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THE IDENTITY, DISTRIBUTION AND SYNONYMY OF *LEMBEJA PAPUENSIS* DISTANT, 1897

(HOMOPTERA, TIBICINIDAE)

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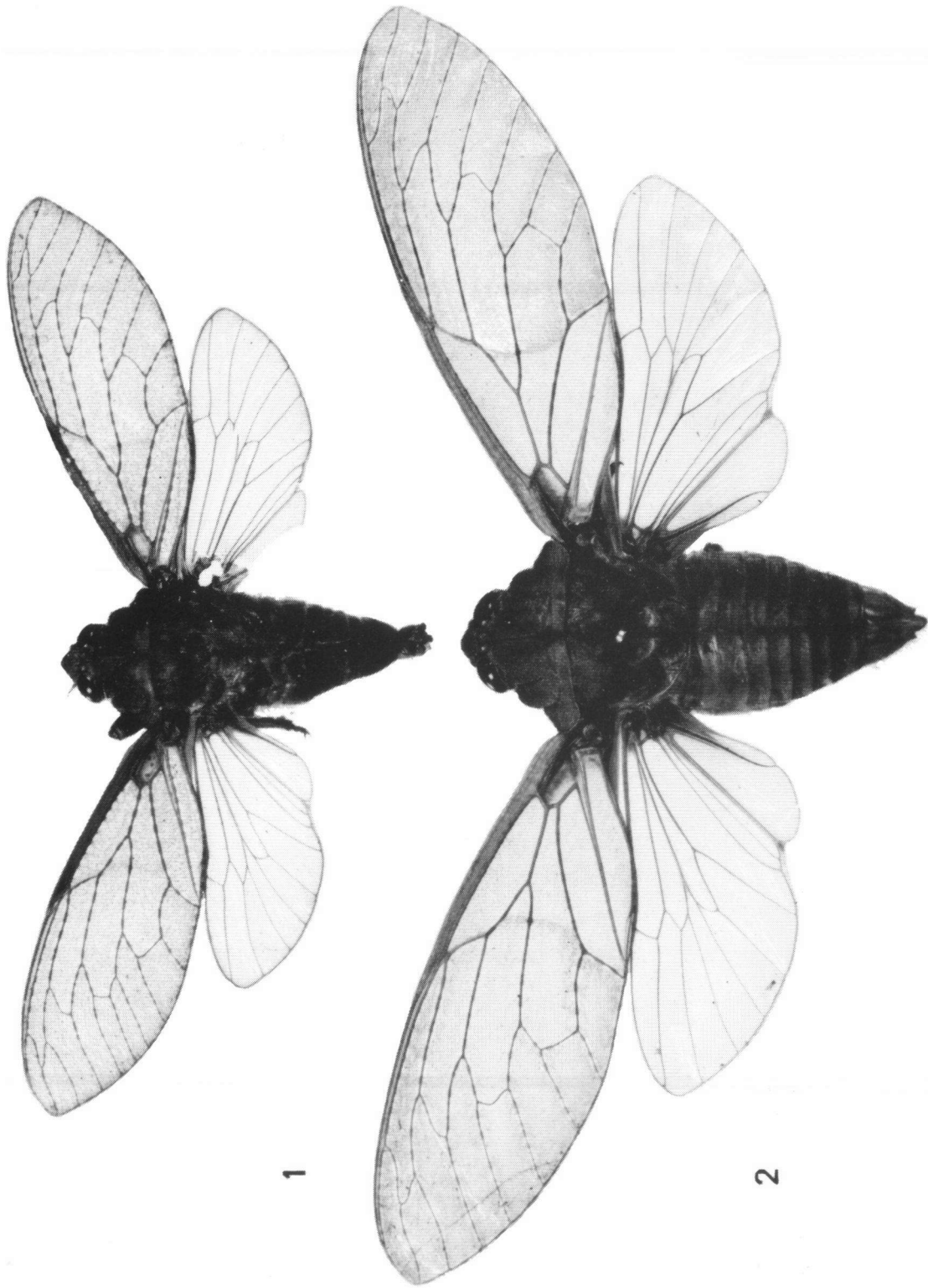
## ABSTRACT

*Lembeja papuensis* Distant, 1897, is redescribed and its relationships are discussed. The whole insect and structures of taxonomic importance are depicted. The species is restricted to East New Guinea. Study of type-material proved the junior synonymy of *Lembeja crassa* Distant, 1909.

## INTRODUCTION

In a previous and a forthcoming publication (Duffels, 1977, in prep.) the origin of a group of Cicadoidea distributed in Sulawesi, New Guinea and the Pacific is discussed on account of a phylogenetic analysis and biogeography of the group and the geological history of the area concerned. Speculations on the common source area of the *Cosmopsaltria* (Duffels, in prep.) suggest that the ancestor of this sub-tribe came from the Philippines and dispersed southwards by way of island arcs to Sulawesi and the Papuan area in the late Tertiary.

