

THE AUSTRALIAN SPECIES OF THE GENUS *LEMBEJA* DISTANT, 1892 (HOMOPTERA, TIBICINIDAE)

by

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ABSTRACT

Four described Australian and one described New Guinean species of the tribe Prasiini in fact represent only two species: *Lembeja paradoxa* (Karsch, 1890) and *Lembeja vitticollis* (Ashton, 1912), the only representatives of the tribe in Australia. Relationships of the species are discussed. The species are redescribed and structures of taxonomic importance as well as the whole insects are depicted. Study of type-material proved the new synonymies of *Lembeja acutipennis* (Karsch, 1890) and *Lembeja brunneosa* Distant, 1910, with *Lembeja paradoxa*. *Lembeja vitticollis* is taken out of the synonymy of *Lembeja brunneosa*.

RÉSUMÉ

Quatre espèces australiennes et une espèce de Nouvelle Guinée actuellement décrites (comme appartenant à la tribu Prasiini) représentent en réalité seulement deux espèces: *Lembeja paradoxa* (Karsch, 1890) et *L. vitticollis* (Ashton, 1912), qui sont les seules représentants de cette tribu en Australie. On discute des affinités de ces espèces, qui sont redécrites, tandis qu'une illustration est donnée des structures d'importance taxonomique ainsi que des habitus. L'étude du matériel-type a montré la nécessité de mettre en synonymie *L. acutipennis* (Karsch, 1890) et *L. brunneosa* Distant, 1910, avec *L. paradoxa*. D'autre part, on arrive à la conclusion que *L. vitticollis* n'est pas un synonyme de *L. brunneosa*.

INTRODUCTION

The genus *Lembeja* Distant, 1892, is one of the four genera of the Oriental Prasiini (De Jong & Duffels, 1981). It is distributed in Mindanao, Sulawesi, Lesser Sunda Islands, New Guinea and northern Queensland (Metcalf, 1962, 1963). The present paper deals with the two species recorded from Australia, *Lembeja paradoxa* (Karsch, 1890) and *Lembeja vitticollis* (Ashton, 1912) n. comb.

L. paradoxa is redescribed in this paper. Examination of type-material for the present study revealed that both *L. acutipennis* (Karsch, 1890) and *L. brunneosa* Distant, 1910, are junior synonyms of *L. paradoxa*. The synonymy of *L. australis*

Ashton, 1912, with *L. brunneosa*, proposed by Distant (1913), proved to be correct.

Prasia vitticollis is transferred here to the genus *Lembeja* since preliminary phylogenetic investigations of the male genitalia revealed its close relationship with *L. robusta* Distant, 1909, and other species among which the recently redescribed *L. papuensis* Distant, 1897 (De Jong & Duffels, 1981). Distant (1913) regarded *L. vitticollis* a synonym of *L. brunneosa*. Recent fieldwork in Queensland by Mr. M. S. Moulds, Sydney (pers. comm.), supported my view that *L. vitticollis* is not a synonym of *L. brunneosa*, but a proper species in its own. Through Mr. Moulds' kindness I had the opportunity to study a fine series of *L. vitticollis* which enables me now to provide a redescription of this species. Through the kindness of Dr. C. N. Smithers, Sydney, I had the opportunity to study the female holotype of the species.

The two species are easily separated in the male sex by the very typical mediodorsal strongly curved spines on the abdomen of *L. paradoxa* (figs. 17-19) which are lacking in *L. vitticollis*. The females of *L. vitticollis* are much larger than the females of *L. paradoxa* (body length *L. paradoxa*: 15.0-22.7 mm, *L. vitticollis*: 27-31.8 mm).

ACKNOWLEDGEMENTS

I am most grateful to the following persons and institutions for the loan of material. In the lists of material the abbreviations of the institutions as given below have been used.

AMS	Australian Museum Sydney; Dr. C. N. Smithers.
BISH	Bernice P. Bishop Museum, Honolulu; Dr. F. J. Radovsky, Dr. C. A. Samuelson.
BM	British Museum (Natural History), London; Dr. W. J. Knight, Mr. M. D. Webb.
CMMOU	Collection M. Moulds, Sydney; Mr. M. S. Moulds.

NMM	National Museum of Victoria, Melbourne; Dr. A. Neboiss.
SAM	South Australian Museum, Adelaide; Dr. E. G. Matthews.
SMD	Staatliches Museum für Tierkunde, Dresden; Dr. R. Emmrich.
USNM	United States National Museum, Smithsonian Institution, Washington; Dr. R. C. Froeschner.
ZMB	Institut für Spezielle Zoologie und Zoologisches Museum der Humboldt-Universität zu Berlin; Dr. N. Göllner-Scheiding.

Special thanks are due to Mr. L. van der Laan, Institute of Taxonomic Zoology, University of Amsterdam, for making the photographs.

TAXONOMY

For tracing the localities of the specimens studied I have used the same geographical sources as mentioned by Duffels (1977), the publications by Wichmann (1910, 1912) on the expeditions to New Guinea between 1828 and 1902, and the publication edited by Walker (1972) on the Torres Strait.

Lembeja paradoxa (Karsch, 1890)

Figs. 1-8, 17-19, 22-23.

Perissoneura paradoxa Karsch, 1890: 191; Mac-Lachlan, 1891: 320.

Lembeja paradoxa; Distant, 1892: xiv, 148; Distant, 1897b: 382; Jacobi, 1903: 13; Distant, 1906: 182; Schmidt, 1925: 43; Kato, 1932: 189; Metcalf, 1963: 432.

Prasia paradoxa; Breddin, 1901: 153.

Perissoneura acutipennis Karsch, 1890: 192; Mac-Lachlan, 1891: 320.

Prasia acutipennis; Breddin, 1901: 153.

Lembeja acutipennis; Jacobi, 1903: 13; Distant, 1906: 184; Kirkaldy, 1907: 309; Schmidt, 1925: 43; Metcalf, 1963: 429; (n. syn.).

