Revision of the Australian Tiphidi Genus Leiothynnus
(Hymenoptera: Tiphidiidae: Thynninae)

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Abstract.—The Australian thynnine genus Leiothynnus Turner is revised, describing five new species from Queensland, including cardalae, ferricolus, limbis, multimaculatus and ochrotarsus, and two previously described species, mackayensis (Turner) and spinigerus Turner, also from Queensland. Distribution maps of species and a key to males are given.

Most Australian genera of Thynninae are widespread, occurring in many Australian states, with some even extending up into New Guinea, New Caledonia and adjacent islands. However, there are some small genera with relatively restricted distributions, such as Oncorhinotynnus, which is only found in west central Western Australia, or Gymnothynnus Turner, from Northern Territory and western Queensland. The genus Leiothynnus Turner is one of these relatively localized groups. All Leiothynnus species have been collected from eastern Queensland. In addition to the two described species, mackayensis (Turner) and spinigerus Turner, there are five new ones, which are described below.

The specific relationships between Leiothynnus and other thynnine genera are not fully resolved. Leiothynnus shares a number of features with Iswaroides Ashmead and Epactiothynnus Turner, including in the male the well-developed and somewhat arculate penis valves, volsella U-shaped in cross-section, stipes arculate with long marginal fringe of setae, vertex with small reddish spot behind the dorsal eye margin, and a large ocellus plate. In the female, the pygidium has two submedial longitudinal carinae, subtended by a long tuft of setae. A few characters are shared with Agriomyia Guérin de Meneville, including the flat male face (Fig. 5), with extreme reduction of the antennal lobes, and simple male epipygium, lacking the well-developed transverse carina or ridge typical of Epactiothynnus and related genera. However, remnants of this ridge can be seen, particularly in cardalae and ochrotarsus. Leiothynnus can be distinguished from these and other genera by the long brush of setae on the base of the male prementum, the darkly stained marginal cell in the forewing, and slender, petiolate male abdomen.

Leiothynnus species differ from one another in modifications of the male legs, abdominal apex and to some extent color. All of the species treated below have the male thorax with dense, nearly contiguous punctuation, and the propodeal punctuation obscured by fine shagreening. These features may or may not be significant at the species level. Collecting seems to be too patchy to say whether or not there are additional undescribed species. Too few females have been collected to generalize about diagnostic features among the species in females, although there appear to be differences in the overall shape of the head and development of carinae or lobes on abdominal segment V.

Specimens were obtained from the fol-
Figs. 1–9. *Leiothyminus* species. 1–3, Front view of female face, antennae removed. 4, Front view of male face, right antenna removed. 5, lateral view of male face. 6–9, Dorsal view of male body showing color pattern, white = yellow, black = black, stippled = orange to red; wings removed.
ollowing institutions and individuals: The Australian National Insect Collection, CSIRO, Canberra, ACT, J. Cardale (CANBERRA); the Natural History Museum, London, England, S. Lewis; Queensland Museum, Brisbane, Australia, C. Burwell (BRISBANE-QM), and University of Queensland, Insect Collection, Brisbane, Australia, G. Daniels (BRISBANE-UQIC). Some paratypes will be deposited in the Bohart Museum of Entomology, University of California, Davis (DAVIS). The types of both previously described species were studied.

*Leiothynus cardalae* Kimsey, new species  
(Figs. 3, 4, 9, 16, 18, 21, 27)

