite 1 setose; T2 longitudinally rugulose over most of sclerite, sculpture extending laterally and becoming both finer and denser near laterotergite, sclerite densely setose laterally.

*Host**Poecilometis strigatus* (Westwood) (Hemiptera : Pentatomidae).*Remarks*

This is a widespread and relatively large species of *Trissolcus*. Its overall size, black radicle, and densely setose T2 are usually sufficient to distinguish it. Some specimens of *Trissolcus oenone* reared from large species of pentatomids may cause some difficulties. The dense and finely incised microsculpture on the lateral portions of T2 found in *T. eetion* will distinguish it from *T. oenone*.

Trissolcus egeria (Dodd)

(Figs 1, 6)

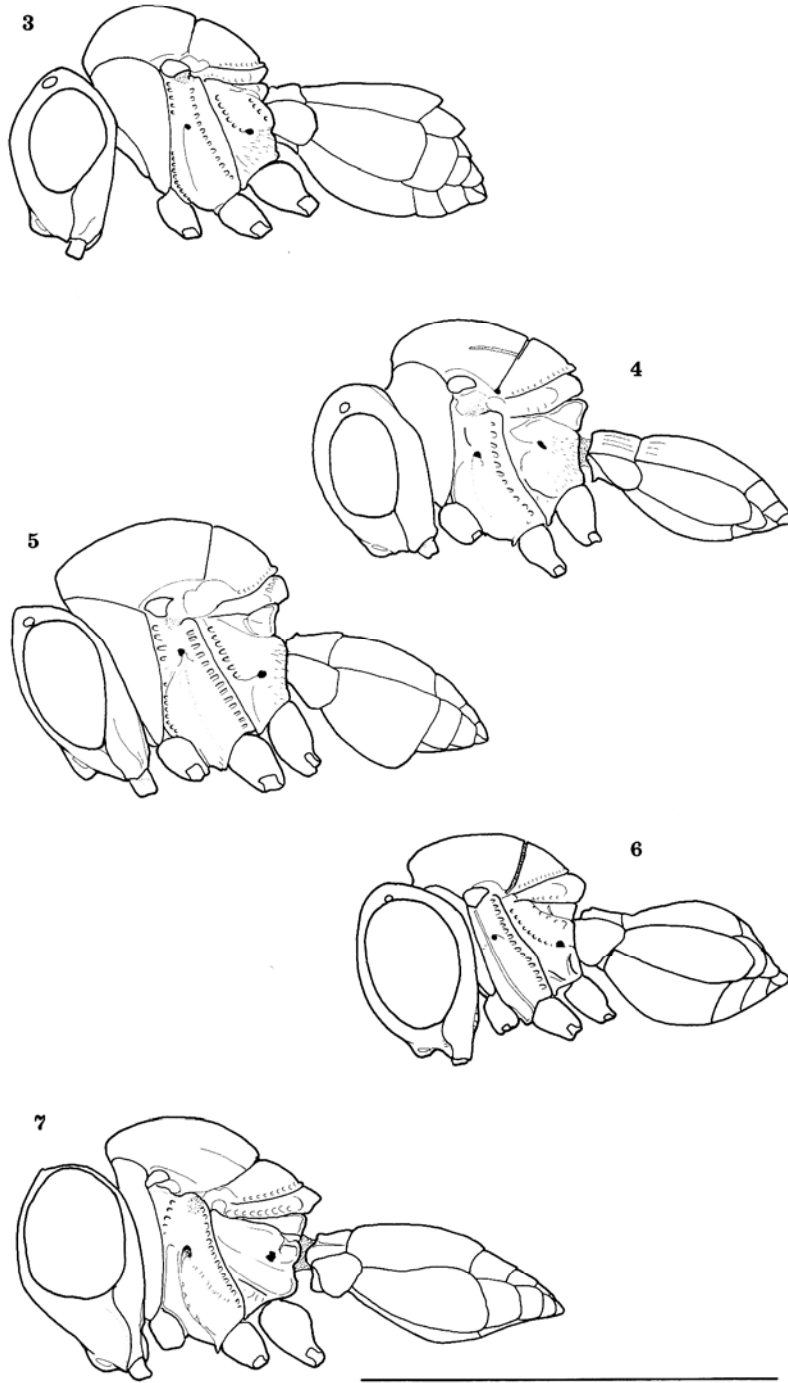
Telenomus egeria Dodd, 1914d: 4. Lectotype in SAMA.*Trissolcus coriaceus* Dodd, 1915: 451. Lectotype in SAMA. **New Synonymy.***Trissolcus coriaceus*.—Johnson, 1988: 239.*Trissolcus egeria*.—Johnson, 1988: 239.*Material Examined*

93♀, 20♂ (AEIC, ANIC, BMNH, QDPI, WARI).

Description

Length 0.79–1.25 mm ($n=20$); hyperoccipital carina absent, vertex rounded onto occiput, sometimes rather abruptly angled; head wide; ocelli small; lateral ocellus separated from inner orbit, connected to it by short sulcus; preocellar pit present; vertex and frons outside of scrobe finely areolate with granulate microsculpture, scrobe narrow, transversely striate; orbital furrow absent; eyes usually glabrous, sometimes with visible setae; genal carina absent; mandibles broad, teeth shallowly incised; radicle yellow to yellowish-brown, rest of A1 and antenna infuscate; notauli usually absent entirely, but sometimes with deep notauli extending over posterior third of mesoscutum; mesoscutum abruptly declivous anteriorly, coriaceous; scutellum coriaceous, nearly flat, short; metapostnotum variable, usually invaginated anterior to dorsellum; mesepisternum anterior to mesopleural carina very narrow,

smooth; intercoxal space usually strongly narrowed or occluded, fore and mid coxae contiguous; mesopleural carina present, nearly straight; surface of mesopleural scrobe smooth; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 very short, wide, with 1–2 pairs of sublateral setae; laterotergite 1 glabrous; T2 extensively reticulate, microsculpture normally extending beyond basal half of sclerite, sparsely setose laterally; laterotergite 2 often with conspicuous patch of setae anteriorly.



Figs 3–7. *Trissolcus* species, lateral habitus. 3, *T. arctatus*; 4, *T. maori*; 5, *T. cirrosus*; 6, *T. egeria*; 7, *T. ogyes*. Scale line = 0.5 mm.

Host

Unknown.

Remarks

See below under *Trissolcus ogyges*.

Trissolcus ephyra (Dodd)

(Figs 1, 21)

Telenomus ephyra Dodd, 1914d: 7. Holotype in SAMA.

Trissolcus ephyra.—Johnson, 1988: 239.

Material Examined

42♀, 14♂ (ANIC, QDPI)

Description

Length 1.58–1.95 mm ($n = 20$); hyperoccipital carina absent, vertex rounded onto occiput; lateral ocellus separated from inner orbit; connected to it by broad furrow; preocellar pit present; vertex and frons outside of scrobe rugulose to areolate, granulate microsculpture; scrobes shallow, transversely striate; orbital furrow present, narrow; eyes glabrous; genal carina present, short, not crenulate; mandibles moderately broad, teeth shallowly incised; radicle, scape, A2–A4 yellow, A5–A11 infusate, colour change not abrupt; notauli absent; mesoscutum rugulose to areolate, with granulate microsculpture; scutellum rugulose to areolate, with granulate microsculpture, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum smooth, setal bases distinctly pustulate; mesopleural carina present; surface of mesopleural scrobe smooth; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with no sublateral setae; laterotergite 1 glabrous; T2 striate beyond basal half of sclerite, sparsely setose laterally.

Host

Unknown.

Remarks

This large species may be confused with *T. mitsukurii* or *T. latisulcus*, both of which may have a similarly enlarged antennal clava. This character seems to be fairly labile so I have not included it in my description, key, or phylogenetic analyses. *Trissolcus mitsukurii* lacks a mesopleural carina, a feature that is strongly developed in *T. ephyra*. In *T. latisulcus*, a species found primarily in the Oriental region, the rugulae radiating from the scrobe in the upper portion of the frons are directed dorsoventrally, while those of *T. ephyra* are transverse throughout. In addition, the antennal clava of *T. latisulcus*, when it is enlarged, tends to be elongate and not swollen as in *T. ephyra*.

Trissolcus euander (Dodd)

(Figs 2, 17)

Telenomus euander Dodd, 1914d: 7. Holotype in SAMA.

Trissolcus euander.—Johnson, 1988: 240.

