



Shedding light on Jacobi's types whilst discovering new species: a taxonomic revision of *Leptolamia* Metcalf, 1936 (Hemiptera: Fulgoromorpha: Cixiidae)

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Abstract The Australian endemic planthopper genus *Leptolamia* is revised taxonomically. Lectotypes are designated for *Australoma praetextata* Jacobi, 1928, *Australoma praetextata* var. *obscura* Jacobi, 1928 and *Leptochlamys compressa* Kirkaldy, 1907, and the former two are synonymised as *Leptolamia praetextata* (Jacobi). Thirteen new species of *Leptolamia* are described: *Leptolamia absona* sp. nov., *L. bunyaensis* sp. nov., *L. bifurcata* sp. nov., *L. conicula* sp. nov., *L. contraria* sp. nov., *L. glaciata* sp. nov., *L. gloriosa* sp. nov., *L. jacobii* sp. nov., *L. juliae* sp. nov., *L. kulija* sp. nov., *L. lunata* sp. nov., *L. radricula* sp. nov. and *L. sonjae* sp. nov. All species are described/redescribed and illustrated. Identification keys to species are provided and host plant information given, where available.

Key words Australian endemic planthopper, identification, morphology.

INTRODUCTION

The planthopper genus *Leptolamia* Metcalf was originally described under the name *Leptochlamys* Kirkaldy to accommodate a single species, *Leptochlamys compressa* Kirkaldy. Because the name was preoccupied by *Leptochlamys* West 1901 (Protista), Metcalf (1936) proposed the new name *Leptolamia*.

In 1928, Jacobi described a new species *Australoma praetextata* Jacobi including its colour-variant *A. praetextata* var. *obscura* Jacobi. This species was subsequently transferred into the genus *Bajauana* Distant, 1907 by Fennah (1980) as he synonymised *Australoma* with the latter. During a revision of the Eucarpiini (Löcker *et al.* 2010), *Bajauana praetextata* was transferred into *Leptolamia*. This transfer increased the number of species in the genus *Leptolamia* to two. Examination of material borrowed from numerous Australian and overseas collections revealed the presence of several new species of *Leptolamia* that are described in this paper.

MATERIALS AND METHODS

The morphological terms applied here follow Löcker *et al.* (2006). For terminology of the vertex, see Figure 1.

The following is a list of the measurements taken in this study:

- Body length: tip of head to posterior margin of forewing
- Length of vertex: distance between basal emargination and apical carina in midline
- Width of vertex: at level of basal emargination
- Length of basal compartment of vertex: distance between basal emargination and subapical carina in midline
- Length of apical compartment of vertex: distance between apical transverse carina and subapical carina in midline
- Length of frons: apical transverse carina to frontoclypeal suture, in midline
- Width of frons: at level of frontoclypeal suture
- Width of forewing: at level of apex of clavus
- Length of forewing: base to posterior margin of forewing

Abbreviations

AMS	Australian Museum, Sydney, Australia
ANIC	Australian National Insect Collection, Canberra, Australia
ASCU	Agricultural Scientific Collections Unit, NSW Department of Primary Industries, Orange, Australia
BMNH	The Natural History Museum, London, United Kingdom
BPBM	Bernice Pauahi Bishop Museum, Honolulu, United States of America

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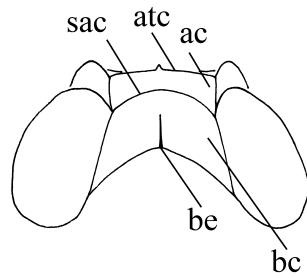


Fig. 1. *Leptolamia radricula*, vertex. ac, apical compartment; atc, apical transverse carina; bc, basal compartment; be, basal emargination; sac, subapical carina.

LBOB	Lois O'Brien, private collection, Green Valley, United States of America
MLM	Melinda Moir, private collection, Perth, Australia
MTD	Museum für Tierkunde, Staatliche Naturhistorische Sammlungen, Dresden, Germany
NHRS	Naturhistoriska Riksmuseet, Stockholm, Sweden
NSW	New South Wales
QDPI	Queensland Department of Primary Industries, Brisbane, Australia
Qld	Queensland
QM	Queensland Museum, Brisbane, Australia
SA	South Australia
SAMA	South Australian Museum, Adelaide, Australia
UQIC	University of Queensland Insect Collection, Brisbane Australia (now part of the QM collection)
VAIC	Victorian Agricultural Insect Collection, Melbourne, Australia
Vic	Victoria

RESULTS

Genus *Leptolamia* Metcalf

Leptochlamys Kirkaldy, 1907: 113, preoccupied by *Leptochlamys* West, 1901 (Protista).

Leptolamia, nomen novum for *Leptochlamys* Kirkaldy, Metcalf 1936: 25

Type species: *Leptochlamys compressa* Kirkaldy, 1907, by monotypy.

Diagnosis. *Leptolamia* is endemic to Australia. It can be distinguished from all other genera of Australian Cixiini by a combination of the following characters: median carina of frons unforked; second hind tarsomere without platellae but with up to three very fine setae; basal compartment of vertex no more than half as long as wide and apical transverse carina of head not deeply u-shaped.

Morphology. Body length: ♂ 3.6–5.7 mm, ♀ 4.3–6.1 mm. **Head:** Vertex 1.3–2.9× wider than long; vertex at level of basal

emargination 1.0–1.4× wider than at subapical carina; basal emargination obtusely angled; basal compartment of vertex 0.7–3.8× as long as apical compartment. Frons 1.0–1.6× as long as wide; without median ocellus; maximum width no more than 2× apical width; median carina complete, unforked; lateral carinae slightly to moderately elevated. Postclypeus and anteclypeus with well-developed lateral carina, postclypeus with well-developed median carina (in *L. contraria* carinae visible but less developed). Anteclypeus lacking median carina. **Thorax:** Median carina of pronotum present, sometimes evanescent. Mesonotum with well-developed median and lateral carinae. Forewing 3.0–4.2× longer than wide, with MP apically bifid; subapical cell C5 distinctly longer than C4. Subapical segment of rostrum less than twice as long as apical segment. Hind leg: tibia without large lateral spines, with six apical spines (sometimes separated into two groups by a narrow gap; innermost tooth smallest, sometimes distinctly less sclerotised than remaining teeth; outermost tooth largest); tarsomeres without platellae but 2nd tarsomere with up to three very fine setae. **Female genitalia:** Sword-shaped without wax plate.

Checklist of species of *Leptolamia*

Leptolamia absona sp. nov.
Leptolamia bifurcata sp. nov.
Leptolamia bunyaensis sp. nov.
Leptolamia compressa (Kirkaldy, 1907)
Leptolamia conicula sp. nov.
Leptolamia contraria sp. nov.
Leptolamia glaciata sp. nov.
Leptolamia gloriosa sp. nov.
Leptolamia jacobii sp. nov.
Leptolamia juliae sp. nov.
Leptolamia kulija sp. nov.
Leptolamia lunata sp. nov.
Leptolamia praetextata (Jacobi, 1928)
Leptolamia radricula sp. nov.
Leptolamia sonjae sp. nov.

Key to species of *Leptolamia* Metcalf

- 1 Tubercles on forewing dark, distinctly contrasted to paler coloured veins (Figs 7a,8a).....2
- Tubercles on forewing dark or pale, concolorous with veins.....3
- 2(1) Median carina of face sharp, blade-like (Fig. 7c). Phallotheca apically extending into a long, transparent conical process (Fig. 25a,b).....*Leptolamia conicula* sp. nov.
- Median carina of face blunt, rounded (Fig. 8c). Phallotheca apically rounded, without a transparent process (Fig. 26a,b).....*Leptolamia contraria* sp. nov.
- 3(1) Forewing with transverse veinlet r-m distinctly basad of fork MA+MP (Figs 3a,20a).....4
- Forewing with transverse veinlet r-m distad or at same level as fork MA+MP (Fig. 10a).....6



Fig. 2. Data and type labels attached to female specimen of *L. jacobii* from NHRS.

- 4(3) Frons clearly visible in dorsal view (Figs 3b,20b). Ventromedian process thickened, with two dark teeth inserting dorsally (Figs 21g,35g).....5
 – Frons invisible or only just visible in dorsal view (Fig. 15b). Ventromedian process of pygofer thin, without dark teeth (Fig. 32g).....
*Leptolamia lunata* sp. nov.
- 5(4) Male anal tube symmetrical in dorsal view (lobes of equal length) as in Figure 21c. Abdominal sternites light brown.....*Leptolamia compressa* (Kirkaldy)
 – Male anal tube asymmetrical in dorsal view (lobes differ in length) as in Figure 35c. Abdominal sternites dark brown.....*Leptolamia sonjae* sp. nov.
- 6(3) Second hind tarsomere with 7 spines.....7
 – Second hind tarsomere with 6 (rarely 5) spines.....8
- 7(6) First hind tarsomere with 6 spines.....
*Leptolamia absona* sp. nov.
 – First hind tarsomere with 7 spines.....
*Leptolamia radricula* sp. nov.
- 8(6) Lateral lobe of male anal tube in lateral view triangular (Figs 24d,27d,29d,30d).....9
 – Lateral lobe of male anal tube in lateral view rectangular with more or less concave sides (Figs 26d,27d,31e,33g).....12
- 9(8) Phallotheca apically with a large spine bearing two small spines (Fig. 27a).....
*Leptolamia glaciata* sp. nov.
 – Phallotheca apically with a large spine that does not bear any small spines.....10
- 10(9) Phallotheca ventrally with a trifurcate spine (Fig. 30a).....*Leptolamia juliae* sp. nov.
 – Phallotheca without forked spines.....11
- 11(10) Phallotheca with a more or less straight spine directed caudally (towards the apex of aedeagus) as spine b in Figure 29a,b.....*Leptolamia jacobii* sp. nov.
 – Phallotheca with a recurved spine which is at its base directed caudally as spine b in Figure 24a,b.....
*Leptolamia bunyaensis* sp. nov.
- 12(8) Phallotheca with only one spine (Fig. 31a,b).....
*Leptolamia kulija* sp. nov.

- Phallotheca with more than one spine.....13
 13(12) Radius posterior (RP) apically bifid (Fig. 5a).....
*Leptolamia bifurcata* sp. nov.
 – RP apically trifid (Fig. 10a).....14
 14(13) Phallotheca with one or more spines directed caudad (Fig. 33a,b,d).....*Leptolamia praetextata* (Jacobi)
 – Phallotheca without any spines directed caudad (Fig. 28a,b).....*Leptolamia gloriosa* sp. nov.

Leptolamia compressa (Kirkaldy, 1907)

(Figs 3,21)

Leptochlamys compressa Kirkaldy, 1907: 113.

Leptolamia compressa (Kirkaldy, 1907), Metcalf 1936: 25.

Types. *Lectotype* (designated here, examined), ♂, AUSTRALIA, Qld: Kuranda, viii.1904 (BPBM 17680). *Paralectotype* (examined), Qld: 1 ♀, Cairns, vii.1904 (BPBM).

Notes. The original description does not mention the designation of a holotype, therefore these specimens are regarded as syntypes. A lectotype is designated to provide a diagnostic reference for the species.

Other material examined. AUSTRALIA, Qld: 18 ♂, 6 ♀, 26 km up Tinaroo Ck Rd via Mareeba, 29.ix.-11.xi.1983 (Storey & Brown) (QDPI); 3 ♂, 3 ♀ ASCU); 1 ♂, same data, 28.i.-6.ii.1983 (QDPI); 1 ♂, same data, 16.ii.-17.iii.1983 (QDPI); 1 ♂, Lake Barine, 530 m, 1.ii.1964 (J. Sedlacek) (BPBM); 1 ♂, Mission Beach, 17.52S 146.05E, S2, 20 m, malaise trap, 2.-29.i.1996 (M. Cermak) (ANIC); 1 ♀, Mission Beach, 17.52S 146.05E, S1, 40 m, malaise trap, 29.i.-4.iii.1996 (M. Cermak) (ANIC); 1 ♀, Mission Beach, 17.52S 146.05E, S3, 10 m, malaise trap, 4.iii.-1.iv.1996 (M. Cermak) (ANIC); 1 ♀, Mission Beach, 17.52S 146.05E, S3, 10 m, pitfall trap, 29.vii.-2.ix.1996 (M. Cermak) (ANIC); 1 ♂, Crystal Cascades, Cairns, 19.iv.1967 (D.H. Colless) (ANIC); 2 ♂, 3 ♀, GS1 Mt Haig, 17.06S 145.36E, 1150 m, malaise trap, 29.ix.-31.x.1995 (L. Umbach) (ANIC); 3 ♂, 1 ♀, same data, 31.x.-29.xi.1995 (L. Umbach) (ANIC); 1 ♀, N. Qld., Upp. Mulgrave R., 10 m. Goldsborough Rd., 9.v.1967 (D.H. Colless) (ANIC); 1 ♀, Kuranda, 12.iii.1956 (J. L. Gressitt) (BPBM); 1 ♀, Kuranda, 10.viii.1904 (Koebele) (W. M. Giffard Collection BPBM); 1 ♀, Windsor Tableland, via Mt Carbine, malaise trap, 10.xi.-26.xii.1983 (Storey & Titmarsh) (QDPI); 1 ♀, Mossman Bluff track, 5–10 km W Mossman, site 8, intercept, 1180 m, 1.-17.i.1989 (Monteith, Thompson & ANZSES) (QM).

Diagnosis. Males of *L. compressa* and *L. sonjae* share a special feature within *Leptolamia*, the presence of two dark teeth on the ventromedian process (Fig. 21g). Some species within *Leptolamia*, such as *L. conicula*, *L. contraria*, *L. kulija* and *L. lunata*, display a ventromedian process with a blackened margin but not extended to form teeth that are inserted at the dorsal side of the ventromedian process. All other species have a uniformly coloured ventromedian process without teeth. *L. compressa* differs from *L. sonjae* by having a

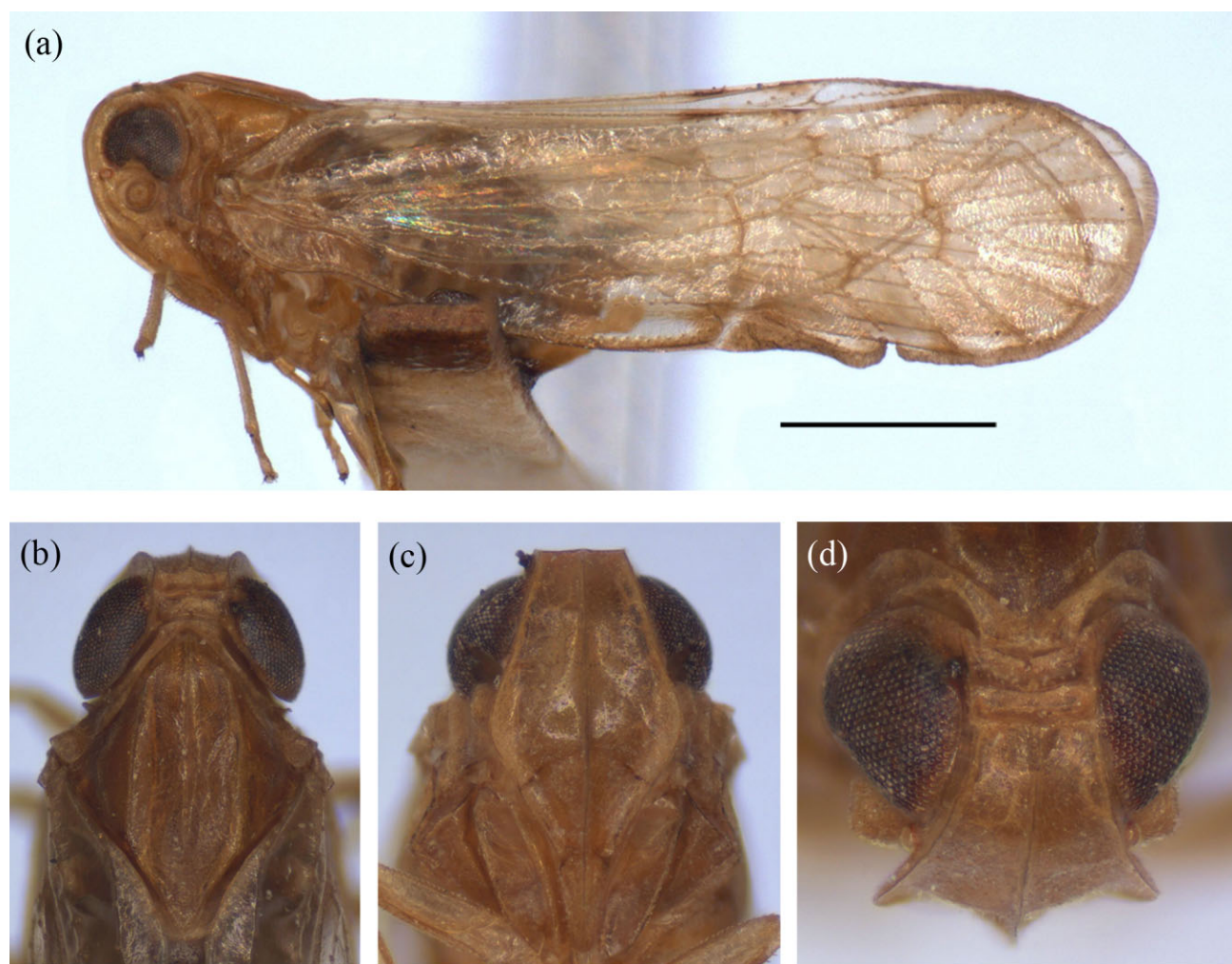


Fig. 3. *Leptolamia compressa*: (a) habitus; (b–d) head. Scalebar 1 mm.

symmetrical anal tube and light-brown sternites (*L. sonjae* has an asymmetrical anal tube and dark brown sternites). *L. compressa*, *L. lunata* and *L. sonjae* have crossvein r-m inserting basad of fork MA-MP. In all other species, r-m inserts distad or at the same level as fork MA-MP.

Colour. Head, thorax (including legs) light brown. Forewing hyaline colourless or light brown with a darker marks on clavus and apical margin of forewing; pterostigma darker; veins and tubercles concolorous with cells, sometimes crossveins darker. Abdominal sternites light brown.

Morphology. Body length: ♂ 4.7–5.2 mm, ♀ 5.0–5.4 mm.

Head: Vertex 1.6–2.3× wider than long; at level of basal emargination 1.0–1.3× wider than at subapical carina; apical and subapical carina v-shaped; median carina of vertex covering $\frac{1}{4}$ – $\frac{1}{2}$ of basal compartment of vertex; basal compartment 1.0–1.5× longer than apical compartment. Frons 1.0–1.2× as long as wide; frons clearly visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture or distinctly distad of frontoclypeal suture. Frontoclypeal suture semicircular, bent upwards. Rostrum sur-

passing hind coxae; apical segment of rostrum distinctly shorter than subapical segment. **Thorax:** Pronotum about same width to moderately wider than head (including eyes). Hind margin of pronotum obtusely, acutely angled or rectangular. Forewing 3.8–4.0× longer than wide; forewing with weakly to well-developed basal emargination; costa with about 21–35 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a moderate-to-long (at least half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP at same level or slightly basad of fork CuA1+CuA2; position of r-m basad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 at same level or basad of r-m; position of icu at CuA at same level or basad of apex of clavus; position of icu at CuP more or less at same level or slightly distant of apex of clavus; RP apically trifid; MA apically trifid; additional subapical cell between branches of MA present in some specimens; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st tarsomere with 6 apical teeth; 2nd tarsomere with 6 (rarely 7) apical teeth. **Male genitalia:** Anal tube symmetrical (lobes of equal length) in dorsal and caudal view (Fig. 21c,e); lateral lobe triangular in lateral view

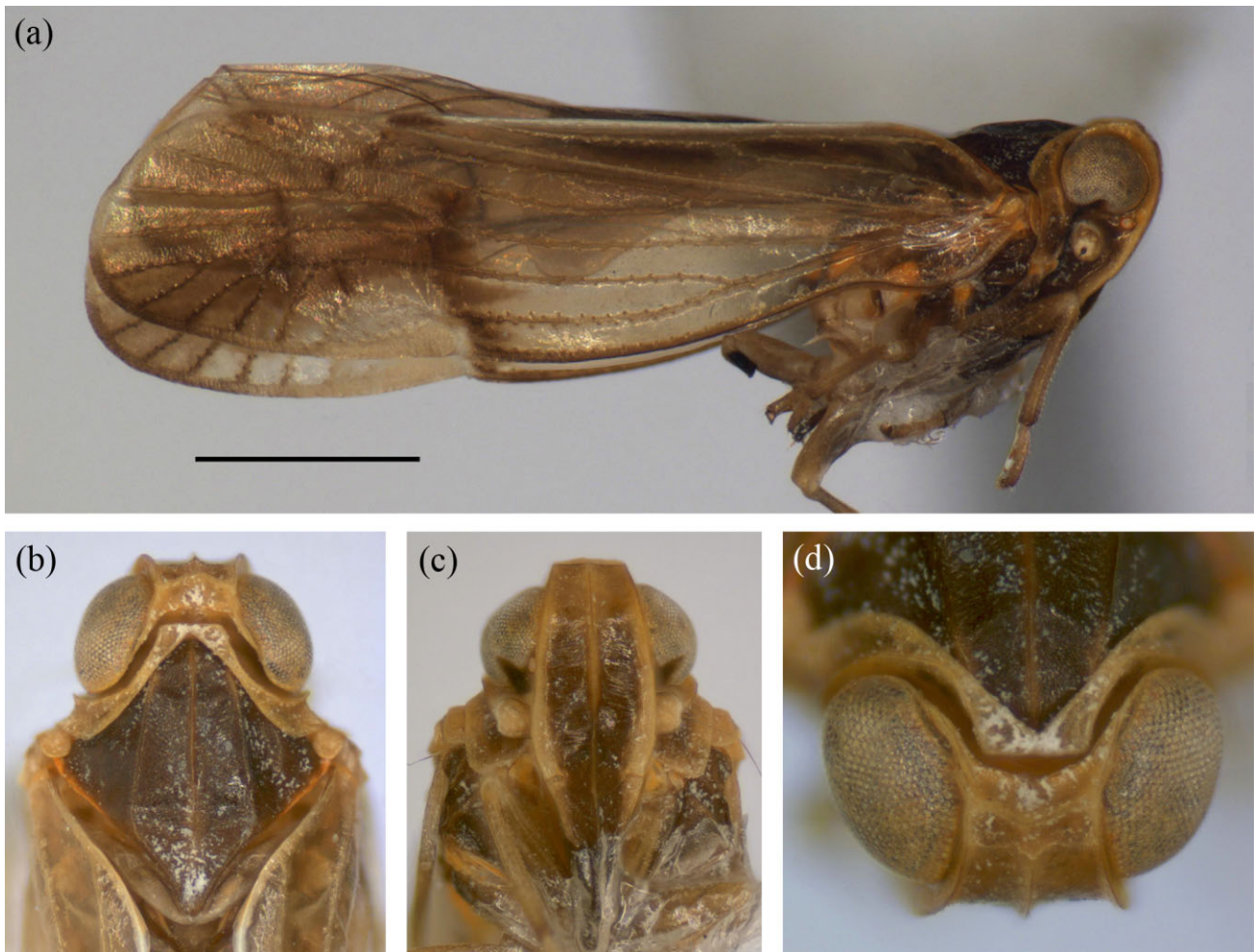


Fig. 4. *Leptolamia absona*: (a) habitus; (b–d) head. Scalebar 1 mm.