**Male.**—Body length 7.5 mm. *Head*: face (Fig. 4) with dense small, nearly contiguous punctures; flagellomere I length 1.5× breadth; flagellomeres II-III 2.5× as long as broad. *Thorax*: punctures dense and nearly contiguous; propodeal punctures obscured by fine dense shagreening; scrobal sulcus strongly U-shaped, ventral loop sharply defined; foretrochanter convex in cross section; forefemur evenly convex basically, without carina, knob or other modification; midtrochanter and femur unmodified; midcoxal inner margin narrowly rounded, not angulate. *Abdomen*: hypopygial apex broadly rounded with short medial projection (projection often weakly sclerotized or translucent in some individuals) (Fig. 21). *Genitalia*: paramere arcuate, broadly rounded apically, broadest subapically (as in Figs. 25, 26). *Color* (Fig. 9): body black, with yellow and orange markings: head black with yellow clypeus, yellow along inner eye margin, between and across antennal lobes; scape pedicel and flagellomeres I-V red; rest of flagellum dark brown; pronotum black with yellow transverse anterior and marginal posterior bands; mesopleuron with subalar yellow spot and large yellow spot above midcoxa; one specimen with small yellow scutal spot; scutellum and metanotum with large medial yellow spot; propodeum with large lateral yellow marks, narrowly separated medially; trochanter and femor reddish brown, femoral apices sometimes paler, tibiae red, tarsi yellow to cream-colored; tergum I orange with transverse subapical yellow band, narrowed medially; tergum II yellow with narrow dark brown bands along anterior and posterior margins; tergum III-IV entirely black; tergum V-VI yellow anteriorly with narrow blackish posterior band, or black with yellow lateral spot; tergum VII dark brown to black; sternum I blackish basally, orange apically with yellowish middle; sternum II orange; sterna III-VI black.

**Female.**—Body length 4 mm. *Head* (Fig. 3): broader than long, vertex somewhat concave, with long seta above each eye; genal area above mandible with carina extending the length of eye. *Thorax* (Fig. 16): pronotal disk abruptly elevated above collar, disk with longitudinal medial sulcus, anterior margin with six long hairs; scutellum about twice as broad as long, propodeum strongly convex dorsally and elevated above scutellum, bulging medially and flattened sublaterally, medial bulge with long erect hairs. *Abdomen*: tergum I with broadly W-shaped transverse sulcus; tergum II with four large transverse ridges; tergum V apicomedially emarginate; tergum VI with narrow parallel-sided carina-edged apical plate, apically subtended by short dense tuft of setae (Fig. 18); sternum VI apicomedially emarginate and thin-edged, with long brush of setae laterally and shorter brush apicomedially. *Color*: dark reddish brown.

Fig. 27. Distribution map of six species of Leiothynnus in Australia.
ga, 3 Mar. 1964, R. Elder (BRISBANE-UQIC, CANBERRA, DAVIS).

Distribution.—Fig. 27.

Etymology.—This species is named in honor of Jo Cardale, who was one of the collectors of the holotype specimen. She also made much of this study possible, with collections support and encouragement overall.

Discussion.—Leiothynnus cardalae is a brightly colored species in the male, characterized by having a reddish brown to orange petiole. This coloration is shared with ferricolus and multinaulatus. Male cardalae can be distinguished by the unmodified fore- and midfemur (a characteristic shared with ochrotarsus), red legs and bicolored antenna. The female of cardalae has the least modified head of species where females are known. The female thorax is distinctive with a sparse row of long hairs along the anterior margin of the pronotum, strongly dorsally arched propodeum, and pygidium with lateral carinae parallel or converging slightly submedially, with a small lateral lobe on tergum VI.

Leiothynnus ferricolus Kimsey, new species
(Figs. 10, 12, 27)

Male.—Body length 7.5–8.0 mm; punctuation as in cardalae. Head: flagellomere II 2.5X as long as broad; flagellomere III length 3X breadth. Thorax: scrob sulcus with ventral loop poorly defined; foretrochanter strongly flattened and concave (Fig. 12); forefemur with short basoventral longitudinal carina, basolateral angle expanded and flattened ventrally (Fig. 12); midfemur with long basoventral tooth, tooth nearly as long as tarsal claw (Fig. 10), adjacent surface of trochanter flattened; midcoxal inner margin sharpened and angulate. Abdomen: hypopygial apex angulate laterally with long medial projection. Genitalia: as in Figs. 25, 26. Color: black with yellow and orange markings; clypeus yellow, interantennal area yellow; inner eye margin with broad yellow stripe; mandible red with basal yellow spot; pronotum with broad transverse yellow anterior and posterior stripes; mesopleuron with large yellow subalar and supracoaxal spots; scutellum and metanotum with large yellow medial spot; propodeum with large lateral yellow spots, narrowly separated medially; hindcoxa with yellow dorsal spot; trochanter and femora dark brown, femoral apices sometimes paler, orange; fore and midtibias orange; hindtibia dark brown or orange; tarsi yellowish brown; wing membrane yellow stained; abdominal segment I black basally, becoming orange for most of length, with transverse yellow band or yellow spots; tergum II brown basally and apically with broad medially yellow band; sternum II brown with small lateral yellow spot; terga III, and in most specimens IV, black with small lateral yellow spot; terga V-VI black with large lateral yellow spot, spots sometimes convergent medially; tergum VII black to dark brown; sternum III-VII black.