Lembeja brunneosa Distant, 1910: 418; Distant, 1913: 601; Ashton, 1914: 356; Metcalf, 1963: 430; Moulds, 1975: 251-254, figs. 1-6; (n. syn.).

Lembeja australis Ashton, 1912b: 77, pl. VII fig. 3; Distant, 1913: 601 (in synonymy of *Lembeja brunneosa*); Metcalf, 1963: 430 ditto.

Material examined. — Papua New Guinea, S.E. New Guinea: Daru Island 3 m, 8.iii.1964, H. Clissold, 1 ♂ BISH; Port Moresby, vii.1928, Pemberton, 1 ♂ BISH; Port Moresby 30 m, 27.ii.1964, J. Sedlacek, 2 ♂ ♂ BISH; Port Moresby area, v.1947, L. Jones, 1 ♂ BM; Port Moresby Newtown, 19.i.1955, at lights, 1 ♀ NMM; Port Moresby, leg. Dr. Finsch, coll. A. Jacobi, *paradoxa*, 1 ♂ SMD; Port Moresby, Dr. Finsch, ♂ lectotype, 5 ♂ ♂ 1 ♀ paralectotypes of *Lembeja paradoxa* ZMB; Rouna 300-500 m, xi.1968, N. L. H. Krauss, 1 ♂ BISH.

Australia, Queensland, Torres Strait: Moa Island, coastal

savannah woodland associated with coconut grove, leg. E. Cameron, 21.ii.1975, 1 ♀ AMS; Moa Island, J. W. Schomberg, 4 ♂ ♂ SAM; Prince of Wales Island, S.E. side opposite Packe Island, savannah woodland, E. Cameron, 15.ii.1975, 1 ♂ AMS; Thursday Island, leg. Finsch, coll. A. Jacobi, *acutipennis*, 1 ♂ SMD; same locality and collector, 1 ♂ lectotype, 2 ♂ ♂ 1 ♀ paralectotypes of *Lembeja acutipennis* ZMB.

Australia, Queensland, Cape York Peninsula: without further specification, type, syntype, Frogatt & Elgner, Distant coll., *Lembeja brunneosa*, 1 ♂ lectotype of *Lembeja brunneosa* BM; 5.i.1907, Elgner, *Lembeja brunneosa*, 1 ♂ SAM; 5.i.1907, Elgner, 1 ♂ BM; 5.i.1907, Elgner, 1 ♂ lectotype of *Lembeja australis* AMS; 5.i.1907, leg. Elgner, coll. H. Ashton, K 30134, 1 ♀ AMS; same data but *Lembeja* sp., K 71679, 1 ♂ AMS; same data, K 71680, 1 ♂ AMS; Iron Range, 4.i.1973, M. S. Moulds, 4 ♂ ♂ 3 ♀ ♀ CMMOU; Weipa, 27.xi.1974, M. S. Moulds, 1 ♂ CMMOU.

New Guinea and Australia without specified locality: N. Guinea, Clarke B.P., 5 ♂ ♂ 1 ♀ USNM; Queensland, *Lembeja brunneosa*, det. Ashton, 1 ♂ NMM.

Lectotype designation for *Lembeja paradoxa*, *L. acutipennis*, *L. brunneosa* and *L. australis*. — *Lembeja paradoxa* was described from nine males and one female from Port Moresby. Through the kindness of Dr. N. Göllner-Scheiding of the Berlin Museum I had the opportunity to study six males and the only female belonging to the type-series. One of the better preserved males is designated lectotype; it bears the following labels: "Neu-Guinea/ P. Moresby/ Dr. Finsch" (handwritten, black); "Typus" (print, red label, black cadre); "Zool. Mus. / Berlin" (print, yellow label, broken black cadre). The other type-specimens studied have been labelled paralectotype. The remaining three syntypes could not be traced.

L. acutipennis was described from five males and one female from Thursday Island (Torres Strait). Again, not the whole type-material is studied since the present location of two males could not be traced. The best preserved male, designated lectotype, bears the following labels: "Thursday Isl. / Torres Str. / Finsch" (handwritten, black); "Typus" (print, red label, black cadre); "Perissoneura/acutipennis/Karsch" (handwritten, black); "10694" (print); "Zool. Mus. / Berlin" (print, yellow label, black broken cadre). The other two males and the single female, kept in the Berlin Museum, are labelled paralectotype.

The holotype status of the male type of *L. brunneosa* in the British Museum (Natural His-

tory) is doubtful since the specimen bears a red "Type"-label and a blue "SYNTYPE"-label, suggesting the existence of at least one more type-specimen, that, however, could not be traced in the BM (NH) or elsewhere. Nevertheless the only type-specimen is designated lectotype of *L. brunneosa*; it bears the following labels: "N. Queensland / Cape York / W. W. Frogatt / Coll. Elgner / Oct. 1909" (partly handwritten, partly print); "Type" (round label, red edged, print); "SYNTYPE" (round label, blue edged, print); "3 ♂" (handwritten); "Lembeja / brunneosa / Type Dist." (handwritten); "Distant Coll. / 1911-383" (print).

L. australis was described after an unknown number of specimens. However, one specimen in the Australian Museum (Sydney), which also bears a holotype-label (probably attached by a later curator) resembles the drawing in Ashton (1912b) very closely so that this one is designated lectotype; it bears the following labels: "Lembeja / australis Ashton / Holotype" (red label, partly handwritten, partly print); "Lembeja producta / (Ashton) Type" (handwritten); "K 30134" (handwritten); "C. York / 5.1.07 / Elgner" (handwritten).

Synonymy. — Comparison of the male lectotypes of *L. paradoxa*, *L. acutipennis* and *L. brunneosa* proved that the last two mentioned species are junior synonyms of *L. paradoxa*. Karsch (1890), when describing *L. paradoxa* and *L. acutipennis*, already stated that these two probably were subspecies. Distant (1913) correctly synonymized *L. australis* with *L. brunneosa*, now a junior synonym of *L. paradoxa*.