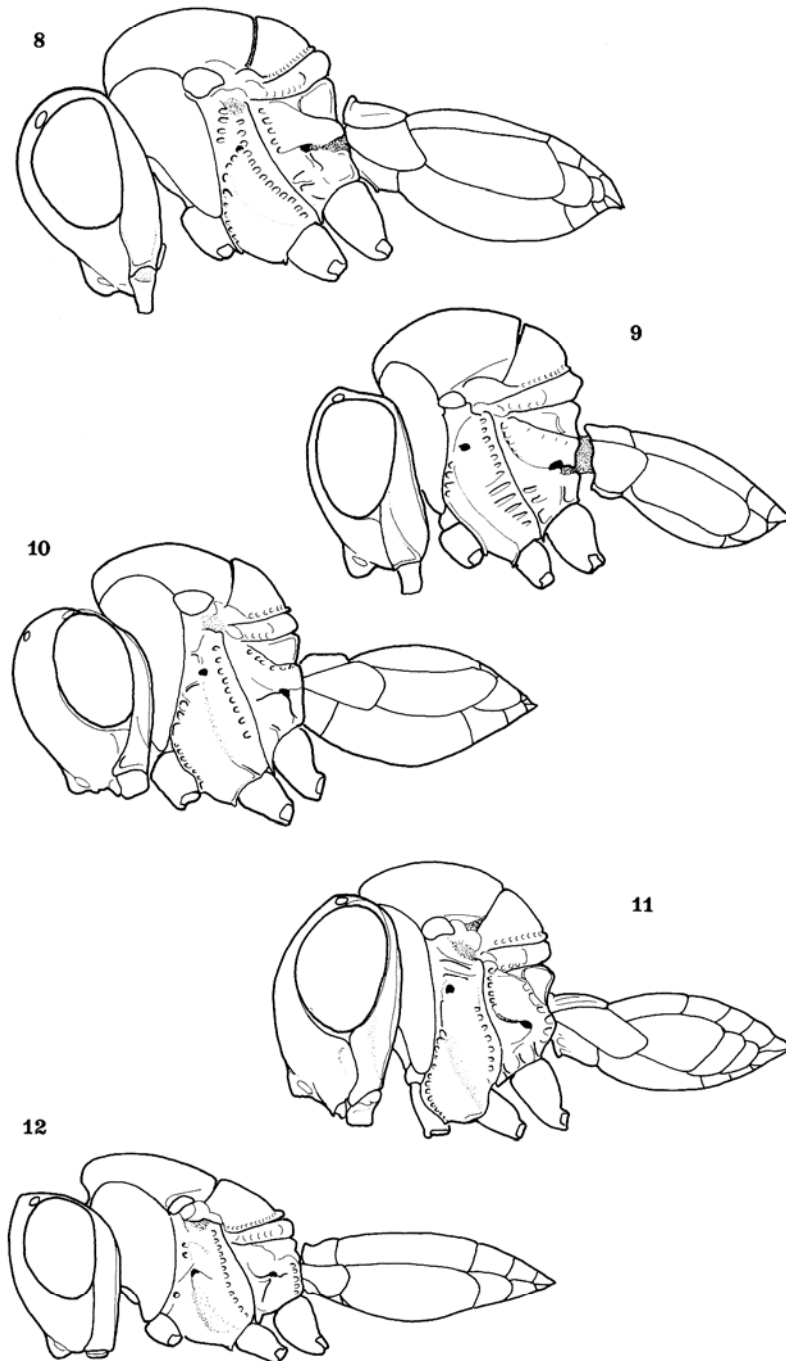
Material Examined

26♀, 2♂ (ANIC, BMNH, BPBM, QDPI, SAMA).

Description

Length 1.53–1.78 mm ($n = 20$); hyperoccipital carina present; lateral ocellus separated from inner orbit, connected with it by short sulcus; preocellar pit present; vertex and upper portion of frons with granulate to coriaceous microsculpture, punctures at setal bases very small, scrobes with short transverse keels; orbital furrow absent; eyes glabrous; genal carina

absent; mandibles moderately broad, teeth shallowly incised; radicle and scape yellow, antenna abruptly bicoloured, A7–A11 dark brown, otherwise yellow; notauli short, inconspicuous; mesoscutum granulate, setal bases raised; scutellum evenly convex, coriaceous to granulate; metapostnotum exposed; anteroventral portion of mesepisternum coriaceous;



Figs 8–12. *Trissolcus* species, lateral habitus. 8, *T. oedipus*; 9, *T. oenone*; 10, *T. miksukurii*; 11, *T. flaviscapus*; 12, *T. sipioides*. Scale line = 0.5 mm.

mesopleural carina present; surface of mesopleural scrobe smooth; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with 1 pair of sublateral setae; laterotergite 1 glabrous; T2 striate in basal half of length, sparsely setose laterally.

Host

Unknown.

Remarks

This is the only species I have found from the Australasian region that has a well developed hyperoccipital carina and a yellow radicle. These characters would normally place *T. euander* in the *flavipes*-group of *Trissolcus*; this species is unusual in that context because it has no enlarged orbital furrow, the sublateral setae on T1 are present, and the frons does not bulge between the eyes and the antennal insertions. In contrast to the many species of the Australasian region which appear to have retained large suites of plesiomorphic characters, I believe *T. euander* is best considered a relatively apomorphic member of the *flavipes* species-group (see discussion of phylogenetic relationships below).

Trissolcus flaviscapus Dodd

(Figs 2, 11)

Trissolcus flaviscapus Dodd, 1916: 32. Holotype in SAMA.

Trissolcus flaviscapus. – Johnson, 1988: 240.

Material Examined

32♀, 1♂ (ANIC, BMNH, BPBM, QDPI).

Description

Length 0.80–1.47 mm ($n = 20$); hyperoccipital carina absent, vertex rounded onto occiput medially; lateral ocellus separated from inner orbit, connected to them by short sulcus; precellar pit indistinct; frons and vertex coriaceous, with distinct medial furrow descending from median ocellus, with weak striae radiating from midline in antennal scrobe; orbital furrow absent; eyes glabrous; genal carina absent; mandibles moderately wide, teeth shallowly incised; radicle concolorous with or lighter than scape, flagellum infuscate; notauli present, extending over basal fourth of mesoscutum; mesoscutum reticulate; scutellum smooth, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum smooth; mesopleural carina sometimes present; surface of mesopleural scrobe smooth; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with 1 pair of sublateral setae; laterotergite 1 setose; T2 very short, smooth beyond basal foveae, sparsely setose laterally.

Host

Unknown.

Remarks

I believe that this species, along with *T. euander*, belongs to the *flavipes*-group of *Trissolcus*. It is unusual for that group in that the hyperoccipital carina and orbital furrow are absent and sublateral setae on T1 are present. These, of course, are the three major apomorphic characters of the *flavipes*-group. I frankly cannot state explicitly the characters upon which I make this assertion, except that this little species looks much like many of the other smaller New World forms with which I am familiar. *Trissolcus flaviscapus* may be distinguished from other Australasian species with a yellow radicle by means of the distinct longitudinal furrow that extends below the median ocellus; in addition, many individuals have T2 extremely shortened, even for a genus in which this sclerite is normally wider than long. Note that, despite the specific name, most specimens have much of the apical portion of the scape darkened.

Trissolcus latisulcus (Crawford)

(Figs 2, 16)

Telenomus latisulcus Crawford, 1913: 244. Holotype in USNM.*Telenomus oecleus* Dodd, 1913: 163. Lectotype in SAMA. **New Synonymy.***Telenomus darwinensis* Dodd, 1914d: 7. Lectotype in SAMA. **New Synonymy.***Telenomus erigone* Dodd, 1914d: 8. Holotype in SAMA. **New Synonymy.***Aphanurus banksi* Gahan, 1921: 349. Holotype in USNM. **New Synonymy.***Microphanurus priapus* Nixon, 1938: 133, figs 2b, 4c. Holotype in BMNH. **New Synonymy.***Microphanurus priapus*.—Nixon, 1943: 143.*Trissolcus latisulcus*.—Masner & Muesebeck, 1968: 73.*Trissolcus darwinensis*.—Johnson, 1988: 239.*Trissolcus erigone*.—Johnson, 1988: 239.*Material Examined*

188♀, 29♂ (ANIC, BMNH, BPBM, CNCI, QDPI, TPNG, USNM).

Description

Length 1.06–2.00 mm ($n = 20$); hyperoccipital carina absent, vertex broadly rounded onto occiput; lateral ocellus contiguous with inner orbit; preocellar pit present; vertex and frons outside of antennal scrobe rugulose, with granulose microsculpture, above rugulae directed dorsoventrally, in some specimens with distinct dorsoventral rugae flanking dorsal portion of scrobe, scrobe transversely keeled; orbital furrow present, narrow ventrally; eyes glabrous; genal carina present, reaching level of lower margin of eye, strongly crenulate anteriorly; clypeus rectangular; apical margin of labrum fringed with fine, short setae; mandibles broad, teeth deeply incised; radicle and scape concolorous, yellow; flagellum infusate; notauli short, inconspicuous; mesonotum with raised reticulations, longitudinally rugose posteriorly, with granulose microsculpture; scutellum rugose, often declivous in posterior half; metapostnotum exposed; anteroventral portion of mesepisternum rugulose; mesopleural carina present; surface of mesopleural scrobe longitudinally striate; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with no sublateral setae; laterotergite 1 glabrous; T2 striate over basal $\frac{3}{4}$ of length, sparsely setose laterally.

Hosts

Biprorulus bibax Breddin, *Poecilometis* sp. (Hemiptera: Pentatomidae); *Chrysocoris purpureus*, *Rhynchocoris humeralis* Thunberg, *R. longirostris*, *Tectocoris diophthalmus* (Thunberg) (Hemiptera: Scutelleridae); *Tessaratomya papillosa* Drury (Hemiptera: Tessaratomidae).

