Sosephena and *Trisephena,* Two New Genera from New Guinea with Tricarinate Frons (Homoptera: Flatidae)

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ABSTRACT

Sosephena, new genus, is described for 2 new species *S. rinkela* and *S. binoba* from New Guinea. *Trisephena,* new genus, is described for 8 new species from New Guinea, as follows: *rubeola, trientor, imposita, lonessa, metrior, estrias, zestreya,* and *anomala.* Type species of the new genera are *S. rinkela* and *T. rubeola,* respectively. The tricarinate frons distinguishes the new genera from *Sephena.* Keys are provided to distinguish the new genera from related taxa and the species within the genera.

INTRODUCTION

My research on New Guinea Flatidae in the Bishop Museum collection, along with examination of specimens loaned by other major museums, has revealed many unnamed genera and species. Although Flatidae are found in all tropical and subtropical regions of the world, it is only in New Guinea and Australia that taxa show such a high proportion of uniformity in derived characters of the female ovipositor and spines on the hind legs.

This is one of a series of articles planned for publication on various complexes of genera and species in New Guinea. It is presented especially to describe unnamed species and to provide an inventory of the flatid fauna of New Guinea in relation to faunas of adjacent areas. The taxonomic research provides a scientific basis for reports of subsequent research on the biology and ecology of these insects.

Two new genera are erected here for undescribed species of Flatidae in New Guinea that have a strong tricarinate structure of the frons. The species are closely related to those with similar development of a tricarinate frons that have been described from Australia in the following genera: *Aflata* Melichar, *Burnix* Medler, *Euphanta* Melichar, *Euryphantia* Kirkaldy, and *Lesabes* Medler.

The metatibial spine formula in this *Trisephena* complex of genera ranges from 1:6 to 1:9, with the maximum number of spines recorded in *Aflata* (1:9:9).

The new taxa closely resemble *Sephena* Melichar in size, morphology, and general appearance. Also, the aedeagus has paired slender ventral processes, which arise apically and are elongated basally as far as the pygofer. Comparable ventral processes are absent in the Australian genera named above, except *Lesabes.*

The new species have a distinctive Cu vein pattern (Fig. 38). Vein Cu is displaced toward vein M from its usual position alongside the claval suture, resulting in the formation of a shallow

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triangular cell with its widest point at the oblique crossvein M_2–Cu. Vein Cu then angles back to meet the claval suture at the claval apex and continues to the apical margin giving rise to short branches, which terminate along the postclaval sutural margin.

The ovipositor has the same fingerlike development of valvulae III as reported by Medler (1985) in nearly all species of Flatidae in New Guinea and Australia. The anal segment is small and oval, and the lateral margins are often downturned.

METHODS

Descriptions of species are based on the type. Length was measured with a mm ruler. All other measurements were made with a binocular microscope eyepiece grid and converted to mm. Measurements from the holotype and allotype are cited in the following format. Length: overall from apex of head to apical margin of tegmen; vertex (v), pronotum (p), and mesonotum (m) along the dorsal midline; frons (f) along the midline from frontoclypeal suture to dorsal margin; tegmen (t) from origin of the basal stem to maximal apical margin; postclaval sutural margin (pcl) from tip of clavus to apex of the sutural angle, or to the midpoint of the arc if the sutural angle convex. Width: vertex (v) transversely along the posterior carina between its junction points with lateral carinae dorsad of the eyes; frons (f) at the maximal plane, usually but not always slightly above antennal insertions; tegmen (t) between costal and sutural margins at maximal point near the claval apex.

The hind leg spines are recorded by formula. Data are listed in sequence of (1) metatibial lateral spine, (2) metatibial apical spines, and (3) metatarsal basal segment apical spines (e.g., 1:6:8).

The following acronyms identify the depository museums that provided specimens used in the research: BPBM = Bishop Museum, Honolulu, HI, USA; AMNH = American Museum of Natural History, New York, NY, USA; BMNH = British Museum (Natural History), London, England; CAS = California Academy of Sciences, San Francisco, CA, USA; IRSN = Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium; NCSU = North Carolina State University, Raleigh, NC, USA; PNGDPI = Department of Primary Industry, Konedobu, Papua New Guinea; RMHL = Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands.