Description. — Body dorsally yellowish-green to red-brown and mottled with dark. Under-side of thorax lighter tinged. Head and thorax together in both sexes shorter than the abdomen. In both sexes head and pronotum together are as long as the meso- and metanotum together. Tegmina in the males short and convex; in the females longer and nearly flat. The male abdominal tergite 1 is very broad with a somewhat raised rectangular median part. The dorsal surfaces of the tergites 2-7 of the males are produced

into a series of curved overlapping spines when not in singing posture.

Greatest width of the body across the second abdominal tergite. Specimens from Thursday Island and Prince of Wales Island are significantly smaller than the specimens from New Guinea, Moa Island and Cape York Peninsula and are therefore kept separately in the list of measurements (figs. 17-19, 22).

Head. — Eyes small, in dorsal view about 0.4 times as wide as vertex between the eyes. Area around ocelli weakly raised; a dark median fissure may continue on the pronotum. Distance between the lateral ocelli about 0.9 times as long as distance between eye and lateral ocellus. Head 1.2 times as wide as vertex between eyes. Post-clypeus somewhat broader than long and obconically protruding in dorsal view. The under-side is laterally compressed, and provided with slightly darker coloured transverse ridges. Antennae with dark patches. Apex of rostrum black and hairy, reaching the intermediate coxae.

Thorax. — The central fasciae on the pronotum are somewhat darker coloured than the remainder and extend to a medial spot on the pronotum collar. Pronotum collar about twice as broad as pronotum just behind eyes; distal parts of its lateral corners rounded and deflected ventrally. Fissures not so deep, the posterior oblique ones just reaching the pronotum collar. Mesonotum with four obconical areas at its proximal margin each consisting mainly of dark mottles on a lighter underground; paramedian areas half as long as the lateral areas. The two small spots in front of the cruciform elevation are mostly darker coloured. Cruciform elevation compressed laterally and therefore somewhat raised; a broad median dark line continues on the metanotum. Mesostigma small, sometimes covered by a fleece.

Legs. — Mostly unicolourous. Fore femora bear elongate dark markings. Fore tibiae somewhat darker coloured. Fore femora bear three thorns (fig. 3), the basal one is cylindrical and the largest; the other two are triangular, the apical one the smallest.

Tegmina and wings. — Tegmina reddish- to brownish-grey, opaque, dark mottled along the veins. Extreme base and costal membrane white to

ochraceous. The tegmen is pointed at the height of the second apical area, especially in the specimens of Thursday Island. Male tegmina slightly convex. Surface of all apical areas together less than half the surface of the tegmen. M1-4 very short, sometimes almost lacking. Third ulnar area longer than the first, fourth ulnar area of about the same length as the radial area. The concavity of the basal veins of the apical areas 7 and 8 give the fourth ulnar area its typical form. Transverse vein of the second ulnar area not extending in the third ulnar area. Small nodes are found in the M1+2 and M3+4. Cu2 and A1 fused up to the tegmen border. Margin of the tegmen outside the ambient vein very narrow. Wing reddish to greyish, subhyaline. Cu2 and A1 fused at about four fifths of their lengths, so that the anal field is enclosed.

Opercula. — Male opercula very small (fig. 1), apical part recurved and just extending over the folded membrane. Female operculum (fig. 2) very small, apical part not recurved and hairy. Meracanthus in both sexes very small, slender and pointed, somewhat shorter than the operculum.

Male abdomen. — The abdomen is broad and short, the mediadorsally acutely pointed tergites 2-7 overlap strongly and are curved over the pygofer. Underside curved upwards towards the apex of the abdomen. Tergite 1 is very large; the raised, rectangular median part is provided with a longitudinal indentation and two lateroproximal

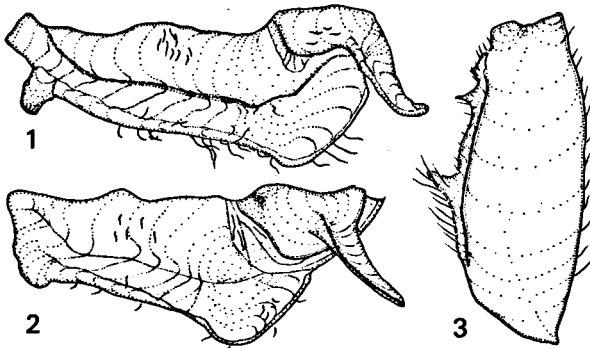
slaps. In singing posture the abdomen is extended to a remarkable degree (see also Moulds, 1975). The folded membrane is parallel with the underside of the thorax; the mirrors are very small. The median triangular structure between the folded membranes is rather small.

Female abdomen. — Brown, of normal shape and dorsally carinate. The ovipositor sheath reaches the caudal dorsal beak.

Tymbals. — Very large, nearly as long as the length of the mesonotum. Each tymbal has 14 long transverse ridges alternating with 14 short medially placed ridges (fig. 8). With the naked eye the series of short ridges seems to form a broad longitudinal faint line, running across the tymbal.