Female.—Unknown.


Distribution.—Fig. 28.

Etymology.—This species is named after its collection locality the Iron Range; ferrus = iron, icolus = loving, Latin, masculine.

Discussion.—The most distinctive features of this species in the male are the cupped foretrochanter, basally carinate forefemur and long midfemoral tooth. Male coloration is very similar to that of cardalae, as discussed under that species.

Leiothynnus linnis Kimsey, new species
(Figs. 2, 17, 20, 22, 24, 25, 27)

Male.—Body length 8–10 mm; punctuation as in cardalae. Head: flagellomere I
length 1.5× as long as broad; flagellomeres II-III 2.2–2.4× as long as broad. Thorax: scrobal sulcus U-shaped, ventral part weakly defined; foretrochanter convex in cross section; forefemur evenly convex basally, without carina, knob or other modification; midtrochanter unmodified, midfemur projecting basoventrally in right angle; mid- and hindcoxal inner margins broadly rounded, not angulate. Abdomen: hypopygial apex subtruncate, with strong medial projection (Fig. 22). Genitalia (Fig. 25): paramere lobes; nal broadest apically, broadest subapically. Color: body black with yellow markings: head black with yellow Clypeus, yellow along inner eye margin and between and across antennal lobes; scape, pedicel and basal flagellomeres red; rest of flagellum dark brown; pronotum black, with yellow transverse anterior band and band along posterior margin; scutum with short yellow band adjacent to tegula; mesopleuron with subalar yellow spot and small yellow spot above midcoxa; mesopleural lamellae translucent with yellow margins; scutellum and metanotum with large medial yellow spot; propodeum with large lateral yellow marks, narrowly separated medially; trochanter and femoral base dark brown, femoral apices and rest of legs reddish orange; tergum I orange with transverse subapical yellow marks becoming darker basomedially, tergum II brown with broad transverse medial yellow band; tergum III-IV black without small yellow spot laterally; tergum V-VI yellow anteriorly, with narrow blackish posterior band, or black with yellow lateral spot (tergum V may also be entirely black); tergum VII brown becoming paler apically.

Female.—Body length 5–7 mm. Head (Fig. 2): slightly broader than long, strongly indented laterally above eye; vertex somewhat concave medially; genal area between mandible and oral fossa deeply longitudinally sulcate. Thorax (Fig. 17): pronotal disk abruptly elevated above collar, concave anteriorly; scutellum about twice as broad as long, propodeum broad, slightly convex dorsally, nearly planar between petiolar socket and scutellum, strongly rounded laterally in dorsal view. Abdomen: tergum I with broadly W-shaped transverse sulcus; tergum II with four large transverse ridges; tergum V apicomically emarginate; tergum VI with narrow parallel-sided carina-edged medioplum with lateral upturned flanges, apical part subtended by long dense tuft of setae (Fig. 20); sternum VI apicomically notched, separated into two halves, by long ventral groove, with long brush of setae laterally, and shorter brush apicomically (Fig. 24). Color: dark reddish brown.

Type material.—Holotype ♀ Queensland, Brisbane, March (BRISBANE). Paratypes: 29 ♀♂, same data as holotype; 1 ♀, 8.5 km SSE Dayboro, 27°16'S 152°52'E (BRISBANE, DAVIS).

Discussion.—The color and general appearance of this species are similar to cardalae. However, linnis can be immediately distinguished in the male by the unmodified forefemur and small basoventral angle on the midtibia, and in the female by the peculiarly modified head and ventrally divided apical abdominal sternum.