(Fig. 21d). Pygofer and genital styles as in Figure 21f,g; ventromedian process of pygofer trapezoid, with two dark teeth inserting dorsally (Fig. 21g). Aedeagus (Fig. 21a,b): Phallosome with two slender, rounded spines, a short spine (a) and a longer spine (b). Spines (a) and (b) insert at two different sheet-like ridges located on ventral side of phallosome. Flagellum with two sclerotised spine s.

***Leptolamia absona* sp. nov.**

(Figs 4,22)

ZooBank Registration: <http://zoobank.org/urn:lsid:zoobank.org:act:56B48712-CEA4-40DB-A787-9A2D6C3220DE>

Types. *Holotype*, ♂, AUSTRALIA, NSW: Bowens Creek, Blue Mountains, 10.i.1963 (DK McAlpine) (AMS K.351928). *Paratypes*, NSW: 4 ♂, 1 ♀, Lorien Ref., 3 km N Lansdowne nr Taree, rainforest margin, malaise, 6.-13.ix.1987 (G. Williams) (AMS); 1 ♂, same data, 1.-11.x.1987 (AMS); 3 ♂, 4 ♀, same data, 11.-18.x.1987 (AMS); 3 ♀, same data, 19.-25.x.1987 (AMS); 1 ♂, Valla Beach, 30.35S, 153.00E, 29.ix.1987 (MM Stevens) (ASCU); 1 ♂, Wild Cattle Creek SF, 30° 13.446S, 152° 46.638E, 666 m, ex mv light, 7-13.i.2008 (ML Moir) (MLM 01005); 2 ♂, Barrington House, via Salisbury, 26.-

28.xii.1965 (T Weir) (QM, formerly UQIC); 1 ♀, Gloucester Tops, rainforest, beat, 28.xii.2005 (ML Moir) (MLM 01002); 1 ♀, 3 km N Lansdowne, nr Taree, ex *Acradenia euodiiformis* blossoms, 19.ix.1991 (G Williams) (AMS); 1 ♀, Gosford, on *L. camara*, 24.x.1967 (KM Moore) (ASCU); 2 ♂, 1 ♀, Gap Cre[e]k Forest Park, 33°01'S, 151°26'E, in yellow pan, wet sclerophyll forest, VWHL-186, 27.x.1992 (Vince Lorimer) (AMS); 1 ♂, 2 ♀, Wishing Well Forest Park, 33°05'S, 151°23'E, in yellow pan trap, sclerophyll forest, VWHL-200, 27.x.1992 (Vince Lorimer) (AMS).

Diagnosis. This species resembles *L. sonjae* and *L. radricula* by having a ventral ridge on the phallosome bearing a pair of spines. These spines are minute in *L. radricula* and larger in the other two species. *L. sonjae* can be distinguished from *L. absona* by the phallosome spines being flattened.

Colour. Vertex light brown (rarely darker); face mid-to-dark brown with paler carinae (i.e. lateral carinae), disc of frons sometimes paler near apical carina. Pronotum light brown; mesonotum dark brown. Forewing hyaline colourless with more or less extended light or mid brown marks; veins and tubercles concolorous with cells, crossveins sometimes darker;

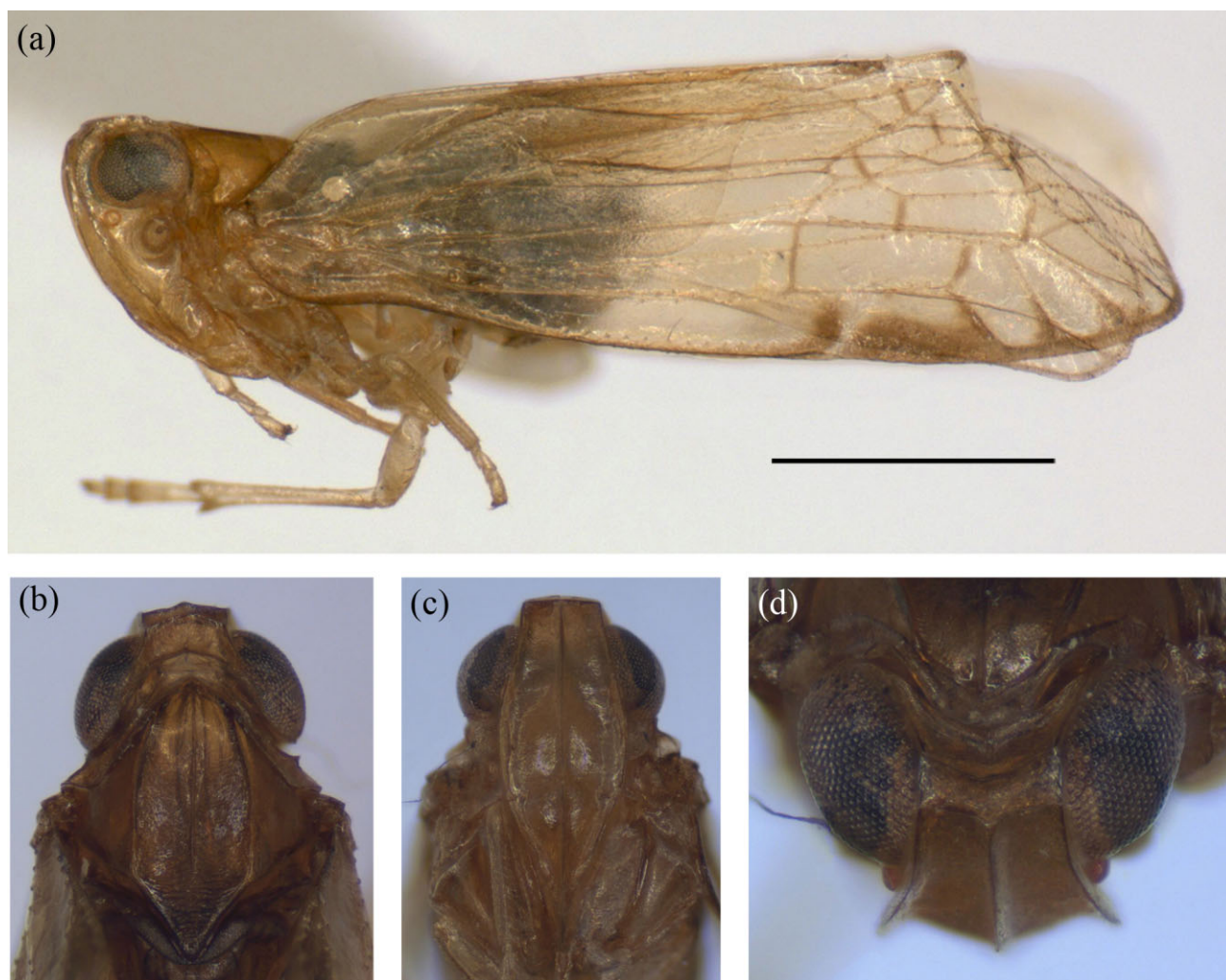


Fig. 5. *Leptolamia bifurcata*: (a) habitus; (b–d) head. Scalebar 1 mm.

pterostigma whitish. Legs light brown. Abdominal sternites mid-to-dark brown.

Morphology. Body length: ♂ 4.1–5.3 mm, ♀ 4.7–5.4 mm.

Head: Vertex 1.7–2.2× wider than long; at level of basal emargination 1.0–1.3× wider than at subapical carina; apical and subapical carina v-shaped; median carina of vertex absent; basal compartment of vertex 1.4–3.0× longer than apical compartment. Frons 1.2–1.6× longer than wide; frons just not or only just visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture. Frontoclypeal suture slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. Rostrum surpassing hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum about same width to moderately wider than head (including eyes). Hind margin of pronotum acutely angled or rectangular. Forewing 3.5–4.0× longer than wide; forewing with well-developed basal emargination; costa with about 30–36 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a short or long common stem

Sc+R+M; fork of ScRA+RP slightly to distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 basad of r-m; position of icu at CuA basad of apex of clavus; position of icu at CuP more or less at same level as apex of clavus; RP apically trifid; MA apically trifid; additional subapical cell between branches of MA absent; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st tarsomere with 6 apical teeth; 2nd tarsomere with 7 apical teeth. **Male genitalia:** Anal tube slightly asymmetrical in dorsal and caudal view (Fig. 22c,e); lateral lobe rectangular (slightly widening towards apex) in lateral view (Fig. 22d). Pygofer and genital styles as in Figure 22f,g; ventromedian process of pygofer trapezoid, uniformly coloured. Aedeagus (Fig. 22a,b): Phallosome with a large spine (a) bearing a short, very slender spine (b); apex of spine (a) serrated or branched one or more times; phallosome ventrally with a small, transverse, sclerotised ridge and a large, sclerotised ridge bearing a pair of curved, parallel spines (c). Flagellum sclerotised, unarmed.

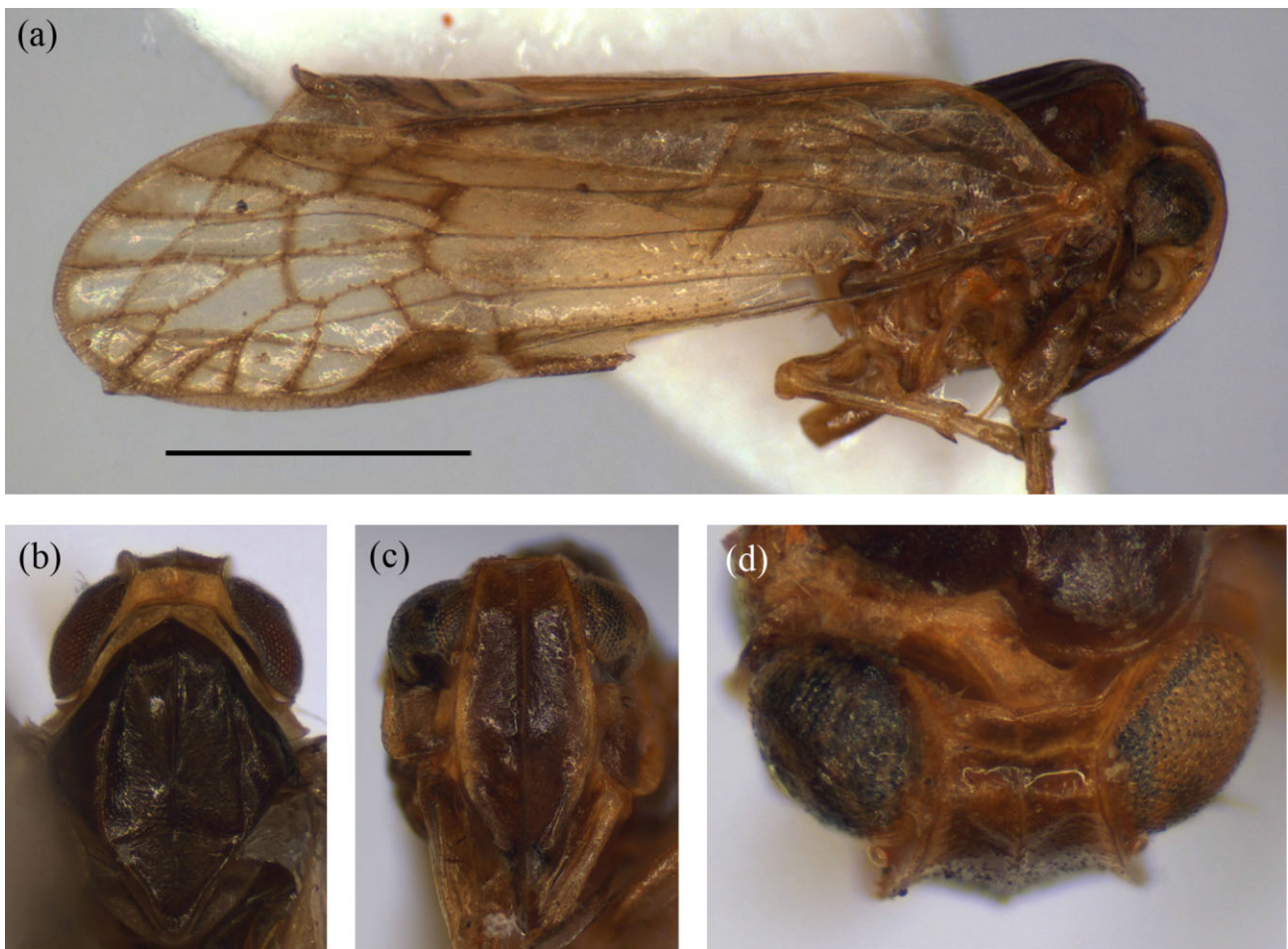


Fig. 6. *Leptolamia bunyaensis*: (a) habitus; (b–d) head. Scalebar 1 mm.

Etymology. The Latin term ‘*absonus*’ means ‘different, discordant’ and refers to the difference in the number of spines on the first and second tarsomere. To be treated as an adjective.

***Leptolamia bifurcata* sp. nov.**

(Figs 5,23)

ZooBank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:064F64B2-714D-4CC3-81C4-90BD4E21E118>

Types. *Holotype*, ♂, AUSTRALIA, Qld: Mary Cairncross Pk, 6 km SE Maleny, 10.xi.1989 (M. Purcell) (ASCTHE035072 ASCU). *Paratypes*, Qld: 1 ♂, same data as holotype (CW O’Brien) (LBOB).

Diagnosis. Species of *Leptolamia* commonly have a trifid RP. *L. bifurcata* has a bifid RP. Other than in this species, this character state has only been observed in a few specimens of *L. kulija*.

Colour. Head and thorax (including legs) light brown. Forewing hyaline light brown with a dark mark basal of pterostigma and dark marks along some veins near apex of forewing and along crossveins; veins and tubercles

concolorous with cells; pterostigma mid or dark brown. Abdominal sternites mid to dark brown.

Morphology. Body length: ♂ 4.2–4.3 mm. **Head:** Vertex about 1.8× wider than long; at level of basal emargination 1.1–1.2× wider than at subapical carina; apical carina v-shaped, subapical carina u- to v-shaped; median carina of vertex covering ½ of basal compartment of vertex; basal compartment 2.2–2.4× longer than apical compartment. Frons 1.5–1.6× longer than wide; frons not visible in dorsal view. Position of maximum width of frons distinctly distad of centre of frontoclypeal suture. Frontoclypeal suture slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. Rostrum reaching hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum moderately wider than head (including eyes). Hind margin of pronotum rectangular to slightly obtuse. Forewing 3.3–3.5× longer than wide; forewing with slightly developed basal emargination; costa with about 30–31 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a long (more than half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP;

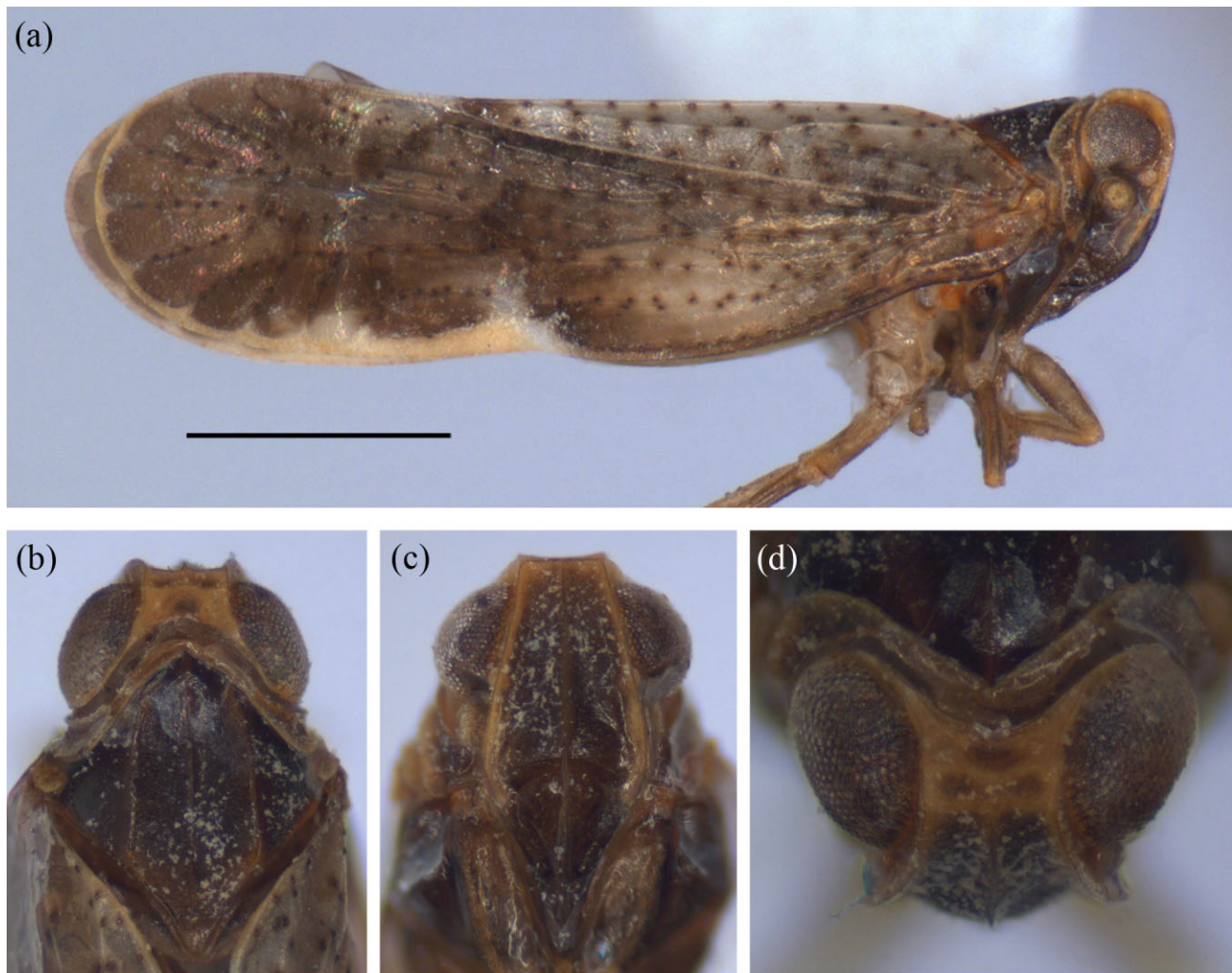


Fig. 7. *Leptolamia conicula*: (a) habitus; (b–d) head. Scalebar 1 mm.

transverse veinlet M3+4 to Cu1a inserting at M3+4 basad of r-m; position of icu at CuA distad of apex of clavus; position of icu at CuP more or less at same level or slightly distant of apex of clavus; RP apically bifid; MA apically trifid; additional subapical cell between branches of MA absent; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 9 apical cells. Hind leg: 1st and 2nd tarsomere with 6 apical teeth. **Male genitalia:** Anal tube asymmetrical in dorsal and caudal view (Fig. 23c,e); left lateral lobe subrectangular (widening towards apex) and right lateral lobe oval in lateral view (Fig. 23d). Pygofer and genital styles as in Figure 23f,g; ventromedian process of pygofer triangular, uniformly coloured. Aedeagus (Fig. 23a,b): Phallosome ventrolaterally with large bifurcate spine (a) with tips of different length and large bifurcate spine (b) with tips of equal length; right lateral with a semi-circular, sheet-like ridge. Flagellum unarmed.

Etymology. Named after the two sets of bifurcate spines on the aedeagus. To be treated as an adjective.

***Leptolamia bunyaensis* sp. nov.**

(Figs 6,24)

ZooBank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:42BE8551-0B42-4287-ACD8-C77B1091046A>

Types. *Holotype*, ♂, AUSTRALIA, Qld: Mt Glorious, malaise trap, rainforest, 26.xi.-10.xii.1979 (QM T183311, formerly QDPI). *Paratype*, Qld: 1 ♂, Bunya Mtn, 10.xii.1925 (H Hacker) (QM).