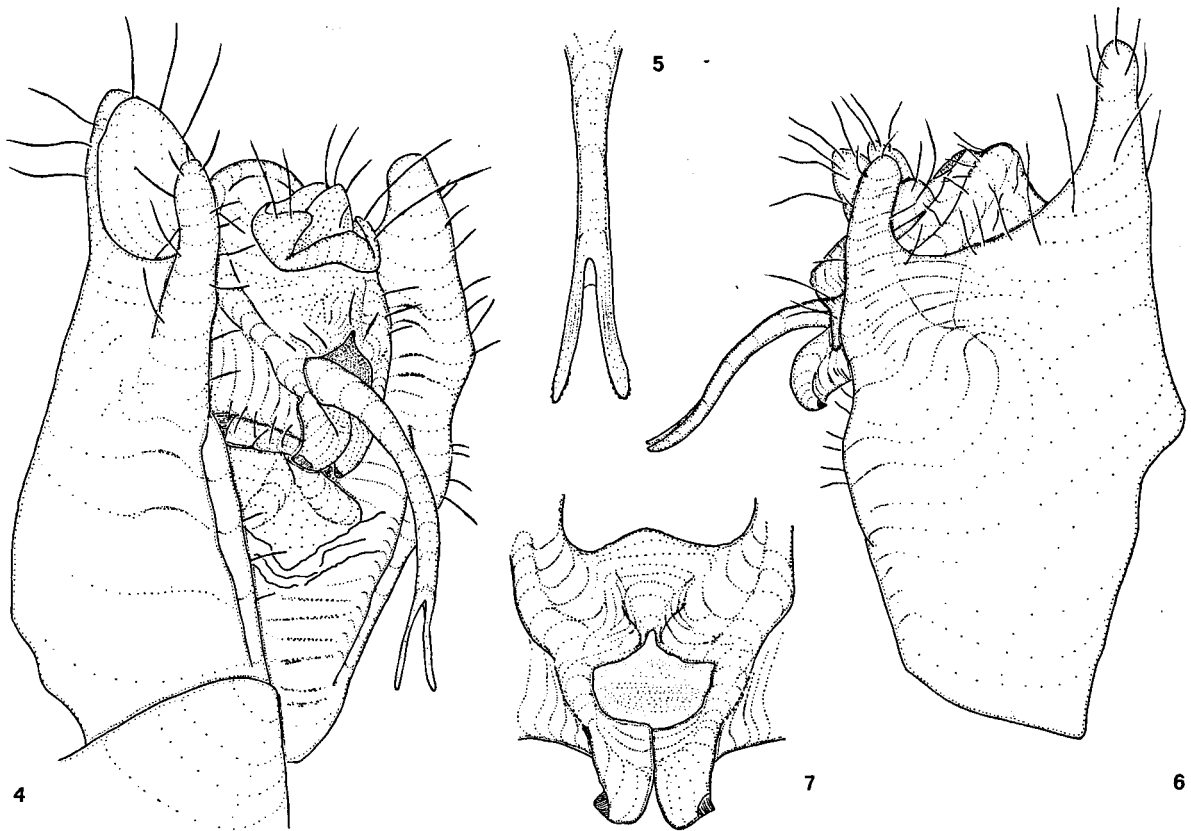
Male genitalia (figs. 4-7). — Lateral lobes of the pygofer small, bluntly pointed and reaching just beyond the anal valves, outer surface concave and inner surface convex. Caudal dorsal beak broad, short and blunt. Uncus broad in dorsal view; the median part between the claspers is compressed laterally. The claspers are connected in a ring-shaped structure around the uncus. Claspers small, swollen and curved proximad; pointed and dark coloured apically. Aedeagus long and slender, the apex has the form of a serpent's tongue. Adjustment of the aedeagus situated at half the length of the pygofer.

Measurements based upon all specimens available. — Thursday Island and Prince of Wales Island: length of body ♂: 15.1-19.1 mm, \bar{x} = 17.4, σ = 1.37, ♀: 15.0 mm; width of pronotum collar ♂: 5.5-6.6 mm, \bar{x} = 6.1, σ = 0.37, ♀: 5.7 mm; length of tegmen ♂: 19.0-21.8 mm, \bar{x} = 20.7, σ = 1.04, ♀: 20.0 mm; all other locations: length of body ♂: 18.8-23.7 mm, \bar{x} = 21.5, σ = 1.18, ♀: 17.8-22.7 mm, \bar{x} = 20.3, σ = 1.95; width of pronotum collar ♂: 6.0-7.7 mm, \bar{x} = 6.7, σ = 0.39, ♀: 6.1-7.4 mm, \bar{x} = 6.8, σ = 0.46; length of tegmen ♂: 21.2-26.8 mm, \bar{x} = 24.9, σ = 1.2, ♀: 24.2-27.6 mm, \bar{x} = 26.1, σ = 1.25.



Figs. 1-3. *Lembeja paradoxa*: 1, male operculum in ventral view, paralectotype *L. acutipennis*; 2, female operculum in ventral view, New Guinea; 3, male femur in lateral view, lectotype *L. paradoxa*.

Distribution. — *L. paradoxa* is found in the southeastern part of New Guinea, in the Torres Strait between New Guinea and Australia on



Figs. 4-7. *Lembeja paradoxa*: 4, pygofer in ventrolateral view, lectotype *L. paradoxa*; 5, aedeagus in dorsal view, lectotype *L. paradoxa*; 6, pygofer in lateral view, Daru Island; 7, uncus and claspers in ventral view, lectotype *L. paradoxa*.

Thursday Island, Moa (= Banks) Island and Prince of Wales Island, and on the Cape York Peninsula of northern Queensland (fig. 23).

***Lembeja vitticollis* (Ashton, 1912) n. comb.**

Figs. 9-16, 20-21, 23.

Prasia vitticollis Ashton, 1912a: 228-229, pl. LI figs. 4, 4a-b; Distant, 1913: 601 (in synonymy of *Lembeja brunneosa*); Metcalf, 1963: 430 (ditto).