SYSTEMATICS

Key to the *Trisephena* Complex of Genera of New Guinea and Australia

1. Disc of frons with 3 strongly raised carinae consisting of median longitudinal carina and 2 lateral carinae united dorsally into V- or U-shaped pattern; lateral margins of frons sharply carinate 3
   Disc of frons with median longitudinal carina; tricarinate remnants, if present, extending no more than short distance from dorsal margin 2
2. Tegmen with 3 longitudinal veins (R, S, M) arising from basal stem . . . . . ***Sephena*** auctorum
   Tegmen with 2 longitudinal veins (R+S, M) arising from basal stem . . . . . ***Sephena***
3. Fronto-clypeal suture truncate, or nearly so; color of tegmina not dark brown, otherwise variable 6
   Fronto-clypeal suture strongly convex; tegmina brown or green 4
4. In frontal view, lateral margins of frons convexly narrowed to margin of clypeus. Tegmina green, with white zigzag line across disc . . . (Australia, monobasic) . . . . . **Aflata**
   Lateral margins of frons not evenly convex, flared outwardly above antennal insertions 5
5. Lateral carinae on disc of frons V-shaped. Specimen colored dark brown; tegmina with scattered dark pustules . . . . . ***Euryphantia***

Lateral carinae on disc of frons U- or V-shaped. Specimen colored green . . . . . ***Euphanta***

6. Vertex shelflike, anterior margin slightly convex, clearly delimited by transverse carina arising from anterodorsal angles of genae . . . (Australia) 7
Not exactly as described above . . . (New Guinea) 8

7. Apex of tegmen obliquely truncate; precostal margin not pustulate; discal cell crossvein marked with red spot . . . (Monobasic) . . . . . ***Lesabes***
Apex of tegmen convexly rounded, the costal and sutural angles of similar configuration; precostal margin pustulate . . . (Monobasic) . . . . . ***Burnix***

8. Anterodorsal margin of head protruding well forward of genal angles; vertex strongly sulcate, median longitudinal suture depressed; crossveins of tegmina stramineous, contrasting with membrane color . . . . . ***Sosephena*, n. gen.**
Anterodorsal margin of head formed by U-carinae of frons, truncate or nearly so. Narrow dorsal margin of frons separated from anterior margin of vertex by transverse carina arising from genal angles; tegmina crossveins red, or concolorous with unmarked membrane . . . . . ***Trisephena*, n. gen.**

Genus ***Sosephena*** Medler, **new genus**

Type species. *Sosephena rinkela* Medler, here designated.

Diagnosis. Vertex wider than long, produced about ⅔ length of pronotum, surface uneven, medially sulcate, anterior margin bluntly acute, marginal carina extending from anterodorsal angle of genae. Ventral margin of frons transverse, lateral margins sharply carinate, elevated above flat disc, evenly convex from clypeus to dorsal margin, united dorsally with lateral margins of vertex, disc with 3 thickened longitudinal carinae, median carina nearly full length of frons, laterals extending about ¾ length, terminating ventrally at plane of antennal insertions, lateral carinae forming U-shaped dorsal margin, united with raised median carina. Genae anterodorsal margins acute, ocelli distinct. Pronotum anterior margin extended slightly anterad of eyes; disc with dimplelike depressions on each side of longitudinal median carina; lateral margins sharply carinate, postocular eminence raised, triangular, connected by ridge to latero-ventral margin of paranotal lobe. Mesonotum with 3 longitudinal carinae, disc flat. Tegmina 2× longer than broad, apical margin broadly convex, 3 longitudinal veins (R, S, M) arising from basal stem, vein S branched apicad of M_1 fork; vein Cu diverging from claval suture toward vein M, forming a shallow triangular cell, number of crossveins moderate, pigmented giving tegmen barred appearance; Y-stem short. Hind leg spine formula 1:6.

Ovipositor modified, valvulae III fingerlike, not sclerotized, not suitable for piercing.

Length: 9.75–11.0 mm, females slightly longer and more robust than males.

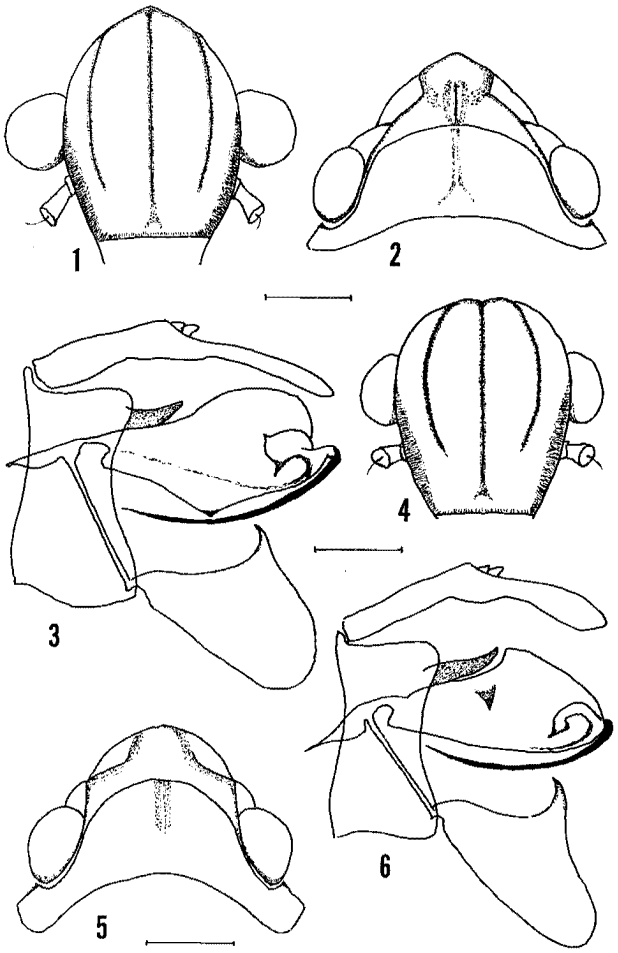
Distribution. Papua New Guinea.