Diagnosis. This species is very similar to *L. jacobii*. It differs from the latter in the curvature of spine (b). In *L. jacobii*, spine (b) is more or less straight, and the entire spine is directed caudally (towards the apex of the aedeagus), whereas in *L. bunyaensis*, spine (b) is recurved with only the base of the spine directed caudally and the tip of the spine directed apically (towards the base of the aedeagus). *L. contraria* possesses a similar aedeagus configuration but has an additional spine on the phallosome compared with *L. bunyaensis* and *L. jacobii*.

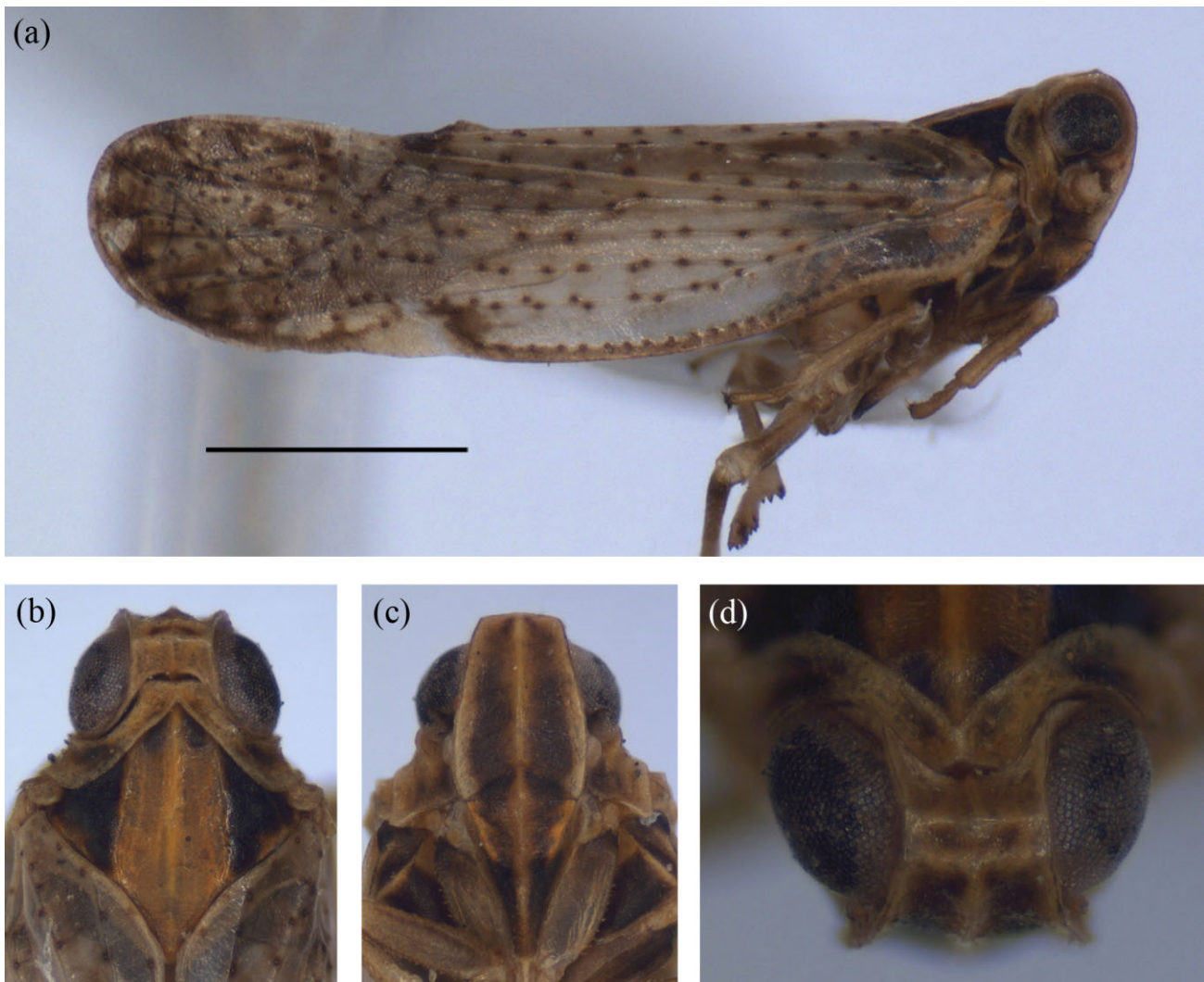


Fig. 8. *Leptolamia contraria*: (a) habitus; (b–d) head. Scalebar 1 mm.

Colour. Head light brown apart from disc of face mid to dark brown and disc of vertex sometimes mid brown, median carina concolorous with face. Pronotum light brown; mesonotum mid to dark brown. Forewing hyaline colourless with a few light-brown marks along crossveins and around veins at apex of wing; veins and tubercles light brown; pterostigma light brown. Legs light brown. Abdominal sternites mid to dark brown.

Morphology. Body length: ♂ 3.8–4.2 mm. **Head:** Vertex 1.8–1.9× wider than long; at level of basal emargination 1.2–1.3× wider than at subapical carina; apical and subapical carina v-shaped; median carina of vertex complete but obscure; basal compartment of vertex 1.0–1.3× longer than apical compartment. Frons 1.2–1.3× longer than wide; frons just not visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture (in some specimens slightly dorsad of frontoclypeal suture). Frontoclypeal suture strongly semicircular, bent upwards, median part reaching at least lower margin of antennal scape.

Rostrum surpassing hind coxae; apical segment of rostrum distinctly shorter than subapical segment. **Thorax:** Pronotum moderately wider than head (including eyes). Hind margin of pronotum obtusely angled. Forewing 3.5–4.0× longer than wide; forewing with slightly developed basal emargination; costa with about 27–32 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a long (more than half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 basad of r-m; position of icu at CuA at same level as apex of clavus; position of icu at CuP more or less at same level or slightly distant of apex of clavus; RP apically trifid; MA apically trifid; additional subapical cell between branches of MA absent; nodus of γ -vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st and 2nd tarsomere with 6 apical teeth. **Male genitalia:** Anal tube symmetrical in dorsal and caudal view (Fig. 24c,e); lateral lobe triangular in lateral view (Fig. 24d). Pygofer and genital

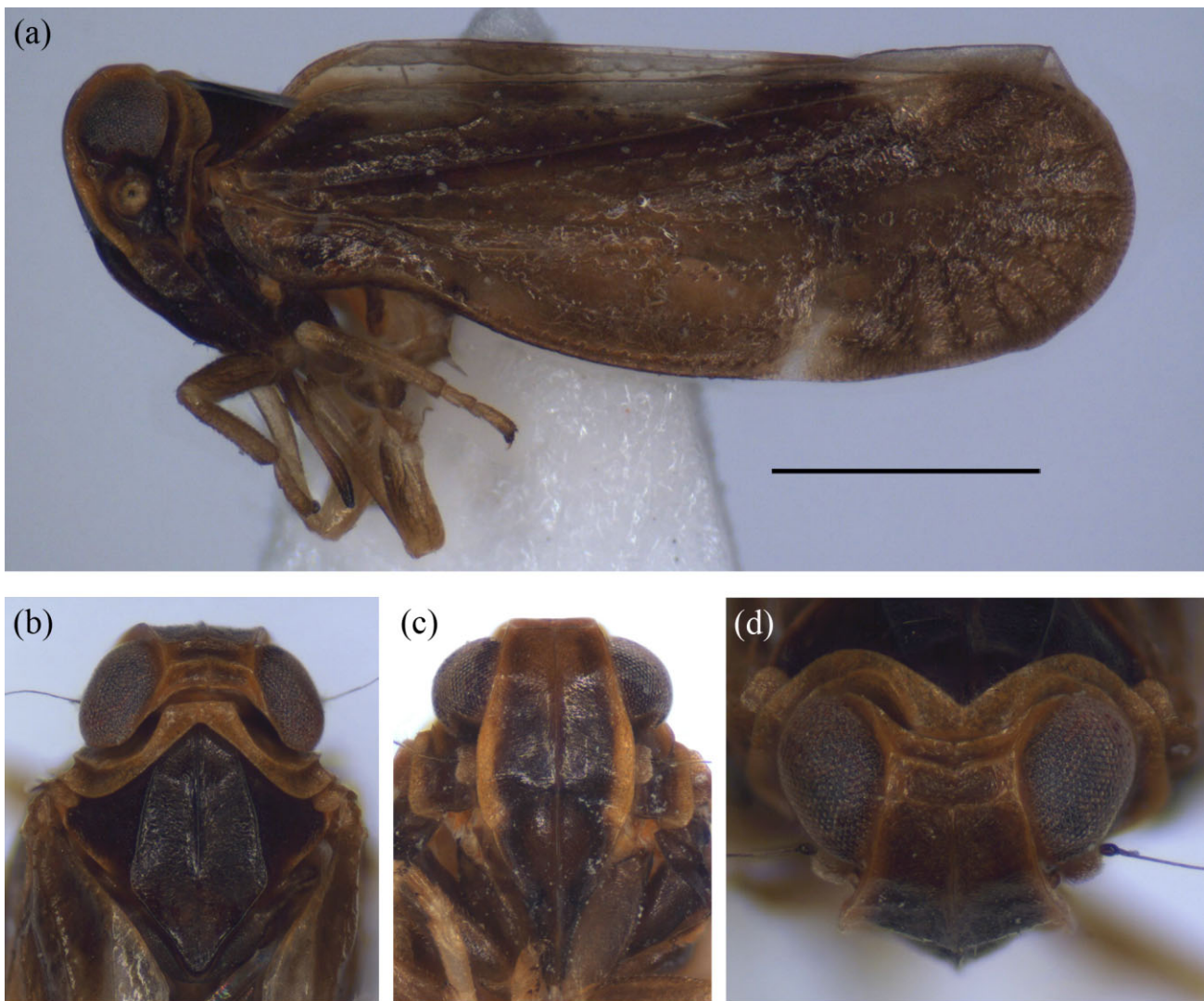


Fig. 9. *Leptolamia glaciata*: (a) habitus; (b–d) head. Scalebar 1 mm.

styles as in Figure 24f,g; ventromedian process of pygofer triangular, uniformly coloured. Aedeagus (Fig. 24a,b): Phallosome left laterally with long, rounded, curved spine (a) inserting at apex of aedeagus; ventrally with recurved spine (b) that is at its base directed caudally and at its tip directed apically; and with long, rounded spine (c). Flagellum unarmed.

Etymology. Named after the paratype locality, Bunya Mountains. To be treated as an adjective derived from the geographical name.

***Leptolamia conicula* sp. nov.**

(Figs 7,25)

Zoobank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:4EAF49A-6A92-4109-B0F5-B1B86A3532D7>

Types. *Holotype*, ♂, AUSTRALIA, NSW: 6 km SE Wauchope, 19.i.2000 (MJ Fletcher & VT Glover) (ASCTHE007010 ASCU). *Paratypes*, NSW: 4 ♀, same data

as holotype (ASCU); 1 ♂, Sugar Creek, Wallingat NP, 32°19.542S, 152° 26.637E, 43 m, ex mv light, 4.i.2008 (ML Moir & KEC Brennan) (MLM 01000); 1 ♂, 2 ♀, Crawford R., Myall R. S.F., 32.25S 152.06E, sweeping foliage (inc. eucalypts), 6.xii.1986 (MM Stevens & FE Frindle) (ASCU); 1 ♀, Gloucester Tops, rainforest beat, 28.xii.2005 (ML Moir) (MLM 01001); 1 ♀, Deriah Aboriginal Area, 23 km E of Narrabri, -30.345S 150.014E, 460 m, SEVT2009002, beating, 10.xi.2009 (DR Britton & J Recsei) (AMS).

Diagnosis. *Leptolamia contraria* and *L. conicula* can be distinguished from other species of *Leptolamia* by the presence of dark tubercles contrasting with lighter veins. All other species of *Leptolamia* have tubercles that are concolorous with veins (either light or dark in colour). Further, *L. contraria* and *L. conicula* share a bifid MA on the forewing. Apart from those two, this feature has only been found in some specimens of *L. praetextata*. Most specimens

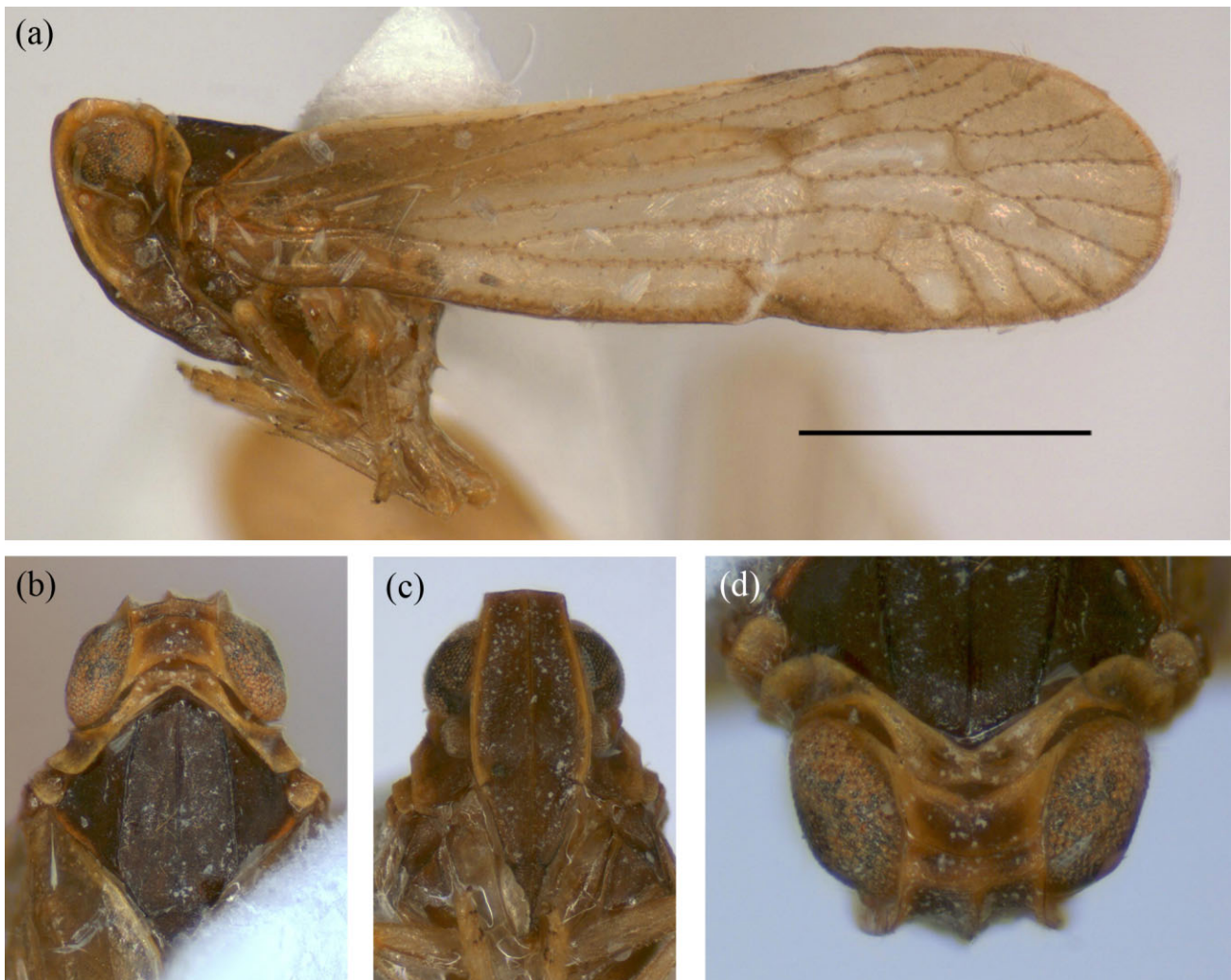


Fig. 10. *Leptolamia gloriosa*: (a) habitus; (b–d) head. Scalebar 1 mm.

of *L. praetextata* and all other species of *Leptolamia* have a trifold MA.

L. conicula differs from *L. contraria* in the shape of the median carina on the face (sharp and blade-like in *L. conicula* while blunt and rounded in *L. contraria*) and the shape of the apex of phallosome (in *L. conicula*, the phallosome is apically extended into a long, transparent conical process; in *L. contraria*, the apex of the phallosome is rounded).

Colour. Vertex light brown, disc sometimes slightly darker. Frons dark brown, carinae (i.e. lateral carinae) paler. Clypeus including carinae dark brown. Pronotum light brown; mesonotum mid or dark brown, carinae paler. Forewing hyaline, whitish near base, brown areas or marks near apex; sometimes with brown marks along crossveins; veins concolorous with cells; tubercles dark, distinctly contrasted to paler coloured veins; pterostigma and apical margin of forewing whitish. Legs whitish, slightly darker towards coxae. Abdominal sternites mid or dark brown, apical margin yellow or orange.

Morphology. Body length: ♂ 3.8–4.3 mm, ♀ 4.6–4.9 mm.

Head: Vertex 1.8–2.2× wider than long; at level of basal emargination 1.0–1.1× as wide as at subapical carina; apical carina v-shaped, subapical carina u- to v-shaped; median carina of vertex absent; basal compartment 1.2–2.7× longer than apical compartment. Frons 1.1–1.3× longer than wide; frons not visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture. Frontoclypeal suture slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. Median carina of frons and clypeus sharp, blade-like. Rostrum slightly surpassing hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum about same width or slightly wider than head (including eyes). Hind margin of pronotum obtusely angled or rectangular. Forewing 3.2–3.9× longer than wide; forewing with weakly to well-developed basal emargination; costa with about 19–21 tubercles, tubercles dark, distinctly in contrast to lighter veins; Sc+R+M near basal cell fused, forming a long (more than half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP distinctly basad of fork CuA1+CuA2; position of

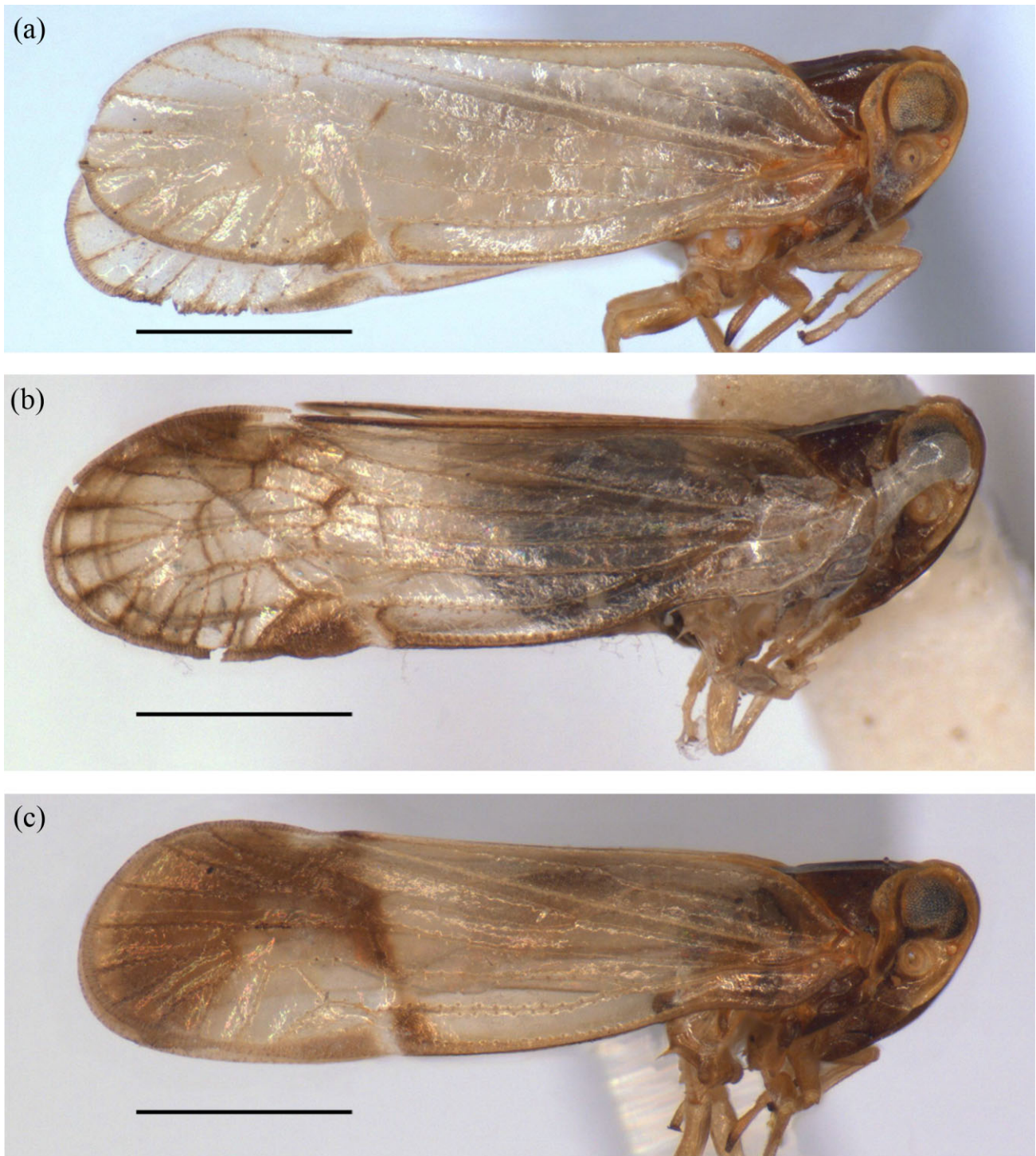


Fig. 11. *Leptolamia jacobii*: (a–c) habitus, (a) specimen from Southport; (b) female specimen from Mt Tambourine, labelled ‘type’ of *Australoma praetextata* (NHRS); (c) specimen from Mt Glorious. Scalebar 1 mm.

r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 basad of r-m; position of icu at CuA at same level or distad of apex of clavus; position of icu at CuP more or less at same level or distant of apex of clavus; RP apically trifid; MA apically bifid; additional subapical cell between branches of MA absent; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 slightly to

distinctly distad of vein delimiting C5; 9 apical cells. Hind leg: 1st tarsomere with 6 apical teeth; 2nd tarsomere with 6 (rarely 7) apical teeth. **Male genitalia:** Anal tube symmetrical in dorsal and caudal view (Fig. 25c,e); lateral lobe rectangular in lateral view (Fig. 25d). Pygofer and genital styles as in Figure 25f,g; ventromedian process of pygofer triangular, margin darkened. Aedeagus (Fig. 25a,b): Phallosome ventrally

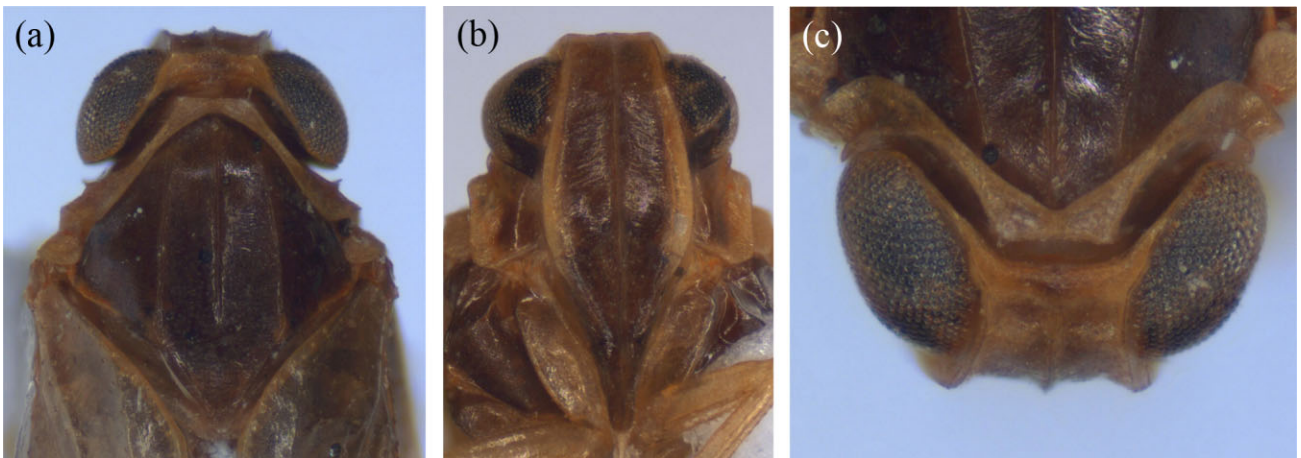


Fig. 12. Leptolamia jacobii: (a–c) head.