Material examined. — Australia, Queensland: Gordon Vale, Atherton Road N. Q., 19.xii.1972, J. V. Peters, 1 ♀ CMMOU; 20 km W. of Kennedy, 550 m, rain forest, 20.i.1980, A. Hiller, 1 ♂ CMMOU; Kuranda, 10.i.1980, Graham Wood, 1 ♀ CMMOU; Lamb Rge, Mareeba District, Davies Ck. Rd., 29.xii.1977, A. Hiller, 1 ♀ CMMOU; same locality but 650 m, rain forest, 7.i.1980, 1 ♀ CMMOU; same locality but 720 m, rain forest, 28.xii.1980, M. S. & B. J. Moulds, 1 ♂ CMMOU; same locality but upper Davies Ck., Lock Creek, 25.xii.1976, M. S. & B. J. Moulds, 2 ♂♂ 2 ♀♀ CMMOU; Tully Falls, S. of Ravenshoe, 11.i.1977,

M. S. & B. J. Moulds, 1 ♀ CMMOU; cardstone near locality mentioned, 9.i.1962, Britton, 1 ♂ 1 ♀ BM; near Tully Rd., cardstone, 8.i.1962, Britton, 1 ♂ BM; Whitfield Range, Cairns, 24.i.1973, A. & M. Walford-Huggins, 1 ♂ 1 ♀ CMMOU; same locality but 1.ii.1972, J. G. Brooks, 1 ♂ CMMOU.

Doubtful locality: Papua New Guinea, S.E. New Guinea: British New Guinea without further specification, coll. A. Jacobi, E. Weiske, 1 ♀ SMD.

Without further specification: *Prasia vitticollis* Ashton type, *Lembeja vitticollis*, Ashton. N. Australia, type, Ashton coll., K 67572, 1 ♀ holotype of *Prasia vitticollis* AMS.

Description. — Body yellow, green or red. Underside of the body and abdomen mostly lighter tinged. Tegmina long. Head and thorax together shorter than abdomen. Head and pronotum together as long as meso- and metanotum together. Greatest width across the pronotum collar. Females a little larger than males (figs. 20-21).

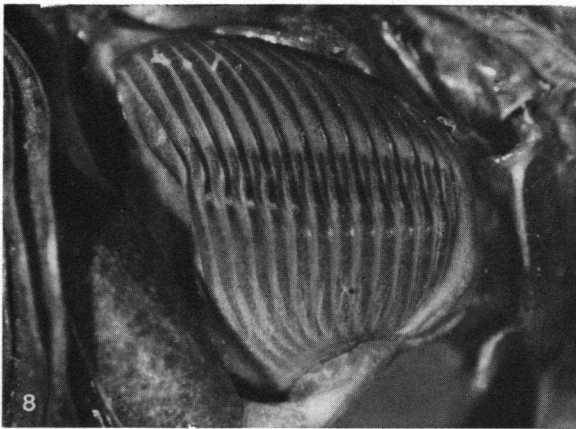


Fig. 8. *Lembeja paradoxa*: tymbal in lateral view, Cape York.

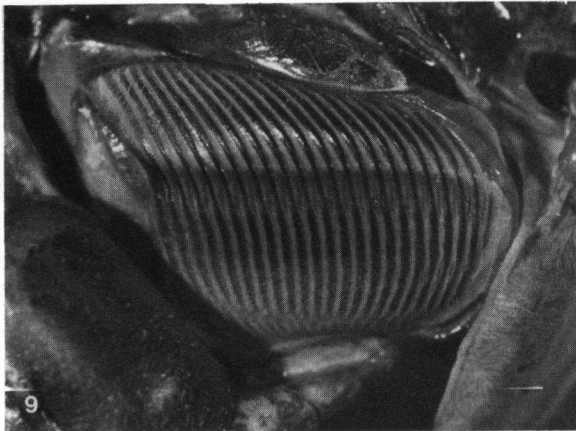


Fig. 9. *Lembeja vitticollis*: tymbal in lateral view, Tully Falls.

Head. — Eyes not large; in dorsal view 0.7 times as wide as vertex between the eyes. Area around ocelli distinctly raised; the median slightly dark coloured furrow on the head extends on the pronotum. Distance between the lateral ocelli 0.8 times as wide as distance between lateral ocellus and eye. Head 1.6 times as wide as vertex between eyes. Postclypeus triangularly protruding in dorsal view; the underside is strongly compressed laterally and provided with two series of nine transverse ridges. Rostrum with a dark apex reaching the intermediate coxae.

Thorax. — The dark coloured medial furrow extends along three fourths of the pronotum length. Pronotum collar twice as broad as the pronotum just behind the eyes. Fissures not so deep; areas between the fissures sometimes lighter

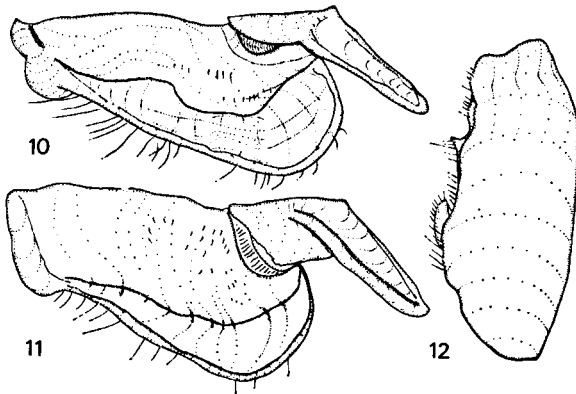
coloured than the remainder. The lateral corners of the pronotum collar are very broadly rounded and deflected ventrally. Mesonotum markings very variable; sometimes densely clouded with green to brown, except for the extreme lateral parts and the area in front of the cruciform elevation; sometimes two median clouded obconical areas can be recognized that are about 0.6 times as long as the two clouded, broad, lateral bands. Two dark round marks are situated in front of the cruciform elevation. The cruciform elevation is moderately raised and of moderate to small size with a median dark line extending on the metanotum. Mesostigma small. The folded membrane makes an angle of 40° with the underside of the abdomen.

Legs. — Mostly unicolourous, sometimes with irregular dark patches. Fore femora with three thorns (fig. 12). The longest basal one is cylindrical, blunt and recurved distad; the smallest, most apical one is weakly developed and hardly thornlike; the intermediate thorn is pointed and small.