In order to test these concepts of island arc distributions in another group of cicadas, we have started a revision of the tribe Prasiini. This tribe seems most appropriate from a zoogeographical point of view as it is widely distributed in the Philippines, Sulawesi, New Guinea and North Australia. According to Metcalf (1963) three genera of this tribe are distributed in this area: the genus *Prasia* Stål, 1863, with five species, four of which distributed in Sulawesi and the fifth recorded from Mysol and New Guinea, the genus *Lembeja* Distant, 1892, with thirteen species described from the Philippines, Sanghir Islands, Sula-



Figs. 1-2. *Lembeja papuensis*: 1, male, lectotype *L. papuensis*; 2, female, paralectotype *D. russia*.

wesi, Sumba, Flores, New Guinea, Thursday Island in the Torres Strait and northern Australia, and the monotypic genus *Arfaka* Distant, 1905, from New Guinea. In the Malayan subregion the Prasiini are represented by the monotypic genus *Jacatra* Distant, 1905, recorded from Java only.

According to Metcalf (1963) the tribe Prasiini is completed with the African genera *Iruana* Distant, 1905 (monotypic) and *Lacetas* Karsch, 1890 (one monotypic subgenus and one subgenus with three species), and the monotypic genus *Sapantanga* Distant, 1905, described after a specimen from unknown origin. Recently Boulard (1975) added an interesting new species to the genus *Iruana*.

This first contribution to a revision of the Oriental Prasiini deals with the identity of *Lembeja papuensis* Distant, 1897, its taxonomy, zoogeography and synonymy.

*Lembeja papuensis* is one of the largest species of the genus and well represented in museum collections. It was described by Distant after two males and a female collected in 1890 in Dilo, East New Guinea by the Italian explorer Lamberto Loria.

A study of the species closely related to *L. papuensis* confirmed the synonymy, established by Distant (1906), of *Drepanopsaltria russula* Jacobi, 1903, with *L. papuensis*. A study of the female type specimens of *L. crassa* Distant, 1909, by the present authors revealed the synonymy of this species with *L. papuensis*.

*Lembeja papuensis* Distant, 1897  
(figs. 1-12)

*Lembeja papuensis* Distant, 1897: 382; Distant, 1906: 185; Horvath, 1912: 609; Ashton, 1914: 356; Metcalf, 1963: 432.

*Prasia papuensis*; Breddin, 1901: 201; Schmidt, 1925: 43.

*Drepanopsaltria russula* Jacobi, 1903, 10, figs. 1-2; Distant, 1906: 185 (in synonymy of *Lembeja papuensis*); Horvath, 1912: 609 (ditto); Schmidt, 1925: 43 (in synonymy of *Prasia papuensis*); Metcalf, 1963: 432 (in synonymy of *Lembeja papuensis*).

*Lembeja crassa* Distant, 1909: 395, pl. X, fig. 7a; Metcalf, 1963: 430 (n. syn.).

Note: Two references to *Lembeja crassa* in Distant, 1912, and in Distant, 1914, concern in

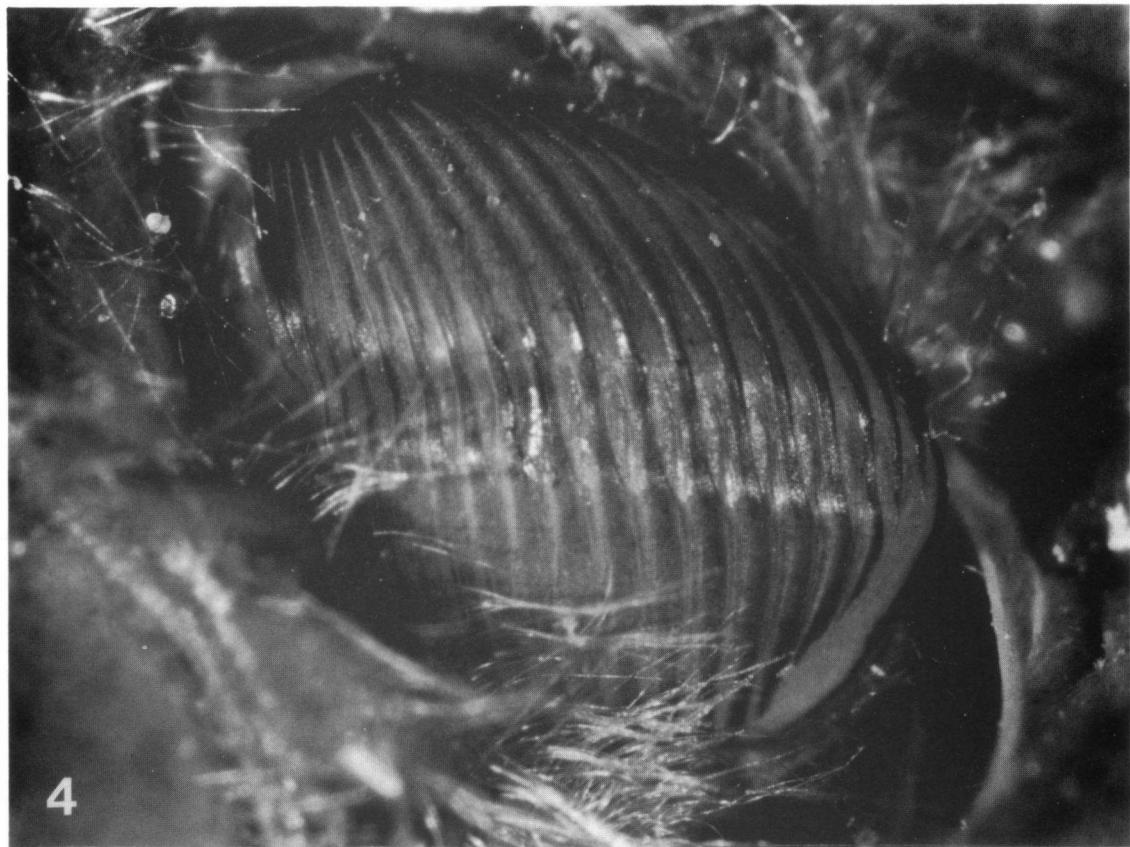
our opinion a new species closely related to *Lembeja robusta* Distant, 1909.