Key to Species of *Sosephena*

Vertex margin produced acutely; disc sulcate, median longitudinal suture deeply impressed, usually narrowly bordered. Posterior spiral of aedeagus with triangular flange on basal margin . . . . . ***rinkela*, n. sp.**
Vertex margin produced obtusely; dorsum depressed, not sulcate, median longitudinal suture shallow. Aedeagus with small triangular projection laterally near ventral margin . . . . . ***binoba*, n. sp.**

Sosephena rinkela Medler, **new species** Figs. 1–3, 37–38

Description. Morphology of frons, vertex and pronotum conforming with generic diagnosis (Figs. 1–2). Narrow flattened ridge at base of vertex deeply bisected by longitudinal



Figs. 1–6. Holotype: **1**, *Sosephena rinkela*, frons; **2**, same, head; **3**, same, genitalia; **4**, *Sosephena binoba*, frons; **5**, same, head; **6**, same, genitalia. Scale = 0.5 mm.

suture, terminating in concave depression bordered by median segment of vertex transverse carina arising from anterodorsal angle of genae.

Morphology and venation of tegmen as in generic diagnosis (Figs. 37–38). Triangular cell formed by divergence of Cu from claval suture, Cu rejoining suture at claval apex, 4–5 terminal crossveins in postclaval sutural margin.

Color variable; holotype stramineous; allotype green, posterior margins of tegmen narrowly red including vein terminations; paratypes with wide array of faded colors from green or orange brown. Tegmen with conspicuous barred appearance due to crossveins bordered with red, orange, or yellow contrasting strongly against membrane. Veins, crossveins, and red margin colors exhibit considerable variation among specimens examined.

Holotype genitalia (Fig. 3).

Measurements (♂, ♀). From holotype and allotype. Length: overall 10.0, 11.0; v 0.75, 0.91; f 1.33, 1.49; p 0.54, 0.54; m 1.66, 1.66; t 8.30, 9.63; pcl 1.66, 2.49. Width: v 0.75, 0.91; f 1.04, 1.04; t 4.32, 4.98. Hind leg spine formula: 1:6:8; 1:6:9.