Leiothynnus mackayensis (Turner) (Figs. 7, 14, 27)

Thynnus mackayensis Turner 1908:123. Lectotype male (designated by Kimsey & Brown 1993); Australia: Qld., MacKay (LONDON).

Male.—Body length 9–10 mm; punctuation as in cardalae. Head: flagellomere I 1.5× as long as broad; flagellomere II 2.5× as long as broad; flagellomere III 3× as long as broad. Thorax: scrobal sulcus U-shaped, ventral segment well-defined; foretrochanter convex in cross section; forefemur deeply cupped ventrobasally (Fig. 14); midtrochanter unmodified, mid-
femur with basoventral tooth, nearly as long as tarsal claw; midtrochanter unmodified; mid- and hindcoxal inner margins broadly rounded, not angulate. **Abdomen:** hypopygium strongly exerted, apex apically rounded, with strongly sclerotized medial tooth. **Genitalia:** paramere arcuate, rounded apically (as in Figs. 25, 26). **Color** (Fig. 7): body black with yellow markings: head black with yellow clypeus, yellow along inner eye margin and between and across antennal lobes; mandible yellow, becoming reddish brown apically; scape, pedicel and flagellomere I red; rest of flagellum dark brown; pronotum with yellow transverse anterior band and posterior lobe adjacent to tegula yellow; mesopleuron with subalar yellow spot and large yellow spot above midcoxa; scutellum and metanotum with large medial and smaller lateral yellow marks; propodeum with large lateral yellow marks, narrowly separated medially; trochanters and most of femora dark brown, femoral apices and rest of legs reddish brown; terga I and III-IV black with small apicodateral yellow spot; tergum II with large lateral yellow spots nearly meeting medially; terga V-VII black; sterna black, although sternum II often with small yellow apicodateral spot; wing membrane yellow-tinted.

**Female.**—Unknown.

**Material examined.**—Australia: Qld, Dunk Is. and Mackay; 5 ♂ ♀ were seen including the lectotype.

**Distribution.**—Fig. 27.

**Discussion.**—Male *mackayensis* share their dark coloration with *spinigerus*, although unlike *spinigerus* this species has a yellow band across the propodeum and tergum II. *L. mackayensis* males can be readily distinguished from *spinigerus* and other species by the combination of the basally cupped forefemur (shared with *multimaculatus*), and strongly dentate midfemur (shared with *ferricollis* and *spinigerus*).

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**Leiothynnus multimaculatus** Kimsey, **new species**

(Figs. 11, 27)

**Male.**—Body length 11 mm; punctuation as in *cardalae*. Head: flagellomere I 1.5× as long as broad; flagellomere II 2.2× as long as broad; flagellomere III 2.5× as long as broad. **Thorax:** scrobal sulcus U-shaped with ventral part weakly defined; forefemur with deep U-shaped basoventral impression, with associated longitudinal carina (similar to Fig. 12); foretrochanter unmodified; midfemur with short basoventral tooth, one half or less as long as tarsal claw (Fig. 11), adjacent area on trochanter flattened; mid and hindcoxae without sharp inner margin, evenly rounded not angulate. **Abdomen:** hypopygium slightly flattened apically on either side of medial spine. **Genitalia:** as in Figs. 25, 26. **Color:** black with yellow and orange markings; clypeus mostly yellow; antennal lobes and subantenal sclerite yellow; inner eye margin with broad yellow band; mandible red with yellow basomedially; postocular margin with short yellow band; scape, pedicel and ventral surface of flagellomeres I-IV paler red; rest of flagellum black; pronotum with yellow band along posterior margin; mesopleuron with large yellow subalar spot; mesopleural lamella with whitish stripe along inner margin; scutellum and metanotum with large medial yellow spot; propodeum with large lateral spots, broadly separated medially; coxae black becoming reddish dorsally on mid and hindlegs; femora dark brown to black, becoming red apically; tibiae and tarsi red (except hindtibia darkened subapically in holotype); terga III-IV black without lateral yellow spots; tergum VI black with small irregular medial yellow spot; tergum VII black; sternum I orange; sternum II orange becoming darker apically with yellowish lateral spot; sterna III-VI black

**Female.**—Unknown.

**Type material.**—Holotype ♂: Queens-
land, Rockpool Gorge, Bluff Range, near Biggenden, 4 Oct. 1976, H. Frauc (CANC-
BERRA). Paratype δ, Bluff Range, Biggen-
den, 9–20 Dec. 1972, H. Frauc (CANCBER-
RA).