Tegmina and wings. — Tegmina red or brown coloured, opaque; margins of the, olivaceous, veins, especially the radial vein, regularly spotted with greenish-brown. Extreme base hyaline. Apical areas cover about half the surface of the tegmen. The 2nd, 5th, 7th and 8th areas are much shorter than the other areas, the 6th being the longest; 3rd ulnar area 1.1 times as long as 1st; 4th ulnar area 0.94 times as long as radial area. Transverse vein of the 2nd ulnar area extending very shortly only into the 3rd ulnar area; corial fold very obsolete. A1 and Cu2 fused along half their length up to the tegmen border. Margin as in *L. paradoxa*. Wing pale hyaline, extreme base more or less pink coloured; veins white. A1 and Cu2 fused at two thirds from their origin, so that the anal field is enclosed.

Opercula. — Male operculum (fig. 10) small, rounded and somewhat longer than the meracanthus. Posterior half rather strongly recurved. Female operculum (fig. 11) relatively smaller than in the male; the apical part slightly recurved; meracanthus somewhat longer than operculum.

Male abdomen. — Somewhat inflated, segments 3-7 strongly carinated along the midline. The medial sclerotized part of tergite 1 trapezoid with



Figs. 10-12. *Lembeja vitticollis*: 10, male operculum in ventral view, Tully Falls; 11, female operculum in ventral view, Lock Creek; 12, male femur in lateral view, Tully Falls.

sharp, somewhat recurved anterolateral corners. Sternite 1 is of moderate size.

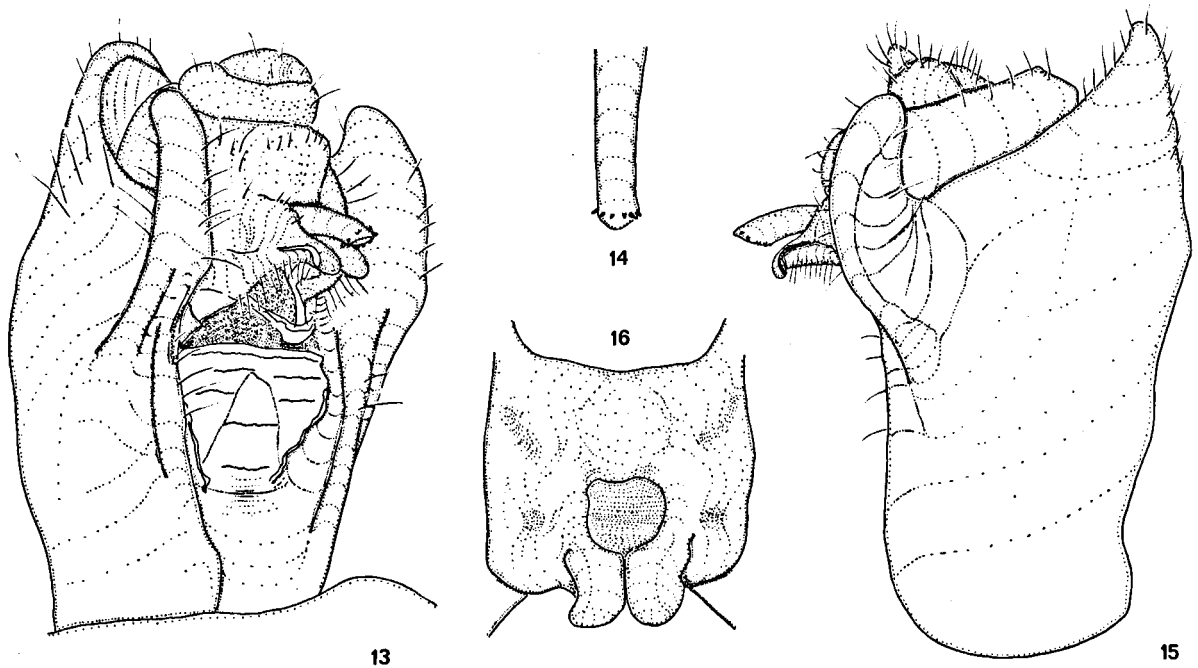
Female abdomen. — Carinate and in lateral view fairly convex along segments 3-5. Ovipositor sheath reaching beyond caudal dorsal beak.

Tymbals. — Large and with a regular pattern of alternating 22 short and 22 long ridges (fig. 9), with the naked eye the series of short light-brown coloured ridges give the impression of a broad dark longitudinal band.

Male genitalia (figs. 13-16). — Lateral lobes of the pygofer swollen, bluntly pointed, not extending beyond the anal valves; the inner surface convex and the outer surface concave. Caudal dorsal beak short and blunt. Uncus very broad and weakly trilobate. Claspers small, slender; the brown coloured apices are rounded. Adjustment of the aedeagus at half the length of the pygofer. Aedeagus slender with spines all around the apex.

Measurements based upon all specimens available. — Length of body ♂: 25.9-29.0 mm, \bar{x} = 28.1, σ = 1.3, ♀: 27.0-31.8 mm, \bar{x} = 29.1, σ = 1.7; width of pronotum collar ♂: 9.2-10.3 mm, \bar{x} = 9.7, σ = 0.4, ♀: 10.3-11.3 mm, \bar{x} = 11.0, σ = 0.3; length of tegmen ♂: 34.6-38.6 mm, \bar{x} = 36.8, σ = 1.4, ♀: 38.8-41.9 mm, \bar{x} = 40.7, σ = 0.9.

Distribution. — *Lembeja vitticollis* is recorded from a restricted area in the "base-of-Peninsula" rain forest of Northern Queensland near Cairns (fig. 23). However, one specimen in the material studied bears a label "Br. N. Guinea", and indicates E. Weiske as collector. From data supplied by Wichmann (1910, 1912) concerning



Figs. 13-16. *Lembeja vitticollis*: 13, pygofer in ventrolateral view, Tully Falls; 14, aedeagus in dorsal view, Tully Falls; 15, pygofer in lateral view, Tully Falls; 16, uncus and claspers in ventral view, Tully Falls.