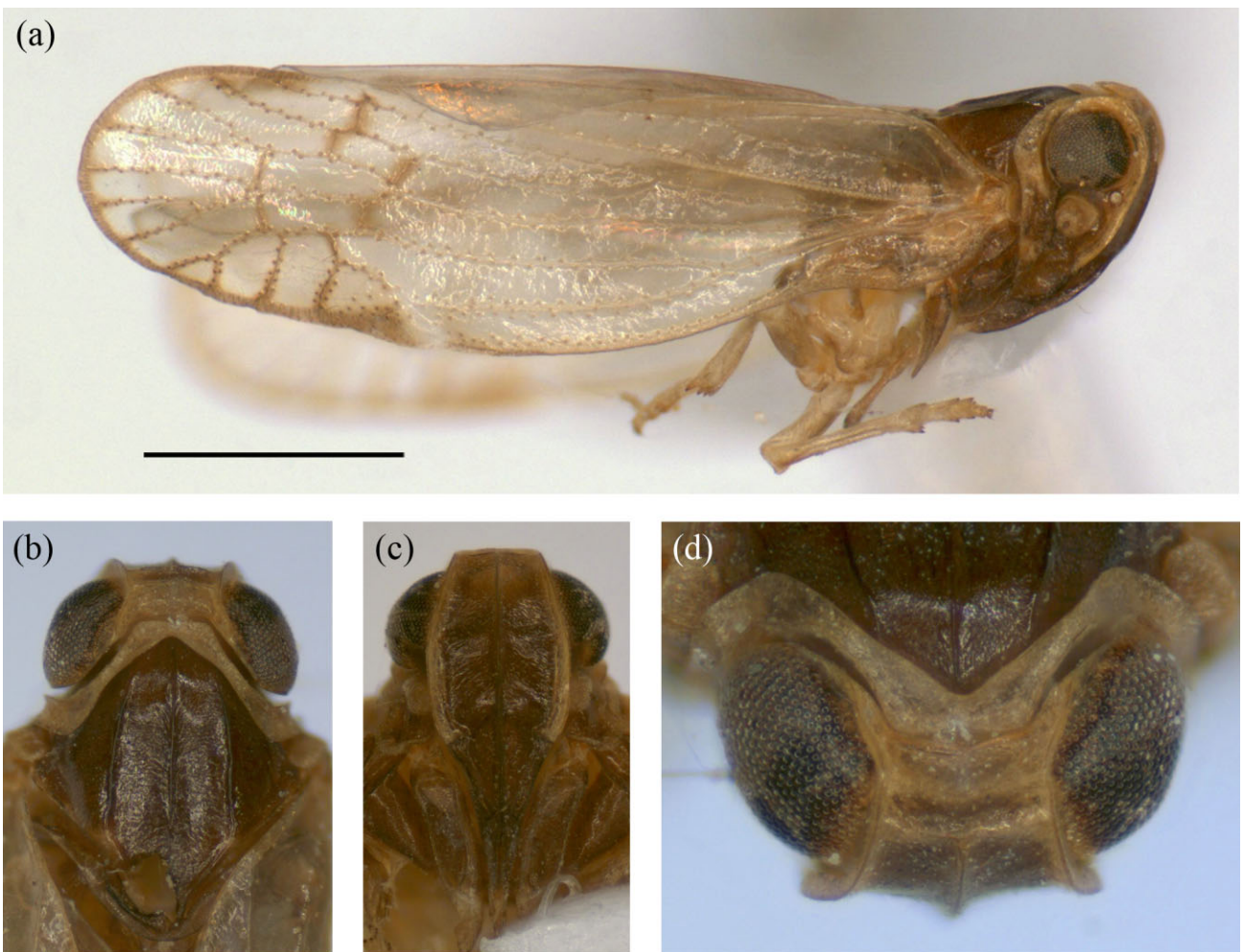


Fig. 13. Leptolamia juliae: (a) habitus; (b–d) head. Scalebar 1 mm.

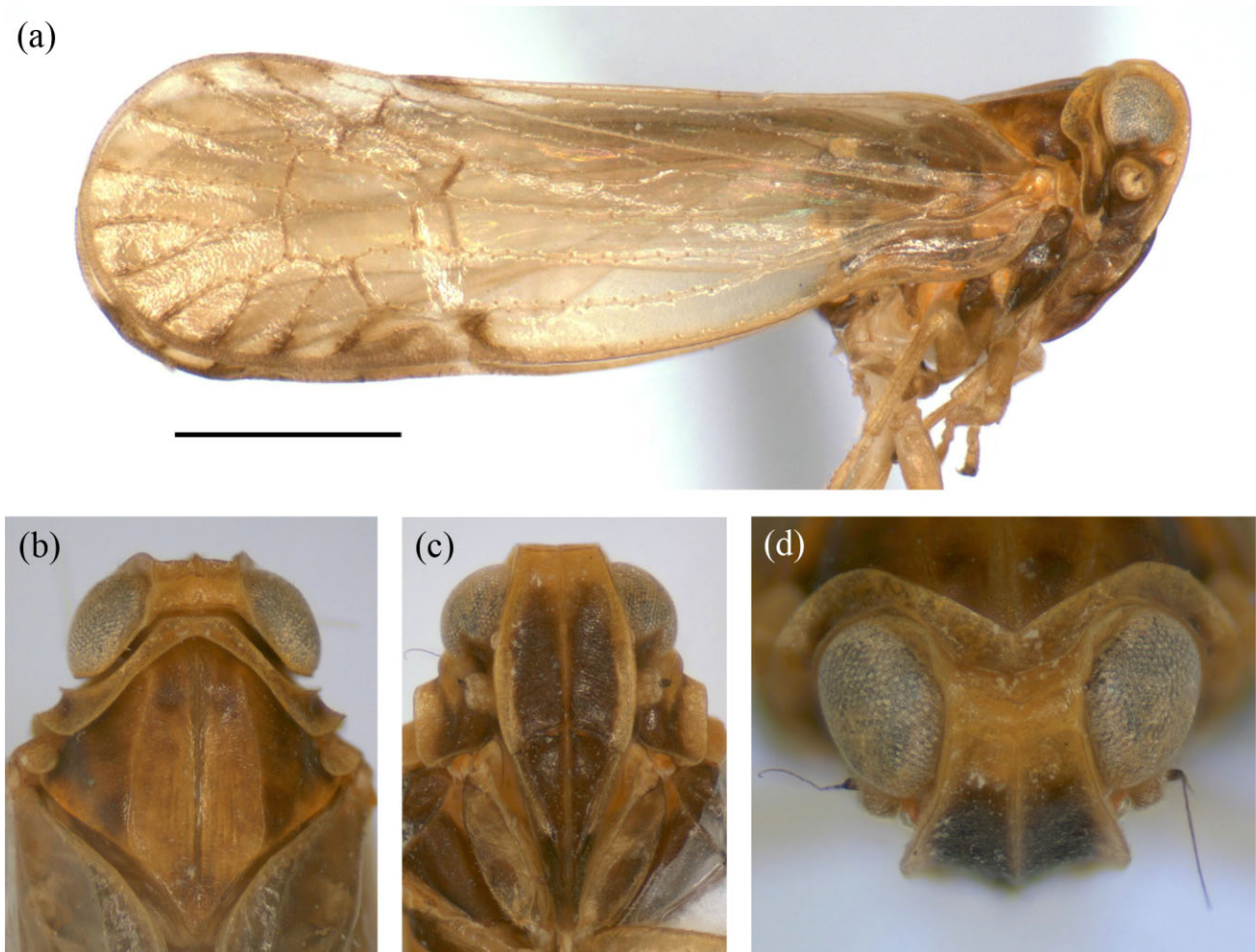


Fig. 14. *Leptolamia kulija*: (a) habitus; (b–d) head. Scalebar 1 mm.

with very long spine (a) performing an almost 180° bend before bending 90° towards the base of phallosome; and a less sclerotised, bifurcate spine (b); apically with a long, transparent, conical process. Flagellum unarmed.

Etymology. Named after the conical process on the apex of phallosome. To be treated as adjective.

***Leptolamia contraria* sp. nov.**

(Figs 8,26)

Zoobank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:EA69BD11-09E7-4B5A-B3E0-D527D367EA1C> [Correction added on 9 May 2014, after first online publication: The Zoobank URL LSID has been corrected for *Leptolamia contraria*.]

Types. *Holotype*, ♂, AUSTRALIA, Vic: Gol Gol, on sticky trap in vineyard, 28.ix.1999 (VAIC 72 153). *Paratype*, SA: 1 ♂, Loxton, ex sticky trap [3.3.16.2.4], 29.ix-14.x.2004 (P Magarey) (ASCU); 1 ♀, Winnininnie, 17 km NE of Yunta, 29.ix.1975 (Z Liepa) (ANIC).

Diagnosis. See Diagnosis section for *L. conicula* for comparison of this species with other species of *Leptolamia*. *L. contraria* shares a similar configuration of spines on the aedeagus with *L. bunyaensis* and *L. jacobii*, (see Diagnosis section of *L. bunyaensis*).

Colour. Vertex light brown; disc or apical compartment darker. Face mid or dark brown with pale carinae. Pronotum light brown with few darker marks; mesonotum light brown dorsally between lateral carinae, laterally mostly dark brown. Forewing hyaline whitish with a dark mark at apex of clavus and basal of pterostigma, a few dark marks along some crossveins and along veins near apex of forewing; veins light brown; tubercles distinctly contrasting with pale veins; pterostigma pale light brown. Legs light brown. Abdominal sternites light to mid brown.

Morphology. Body length: ♂ 4.2 mm, ♀ 4.6 mm. **Head:** Vertex about 1.4× wider than long; at level of basal emargination about 1.1× wider than at subapical carina; apical and subapical carina u- to v-shaped; median carina of vertex complete; basal compartment about 1.6× longer than apical



Fig. 15. *Leptolamia lunata*: (a) habitus; (b–d) head. Scalebar 1 mm.

compartment. Frons 1.2× longer than wide; frons only just visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture. Frontoclypeal suture slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. Median carina of frons and clypeus blunt, rounded. Rostrum reaching hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum moderately wider than head (including eyes). Hind margin of pronotum more or less rectangular. Forewing 4.2× longer than wide; forewing with slightly developed basal emargination; costa with about 29–31 tubercles, tubercles dark, distinctly in contrast with lighter veins; Sc+R+M near basal cell fused, forming a long (more than half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP distinctly basad of fork CuA1+CuA2; position of icu at CuA at same level as apex of clavus; position of icu at CuP distant of apex of clavus; RP apically trifid; MA apically bifid; additional subapical cell between branches of MA absent; nodus of γ -vein slightly basad of centre of clavus; vein delimiting subapical cell C4 slightly distad of vein delimiting C5; 9 apical cells. Hind leg: 1st and 2nd tarsomere with 6 apical teeth. **Male genitalia:**

Anal tube asymmetrical in dorsal and caudal view (Fig. 26c,e); lateral lobe with lateral margin slightly excavated (Fig. 26d). Pygofer and genital styles as in Figure 26 f,g; ventromedian process of pygofer trapezoid, medially slightly emarginate, margin darkened (Fig. 26g). Aedeagus (Fig. 26a,b): Phallosome dorsally with slightly curved spine (a); ventrally with very long, almost straight spine (b); strongly bent spine (c); and short, caudally (towards apex of phallosome) directed spine (d). Flagellum without sclerotised spines.

Etymology. Named after the spines on the aedeagus that extend in opposite directions. To be treated as adjective.

***Leptolamia glaciata* sp. nov.**

(Figs 9,27)

ZooBank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:43B2B973-2E63-4ECC-8B2F-D2A456E654FC>

Types. *Holotype*, ♂, AUSTRALIA, NSW: Mt Banda Banda, 1200 m, 8.xii.1986 (DJ Bickel) (AMS K.351929). *Paratypes*, NSW: 2 ♂, 2 ♀, same data as holotype (1 ♂, 1 ♀ AMS; 1 ♂, 1 ♀ ASCU).

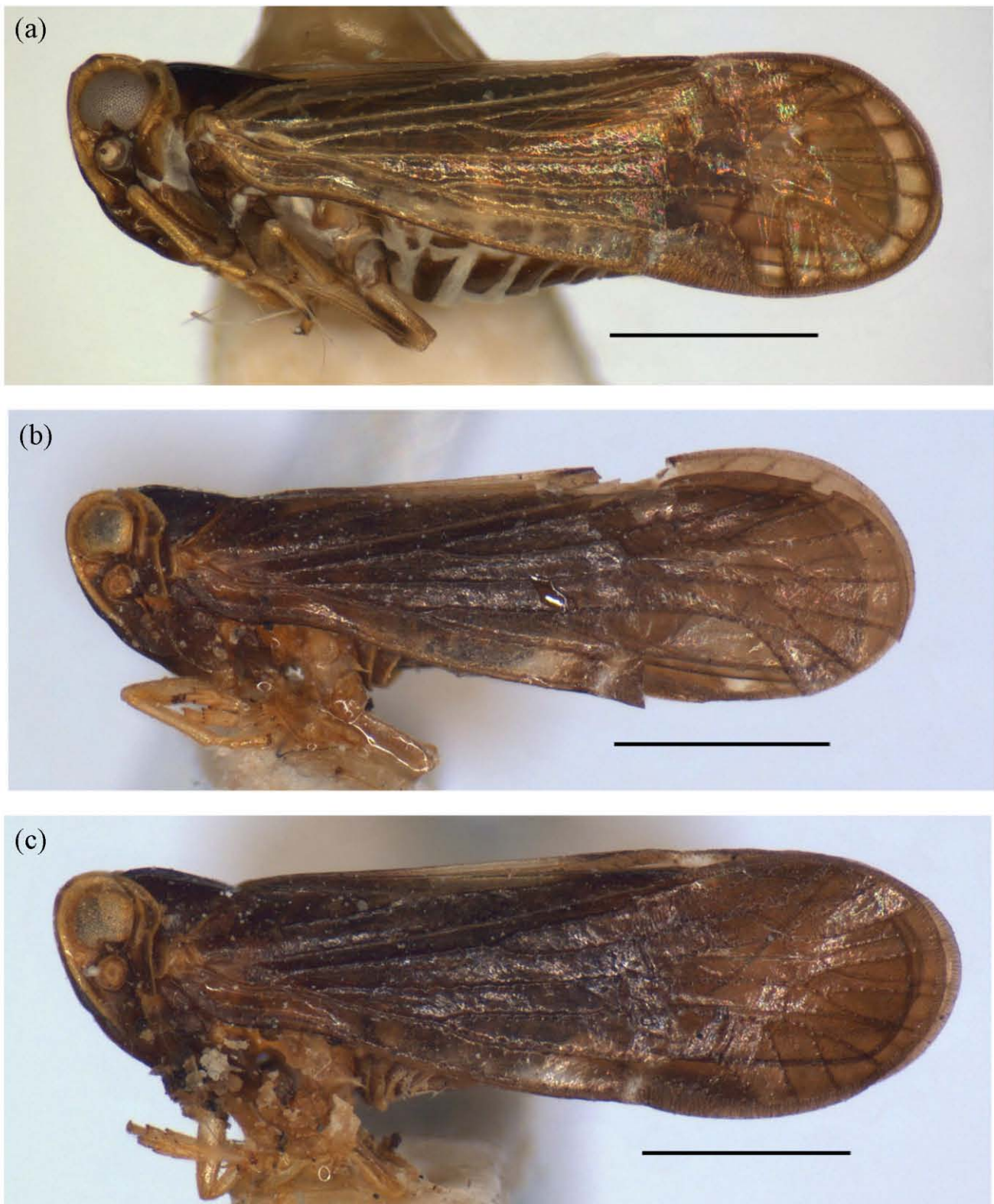


Fig. 16. *Leptolamia praetextata*: (a–c) habitus, (a) specimen with forewing pattern A; (b) male lectotype of *Australoma praetextata* var. *obscura*, forewing pattern B; (c) female paralectotype of *Australoma praetextata* var. *obscura*, forewing pattern B. Scalebar 1 mm.

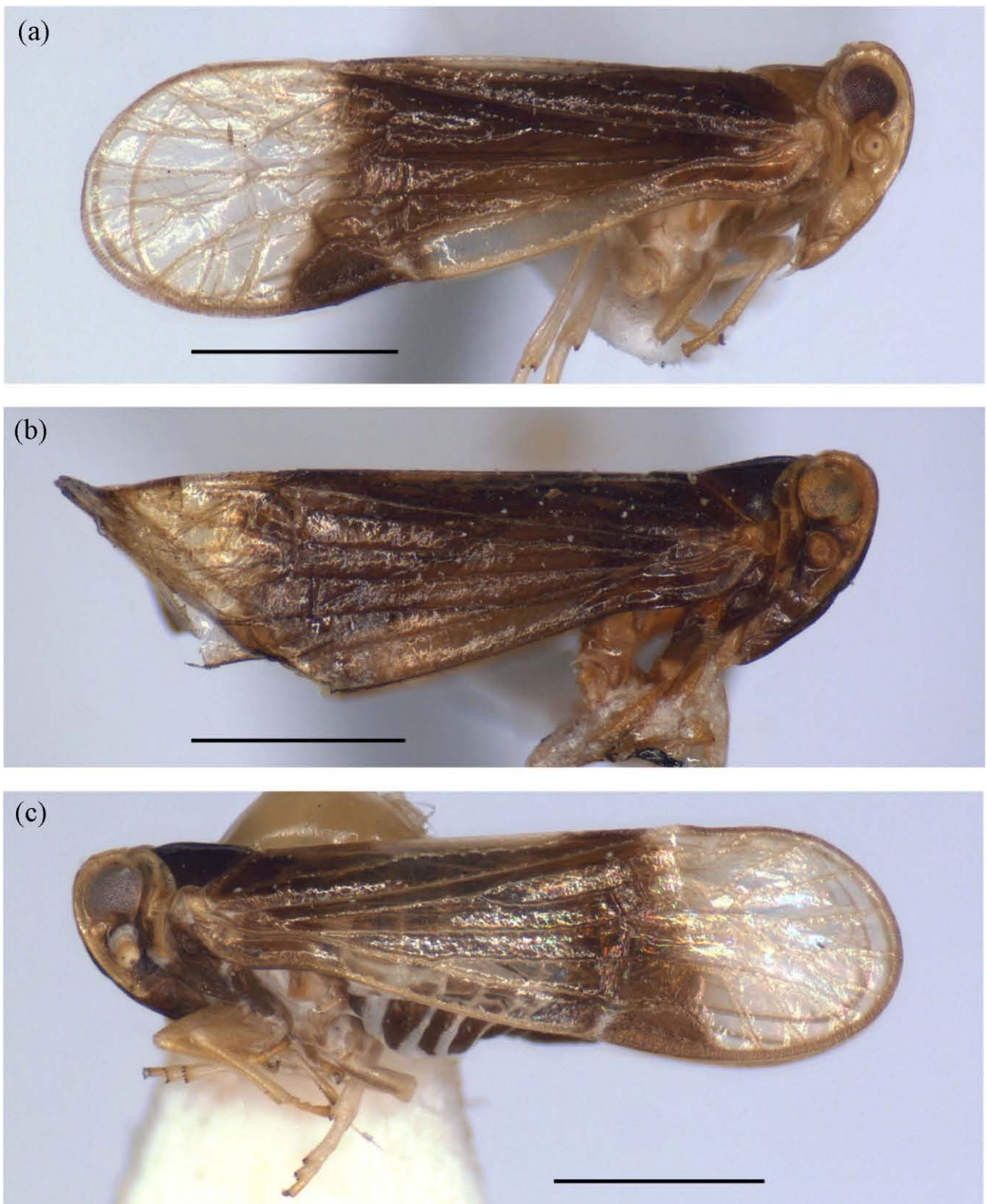


Fig. 17. *Leptolamia praetextata*: (a–c) habitus, (a) specimen with forewing pattern C; (b) male lectotype of *Australoma praetextata*, forewing pattern C; (c) specimen with forewing pattern D. Scalebar 1 mm.