Remarks

This species, widely distributed through the Oriental regions, is found in Australia only along the east coast south to the northern limit of New South Wales. *Trissolcus latisulcus* may be confused with some specimens of *T. personatus*. The latter species has the orbital furrow distinctly widened ventrally near the lower margin of the eye and the malar sulcus. In *T. latisulcus* the furrow is not expanded or may become narrower ventrally. The degree of excavation of the scutellum is variable. Similar variability in this character is found in the Neotropical species *T. antaeus* and *T. bodkini*.

Trissolcus maori, sp. nov.

(Fig. 4)

*Material Examined**Holotype*. ♀, **New Zealand**: BR, Punakaiki, 29.xii–3.i.1984 (Masner) (NZAC).

Paratype. **New Zealand**: 5♀, with same data as holotype (CNCI); Auckland, i.1950, ex: *Rhopalimorpha obscura* (Woodward), 3♀ (BMNH); Watts Rock, Cromwell, 9–15.i.1981 (Noyes, Valentine), 1♂ (BMNH); Evans Creek, 24.i.1962, on *Griselinia littoralis* (Valentine), 15♀, 3♂ (BMNH); Pakaraka, 4.xii.1963, ex: *Rhopalimorpha obscura* (Cumber), 3♀, 1♂ (BMNH); Pakaraka, 4.xii.1943, ex: *Rhopalimorpha obscura* (Cumber), 1♀, 1♂ (BMNH); O.L., Makarora, 21–24.i.1978 (S. & J. Peck),

1♀ (CNCI); Marnia Springs, 17.xii.1962, ex: heteroptera eggs on *Coprosma* sp. (Given), 4♀, 2♂ (BMNH); Rosedale, 18.i.1962, on plum (Valentine), 16♀, 1♂ (BMNH); B.R., Nelson Lakes, N.P., north slope Mt Robert, 860 m, 23–26.iii.1980, *Nothofagus* spp., pyrethrin fogging *Nothofagus menziesii* bark (Newton, Thayer), 1♀ (CNCI).

Description

Length 0.84–1.16 mm ($n=20$); hyperoccipital carina absent, vertex broadly rounded onto occiput; lateral ocellus separated from inner orbit, connected to it by short sulcus; preocellar pit present; vertex and frons coriaceous; orbital furrow absent; eyes sparsely setose, setae very short; genal carina absent; radicle yellow, antennae otherwise infusate; notauli present, extending over basal third of mesoscutum; mesoscutum coriaceous; scutellum coriaceous, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum smooth; mesopleural carina absent; surface of mesopleural scrobe smooth; ventral portions of metapleuron and lateral face of propodeum setose; T1 with 2 pairs of sublateral setae; laterotergite 1 glabrous; T2 with weak rugulae in basal half of sclerite, lateral margins sparsely setose.

Hosts

Rhopalimorpha obscura A. White, *Oncacontias vittatus* (Valentine 1964) (Hemiptera: Acanthosomatidae).

Remarks

The biology of this species was discussed by Cumber (1964) as *Asolcus* sp. A. He was able to rear it in the laboratory only on the two species of acanthosomatines available, *R. obscura* and *R. lineolaris* Prend. (only 4 species in this subfamily are found in New Zealand).

Trissolcus maori may be separated from most other Australasian species of the genus by the possession of setae on the lower portions of the metapleuron and the lateral face of the propodeum. This character is shared with *T. arctatus* and *T. cirrosus*; *T. maori* is distinguished from those by the presence of well developed notauli. Many aspects of the habitus of *T. maori* strongly resemble those of *Trissolcus oedipus*. Both have the first metasomatic segment more quadrate than most other *Trissolcus*, in this respect resembling *Telenomus*. The eyes are more distinctly setose, the antennal clava rather loosely articulated, and the entire facies more gracile than most congeners. *Trissolcus oedipus* never has setae on the metapleuron, but I have seen several *T. maori* in which these hairs are difficult to see or absent. In these cases *T. maori* is separable by the presence of two pairs of sublateral setae on T1.

Trissolcus mitsukurii (Ashmead)

(Figs 2, 10)

Telenomus mitsukurii Ashmead, 1904: 72. Lectotype in USNM.

Telenomus oecleoides Dodd, 1914c: 122. Holotype in SAMA. **New Synonymy.**

Trissolcus mitsukurii.—Masner & Muesebeck, 1968: 73.

Trissolcus oecleoides.—Johnson, 1988: 240.

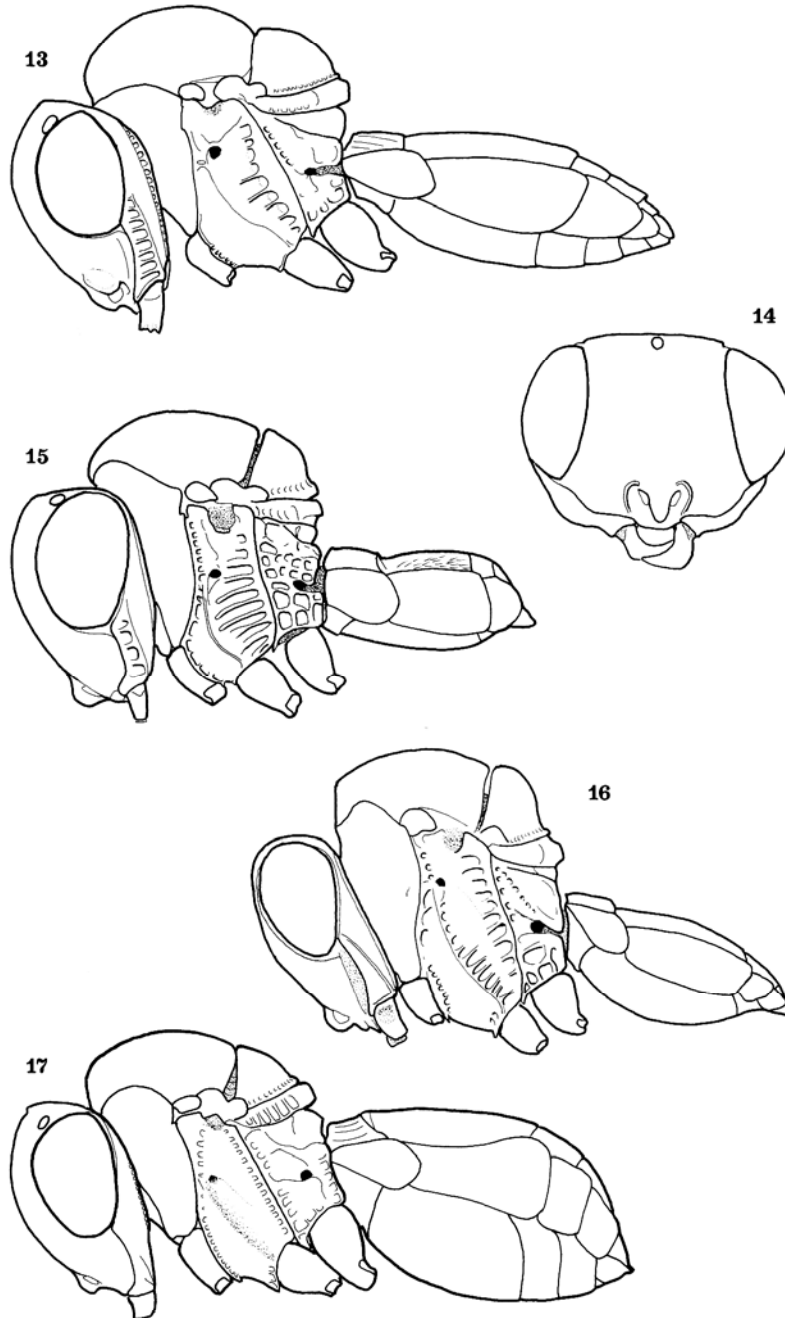
Material Examined

68♀, 14♂ (ANIC, BMNH, BPBM, QDPI, USNM).

Description

Length 1.06–1.87 mm ($n=20$); hyperoccipital carina absent, vertex strongly declivous behind lateral ocelli; lateral ocellus separated from inner orbit, connected to it by short sulcus; preocellar pit present; vertex and frons outside of antennal scrobe rugulose, with granulose microsculpture; antennal scrobes transversely keeled, with weak central keel; no background sculpture; orbital furrow well developed, smooth; mandibles broad, teeth truncate; radicle yellow, concolorous with base of scape; flagellum variable, abruptly bicoloured with A8–A11 dark brown or infusate throughout; genal carina present; notauli

short; mesoscutum and scutellum rugulose to areolate-rugose, with granulose microsculpture, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum smooth; mesopleural carina absent except for ventral extreme, anterior margin of mesopleural scrobe rounded through most of its length; surface of mesopleural scrobe smooth; ventral portions



Figs 13–17. 13, *Trissolcus ancon*, lateral habitus; 14, *T. painei*, head, frontal view, showing position of keels surrounding antennal insertions; 15–17, *Trissolcus* species, lateral habitus; 15, *T. setifer*; 16, *T. latusculus*; 17, *T. euander*. Scale line = 0.5 mm.

of metapleuron and lateral face of propodeum glabrous; T1 with 1 pair of sublateral setae; laterotergite 1 setose; T2 with extensive striae over most of length beyond basal foveae, lateral margins sparsely setose.