Type data. Holotype ♂ (BPBM 14,032), PAPUA NEW GUINEA: Morobe Prov: Lae, sea level, 26.VII.1955 (J.L. Gressitt); allotype ♀, Lae, 0–100 m, IX.1968 (N.L.H. Krauss). Both deposited in BPBM. Paratypes: PAPUA NEW GUINEA: Central Prov: ♂, Daradae, nr. Javarere, Musgrave Riv, 100 m, 3.X.1958 (Gressitt); ♂, Goilala, Loloipa, Owen Stanley Range, 1–15.II.1958 (W.W. Brandt); ♂, Tapini, 1,000–1,100 m, 18.V.1961 (J.L. & M. Gressitt); ♀, Tapini, 800–1,100 m, XI.1968, (Krauss) (BPBM). Eastern Highlands Prov: ♀, Arau, 40 km E of Kainantu, 1,400 m, 16.X.1959 (T.C. Maa); ♀, Kassam, 1,350 m, 48 km E of Kainantu, 7.XI.1959 (Maa) (BPBM); ♀, Sirasira, 14.V.1988, St. 029 (J. Van Stalle No. 27363) (IRSN). Madang Prov: ♀, Adelbert Mts, 800–1,000 m, 25.X.1958 (Gressitt); ♀, Dundi, 10.V.1988, St. 023 (Van Stalle No. 27363) (IRSN); 2♂, Saidor, Gabumi Vill, Finisterre Range, 24–30.VI.1958 (Brandt); ♀, Saidor, Sibog Vill, Finisterre Range, 6–16.VI.1958 (Brandt) (BPBM); ♀, Tapo Cr, 26 km SW Madang, 5° 24′S, 145° 38′E, 22.III.1987 (N.D. Penny); 2♀, Tapo Cr, 22.III.1987 (Penny) (CAS); ♀, Wanuma, 600–720 m, VIII.1968 (Krauss) (BPBM). Morobe Prov: ♀, Amingwiwa Mt (NW end), 1,000–1,500 m, 3.X.1970 (Gressitt); ♀, Bubia, Markham Val, 50 m, 20.IX.1955 (Gressitt); ♀, Bulem Riv, 64 km N of Lae, 30 m, 29.IV.1963 (J. Sedlacek); ♂, Bulolo, 10 km W, 780 m, 5–25.VIII.1967, malaise trap over stream (R. Straatman); ♀, Bulolo, 900 m, 29.III.1968 (P. Colman) (BPBM); ♀, Bulolo, Mt Busa, 950 m, 19.V.1988, St. 041 (Van Stalle No. 27363) (IRSN); ♂, ♀, Busa Riv, E of Lae, 100 m, 13–15.IX.1955 (Gressitt) (BPBM); ♂, 2♀, Finschhafen, 12–14.IV.1944, 11.V.1944 (E.S. Ross) (CAS); ♀, Finschhafen, Huon Pen, 50–150 m, 11.IV.1963 (Sedlacek); ♀, Kalolo, 750 m, 20–30, VIII.1966, malaise trap (G.A. Samuelson); ♀, Lae, Sirguawa Riv, 147° 10′E, 6° 45′S, 30 m, IV.1968 (O.R. Wilkes); ♀, Zenag-Lae Rd, 200 m, 17.I.1965, malaise trap (Sedlacek) (BPBM); ♀, Pindiu, Huon Pen, 3,000 ft (915 m), 13.VII.1964, 7th Archbold Exped. (H.M. Van Deusen) (AMNH); ♂, Tuwep, Selawaket Range, 1,350 m, 9.IX.1956, light trap (E.J. Ford, Jr.); ♂, Ulap, 800–1,000 m, IX.1968 (Krauss); ♂, Wau, 1,200 m, 22–30, VI.1962, light trap; ♀, 1,050 m, 7.I.1963; ♀, 1,090 m, 25.I.1963; ♀, 1,200 m, 1–3.X.1963 (Sedlacek); ♂, 1,200 m, 18.IV.1965; ♂, 1,250–1,800 m, 12.IX.1965; ♂, 900–1,100 m, 25.IX.1965 (J.& M. Sedlacek); ♀, Wau, Hospital Crk, 1,250 m, 17.V.1965, malaise trap (Sedlacek); ♀, Wau, 1,200–1,500 m, 30.IX.1965 (Sedlacek); ♀, Wau, 1,200 m, 18.I.1967 (Samuelson); ♂, Wau, 1,100–1,200 m, VI.1968 (Krauss); ♀, Wau, Mt Missim, 1,100–1,250 m, 14.VII.1971 (Sedlacek) (BPBM).

Collection data indicate that this species has a wide distribution in Papua New Guinea. It apparently is adapted to several different habitats; specimens were collected at elevations ranging from 0–1,800 m.

Sosephena binoba Medler, **new species** Figs. 4–6

Description. Morphology of frons, vertex, and pronotum conforming with generic diagnosis (Figs. 4–6). This species is closely similar to *rinkela*, but may be distinguished by the shape of the vertex that is less produced anteriorly, and the anterior margin tends to be convex rather than acute.

The genitalia (Fig. 6) differ from *rinkela* in structures of the aedeagus. A small triangular lateral projection originates close to dorsal margin at point below apex of dorsal process; in *rinkela* this triangular projection is absent.

Color green. Tegmen shape and venation similar to *rinkela*, barred appearance caused by orange-yellow crossveins contrasting with green membrane. Female tegmen posteriorly with narrow red margins, including pigmented vein terminations.

Measurements (♂, ♀). From holotype and allotype. Length: overall 9.75, 10.0; v 0.33, 0.33; f 1.20, 1.33; p 0.50, 0.54; m 1.49, 1.49; t 7.80, 8.13; pcl 1.99, 1.99. Width: v 0.79, 0.79; f 1.00, 1.00; t 4.15, 4.48. Hind leg spine formula: 1:6:7, 1:6:7.

Type data. Holotype ♂, PAPUA NEW GUINEA: Madang Prov: Nobonob Hill, 7 km NW Madang, 5° 10′S, 145° 45′E, 16.III.1987 (N.D. Penny); allotype ♀, Nobonob Hill, 7 km NW Madang, 5° 10′S, 145° 45′E, 21.III.1987 (Penny). Both deposited in CAS. Paratypes: PAPUA NEW GUINEA: Madang Prov: ♂, ♀, Nobonob Hill, 7 km NW Madang, 5° 10′S, 145° 45′E, 9.II.1987 (Penny) (CAS); ♂, Naru Riv, 31 km SW Madang, 5° 26′S, 145° 27′E, 3.III.1987 (Penny); ♀, Nobonob Hill, 7 km NW Madang, 5° 10′S, 145° 45′E, 13–14.II.1987 (Penny) (BPBM).