Distribution.—Fig. 27.

Etymology.—The species name is de-
derived from the multicolored male; multus = many, maculatus = marks, Latin, mas-
culine.

Discussion.—The most distinctive fea-
tures of this species in the male are the
ventrally cupped forefemur, small basal
midfemoral tooth and associated indenta-
tion on the midcoxa, red legs and red bas-
al abdominal segments. L. multimaculatus
most closely resembles mackayensis but can
be distinguished by the more extensive
yellow and orange coloration and smaller
midfemoral angle (as in Fig. 11).

Leiothynnus ochrotarsus Kimsey, new
species
(Figs. 5, 6, 23)

Male.—Body length 11 mm; punctuation
as in cardalae. Head (Fig. 5): flagellomere I
1.5× as long as broad; flagellomere II
length twice breadth; flagellomere III 2.3×
as long as broad. Thorax: foretrochanter
convex in cross-section; forefemur basally
indented with short longitudinal carina;
mesopleuron with ventral part of scrobal
sulcus obsolescent; midfemur basoventr-
ally with slight angle or unmodified; mid-
trochanter unmodified; mid- and hindcox-
ae inner margins broadly rounded. Abdo-
men: epipygium with well-developed sub-
apical transverse ridge; hypopygium
broadly triangular apically (Fig. 23). Gen-
talia: as in Figs. 25, 26. Color (Fig. 6): head
yellow, except frons medially, mandibular
apex and occiput black; thorax yellowish
orange, except anterior face of pronotum
medially black, scutum black between no-
tauli surrounding large medial yellow
spot, mesopleural venter and propodeal
base black; legs orange to yellow except
base of coxae blackish; mesopleural la-
mellae translucent with yellow or whithish
margins; abdominal segment I orange be-
coming yellow laterally; abdominal seg-
ment II yellow with narrow dark brown
posterior band; abdominal segment III
black; tergum IV yellow, basally and apica-
ly with narrow black band; terga V–VII
yellow with narrow basal black band; ster-
na IV–VII black with yellow lateral spot;
parameres yellow; wing membrane yel-
low-tinted, except marginal cell darker,
brownish.

Female.—Unknown.

Type material.—Holotype δ: Queens-
land, 30 km w Collinsville, 12 Sept. 1950,
E. F. Riek (CANCBERRA).

Etymology.—orchros = yellow; tarsus =
legs, Greek, masculine.

Discussion.—Male ochrotarsus can be dis-
tinguished by the bright coloration, fore-
femur with basal depression and associ-
ated longitudinal carina and unmodified
midfemur. The apically triangular hypo-
pygium may or may not be diagnostic as
the holotype is an old individual with
highly worn mandibles and the hypo-
pygial apex may also be worn.

Leiothynnus spinigerus Turner
(Figs. 1, 8, 13, 15, 19, 26, 27)

Leiothynnus spinigerus Turner 1912:534. Lecto-
type male (designated by Kimsey & Brown
1993); Australia: Stradbroke Is., Moreton Bay
(LONDON).

Male.—Body length 9–12 mm; puncta-
tion as in cardalae. Head: flagellomere I 1.3–
1.4× as long as broad; flagellomere II
twice as long as broad; flagellomere III
2.4× as long as broad; punctuation as in
cardalae. Thorax: mesopleuron with ventral
part of scrobal sulcus obsolescent; forefe-
mur with basoventral knob or swelling,
separated from longitudinal carina by in-
dentation (Fig. 13); forecoxa convex in
cross section; midfemur with long baso-
ventral tooth, nearly as long as tarsal claw;
midtrochanter flattened adjacent to femo-
ral tooth; mid and hindcoxae inner mar-
gins rounded. Abdomen: hypopygium
strongly exserted, parallel-sided, apex rounded with long medial tooth. *Genitalia:* as in Figs. 25, 26. *Color* (Fig. 8): black, with yellow and red markings; head black with yellow band along inner eye margin, clypeal apical margin yellow, antennal lobes yellow; scape and pedicel reddish; flagellum dark brown to black; pronotum with short transverse anterior yellow band, band sometimes ending at lateral notch; mesopleuron may have subalar yellow spot; scutellum in some specimens with small medial yellow spot; mesopleural lamella translucent with white or yellow margins; metanotum with yellow medial spot; meso- and metapleure with small pale spot above coxae; coxae, trochanters and midfemoral base and hindfemur and hindtibia brown, rest of legs red; abdomen black except small lateral spot on tergum I-II or I-IV; wing membrane yellow-tinted, becoming brownish in marginal cell.