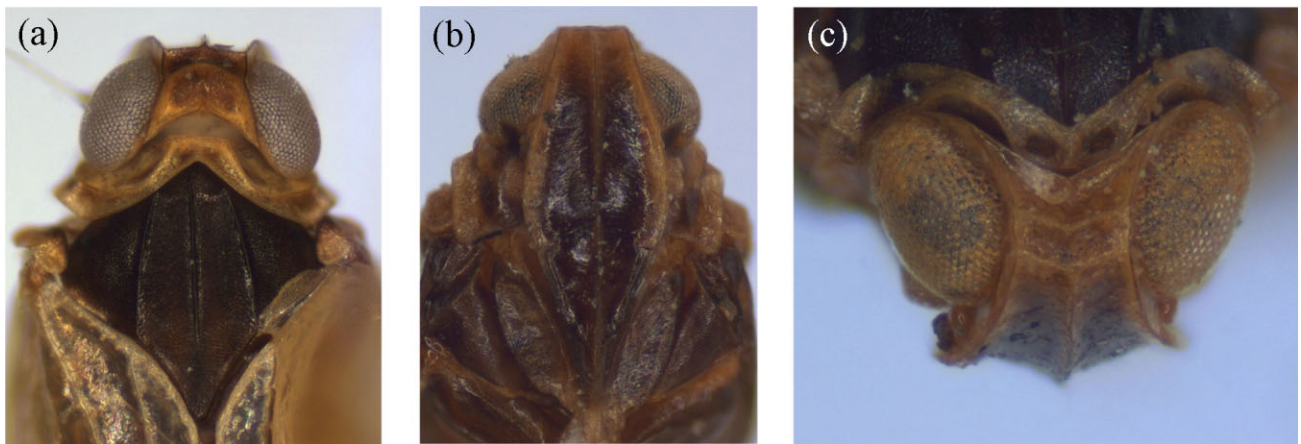


Fig. 18. *Leptolamia praetextata*: (a–c) head.

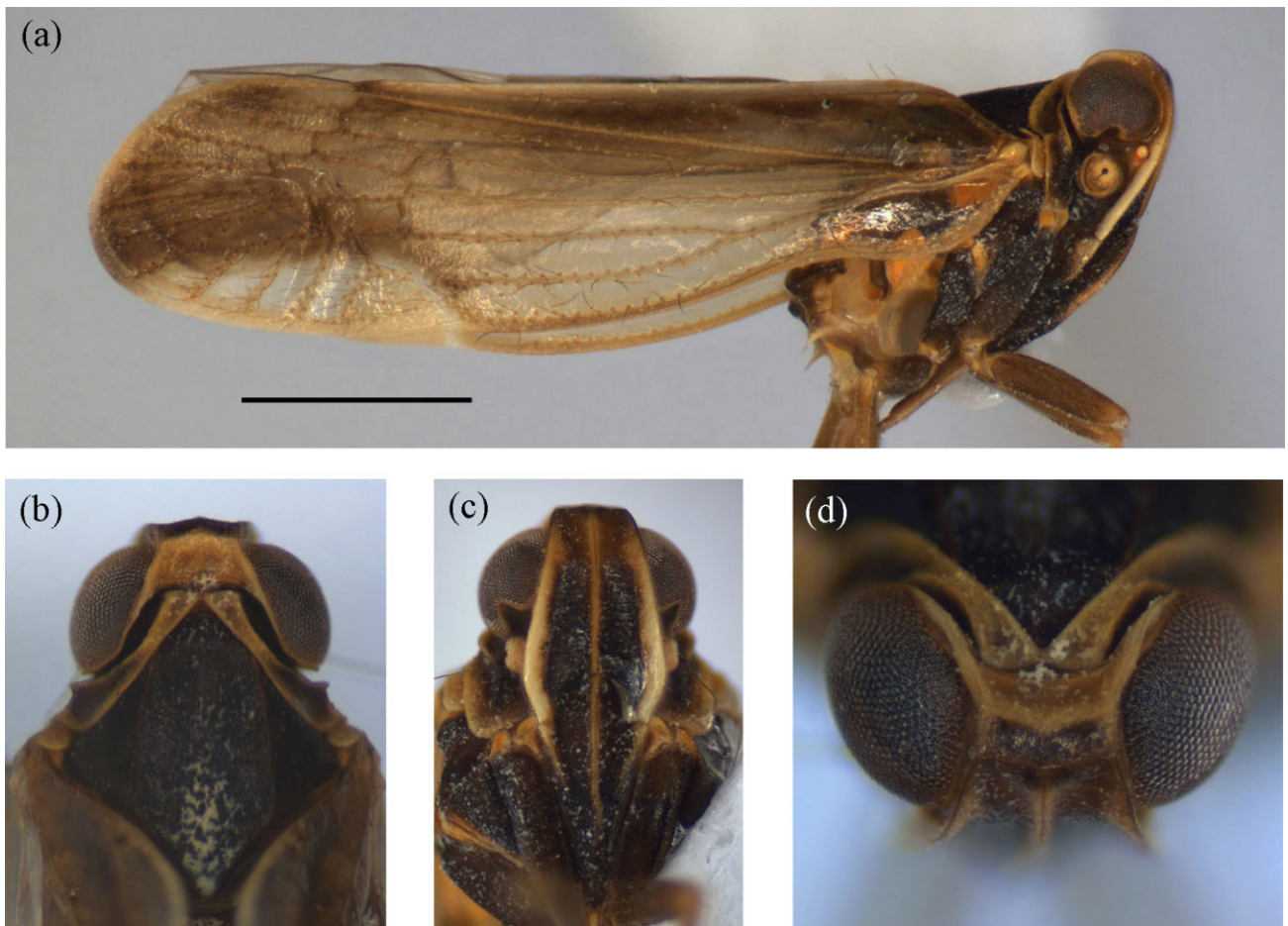


Fig. 19. *Leptolamia radricula*: (a) habitus; (b–d) head. Scalebar 1 mm.

Diagnosis. *L. glaciata* and *L. radricula* can easily be distinguished from all other species of *Leptolamia* by the presence of a large spine on the phallotheca bearing two little spines in its basal half. In *L. radricula*, the little spines insert on opposite sides of the large spine, whereas in *L. glaciata*, the little spines

insert right next to each other on the same side of the large spine. The following feature, nodus of the y-vein distinctly basad of the centre of clavus has only been observed in *L. glaciata* and *L. gloriosa*. In all other species, the nodus of the y-vein lies more or less centrally within the clavus.

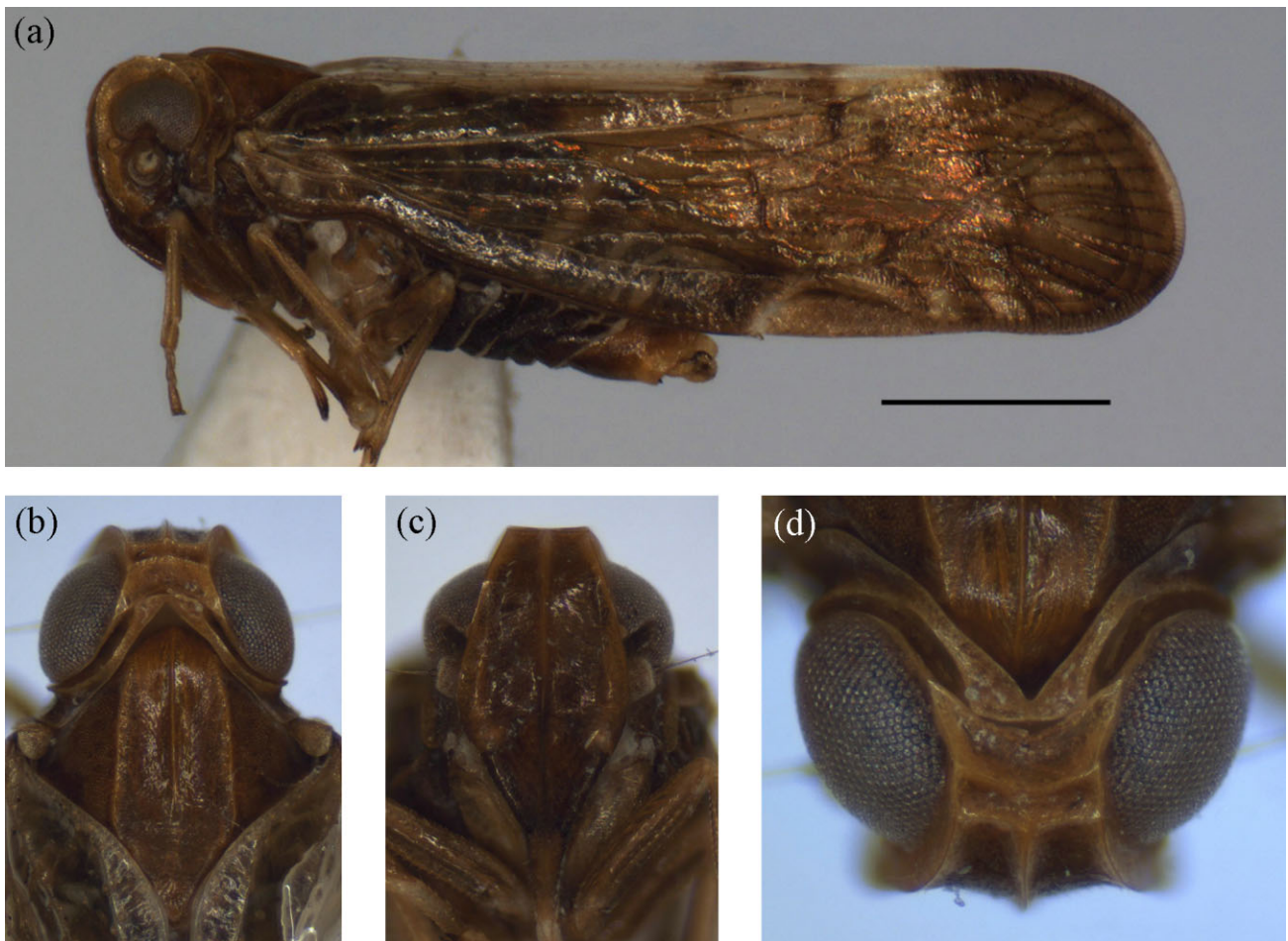


Fig. 20. *Leptolamia sonjae*: (a) habitus; (b–d) head. Scalebar 1 mm.

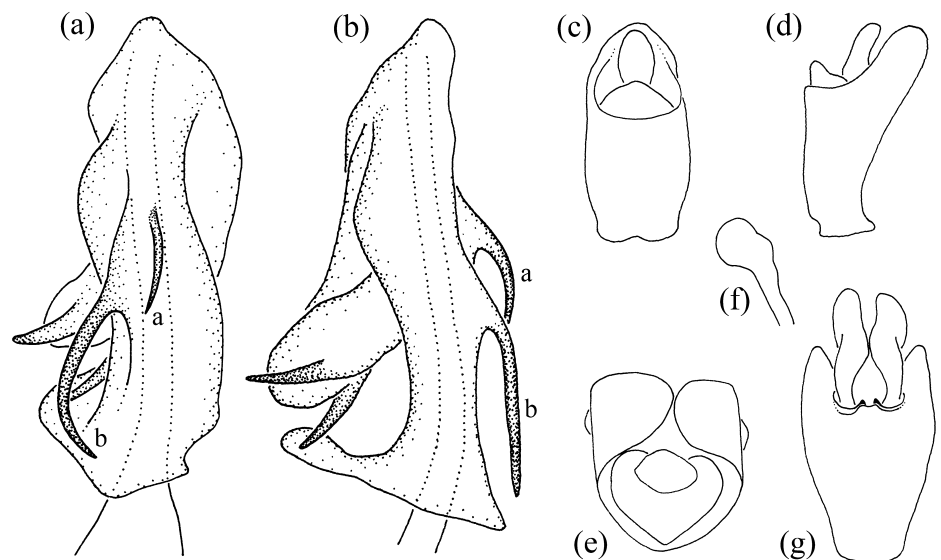


Fig. 21. *Leptolamia compressa*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

Colour. Vertex light brown, disc slightly darker. Face dark brown with paler carinae (i.e. lateral carinae); disc of frons near apical carina paler. Pronotum light brown, mesonotum dark brown. Forewing hyaline mid brown (rarely light brown) with 3 white marks along dorsal margin (2 within clavus, one distad of apex of clavus) and a white mark at base of

pterostigma, pterostigma darker apically; veins and tubercles concolorous with cells. Legs light brown, darker towards coxae. Abdominal sternites dark brown.

Morphology. Body length: ♂ 3.9–4.1 mm, ♀ 4.4–4.5 mm. **Head:** Vertex 2.3–2.9× wider than long; at level of basal

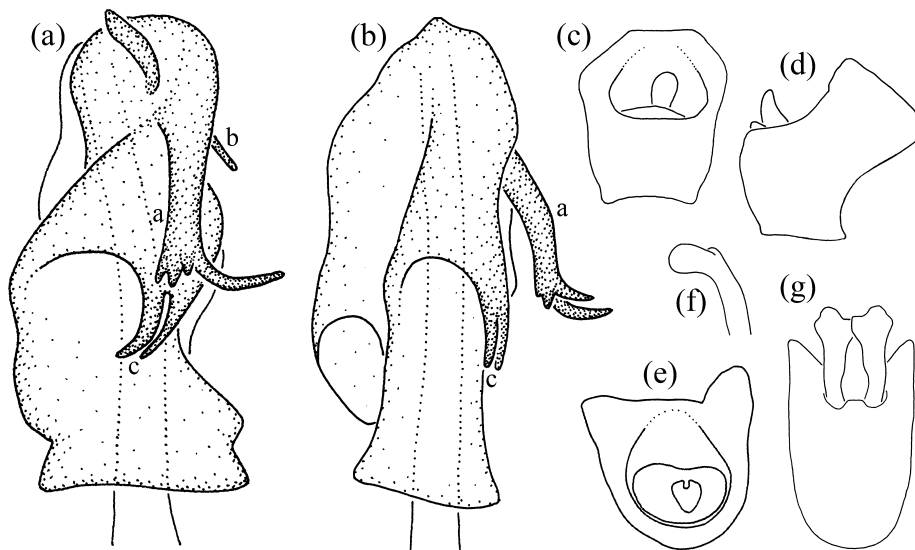


Fig. 22. *Leptolamia absona*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

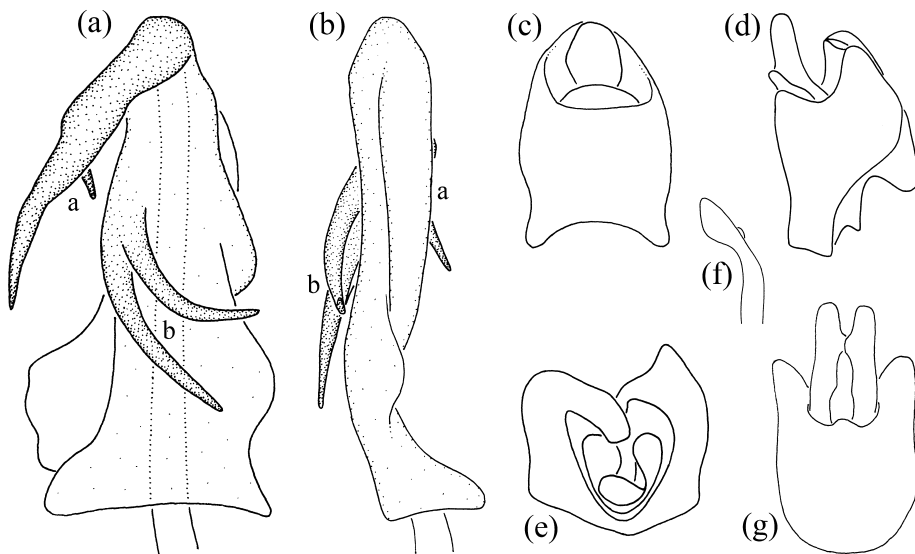


Fig. 23. *Leptolamia bifurcata*: (a) aedeagus ventral; (b) aedeagus right lateral; (c–e) anal tube; (f, g) genital styles.

emargination about 1.2× wider than at subapical carina; apical and subapical carina v-shaped; median carina of vertex absent; basal compartment of vertex 1.1–2.0× longer than apical compartment. Frons 1.1–1.2× longer than wide; frons clearly visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture. Frontoclypeal suture straight or slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. Rostrum surpassing hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum slightly to moderately wider than head (including eyes). Hind margin of pronotum obtusely angled or rectangular. Forewing 3.1–3.4× longer than wide; forewing with well-developed basal emargination; costa with about 27–28 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a short-to-moderate (half of length of basal cell or less) common stem Sc+R+M; fork of ScRA+RP

moderately to distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 basad of r-m; position of icu at CuA at same level as apex of clavus; position of icu at CuP more or less at same level as apex of clavus; RP apically trifid; MA apically trifid; additional subapical cell between branches of MA absent; nodus of y-vein distinctly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st and 2nd tarsomere with 6 apical teeth. **Male genitalia:** Anal tube symmetrical in dorsal and caudal view (Fig. 27c,e); lateral lobe triangular in lateral view (Fig. 27d). Pygofer and genital styles as in Figure 27f,g; ventromedian process of pygofer triangular, uniformly coloured. Aedeagus (Fig. 27a,b): Phallosome left laterally with a large, curved spine (a) bearing two very small, parallel spines (b,c), ventrally with a sclerotised ridge bearing a short spine (d). Flagellum unarmed.

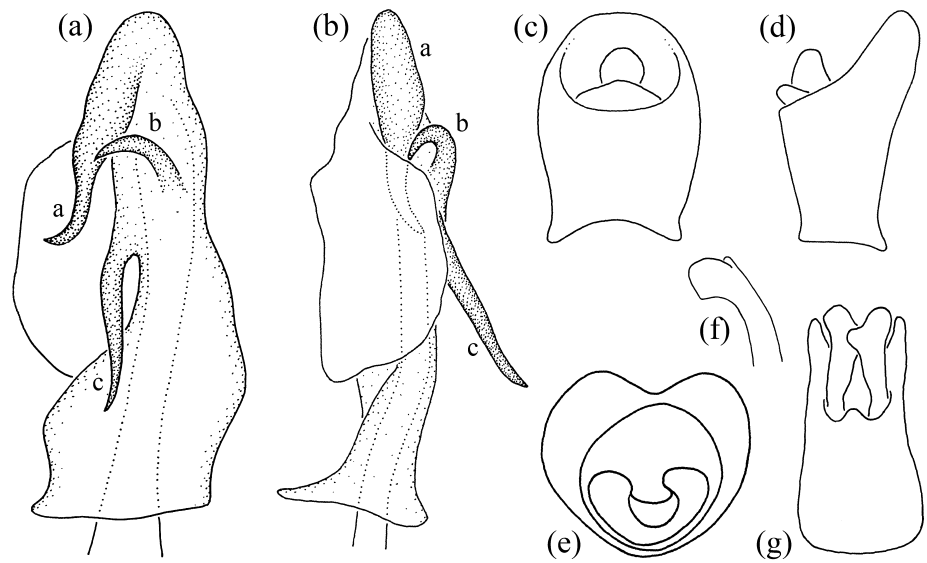


Fig. 24. *Leptolamia bunyaensis*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

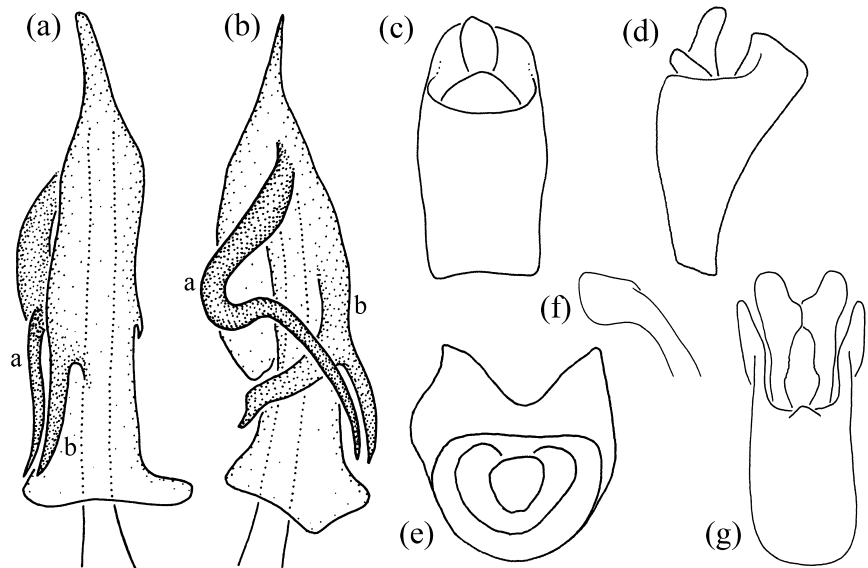


Fig. 25. *Leptolamia conicula*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

Etymology. The Latin term ‘glacio’ means ‘freeze’ and refers to the two little spines hanging, like icicles, from the large spine. To be treated as past participle.