Distribution records limited to Madang Province; determinations confirmed by study of male genitalia of several specimens.

Genus ***Trisephena*** Medler, **new genus**

Type species. *Trisephena rubeola* Medler, n. sp., here designated.

Diagnosis. Dorsum of head short, wide, composed of frons and vertex; anterior margin formed by frontal U-carinae, narrow dorsal ledge of frons clearly delimited posteriorly from vertex by transverse carina arising from anterodorsal genal angles. Transverse carina either uninterrupted or medially broken to varying extent by longitudinal suture, V-notch, or shallow depression of vertex. Lateral margins of frons sharply carinate, elevated, evenly convex from clypeal margin to lateral margins of vertex, disc with 3 thickened longitudinal carinae, lateral carinae shorter than median carina, lateral carinae narrowly or broadly U-shaped, joined dorsally with median carina. Anterior and lateral margins of pronotum carinate, lateral margin extended beyond middle of eye, postocular eminence elevated, broadly triangular, margin extending as strong ridge to anteroventral margins of paranotal lobe. Mesonotum with 3 longitudinal carinae, disc flat.

Apical margin of tegmen obliquely truncate, shape of costal and sutural angles dissimilar, postclaval margin elevated; either 3 (R,S,M) or 2 (R+S,M) longitudinal veins arising from basal stem, vein R unbranched from base to weak R+C junction, vein S 5-branched, vein M strongly 4-branched, each branch forming several apical terminals, vein Cu oblique crossvein displacing Cu away from claval suture toward M_2 forming triangular cell; Cu and suture reunited at claval apex, Cu continuing toward apical margin as irregular submarginal vein with 5–6 branches terminating along postclaval sutural margin; Y-stem short. Tegmen of some species with scattered pustules, or heavy concentration of pustules basally in clavus and precostal marginal cell.

Color variable, tendency toward faded colors and sexual dimorphism, red colors more brilliant in females. Specimens with or without red spots and dashes, small red spots on lateral margins of frons and sides of pronotum, tegmina with thin red margins, variable sizes and frequencies of red spots and dashes on veins and membrane. Relatively small species, length 7.5–9.5 mm, females slightly larger than males.

Ovipositor modified, valvulae III fingerlike, not sclerotized, not suitable for piercing.

Distribution. Papua New Guinea, New Britain, Irian Jaya.

Key to Species of *Trisephena*

1. Anterior margin of vertex separated from dorsal surface of frons by unbroken transverse carina originating at genal angles. Tegmen with red spots, 2 longitudinal veins (R+S, M) arising from basal stem 2

   Transverse carina delimiting anterior margin of vertex unbroken or interrupted medially by notch or depression; tegmen with or without red spots, 3 longitudinal veins (R, S, M) arising from basal stem 3

2. Apical margin of tegmen oblique, pcl margin convexly elevated; vein Cu and M_2 united by oblique crossvein . . . . . ***zestreya*, n. sp.**
   Apical margin of tegmen elongate oval, pcl margin not elevated; apex of clavus midway between tip of scutellum and apex of tegmen; Cu and M_2 uniting in short stem, then dividing with noticeable gap between Cu and apex of clavus . . . . . ***anomala*, n. sp.**
3. Tegmen without red spots, crossveins not outlined in red, or sparsely so. Transverse dorsal carina unbroken; frontal U-shaped carinae shallowly raised, dorsal margin with convex ledge anterior of vertex 4
   Frontal carinae wide, U-shaped, strongly raised. Tegmen with red spots, crossveins strongly red or outlined by red; transverse dorsal carina notched medially or interrupted by shallow depression 5
4. Overall length 7.5 mm; tegmina opaque white; ventrally directed process of aedeagus triangular, short (Fig. 21) . . . . . ***estrias*, n. sp.**
   Overall length 9.0–9.5 mm; tegmina green; ventrally directed process of aedeagus slender, elongate (Fig. 24) . . . . . ***metrior*, n. sp.**
5. Anterior margin of vertex truncate, interrupted medially by concave depression extending to frontal carinal margin . . . . . ***lonessa*, n. sp.**
   Anterior margin of vertex angulate anterad, interrupted medially by depression or V-notch 6
6. Pronotum and frons not marked with small red dots; tegmen with sparse pattern of red crossveins. Dorsal basal process of aedeagus much enlarged apically (Fig. 15) . . . (New Britain) . . . . . ***imposita*, n. sp.**
   Sides of pronotum and lateral margins of frons with numerous small red dots; tegmen usually heavily marked with red crossveins and spots; pustules prominent, especially in basal part of clavus and precostal margin 7
7. Posterodorsal angle of pygofer sharply pointed; posterior process of aedeagus circular (Fig. 9) . . . . . ***rubeola*, n. sp.**
   Pygofer angle not pointed; posterior process of aedeagus straight or slightly curved, basally directed lateral process straight or downturned . . . . . ***trientor*, n. sp.**

