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## Redefinition and revision of *Lydda* Westwood, 1840 with taxonomic notes on *Diostrombus* Uhler, 1896 (Homoptera: Fulgoroidea, Derbidae)

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A redefinition and taxonomic revision is given of the genus *Lydda*. Twenty-one species are attributed to this genus occurring in New Guinea and northern Australia. The zoraidine genera with short antennae are keyed and all *Lydda* species are keyed and redescribed with emphasis on the male and female genitalia. Four species are described as new: *Lydda perlucida*, *L. guttata*, *L. cornuta* and *L. fusca*; 16 species are transferred from *Proutista* to *Lydda* given 16 new combinations. *P. awarensis* Van Stalle, 1986 is synonymized with *L. gemina* Muir, 1913. *Arfaka* Distant, 1907 and *Afakia* Kirkaldy, 1909, former synonyms of *Proutista* are now considered as synonyms of *Lydda*. The Afrotropical species attributed to *Lydda* are transferred to *Diostrombus*, new subgenus *Lyddastrostombus*, giving seven more new combinations. *Proutista jezeki* Dlabola, 1979 and *P. jezeki* Dlabola, 1981 are transferred to *Diostrombus* s. str., giving *D. jezeki* (Dlabola) comb. n. and *D. adila* (Dlabola) comb. n. A lectotype is selected for *Lydda elongata*, *Lydda perkinsi*, *L. lutea*, *L. lurida*, *L. decisa*, *L. straminea*, *L. lumholtzi*, *L. australis*, *L. gemina*, *L. kobebelei*, *L. calypso* and *Philadelphiea pandani*. *Diostrombus muiri* nom. n. is proposed for *D. cocos* Muir, 1928, a secondary junior homonym of *D. cocos* (Muir, 1926) comb. n.

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### Introduction

The Derbidae is one of the largest families of Fulgoroidea with over 1000 species described; they occur on a variety of plants in tropical and subtropical regions and occasionally, as the group studied below, they are found on cultivated crops. The tribe Zoraidini is limited to the Old World tropics. The African species have been revised by Synave (1973) but for the Oriental region no comprehensive, revisionary studies are available. All species have long tegmina with a short, open clavus and a relatively short body; the wings are not longer than half the length of the tegmina. The tribe is divided in a group of genera with long and a group with short antennae.

The genera *Lydda*, *Proutista* and *Diostrombus* have short antennae, tegmina with five or six un-forked medial branches and, in the females, reduced valvulae. At present their definition and

taxonomy are problematical: in total 11 nominal genera have been created to accommodate species groups now placed in these three genera. *Lydda* itself was erected by Westwood (1840) to accommodate the Australian species *Derbe elongata* Fabricius, 1781. Two further generic names, *Diospolis* Westwood, 1841 and *Philadelphiea* Kirkaldy, 1906 (Metcalf 1945) are objective synonyms of *Lydda* as they both were erected for the same species, *D. elongata*.

Several species discussed here have been found on economically important crops such as coconut palms, oil palms, maize, sugar cane and banana. Although any damage to crops has not been recorded for these species, they are thought to be potentially injurious. Transmission of plant pathogens has not yet been proved (Wilson & O'Brien 1987).

The only comprehensive taxonomic treatments in this group are those on the Afrotropical species of *Diostrombus* and *Lydda* auct. by Synave (1973)

and Wilson (1987). The present study originated from a taxonomic study on *Proutista* (Van Stalle 1986, 1990) in conjunction with a study of species groups occurring in New Guinea and described in *Proutista* by several authors. After studying some closely related genera more in detail it became clear that some of the generic definitions were in need of revision. An enigma was the remarkable geographic distribution of *Lydda* with one species in Australia (the type species) and seven in the Afrotropics. Is this group indeed monophyletic? If not, what is the status of the Afrotropical '*Lydda*' species? What is the relationship between *Lydda* and *Proutista* and how can both genera be separated and defined?

Fennah (1950, 1956) and Synave (1973) provided keys for the Australasian and Pacific genera and for the African species, respectively. Discriminating characters are the width of the head in relation to the thorax (equally wide in *Lydda*) and the length of the wings in proportion to the tegmina: wings less than half length of tegmina and apex acute (*Diostrombus*) or wings about half as long and apex rounded (*Proutista*). Accordingly, the genus *Lydda* has always been separated on a single character, the very broad head. I have pointed out that the broad head must have evolved at least twice and accordingly the genus *Lydda* as defined at present is considered as polyphyletic; the seven Afrotropical species also differ considerably from *Lydda elongata* in other respects, such as the venation of the wings and tegmina and the structure of the aedeagus.

Recognition of the polyphyletic status of *Lydda* implements a new status for the seven Afrotropical species. The tubular aedeagus, the pointed apex and the length of the wings in proportion to the tegmina suggest a close relationship with the species of *Diostrombus*. As the African species, on the basis of the broad head, certainly form a monophyletic group, I propose to place them in a new subgenus of *Diostrombus*, described below. *Diostrombus biclavatus* (Westwood) is also included in this new subgenus.

*Diostrombus* includes several species groups which are characterized by the structure of the head. Supposedly, this is caused by selection pressures reflecting different feeding strategies. Such differences have not been observed in *Proutista*; in *Lydda* (new definition) only *Lydda elongata* shows the remarkably broad head.

The closely related genus *Proutista* includes about 30 species, which are all Oriental except for two Afrotropical (one recently introduced - Wilson

1987); all the species listed in *Proutista* from New Guinea and Australia and one species of Larat I. are here transferred to *Lydda* and redescribed and illustrated together with four new species from Australia. The two species of *Proutista* described by Diabola (1979; 1981) from Saudi Arabia and Iran are transferred to *Diostrombus*.

Unlike most other derbids the female terminalia of *Lydda* show distinct processes which are useful for species recognition. In some species, e.g. *L. oui-ni* and *L. lurida*, the females are even easier to identify than the males. The female processes may have the function of claspers to provide a firmer grip of the male during copulation; alternatively, although less likely, the female processes have isolating functions by preventing interspecific copulations.

### Material and methods

The types of all species have been examined and lectotypes were selected for 11 species where the number of specimens was not specified in the original description. All major museums and institutions thought to have material for this study were contacted. My own collections and observations were made in Madang, Papua New Guinea during a field trip in April-June 1988. Most species can be found by looking on the underside of banana leaves where they sit upside down with their tegmina spread open, the surface perpendicular to the body axis, the whole forming a V when viewed in front. They usually sit there close to the main nerve, five specimens, maximum ten on one leaf.

Illustrations were made with a Wild M5 stereomicroscope and camera lucida. Measurements were performed with an ocular micrometer and are given in mm. In some males the genital chamber is partly open but male holotypes were dissected in case the aedeagus was not visible from the outside. The anal segment, pygofer and genital styles are figured in lateral view; the medioventral process of the pygofer and sometimes the genital styles in ventral view. The aedeagus is illustrated in lateral and dorsal views. For the females drawings were made of the external genitalia in lateral and ventral views; where helpful for species identification the complete abdomen of one of both sexes is figured.

Morphological terminology follows O'Brien & Wilson (1985). The definition of the cubital and medial veins in Zoraidini has been the subject of confusion. Muir gives another definition to those

of Synave (1973), Fennah (1952) and Evans (1964). I interpret the media as having five branches in *Lydda* and six in *Proutista* and *Diostrombus*, with the first branch implanted close to the base of the tegmina and joined with the cubital vein by a small transverse vein m-cu; accordingly the media touches the inner and apical border of the tegmina at six points in *Lydda*: five branches and the main stem; this is in contrast with the terminology used by Broomfield (1985) where the same situation would be defined as 'six-branched'. The numbering of the medial branches starts with the most proximally implanted branch which is designated as the first; this fulgoroid tradition is in contrast with the Comstock system where the numbering starts in the opposite direction. The radial cell begins at the basal cell and terminates on the last transverse vein r-m and thus has another transverse vein r-m at about 2/3 distance of its base; this is important when to decide whether 1/2 or more of total area of radial cell is coloured brown. Tegmen and wing of a species are always drawn to the same scale. In the figures of the wings the anal area with the stridulation surface is sometimes missing. This is because in the wing mounts this area tends to recurve under the remaining wing. The numbering of the abdominal segments can be found by starting with the most basal tergite which is the 3rd, and which can easily be recognised by a remarkable spot with bristles.

The depositories are given with their abbreviations as follows (in alphabetic order): AM Australian Museum, Sydney, Australia; BMNH Natural History Museum (formerly British Museum (Natural History)), London, U.K.; BPBM Bishop Museum, Honolulu, Hawaii, U.S.A.; CAS California Academy of Sciences, San Francisco, U.S.A.; COB Coll. Lois O'Brien, Agricultural A & M University, Tallahassee, Florida, U.S.A.; KBIN Koninklijk Belgisch Instituut voor Natuurwetenschappen, Belgium; MZB Museum Zoologicum Bogoriense, Bogor, Indonesia; NMB Naturhistorisches Museum, Basel, Switzerland; NR Naturhistoriska Riksmuseet, Stockholm, Sweden; NSWAF Agriculture & Fisheries, Biological and Chemical Research Institute, Rydalmere, Australia; NTMS Northern Territory Museum of Arts & Sciences, Darwin, Australia; NTU National Taiwan University, Taipei, Taiwan; PAN Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland; RNH Rijksmuseum voor Natuurlijke Historie, Leiden, Netherlands; SAM South Australian Museum, Adelaide, Australia; ZMUC Zoological Museum, University of Copenhagen, Denmark

### Tribe ZORAIDINI Muir, 1918

Type genus: *Zoraida* Kirkaldy, 1900.

The Zoraidini can be separated from other tribes by the presence of long tegmina with a long subcostal cell, reduced wings which bear a stridulatory organ, and the compound eyes which do not reach to the level of the postclypeus. Within the tribe basically two groups can be recognised: these with long antennae (long pedicel) and subapical arista and ovipositor with 'normally' developed valvulae, and a second group with short antennae (pedicel ovoid) having a terminal arista and ovipositor with reduced valvulae. The genera discussed in this paper form part of the second group. The highly specialised character of the female genitalia however question the monophyletic status of the tribe.

Diagnostic characters are the number and state of the medial branches, and exceptionally the length of the pedicel (*Shizuka*). With the present redefinition of *Lydda* a modified key is given to the Zoraidine genera with short antennae and unforked medial branches, or only first branches forked:

1. Media with five branches (Fig. 1) ..... 2
- Media with six branches ..... 3
2. Media with five branches which are separate, not fused over a certain length; Australia, New Guinea ..... *Lydda* Westwood
- First and second branch fused over a short distance giving the impression of having a forked first branch; Madagascar ..... *Raizoda* Muir
3. Vertex and frons separated by a distinct transverse keel; lateral keels of frons distinctly separate in upper half, contiguous in lower half; first medial branch seemingly bifurcate by the fact that the vein is strongly angulate at the place of junction with the transverse vein between the first and second branch; Africa ..... *Zorabana* Van Stalle
- Transverse keel between vertex and frons lacking; keels of frons contiguous over their whole length or separate over their whole length; first branch of media not seemingly bifurcate but going straight to inner border of tegmina ..... 4
4. Pedicel more than twice as long as broad; Taiwan ..... *Shizuka* Matsumara
- Pedicel less long ..... 5
5. Wings less long than half the length of the tegmina, apex acute (genus *Diostrombus*) ..... 6
- Wings half as long as tegmina, apex rounded ..... *Proutista* Kirkaldy
6. Head as wide as thorax; Africa ..... *Lydda* subgen. n.
- Head appreciably less wide than thorax ..... *Diostrombus* Uhler

genus *Diostrombus* Uhler, 1896

subgenus *Lyddastrombus* subgen. n.

*Lyddastrombus* subgen. n. is erected as a subgenus *Diostrombus* Uhler to accommodate seven subtropical species previously referred to *Lydda*.

Type species: *Diospolis annetti* Muir, 1918.

**Description.** – Head as wide or wider than thorax, antennae short, pedicel ovoid. Frons narrow, lateral ridges not touching, parallel. Vertex trapezoidal. Pronotum small, without distinct carinae; mesonotum with three indistinct longitudinal keels. Tegmina hyaline with some brown spots usually situated at base, in radial cell or along transverse veins, about four times as long as broad; claval vein fused with cubital vein, the latter going straight to the inner margin, not bent at the place of fusion with Cl; media with six branches. Wings pointed at apex, shorter than half the length of the tegmina. Legs slender, hind tarsi with five or six small teeth on first and second tarsomere. Abdomen yellow and brown, in male anal segment with an apex which can be tapering, pointing ventrad or having two separate processes. Pygofer with an angulate or sinuose dorsolateral angle and with or without a medioventral process; apex of genital styles tubular with various small apical processes or spines. Aedeagus with a tubular perianthium with at least a dorsal subapical movable process which is pointed dorsad or cephalad and a basal unmovable spinose process; usually some more spines on the apex and pointing caudad or dorsad.

**Diagnosis.** – *Lyddastrombus* can be separated from the nominate subgenus *Diostrombus* by the shape of the head which is as wide as the thorax in *Lyddastrombus* and appreciably less wide than the thorax in *Diostrombus*.

The following species are transferred from *Lydda* to *Diostrombus*, subgenus *Lyddastrombus*, together with *Diostrombus biclavatus* (Westwood, 1851); I have examined the type of the latter species which is deposited in the British Museum; it is mutilated but the presence and shape of the head leave no doubt of its subgeneric placement; the types of the other species have not been examined, they are redescribed and illustrated in Synave (1973: 8–19, figs 1–26):

- Diostrombus (Lyddastrombus) annetti* (Muir, 1918) comb. n.
- Diostrombus (Lyddastrombus) woodi* (Muir, 1926) comb. n.

- Diostrombus (Lyddastrombus) hargreavesi* (Muir, 1926) comb. n.
- Diostrombus (Lyddastrombus) mayumbensis* (Synave, 1966) comb. n.
- Diostrombus (Lyddastrombus) cocos* (Muir, 1926) comb. n.
- Diostrombus (Lyddastrombus) lineatipes* (Muir, 1926) comb. n.
- Diostrombus (Lyddastrombus) elaeidis* (Muir, 1928) comb. n.

**Subgenus *Diostrombus* Uhler**

*Diostrombus* Uhler, 1896: 283. Type species: *Diostrombus politus* Uhler, 1896.

The following species should be listed in the nominate subgenus *Diostrombus*: *Diostrombus nika* Linnavuori, 1989 (described from South Yemen), all *Diostrombus* species described and redescribed by Synave (1973: 23–66) except for *Diostrombus biclavatus*, and all species listed and described by Wilson (1987: 569–573) under *Diostrombus*. Due to the above transfer *Diostrombus (Lyddastrombus) cocos* (Muir, 1926), comb. n., enters into homonymy with *Diostrombus (Diostrombus) cocos* Muir, 1928; the junior homonym is replaced by the new name *Diostrombus (Diostrombus) muiri* nom. n. Finally, two species are transferred from *Proutista* to *Diostrombus* (s. str.), and the following two new combinations are made:

- Diostrombus (Diostrombus) adila* (Dlabola, 1979) comb. n.
- Diostrombus (Diostrombus) jezeki* (Dlabola, 1981) comb. n.

The name '*adila*' is an arbitrary word and treated here as an indeclinable noun in accordance with Appendix D(26) of the 'International Code of Zoological Nomenclature'.

**Genus *Lydda* Westwood, 1840**

- Diospolis* Westwood, 1841: 9. Type species: *Lydda elongata* Fabricius, 1781.
- Philadelpheia* Kirkaldy, 1906: 432. Type species: *Philadelpheia pandani* Kirkaldy, 1906.
- Arfaka* Distant, 1907: 397. Type species: *Arfaka decisa* Distant, 1907. Syn. n.<sup>1</sup>
- Afakia* Kirkaldy, 1909: 391 (replacement name for *Arfaka*). Syn. n.<sup>1</sup>

**Redescription.** – Head with eyes in dorsal view half to ¾ as width as thorax measured at posterior angles of pronotum. Vertex elongate triangular, lateral keels meeting each other at junction with frons.

<sup>1</sup>Listed in Metcalf (1945) as a synonym of *Proutista* Kirkaldy.