***Leptolamia gloriosa* sp. nov.**

(Figs 10, 28)

Zoobank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:464A43F9-278C-4E1E-8544-63288FDFA5EF>

Type. *Holotype*, ♂, AUSTRALIA, Qld: Mt Glorious, rain forest, 24.–28.ii.1961 (L. & M. Gressitt) (BPBM 17633).

Diagnosis. *L. gloriosa* resembles *L. glaciata* in the position of the nodus of the y-vein (see Diagnosis section of *L. glaciata*).

Colour. Head mid brown, carinae (i.e. lateral carinae) paler. Pronotum light brown; mesonotum mid to dark brown. Fore-

wing hyaline light brown; slightly darker along crossveins; pterostigma basally whitish, apically darker. Legs light brown. Abdominal sternites mid brown.

Morphology. **Body length:** ♂ 3.8 mm. **Head:** Vertex about 1.8× wider than long; at level of basal emargination about 1.1× wider than at subapical carina; apical carina v-shaped, subapical carina u-shaped; median carina of vertex absent; basal compartment about 3.0× longer than apical compartment. Frons 1.5× longer than wide; frons just not visible in dorsal view. Position of maximum width of frons distinctly distad of centre of frontoclypeal suture. Frontoclypeal suture slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. **Thorax:** Pronotum slightly wider than head (including eyes). Hind margin of pronotum obtusely angled. Forewing 3.3× longer than wide; forewing with slightly developed basal emargination; costa with

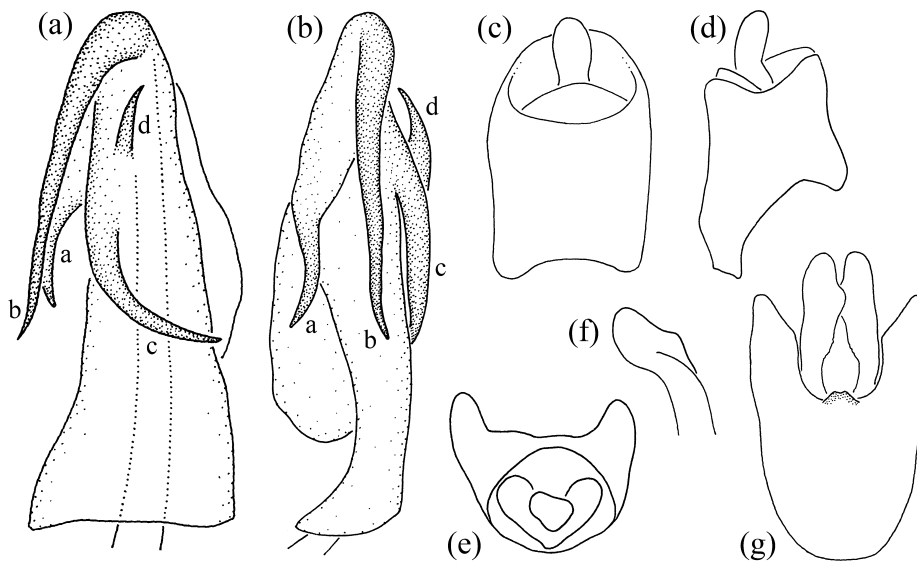


Fig. 26. *Leptolamia contraria*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

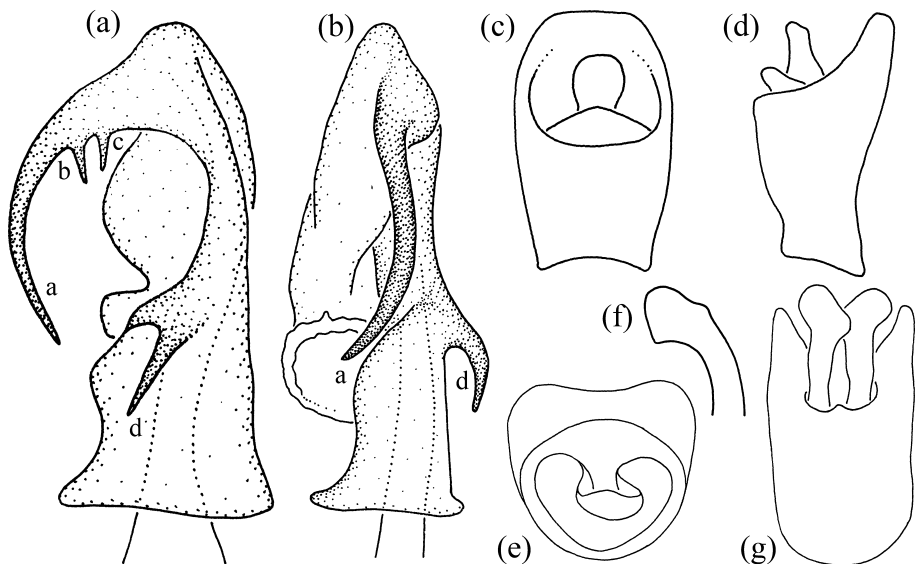


Fig. 27. *Leptolamia glaciata*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

about 30 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a long (more than half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 at same level or basad of r-m; position of icu at CuA at same level as apex of clavus; position of icu at CuP more or less at same level as apex of clavus; RP apically trifid; MA apically trifid; additional subapical cell between branches of MA absent; nodus of y-vein distinctly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st and 2nd tarsomere with 6 apical teeth. **Male genitalia:** Anal tube symmetrical in dorsal and caudal view (Fig. 28c,e); lateral lobe with lateral margin excavated (Fig. 28d). Pygofer and genital styles as in Figure 28f,g; ventromedian process of pygofer trapezoid, margin darkened. Aedeagus (Fig. 28a,b): Phallosome ven-

trally with medium-sized, curved spine (a) and a large ridge bearing two curved spines (b, c); left laterally with a thick, well-sclerotised, bifurcate spine (d) inserting at apex of phallosome; dorsally with a large, triangular sheet-like ridge bearing a short spine (e). Flagellum unarmed.

Etymology. Named after the beauty of this species as well as the type locality. To be treated as adjective.

***Leptolamia jacobii* sp. nov.**

(Figs 2,11,12,29)

Zoobank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:19AED3D2-AD50-4149-B550-77B8197B9E77>

Types. *Holotype*, ♂, AUSTRALIA, Qld: Southport, 19.x.1925 (H Hacker) (QM T196226). *Paratypes*, Qld: 1 ♀, same data as holotype (QM); 1 ♂, 3 ♀, Mt Tambourine (Mjöberg's Expedition) (1 ♂, 2 ♀, NHRS; 1 ♂, 1 ♀, MTD);

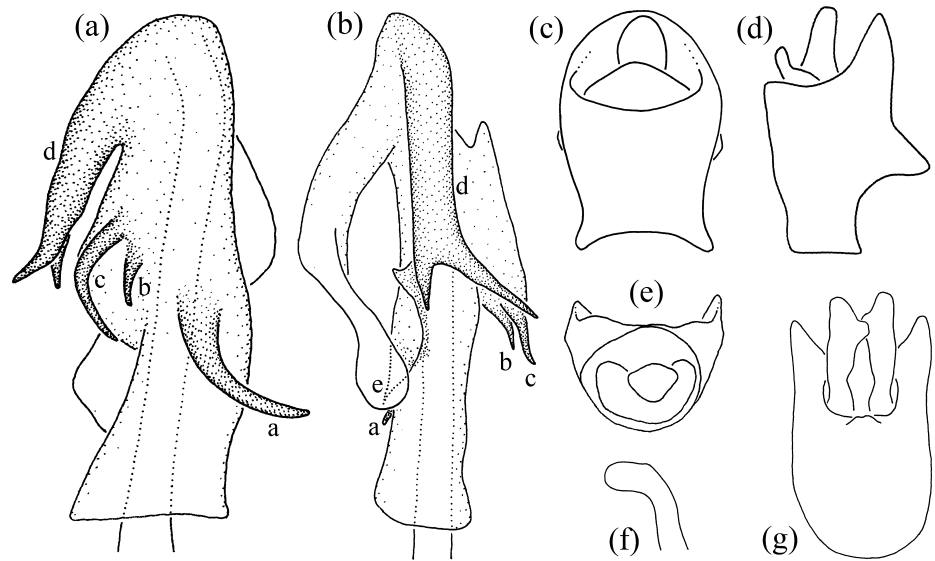


Fig. 28. *Leptolamia gloriosa*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

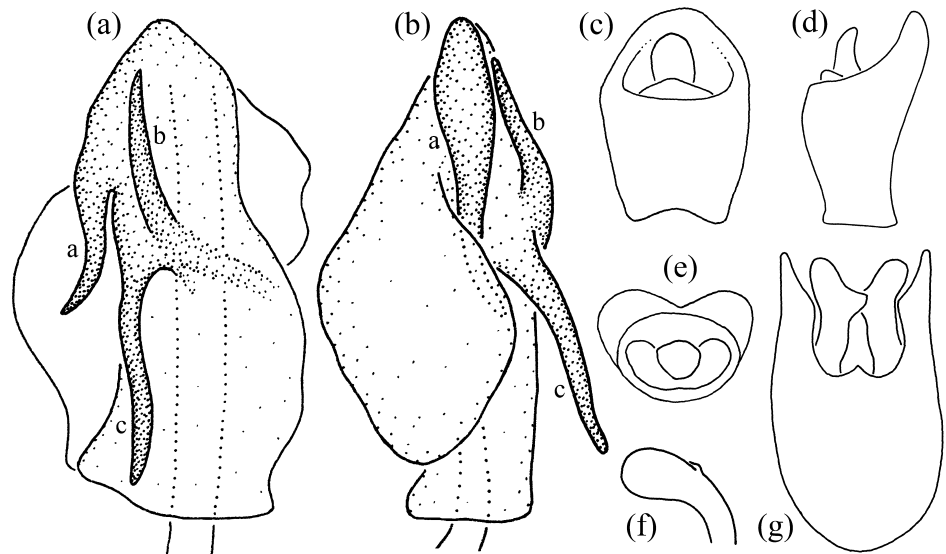


Fig. 29. *Leptolamia jacobii*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

1 ♂, Mt Glorious, sclerophyll forest, 13.-16.ii.1961 (L & M Gressitt) (BPBM).

Other material examined

NSW: 1 ♂ approx. 3 km N Lansdowne via Taree, on *Caldecluvia paniculosa* blossom, 13.xi.1990 (G & T Williams) (AMS).

Note: This specimen is excluded from the type series as it is shrivelled and in a bad condition and shows some variation in the male genitalia compared with the remainder of the material.

Diagnosis. Regarding the configuration of spines on the aedeagus *L. jacobii* is very similar to *L. bunyaensis* and *L. contraria* (see Diagnosis section of *L. bunyaensis*).

Colour. Vertex light brown; frons mid brown, carinae paler; clypeus mid brown. Pronotum light brown; mesonotum mid to

dark brown. Forewing hyaline colourless (Fig. 11a), sometimes with one or more brown marks apically (Fig. 11b), sometimes with apical third of forewing mid to dark brown apart from a semicircular hyaline area (Fig. 11c); veins and tubercles concolorous with cells; pterostigma mid brown (basally paler). Legs light brown. Abdominal sternites light, mid or dark brown.

Morphology. Body length: ♂ 4.1–4.5 mm, ♀ 4.7–4.9 mm.

Head: Vertex 1.8–2.6× wider than long; at level of basal emargination 1.1–1.2× wider than at subapical carina; apical and subapical carina v-shaped; median carina of vertex absent or incomplete (covering ½ of basal compartment of vertex); basal compartment of vertex 0.7–1.3× longer than apical compartment. Frons 1.3× longer than wide; frons only just visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture or distinctly distad of frontoclypeal suture. Frontoclypeal suture slightly semicir-

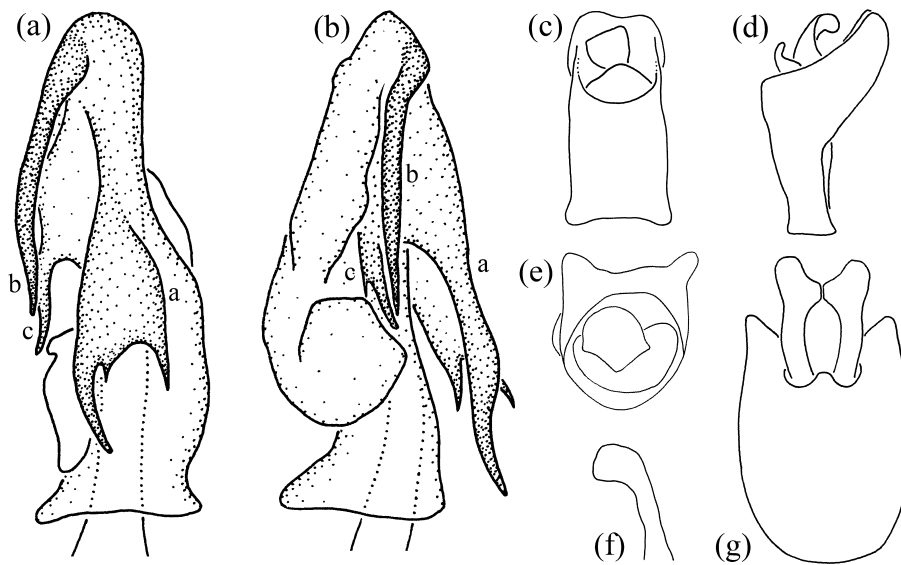


Fig. 30. *Leptolamia juliae*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

cular, bent upwards, median part not reaching lower margin of antennal scape. Rostrum reaching or slightly surpassing hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum slightly to moderately wider than head (including eyes). Hind margin of pronotum obtusely angled. Forewing 3.3–3.7× longer than wide; forewing with slightly developed basal emargination; costa with about 28–34 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a short (less than half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 at same level or basad of r-m; position of icu at CuA at same level or distad of apex of clavus; position of icu at CuP more or less at same level or distant of apex of clavus; RP apically trifid; MA apically trifid; additional subapical cell between branches of MA absent; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st tarsomere with 6 (rarely 5 or 7) apical teeth; 2nd tarsomere with 6 apical teeth. **Male genitalia:** Anal tube symmetrical in dorsal and caudal view (Fig. 29c,e); lateral lobe triangular in lateral view (Fig. 29d). Pygofer and genital styles as in Figure 29f,g; ventromedian process of pygofer, triangular, uniformly coloured. Aedeagus (Fig. 29a,b): Phallosome left laterally with long, rounded, curved spine (a) inserting at apex of aedeagus; ventrally with more or less straight spine (b) that is directed caudally; and with long, rounded spine (c). Flagellum unarmed.

Etymology. This species is named in honour of Arnold Jacobi whose publications on the Australian fauna were very significant. To be treated as noun in the genitive case.

Remarks. A female specimen labelled ‘type’ (Figs 2,11b), and two males and two females labelled ‘cotype’ of *L. praetextata* were found in the collections of MTD and

NHRS. However, these specimens do not match the original description of *L. praetextata*. They represent a new species described here as *L. jacobii*. For further comments, see Notes section of *L. praetextata*.

The length and curvature of spine (a) varies within *L. jacobii*. In the male specimens from Mt Glorious and Lansdowne spine (a) is much longer than in the specimen illustrated, it reaches as far down the base of the aedeagus as spine (c). In most specimens, spine (a) is sinuate, whereas in the specimen from Lansdowne, the spine is arcuate.

Leptolamia juliae sp. nov.

(Figs 13,30)

Zoobank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:576AB5BA-C9EA-40B8-A511-72B905884948>

Types. *Holotype*, ♂, AUSTRALIA, Qld: 1 ♂, Nagaragoon Falls, Lamington NP, sweeping shrubs, 28.x.1955 (TE Woodward) (QM T183312, formerly UQIC). *Paratypes*, Qld: 3 ♂, O’Reillys Guest House, via Canungra, malaise trap, edge forest, 3.ii.–2.iii.1980 (QDPI; 1 ASCU).

Diagnosis. This species is unique within *Leptolamia* by the presence of a large, ridge-like, trifurcate spine on the ventral side of the phallosome. The only other species that can have a trifurcate spine is *L. lunata*. However, in *L. lunata*, there are two spines on the Flagellum, whereas the Flagellum is unarmed in *L. juliae*.

Colour. Vertex light brown, disc of apical (and rarely basal) compartment dark. Frons mid to dark brown, lateral carinae light brown. Clypeus including carinae dark brown. Pronotum light brown; mesonotum mid or dark brown. Forewing hyaline colourless with some light brown marks along crossveins and veins near apical margin of wing; pterostigma basally whitish, apically light to mid brown. Legs light brown. Abdominal sternites mid brown.

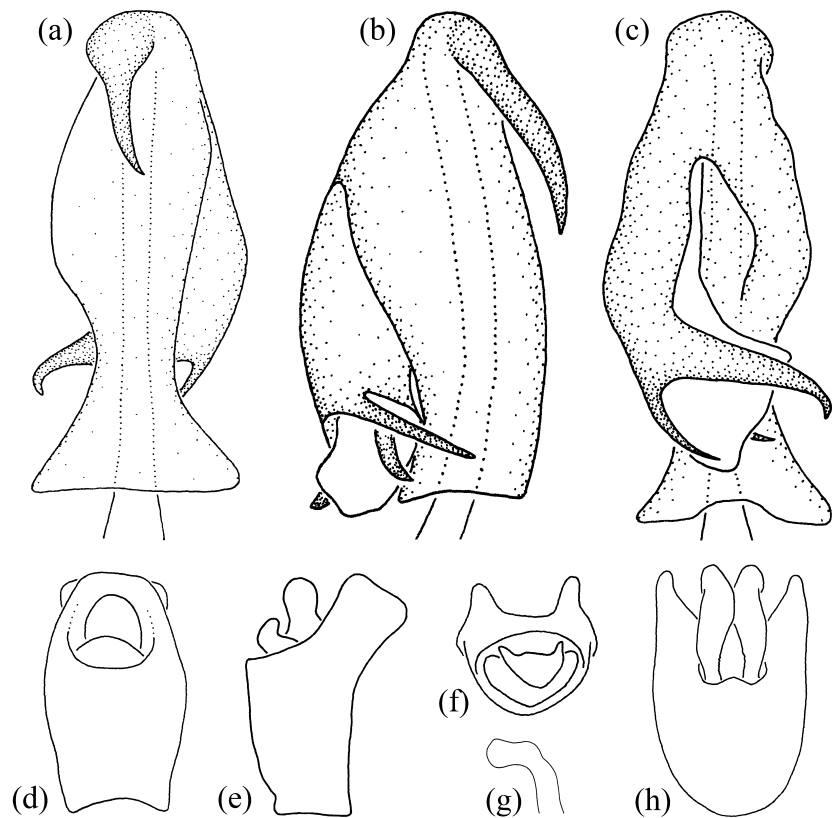


Fig. 31. *Leptolamia kulija*: (a) aedeagus ventral; (b) aedeagus left lateral; (c) aedeagus dorsal; (d–f) anal tube; (g, h) genital styles.

Morphology. Body length: ♂ 3.8–4.2 mm. **Head:** Vertex 2.3–2.4× wider than long; at level of basal emargination about 1.1× wider than at subapical carina; apical carina v-shaped, subapical carina v-shaped (rarely u-shaped); median carina of vertex absent; basal compartment 2.0–2.5× longer than apical compartment. Frons 1.2–1.5× longer than wide; frons just not visible in dorsal view. Position of maximum width of frons distinctly dorsad of centre of frontoclypeal suture. Frontoclypeal suture slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. Rostrum surpassing hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum about same width or slightly wider than head (including eyes). Hind margin of pronotum obtusely angled or rectangular. Forewing 3.5–3.6× longer than wide; forewing with well-developed basal emargination; costa with about 30–37 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a short-to-moderate (half of length of basal cell or less) common stem Sc+R+M; fork of ScRA+RP distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 basad of r-m; position of icu at CuA at same level as apex of clavus; position of icu at CuP more or less at same level as apex of clavus; RP apically trifid; MA apically trifid; additional subapical cell between branches of MA absent; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st and 2nd tarsomere with 6 apical teeth. **Male genitalia:** Anal tube more or less symmetrical in dorsal and caudal view

(Fig. 30c,e); lateral lobe triangular in lateral view (Fig. 30d). Pygofer and genital styles as in Figure 30f,g; ventromedian process of pygofer triangular to trapezoid, uniformly coloured. Aedeagus (Fig. 30a,b): Phallosome ventrally with a large, ridge-like, trifurcate spine (a), left laterally with a long, well-sclerotized spine (b) and a sheet-like ridge, bearing a short, less sclerotized spine (c). Flagellum unarmed.

Etymology. Named in honour of the author's daughter Julia. To be treated as noun in the genitive case.