Trisephena rubeola Medler, **new species** Figs. 7–9, 35–36

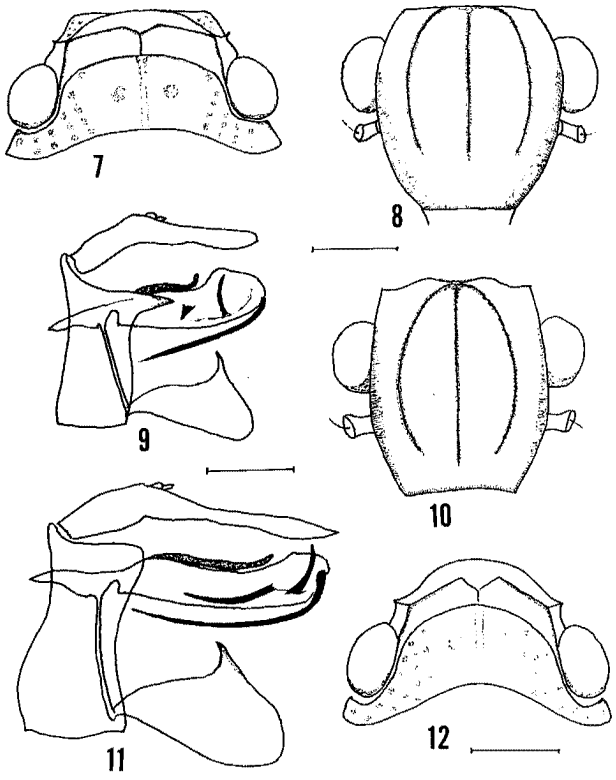
Description. Morphology of frons, vertex, and pronotum as in generic diagnosis (Fig. 7–8). In dorsal view, U-carina of frons forming anterior margin of head. Anterior margin of vertex delimited by slightly angulate transverse carina arising from anterodorsal angles of genae, median notch V-shaped. Pronotal lateral carina extended posteriorly nearly to raised triangular postocular eminence. Mesonotum tricarinate, disc flat. Tegmen whitish, translucent, apical margin obliquely truncate, postclaval sutural margin slightly raised (Fig. 36).

Coloration strongly red; sides and adjacent part of dorsum heavily marked with uniform red dots, disc unmarked except by red median longitudinal band that continues across mesonotum. Similar red spots also on frons in space between lateral margin and lateral arm of U-carina. Cells and crossveins of tegmina strongly marked with scattered red spots of variable size, most numerous on apical crossveins, vein terminations at margin red; scattered red pustules present, some pustules ivory, rimmed with red, pustules largest in size in base of clavus.

Coloration variable; pattern and color of markings variable; colors green, tawny, red orange; faded or bright.

Genitalia (Fig. 9). Posterodorsal angle of pygofer sharply pointed. This character state unique in the genus.

Measurements (♂, ♀). From holotype and allotype. Length: overall 9.0, 10.05; v 0.25, 0.29; f 1.16, 1.33; p 0.42, 0.46; m 1.66, 1.49; t 7.80, 8.30; pcl 1.83, 2.49. Width: v 0.83, 0.95; f 1.08, 1.33; t 3.65, 3.82. Hind leg spine formula: both 1:6:9.



Figs. 7–12. Holotype: **7**, *Trisephena rubeola*, head; **8**, same, frons; **9**, same, genitalia; **10**, *Trisephena trientor*, frons; **11**, same, genitalia; **12**, same, head. Scale = 0.5 mm.