**Female.**—Head (Fig. 1): vertex dorsally convergent and angulate, not evenly rounded; gena evenly rounded, without sulci or grooves; posterior margin behind eyes strongly convex in front view; clypeus narrowly truncate apicomedially; mandible slender, broadest basally, edentate. *Thorax* (Fig. 15): pronotal disk broadly quadrate, with scattered erect setae of irregular lengths, particularly along anterior margin; propodeum with ventral tuft of long setae on either side; scutellum about as long as broad; propodeum with broadly convex dorsal surface, planar with scutellum, flattened posteriorly, parallel-sided in posterior view, with erect setae particularly laterally. *Abdomen:* tergum V apicomically emarginate; pygidium with lateral carinae parallel-sided or diverging medially, subtended laterally by short flange and long tuft of setae; sternum VI apex hoof-like (Fig. 19).

**Material examined.**—Australia: Qld, Stradbroke Is., Brisbane, Bundaberg, and Bribie Is.; 17 ♂♂ and 3 ♀♀ were examined including the lectotype.

**Distribution.**—Fig. 27.

**Discussion.**—The coloration of male *spinigerus* is similar to that of *mackayensis*, but without the broad yellow bands or stripes seen in that species. Other diagnostic features of male *spinigerus* are the unmodified foretrochanter, forefemur with basal knob and longitudinal carina, and long midfemoral tooth. Females have a distinctively narrowed vertex, tufted propodeum, and pygidium subtended by a short flange.

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**KEY TO MALES OF THE SPECIES LEIOTHYNNUS**

1 Forefemur basoventrally convex, without depression or ridge .................................................. 2
- Forefemur with basoventral depression, often accompanied by short longitudinal ridge (as in Figs. 12-14) ................................................................. 3

2 Midfemur with small basoventral angle (as in Fig. 11); flagellum monochrome, brown or red ................................................................. *liinis Kimsey, new species*
- Midfemur without basoventral angle; flagellum bicolored red and black (or dark brown) ................................................................. *cardalae Kimsey, new species*

3 Forefemur with distinct longitudinal basoventral ridge and associated depression (as in Fig. 12) ................................................................. 4
- Forefemur with basoventral cuplike depression without longitudinal ridge (as in Fig. 14) ................................................................. 5

4 Foretrochanter strongly concave or cuplike in cross-section (Fig. 12); forefemur without knob or swelling adjacent to longitudinal basal ridge (Fig. 12); midcoxa inner margin angular and sharp-edged ................................. *ferricolus Kimsey, new species*
- Foretrochanter convex in cross-section, unmodified; forefemur with knob or swelling adjacent to longitudinal basal ridge (Fig. 13); midcoxa unmodified ................................. *spinigerus Turner*
5 Forefemur with large basoventral tooth, tooth nearly as long as tarsal claw; petiole (basal two abdominal segments) black; tarsi red .......................... mackayensis (Turner)
- Forefemur with short basoventral tooth, less than half as long as tarsal claw, or basoventrally rounded without tooth or angle; petiole primarily yellow or orange; tarsi pale yellow, red or brown .......................................................... 6
6 Midfemur unmodified; tarsi pale yellow ..................... ochrotarsus Kimsey, new species
- Midfemur with small basoventral tooth or angle (Fig. 11); tarsi red to brown ...........
 ............................................................. multimaculatus Kimsey, new species

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LITERATURE CITED