Hosts

Biprorulus bibax, *Cuspicona privata*, *Nezara antennata*, *Nezara viridula*, *Poecilometis* (laboratory host), *Trabala vishnu* (Hemiptera : Pentatomidae).

Remarks

Trissolcus mitsukurii is similar in some respects to *T. ephyra*: both have the radicle yellow and antennal clava often noticeably thickened. *T. mitsukurii* may be distinguished by the absence of a mesopleural carina, even in specimens that are quite large. Kozlov and Lê (1976) included this species in their concept of the *flavipes*-group of *Trissolcus*. However, it lacks the hyperoccipital carina normally characteristic of this group, the vertex is broadly rounded onto the occiput, the genal carina is well developed, and the mesopleural carina is lacking.

Trissolcus oedipus (Dodd)

(Figs 1, 8)

Telenomus oedipus Dodd, 1913: 164. Lectotype in SAMA.

Trissolcus oedipus.—Johnson, 1988: 240.

Material Examined

61♀, 21♂ (ANIC, CNCI, QDPI).

Description

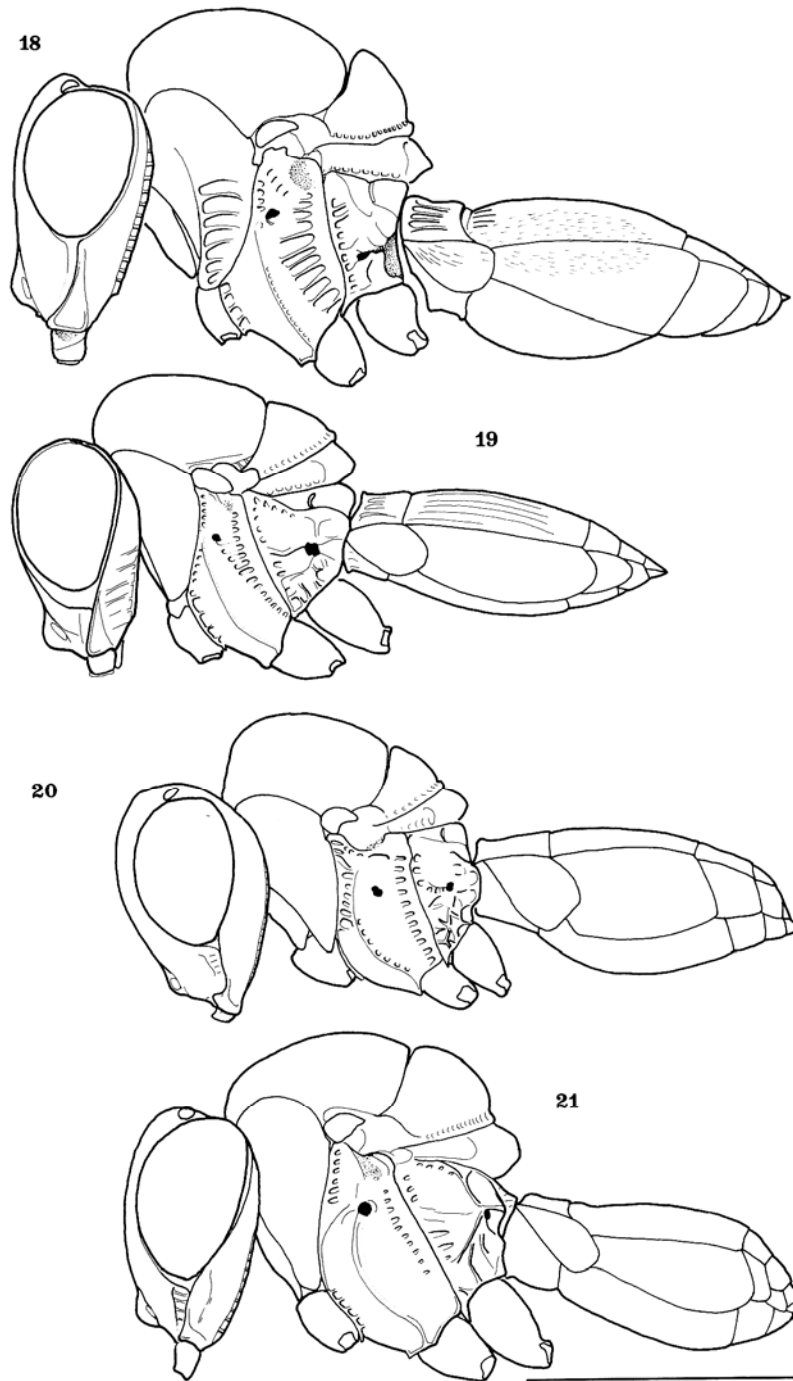
Length 0.95–1.53 mm ($n = 20$); hyperoccipital carina absent, vertex broadly rounded onto occiput; lateral ocellus separated from inner orbit, connected to it by short sulcus, vertex weakly margined behind; precellar pit present; vertex and frons outside of antennal scrobe coriaceous, frons with weak rugulae radiating from scrobe, scrobe finely coriaceous, with weak transverse striae arising from poorly defined central keel; orbital furrow distinguishable only ventrally, with same sculpture as frons; eyes sparsely setose, setae usually short; genal carina absent; radicle and scape concolorous, usually yellow, flagellum infusate; notauli present, short; mesoscutum pustulate, sculpture less pronounced posteriorly; scutellum reticulate to coriaceous, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum smooth; mesopleural carina absent; mesopleural scrobes smooth; ventral portions of metapleuron and lateral face of propodeum glabrous; course of metapleural carina indicated by line of foveae; T1 with 1 pair of sublateral setae; laterotergite 1 glabrous; T2 with rugulae extending medially over basal $\frac{2}{3}$ of length, shorter laterally, sparsely setose laterally.

Host

Unknown.

Remarks

This is a species of southern Australia: with the exception of a single female specimen from Bellenden Ker, it has only been collected in Tasmania, Victoria, southern New South Wales, the A.C.T., and southwestern Western Australia. It is very similar to *T. maori* of New Zealand, differing from it conspicuously in the absence of setae on the metapleuron and lateral face of the propodeum. Among Australasian species, *T. oedipus* is distinguished by the loosely articulated clavomeres, the hairy eyes (setae usually easily visible), and the coriaceous sculpture with radiating wrinkles on the frons. I have a series from Western Australia collected by J. Noyes (British Museum) that is remarkable in that the posterior portion of the mesoscutum and the scutellum are quite smooth and shining.



Figs 18–21. *Trissolcus* species, lateral habitus. 18, *T. eetion*; 19, *T. personatus*; 20, *T. oeneus*; 21, *T. ephyra*. Scale line = 0.5 mm.

Trissolcus oeneus (Dodd)

(Figs 1, 20)

Telenomus oeneus Dodd, 1913: 164. Holotype in SAMA.*Trissolcus oeneus*.—Johnson, 1988: 241.*Material Examined*

62♀, 2♂ (ANIC, BMNH, QDPI).

Description

Length 1.53–2.08 mm ($n=20$); hyperoccipital carina absent, vertex angled behind lateral ocelli, rounded and noticeably depressed medially; lateral ocellus distinctly separated from inner orbit, connected with it by short sulcus; preocellar pit present; vertex and frons outside of antennal scrobe with deep setigerous punctures, with granulose microsculpture; antennal scrobe narrow, transversely keeled, with weak central keel; orbital furrow absent; genal carina absent; radicle and scape yellow, A2–A11 infuscate; mandibles broad, teeth shallowly incised; eyes glabrous; notauli short, indistinct; mesoscutal sculpture similar to vertex, punctures closely spaced, nearly contiguous, mesoscutum posteriorly with irregular longitudinal sculpture; scutellum short, rugulose, convex; metapostnotum exposed; anteroventral portion of mesepisternum granulose; mesopleural carina present; mesopleural scrobe with shallow, indistinct punctures; lower portions of metapleuron and lateral face of propodeum glabrous; T1 with 1 pair of sublateral setae; laterotergite 1 glabrous; T2 with shallow striae in basal half, lateral margins sparsely setose.

Host

Unknown.

Remarks

This species appears to be restricted to temperate regions in southeastern Australia (collected on Kangaroo Island, Tasmania, the A.C.T., southern New South Wales and Victoria). It is distinguished from other Australasian *Trissolcus* by the densely punctate head (including the occiput and genae), the large eyes and the excavate vertex. It is most similar to *T. strigis*, from which it may be distinguished by the presence of short notauli and the lack of a fuscous cloud surrounding the stigmal vein of the forewing. I have seen one specimen from southeastern Brazil (state of Espírito Santo); I have no idea whether this is an accidental introduction, a native species, or a mislabelled specimen (although I doubt the last is the case).

Trissolcus oenone (Dodd)

(Figs 2, 9)

Telenomus oenone Dodd, 1913: 165. Holotype in SAMA.*Telenomus otho* Dodd, 1914b: 252. Holotype in SAMA. **New Synonymy.***Telenomus obliteratus* Dodd, 1914c: 122. Holotype in SAMA. **New Synonymy.***Telenomus biproruli* Girault, 1926b: 137. Holotype in QM. **New Synonymy.***Telenomus wilsoni* Dodd, 1930: 28. Holotype in National Museum of Victoria. **New Synonymy.***Trissolcus biproruli*.—Johnson, 1988: 239.*Trissolcus obliteratus*.—Johnson, 1988: 240.*Trissolcus oenone*.—Johnson, 1988: 241.*Trissolcus otho*.—Johnson, 1988: 241.*Trissolcus wilsoni*.—Johnson, 1988: 241.*Material Examined*

214♀, 49♂ (ANIC, BMNH, QDPI, WARI).