Type data. Holotype ♂ (BPBM 14,033), allotype ♀, PAPUA NEW GUINEA: Eastern Highlands Prov: Kassam, 1,350 m, 48 km E of Kainantu, 7.XI.1959 (T.C. Maa). Both deposited in BPBM. Paratypes: PAPUA NEW GUINEA: Eastern Highlands Prov: ♂, ♀, Arau, 40 km E of Kainantu, 1,400 m, 16.X.1959 (Maa); ♂, ♀, Kassam, 48 km E of Kainantu, 1,350 m, 7.XI.1959 (Maa) (BPBM). East New Britain Prov: ♂, 2♀, Bainings, St. Paul's, Gazelle Pen, 350 m, 8–9.IX.1955 (Gressitt); ♀, Gaulim, Gazelle Pen, 130 m, 23–28.X.1962 (Sedlacek); ♂, ♀, Mt Sinewit, Gazelle Pen, 900 m, 7–16.XI.1962, malaise trap (Sedlacek) (BPBM). East Sepik Prov: ♂, Bainyik, S of Maprik, 150 m, 12.I.1960; ♀, 160 m, 29.XII.1959–17.I.1960 (Maa); 4♀, Wum, Upper Jimi Val, 840 m, 16–18.VII.1955 (Gressitt) (BPBM). Madang Prov: ♂, Bundi, 5° 45′S, 145° 15′E, 10–12.III.1987 (Penny) (CAS); ♀, Bundi, 1,300 m, 8.V.1988, St. 019, (Van Stalle No. 27363); ♀, Brahman Bundi, 700 m, 7.V.1988, St. 041, (Van Stalle No. 27363) (IRSN); ♀, Kurum, Karkar I, 0–100 m, VIII.1968, (Krauss) (BPBM); ♂, Naru Riv, 31 km SW Madang, 5° 26′S, 145° 27′E, 3.III.1987 (Penny); 2♂, 2♀, Nobonob Hill, 7 km NW Madang, 5° 10′S, 145° 45′ E, 9–14.II.1987; ♂, ♀, 2–19.III.1987 (Penny) (CAS); ♀, Saidor, Sibog Vill, Finisterre Range, 27.V–5.VI.1958 (Brandt) (BPBM); 2♀, Tapo Crk, 26 km SW Madang, 5° 24′S, 145° 38′E, 23.II–15.II.1987 (Penny) (CAS); ♂, ♀, Wanuma, Adelbert Mts, 800–1,000 m, 24–25.X.1958 (Gressitt); 2♂, 3♀, Wanuma, 600–720 m, VIII.1968 (Krauss) (BPBM). Milne Bay Prov: ♀, Fergusson I, Mts between Agamoia and Ailuluai, 900 m, No. 4, 5–17.VI.1956, 5th Archbold Exped. (L.J. Brass) (AMNH). Morobe Prov: ♀, Bubia, IX.1949

(Krauss); 2♀, Busa Riv, E of Lae, 100 m, 14.X.1956 (Gressitt) (BPBM); ♂, Lae, Melambi Riv, Mirilunga Vill, 4,500 m, 29.XII.1956 (J.H. Ardley) (PNGDA); ♀, Lae, VII.1944 (F.E. Skinner); ♀, Lae, sea level, 26.VII.1955 (Gressitt) (BPBM); ♂, Umi Riv, Markham Vall, 480 m, No. 14, 24.XI.1959, 6th Archbold Exped. (Brass) (AMNH). Southern Highlands Prov: ♀, Korop, Upper Jimi Vall, 1,300 m, 12.VII.1955 (Gressitt) (BPBM). Western Highlands Prov: 2♂, ♀, Tsenga, Upper Jimi Vall, 14–15.VI.1955 (Gressitt) (BPBM). INDONESIA: IRIAN JAYA: ♂, Bodem, 11 km SE Oerberfaren, 100 m, 7–17.VII.1959 (Maa) (BPBM).

A ♀ specimen in the Bishop Museum from the Philippines: Mindanao, Agusan, 10 km SE Francisco, 14.XI.1959, L.W. Quate, may represent a valid extension of distribution to the Philippine Islands, or may only be a mislabeled specimen.

Trisephena trientor Medler, **new species** Figs. 10–12

Description. Morphology of frons, vertex, and pronotum as in generic diagnosis (Figs. 10, 12). Specimens closely resemble *rubeola* in red markings and angulate shape of vertex with median V-shaped notch, but differ in acute anterodorsal angle of genae and characters of the genitalia (Fig. 11). Heavily marked with red dotlike spots on pronotum; dark red brown median longitudinal band on pro- and mesonotum; red crossveins and spots on tegmina, large red spots on each side of discal cell crossvein, in next apicad tier of crossveins; and in Cu triangular cell. Tegmen pustulate, especially between S and M veins, in precostal margin, and base of clavus.

Measurements (♂, ♀). From holotype and allotype. Length: overall 8.5, 9.0; v 0.25, 0.25; f 1.20, 1.33; p 0.46, 0.50; m 1.41, 1.66; t 6.97, 7.64; pcl 2.16, 2.16. Width: v 0.79, 0.87; f 1.08, 1.20; t 3.32, 3.65. Hind leg spine formula: both 1:6:7.