***Leptolamia kulija* sp. nov.**

(Figs 14,31)

Zoobank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:493F47EE-6ADD-4A9F-9191-3532F9BACB7B>

Types. *Holotype*, ♂, AUSTRALIA, NSW: Mt Wilson, Blue Mountains, 10.-11.xii.1983 (DS Horning, Jr) (ANIC 20-004508). *Paratypes*, NSW: 4 ♂, same data as holotype (ANIC); 1 ♂, Dorrigo NP, 28.i.1961 (DK McAlpine) (AMS); 1 ♂, Wilson R. Reserve via Bellangry, 26.xi.1966 (DK McAlpine) (AMS); 1 ♂, same data, 27.xi.1966 (AMS); 3 ♂, Salisbury, xi.1964 (ASCU); 1 ♂, Lorien Ref., 3 km N Lansdowne nr Taree, rainforest margin, malaise trap, 19.-25.x.1987 (G Williams) (AMS). Qld: 1 ♂, Bunya Mtn, 10.xii.1925 (H Hacker) (QM).

Diagnosis. This species is unique within *Leptolamia* by having only a single (unforked) spine on the phallosome.

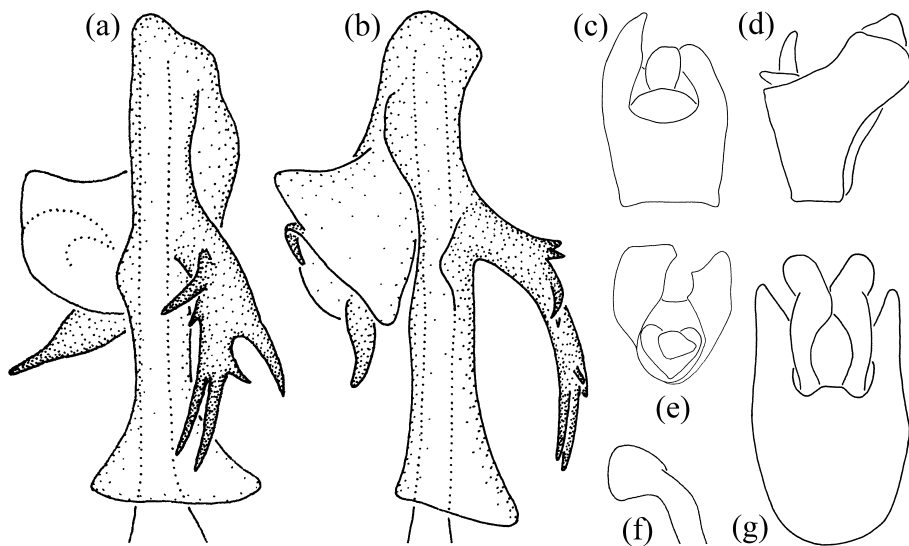


Fig. 32. *Leptolamia lunata*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

Colour. Vertex light brown, disc sometimes darker. Face mid or dark brown, carinae paler; sometimes disc of frons near apical carina paler. Pronotum light brown; mesonotum light, mid or dark brown, sometimes with darker or paler areas, carinae sometimes paler. Forewing hyaline light brown with some darker marks along crossveins and along veins near apex of forewing; veins and tubercles concolorous with cells (rarely tubercles slightly darker than veins); pterostigma basally whitish, apically darker. Legs light brown, sometimes darker towards coxae. Abdominal sternites dark brown.

Morphology. Body length: ♂ 4.5–4.9 mm. **Head:** Vertex 1.8–2.4× wider than long; at level of basal emargination 1.1–1.3× wider than at subapical carina; apical and subapical carina v-shaped; median carina of vertex absent, incomplete or complete; basal compartment of vertex 1.1–2.5× longer than apical compartment. Frons 1.2–1.5× longer than wide; frons just not visible or only just visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture or distinctly distad of frontoclypeal suture. Frontoclypeal suture slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. Rostrum surpassing hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum moderately to distinctly wider than head (including eyes). Hind margin of pronotum obtusely angled. Forewing 3.0–3.3× longer than wide; forewing with weakly to well-developed basal emargination; costa with about 27–36 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a short or long common stem Sc+R+M; fork of ScRA+RP distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 at same level or basad of r-m; position of icu at CuA at same level as apex of clavus; position of icu at CuP more or less at same level or slightly distant of apex of clavus; RP apically bifid or trifid; MA apically trifid or quadrid; additional subapical cell between branches of MA absent; nodus of y-vein slightly basad of centre of clavus; vein

delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st tarsomere with 6 apical teeth; 2nd tarsomere with 6 (rarely 5) apical teeth. **Male genitalia:** Anal tube symmetrical in dorsal and caudal view (Fig. 31d,f); lateral lobe subrectangular (widening towards apex) in lateral view (Fig. 31e). Pygofer and genital styles as in Figure 31g,h; ventromedian process of pygofer triangular, margin slightly darkened dorsally. Aedeagus (Fig. 31a–c): Phallosome apically with a well-sclerotised spine with a very large round base. Flagellum sclerotised with three spines apically.

Etymology. The Aboriginal term ‘kulija’ means ‘penguin’ and refers to the shape of the aedeagus in ventral and left lateral view. To be treated as noun in apposition.

Leptolamia lunata sp. nov.

(Figs 15,32)

Zoobank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:B05AD5AD-B622-459E-9CC7-E4EAF1CD975A>

Types. *Holotype*, ♂, AUSTRALIA, Qld: Speewah Rd, 5 mi. S Kuranda, 12.i.1967 (DK McAlpine & G Holloway) (AMS K.351930). *Paratypes*, Qld: 2 ♂, 1 ♀, same data as holotype (1 ♂, 1 ♀ AMS; 1 ♂ ASCU); 1 ♂, 3.5mls Kuranda-Mareeba Rd, 20.i.1962 (E Britton) (BMNH); 1 ♂, 1 ♀, Kuranda, Windy Hollow Rd, 24.ii.1997 (LB O’Brien) (LBOB); 3 ♂, 14 ♀, Cairns dist. (AM Lea) (SAMA), 1 ♀, 6mi WNW of Kuranda, 13.ii.1972 (N. McFarland) (ANIC), 2 ♀, Davies Ck S.F., NE Qld, disturbed habitat, 18.ii.1984 (ID Galloway) (QDPI); 1 ♀, Cougal Creek, Upper Tallebudgera, 28°12’S 153°21’E, 80 m, rainforest, 12–14.x.1990 (G Daniels) (QM, formerly UQIC).

Diagnosis. This species shares the basad position of crossvein r-m with *L. compressa* and *L. sonjae*, but differs from those in the configuration of the spines on the aedeagus.

Colour. Head and thorax orange with a light brown tinge; clypeus sometimes darker. Forewing hyaline light brown; apical margin slightly darker between apex of clavus and pterostigma; mid brown mark basal of pterostigma; veins and tubercles concolorous with cells; pterostigma mid brown. Legs light brown (rarely mid brown). Abdominal sternites mid brown, often with an orange margin.

Morphology. Body length: ♂ 5.0–5.7 mm, ♀ 5.3–6.1 mm.
Head: Vertex 1.3–1.8× wider than long; at level of basal emargination 1.1–1.4× wider than at subapical carina; apical and subapical carina v-shaped; median carina of vertex covering ¼–½ of basal compartment of vertex; basal compartment 2.3–3.6× longer than apical compartment. Frons 1.2–1.5× longer than wide; frons just not visible or only just visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture or distinctly distad of frontoclypeal suture. Frontoclypeal suture slightly semicircular, bent upwards, median part not reaching lower margin of antennal scape. Rostrum reaching or slightly surpassing hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum slightly to moderately wider than head (including eyes). Hind margin of pronotum obtusely angled. Forewing 3.3–3.5× longer than wide; forewing with well-developed basal emargination; costa with about 20–25 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a moderate-to-long (at least half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP slightly distad of fork CuA1+CuA2; position of r-m basad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 at same level or basad of r-m; position of icu at CuA at same level or basad of apex of clavus; position of icu at CuP more or less at same level or slightly distant of apex of clavus; RP apically trifold or quadrifold; MA apically trifold; additional subapical cell between branches of MA absent; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10–11 apical cells. Hind leg: 1st tarsomere with 7 (sometimes 6 or 8) apical teeth; 2nd tarsomere with 7 (sometimes 6 or 8) apical teeth. **Male genitalia:** Anal tube asymmetrical in dorsal and caudal view (Fig. 32c,e); left lateral lobe subrectangular (slightly widening towards apex), right lateral lobe subtriangular (narrowing towards apex) in lateral view (Fig. 32d). Pygofer and genital styles as in Figure 32f,g; ventromedian process of pygofer trapezoid, margin darkened. Aedeagus (Fig. 32a,b): Phallosome ventrally with a large spine, branched three or more times. Flagellum sclerotised, with two large spines apically, one of which is strongly curved.

Etymology. The Latin term ‘*lunatus*’ means ‘bent like a crescent moon’ and refers to curvature and shape of a spine on the flagellum. To be treated as past participle.

***Leptolamia praetextata* (Jacobi, 1928)**

(Figs 16–18,33)

Australoma praetextata Jacobi, 1928: 36, Figure 23.

Bajauana praetextata (Jacobi), Fennah 1980: 239.

Leptolamia praetextata (Jacobi), Löcker *et al.* 2010: 4.

Australoma praetextata var. *obscura* Jacobi, 1928: 37, syn. nov.

Types. *Lectotype* (designated here) of *A. praetextata*, (examined), ♂, AUSTRALIA, Qld: Malanda (Mjöberg Expedition) (ASCTHE030320 MTD).

Lectotype (designated here) of *A. praetextata* var. *obscura*, (examined), ♂, AUSTRALIA, Qld: Malanda (Mjöberg Expedition) (ASCT00179849 MTD). *Paralectotype* (examined), 1 ♀, same data as lectotype (MTD).

Other material examined. AUSTRALIA, Qld: 19 ♂, 5 ♀, 26 km up Tinaroo Ck Rd via Mareeba, 29.ix.-11.xi.1983 (Storey & Brown) (QDPI; 3 ♂, 2 ♀ ASCU); 1 ♂, 1 ♀, Mt Lewis, malaise trap, 16.-20.xi.1980 (R.I. Storey) (QDPI); 1 ♂, 1 ♀, same data, 16.-29.xi.1980 (QDPI; 1 ♀ ASCU); 4 ♂, GS1 Mt Haig, 17.06S 145.36E, 1150 m, malaise trap, 29.ix.31.x.1995 (L. Umbach) (ANIC); 3 ♂, same data, 31.x.-29.xi.1995 (ANIC); 1 ♂, BS2 [Mt] Fisher, 17.33S 145.32E, 1150 m, malaise trap, 3.x.-2.xi.1995 (L. Umbach) (ANIC); 2 ♂, BS3 Massey Crk, 17.37S, 145.34E, 1000 m, malaise trap, 3.x.-2.xi.1995 (L. Umbach) (ANIC). [Possibly Qld (no information given on label)]: 1 ♂, 1 ♂ or ♀, ex stinging plant, 25.viii.1964 (L. Eacham) (QDPI).

Notes: Investigations of the ‘type’ material of *Australoma praetextata* and *A. praetextata* var. *obscura* revealed interesting facts. Jacobi (1928) described the species *A. praetextata* based on one male and two females from Malanda. He characterised the colouration of *A. praetextata* as follows: forewings black, corium sometimes paler, forewings apically hyaline with a very narrow black margin. Jacobi (*loc.cit.*) described *A. praetextata* var. *obscura* as varying in colouration from the nominal form. *A. praetextata* var. *obscura* has entirely black forewings except for more or less extended bands between the Costa and the Subcosta, and along the claval suture as well as brown spots in the apical parts of the wing. Jacobi (*loc.cit.*) explains that because of the absence of male specimens, he is uncertain whether it represents a separate species or not.

The following specimens, labelled as types of *A. praetextata*, were located in NHRS and MTD: Two males and three females from Mt. Tambourine; forewings hyaline, sometimes with a few brown marks apically, veins hyaline to light brown, apices of veins and some crossveins mid to dark brown (Figs 2,11b).

No specimens labelled as *A. praetextata* var. *obscura* could be found. In addition, there are significant discrepancies between the original description and the specimens labelled as types of *A. praetextata*. First, the type locality should be Malanda instead of Mt. Tambourine. Moreover, the colouring of the forewing does not match the description nor does the number of specimens in the type series.

Material was discovered in MTD labelled as *Leptochlamys apicalis* (Fig. 17b) and *Leptochlamys apicalis* var. *obscura* (Fig. 16b,c) (R Emmrich pers. comm. 2004) that led to the clarification of Jacobi’s types:

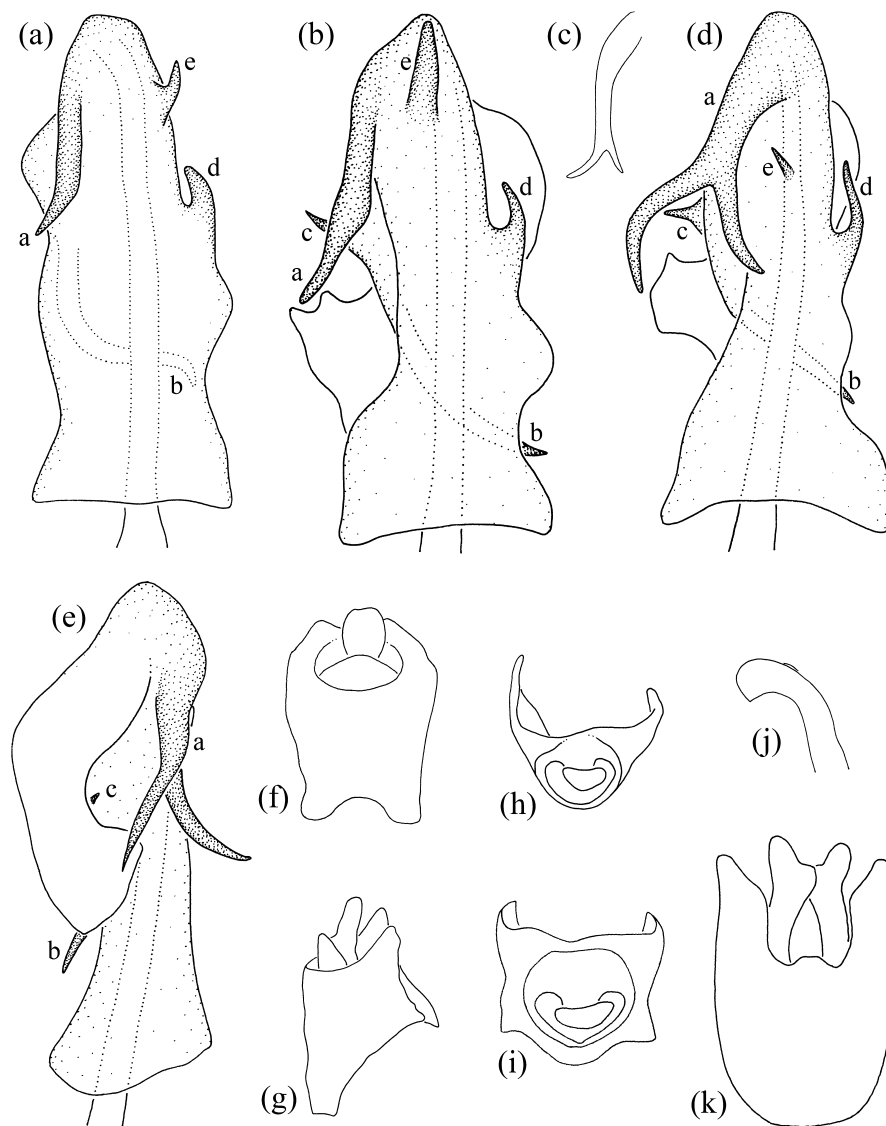


Fig. 33. *Leptolamia praetextata*: (a–d) aedeagus ventral: (a) specimen from Tinaroo Ck Rd, forewing pattern d; (b) specimen from Massey Crk, forewing pattern a; (c) ventral spine of specimen from Fisher, forewing pattern a; (d) specimen from Tinaroo Ck Rd, forewing pattern a; (e) aedeagus left lateral; (f–i) anal tube: (f–h) lectotype of *Australoma praetextata*, (i) specimen from Tinaroo Ck Rd, forewing pattern a; (j, k) genital styles, lectotype of *Australoma praetextata*.

- *Leptochlamys apicalis*:
One male from Malanda; forewings mid to dark brown, apically hyaline (Figs 17b, 18b, c).
- *Leptochlamys apicalis* var. *obscura*:
One male and one female from Malanda; entire wing mid to dark brown except for a hyaline, colourless stripe within clavus and one between Costa and Subcosta (Fig. 16b, c).

A thorough literature search failed to reveal any evidence that the name *Leptochlamys apicalis* was ever published by Jacobi or any other author. The type locality, Malanda, of the specimens labelled as *Leptochlamys apicalis* and *Leptochlamys apicalis* var. *obscura* matches that of the original description of *A. praetextata* and *A. praetextata* var. *obscura*. Moreover, the colouring matches the corresponding descriptions. This suggests that Jacobi changed his mind about the name. Although Jacobi stated that *A. praetextata* var. *obscura* was represented by two females, one syntype specimen of var. *obscura* is a male.

The genitalia of the male specimen of var. *obscura* matched those of *Leptochlamys apicalis* (the tip of spine (e) appears to be broken off in *Leptochlamys apicalis* var. *obscura*). It would appear that Jacobi intended to describe *Leptochlamys apicalis* plus *L. apicalis* var. *obscura* in the genus *Leptochlamys* (now *Leptolamia*), but the description was inadvertently published under the name *A. praetextata* in the genus *Australoma* (now *Bajauana*) and the name associated with the wrong specimens.

Based on the reasons given, I recognise the male specimen from Malanda (labelled *Leptochlamys apicalis*) as a syntype of *A. praetextata*, and it is designated here as the lectotype. The male and female specimen from Malanda (labelled as *Leptochlamys apicalis* var. *obscura*) are recognised as syntypes of *Australoma praetextata* var. *obscura*, and the male specimen is hereby designated as the lectotype and the female as paralectotype.

The ICZN (Art. 45.6.4) states that a name described as a variety before 1961 should be considered subspecific. However, our examination of the variety *obscura* shows that it

is simply a colour variant of *A. praetextata*, and it is hereby synonymised.

The specimens from Mt Tambourine (labelled as *A. praetextata*) represent an undescribed species of *Leptolamia* that is newly described in this paper as *L. jacobii*. The specific epithet *apicalis* is regarded as a manuscript name only.

Diagnosis. *Leptolamia praetextata* can be distinguished from all other species of *Leptolamia* by the presence of a large dorsal spine, crossing over from the left side of the aedeagus to the right side.

Colour. Vertex light or mid brown with light brown to yellow carinae. Pronotum light brown or yellow; mesonotum dark brown (rarely light brown). Forewing varying in colour (see Remarks section). Legs whitish or light brown, femura sometimes darker. Abdominal sternites mid brown.

Morphology. Body length: ♂ 4.0–4.6 mm, ♀ 4.3–4.6 mm.

Head: Vertex 1.5–2.0× wider than long; at level of basal emargination 1.1–1.4× wider than at subapical carina; apical carina v-shaped, subapical carina u- or v-shaped; median carina of vertex absent or incomplete (covering ¼–½ of basal compartment of vertex); basal compartment 1.7–3.0× longer than apical compartment. Frons 1.1–1.5× longer than wide; frons just not or only just visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture to distinctly dorsad of frontoclypeal suture. Frontoclypeal suture semicircular, bent upwards. Rostrum reaching or surpassing hind coxae; apical segment of rostrum almost as long or distinctly shorter than subapical segment.

Thorax: Pronotum moderately to distinctly wider than head (including eyes). Hind margin of pronotum obtusely or acutely angled or rectangular. Forewing 3.0–3.4× longer than wide; forewing with slightly developed basal emargination; costa with about 21–36 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a long (more than half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP moderately to distinctly basad, at same level or slightly distad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 basad of r-m; position of icu at CuA at same level as apex of clavus; position of icu at CuP more or less at same level or slightly distant of apex of clavus; RP apically trifid; MA apically bifid or trifid; additional subapical cell between branches of MA present in some specimens; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 basad or distad of vein delimiting C5; 9 or 10 apical cells. Hind leg: 1st tarsomere with 6 (rarely 5 or 7) apical teeth; 2nd tarsomere with 6 (rarely 5) apical teeth. **Male genitalia:** Anal tube asymmetrical (rarely symmetrical) in caudal view (Fig. 33h,i); lateral lobe slightly bifurcate in lateral view (Fig. 33g). Pygofer and genital styles as in Figure 33j,k; ventromedian process of pygofer triangular or trapezoid, uniformly coloured. Aedeagus (Fig. 33a–e): Phallosome left laterally with long, slightly curved spine (a) that can be bifurcate; dorsally with very long,

curved spine (b) and short, outwardly directed spine (c); right laterally with sheet-like ridge, bearing upwardly directed spine (d); ventrally or ventrolaterally with upwardly directed spine (e). Flagellum without sclerotised spines.

Remarks. Löcker *et al.* (2010) transferred *Bajauana praetextata* into *Leptolamia* on the basis of the carination of the head, the venation of the forewing and the chaetotaxy of the 2nd hind tarsomere. The following characters support this decision: presence of a very distinct subapical transverse carina on top of the head; lateral carinae on anteclypeus absent; forewing with Sc+R+M forming a common stem, intercubitus at the same level as apex of clavus, Radius posterior trifid, 10 apical cells and 2nd hind tarsomere with 6 apical teeth.

Regarding the forewing, different colour patterns are present:

Pattern A. Forewing uniformly light brown; pterostigma slightly darker; sometimes a few darker marks along crossveins (Fig. 16a). This pattern is present in many specimens from Tinaroo Ck Rd and all specimens from Mt Haig, Mt Fisher and Massey Ck.

Pattern B. Forewing uniformly mid to dark brown except for a pale stripe within clavus and a hyaline, colourless stripe between Costa and Subcosta; pterostigma mid or dark brown (Fig. 16b,c). This colour variation is displayed in the type specimens of *L. praetextata* var. *obscura* and in the male specimen found on the ‘stinging plant’.