Description

Length 0.95–2.09 ($n=20$); hyperoccipital carina absent; vertex rounded onto occiput; lateral ocellus close to inner orbit, separated from it by broad furrow; precellar pit present; vertex and frons outside of scrobe with granulose to coriaceous microsculpture, rugulose dorsally, with weak rugulae radiating from scrobes, rugulae dorsoventral below median ocellus, scrobe transversely striate; orbital furrow present, narrow; eyes glabrous; genal carina present, crenulate anteriorly, not reaching lower margin of eye; mandibles moderately broad, teeth shallowly incised; radicle black, scape usually yellow, flagellum infuscate, sometimes scape nearly black and concolorous with radicle, but with base of scape usually lighter in colour; notauli absent; mesoscutum reticulate, with granulose microsculpture; scutellum weakly rugulose, with coriaceous microsculpture, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum rugulose; mesopleural carina present; surface of mesopleural scrobe longitudinally striate; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with 1 pair of sublateral setae; laterotergite 1 glabrous; T2 longitudinally striate beyond basal half of sclerite, sparsely setose laterally.

Hosts

Biprorulus bibax Breddin, *Cermatulus nasalis*, *Cuspicona privata*, *Nezara viridula* L., *Oechalia consocialis*, *O. schellenbergii*, *Plautia affinis* (Hemiptera : Pentatomidae).

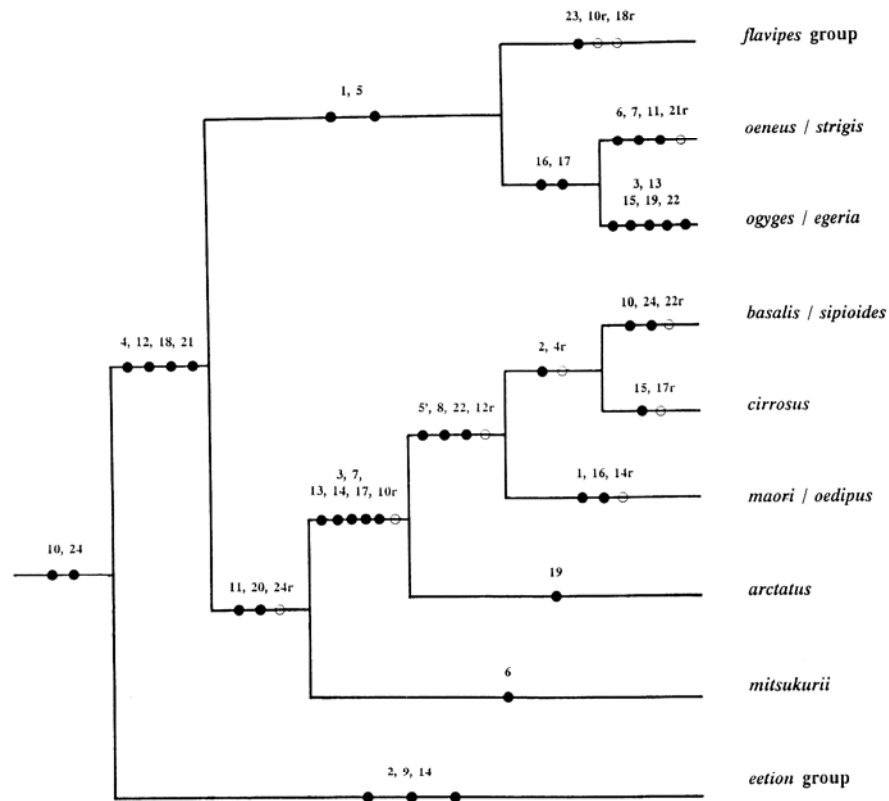


Fig. 22. Cladogram representing interrelationships among *Trissolcus* species of the Australasian region. Apomorphic character states are indicated by numbers as listed in Appendix 1. Open circles and 'r' following a number refer to apparent reversals of character states to the plesiomorphic condition.

Remarks

This species is extremely common throughout Australia; it, together with *T. ogyges*, are the two dominant species of the Australasian fauna. Some specimens have the appendages extremely dark, the only contrast between the black radicle and the rest of the antennomere being at the very base of the scape, just above the radicle. In a few specimens, even this is obscure, and therefore I have worked this through both halves of the key. Specimens vary greatly in size; one of the largest forms was described by Girault as *T. biproruli*. It is often distinguishable because the lateral margins of T2 are rather heavily setose, but they differ from *T. eetion* in lacking the numerous fine striolae amongst the longitudinal striae. *Trissolcus oenone* is very similar to *T. painei*; however, there are no raised keels flanking the antennal insertions in the former species. Some aspects of the biology of *Trissolcus oenone* were described by Cumber (1964) for the population in New Zealand (as species N).

Trissolcus oenopion (Dodd)

Telenomus oenopion Dodd, 1913: 165. Holotype in SAMA.

Trissolcus oenopion.—Johnson, 1988: 241.

All that remains of the holotype of this species is half of a forewing and a broken female antenna. The antenna makes it clear that the specimen was a species of *Trissolcus*, but it is impossible to determine to which of my species concepts this name belongs.

Trissolcus ogyges (Dodd)

(Figs 1, 7)

Telenomus ogyges Dodd, 1813: 166. Lectotype in SAMA.

Telenomus oreas Dodd, 1913: 180. Holotype in SAMA. **New Synonymy.**

Telenomus orontes Dodd, 1914a: 120. Holotype in SAMA. **New Synonymy.**

Dissolcus atriscapus Girault, 1926a: 1 [in Gordh *et al.*, 1979: 200]. Lectotype in QDPI. **New Synonymy.**

Dissolcus beenleighi Girault, 1932: 5 [in Gordh *et al.*, 1979: 297]. Holotype in QM. **New Synonymy.**

Trissolcus atriscapus.—Johnson, 1988: 239.

Trissolcus beenleighi.—Johnson, 1988: 239.

Trissolcus ogyges.—Johnson, 1988: 241.

Trissolcus oreas.—Johnson, 1988: 241.

Trissolcus orontes.—Johnson, 1988: 241.

Material Examined

510♀, 62♂ (ANIC, BMNH, CNCI, NSW, QDPI, QM, SAMA).

Description

Length 0.68–1.14 mm ($n = 20$); hyperoccipital carina absent, vertex rounded onto occiput medially; lateral ocellus separated from inner orbit, connected to it by short sulcus; pre-ocellar pit present; vertex and frons outside of scrobes with umbilicate punctures, granulose to coriaceous microsculpture, punctures sometimes very close, frons then appearing shallowly areolate, scrobes transversely striate or with all sculpture effaced, frontal sculpture in general variable; orbital furrow absent; eyes glabrous; genal carina absent; mandible moderately broad, teeth shallowly incised; radicle yellow to brownish-yellow, lighter in colour than scape, antennae otherwise variable in colour, usually dark brown or nearly black; notauli usually present, extending over posterior third of mesoscutum, very shallow, sometimes poorly defined; mesoscutum coriaceous; scutellum coriaceous to smooth, evenly convex; metapostnotum variable, usually invaginated anterior to dorsellum; anteroventral portion of mesepisternum smooth or with reticulate microsculpture; intercoxal space well developed, mid and fore coxae always distinctly separated; mesopleural carina present, only weakly sinuate, nearly straight; surface of mesopleural scrobe smooth; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with 1 pair of sublateral setae; laterotergite 1 glabrous; T2 laterally with shallowly incised reticulate microsculpture, this often

effaced medially, sparsely setose laterally; laterotergite 2 without patch of dense setae near anterior margin.

Hosts

Cermatulus nasalis, *Nezara viridula* L., *Oechalia schnellenbergi*, *Oncocoris desertus* (Hemiptera : Pentatomidae).

Remarks

I have had great difficulty in coming to a conclusion concerning the limits of this species as it compares with *T. egeria*. Basically, *T. ogyges* is characterised by the presence of reticulate microsculpture on T2 (distinguishing it from almost all other Australasian *Trissolcus*) and the presence of shallow notauli. *Trissolcus egeria* only rarely has notauli present, and in those few cases the notauli are quite deep and distinct, and the intercoxal space is strongly narrowed or occluded and the fore and mid coxae are very closely approximated. The shallow depth of the notauli in *T. ogyges* led me to distrust its value as a distinguishing characteristic; there are some specimens (here placed in *T. egeria*) that lack notauli altogether, yet appear in many ways more similar to 'typical' *T. ogyges* than to *T. egeria*. I have not combined these two species concepts into a single, broader concept for the following reasons. Many *T. egeria* differ quite strongly from the most common form of *T. ogyges*: they have an extremely short scutellum, the anterior portion of the mesoscutum is abruptly deflexed downward, the vertex is more sharply angled, the fore and mid coxae are nearly contiguous, the scutellum and T2 are more strongly coriaceous (i.e. the individual cells of the microsculpture are more clearly defined), and the laterotergite of the second metasomatic segment has a dense patch of setae anteriorly. All these characters may be viewed as merely one extreme of intraspecific variation, especially as they are not consistent even within *T. egeria*. However, *T. egeria* in general seems to have the microsculpture of the body better defined than *T. ogyges* while at the same time usually lacking any indication of notauli (and when notauli are present, they are quite deep). Thus, the degree to which these two characters are expressed would seem to be independent characters, and I have placed greater weight on the presence of the notauli as an indicator of specific differences here. This conclusion leaves me uncomfortable to some degree; another possibility is the existence of several biological species within these two concepts, but more material with information on hosts and habitats is needed to properly assess the hypothesis.