Lectotype designation for *Lembeja papuensis*, *Drepanopsaltria russula* and *Lembeja crassa*.-

*L. papuensis* was described from Dilo, probably after two males and one female. One male specimen is in the collection of the British Museum (Nat. Hist.). The other two specimens are in the Genova Museum. The male in the Brit. Mus. is in the best condition and therefore designated here as lectotype; it bears the following labels: "Lembeja/papuensis/Type Dist." (handwritten, black); "N. Guinea/Dilo/Loria vi-vii-90" (print, black cadre); "syntype" (print, round label, blue-edged); "type" (print, round label, red-edged); "Distant Coll./1911-383" (print). Consequently the other male and the female in the Genova Museum become paralectotypes. Another male, from Paumotu river, in the collection of the Genova Museum bearing a label "papuensis Dist." and a "syntypus" label has no type-status.

*D. russula* was described in both sexes from specimens collected at Bongu, New Guinea. The collection of the Staatliches Museum für Tierkunde, Dresden contains one male specimen bearing the labels: "Deutsch/N. Guinea" (blue label, print); "Coll. A. Jacobi/1911-5" (blue label, print); "A. Jacobi/Typus" (pink label, print, black cadre); "Prasia/papuensis Dist./(Drepanopsaltria/russula Jac.)" (handwritten, black); "Staatl. Museum für/Tierkunde Dresden" (print). Furthermore this collection contains a female with the labels: "papuensis/Dist." (handwritten, purple label); "K. Wilhelms-/Land, Bongu" (print, blue label); "A Jacobi/Typus" (print, pink label, black cadre); "Coll. A. Jacobi/1911-5" (print, blue label); "Staatl. Museum für/Tierkunde Dresden" (print). The male and female mentioned are supposed to be the only specimens with type status. In spite of the fact that the male syntype does not bear a label with the specified locality Bongu, this specimen is designated as lectotype of *D. russula* since the other labels plead strongly in favour of its type-status; the female with the syntype label is regarded as paralectotype.

*L. crassa* was described after two females, one from Bongu and one from Dilo. One of these



Figs. 3-4. *Lembeja papuensis*: 3, male mesostigma in ventral view, lectotype *D. russula*; 4, tymbal in lateral view, Stephansort.

two female specimens, in the Brit. Mus. (Nat. Hist.), bears the following labels: "Lembeja/crassa/typus Dist." (handwritten); "Type" (round label, red-edged, print); "K. Wilhelms-/Land, Bongu" (blue label, print); "1909-21". (print), and is designated here as lectotype. Consequently the other female with a *crassa* label, from Dilo, is regarded as a paralectotype. This specimen is apparently from the same lot upon which the description of *L. papuensis* was based twelve years earlier, but it was probably overlooked at that time.

#### Synonymy.-

Comparison of the male lectotypes of *L. papuensis* and *D. russula* proved that Distant correctly synonymized these two species (1906). We can now add to this synonymy *L. crassa*, after studying all type specimens concerned.-

#### Description.-

Body dorsally and ventrally dull ochraceous to light or dark-brown; pronotum collar sometimes lighter or darker. Abdominal segments 1 and 2 covered with long hairs, especially in the males. Females much larger and stouter than the males. Head and pronotum together 1.2 times as long as meso- and metanotum together. Head and thorax together 1.1 times as long as abdomen. Greatest width of the body across the lateral angles of the pronotum collar (fig. 1-2).