Frons in profile with margin parallel to eyes, lateral keels contiguous; lateral ocelli situated on base of frons. Postclypeus with a median and two lateral keels; labium with terminal segment about as long as broad, black in many species. Antennae short, pedicel ovoid, 1.3 to 1.8 times as long as broad at its widest part, flagellum implanted apically. Pronotum short, without keels, and posterior margin excavated. Mesonotum with three longitudinal indistinct keels. Metanotum well visible, triangular. Tegmina about 6.5 to 8.5 mm long, 3.4 to 4.4 times as long as broad, hyaline with brown spots or sometimes uncoloured; clavus open by the fact that Pcu goes beyond Cu2 (claval suture); Cul with two branches which can be partly fused. M with five unforked branches, all branches of Cul and M linked by cross-veins. Sc+R forked just before middle, and a variable number of cross-veins between the costal margin and Sc. Wings half as long as tegmina, anal area reduced and folded under the wing, having a relatively large, ridged surface which comes in contact with a bristled spot on the third (first visible) tergite of the abdomen. Legs slender, hind tibiae with small lateral spines, in many species not much larger than hairs and therefore difficult to observe; first and second hind tarsomere with five to seven small teeth on apex.

**Male genitalia:** anal segment very short to long, obtuse or tapering, in some species bent downwards. Pygofer with rounded to angulate dorsolateral margin, medioventral process present, poorly developed or lacking. Aedeagus with a well-developed plate-shaped suspensorium which is connected to the dorsal part of the pygofer close to the anal segment; apex often bearing a movable, dorsally pointing spinose process and some rigid spines on sides.

**Female genitalia:** valvulae reduced, tergite VIII often bearing a triangular process which can be very long in some species.

**Phylogeny.** – The only diagnostic character of *Lydda* sensu auctorum was the presence of a broad head; this character has clearly evolved several times and cannot be used as a synapomorphy for the present group defined as *Lydda*. The five branched state of the M which separate it from *Proutista* is regarded here as a symplesiomorphy. The presence of small spines on the hind tibiae of *Lydda* could be of phylogenetic value but we did not yet have the opportunity to examine enough species in other genera. The only character retained as a

synapomorphic character is the structure of the aedeagus, which is basically tripartite when view in dorsal aspect; in some species however it can be highly modified.

**Distribution.** – *Lydda* is a tropical genus which is distributed over northern Australia, New Guinea, with its most western record on Larat I.; *L. elongata* and *L. lumholtzi* have a very wide distribution and occur as well in Australia as in New Guinea, *L. gressitti*, *L. lurida* and *L. ouini* are common species in New Guinea and *L. ouini*, described from New Guinea has also been found in West New Britain; *L. calypso* (from Larat I.) is the only species which does not occur on the New Guinean continent. For most species negative or positive data of adjacent islands are lacking.

**Food plants and biology.** – *Lydda gressitti*, *L. ouini* and *L. lurida* have been observed by me on the underside of banana leaves where they often sit close to the central nerve of the leaf, with their wings and tegmina in a position perpendicular to the body axis and to the leaf surface, forming a V in frontal view. The same kind of resting position was also observed in other Zoraidine genera. O'Brien (1982) records the same resting position for *Neodawnaria* (Cenchreini). She states that it might be an adaptation to keep raindrops from sticking their tegmina to the substrate. *L. gressitti* has been collected on sugar cane, banana and maize; *L. lurida* on sugar cane, banana, coconut palm and *Musa sapientum*; *L. straminea* on coconut palm and *L. sacchari* on sugar cane; *L. guttata* and *L. elongata* on *Pandanus*.

**Key to males**

The key starts with colour marks of tegmina and tarsi and then uses external characters of the male genitalia. Although this key is destined to identify *Lydda* males we have also incorporated those species which are only known from females, namely *L. straminea* and *L. australis*.

1. Tegmina with, in total, more than ½ of total area of radial cell occupied by brown to dark brown spots (Figs 1, 9, 37); when in doubt, take the alternative ..... 2
- Tegmina with space occupied by spots in radial cell equal or less than total area of radial cell; tegmina hyaline, ochreous or pale brown, never dark brown (Figs 42, 49) ..... 14
2. Tegmina with cubital and medial cells completely fumated with brown, without hyaline spots or windows (Figs 1, 17) ..... 3

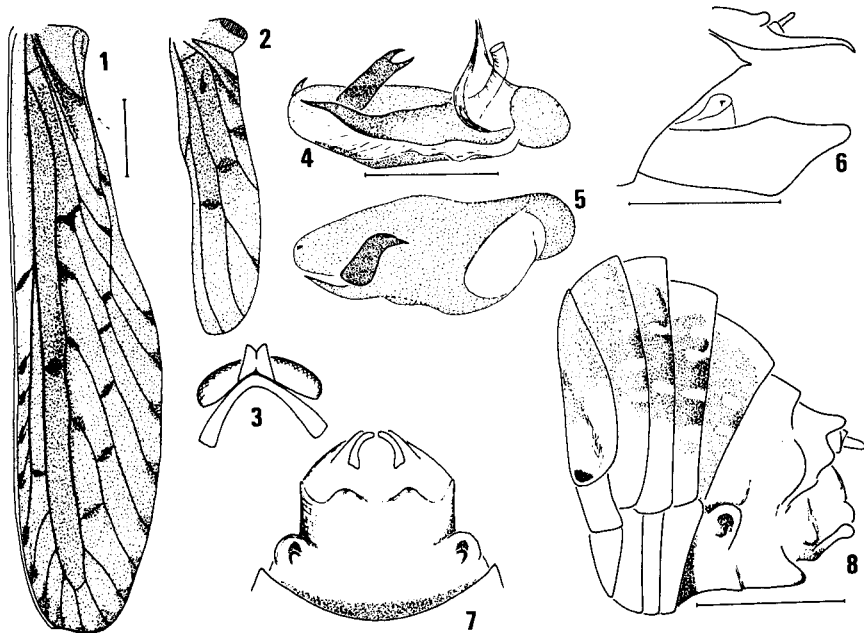
- Tegmina with hyaline areas in cubital and medial cells (Fig. 9) ..... 4
3. Head almost as broad as pronotum (Fig. 3), apex of tegmina brown (Fig. 1); Australia ..... 1. *L. elongata*
- Head of 'normal' size; tegmina with two apical cells hyaline (Fig. 17); Australia ..... 3. *L. perlucida*
4. Subapical transverse vein r-m brown fumated and on each side (proximally and distally) bordered by a hyaline area or by a circular hyaline spot (Figs 83, 96) ..... 5
- Subapical transverse vein r-m brown fumated and incorporated in the brown colour of the radial cell, not bordered by a hyaline area or hyaline circular/oval spot (Figs 24, 37) ..... 11
5. Legs entirely pale yellowish; male unknown; female with pregenital sternite with three caudal projections at apex (Fig. 94); Australia ..... 15. *L. australis*
- Legs with last tarsomere and/or apex of hind tibia black or brown ..... 6
6. Apex of hind tibia not fumated with brown; pygofer without a medioventral process (Figs 106, 109) ..... 7
- Apex of hind tibia fumated with brown or black; pygofer with or without a medioventral process ..... 8
7. Pygofer with a triangular dorsolateral angle and without a medioventral process; anal segment very short (Fig. 106), almost not surpassing dorsolateral margin of pygofer; Australia ..... 17. *L. koebelii*
- Pygofer without such a triangular dorsolateral margin; anal segment much longer, surpassing dorsolateral margin of pygofer over more than half its length (Fig. 109); Australia ..... 18. *L. cornuta*
8. Anal segment with a long spine on apex directed ventrad; pygofer with a distinct medioventral process (Fig. 85); Australia, New Guinea, Amboina ..... 14. *L. lumholtzi*
- Anal segment without a such a spine ..... 9
9. Pygofer without a medioventral process (Fig. 99); ventral part of pygofer yellowish brown; New Guinea ..... 16. *L. gemina*
- Pygofer with a small medioventral process (Figs 118, 129), ventral part of pygofer black ..... 10
10. Anal segment broad in lateral view (Fig. 118); pygofer without an ensiform process on dorsolateral margin; aedeagus (Figs 116, 117) with one large spinose process and one vertical spine; New Guinea ..... 19. *L. sacchari*
- Anal segment in lateral view with a flat apical process; pygofer with a small ensiform process on dorsolateral margin (Fig. 127); aedeagus otherwise shaped (Figs 125, 126); Australia ..... 20. *L. fusca*
11. Tegmina with major part brown; inner margin broadly bordered with brown thereby forming a hyaline 'window' on medial cells (Fig. 24); pygofer with a distinct medioventral process which is longer than broad (Fig. 25); New Guinea ..... 4. *L. lutea*
- Tegmina with inner margin hyaline; pygofer with medioventral process small or absent ..... 12
12. Tegmina with outer cubital cell and transverse veins between medial branches fumated with brown (Figs 9, 10); Australia ..... 2. *L. perkinsi*
- Tegmina coloured otherwise ..... 13
13. Pygofer with a small medioventral process and a rounded dorsolateral angle (Fig. 30); apex of tegmina with a distinct dark spot (Fig. 29); New Guinea ..... 5. *L. grootaerti*
- Pygofer without a medioventral process and dorsolateral angle angulate (Fig. 41) apex of tegmina without a distinct dark spot (Fig. 37); New Guinea ..... 6. *L. sepikensis*
14. Tegmina completely hyaline except for some small spots near base; veins brown fumated (Fig. 69) ..... 15
- Tegmina with ochreous to brown spots, not confined to base (Figs 42, 49) ..... 16
15. Anal segment with apical process not longer than greatest width of anal segment in caudal view; medioventral process of pygofer thin, spine-shaped (Fig. 73); Australia ..... 11. *L. pseudodecisa*
- Anal segment with apical process much longer than greatest width of anal segment; pygofer with a broad, triangular medioventral process (Fig. 66); New Guinea ..... 10. *L. decisa*
- Male unknown; the females can be recognised by the two large submedian processes of the pregenital sternite (Fig. 75) which easily distinguish it from *L. decisa* but which closely resemble those of *L. pseudodecisa*; Australia ..... 12. *L. straminea*
16. Genital styles appreciably longer than anal segment, and apex curved inward and spine-shaped (Figs 44, 46); New Guinea ..... 7. *L. gressitti*
- Genital styles not or slightly surpassing apex of anal segment ..... 17
17. Wings with a broad brown band just before middle and another on apex (Fig. 124) ..... 20. *L. fusca*
- Wings hyaline, without brown bands as described above ..... 18
18. Distal 3/4 of postclypeus brown; tegmina with subapical transverse vein r-m having a conspicuous brown spots which is darker than the other marks (Fig. 76); pygofer with dorsolateral margin sharply angulate (Fig. 79); ventral part black; Australia ..... 13. *L. guttata*
- Postclypeus almost entirely yellow or only tip brown fumated; tegmina without a conspicuous brown spot on subapical r-m; pygofer with dorsolateral margin not sharply angulate ..... 19
19. Genital styles with a terminal appendice (Fig. 136); pygofer with dorsolateral margin not rounded; medioventral process shorter than half length of anal segment (Figs 135, 136); aedeagus as illustrated in Figs 133 and 134; Larat ..... 21. *L. calypso*
- Genital styles otherwise shaped: with an additional spine on dorsal inner side inserted before apex (Fig. 55); pygofer with dorsolateral margin rounded (Fig. 58), in lateral view medioventral process almost as long as anal segment ..... 20
20. Aedeagus as illustrated in Figs 50 and 51; apex

- of genital styles as illustrated in Fig. 55b; New Guinea ..... 8. *L. lurida*
- Aedeagus as illustrated in Figs 56 and 57; apex of genital styles as illustrated in Fig. 55a; New Guinea ..... 9. *L. ouini*

### Key to females

The females of *L. gemina*, *L. sepikensis* and *L. koebelii* are unknown. *L. sepikensis* is incorporated in the key.

1. Tegmina with, in total, more than 1/2 of total area of radial cell occupied by brown to dark brown spots (Figs 1, 9, 37); when in doubt, take the alternative ..... 2
- Tegmina with space occupied by spots in radial cell equal or less than total area of radial cell; tegmina hyaline, ochreous or pale brown, never dark brown (Figs 42, 49) ..... 12
2. Tegmina with cubital and medial cells completely fumated with brown, without hyaline spots or windows (Figs 1, 17) ..... 3
- Tegmina with hyaline areas in cubital and medial cells (Fig. 9) ..... 4
3. Head almost as broad as pronotum (Fig. 3), apex of tegmina brown (Fig. 1); pregenital sternite with two submedian elevations not extending behind tip of abdomen (Figs 7, 8); Australia ..... 1. *L. elongata*
- Head of 'normal' size, tegmina with two apical cells hyaline; pregenital sternite with a plate-shaped process extending behind tip of abdomen (Figs 22, 23); Australia ..... 3. *L. perlucida*
4. Subapical transverse vein r-m brown fumated and on each side (proximally and distally) bordered by a hyaline area or by a circular hyaline spot (Figs 83, 96) ..... 5
- Subapical transverse vein r-m brown fumated and incorporated in the brown colour of the radial cell, not bordered by a hyaline area (Figs 24, 37) ..... 9
5. Pregenital sternite with three distinct processes; legs entirely pale yellowish; abdomen almost completely dark brown (Fig. 94); Australia ..... 15. *L. australis*
- Pregenital sternite otherwise shaped; legs with last tarsomere and/or tip of hind tibia brown fumated; group with *L. gemina* and *L. koebeli* but ♀ unknown) ..... 6
6. Pregenital sternite with a large basal spine pointing ventrocaudad (Fig. 90); Australia, New Guinea, Amboina ..... 14. *L. lumholtzi*
- Pregenital sternite without such a spine ..... 7
7. Pregenital sternite apically with a broad, plate-shaped process (Figs 121, 122); New Guinea ..... 19. *L. sacchari*
- Pregenital sternite without such a process, but with a shallow median furrow; Australia ..... 8
8. 1/4 of radial cell dark brown (Fig. 107); pregenital sternite with two small elevations separated by a median furrow (Fig. 114); Australia ..... 18. *L. cornuta*
- only 1/2 of radial cell dark brown (Fig. 123); pregenital sternite otherwise shaped (Fig. 131) ..... 20. *L. fusca*
9. Tegmina with major part brown, inner margin broadly bordered with brown and thereby forming a hyaline 'window' on medial sectors (Fig. 24); pregenital sternite with caudal margin produced into a bifurcate process, appreciably extending behind abdomen and giving rise to two pointed processes separated by a V-shaped incision (Figs 27, 28); New Guinea ..... 4. *L. lutea*
- Tegmina with inner margin hyaline (Figs 10, 29); pregenital sternite without such a bifurcate process with pointed forks ..... 10
10. Apex of tegmina with a distinct dark spot (Fig. 29); pregenital sternite with caudal process not extending behind abdomen (Figs 35, 36); New Guinea ..... 5. *L. grootaerti*
- Apex of tegmina without such a dark spot; pregenital sternite with a process extending behind abdomen (Fig. 16) (♀ of *L. sepikensis* unknown) ..... 11
11. Australia; tegmina with outer cubital cell and transverse veins between medial branches fumated with brown, the latter forming a nearly continuous longitudinal band (Figs 9, 10); female genitalia with a plate-shaped structure extending behind abdomen and with a small U-shaped incision on apex (Figs 15, 16) ..... 2. *L. perkinsi*
- New Guinea; tegmina with outer cubital cell hyaline and transverse veins between medial branches not broadly fumated with brown and not forming a continuous longitudinal band (Fig. 37); female unknown ..... 6. *L. sepikensis*
12. Tegmina completely hyaline except for some small spots near base (Fig. 69); veins brown fumated ..... 13
- Tegmina with ochreous to brown spots, not confined to base (Figs 42, 49) ..... 15
13. Pregenital sternite with caudal margin produced into a bifurcate process, slightly extending behind the abdomen; 8th segment with a triangular projection (Fig. 75) ..... 14
- Pregenital sternite with two small submedian processes not extending behind the abdomen; dorsolateral border of 8th sternite rounded (Fig. 67); New Guinea ..... 10. *L. decisa*
14. Possibly distinguished from *L. pseudodecisa* by examination of male genitalia; Australia ..... 12. *L. straminea*
- Only separated by examination of male genitalia; New Guinea ..... 11. *L. pseudodecisa*
15. Tergite of 8th segment without a finger-shaped projection ..... 16
- Tergite of 8th segment with a triangular or finger-shaped projection (Figs 54, 59) ..... 19
16. Wings with a broad brown band just before middle and another on apex (Fig. 124) ..... 20. *L. fusca*
- Wings hyaline, without brown bands as described above ..... 17
17. Pregenital sternite with a large unpaired caudal process surpassing level of valvulae; abdomen



Figs 1-8. *Lydda elongata* (Fabricius): (1) left tegmen; (2) left wing; (3) head and pronotum, dorsal view; (4) aedeagus, right lateral view; (5) aedeagus, dorsal view; the spine which is running along the ventral margin is not figured; (6) anal segment, pygofer and genital style; (7) female terminalia, ventral aspect; (8) female abdomen, lateral view. Scale lines: 1 mm, aedeagus 0.5 mm.