Pattern C. The lectotype of *L. praetextata*, several specimens from Tinaroo Ck Rd and Mt Lewis and one specimen found on the ‘stinging plant’ display the following colour pattern: Forewing mid to dark brown except for hyaline, colourless apex of wing (apically of clavus) and in most specimens with a hyaline, colourless stripe within clavus and one between Costa and Subcosta; pterostigma mid brown (Fig. 17a,b).

Pattern D. In some specimens from Tinaroo Ck Rd and Mt Lewis, the brown area is reduced to one or two transverse stripes across the wing (one near base of wing, one between pterostigma and apex of clavus) (Fig. 17c).

In addition, differences have been observed in the shape and length of spine (a). In the lectotype of *L. praetextata*, the type series of var. *obscura* as well as in the specimens from Massey Crk and a number of specimens from Tinaroo Ck Rd and Mt Lewis spine (a) is a single spine with a certain degree of variation in the length of the spine (Fig. 33a,b), whereas in the remaining specimens spine (a) is bifurcate (Fig. 33c–e). The specimen from Mt Fisher appears to be an intermediate stage between the two extremes, with only the tip of spine (a) bifurcate (Fig. 33c). Further, the size and position of spine (e) varies considerably within the material examined. In the lectotype of *L. praetextata* and several specimens from Tinaroo Ck Rd and Mt Lewis, spine (e) is comparatively long, inserting ventrolaterally and bending over to the dorsal side of the aedeagus (Fig. 33a). In the lectotype of var. *obscura*, spine (e)

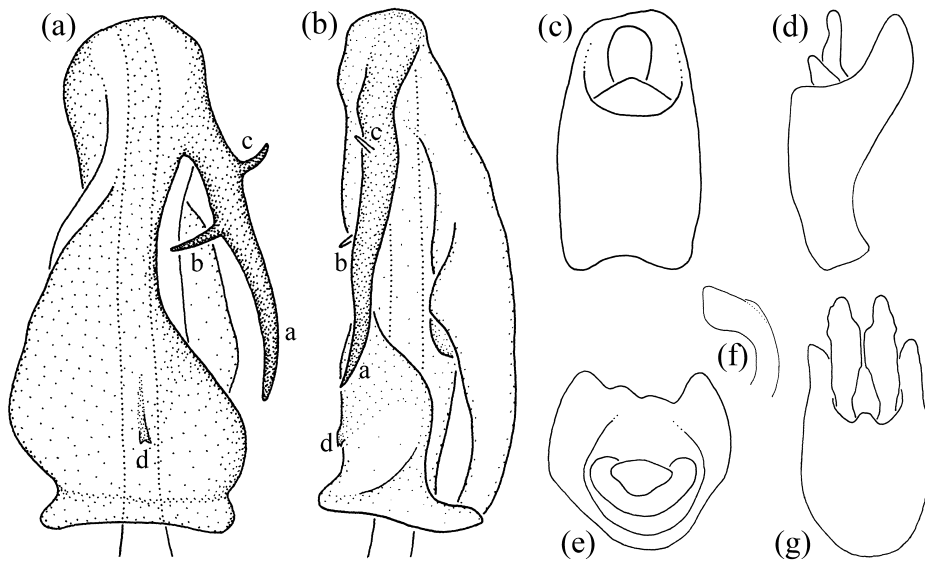


Fig. 34. *Leptolamia radricula*: (a) aedeagus ventral; (b) aedeagus right lateral; (c–e) anal tube; (f, g) genital styles.

inserts in the same position; however, the tip of the spine is broken off. In the specimens from Massey Crk and Mt Fisher, spine (e) is still relatively long but is situated in a ventral position near midline (Fig. 33b). In all other specimens, spine (e) is reduced to a very small spine or knob that is hardly visible (Fig. 33d). Spines (c and d) also vary in size across the material examined.

The differences observed in the male genitalia do not correlate well with the patterns in forewing colouration. All specimens with a bifurcate spine (a) display colour pattern A. Most specimens with a single spine (a) and a ventrolateral spine (e) possess a hyaline tip of the forewing (colour patterns C and D). However, there are some interesting cases: The lectotype of *L. praetextata* and the type series of var. *obscura* have all been collected at Malanda and have the same aedeagal configuration of a single spine (a) and a ventrolateral spine (e); however, they represent different extremes of forewing colouration. The lectotype follows forewing pattern C (tip of forewing hyaline), whereas var. *obscura* displays forewing pattern B (tip of forewing brown). A large number of specimens has been collected 26 km up Tinaroo Ck Rd near Mareeba. About half of those specimens have a bifurcate spine (a) and entirely dark forewings (forewing pattern A) the other half has a single spine (a) and hyaline tipped forewings (forewing patterns C and D). The two specimens collected on the 'stinging plant' also represent two different colour patterns, namely B and C.

There appears to be a gradual shift (the direction of which is still unclear) from the genitalic configuration of a single spine (a) and a large, ventrolateral spine (e) to the configuration of a bifurcate spine (a) and a very reduced, ventral spine (e), via the intermediate stages of a slightly bifurcate spine (a) and a large, ventral spine (e). However, this shift is not well supported by other data such as colour pattern of forewing or locality. All this may indicate that this species is in the process of speciation. Further studies, particularly molecular analysis, are necessary to clarify the situation.

One specimen from Mt Haig shows 7 apical spines on the 2nd hind tarsomere. This appears to be an aberration. First, because four very fine setae are present, a situation the author has not recorded from any other Cixiidae species (usually there are up to three setae present). Second, the 7 spines were only counted on one leg, the other leg displays 6 spines (the usual configuration for this species).

Leptolamia radricula sp. nov.

(Figs 1, 19, 34)

ZooBank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:8B003D06-B67E-4F3C-A460-B427B25BE053>

Types. *Holotype*, ♂, AUSTRALIA, NSW: Oxley Park, 31.05S 150.57E, 515 m, ex *Senecio quadridentatus*, 21.x.1990 (JR Hosking) (ANIC 20-004509). *Paratype*, NSW: 1 ♀, same data as holotype (ANIC); 1 ♂, same data, ex *Senecio lautus* ssp. *dissectifolius*, 28.x.1990 (ANIC); 2 ♂, Yulludunida Crater Tk, Mt Kaputar NP, 30.17S 150.05E, 86–1170 m, unburnt and regrown eucalypt forest, 4.xii.1987 (GR Brown) (ASCU); 1 ♀, Salisbury, xi.1940 (JW E[vans]) (ASCU); 1 ♂ or ♀, Nadgee NR, Nadgee R., wet scler[ophyll forest] (D Bickel) (ASCU).

Diagnosis. This species shares a particular feature on the phallosome with *L. absona* and *L. sonjae* (see Diagnosis section of *L. absona*). All specimens of *L. radricula* have 7 spines on the 1st and 2nd hind tarsomere. This deviates from the usual 6 spines on the 1st and 2nd hind tarsomere within *Leptolamia*. *L. absona* has 6 spines on the 1st and 7 spines on the 2nd tarsomere, and in *L. lunata*, 6–8 spines can be found on the 1st and 2nd tarsomere. For details of how to distinguish *L. radricula* and *L. glaciata* from all other species of *Leptolamia*, see Diagnosis section of *L. glaciata*.

Colour. Vertex light brown apart from mid to dark brown disc of apical compartment of vertex and dark apical carina. Face

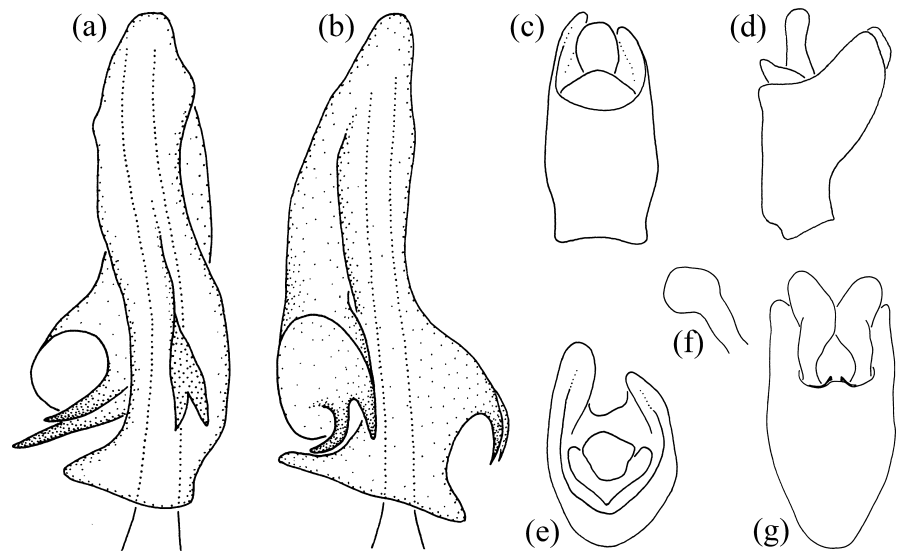


Fig. 35. *Leptolamia sonjae*: (a) aedeagus ventral; (b) aedeagus left lateral; (c–e) anal tube; (f, g) genital styles.

mid to dark brown with pale carinae. Pronotum light brown; mesonotum mid to dark brown. Forewing hyaline colourless with a few light brown marks; pterostigma and area apical of pterostigma whitish followed by a mid to dark brown area around R and MA; veins and tubercles concolorous with cells. Legs light to mid brown. Abdominal sternites mid to dark brown.

Morphology. Body length: ♂ 4.4–4.8 mm, ♀ 5.0–5.4 mm. **Head:** Vertex 1.7–1.8× wider than long; at level of basal emargination 1.3–1.4× wider than at subapical carina; apical and subapical carina v-shaped; median carina of vertex absent; basal compartment of vertex 3.2–3.8× longer than apical compartment. Frons about 1.2× longer than wide; frons just not visible in dorsal view. Position of maximum width of frons more or less around centre of frontoclypeal suture. Frontoclypeal suture semicircular, bent upwards. Rostrum surpassing hind coxae; apical segment of rostrum almost as long as subapical segment. **Thorax:** Pronotum slightly to moderately wider than head (including eyes). Hind margin of pronotum acutely angled or rectangular. Forewing 3.7–4.1× longer than wide; forewing with well-developed basal emargination; costa with about 31–37 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a moderate-to-long (at least half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP moderately to distinctly basad of fork CuA1+CuA2; position of r-m distad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 at same level or distad of r-m; position of icu at CuA at same level as apex of clavus; position of icu at CuP more or less at same level as apex of clavus; RP apically trifid; MA apically trifid; additional subapical cell between branches of MA absent; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st and 2nd tarsomere with 7 apical teeth. **Male genitalia:** Anal tube more or less symmetrical in dorsal and caudal view (Fig. 34c,e); lateral lobe triangular in lateral view (Fig. 34d). Pygofer and genital styles as in Figure 34f,g; ventromedian

process of pygofer triangular, margin slightly darker. Aedeagus (Fig. 34a,b): Phallosome right lateral with very long, thick spine (a), bearing two little spines (b,c). Little spines very slender, facing opposite directions. Phallosome ventrally with a sclerotised ridge bearing a pair of minute spines (d). Flagellum sclerotised, unarmed.

Etymology. The Latin term ‘radicula’ means ‘little root’ and refers to shape of the aedeagal spine which looks like a primary root with secondary roots branching off. To be treated as noun in apposition.

***Leptolamia sonjae* sp. nov.**

(Figs 20,35)

Zoobank registration: <http://zoobank.org/urn:lsid:zoobank.org:act:7F05807C-A125-4B50-9B6A-6447B2F837D5>

Types. *Holotype*, ♂, AUSTRALIA, Qld: Windsor Tableland via Mt Carbine, malaise trap, 10.xi-26.xii.1983 (Storey & Titmarsh) (QM T183313, formerly QDPI). *Paratypes*, Qld: 4 ♂, 5 ♀, same data as holotype (QDPI; 2 ♂, 1 ♀ ASCU); 1 ♂, 2 ♀, same locality data, malaise trap, 4.-29.xii.1980 (QDPI); 2 ♀, same locality data, malaise trap, 29.xii.1980-27.i.1981 (QDPI); 1 ♂, 3 ♀, same locality data, 26.xii.1983-24.i.1984 (Storey & Halfpapp, MDPI FIT) (QDPI); 6 ♂, 4 ♀, Mt Lewis, malaise trap, 14.-25.xi.1980 (RI Storey) (QDPI); 1 ♂, 1 ♀ ASCU); 1 ♀, same data, 30.x.-13.xi.1980 (QDPI); 1 ♂, 3.5 km NNE Mt Spurgeon, 16.24S 145.13E, 1330 m, pyrethrum, trees & rocks, 16.x.1991 (Monteith & Janetzki) (QM); 1 ♂, Mission Beach, 17.50S 146.06E, S3, 10 m, malaise trap, 29.i.-4.iii.1996 (M Cermak) (ANIC); 1 ♂, 1 ♀, Mission Beach, 17.52S 146.04E, S1, 40 m, malaise trap, 29.i.-4.iii.1996 (M Cermak) (ANIC); 1 ♂, Mossman Bluff Track, 5–10 km W Mossman, 1260 m, flight intercept, 17.-31.xii.1988 (Monteith, Thompson & ANZSES) (QM); 1 ♀, GS1 Mt Haig, 17.06S 145.36E, 1150 m, malaise trap, 31.x.-29.xi.1995 (L Umback) (ANIC); 1 ♀, Yangaborra, Atherton Tablelands, 850 m, malaise trap, 9.-12.v.1961 (JL Gressitt)

(BPBM); 1 ♀, Carbine Tableland, Pauls Luck, pyrethrum-trees & logs, 1100 m, 29.xi.1990 (Monteith & Janetzki) (QM); 1 ♀, Wallaman Falls Area, W. Ingham, rain forest, at light, 7.ii.1975 (BK Cantrell); Karnak-Devil's Thumb, 8–12 km NW Mossman, site 10, 1080 m, flight intercept, 26.xii.1989–15.i.1990 (ANZSES Expedition) (QM); 1 ♀, Bamboo Ck, near Miallo, N of Mossman, 25.iv.1967 (DH Colless) (ANIC); 6 ♀, 26 km up Tinaroo Ck Rd, via Mareeba, 29.ix.–11.xi.1983 (Storey & Brown) (QDPI); 3 ♀, same data, 16.ii.–17.iii.1983 (QDPI); 1 ♀, same data, 16.iii.–12.iv.1983 (QDPI); 1 ♀, same data, 28.i.–16.ii.1983 (QDPI); 1 ♀, same data, 28.i.–6.ii.1983 (QDPI); 1 ♀, Karnak-Devil's Thumb, 8–12 km NW Mossman, Site 10, 1080 m, ft. intercept, 26.xii.1989–15.i.1990 (ANZSES Expedition) (QM).

Other material examined. AUSTRALIA, Qld: 1 ♂, Mossman Gorge, 23.iv.1967 (DH Colless) (ANIC).

Notes: The specimen from Mossman Gorge is excluded from the type series as the pair of spines on the ventral side of the aedeagus is poorly developed in this specimen.

Diagnosis. This species is similar to *L. compressa*, *L. absona* and *L. radricula*, (see Diagnosis section of *L. compressa* and *L. absona*).

Colour. Head and thorax uniformly light to mid brown; legs slightly paler. Forewing hyaline colourless with some darker patches or hyaline light brown; darker marks on clavus, apical margin of forewing and along crossveins; pterostigma light, mid or dark brown. Abdominal sternites dark brown; pygofer paler.

Morphology. Body length: ♂ 4.8–5.1 mm, ♀ 5.3–5.9 mm.

Head: Vertex 1.5–2.0× wider than long; at level of basal emargination 1.0–1.2× wider than at subapical carina; apical carina v-shaped, subapical carina u- or v-shaped; median carina of vertex absent or incomplete (covering up to ½ of basal compartment of vertex); basal compartment of vertex 1.1–2.2× longer than apical compartment. Frons 1.0–1.3× as long as wide; frons clearly visible in dorsal view. Position of maximum width of frons distinctly distad of centre of frontoclypeal suture. Frontoclypeal suture semicircular, bent upwards. Rostrum surpassing hind coxae; apical segment of rostrum almost as long or distinctly shorter than subapical segment. **Thorax:** Pronotum about same width or slightly wider than head (including eyes). Hind margin of pronotum acutely angled or rectangular. Forewing 3.5–3.6× longer than wide; forewing with well-developed basal emargination; costa with about 36–43 tubercles, tubercles concolorous with veins; Sc+R+M near basal cell fused, forming a moderate-to-long (at least half of length of basal cell) common stem Sc+R+M; fork of ScRA+RP slightly to moderately basad of fork CuA1+CuA2; position of r-m distinctly basad of fork MA+MP; transverse veinlet M3+4 to Cu1a inserting at M3+4 basad of r-m; position of icu at CuA at same level as apex of clavus; position of icu at CuP more or less at same level or distant of apex of clavus; RP apically trifid; MA apically trifid;

additional subapical cell between branches of MA present; nodus of y-vein slightly basad of centre of clavus; vein delimiting subapical cell C4 distinctly distad of vein delimiting C5; 10 apical cells. Hind leg: 1st and 2nd tarsomere with 6 apical teeth. **Male genitalia:** Anal tube asymmetrical (lobes differ in length) in dorsal and caudal view (Fig. 35c,e); lateral lobe triangular in lateral view (Fig. 35d). Pygofer and genital styles as in Figure 35f,g; ventromedian process of pygofer trapezoid, with two dark teeth inserting dorsally (Fig. 35g). Aedeagus (Fig. 35a,b): Phallosome ventrally with a sheet-like ridge bearing a pair of flattened spines. Flagellum with two sclerotised spines.

Etymology. Named in honour of the author's daughter Sonja. To be treated as noun in the genitive case.

DISCUSSION

This paper increases the known species of *Leptolamia* from two to 15. *Leptolamia* is endemic to eastern and southern parts of Australia (Qld, NSW, Vic, SA). Few host plant records (see Table 1) are available, but those are from a diverse range of plant orders (Sapindales, Laminales, Asterales and Rosales). *Leptolamia absona* has been recorded on *Lantana camara*, a weed of national significance in Australia.

A great degree of interspecific variation in the shape and symmetry of the anal tube has been observed in *Leptolamia*. The anal tube can be asymmetrical, which means the lobes differ in length. This situation is found in *L. bifurcata*, *L. contraria*, *L. lunata* and *L. sonjae* and to a certain degree also in *L. praetextata*, *L. radricula*, *L. juliae* and *L. absona*. In all other species of *Leptolamia*, the anal tube is symmetrical (lobes of equal length). This character is best observed in dorsal and caudal view. Further variation can be found in the shape of the lateral lobe as seen in lateral view. Most species have a triangular lateral lobe (Fig. 24d). In *L. absona*, *L. conicula*, *L. kulija* and *L. bifurcata*, and partly in *L. lunata*, the lateral lobe is rectangular or subrectangular, widening towards apex (Fig. 22d), whereas in *L. praetextata*, *L. contraria* and *L. gloriosa* the lateral margin of the lobe is excavated (Fig. 28). The three species *L. jacobii*, *L. contraria* and *L. bunyaensis* share a very similar configuration of aedeagal spines as described in the Diagnosis section of *L. bunyaensis*. Looking at the shape of the anal tube, however, these species cover different ends of the spectrum, namely triangular lateral lobe and excavated lateral lobe as well as asymmetrical and symmetrical.

Table 1 Associated plant records of *Leptolamia* species

Plant family	Recorded species	Insect species
Asteraceae	<i>Senecio lautus</i>	<i>Leptolamia radricula</i>
	<i>Senecio quadridentatus</i>	<i>Leptolamia radricula</i>
Cunoniaceae	<i>Caldcluvia paniculosa</i>	<i>Leptolamia jacobii</i>
Rutaceae	<i>Acradenia euodiiformis</i>	<i>Leptolamia absona</i>
Verbenaceae	<i>Lantana camara</i>	<i>Leptolamia absona</i>

Another interesting feature is the presence of two dark teeth on the ventromedian process of the pygofer as further detailed in the Diagnosis section of *L. compressa*. This feature is shared by *L. compressa* and *L. sonjae*. Four species within *Leptolamia* display a ventromedian process without teeth but with a blackened margin, whereas all other species have a uniformly coloured ventromedian process without teeth. The ‘uniformly coloured group’ plus two of the species in the ‘blackened margin group’ are characterised by an unarmed flagellum, as opposed to an armed flagellum (2–3 spines) present in two species of the ‘blackened margin group’ (*L. lunata* and *L. kulija*) as well as all species in the ‘dark teeth’ group. This gradual shift is not supported by the features of the anal tube discussed earlier. This means the patterns found in symmetry and shape of the lateral lobe of the anal tube do not seem to correlate well with other characters such as configuration of aedeagal spines and features of the ventromedian process of pygofer. A phylogenetic analysis of the genus is needed to clarify relationships within the species of *Leptolamia*.

The dichotomous key presented in this paper allows identification of females to species level for the following seven species of *Leptolamia*: *L. absona*, *L. compressa*, *L. conicula*, *L. contraria*, *L. lunata*, *L. radricula* and *L. sonjae*. The material examined consists of more than 130 females of *Leptolamia* that could not be identified to species level, but which are likely to represent some of the remaining eight species of *Leptolamia*. Studies of the female material examining genitalic structures, such as the anal tube, gonapophysis IX, vagina, spermatheca and bursa copulatrix, as described in Bourgoïn (1993), Holzinger (2002), Holzinger *et al.* (2002), Orosz (2013), and Remane and Asche (1979), may reveal the presence of diagnostic features to allow identification of all females of *Leptolamia* to species level.

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