Head: Dull ochraceous to dark brown. Eyes large; in dorsal view the eye is about 1.1 times the width of vertex between the eyes. Ocelli raised distinctly; a median fissure runs in between the lateral ocelli. Distance between the lateral ocelli in the males 1.5 times, in the females 1.8 times as wide as distance between lateral ocellus and eye. Head nearly twice as long as vertex width between eyes. Postclypeus triangularly protruding in dorsal view, the most apical part is sometimes lighter coloured. Underside of postclypeus strongly laterally compressed, especially the proximal two-thirds. A median, light-coloured fascia runs from halfway the dorsal length of the postclypeus downwards to the clypeal suture; parts of this fascia may be obsolete. Distal part of the postclypeus with mostly very weak

transverse ridges, which are lightly coloured and alternate with the dark ground-colour. Genae and mandibular plates densely covered with hairs. Rostrum with a black apex reaching the intermediate coxae.

Thorax: Central fasciae on pronotum sometimes lighter than the ground-colour. Pronotum collar about twice as broad as the pronotum just behind the eyes. The fissures are deep so that the pronotum looks very strongly domed. The posterior oblique fissures do not reach the pronotum collar. A large dark spot is situated medially on the pronotum collar; the distal parts of the lateral corners of the collar are deflected ventrally and broadly rounded. Mesonotum sometimes darker than the remaining part of the body; in some specimens four almost concolourous spots are distinguished at the proximal margin, the two paramedian spots are about half as long as the two lateral spots. Mesonotum covered with short hairs. The two round indented marks in front of the cruciform elevation are of the same colour as the mesonotum and hairless. Cruciform elevation of moderate size and somewhat raised. Mostly there is a median dark line on the cruciform elevation, which continues in the small part of the metanotum that extends from below the mesonotum. Mesostigma (fig. 3) very large, sometimes covered by a fleece. Whole underside covered with fairly long hairs.

Legs: Mostly concolourous, sometimes with longitudinal stripes on the fore femora. The fore femora bear three thorns (fig. 7). The basal one is longest and cylindrically shaped with a blunt apex, which bears a minute dark coloured spine. The other two thorns which are placed close together near the distal end of the femur are triangularly shaped and have sharp, dark coloured, apices. The most apical thorn is very small.

Tegmina and wings: Tegmen talc-like, subhyaline, brownish or reddish ochraceous. Extreme base red to light brown. Veins beyond basal area spotted with fuscous. The ventral sides of the veins are hairy. Apical areas very short: the third, fourth and sixth areas being somewhat longer than the rest, the seventh and eighth areas the shortest. Total surface of apical areas less than half the surface of the

tegmen. Third ulnar area as long as the first; fourth ulnar area one-and-one-third times as long as radial area. The transverse vein of the second ulnar area does not extend in the third ulnar area. Corial fold very obsolete, but indicated by a faint line in the pigmentation dividing the fourth ulnar area in two parts of nearly equal length. Small nodes are found in the M1+2 and M3+4. A1 and Cu2, fused along their whole length, form a triangle at the border of the tegmen in most specimens. The margin outside the ambient vein is very narrow, almost lacking, in the tegmen as well as in the wing.

Wing pale hyaline, extreme base red to light-brown, veins light-brown to ochraceous. A1 and Cu2 are not fused, so that the anal field is not enclosed.