- with large fuscous spots on tergite III to VII as illustrated in Fig. 141 ..... 22. sp. A
- Pregenital sternite without such a process; tergites of abdomen without a number of large fuscous spots ..... 18
  - 18. A pale species; postclypeus entirely yellow; tegmina hyaline with indistinct hyaline brown spots (Fig. 132) ..... 21. *L. calypso*
  - Head and pronotum whitish, part of postclypeus and anteclypeus brown; tegmina with distinct brown spots (Fig. 143); female genitalia as illustrated in Figs 144 and 145 ..... 23. sp. B
  - 19. Tergite of 8th segment with triangular or finger-shaped projection not extending behind abdomen (Figs 54, 81) ..... 20
  - Tergite of 8th segment with finger-shaped projection appreciably extending behind abdomen (Fig. 47) ..... 7. *L. gressitti*
  - 20. Pregenital sternite with two distinct submedian processes (Fig. 82); distal 3/5 of postclypeus brown; tegmina with subapical transverse vein r-m having a conspicuous brown spots which is darker than the other marks (Fig. 76); Australia ..... 13. *L. guttata*
  - Pregenital sternite with only one plate-shaped structure or only two small elevations (Figs 54,

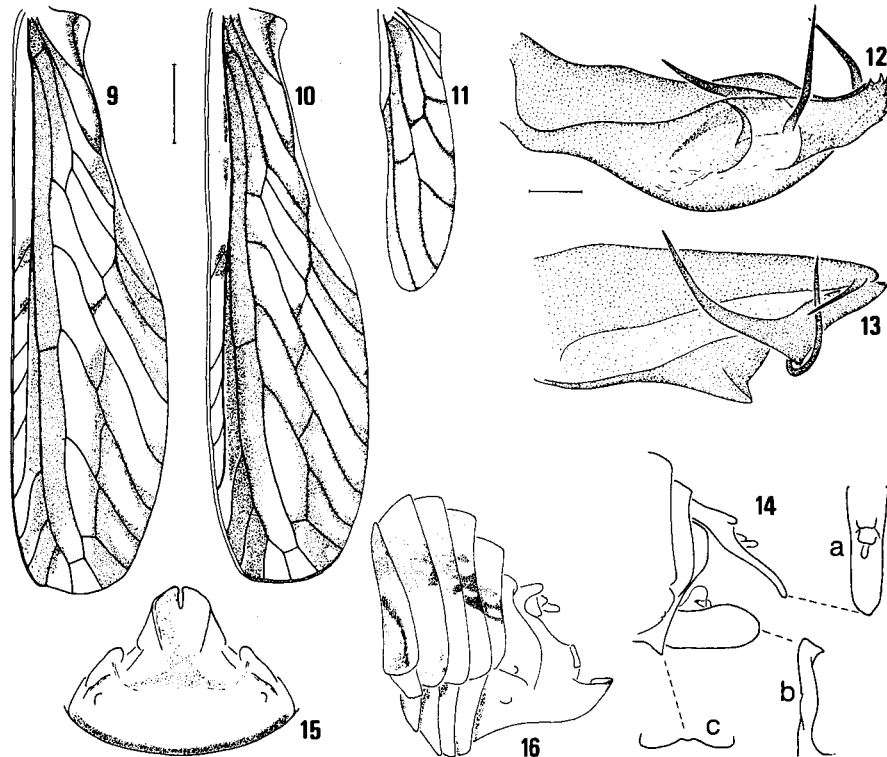
- 59); postclypeus almost entirely yellow or only tip brown fumated; tegmina without a conspicuous brown spot on subapical r-m ..... 20
- 21. Pregenital sternite with a distinct plate-shaped projection on caudal margin (Figs 59, 60) ..... 9. *L. ouini*
- Pregenital sternite with only a very small elevation on caudal border (Fig. 54) ..... 8. *L. lurida*

1. *Lydda elongata* (Fabricius, 1781) **comb. n.**  
(Figs 1-8)

*Cicada elongata* Fabricius, 1781: 324.  
*Philadelphiea pandani* Kirkaldy, 1906: 432.

**Type material.** - Lectotype [sex?] of *Cicada elongata* Fabricius, here designated, labelled 'Australia' (handwritten), and on a small blue label '63' above '47', BMNH (Coll. Banks); paralectotype ♀, without head, in same collection. Lectotype ♀ of *Philadelphiea pandani*, here designated, Australia, Qld, Cairns, VIII.1904, BPBM (examined).

**Other material.** - Australia: 2♂, 1♀, Qld, Bowen, no date, KBIN; 1♂, N Terr., Melville; 22 exx., Coen Aerodrome, 26.VI.1960, NSWAF; 7 exx., 'Plum Tree', Thirsty



Figs 9-16. *Lydda perkinsi* (Muir): (9) left tegmen, lectotype; (10) left tegmen, specimen Kuranda; (11) left wing; (12) aedeagus, right lateral view; (13) aedeagus, dorsal view; (14) tip of male abdomen with anal segment, pygofer and genital style in left lateral view, and a dorsal view of the anal segment (a), a ventral view of the ventral margin of the pygofer (c), and a ventral view of the left genital style (b); (15) female terminalia, specimen from Kuranda compared to the lectotype, ventral view; (16) female abdomen, same specimen, lateral view. Scale lines: 1 mm, aedeagus 0.1 mm.

Sound, Queensland, V.1957, AM; Papua New Guinea: 5 exx., W Prov., Wereave, J. W. Ismay, ex sugarcane; 3 exx., W Prov., Bensbach, 26.XI.1985, on sugarcane; Irian Jaya: 1♀, Eramboe, 80 km ex Merauke, 30.I.1960, BPBM.

**Description.** - Head (Fig. 3) almost as wide as pronotum in dorsal view. Vertex and frons white, postclypeus yellowish with white keels; anteclypeus brown, labium with anterior part blackened and white laterally, terminal segment black. Pronotum white with a yellowish lateral spot. Mesonotum yellow with white keels, scutellum and a median line on metanotum white. Tegmina (Fig. 1) pale brown throughout, with dark brown spots on transverse

veins and on tips and basis of cubital and medial veins; costal margin paler and radial cell somewhat darker than remaining part of tegmina. Abdomen (Fig. 8) white with pale brown spots. In female base of pregenital sternite fuscous; in male genital styles slightly fumated with brown and ventral part of pygofer brown. Legs white, terminal segment of all tarsi brown. Chaetotaxy: 7-8/6-7. Length tegmina: 8 mm.

**Male genitalia:** Anal segment with apex slightly depressed ventrally and tapering. Pygofer with a short spine on dorsolateral angle and without a medioventral process. Genital styles with a short

line on apex with is curved to median line. Aedeagus with three large spinose processes: a spine inserted on base and almost reaching to the apex of the aedeagus, a second thinner spine along the ventral margin and a third short spine on dorsal margin directed cephalad and bifurcate; finally, a very short tooth on apex of aedeagus. Periandrium on left side with a large lobe on base.

Female genitalia: Pregenital sternite with two small processes near caudal margin.

**Diagnosis.** - *Lydda elongata* can be distinguished from any other species by the very broad head.

### 1. *Lydda perkinsi* (Muir, 1913) comb. n.

Figs 9-16)

*Procutista perkinsi* Muir, 1913: 75.

**Type material.** - Lectotype ♀, here designated, Australia, Queensland (no locality label on type), BPBM.  
**Other material.** - Australia: 1♂, 2♀, N Qld, Speewah Road, 5 mi. S Kuranda, 12.I.1967, D. K. McAlpine & G. Holloway, AM & KBIN; 1♂, 1♀, N Qld, Mt Molloy, 20.II.1975, G. R. Brown, NSWAF.

**Description.** - Frons white, postclypeus and anteclypeus brown to dark brown, median keel of postclypeus white. Labium black. Antennae white, pedicel 1.5 times as long as broad. Pronotum white with a brown irregular spot behind eyes. Mesonotum brown, keels and space between keels more yellowish. Metanotum pale yellowish. Abdomen with tergites pale yellowish with brown spots as illustrated in Fig. 16, sternites white, some bordered with brown. pregenital sternite of female bordered with dark brown at base. Tegmina with radial cell almost completely brown, paler at apex; most cells bordered with brown and thereby giving a pronounced aspect to the veins. Wings hyaline with brown veins. Legs white to pale yellowish, last tarsomere of all tarsi fuscous; chaetotaxy hind tarsi 6/6. Length tegmen: 7.3-7.7 mm.

**Male genitalia:** Anal segment long with an almost obtuse apex. Pygofer bearing a very small medioventral process with a shallow median excavation. Genital styles as illustrated, apex with a tooth-shaped process directed medially. Aedeagus with three long spines and a toothed apex.

**Female genitalia:** Pregenital sternite with a caudal projection bearing a small, deep incision at its apex.

**Diagnosis.** - *L. perkinsi* can easily be distinguished from related species by the colour pattern of the teg-

mina, in the male by the toothed aspect of the aedeagus, and in the female by the shape of the pregenital sternite.

### 3. *Lydda perlucida* sp. n.

(Figs 17-23)

**Type material.** - Holotype ♂, Australia, N.T., Arnhem Land, Maningrida, 20-21.III.1961, J. L. & M. Gressitt, BPBM. Paratypes: 1♂, same data as holotype; 1♀, Prince of Wales I., Cape York Is., VIII-1920, J. A. Kuschke, BPBM.

**Description.** - Vertex and frons yellowish, clypeus and lorum slightly embrowned. Labium whitish, last segment black. Antennae pale yellowish, pedicel 1.4 times as long as broad. Pronotum and mesonotum pale yellowish, with an indistinct yellowish brown mark on their lateral parts; metanotum pale yellowish. Tegmina and wings with pale brown and dark brown markings as illustrated. Abdomen yellowish, a dark brown spot at the base of the third tergite and brown spots (Fig. 21) on other tergites; apical processes of female pregenital sternite fuscous; genital styles and a part of the male pygofer embrowned. Legs pale yellowish, all second and third tarsomeres embrowned. Chaetotaxy hind tarsi 6-7/7. Length tegmen: 7.5 mm

**Male genitalia:** Anal segment with a long ventrally pointed process. Pygofer devoid of a distinct medioventral process, ventral margin slightly undulate. Genital styles with apex slightly curved inward. Aedeagus nearly bilaterally symmetrical, right side more curved than left side, and with two straight spines pointed caudad.

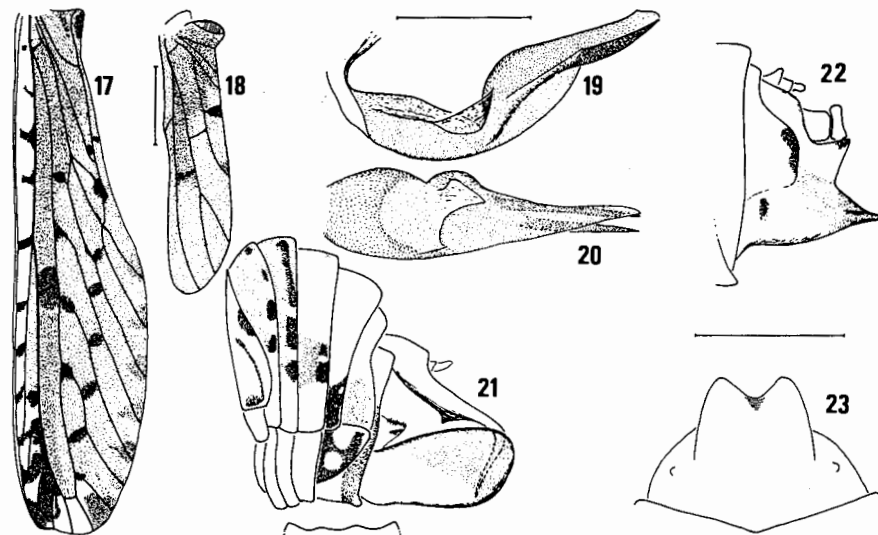
**Female genitalia:** I have tentatively figured a female from 'Prince of Wales I', which agrees in all characters with the males listed above. The caudal margin shows two large plate-shaped processes which are separated by a distinct excavation.

**Diagnosis.** - *L. perlucida* resembles *L. elongata* by the colour of the tegmina, but it can be immediately distinguished by the size of the head which is less broad. The male can be easily distinguished from all other species by the very characteristic shape of the aedeagus. The female has a very distinct lamellate process which is totally lacking in *L. elongata*.

### 4. *Lydda lutea* (Muir, 1913) comb. n.

(Figs 24-28)

*Procutista lutea* Muir, 1913: 77; Van Stalle 1986: 92, figs 16-19; 1990: 116, figs 33-34.



Figs 17-23. *Lydda perlucida* sp. n.: (17) left tegmen; (18) left wing; (19) aedeagus, left lateral view; (20) aedeagus, dorsal view; (21) male abdomen, lateral view, with a ventral view of the ventral margin of the pygofer; (22) female terminalia, specimen from 'Prince of Wales', lateral view; (23) tip of female abdomen, ventral view. Scale lines: 1 mm, aedeagus 0.5 mm.

**Type material.** - Lectotype ♂, here designated, Papua New Guinea, Laloki, F. Muir, 1910, BPBM.

**Other material.** - Papua New Guinea: 2♀, Brown River, 5 m, 23.X.1960, J. L. Gressitt, BPBM.

**Description.** - Vertex, frons and antennae pale yellowish. postclypeus and anteclypeus brown, postclypeus yellowish on median keel. Pedicel 1.8 times as long as broad. Labium dark brown, terminal segment black. Pronotum pale yellowish with a brown lateral spot. Mesonotum and metanotum yellow, mesonotum paler on median part between keels. Abdomen yellowish brown, sides fuscous. Tegmina brown with a hyaline part from medial branches to apex (Fig. 24). Wings brown. Legs yellowish, last tarsomere black; chaetotaxy hind tarsi 5-6/5-6. Length tegmen: 8 mm.

**Male genitalia:** Anal segment long, tapering. Pygofer with a small process on dorsolateral angle; lateral margin sinuate, medioventral process spatulate. Genital styles with a bifurcate process and a spine more distally on dorsal margin.

**Female genitalia:** Pregenital sternite with a plate-shaped process provided with a bifurcate projection; base of pregenital sternite with a small elevation, not visible on figure.

**Remarks.** - There is no indication of the number of specimens on which the species was originally described, nor is there a holotype designation; accordingly I have selected a lectotype.