Weiske's expeditions in New Guinea can be read that Weiske lived in Queensland for some years before he went to New Guinea. Since the specimen of *vitticollis* may have been mixed up with material from New Guinea, this locality seems doubtful.

Infrageneric relationships of *L. paradoxa* and *L. vitticollis*. — Preliminary study of the infrageneric relationships in *Lembeja* revealed that *L. paradoxa* and some other species of *Lembeja* share the longitudinally medially dented abdominal tergite 1 in the male sex, which is regarded as a possible apomorphic character, since this character has not been found in any other species of Cicadoidea. The other species that display this character are *L. fatiloqua* (Stål, 1870), *P. tincta* Distant, 1909, *L. sanguinolenta* Distant, 1909 and *L. roehli* Schmidt, 1925.

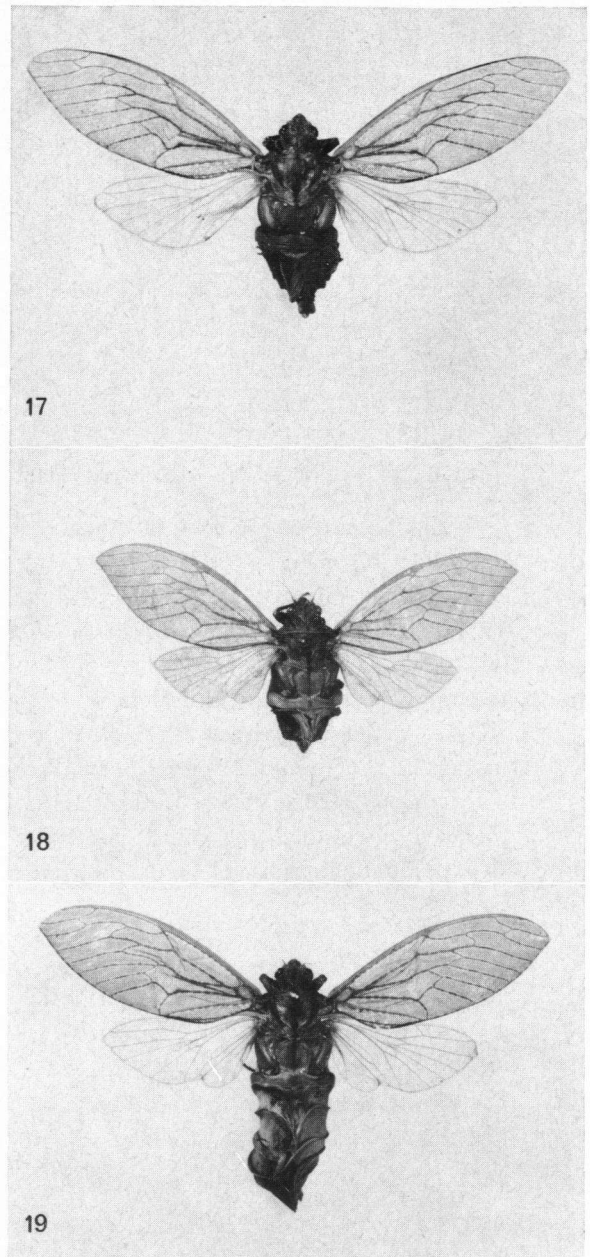
These four species are distributed in the western part of the distributional range of the genus *Lembeja*, viz. Mindanao, Sulawesi and the Lesser Sunda Islands. If this group is a natural one, then *L. paradoxa* is the only representative in the eastern part of the distributional range, viz., S.E. New Guinea, several islands in the Torres Strait and the Cape York Peninsula.

L. vitticollis shows a strong relationship, as already mentioned, with *L. robusta* and some relatives among which *L. papuensis*. They all show a more or less trilobate structure of the uncus in the males. This may be an apomorphic character for this group. All members of this group, except for *L. vitticollis*, which is endemic for Australia, are distributed in New Guinea.

Concluding it can be stated that the *Lembeja* species of Australia probably occupy quite different positions in the phylogeny of the Oriental Prasiini.