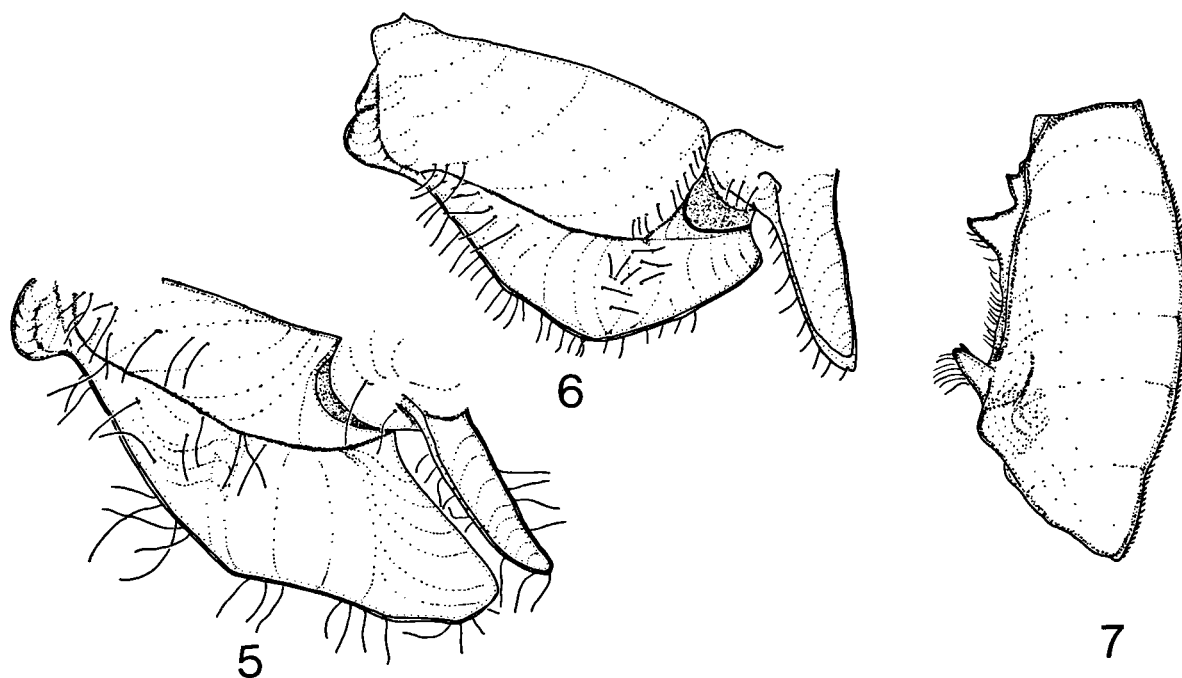
Opercula: Male operculum (fig. 5) large, sickle-shaped, fairly convex. The operculum does not cover the tymbal cavity since its posterior edge is reflected in a more or less right angle with the body. Female operculum (fig. 6) small and more or less rounded. Operculum and meracanthus very hairy in both sexes. Meracanthus fairly broad; in the males about 0.7 as long as the operculum, in the females about as long as the operculum

Male abdomen: Not inflated, but elongate triangular in shape, medially raised along the whole length, weakly carinate. The greatest part of tergite 1 is covered by the metanotum in most specimens. When visible, tergite 1 has the shape of a trapezium, with sharp proximal angles and obtuse distal angles. Sternite 1 is very small and triangular with a broadly rounded apex pointing distally. Tergite 3 is somewhat longer than each of the tergites 2 and 4.

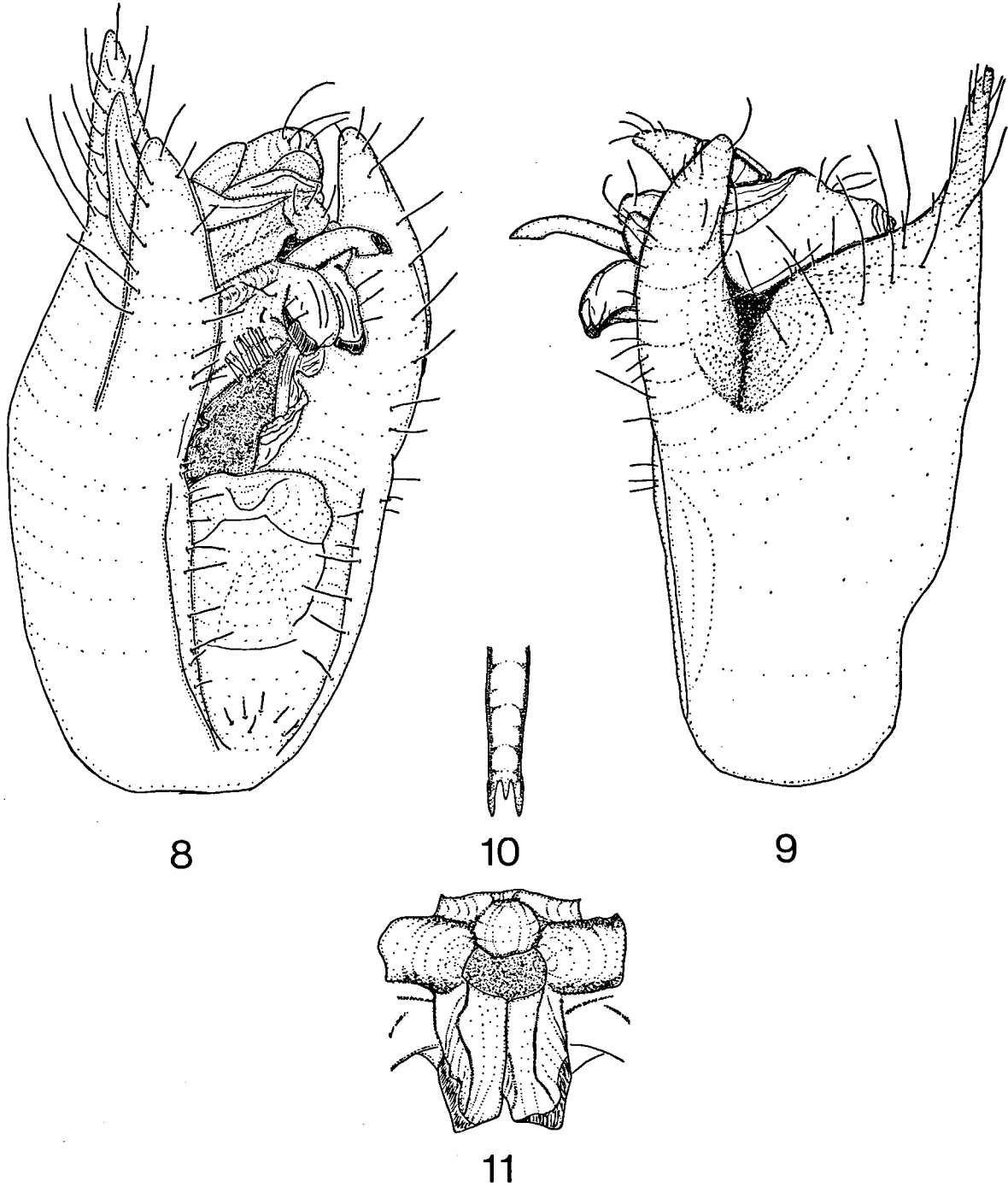
Female abdomen: Broad and weakly raised medially. Underside weakly convex. Length of segment 9 about one fourth of the total abdominal length. The ovipositor sheath does not reach beyond the epimeral triangle.