### 5. *Lydda grootaerti* (Van Stalle, 1986) comb. n.

(Figs 29-36)

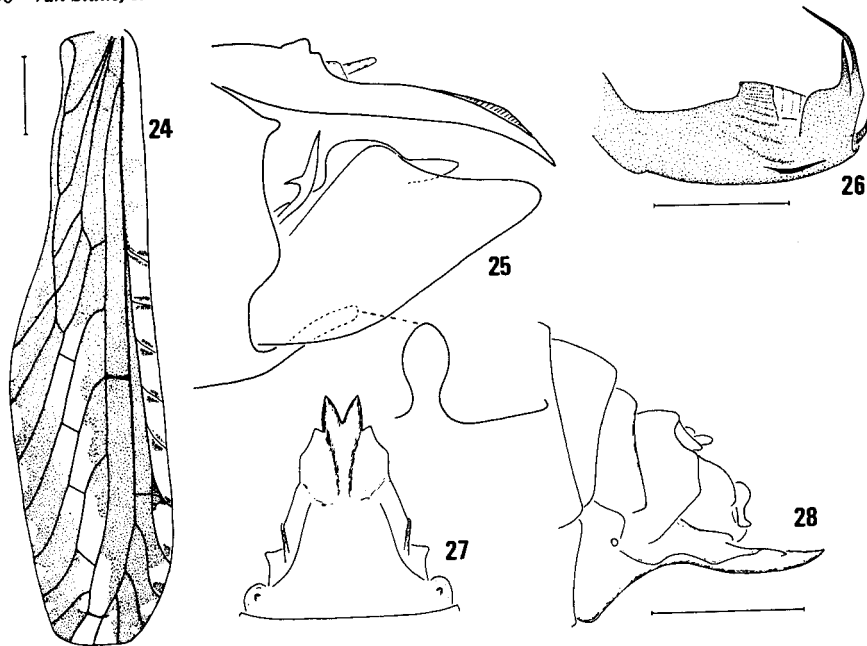
*Procutista grootaerti* Van Stalle, 1986: 91; 1990: 116, fig. 36.

**Type material.** - Holotype ♂, Papua New Guinea, Madang Prov., Condor Point, 13.V.1982, P. Grootaert, KBIN.

**Other material.** - Papua New Guinea: 1♀, Lae, VIII.1944, F. E. Skinner, BPBM (compared with holotype).

**Description.** - Colour entirely pale yellowish; pedicel 1.5 times as long as broad; terminal segment of labium, last tarsomere of all legs, and a few spots on 6th and 7th tergite black. Tegmina hyaline, radial cell and one apical cell brown, ends of cubital and medial branches and transverse veins dark brown. Chaetotaxy hind tarsi 7/7. Length tegmen: 7 mm.

**Male genitalia:** Anal segment with a blunt apex. Pygofer with a rounded dorsolateral angle and a small medioventral process. Genital styles ter-



Figs 24–28. *Lydda lutea* (Muir): (24) right tegmen; (25) anal segment, pygofer and genital style, with a ventral view of the medioventral process of the pygofer; (26) aedeagus, left lateral view; (27) female terminalia, ventral view, specimen of 'Brown River'; (28) tip of female abdomen, lateral view, same specimen. Scale lines: 1 mm, aedeagus 0.5 mm.

minating in a tapering apex. Aedeagus with three spinose processes.

Female genitalia: Pregenital sternite with a deep, narrow incision and near base with two lateral elevations as illustrated on ventral view in Fig. 35.

**6. *Lydda sepikensis* (Van Stalle, 1989) comb. n.**  
(Figs 37–41)

*Proutista sepikensis* Van Stalle, 1990: 116, figs 37–40.

**Type material.** – Holotype ♂, New Guinea (NE), Dreikikir, Sepik distr., 350 m, 23.VI.1961., J. L. & M. Gressitt, BPBM. Paratype, 1♂, same data as holotype, BPBM.

**Description.** – General colour yellowish. Anteclypeus and lateral parts of postclypeus embrowned. Pedicel 1.4 times as long as broad. Last segment of labium black. Pronotum and mesonotum whitish, yellow laterally. Abdomen with a few brown to black spots as illustrated. Tegmina and wings with pale brown spots as illustrated in Figs 37

& 38. Legs yellow, last tarsomeres black, chaetotaxy hind tarsi 5/4. Length tegmina: 8 mm.

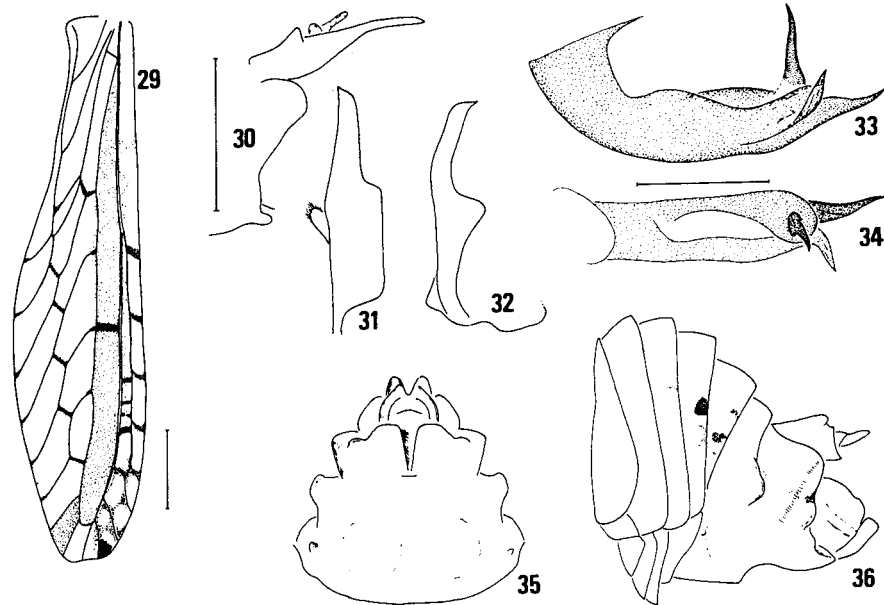
Male genitalia: Anal segment short. Pygofer without a medioventral process. Genital styles large, apex slightly curved inward. Aedeagus with two slender spines.

Female unknown.

**Diagnosis.** – Closely resembles *L. grootaerti*, *L. perkinsi* and *L. perlucida* from which it can be distinguished by details in the colouration of the apex of the tegmina, namely the absence of a dark spot and the extension of the brown colouration, and in the different shape of the pygofer, genital styles and aedeagus, which is very characteristic, having only two slender spines on the apex.

**7. *Lydda gressitti* (Van Stalle, 1990) comb. n.**  
(Figs 42–48)

*Proutista gressitti* Van Stalle, 1990: 105, figs 3–9, map 1.



Figs 29–36. *Lydda grootaerti* (Van Stalle): (29) right tegmen; (30) anal segment and pygofer; (31) left genital style, lateral view; (32) left genital style and ventral border of pygofer; (33) aedeagus, holotype, left lateral view; (34) aedeagus, dorsal view; (35) female terminalia, specimen from Lae, ventral view; the two basal elevations are indicated by the circles; (36) female abdomen, lateral view. Scale lines: 1 mm, aedeagus 0.5 mm.

**Type material.** – Holotype ♂, Papua New Guinea, Madang Pr., near Madang, Gogol River, 15.VI.1988, KBIN. Paratypes: Irian Jaya: 1♂, 1♀, Waris, S of Hollandia, 450–500 m, VIII.1959, T. C. Maa, BPBM; 1♂, Hollandia–Binnen, 100 m, 22.XI.1958, J. L. Gressitt, BPBM; 2♂, 2♀, 'rain forest behind dock V', 20 m, Hollandia, 14.VII.1957, Elmo Hardy, BPBM; 2♂, 1♀, Cyclops Mts: Ifar, 300 m, 4.XI.1958, J. L. Gressitt, BPBM; 7♂, 11♀, West Yrian, Sentani, 29.III.1973, S. Adisoemarto, MZB; Papua New Guinea: 1♀, Madang Pr., Mt Hanseman, 14.VI.1988, on banana, KBIN; 2♂, 2♀, Madang Pr., Yoro, 31.V.1988, KBIN; 4♀, Madang Pr., near Gogol River, 15.VI.1988, KBIN; 13♂, 8♀, Eastern Highlands Pr., Sirasira, 15.V.1988, on sugar cane, KBIN; 1♂, Morobe Pr., Bulolo, 23.V.1988, on banana, KBIN; 1♀, NE upper Sepik, Wagu, 5.VII.1963, R. Straatman, BPBM; 3♂, 3♀, Bulolo, 16.VIII.1956, on sugar cane, E. J. Ford, BPBM; 2♂, 2♀, West Sepik Pr., Hufi, banana, XI.1985, J. W. Ismay, BMNH; 2♂, West Sepik Pr., Imonda, maize, XI.1985, J. W. Ismay, BMNH; 1♂, West Sepik Prov. Kandriap, banana, J. W. Ismay, BMNH; Papua New Guinea?: 1♂, 6♀, N. New Guinea, Torricelli Mts, 200–1000', 1.1939, E. L. Cheesman, SAM.

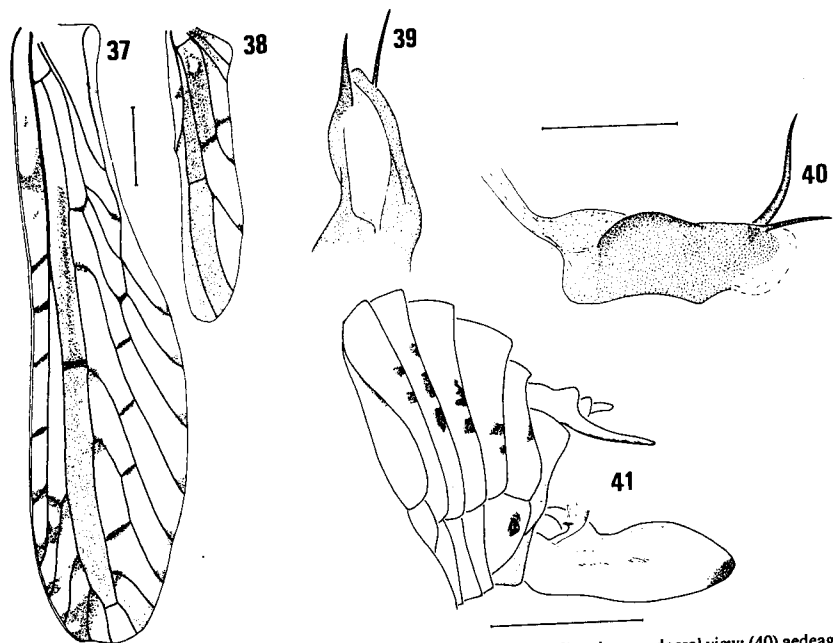
**Description.** – General colour pale yellowish; last

segment of labium black; pedicel 1.6 times as long as wide; three keels on mesonotum distinct; brown spots on abdomen and pale brown spots on tegmina and wings as illustrated in Figs 42, 43 and 46. Legs pale yellowish, tarsomeres of fore and middle legs dark brown fumated, hind legs with apex of tibia and last tarsomere fuscous. Chaetotaxy hind tarsi 6–7/6–7. Length tegmen: 8–8.5 mm.

Male genitalia: Anal segment with a slightly up-curved apex. Pygofer with a large, tapering medioventral process; genital styles long, apex curved inward. Aedeagus with four spinose processes as illustrated in Fig. 7 (dorsal view).

Female genitalia: 8th tergite characterized by a long process on each side surpassing the caudal margin of the pregenital sternite. The latter with a large plate-shaped process on caudal margin.

**Diagnosis.** – This species closely resembles *Lydda lurida* Muir in external morphology and with which it is commonly found together (pers. obs.). *L. gres-*



Figs 37–41. *Lydda sepikensis* (Van Stalle): (37) left tegmen; (38) left wing; (39) aedeagus, dorsal view; (40) aedeagus, left lateral view; (41) male abdomen with anal segment, pygofer and genital style, lateral view. Scale lines: 1 mm, aedeagus 0.5 mm.

*sittican* be distinguished in details of the colouration of the tegmina, namely in the presence of more brown on the tegmina than in *L. lurida*. The males can be distinguished by the presence of relatively long genital styles, which are shorter in *L. lurida*, and the females are characterized by the presence of very long appendices on the 8th segment, which have a 'normal' size in *L. lurida*, namely not surpassing the level of the caudal margin of the pregenital sternite by more than its width.

**Food plants and distribution.** – The species has been recorded on banana, sugar cane and maize. It is very common in the northern part of Papua New Guinea and probably also of Irian Jaya.

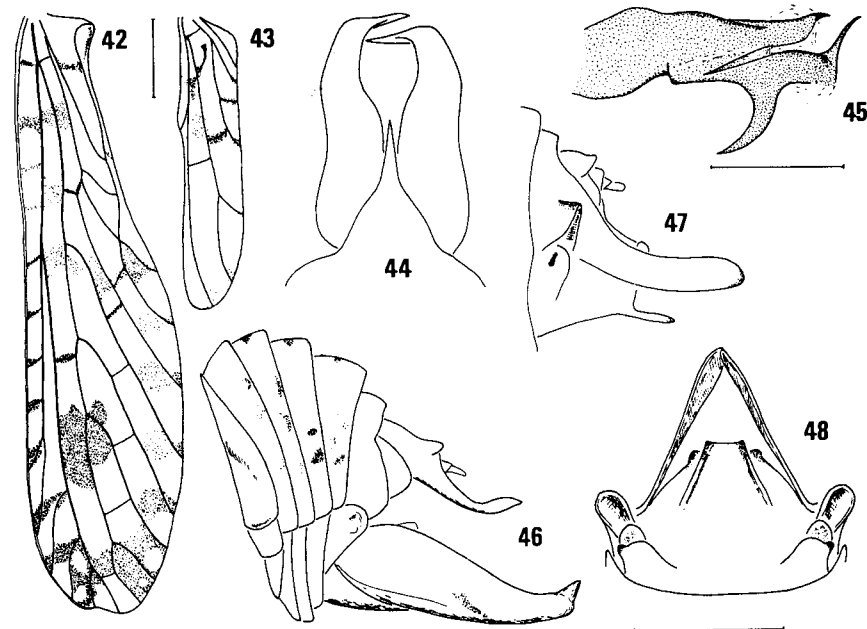
### 8. *Lydda lurida* (Muir, 1913) comb. n.

(Figs 49–54)

*Proutista lurida* Muir, 1913: 76; Van Stalle 1986: 92; 1990: 107, figs 10–12.

**Type material.** – Lectotype ♀, here designated, Papua New Guinea, Laloki, BPBM.

**Other material.** – Papua New Guinea: 6♂, 11♀, Morobe Pr., Lae, 24.V.1988, KBIN; 1♀, Morobe Pr., Bulolo, 23.V.1988, KBIN; 12♂, 9♀, Morobe Pr., McArthur nature res. near Bulolo, 20.V.1988, KBIN; 2♂, 3♀, Madang, Sapi forest res., 5°12'S 145°30'E, 26.II.1987, N. D. Penny, CAS; 6♂, 7♀, Lae, VI.1944, F. E. Skinner, BPBM; 1♀, 6 mi NW Lae, rain forest, 15 m, 9.VII.1957, BPBM; 1♂, Daradae Pt'n, 500 m, 80 km N to Pt. Moresby, 7.IX.1959, BPBM; 1♂, 5♀, Kokoda, Pitoki, 450 m, 24.III.1956, J. L. Gressitt, BPBM; 1♂, 1♀, Kokoda, 1200 ft, VII.1933, L. E. Cheesman, 'under stones riverside', BMNH; 1♀, Morobe Pr., Buso, IX–XI.1979, J. Martin, BMNH; 1♂, Bakahari Pt'n, Popondetta, 22.I.1962, A. Catley, BMNH; 2♂, 3♀, Mr Kam Hong's Plant'n, near Bubia, Markham valley, Morobe distr., 21.VII.1959, 'on the leaves of *Cocos nucifera* (dense populations)' and 'on the leaves of *Musa sapientum* (dense populations)', BMNH; 3♂, 5♀, Isivena area, via Popondetta, 22.II.1962, A. Catley, 'feeding on sugar cane leaf', BMNH; 3♂, 3♀, Surprise Creek, 12 mi. N Bulolo, 10.VIII.1955, G. D. Woodard, CAS; 1♂, Finschhafen, 14.IV.1944, E. S. Ross, CAS; Papua New Guinea: 13♂, 17♀, N New Guinea, 'Krisa', 'Vanimo, IV.1939', SAM; Irian Jaya: 1♂, 4♀, Bodem, 10–17.VII.1959,



Figs 42–48. *Lydda gressitti* (Van Stalle): (42) left tegmen; (43) left wing; (44) ventral margin of pygofer with the medioventral process and genital styles, ventral view; (45) aedeagus, holotype, dorsal view; (46) male abdomen with anal segment, pygofer and genital style; (47) female terminalia, lateral view; (48) female terminalia, ventral view. Scale lines: 1 mm, aedeagus 0.5 mm.

banana, T. C. Maa, BPBM; 3♂, 2♀, Waris, S of Hollandia, 450–500 m, 24–31.VIII.1959, BPBM; 1♀, Vogelkop: Fak Agric. St., 1.VI.1959, T. C. Maa, BPBM; 1♀, Genjam, 40 km W of Hollandia, 100–200 m, 1–10.III.1960, T. C. Maa, BPBM; 3♂, 7♀, Maffin Bay, IX–X.1944, E. S. Ross, CAS.