Trissolcus ogyges is one of the most common Australian species, one that is widely distributed throughout the continent (including Tasmania) and commonly reared from agricultural pests. However, while it has apparently been successful in a broad variety of habitats and parasitises several species of pentatomids, it is an Australian endemic, and has not been recorded from New Guinea.

Trissolcus painei (Ferrière)

(Figs 2, 14)

Microphanurus painei Ferrière, 1933: 198, fig. 12b. Holotype in BMNH.

Microphanurus painei.—Nixon, 1938: 135, fig. 4d.

Material Examined

35♀, 28♂ (BMNH, QDPI, TPNG).

Description

Length 0.99–1.65 mm ($n=20$); hyperoccipital carina absent; lateral ocelli contiguous with inner orbits; precellar pit present; vertex and frons outside of scrobe rugulose, with granulose microsculpture, scrobe poorly developed, nearly flat, transversely striate; orbital furrow present, narrow; genal carina present, extending from mandible to lower margin of eye; crenulate anteriorly; gena covered by extensions of crenulae flanking anterior margin of occipital carina; mandibles broad, clasping, teeth deeply incised; acute; radicle black, scape and A2–A5 yellow; antennal insertions flanked by low raised keel; notauli absent;

mesoscutum rugulose to areolate-rugulose, longitudinally rugulose posteriorly, with granulose microsculpture; scutellum rugulose to areolate-rugulose, evenly convex; metapostnotum exposed, narrow; anteroventral portion of mesepisternum rugulose; mesopleural carina present; surface of mesopleural scrobe longitudinally striate; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with 2 pairs of sublateral setae; laterotergite 1 glabrous; T2 with weak striae medially extending beyond basal half of sclerite, sparsely setose laterally; metasoma as a whole notably short.

Hosts

Axiagastus campbelli, *Axiagastus* sp. (Hemiptera : Pentatomidae).

Remarks

This species is quite distinctive because of its stout, almost hunched habitus, the projecting mandibles that seem to clasp one another (as described by Nixon 1943), and the raised flanges flanking the insertions of the antennae. It is most closely related to *Trissolcus ancon*, a species known so far only from New Britain. *Trissolcus painei* may be distinguished from it by its relatively shorter body, exemplified most clearly in the transverse T2. The biology of this species has been discussed by Lever (1934).

Trissolcus personatus, sp. nov.

(Figs 2, 19)

Material Examined

Holotype. ♀, **New Caledonia:** Col d'Amieu, N. La Foa, 31.vii-7.viii.1978, 400 m (Peck & Peck) (CNCI).

Paratypes. **Australia: A.C.T.:** Canberra, 15-31.xii.1974, ex: *Cuspicona privata* on raspberry (Callan), 2♂ (ANIC). **New South Wales:** Gibraltar Range, 15.i.1979, rainforest margin (Naumann), 1♂ (ANIC); Clyde Mtn, west slope, 1.ii.1973 (Colless), 1♀ (ANIC). **Queensland:** Mt Glorious, 25.xi.1976 (Boucek), 1♀ (BMNH); Mt Glorious, 31.xii.1979 (Naumann), 1♀ (ANIC); Brisbane, ix.1977, Malaise trap, CSIRO Long Pocket site, 3♀ (QDPI); Brisbane, x.1929, bug eggs on *Salanum* (Brimblecombe), 12♀, 1♂ (ANIC); 16 km up Davies Creek Rd via Mareeba, 2.x-5.xi.1984, Malaise trap in rainforest (Storey), 1♂ (QDPI); DPI Indooroopilly site, 10-17.xii.1984, Malaise trap, 1♀ (QDPI); 26°52'S., 151°34'E. nr Westcott Plain, Bunya Mts N.P., 6-7.x.1984 (Naumann, Cardale), 1♀ (ANIC); 26°53'S., 151°37'E., Russell Park, nr Mt Mowbull, 7.x.1984, (Naumann, Cardale), 1♀ (ANIC). **Papua New Guinea:** Tari Gap, nr Mt Hagen, 29-31.xii.1978, 2600 m, J. Sedlacek, 2♀ (AEIC). **New Caledonia:** 1♀, with same data as holotype (CNCI); Mts des Koghis, 400-600 m, i.1969 (Krauss), 6♀, 3♂ (BPBM); Col d'Amieu, 700-800 m, 31.iii.1968, (Gressitt), 1♀ (BPBM); Yahoue, ii.1978 (Krauss), 1♀, iii.1978 (Krauss), 4♀ (BPBM); Yahoue, 22.i.1963 (Yoshimoto), 1♀ (BPBM); Yahoue, 60-100 m, iii.1980 (Krauss), 1♂ (CNCI); Yahoue, 12.ii.1962 (Krauss), 1♀ (BPBM); Paahoumene, 0-20 m, 31.i.1971 (Krauss), 1♀ (BPBM); 4 km N. St Louis, Foret de Thi, 100-300 m, 7.viii.1979 (Nishida) 1♀ (Samuelson), 2♀ (BPBM); Col de la Pirogue, 330 m, 14.ii.1963 (Krauss), 1♂ (BPBM); Col de la Pirogue, 23.i.1962 (Krauss), 1♂ (BPBM); Col de la Pirogue, vii.1950 (Krauss), 1♀ (BPBM); Col de Roussettes, 450-550 m, 4-6.ii.1963 (Gressitt), 1♀ (BPBM); Mt Koghi, ii.1962 (Krauss), 1♀ (BPBM); Ouen Toro, Noumea, 1-19.vi.1972 (Cochereau), 1♂ (CNCI). Loyalty I., Ouvea, Fayaoued, 0-50 m, xii.1968 (Krauss), 1♀ (BPBM). Loyalty I., Maré, Tadine, 9-14.x.1958 (Malkin), 1♀ (BPBM). **Vanuatu:** Efate I. (NW): Limestone, Plateau N. of Maat, 100 m, 18.viii.1957 (Gressitt), 1♀ (BPBM). **Fiji:** Vanua Levu I.: Savusavu, 0-100 m, iii.1978 (Krauss), 1♀ (BPBM). **Tahiti:** Mt Aorai, NW. Ridge 1400-1450 m, 10.vii.1961, *Weinmannia parviflora* (Gressitt), 1♀ (BPBM).

Description

Length 0.99-1.70 mm ($n=20$); hyperoccipital carina absent, vertex abruptly falling off to occiput; lateral ocellus separated from inner orbit, connected to it laterally by short sulcus, mesally surrounded by continuation of carina delimiting inner edge or orbital furrow; preocellar pit present; vertex and upper portion of frons with granulose microsculpture, vertex with weakly defined areolae, upper portion of frons with rugae radiating from antennal scrobe, rugae directed dorsoventrally below median ocellus, scrobe transversely keeled; orbital furrow present, distinctly widened ventrally; eyes glabrous; genal carina present, reaching level of ventral margin of eyes, strongly crenulate anteriorly; clypeus

triangular; mandibles narrow, teeth shallowly incised; radicle and scape yellow, flagellum infusate; notauli sometimes discernible, very short; mesoscutum areolate anteriorly, longitudinally rugose posteriorly; scutellum rugose, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum rugose, mesopleural carina present; surface of mesopleural scrobe transversely rugose; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with 1 pair of sublateral setae; laterotergite 1 glabrous; T2 striate over basal $\frac{2}{3}$ of length, sparsely setose laterally.

Host

Cuspicona privata (Hemiptera : Pentatomidae).

Remarks

Within Australia, *Trissolcus personatus* is most likely to be confused with *T. latusculus*; however, in the former the orbital furrow is distinctly widened ventrally and the scutellum is evenly convex, never excavated posteriorly. Both species have the basal antennomeres and the legs yellow, but in the other specimens that I am here attributing to *T. personatus*, the body is uniformly darkened. The antenna, from radicle to the tip of the clava is black. These specimens are also generally larger and the appendages more elongate than the continental examples, but these are not absolute characteristics. Further collections may necessitate the recognition of two different species.

Trissolcus setifer, sp. nov.

(Fig. 15)

Material Examined

Holotype. ♀, Papua New Guinea: Manus I.: Rossum, 35–125 m, 1.vii.1959, sweeping (Maa) (BPBM).

Paratype. ♀, New Britain, Keravat, 135 m, 20–25.xi.1959 (Maa) (BPBM).