Tymbals: Not very large, of about the same size as the cruciform elevation. Each tymbal has a high number of ridges, 17-19 long ridges alternate with short medial ridges (fig. 4) in a very regular pattern. With the naked eye the series of short ridges seems to be a broad longitudinal faint line, running across the tymbal.

Male genitalia (figs. 8-11): Lateral lobes of the pygofer of moderate size, swollen and bluntly pointed, not extending beyond anal valves. The epimeral triangle varies in shape from long, slender and pointed to somewhat broader,



Figs. 5-7. *Lembeja papuensis*: 5, male operculum in ventral view, Mt. Lamington; 6, female operculum in ventral view, lectotype *L. crassa*; 7, male femur in lateral view, lectotype *L. papuensis*.



Figs. 8-11. *Lembeja papuensis*: 8, pygofer in ventrolateral view, Mt. Lamington; 9, pygofer in lateral view, Mt. Lamington; 10, aedeagus in dorsal view, Mt. Lamington; 11, uncus and claspers in ventral view, Mt. Lamington.

shorter and more blunt. Claspers swollen and curved proximad, pointed and dark coloured apically. Uncus trilobate with two lateral swollen lobes and one medial swollen lobe. Adjustment of the aedeagus situated halfway along the pygofer. Aedeagus slender, apex with two lateral lobes and a mediodorsal short spine. The pygofer is provided with longer hairs.

Measurements based upon all specimens available: Length of the body ♂: 25.6-31.9 mm,  $\bar{x}$  = 28.2,  $\sigma$  = 1.4, ♀: 29.2-38.2 mm,  $\bar{x}$  = 34.6,  $\sigma$  = 2.4; width of pronotum collar ♂: 25.6-31.9 mm,  $\bar{x}$  = 10.8,  $\sigma$  = 0.5, ♀: 13.0-15.5 mm,  $\bar{x}$  = 14.5,  $\sigma$  = 0.4; length of tegmen ♂: 29.5-34.4 mm,  $\bar{x}$  = 31.7,  $\sigma$  = 1.3, ♀: 39.1-47.1 mm,  $\bar{x}$  = 42.7,  $\sigma$  = 2.0.

#### Distribution.-

*L. papuensis* is found in the eastern part of New Guinea (fig. 12). Ashton's record (1914) of the species from northern Queensland proved to be incorrect and concerns a specimen from New Guinea.

#### Material examined.-

PAPUA-NEW GUINEA, NE NEW GUINEA: K. Wilhelmsland, Bongu, 1911-5, 1♀ paralectotype of *Drepanosaltria russula* SMD; K. Wilhelmsland, Bongu, 1909-21, 1♀ lectotype of *Lembeja crassa* BM; K. Wilhelmsland, Bongu, 1♂ BM, same data but with: Weiske, coll. A. Jacobi, 1♂ SMD, same data, without Weiske but with: 881, 1♂ SMD; Madang Dist., R. Buru, 1200 ft., N.W. Lae, 1.x.1964, 1♂ BM; Ramu River area, 1896, Lauter-