**Description.** – Colour pale yellowish. Pedicel 1.5 times as long as broad. Terminal segment of labium, first and second tarsomeres of fore and middle legs, apex of hind tibiae and last tarsomere of hind legs fuscous. A few spots on abdomen brown. Tegmina with pale brown marks as illustrated; transverse veins fuscous. Chaetotaxy hind tarsi 6–7/6–7. Length tegmen: 7.5 mm.

**Male genitalia:** Anal segment tapering. Pygofer with laterodorsal margin rounded and a large spinose medioventral process. Genital styles with an additional spine on dorsal margin. Aedeagus with three spinose processes: on left side one large, broad process tapering distally, a second mem-

braneous process apically, and a third process on right side, slender and directed to dorsal margin.

**Female genitalia:** 8th tergite with a finger-shaped process not or nearly surpassing caudal margin of pregenital sternite. The latter with two small process on caudal margin.

**Remarks.** – *L. lurida* is probably the most common species of New Guinea. Most records are situated in the northern part and only a few records are available from the south, situated near Pt. Moresby, but this might be due to the fact that the southern lowlands have been less explored.

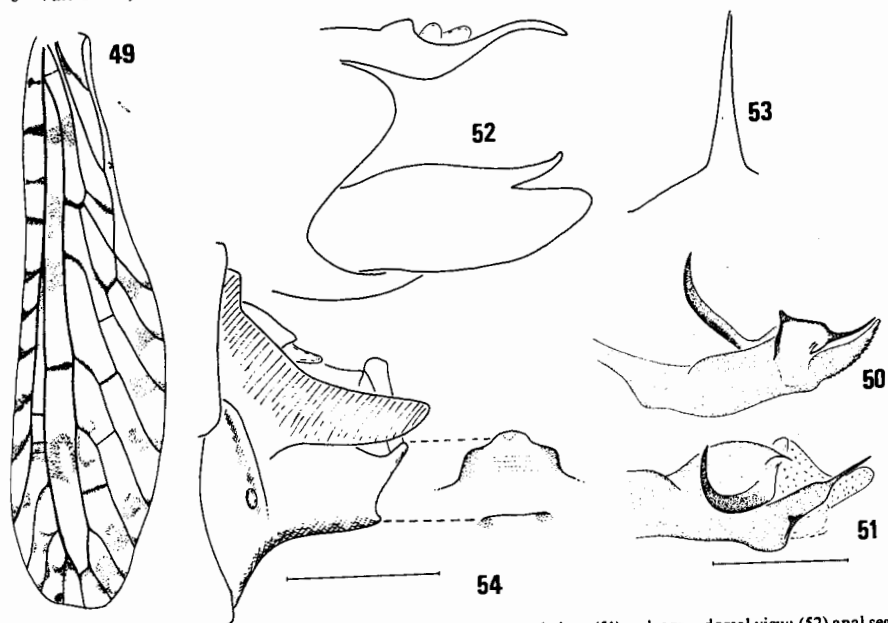
### 9. *Lydda ouini* (Van Stalle, 1990) comb. n.

(Figs 55–60)

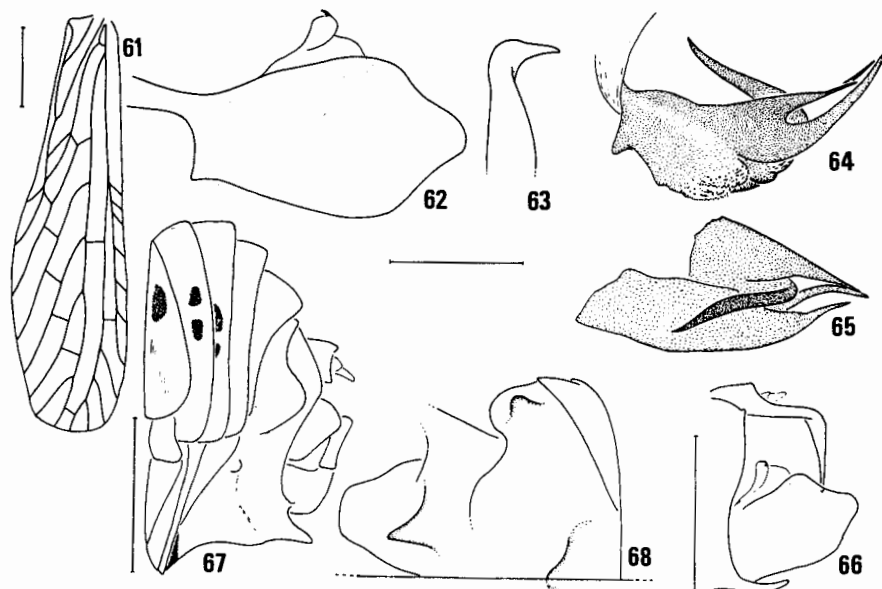
*Proutista ouini* Van Stalle, 1990: 110, figs 13–18, map 2.

**Type material.** – Holotype ♂, Papua New Guinea, Madang Pr., Sepen village n° 2 (close to Bogia), 3.VI.1988,

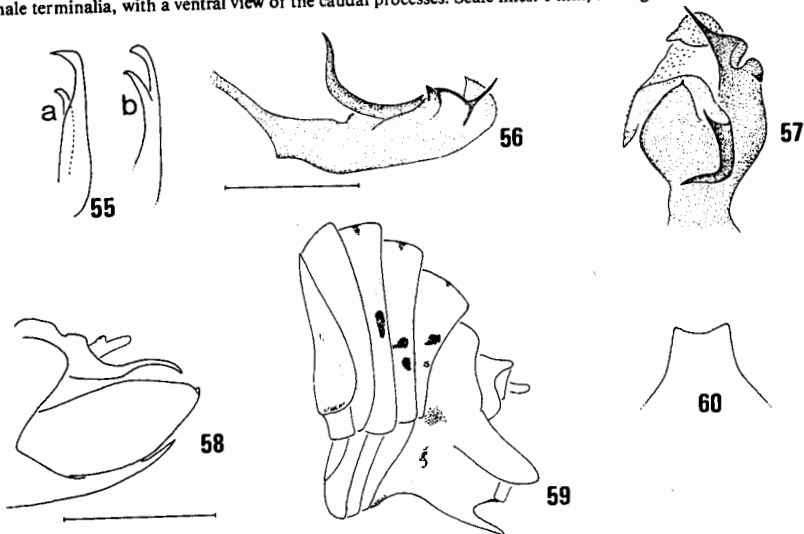




Figs 49–54. *Lydda lurida* (Muir): (49) left tegmen; (50) aedeagus, lateral view; (51) aedeagus, dorsal view; (52) anal segment, pygofer and genital style, with a ventral view of the caudal processes. Scale lines: 1 mm, aedeagus 0.5 mm.



Figs 61–68. *Lydda decisa* (Distant): (61) right tegmen; (62) left genital style; (63) apex of left genital style; (64) aedeagus, lateral view; (65) aedeagus, dorsal view; (66) anal segment, pygofer and genital style; (67) female abdomen, specimen Kiunga, lateral view; (68) female terminalia, ventral view. Scale lines: (61, 67) 1 mm, others 0.5 mm.



Figs 55–60. *Lydda ouini* (Van Stalle): (55) left genital style (a), dorsal view and the same style (b) of *L. lurida*; (56) aedeagus, left lateral view; (57) aedeagus, dorsal view; (58) anal segment, pygofer and genital style; (59) female abdomen, lateral view; (60) ventral view of the process on the pregenital sternite. Scale lines: 1 mm, aedeagus 0.5 mm.

KBIN. Paratypes: Papua New Guinea: 4♂, 2♀, same data as holotype, KBIN; 1♂, 1♀, Madang Pr., nr. Gogol River, 15.VI.1988, KBIN; 1♂, 1♀, Madang Pr., Sapi forest res. (30 km W Madang), 5°12'S 145°30'E, 26.II.1987, N. D. Penny, CAS; 1♂, 1♀, Madang Pr., Nobonob Hill (7 km NW Madang), 5°10'S 145°45'E, 2.III.1987, N. D. Penny, CAS; 1♀, Madang Pr., 4 km S Hatzfeldhaven, 4°25'S 145°13'E, 19.III.1987, N. D. Penny, CAS; 1♂, 10♀, Eastern Highlands Pr., Sirasira, 15.V.1988, KBIN; 1♂, Morobe Pr., Lae, 24.V.1988, KBIN. Other material. – Papua New Guinea: 1♂, W New Britain, 28.IV.1968, D.F. O'Sullivan, BMNH.

**Description.** – Externally identical to *L. lurida*. It can only be distinguished from this species by the shape of the male and female genitalia.

**Male genitalia:** Differ from *L. lurida* in the shape of the genital styles and the aedeagus. The genital styles are slightly longer, the apex bears a larger tooth, and the distance between the apex of the dorsal spine and the apex of the genital styles is longer. In the aedeagus the processes are slightly different as expressed in Figs 56 and 57. These differences are constant and no intermediate forms have been observed.

**Female genitalia:** Easily separated from *L. lurida*

by the shape of the process on the pregenital sternite: the caudal border bears a very distinct quadrate process while only a small elevation is present at the same place in *L. lurida*.

**Distribution.** – Probably a common species in the northern part of New Guinea; it has about the same distribution as the closely related *L. lurida*.

**10. *Lydda decisa* (Distant, 1907) comb. n.**

(Figs 61–68)

*Arfaka decisa* Distant, 1907: 398.

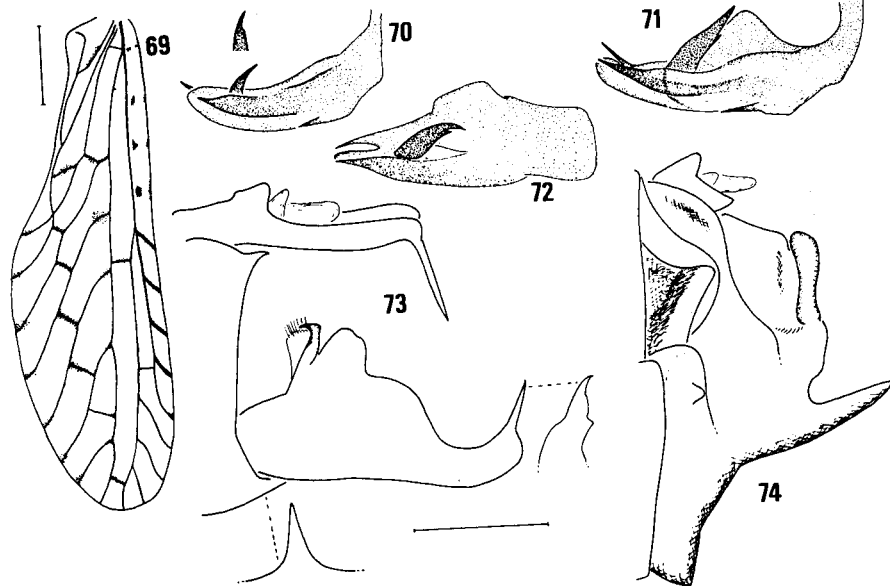
*Afakia decisa*; Distant 1910: 318.

*Proutista decisa*; Muir 1918: 174; Van Stalle 1986: 95, figs 25–34; 1990: 110, figs 19–20, map 1.

**Type material.** – Lectotype ♂, New Guinea, BMNH; paralectotype ♀, New Guinea, BMNH.

**Other material.** – Papua New Guinea: 3♂, 2♀, Kiunga, Fly river, 28–31.VIII.1957, W. W. Brandt, BPBM; 6♂, 5♀, Middle Fly river, VII.1928, Pemberton, BPBM; 1♂, Kikori, 12.VII.1928, Pemberton, BPBM; 1♀, 'Nouvelle Guinée', C. Van Volxem, KBIN.

**Description.** – Pale yellowish, terminal segment of labium, last tarsomere of each leg and a few spots



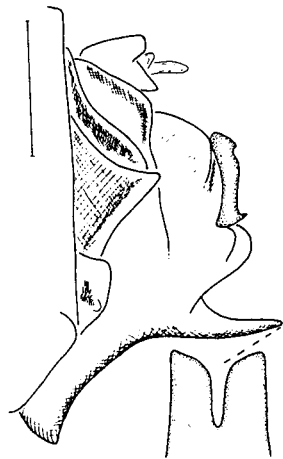
Figs 69–74. *Lydda pseudodecisa* (Muir): (69) right tegmen; (70) aedeagus holotype, right lateral view; (71) aedeagus, specimen Halifax, dorsal view; (72) aedeagus, specimen Halifax, right lateral view; (73) anal segment, pygofer and genital style, with medioventral process of pygofer and apex of genital style; (74) tip of female abdomen, lateral view. Scale lines: tegmen 1 mm, others 0.5 mm.

on abdomen brown. Pronotum whitish with a yellow spot behind each eye. Pedicel 1.3 times as long as broad. Chaetotaxy hind tarsi 6/6. Tegmina hyaline, veins brown, transverse veins fuscous. Length tegmina 7.5 mm.

**Male genitalia:** Anal segment with a long spinose process directed ventrad. Pygofer with dorsolateral margin quadrate and a triangular medioventral process, obtuse at apex. Genital styles with a spinose apex, recurved to median line. Aedeagus with three apical processes directed caudad and a long dorsal spine.

**Female genitalia:** 8th tergite with an obtuse, triangular lobe. Pregenital sternite with two small submedian processes.

**Remarks.** – Only recorded in the southern lowland parts of Papua New Guinea. The female genitalia and the brown spots on the abdomen are illustrated in Fig. 19.



Figs 75. *Lydda straminea* (Muir): (75) female terminalia, lateral view, with a ventral view of the caudal process. Scale lines: 0.5 mm.

11. *Lydda pseudodecisa* (Muir, 1918) comb. n. (Figs 69–74)

*Proutista pseudodecisa* Muir, 1918: 177.

**Type material.** – Holotype ♂, Australia, Northern Terr., Stapleton, 13.X.1891, G. F. Hill (BMNH) (examined). Two more males are listed in the description.

**Other material.** – Australia: 6♂, 4♀, N. Qld., Halifax, 12.V.1919, BMNH, ♂ & ♀ in KBIN; 3♂ & 1 mutilated, Stapleton, 31.X.1913, G. F. Hill, SAM; 2♀, N.T., Holmes Jungle Palm Cr., 15 km NE of Darwin, 14–15.III.1963, BPBM.

**Description.** – Externally like *L. decisa*; chaetotaxy hind tarsi 5/5. Length tegmen: 5.5–6.5 mm.

**Male genitalia:** Anal segment with a tapering apical process pointed ventrally. Pygofer with dorsolateral angle terminating into a spinose process; medioventral process thin and tapering, shorter than anal segment. Genital styles terminating into a spinose process which is recurved to the middle and slightly denticulated in some specimens. Aedeagus with four spinose processes, three lateral ones directed caudad and one spine inserted on dorsal side and pointing upwards, carrying a small spine on its side. The aedeagus of the holotype differs in details from the aedeagus figured from specimens from Halifax, namely in the absence of a small additional spine on the large dorsal process and in the shorter spine on the right side, but other specimens of the type locality are intermediate.

**Female genitalia:** 8th tergite with a triangular process; pregenital sternite with a large bifurcate process slightly surpassing tip of abdomen.

**Remarks.** – Muir used three specimens for his original description; his statement 'Three males, including the type, in the B.M. coll.' is interpreted here as a holotype designation. *L. pseudodecisa* might possibly be a synonym of *L. straminea*. The female genitalia are almost identical but in the absence of males of *L. straminea* or males of *L. pseudodecisa* of New Guinea there is no evidence to confirm the synonymy.

12. *Lydda straminea* (Muir, 1913) comb. n. (Fig. 75)

*Proutista straminea* Muir, 1913: 76; Van Stalle 1986: 96, fig. 35; 1990: 111, fig. 21, map 2.