Description

Length 1.43–1.55 mm ($n=2$); hyperoccipital carina absent, vertex angled behind lateral ocelli, rounded medially; lateral ocellus contiguous with inner orbit; precellar pit present; vertex and frons outside of scrobe rugulose to areolate-rugulose, scrobe transversely striate; orbital furrow present, narrow; eyes glabrous; genal carina present, extending from mandible to lower margin of eye, crenulate anteriorly; gena covered by extensions of crenulae flanking anterior margin of occipital carina; mandibles broad, clasping, teeth deeply incised; acute; radicle, scape, A2–A6 yellow; antennal insertions without flanking keel; notauli absent; mesoscutum rugulose to areolate-rugulose, distinctly longitudinally rugulose, posteriorly, with granulate microsculpture; scutellum areolate-rugulose anteriorly, longitudinally rugulose posteriorly, depressed posteriorly; metapostnotum exposed; anteroventral portion of mesepisternum rugulose; mesopleural carina present; surface of mesopleural scrobe longitudinally striate; ventral portions of metapleuron and lateral face of propodeum glabrous; T1 with no sublateral setae; laterotergite 1 glabrous; T2 longitudinally striate beyond basal half of sclerite, densely setose laterally.

Host

Unknown.

Remarks

Trissolcus setifer belongs to the group of species clustered about *Trissolcus eetion*. It may be distinguished from them by the combination of the yellow radicle (separating it from *T. oenone*, *T. eetion*, *T. painei* and *T. ancon*) and the densely setose lateral portions of T2 (very few setae present in *T. ephyra*, *T. latusculus* and *T. personatus*).

Trissolcus sipioides, sp. nov.

(Figs 2, 12)

Material Examined

Holotype. ♀, **Australia:** 15°30'S., 145°16'E., Queensland, 1 km SE. Mt Cook, Cooktown, 13.v.1980 (Cardale) (ANIC).

Paratypes. **Australia:** Queensland, Babinda, xi.1920 (A. Dodd), 3♀, 1♂ (ANIC). **India:** Cuttack, 1982 ex *Andrallus* (Paticoll), 1♂ (BMNH). Bohm, Solijanawa, 10.x.1983, on paddy leaf (Samujh), 9♀, 1♂ (BMNH). **Zimbabwe:** Salisbury, v-vii.1975 (Watsham), 2♀ (CNCI).

Description

Length 0.88–1.29 mm ($n = 20$); hyperoccipital carina absent, vertex rounded onto occiput; lateral ocellus separated from inner orbit, connected to it by short sulcus; precellular pit present; frons and vertex coriaceous, with punctures at setal bases distinct; orbital furrow absent; eyes glabrous; genal carina present, but poorly differentiated; mandibles moderately wide, teeth shallowly incised; radicle dark, antenna otherwise infusate, sometimes strongly so; head, in frontal view, distinctly wider than high; notauli absent; mesoscutum coriaceous, distinctly depressed; scutellum coriaceous, flattened; dorsellum smooth; metapostnotum exposed; anteroventral portion of mesepisternum coriaceous; mesopleural carina present; surface of mesopleural scrobe smooth; ventral portions of metapleuron and propodeum glabrous; tarsomeres generally short and wide, apical tarsomere distinctly enlarged; T1 with 1 pair of sublateral setae; laterotergite of segment 1 glabrous; T2 striate to reticulate beyond basal half of length, sculpture shallowly incised, sparsely setose.

Hosts

Andrallus sp. (Hemiptera : Pentatomidae).

Remarks

This species is remarkable for the general depression of the body, the loss of sculpture on the dorsellum, and the short and relatively stout legs. All these characteristics are typical of species phoretic upon their hosts and I strongly suspect that this will be found to be true for this species. The shape of the clavomeres seems to be subject to some variation: in some specimens they are noticeably widened and together form a distinguishable unit. In others, however, they are little wider than the funicular segments and separated from one another; in some cases a superficial examination could lead to the impression that the specimen is a male (one quickly corrected simply by counting the number of antennomeres). This species is most similar to *Trissolcus sipius* (Nixon), known from Africa. However, the dorsellum in *T. sipius* is sculptured, even extending onto the ventral lip and the radicle and scape are concolorous. Nixon (1936, 1943) states that the scape of *T. sipius* clearly reaches beyond the vertex. I was inclined to doubt the importance of this, but after examining specimens of the type series I found it to be quite striking. The elongation is evident not only in the scape but in the other antennomeres, and, in addition, the wings of *T. sipius* are extremely large and extend far beyond the apex of the metasoma. Among the fauna of the Australasian region, *T. sipioides* is most similar to *Trissolcus basalis* and may be distinguished from it by the overall depression of the body and the smooth metanotal dorsellum.

Trissolcus strigis, sp. nov.*Material Examined*

Holotype. ♀, **Australia:** A.C.T., 35°22'S., 148°48'E., Piccadilly Circus, iii.1984, 1240 m, flight intercept window/trough trap (Lawrence, Weir, Johnson) (ANIC).

Paratypes. 10♀ with same locality data as holotype, collected ii.1984 (1♀), iii.1984 (5♀), iv.1984 (3♀), v.1984 (1♀); 35°35'S., 149°00'E., Honeysuckle Creek, 21–31.iii.1985, Malaise trap/ethanol (Naumann, Cardale), 1♀; 35°19'S., 148°51'E., Wombat Creek, 6 km NE. Piccadilly Circus, 750 m, xii.1984, flight intercept window/trough trap (Weir, Lawrence, Johnson), 1♀; 2 km S. Bulls Head, Brindabella Range, 3.iv.1983, under gum bark (Harvey); 1♀; all specimens from ANIC.

Description

Length 1.20–1.63 mm ($n = 12$); hyperoccipital carina absent, vertex rounded onto occiput and distinctly depressed medially; lateral ocellus distinctly separated from inner orbit, connected to it by short sulcus; preocellar pit present; vertex and frons outside of scrobe rugulose to areolate, with granulate microsculpture, scrobes transversely rugose; orbital furrow present, narrow; eyes very large, with short setae; genal carina absent; mandibles narrow, teeth shallowly incised; radicle yellow, concolorous or lighter in colour than scape, scape variable in colour, flagellum infuscate; notauli absent; mesoscutum rugulose, with granulate microsculpture, depressed; scutellum rugulose, evenly convex; metapostnotum exposed; anteroventral portion of mesepisternum smooth; mesopleural carina present; surface of mesopleural scrobe rugulose; ventral portions of metapleuron and lateral face of propodeum glabrous; forewings infuscate near marginal vein; T1 with 1 pair of sublateral setae; laterotergite 1 glabrous; T2 striate beyond basal half of sclerite, sparsely setose laterally.

Host

Unknown.

Remarks

This species is most closely related to *T. oeneus*, from which it may be distinguished by the complete absence of notauli and the faint fuscous cloud surrounding the stigmal vein in the forewing. To date, *T. strigis* has been collected only in the Australian Capital Territory.

Relationships Among Species of *Trissolcus*

In my earlier attempts to understand the interrelationships among species of *Trissolcus* I subdivided the genus into three species-groups. The *flavipes* species-group, first recognised by Kozlov (1968), was characterised by the presence of a hyperoccipital carina, well developed setigerous punctures on the frons, the bulging of the lower portions of the frons between the antennal insertions and the inner orbits, the presence of an orbital furrow, the radicle and the base of the scape concolorous, the well developed notauli, and the absence of sublateral setae on T1 (see Kozlov & Lê 1976; Johnson 1984b, 1987). The included species are found worldwide, but are especially diverse in the Neotropical realm. Conversely, the Neotropics have few native species (perhaps only two) other than those of the *flavipes*-group. The second group, the *thyantae* species-group (Johnson 1985a), was characterised by the presence of notauli and sublateral setae, the absence of a hyperoccipital carina, the radicle and base of the scape concolorous, and the development of setae on the lower portions of the metapleuron and lateral face of the propodeum. These species are found in all major zoogeographic realms with the notable exception of the Neotropical region. Finally, the *basalis*-group was delimited by the presence of sublateral setae, the absence of notauli (or, at least, notauli extremely shortened or obscured by the longitudinal sculpture of the posterior region of the mesoscutum), the hyperoccipital carina absent, and (with one exception) a dark radicle that contrasts sharply with the light (usually yellow) basal portion of the scape. Again, these species are found worldwide, but only two, *T. hullensis* (Harrington) and *T. radix* Johnson, occur in the Neotropics.

This study of the Australasian fauna has caused me to alter these concepts. I originally approached this problem by attempting to analyse the distribution of characters among all Australasian species using the Phylogenetic Analysis Using Parsimony microcomputer program (PAUP) of D. Swofford (University of Illinois). This strategy proved to have limited effectiveness, primarily because of limitations of the data at hand (see below). I will therefore discuss components of the analyses separately before trying to synthesise them.

I had earlier (Johnson 1985b) suggested that three species of New World *Trissolcus* of the *basalis*-group, *T. hullensis*, *T. radix* and *T. solocis* Johnson, were closely related. A number of Australasian species, namely *T. eetion*, *T. ancon*, *T. painei*, *T. oenone*, *T. ephyra*, *T. personatus*, *T. latisulcus* and *T. setifer*, should now be included with these.