bach, 2♀ ZMB, same data but with: 15.vii, 1♂ 1♀ ZMB, same data but with: 3.vii, 1♀ ZMB; Saidor, iii-iv.44, O.H. Graham, 1♂ 2♀ USNM; Kais. Wilh.-Land, Stephansort, x-xii.88, S. Rohde, 4♂ 3♀ ZMB; Stephansort, Astrolabe B., 1894, Kunzmann, 1♂ BM. PAPUA-NEW GUINEA: SE NEW GUINEA: Buka Bara, Northern District, 23.ix.1963, F. Shanahan, 1♂ BISH; Dilo, vi-vii.90, 1♂ 1♀ paralectotypes of *Lembeja papuensis* MSNG, same data, 2♀ MSNG, same data but with: Distant coll. 1911-383, 1♂ lectotype of *Lembeja papuensis* BM, same locality and date but with *Lembeja crassa* Dist., 1♀ paralectotype of *Lembeja crassa* BM; Kokoda, 1200 ft., 1933, L.E. Cheesman, 1♀ BM; Mt. Lamington, 500 m, vi.1966, P. Shanahan, G. Lippert, 1♂ BISH; Mamai Plt'n near Port Glasgow, 8-9.ii.1965, R. Straatman, 1♀ BISH; Milne Bay, xii.1943, O.H. Graham, 3♂ 2♀ USNM; Milne Bay, 1898-'99, 1♀ BM; Paumomu riv., N. Guinea SE, ix-xii.92, Loria, Syntypus, 1♂ MSNG; Peria Creek/Kwagira river, 50 m. No. 7, 14.viii-6.ix.1953, Geoffrey M. Tate, 1♂ 4♀ AMNH; Popondetta, Inbora Plant'n, 23.ix.1963, P. Shanahan, 1♀ BISH; Popondetta, 25 m, vi.66, Shanahan & Lippert, Light Trap, 3♀ BISH; Popondetta, 60 m, 1-4.ix.63, J. Sedlacek collector, 1♂ BISH, same locality but 3-4.ix.63, 1♂ BISH, same locality but 2.ix.63, malaise trap, 1♂ BISH. New Guinea without, or with untraceable, locality: Base B.A.P.O., 503 N. Guinea, iv.15.1944, Horsefall coll., 3♂ SEM; Br. N. Guinea, E. Weiske, coll. A. Jacobi, 1911-13, 1♀ SMD; Deutsch N. Guinea, coll. A. Jacobi, 1911-5, 1♂ lectotype of *Drepanosaltria russula* SMD; N. Guinea, Det. H. Ashton, 1♂ SAM; New Guinea, J.E. Hadley, 1943. KSNM-166716, 1♂ USNM; Collectie C. & O. Vogt, Acq 1960, *Prasia Stål* n.sp., 1♀ ZMA.

Note: For tracing the localities we have used the same geographical sources as mentioned by Duffels (1977), and the most interesting publication by Wichmann (1912) on the expedi-

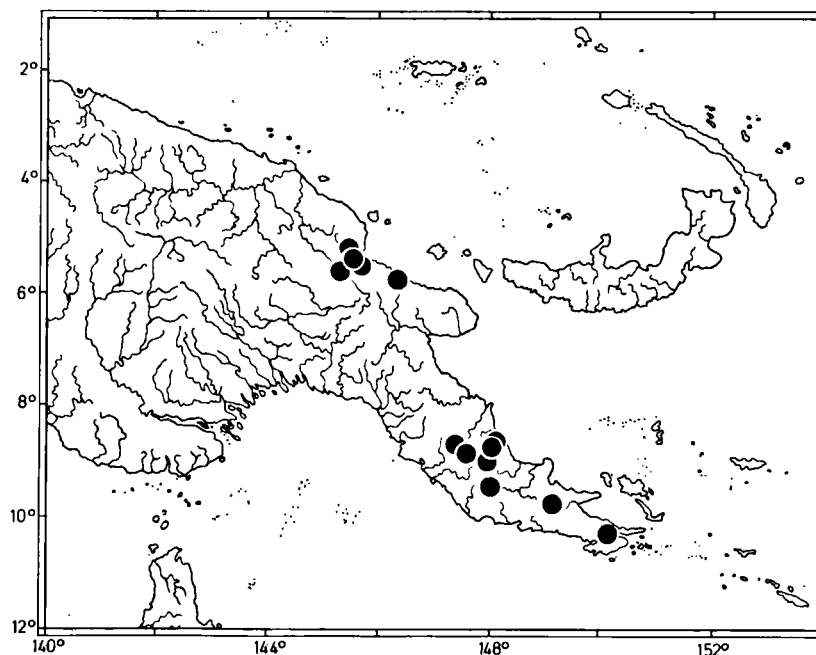


Fig. 12. Distribution of *Lembeja papuensis*.



tions to New Guinea between 1885-1902.