**Type material.** – Lectotype ♂, here designated, Papua, Laloki, F. Muir, 1910, BPBM (examined).

**Other material.** – 1♀, Irian Jaya: Eramboe, 80 km ex Merauke, 30.I.1960, coconut palm, T. W. Maa, BPBM.

**Description.** – Externally identical to *L. pseudodecisa* (Australia).

**Female genitalia:** like those of *L. pseudodecisa*.

**Distribution.** – Like *L. decisa*, only recorded from the southern lowland parts of New Guinea.

**Remarks.** – *L. straminea* might possibly be identical to *L. pseudodecisa*, but in the absence of males from New Guinea resembling the type of *L. straminea* we have no evidence to regard these names as synonyms. As there are no numbers of specimens indicated in the original description I have selected a lectotype.

13. *Lydda guttata* sp. n. (Figs 76–82)

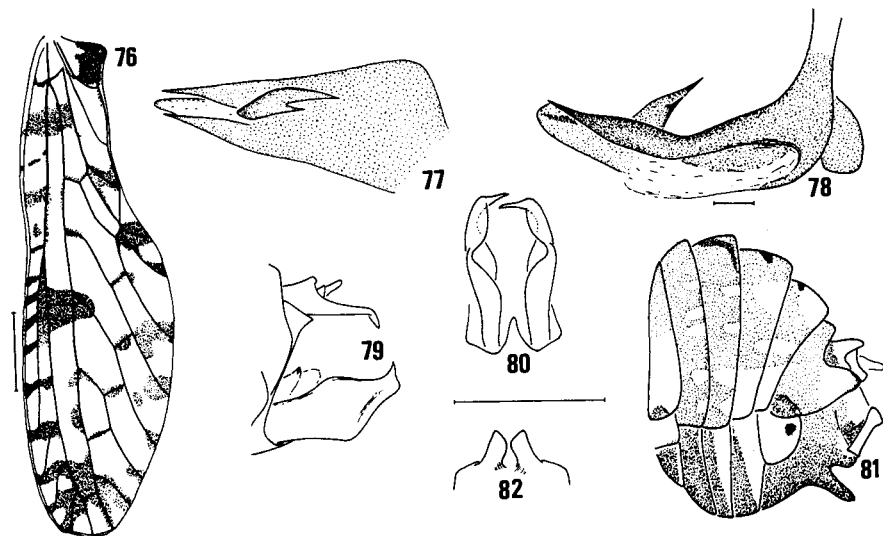
**Type material.** – Holotype ♂, Australia, N.T., Arnhem land, Maningrida, 19.III.1961, J.L. & M. Gressit, on *Pandanus*, BPBM. Paratypes: Australia: 6♂, 3♀, same data as holotype, BPBM, 2 in KBIN; 4♂, 1♀, N.T., Darwin, G. F. Hill, SAM; 1♀, N.T., Maningrida, 4.I.1976, J. Grigg, NSWAF.

**Description.** – Vertex and frons yellowish. Postclypeus and anteclypeus fuscous, with a whitish spot one lateral margin under antennae and along median keel. Labium white, terminal segment black. Pronotum yellowish with a brown lateral spot. Mesonotum yellowish between keels, brown on lateral portions; metanotum yellowish, brown laterally. Abdomen with yellowish brown and brown spots, darker on ventral margin than on tergites. In females genitalia almost black ventrally; in males ventral part of pygofer fuscous and genital styles partly fumated with brown. Legs yellowish white, fore and middle tarsi, and last hind tarsomere black; base of fore and middle coxae, and base of hind femora embrowned. Chaetotaxy hind tarsi 6/6. Length tegmina: 5.5–6 mm.

**Male genitalia:** Anal segment short, apex slightly bent ventrally. Pygofer with a tapering dorsolateral angle and a triangular medioventral process. Genital styles with a spine-shaped apex directed to median line. Aedeagus with three spinose processes, one on each side directed caudad and a third process inserted on dorsal margin and bearing an additional small spine.

**Female genitalia:** 8th segment with a broad triangular process. Pregenital sternite almost black, with two submedian flattened cylindrical processes close to each other.

**Diagnosis.** – The aedeagus resembles that of *L. pseudodecisa* but both species can be easily separated by the brown spots present in this new species.



Figs 76–82. *Lydda guttata* sp. n. (76) left tegmen; (77) aedeagus, dorsal view, paratype; (78) aedeagus, right lateral view; (79) anal segment, pygofer and genital style; (80) ventral view of genital styles and ventral margin of pygofer with medioventral process; (81) female abdomen; (82) caudal process on female genitalia. Scale lines: 1 mm, aedeagus 0.1 mm.

14. *Lydda lumholtzi* (Kirkaldy, 1907) comb. n.  
(Figs 83–91)

[*Sardis maculosa* (Krüger, 1897); Kirkaldy 1906: 433; Distant 1907: 221 (wrongly synonymized with *P. australis*). Misidentifications.]

*Proutista lumholtzi* Kirkaldy, 1907: 126.

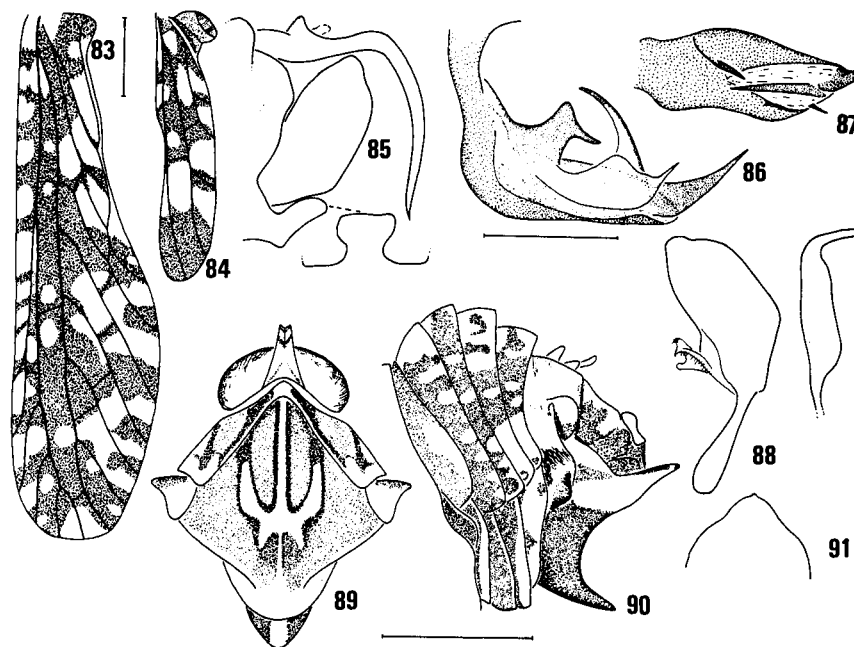
*Proutista lumholtzi*; Van Stalle 1990: 111, figs 22–30, map 2.

**Type material.** – Australia: 1 ♂, 4 ♀, N.T., Kakadu NP, Obiri Rock area, 29.III.1980, M.B. Malipatil, NTMS, KBIN; 6 ♂, 5 ♀, Cairns, VIII.1904, Koebele, BPBM; 1 ♂, N.T., Arnhem Land, Maningrida, 5 m, 19.III.1961, BPBM; 8 ♂, 11 ♀, Bundaberg, X.1904, R. C. L. Perkins, BMNH; 18 ♂ and ♀, Cairns, VIII.1904, BPBM; 9 ♂ and ♀, Amboina, F. Muir, BPBM; 2 ♂, N Qld, Mossman, 24.IV.1919, F. X. Williams, BPBM; 21 ex., Darwin, SAM; 2 ex., Kuranda, SAM; 4 ex., Stapleton, SAM; 1 ♂, 2 ♀, N Qld, Mt Molloy, 20.II.1975, G. R. Brown, NSWAF; 1 ♀, Pandanus swamp, N side of airstrip Iron Range, Queensland, 18.X.1974, AM; Papua New Guinea: 12 ♂, 10 ♀, Kiunga, Fly River, 28–31.VIII.1957, W. W. Brandt, BPBM; Irian Jaya: 2 ♂, 11 ♀, Vogelkop, Manokwari, 18–24.VII.1957, W. W. Brandt, BPBM; 1 ♂, Sepik, Maprik area, 160 m, 28.VIII.1957, D. E. Hardy, BPBM; 4 ♂, 1 ♀, Koitaki 1500 ft., X–XI.1928, Pemberton, BPBM;

**Description.** – Vertex and frons whitish, frons slightly embrowned near eye, often with three small spots on keels. Postclypeus and anteclypeus dark brown, a narrow longitudinal spot on postclypeus and a roundish spot in upper half of lorum whitish. Labium whitish, last segment dark brown. Antennae embrowned, pedicel 1.2 times as long as broad. Pronotum and mesonotum partly embrowned, as illustrated in Fig. 89. Legs yellowish, in fore and middle legs second and third tarsomere black, in hind legs last tarsomere and apex of tibia black, and proximal half of femur slightly embrowned. Tegmina and wings densely dark brown mottled, as illustrated in Figs 83 and 84. Abdomen predominantly brown with whitish irregular spots, in female proximal part of pregenital sternite black, in male anal segment whitish–yellowish, apical spine brown, and genital styles partly yellowish and brown. Chaetotaxy hind tarsi 6/6. Length tegmen 7 mm.

**Male genitalia:** Anal segment with a long spinose process. Pygofer with obtuse laterodorsal angles and a short, but broad medioventral process. Gen-

1 ♂, 4 ♀, Cyclops Mts, Ifar 300 m, 22.VI.1959, BPBM; 2 ♀, Koitaki, 1500 ft., X–XI.1928, Pemberton, BPBM.



Figs 83–91. *Lydda lumholtzi* (Kirkaldy); (83) left tegmen (dark specimen); (84) left wing; (85) anal segment, pygofer and genital style, and medioventral process of pygofer; (86) aedeagus, left lateral view; (87) aedeagus, dorsal view; (88) lateral view of the genital style, (89) head, pronotum and mesonotum; (90) female abdomen; (91) with a ventral view of the caudal process. Scale lines: 1 mm, aedeagus 0.5 mm.

tal styles with an apical spine pointed medially. Aedeagus with three spinose processes and a short unmovable process near base.

**Female genitalia:** Pregenital sternite with a large spine on base and a lamellate process at apex. 8th tergite with a rounded lobe.

**Diagnosis.** – *L. lumholtzi* can be recognised from all other Australian and New Guinean species by the presence of a large spine on the anal segment in the male and the presence of a large basal spine on the pregenital sternite of the female. No closely related species have been observed.

15. *Lydda australis* (Distant, 1907) comb. n.  
(Figs 92–95)

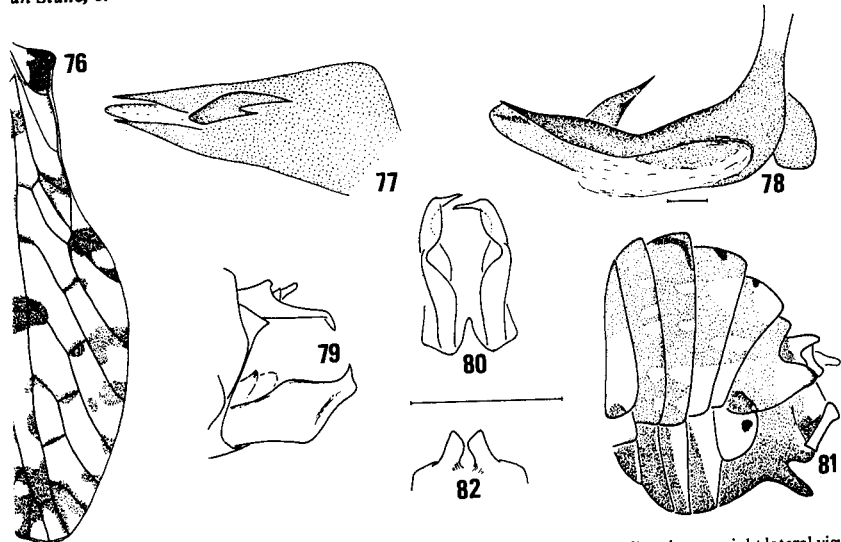
*Phenice australis* Distant, 1907: 397.

**Type material.** – Lectotype ♀, here designated, Australia, Queensland, F. P. Dodd, BMNH.

**Description.** – Female only. Frons and vertex greyish white; lower part of head with postclypeus and lorae brown, with a longitudinal greyish–white line on postclypeus. Labium whitish last segment brown. Antennae with basal segment brown, second segment whitish, slightly embrowned dorsally, 1.6 times as long as broad. Pronotum brown, yellowish in middle and later margins with a fine white border. Mesonotum brown with three longitudinal whitish streaks arranged as in *L. lumholtzi*. Tegmina and wings dark brown mottled as illustrated in Figs 92 and 93. Abdomen dark brown to black, with whitish spot (Fig. 94). Legs entirely pale yellowish. Chaetotaxy: hind tarsi 6/6. Length tegmen: 8 mm.

**Female genitalia:** Pregenital sternite with three projections at apex, the middle one shorter than the two lateral processes.

**Diagnosis.** – This species is easily distinguished



76-82. *Lydda guttata* sp. n.: (76) left tegmen; (77) aedeagus, dorsal view, paratype; (78) aedeagus, right lateral view; (79) ventral view of genital styles and ventral margin of pygofer with medial segment, pygofer and genital style; (80) ventral view of genital styles and ventral margin of pygofer with medial segment, pygofer and genital style; (81) female abdomen; (82) caudal process on female genitalia. Scale lines: 1 mm, aedeagus 0.1 mm.

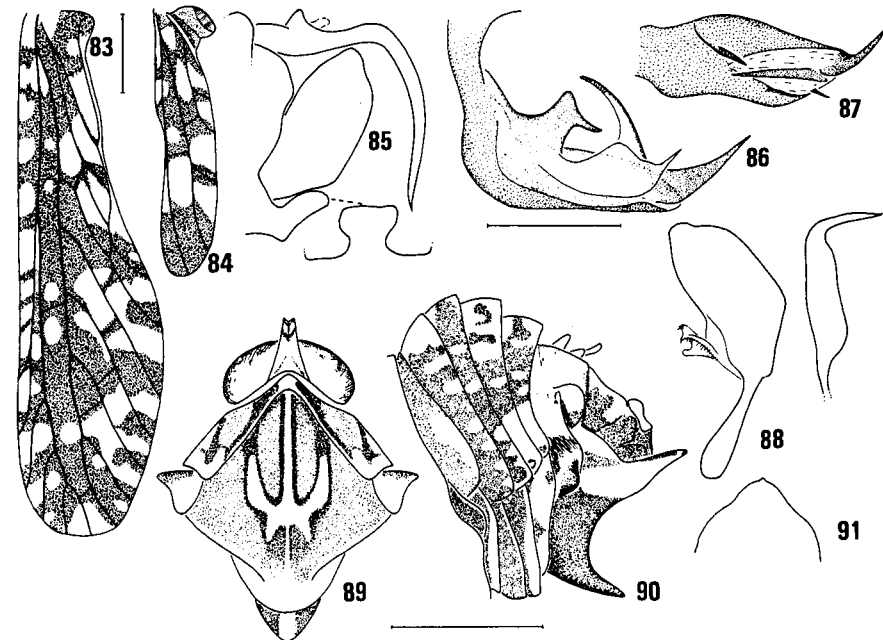
*Lydda lumholtzi* (Kirkaldy, 1907) comb. n. (33-91)

*Lydda maculosa* (Krüger, 1897); Kirkaldy 1906: 433; Distant 1907: 221 (wrongly synonymized with *P. australis*). [Identifications.]  
*Lydda lumholtzi* Kirkaldy, 1907: 126.  
*Lydda lumholtzi*; Van Stalle 1990: 111, figs 22-30, map

**Material.** - Australia: 1 ♂ labelled 'holotype', here designated as lectotype; 1 ♀ labelled 'allotype', paralectotype. Cairns, VIII.1904, BPBM; 1 ♂, 4 ♀, Queensland, s. VIII.1904, CAS.  
 - Australia: 1 ♂, 4 ♀, N.T., Kakadu NP, Rock area, 29.III.1980, M.B. Malipatil, NTMS; 6 ♂, 5 ♀, Cairns, VIII.1904, Koebele, BPBM; 1 ♂, Arnhem Land, Maningrida, 5 m, 19.III.1961, vj; 8 ♂, 11 ♀, Bundaberg, X.1904, R. C. L. Perkins, (H); 18 ♂ and ♀, Cairns, VIII.1904, BPBM; 9 ♂ and ♀, Muir, BPBM; 2 ♂, N Qld, Mossman, 1919, F. X. Williams, BPBM; 21 exx., Darwin, SAM; 1 ♂, Kuranda, SAM; 4 exx., Stapleton, SAM; 1 ♂, 2 ♀, Mt Molloy, 20.II.1975, G. R. Brown, NSWAF; 1 ♀, Lanus swamp, N side of airstrip Iron Range, Queensland, 18.X.1974, A.M.; Papua New Guinea: 12 ♂, 10 ♀, Kikrik, Fly River, 28-31.VIII.1957, W. W. Brandt, BPBM; 2 ♂, 1 ♀, Vogelkop, Manokwari, 4.VII.1957, W. W. Brandt, BPBM; 1 ♂, Sepik, Kikrik area, 160 m, 28.VIII.1957, D. E. Hardy, BPBM; 1 ♀, Koitaki 1500 ft., X-XI.1928, Pemberton, BPBM;

1 ♂, 4 ♀, Cyclops Mts, Ifar 300 m, 22.VI.1959, BPBM; 2 ♀, Koitaki, 1500 ft., X-XI.1928, Pemberton, BPBM.