Generally these species, the *eetion*-group, have a well developed genal carina, no notauli (or at least none distinguishable), the lateral ocellus contiguous with the inner orbit or connected to it by a broad, shallow depression, the mesopleural carina present, the crenulae marking the position of the mesopleural suture and those flanking the mesopleural carina often elongated across the mesopleural depression, and the metapostnotum often invaginated laterad of the dorsellum. Several of these species (*T. eetion*, *T. ancon*, *T. painei*, *T. oenone* and *T. latisulcus*) have a black radicle and yellow scape, but these form only a small majority of the total. Thus, although this character is generally unusual among telenomines, it is apparently also subject to a considerable degree of homoplasy. A similar situation occurs in the genus *Psix* Kozlov and L  : the black radicle appears near the base of the cladogram, but reverses apically in the species pair [*P. abnormis* Kozlov & L   + *P. watshami* Johnson & Masner] (Johnson & Masner 1985).

I believe that *T. flaviscapus* and *T. euander* belong to the *flavipes*-group. However, their structure suggests that a great deal more morphological diversity occurs here than I had previously thought. First, both possess sublateral setae on T1, a characteristic universally absent among New World species. Secondly, they lack several of the apomorphic characters of the group which I consider to be losses: the absence of the orbital furrow in both, the absence of a hyperoccipital carina in *T. flaviscapus*, and the relatively evenly convex frons of *T. euander*. Among New World species it is not unusual for the hyperoccipital carina to be poorly developed or even absent, particularly medially or in small individuals, as is the case with *T. flaviscapus*. The presence of sublateral setae is more puzzling. It may represent the 'reacquisition' of a lost or suppressed character, but I can find no compelling evidence that *T. euander* and *T. flaviscapus* are more closely related to one another than to any other *flavipes*-group species; it may also suggest a monophyletic cluster within the *flavipes*-group, i.e. those lacking the setae. Both possibilities are still being examined.

The *thyantae*-group, at least when viewed on a worldwide level, is probably a polyphyletic grouping. The presence of setae on the metapleuron and propodeum occurs not only in these species of *Trissolcus* but also among numerous species related to *Phanuromyia rufobasalis* Dodd, the genus *Psix*, an undescribed Neotropical species related to *Telenomus longiventris* Cameron, and is particularly widespread in the subfamily Scelioninae. I thus suspect that it is a plesiomorphic character within the Telenominae.

Both *Trissolcus basalis* and *T. sipioides* are elements of a group of species characteristic of the Holarctic and Afrotropical regions. *Trissolcus basalis* was introduced into Australia and New Zealand; in the Australasian realm *T. sipioides* has so far been found only in the wet tropical regions of North Queensland and its closest relatives seem to occur in Africa and tropical Asia. These are characterised by the lack of notauli and the development of a black radicle (otherwise lacking the characteristics of the *eetion*-group).

In all analyses of relationship attempted, three pairs of species come out together: *T. ogyges* and *T. egeria*, *T. oedipus* and *T. maori*, and *T. oeneus* and *T. strigis*. The first pair of species is strictly Australian, although within that continent it occurs widely. The second consists of one element found in southeastern and southwestern Australia (including Tasmania) and one found only in New Zealand. The third, without considering the one Brazilian specimen (see under *Trissolcus oeneus* above), is found only in southeastern Australia. *Trissolcus oeneus* and *T. strigis* are in some ways similar to species of the *flavipes*-group: they have well developed setigerous, umbilicate punctures on the frons (extending onto the occiput and genae) and the frons distinctly bulges between the antennal insertions and inner orbits. Perhaps we should not so quickly discount the importance of the Neotropical specimen; it may document a link between *T. oeneus* and the numerous, and generally plesiomorphic, Neotropical species of the *flavipes*-group.

Use of a data matrix of all Australasian taxa and all characters exceeded the storage capacity of PAUP for equally parsimonious trees (100). Strict consensus trees of these sets of 100 revealed few informative components. Therefore I reduced the data matrix in three ways. First, the three pairs of species discussed in the preceding paragraph and *T. basalis*/*T. sipioides* were condensed into four OTUs; I used the plesiomorphic character state for those cases in which conflicts occurred. Secondly, I represented the species *T. flaviscapus* and *T. euander* by a groundplan *flavipes*-group data set. This corresponds to the characters

found in *Trissolcus bodkini* (Crawford) (a Neotropical species) with the exception that I coded the sublateral setae as present. And thirdly, I used *Trissolcus eetion* as representative of the groundplan of the *eetion*-group of species. The characters used and the data matrix are presented in an Appendix. All multistate characters are treated as unordered. The states of the hypothetical ancestor are based upon the characters found most commonly within the tribe Gryonini (Scelioninae), at present the best available candidate for the sister-group of Telenominae as a whole. The branch-and-bound algorithm of PAUP found a single tree (Fig. 22). The results of branch and bound analysis of the species of the *eetion*-group, using the same hypothetical ancestor as out-group, produced little resolution of relationships. *Trissolcus eetion* emerged from the base of the cladogram and the species *T. personatus* and *T. ephyra*, and *T. painei* and *T. ancon*, were grouped together (the second pair is trivial since they do not differ in the characters used here).

I believe the position of *T. basalis* and *T. sipioides* in these cladograms should be viewed with reservation for the same reasons that I had difficulties in obtaining resolution using the full data set. There appears to be a considerable degree of homoplasy in the characters available for these species, both in the parallel development of characters and reversals to 'plesiomorphic' states. I suspect that the rate at which this occurs may be sufficiently high and its occurrence of a random enough character to effectively obscure broader patterns of relationship that may be indicated by only a small number of characters. Both *T. basalis* and *T. sipioides*, as well as those species of the *thyantae*-'group' discussed here, appear to be relatively derived members of *Trissolcus*, at least as indicated by the absence of numerous carinae and coarse sculptural elements. They may cluster as they do because of these fluctuating characters, and the inclusion of other related species (with more plesiomorphic characters) and more and 'better' characters are necessary to address this question. Thus, a proper analysis of relationships under these conditions seems to be critically dependent upon the choice, or sampling, of taxa analysed.

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Appendix

Characters used in phylogenetic analysis. Plesiomorphic characters represented by (0), apomorphic states by (1) or (2). All characters were treated as unordered.

1. Genal carina raised, extending dorsad from base of mandibles (0); gena rounded, without carina (1). 2. Radicle and scape concolorous (0); radicle dark, scape (at least basally) light (1). 3. Orbital furrow absent (0); present (1). 4. Ocelli connected to inner orbits by narrow sulcus (0); ocelli contiguous with inner orbits (1). 5. Frons with closely spaced, well defined setigerous punctures (0); rugulose (1); coriaceous (2). 6. Frontal keel absent (0); composed of low carina (1); with lateral flanges (2). 7. Frons above malar sulcus flat or broadly rounded (0); with a keel or ridge parallel to sulcus (1). 8. Mesopleural carina present (0); absent (1). 9. Mesopleural scrobe smooth (0); with row of foveae extending from mid coxa to mesopleural pit, these sometimes connected to crenulae along posterior edge of mesopleural carina (1). 10. Netrion smooth, delimited by foveae anterior (0); covered by longitudinal striae (1). 11. Anteroventral portion of mesepisternum rugulose (0); coriaceous or smooth (1). 12. Metapleural process (extending ventrally toward mid coxa) short (0); long, i.e. surpassing posterior edge of mesopleuron (1). 13. Scutellum coarsely sculptured (0); coriaceous or smooth (1). 14. Notauli present and distinct (0); absent or indistinguishable amid mesoscutal sculpture (1). 15. Metapostnotum exposed, surpassing lateral edges of dorsellum (0); invaginated laterad of dorsellum (1). 16. Metapleural surface extending over metapleural pit (0); pit clearly evident on surface of metapleuron (1). 17. Laterotergite 1 setose (0); glabrous (1). 18. T2 densely setose laterally (0); sparsely setose (1). 19. Striae on T2 extending beyond basal half of sclerite (0); limited to basal half (1). 20. T2 reticulate (0); without reticulate sculpture (1). 21. Lateral margins of T2 striolate (0); smooth (1). 22. Mesoscutum rugulose or striate posteriorly (0); coriaceous (1). 23. Hyperoccipital carina absent (0); present (1). 24. Metapleuron and lateral face of propodeum setose (0); glabrous (1). 25. Sublateral setae on T1 present (0); absent (1).

Data Matrix. Columns correspond to characters described above.

	Characters																													
HYPANC	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0			
<i>flavipes</i> -group	1	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
<i>eetion</i>	0	1	1	1	1	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>basalis</i>	0	1	0	1	2	0	0	0	0	1	1	0	1	1	0	0	1	1	0	1	1	0	1	1	0	0	0	0	0	0
<i>maori/oedipus</i>	1	0	0	2	0	0	0	0	0	1	0	1	0	0	1	1	1	0	1	1	1	0	1	1	1	0	1	0	1	0
<i>oeneus/strigis</i>	1	0	1	0	0	1	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>ogyges/egeria</i>	1	0	0	0	0	1	1	0	1	0	1	1	0	1	1	1	1	1	0	1	1	0	1	1	0	0	0	0	0	0
<i>cirrosus</i>	0	1	0	1	2	0	0	0	0	0	1	0	1	1	1	0	0	1	0	1	1	1	0	1	1	0	1	0	1	0
<i>arctatus</i>	0	0	0	1	0	0	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	0	0	1	1	0	0	1	0	1
<i>mitsukurii</i>	0	0	1	0	1	1	1	1	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	1	0