#### Discussion.-

*Lembeja papuensis* had a rather isolated position in the genus by the absence of a fusion of the hindwing veins A1 and Cu2. These veins are fused in the other species of the genus, with exception of *L. robusta* and some undescribed relatives. The venation of the hindwing has been used as a distinctive feature separating *Lembeja* from *Prasia*, which lacks this fusion (e.g. Schmidt, 1925). On account of this feature Schmidt (1925) transferred *L. papuensis* to *Prasia*.

Preliminary results of our taxonomic studies in *Lembeja* and *Prasia* plead in favour of a close relationship of *L. papuensis* to *L. robusta* and some undescribed species, not only on account of the absence of a fusion of A1 and Cu2 in the hindwing, but mainly by similarities in the structure of the male genitalia.

#### ACKNOWLEDGEMENTS

We are most grateful to the following persons and institutions for the loan of material. The abbreviations of the institutions as given below, have been used in the list of material.

- AMNH American Museum of Natural History, New York; Dr. R.T. Schuh, Dr. P. Wygodzinsky.  
 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.  
 MSNG Museo Civico di Storia Naturale "G. Doria", Genova; Dr. R. Poggi.  
 SAM South Australian Museum, Adelaide; Dr. E.G. Matthews.  
 SEM Snow Entomological Museum, Lawrence, Kansas; Dr. P.D. Ashlock, Dr. V.P. Gapud.  
 SMD Staatliches Museum für Tierkunde, Dresden; Dr. R. Emmrich.  
 USNM National Museum of Natural History, Smithsonian Institution, Washington; Dr. R.C. Froeschner.  
 ZMA Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam.

ZMB Institut für Spezielle Zoologie und Zoologisches Museum der Humboldt-Universität zu Berlin; Dr. N. Göllner-Scheiding.

Furthermore, we are much obliged to mr. L. v.d. Laan for making the photographs.

#### REFERENCES

- ASHTON, H., 1914. Catalogue of the Cicadidae in the South Australian Museum, with descriptions of several new species.- Trans. R. Soc. S. Austr., 38: 345-358, pl. 17.  
 BOULARD, M., 1975. *Iruana rougeoti* n.sp. intéressante cigale éthiopienne.- Bull. Soc. ent. Fr., 80: 176-179, figs. 1-2.  
 BREDDIN, G., 1901. Die Hemipteren von Celebes. Ein Beitrag zur Faunistik der Insel.- Abh. naturforsch. Ges. Halle, 24: 1-213, pl. 1.  
 DISTANT, W.L., 1897. Viaggio di Lamberto Loria nella Papuasias orientales xvii. Additions to our knowledge of the Cicadidae of New Guinea.- Annali Mus. civ. Stor. nat. Giacomo Doria, (2) 17: 378-383.  
 -----, 1906. A Synonymic Catalogue of Homoptera. Part. 1. Cicadidae: 1-207. (Trustees of the British Museum, London).  
 -----, 1909. New Malayan Rhynchota.- Trans. R. ent. Soc. Lond., 1909: 385-396, pl. 10.  
 -----, 1912. An enumeration of the Rhynchota collected during the expedition of the British ornithologists' union to Central Dutch New Guinea.- Trans R. ent. Soc. Lond., 1912: 591-604, pl. 49.  
 -----, 1914. Report on the Rhynchota collected by the Wollaston Expedition in Dutch New Guinea.- Trans. zool. Soc. Lond., 20: 335-362, pl. 34.  
 DUFFELS, J.P., 1977. A revision of the genus *Diceropyga* Stal, 1870 (Homoptera, Cicadidae).- Monografieën ned. ent. Vereen., 8: 1-227, figs. 1-265.  
 -----, in preparation. Taxonomy, phylogeny and biogeography of the genus *Cosmopsaltria* Stal with remarks on the historic biogeography of the subtribe *Cosmopsaltriaria* (Homoptera, Cicadidae).  
 HORVATH, G., 1912. Miscellanea Hemipterologica, xii. Adnotationes Synonymicae et systematicae.- Anns hist.-nat. Mus. natn. hung., 10: 607-609.  
 JACOBI, A., 1903. Singcikaden von Ost-Neuguinea.- Sber. Ges. naturf. Freunde Berl., 1903: 10-15, figs. 1-5.  
 METCALF, Z.P., 1962. General catalogue of the Homoptera, viii. A bibliography of the Cicadoidea (Homoptera: Auchenorrhyncha): i-iv, 1-229 (North Carolina State College, Raleigh, N.C.).  
 -----, 1963. General catalogue of the Homoptera, viii, Part 2. Tibicinidae: i-vi, 1-492 (North Carolina State College, Raleigh, N.C.).  
 SCHMIDT, E., 1925. Zwei neue Singcicaden von der Insel Sumba.- Societas ent., 40: 42-43.  
 WICHMANN, A., 1912. Entdeckungsgeschichte von Neu-Guinea (1885-1902).- Nova Guinea, 2 (2): i-xvi, 371-1026, map i-ii, figs. 38-73.

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