**Description.** - Vertex and frons whitish, frons slightly embrowned near eye, often with three small spots on keels. Postclypeus and anteclypeus dark brown, a narrow longitudinal spot on postclypeus and a roundish spot in upper half of lorum whitish. Labium whitish, last segment dark brown. Antennae embrowned, pedicel 1.2 times as long as broad. Pronotum and mesonotum partly embrowned, as illustrated in Fig. 89. Legs yellowish, in fore and middle legs second and third tarsomere black, in hind legs last tarsomere and apex of tibia black, and proximal half of femur slightly embrowned. Tegmina and wings densely dark brown mottled, as illustrated in Figs 83 and 84. Abdomen predominantly brown with whitish irregular spots, in female proximal part of pregenital sternite black, in male anal segment whitish-yellowish, apical spine brown, and genital styles partly yellowish and brown. Chaetotaxy hind tarsi 6/6. Length tegmen 7 mm. Male genitalia: Anal segment with a long spinose process. Pygofer with obtuse laterodorsal angles and a short, but broad medioventral process. Gen-



Figs 83-91. *Lydda lumholtzi* (Kirkaldy): (83) left tegmen (dark specimen); (84) left wing; (85) anal segment, pygofer and genital style, and medioventral process of pygofer; (86) aedeagus, left lateral view; (87) aedeagus, dorsal view; (88) left genital style, lateral and ventral view; (89) head, pronotum and mesonotum; (90) female abdomen; (91) with a ventral view of the caudal process. Scale lines: 1 mm, aedeagus 0.5 mm.

ital styles with an apical spine pointed medially. Aedeagus with three spinose processes and a short unmovable process near base.

Female genitalia: Pregenital sternite with a large spine on base and a lamellate process at apex. 8th tergite with a rounded lobe.

**Diagnosis.** - *L. lumholtzi* can be recognised from all other Australian and New Guinean species by the presence of a large spine on the anal segment in the male and the presence of a large basal spine on the pregenital sternite of the female. No closely related species have been observed.

15. *Lydda australis* (Distant, 1907) comb. n. (Figs 92-95)

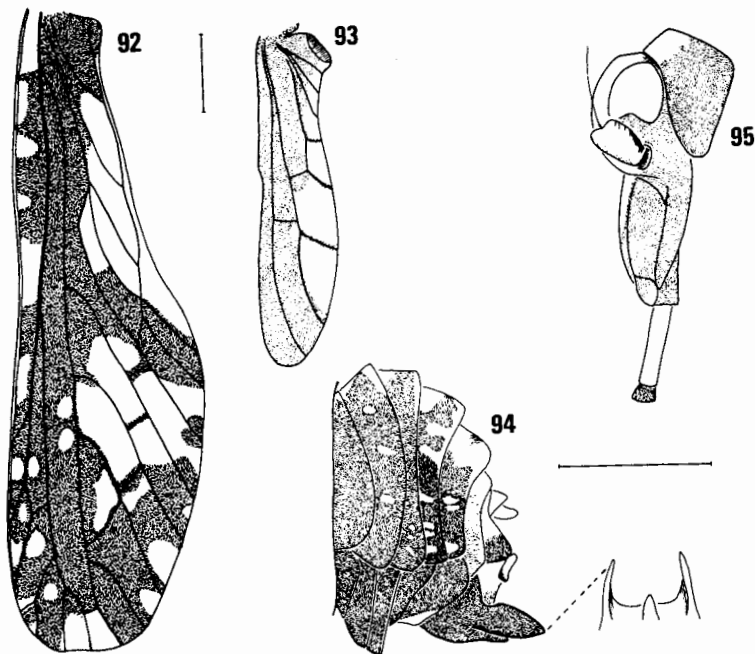
*Phenice australis* Distant, 1907: 397.

**Type material.** - Lectotype ♀, here designated, Australia, Queensland, F. P. Dodd, BMNH.

**Description.** - Female only. Frons and vertex greyish white; lower part of head with postclypeus, anteclypeus and lorae brown, with a longitudinal greyish-white line on postclypeus. Labium white, last segment brown. Antennae with basal segment brown, second segment whitish, slightly embrowned dorsally, 1.6 times as long as broad. Pronotum brown, yellowish in middle and lateral margins with a fine white border. Mesonotum brown with three longitudinal whitish streaks arranged as in *L. lumholtzi*. Tegmina and wings dark brown mottled as illustrated in Figs 92 and 93. Abdomen dark brown to black, with whitish spots (Fig. 94). Legs entirely pale yellowish. Chaetotaxy hind tarsi 6/6. Length tegmen: 8 mm.

Female genitalia: Pregenital sternite with three projections at apex, the middle one shorter than the two lateral processes.

**Diagnosis.** - This species is easily distinguished



92-95. *Lydda australis* (Distant), lectotype: (92) left tegmen; (93) left wing; (94) female abdomen with a ventral view of the three caudal processes; (95) head and pronotum, lateral view. Scale lines: 1 mm.

from other Australian species by the shape of the female genitalia which are characterized by the presence of three processes at the apex of the preanal sternite; no closely related species have been served.

***Lydda gemina* (Muir, 1913) comb. n.**

figs 96-99)

*Proviusta gemina* Muir, 1913: 74; Van Stalle 1990: 114, fig. 31, map 2.

*Proviusta awarensis* Van Stalle, 1986: 89; synonymized by Van Stalle 1990: 114.

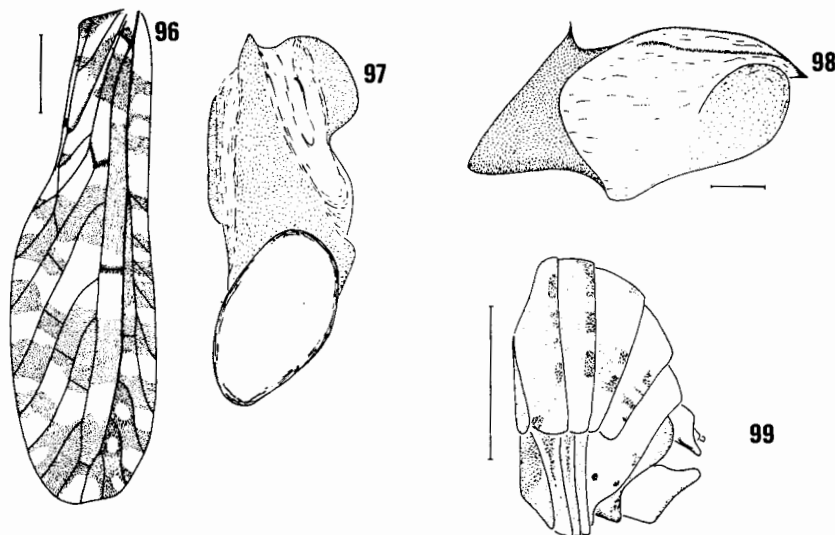
**Type material.** - Lectotype ♂, *P. gemina*, here designated, Papua New Guinea, Laloki, F. Muir, 1909, BPBM; holotype ♂, *P. awarensis*, Papua New Guinea, Awar airfield (adang Pr.), 11.V.1982, KBIN; paratype, 1 ♂, Irian Jaya, Mt. Ilopso, Ifor, 300 m, 22.VI.1959, T. C. Maa, BPBM.

**Description.** - Male only. Vertex, frons and antennae whitish, postclypeus and anteclypeus brown, postclypeus whitish under antennae and on median

keel. Labium whitish, apex of second segment and terminal segment fuscous. Pedicel 1.5 times as long as broad. Pronotum white with a brown spot laterally. Mesonotum brown, paler in middle between keels and scutellum. Metanotum brown, a white longitudinal band in middle. Abdomen with brown spots. Tegmina (Fig. 96) and wings dark brown mottled. Legs whitish, tarsi of fore and middle legs, last tarsomere of hind legs and apex of hind tibiae fuscous. Chaetotaxy hind tarsi 6/6. Length tegmina: 7 mm.

**Male genitalia:** Small in comparison to abdomen. Anal segment short. Pygofer with laterodorsal angle rounded, medioventral process absent. Genital styles with a small tooth on apex. Aedeagus with a plate-shaped process apically, curved from right to left along ventral margin; major part of left side membranous.

**Remarks.** - The type locality of *L. gemina* was not listed in the original description, and listed as



Figs 96-99. *Lydda gemina* (Muir): (96) right tegmen; (97) aedeagus, dorsal view; (98) aedeagus left lateral view; (99) male abdomen. Scale lines: 1 mm, aedeagus 0.1 mm.

'unknown' in Metcalf (1945). I have seen the type specimen during a visit in the BPBM and it is clearly labelled 'Papua, Laloki'. Unfortunately it is conspecific with my *L. awarensis*, which is therefore a new junior synonym of *L. gemina*. The aedeagus of the type of *L. gemina* is somewhat shorter and the genital styles are slightly excavated along their caudal margin but this is estimated here to fall into the infraspecific variability of the species.

*L. gemina* has been recorded three times in small numbers in very remote parts near the coast or in lowland conditions, which suggest that it is probably widespread but present in low numbers.

**17. *Lydda koebele* (Muir, 1913) comb. n.**

(Figs 100-106)

*Proviusta koebele* Muir, 1913: 74.

**Type material.** - Lectotype ♂, here designated, Australia, Queensland, Koebele, BPBM.

**Other material.** - 1 ♂, no locality label, with Muir's identification label, BPBM.

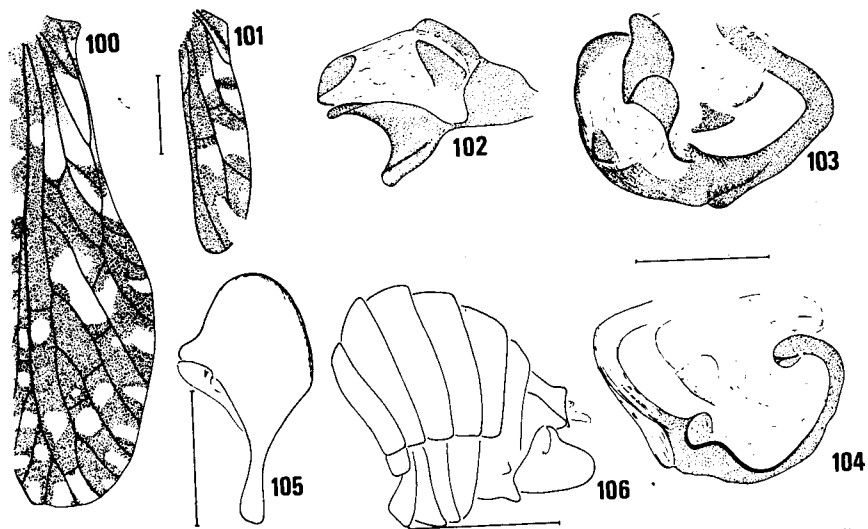
**Description.** - Male only. Frons pale ochreous, clypeus and labium brown, last segment of latter fuscous. Pronotum, mesonotum, metanotum, and

abdomen brown. Antennae brown, pedicel 1.3 times as long as broad. Tegmina and wings coloured dark brown as illustrated in Fig. 100 and 101. Legs paler, last tarsomere of all tarsi brown; chaetotaxy hind tarsi 6/6. Length tegmina 6 mm.

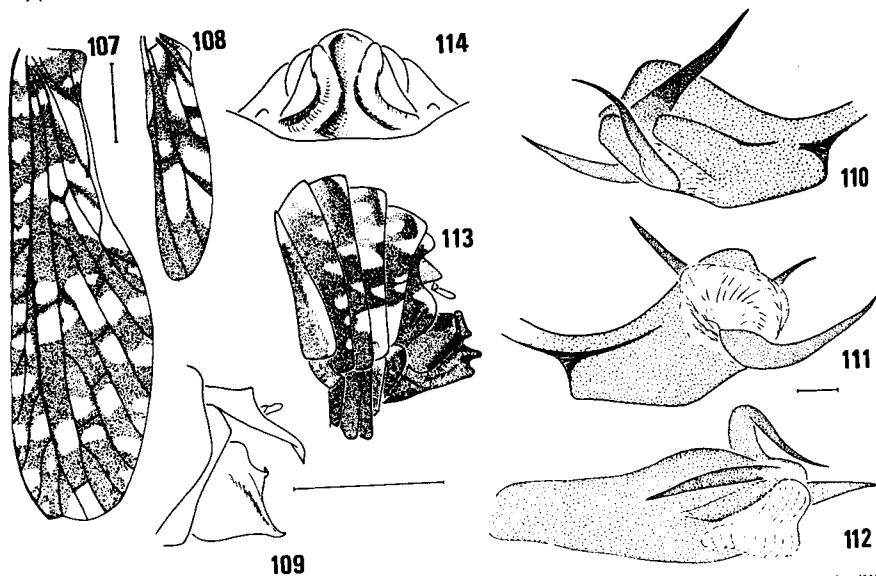
**Male genitalia:** Small compared to abdomen. Anal segment and genital styles short. Pygofer with a triangular dorsolateral angle and without a medioventral process, ventral border thus straight in ventral view. Aedeagus as illustrated in Figs 102 and 103.

**Diagnosis.** - This species resembles *L. gemina* (New Guinea) in colour, in the small size of the male genitalia, the short anal segment and genital styles and in the absence of a medioventral process on the pygofer. It can be distinguished from *L. gemina* in the shape of the dorsolateral angle of the pygofer which is triangular instead of rounded, in details of the structure of the genital styles and in the structure of the aedeagus.

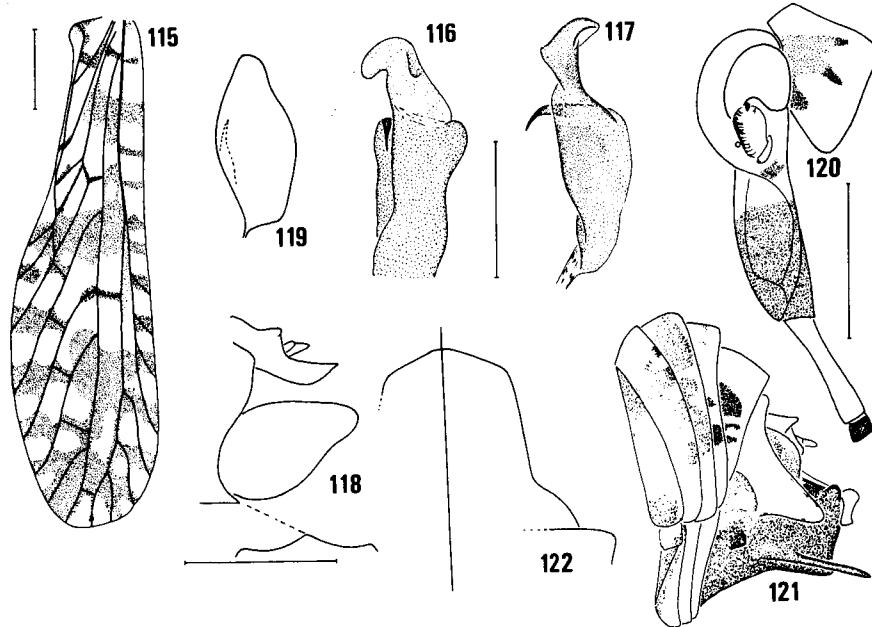
**Remarks.** - In Muir's original description, the reference 'coll. Koebele N° 2270' is not regarded as a holotype designation.