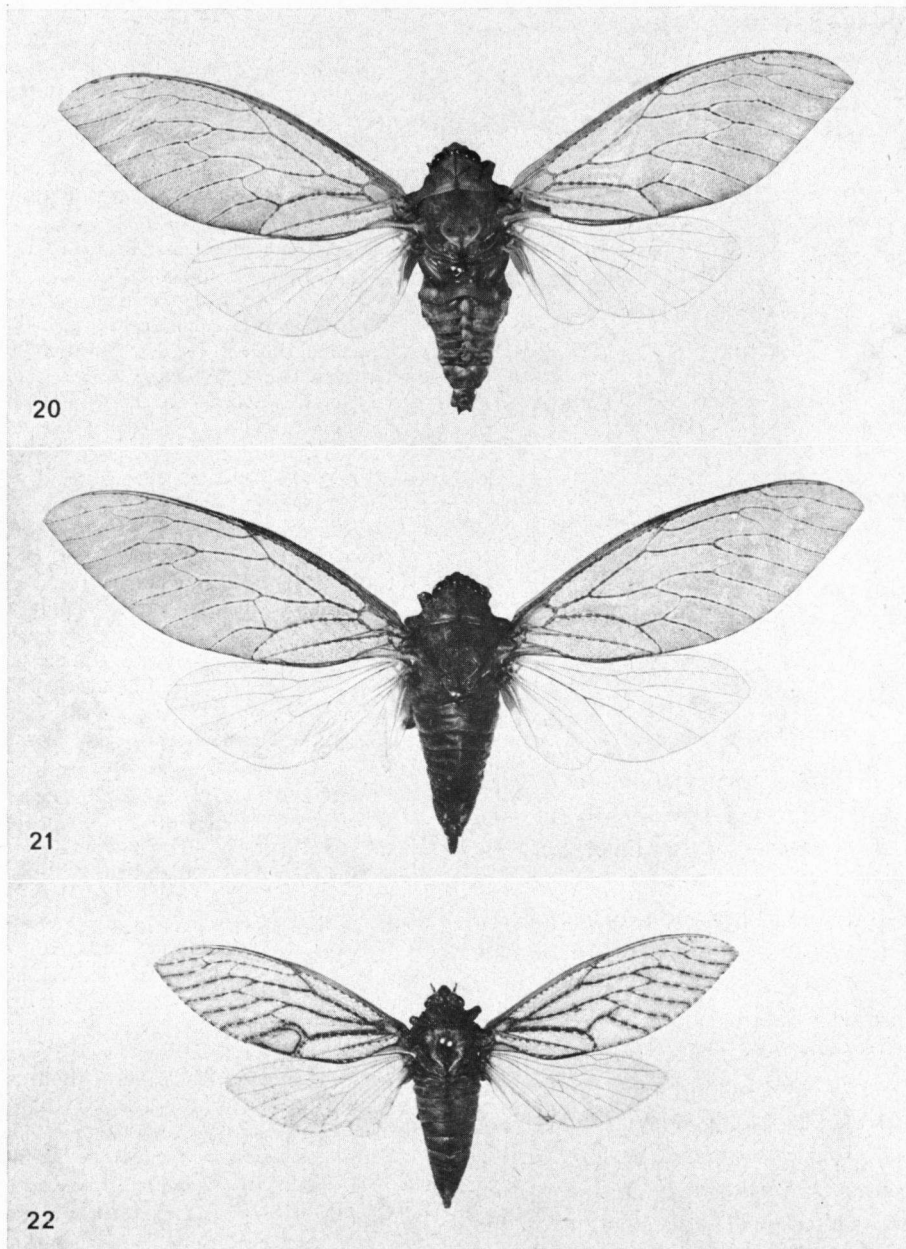
NOTE ON THE BIOGEOGRAPHY OF *LEMBEJA*

The genus *Lembeja* is presently distributed in the Philippines, Sulawesi, Lesser Sunda Islands, New Guinea and Australia. *L. paradoxa* and *L. vitticollis* are the only two species occurring in Australia.



Figs. 17-19. *Lembeja paradoxa*: 17, male, Rouna; 18, male, lectotype *L. acutipennis*; 19, male with inflated abdomen, New Guinea.

Bredden (1901) and Jacobi (1941) believed that members of the genus dispersed by way of land bridges from Australia to the Malaysian region. Bredden supposed that *Prasia* Stål, 1863, and the Australian genus *Cystosoma* Westwood, 1842, evolved from a common Australian ancestor and that *Prasia* (sensu Bredden) dispersed



Figs. 20-21. *Lembeja vitticollis*: 20, male, Tully Falls; 21, female, Tully Falls
 Fig. 22. *Lembeja paradoxa*: female, New Guinea.

via the Torres Strait, New Guinea, Mysol, Sulawesi and the Sanghir Islands to the Philippines. In Breddin's concept *Prasia* consisted of the species of *Lembeja* and *Prasia* described at that time with exception of *P. culta* Distant, 1898 and *P. princeps* Distant, 1888, which were accommodated in *Drepanopsaltria* Breddin, 1901, and *L. papuensis*, which species was not studied by him.

Jacobi considered New Guinea and northern Australia the center of greatest taxonomic diversity with radiations to Sulawesi and the Philippines, considering two species from the Lesser Sunda Islands, viz. *L. roehli* Schmidt, 1925 and *L. harderi* Schmidt, 1925, rather pioneer species than remainders of a formerly more westernly distributed genus. If taxonomic diversity provides

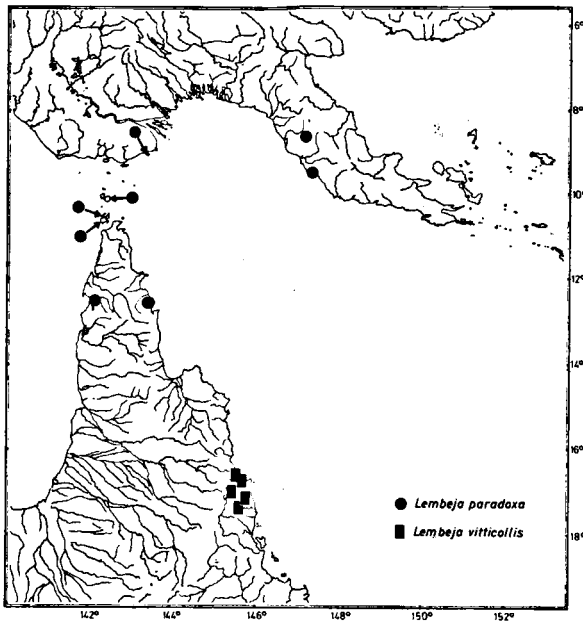


Fig. 23. Distribution of *Lembeja paradoxa* and *Lembeja vitticollis*.

any argument in historic explanations, it may be noticed that recent material shows that Sulawesi has probably more species of Prasiini than New Guinea.

Another historic biogeographic explanation has been presented recently by Holloway (1979). He suggests that *Lembeja*, if confirmed by revision, shows an interesting distribution in Sulawesi and the Inner Melanesian Arc. The role of island arcs in the historic biogeography of the cicada-fauna of Sulawesi, Moluccas, New Guinea and the South-West Pacific is stressed by Duffels (in press) based upon a phylogenetic reconstruction of the *Cosmopsaltria*. The distribution of the Oriental Prasiini also suggests an island arc vicariance. However, a historic biogeographic study of this tribe should rely upon phylogenetic arguments, which can be obtained only by a future phylogenetic revision of the tribe as a whole.

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