Figs 100–106. *Lydda koebeleri* (Muir): (100) left tegmen; (101) left wing; (102) aedeagus, dorsal view, holotype; (103) aedeagus, right lateral view; (104) aedeagus, left lateral view; (105) genital style; (106) male abdomen. Scale lines: (102–105) 1 mm, (100, 101, 106) 0.5 mm.



Figs 107–114. *Lydda cornuta* sp. n.: (107) left tegmen; (108) left wing; (109) anal segment, pygofer and genital style; (110) aedeagus, right lateral view, holotype; (111) aedeagus left lateral view; (112) aedeagus, dorsal view; (113) female abdomen, lateral view; (114) female terminalia, ventral view. Scale lines: 1 mm, aedeagus: 0.1 mm.



Figs 115–122. *Lydda sacchari* (Van Stalle): (115) right tegmen; (116) aedeagus, dorsal view; (117) aedeagus, left lateral view; (118) anal segment, pygofer and genital style, with a ventral view of the ventral margin of the pygofer; (119) genital style with inner spine (dotted line); (120) head and pronotum; (121) female abdomen; (122) ventral caudal plate of female genitalia. Scale lines: 1 mm, aedeagus 0.5 mm.

### 18. *Lydda cornuta* sp. n.

(Figs 107–114)

**Type material.** – Holotype ♂, Australia, N.T., Arnhem Land, Maningrida, 5 m, 18.III.1961, J. L. & M. Gressitt, BPBM. Paratype: 1 ♀, same data as holotype, BPBM.

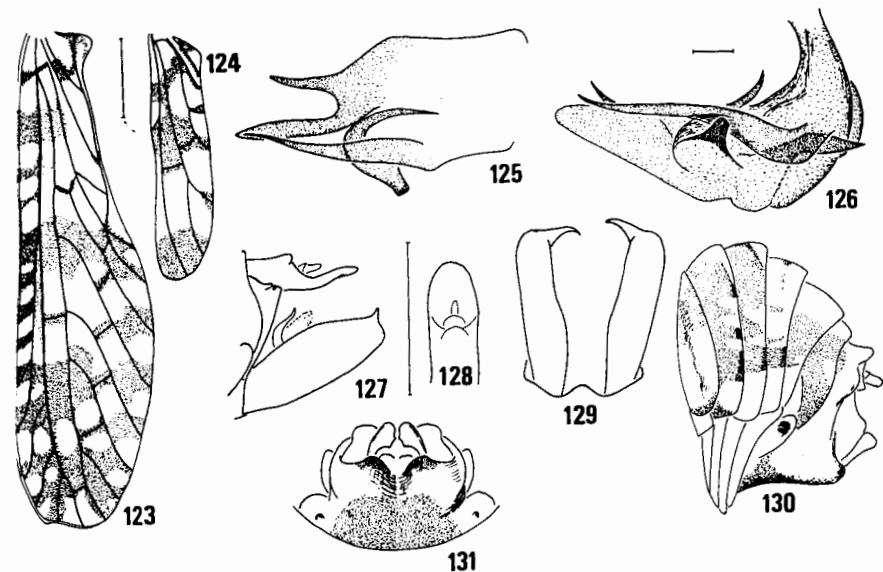
**Description.** – Vertex and frons whitish, postclypeus and anteclypeus dark brown, a spot just beneath antennae, median carina of postclypeus, and tip of anteclypeus pale yellowish. Labium whitish, terminal segment fuscous; pedicel 1.3 times as long as broad. Pronotum whitish with a large, irregular spot behind eyes. Mesonotum brown, darker exterior of keels, scutellum and a large X-shaped mark partly containing the posterior portion of the lateral keels yellow. Metanotum brown, tip yellowish. Abdomen brown with irregular paler spots. Legs pale yellowish, last tarsomere of all legs fuscous, chaetotaxy hind tarsi 6/6. Length tegmen: 6.5 mm.

**Male genitalia:** Anal segment slightly depressed

at apex. Pygofer with laterodorsal margin slightly angulate and without medioventral process. Genital styles short and slightly excavated on dorsoapical margin, without a terminal, inwardly curved spine. Aedeagus with three spinose processes: two processes directed caudad and surpassing apex of aedeagus, and one slender spine directed dorsad.

**Female genitalia:** Only female (paratype) available partly deformed by desiccation. 8th tergite with a rounded lobe (Fig. 113). Pregenital sternite in ventral view with a median shallow furrow widening caudad and cephalad, and two lateral shallow furrows; caudal border slightly produced caudad and forming a continuous border.

**Diagnosis.** – *L. cornuta* is a dark brown species with short male genitalia and therefore somewhat resembling *L. gemina* and *L. koebeleri*. It can be distinguished from these species by the combination of the following characters: medioventral process on pygofer lacking and dorsolateral margin triangular; aedeagus with three long spines.



igs 123–131. *Lydda fusca* sp. n.: (123) left tegmen; (124) left wing; (125) aedeagus, dorsal view, holotype; (126) aedeagus, right lateral view; (127) anal segment, pygofer and genital style; (128) anal segment, dorsal view; (129) genital styles and ventral border of pygofer; (130) female abdomen; (131) female terminalia, ventral aspect. Scale lines: 1 mm, aedeagus .1 mm.

### 19. *Lydda sacchari* (Van Stalle, 1986) comb. n.

Figs 115–122)

*Proutista sacchari* Van Stalle, 1986: 91, figs 4–10; 1990: 114, fig. 32, map 2.

**Type material.** – Holotype ♂, Papua New Guinea, Western P., Sapoka 8°09'S 141°59'E, 4.III.1981, J. W. Ismay, BMNH, 'on sugar cane'. Paratypes: 1♂, 1♀, same loc., BMNH, 1♂ in KBIN.

**Other material.** – Papua New Guinea, 1♀, Kiunga, VIII.1969, M. Sedlacek, BPBM; 4♂, 1♀, Kiunga, Fly River, 28–31.VIII.1957, W. W. Brandt, BPBM; 3♀, W. Distr., Oriomo Govt. Sta., 26–28.X.1960; 2♂, Moorhead, 18 m, 30.VI.1964, BPBM.

**Description.** – Vertex, frons and genae pale ochreous, postclypeus and anteclypeus fuscous, postclypeus pale ochreous under the antennae. Labium dark ochreous, terminal segment fuscous. Antennae yellowish, pedicel 1.5 times as long as broad. Pronotum whitish with a brown spot laterally. Mesonotum yellowish between keels and brown outside keels, scutellum and metanotum yellowish, the latter brown fumated laterally. Abdomen with yellow and brown areas as illustrated in Fig. 121, male genitalia yellowish and pygofer black ventral-

ly, in female genitalia 8th segment yellowish and ventral part of genitalia black. Legs yellowish, fore and middle tarsi, last hind tarsomere and tip of hind tibia black. Chaetotaxy hind tarsi: 6/6. Length tegmen: 6.5–7 mm.

**Male genitalia:** Anal segment short, pygofer with a small medioventral process. Genital styles with a spine along their dorsal margin and a tooth-shaped apex recurved to median line. Aedeagus with a large process apically and a dorsal spine directed upward.

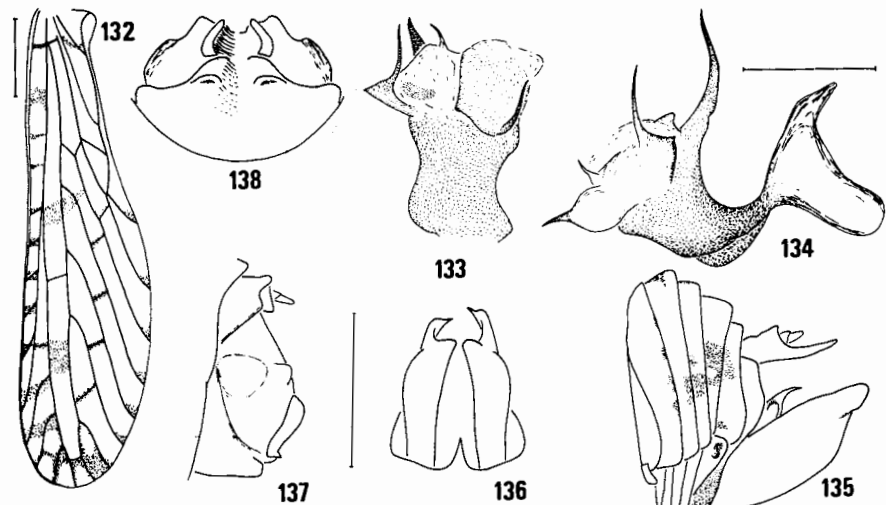
**Female genitalia:** Pregonital sternite with a large plate-shaped process. 8th tergite with a triangular lobe.

**Remarks.** – Probably a common species in the southern lowland parts of Papua New Guinea and Irian Jaya.

### 20. *Lydda fusca* sp. n.

(Figs 123–131)

**Type material.** – Holotype ♂, Australia, N.T., Arnhem land, Maningrida, 5 m, *Pandanus*, 19.III.1961, J. L. & M. Gressitt, BPBM. Paratypes: 3♂, 3♀, same data as holotype, 17–19.III.1961, BPBM & KBIN.



Figs 132–138. *Lydda calypso* (Muir): (132) left tegmen; (133) aedeagus, dorsal view; (134) aedeagus, right lateral view; (135) male abdomen; (136) ventral aspect of the caudal border of the pygofer and the genital styles; (137) female terminalia, lateral view; (138) female terminalia, ventral view. Scale lines: 1 mm, aedeagus 0.5 mm.

**Description.** – Vertex and face yellowish to white, an indistinct brown suffusion on genae. Postclypeus yellowish brown, a pale spot just under the antennae and on the median keel, and more brown towards anteclypeus. Anteclypeus brown. Labium white, terminal segment black. Pedicel 1.4 times as long as broad. Pronotum whitish with a yellow spot on each side just behind eyes. Mesonotum yellow, paler between keels. Metanotum yellow. Abdomen with pale brown spots as illustrated. Tegmina and wings dark brown mottled. Legs pale yellowish. Fore, middle tarsi, apex of hind tibiae and last tarsomere of hind legs black; hind femora slightly fumated with brown. Chaetotaxy hind tarsi 6/6. Length tegmen: 6–6.5 mm.

**Male genitalia:** Anal segment directed caudad, apex obtuse. Pygofer with a small ensiform process on dorsolateral margin and a small but distinct obtuse medioventral process. Genital styles with a spinose apex curved to median line. Aedeagus with a large bifurcate process on left side, a slender spine on right side and a small dorsal spine connected with a short truncate process on right margin; on right side a short spine directed cephalad.

**Female genitalia:** Pregonital sternite with a median furrow.

### 21. *Lydda calypso* (Muir, 1913) comb. n.

(Figs 132–138)

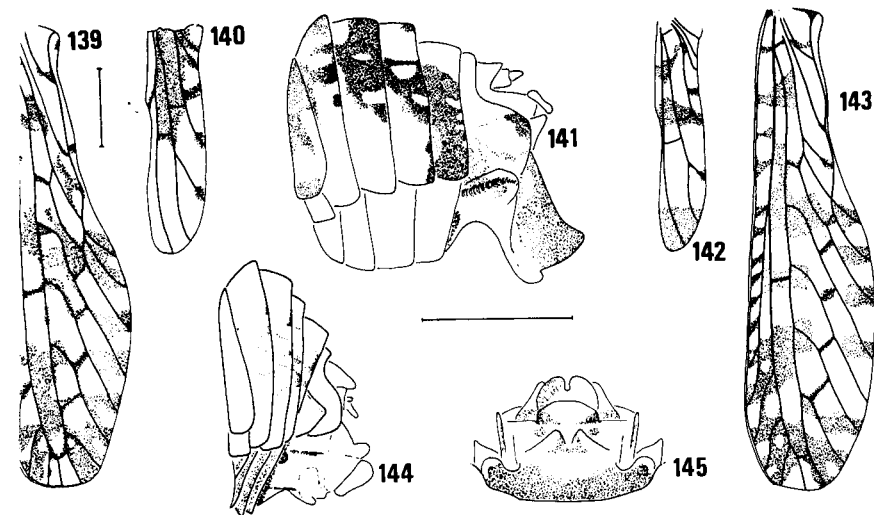
*Proutista calypso* Muir, 1913: 75.

**Type material.** – Lectotype ♀, here designated, Maluku, Tanimbar, Larat, F. Muir, BPBM (examined).

**Other material.** – 2♂, 5♀, Maluku: same data as for lectotype, BPBM.

**Description.** – Colour pale yellowish, last segment of labium black. Pronotum bordered with white. Pedicel 1.5 times as long as broad. Tegmina hyaline with pale brown, translucent spots as illustrated. Wings hyaline, pale brown on transverse veins. Abdomen orange–yellowish with brown spots on 4th to 8th tergite and on ventral margin of pygofer. Legs pale yellowish, first and second tarsomere of fore and middle legs, and last tarsomere and apex of tibia of hind legs brown; chaetotaxy of hind tarsi 5–6/6. Length tegmen: 6.5–7 mm.

**Male genitalia:** Anal segment short, directed caudad. Pygofer with dorsolateral margin rounded and a spine-shaped medioventral process. Genital styles with a tapering appendice as illustrated in Fig. 136. Aedeagus with one long dorsal spine, three shorter spines on right margin, and a small tooth on dorsal margin.



gs 139–145. *Lydda* sp. 22: (139) left tegmen; (140) left wing; (141) female abdomen; *Lydda* sp. 23: (142) left wing; (143) tegmen; (144) female abdomen; (145) female terminalia, ventral view. Scale lines: 1 mm.

Female genitalia: Pregenital sternite with two all ridges on caudal margin separated by a shallow median furrow.

marks. – Although males and females are marked in the original description. Only one female is marked as type in the collections of the BPNM; accordingly we have selected this specimen as lectotype.

#### *Lydda* sp. A gs 139–141)

Material. – Australia: 1 ♀, Qld, Bentick Is., at light, 1.1965, P. Aitken, N.B. Tindale, SAM; 1 ♀, Darwin, G. Hill, SAM.

Description. – Female only. Head pale brown, labium paler, terminal segment black. Antennae as long as broad. Pronotum, mesonotum, metanotum, abdomen and legs pale yellowish to white. Mesonotum behind eyes with an indistinct pale brown spot. Abdomen with a series of fuscous spots on tergites as illustrated in Fig. 141. Tegmina and wings with brown spots as illustrated in Fig. 140. Last tarsomere of all legs and tip of hind tibiae fuscous. Chaetotaxy hind tarsi 7/8. Length tegmina 6.0 mm.

Female genitalia: Pregenital sternite forming a large unpaired backwards process which is laterally compressed.

#### 23. *Lydda* sp. B (Figs 142–145)

Material. – Australia: 4 ♀, Darwin, SAM.

Description. – Female only. Vertex, frons and antennae whitish, postclypeus with basal  $\frac{2}{3}$  and anteclypeus brown; labium white, terminal segment black; pedicel 1.5 times as broad as long. Pronotum white with a yellow spot behind eye. Mesonotum yellow with white keels. Abdomen yellow with some white and small brown spots as illustrated in Fig. 144. Tegmina and wings with brown spots as illustrated. Legs white, last two tarsomeres of fore and middle legs brown, on hind legs last tarsomere, femora and tip of tibia fumated with brown. Chaetotaxy hind tarsi 5/6. Length tegmina: 6.3 mm.

Female genitalia: Pregenital sternite with two subapical triangular processes.

Remarks. – This species might be related to *L. calypso* by the presence of the two subapical processes on the pregenital sternite which are trian-

gular in this species and rounded in *L. calypso*, and by the presence of numerous transverse veins between the costal margin and the subcosta.

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