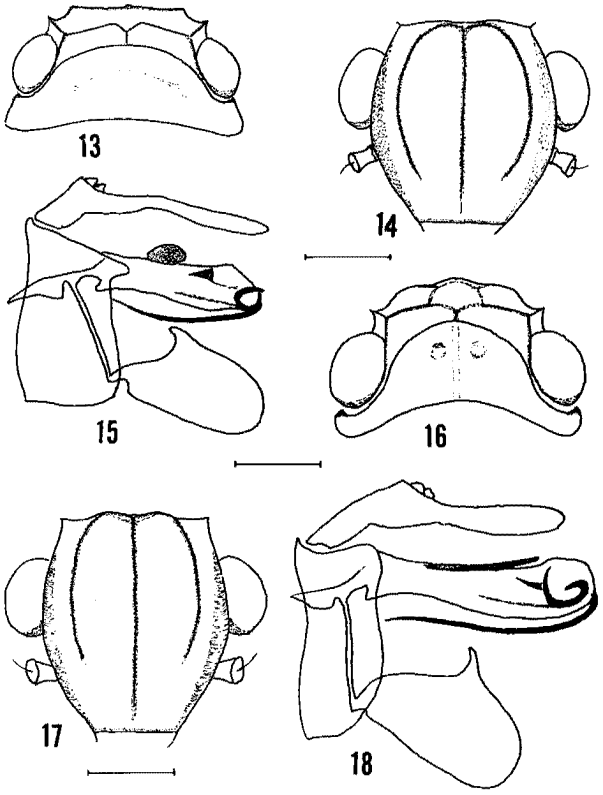
Type data. Holotype ♂ (BPBM 14,034), PAPUA NEW GUINEA: West Sepik Prov: Torricelli Mts, Mokai Vill, 750 m, 8–15.XII.1958 (W.W. Brandt); allotype ♀, Torricelli Mts, Mobitei, 750 m, 1.IV.1959 (Brandt). Both deposited in BPBM. Paratypes: PAPUA NEW GUINEA: East Sepik Prov: 2♂, ♀, Angoram, 20–30 m, 14–16.VIII.1969 (Gressitt) (BPBM); ♂, Maprik, 19.X.1957 (J. Smart) BM 1957–693 (BMNH). West Sepik Prov: ♂, Torricelli Mts, Mokai Vill, 750 m, 1–23.I.1958 (Brandt); ♀, Torricelli Mts, Mobitei, 750 m, 28.II–4.III.1959; 2♀, 1–15.IV.1959 (Brandt) (BPBM).

Trisephena imposita Medler, **new species** Figs. 13–15

Description. Morphology of frons, vertex, and pronotum as in generic diagnosis (Figs. 13–14). Head characters of this species are similar to *rubeola,* but specimens can be distinguished by distribution in New Britain, absence of red spots on frons and pronotum, and lack of median red spots on tegmina crossveins. Color stramineous, thin red lines on crossveins, margins of tegmina narrowly red. Genitalia (Fig. 15) are uniquely characterized by large dorsal process and circular posterior process of aedeagus.

Measurements (♂, ♀). From holotype and allotype. Length: overall 9.0, 9.0; v 0.21, 0.33; f 1.16, 1.25; p 0.42, 0.50; m 1.33, 1.33; t 7.14, 7.30; pcl 2.16, 1.99. Width: v 0.79, 0.83; f 1.08, 1.04; t 3.49, 3.65. Hind leg spine formula: both 1:6:7.

Type data. Holotype ♂ (BPBM 14,035), PAPUA NEW GUINEA: East New Britain Prov: Mt Sinewit, Gazelle Pen, 900 m, 14–16.XI.1962 (Sedlacek); allotype ♀, same date, but 7–16.XI.1962 (Sedlacek). Both deposited in BPBM. Paratypes: PAPUA NEW GUINEA: East New Britain Prov: ♀, Bainings, St. Paul's, Gazelle Pen, 350 m, 8.IX.1955 (Gressitt); ♂, Sio, N Coast, 600 m, 24.VII.1956 (Ford); ♂, Umboi I, 8 km WNW Lab Lab, 300 m, 8–19.II.1967 (G.A. & S.L. Samuelson, P.H. Colman) (BPBM). Morobe Prov: ♂, Buso, IX–XI.1979 (J. Martin) BM 1980–150 (BMNH).



Figs. 13–18. Holotype: **13**, *Trisephena imposita*, head; **14**, same, frons; **15**, same, genitalia; **16**, *Trisephena lonessa*, head; **17**, same, frons; **18**, same, genitalia. Scale = 0.5 mm.

Trisephena lonessa Medler, **new species** Figs. 16–18

Description. Morphology of frons, vertex, and pronotum (Figs. 16–17) are in agreement with the generic diagnosis except that median depression of vertex is the character state found in *Sosephena*. Tegmina heavily pustulate, most pustules red.

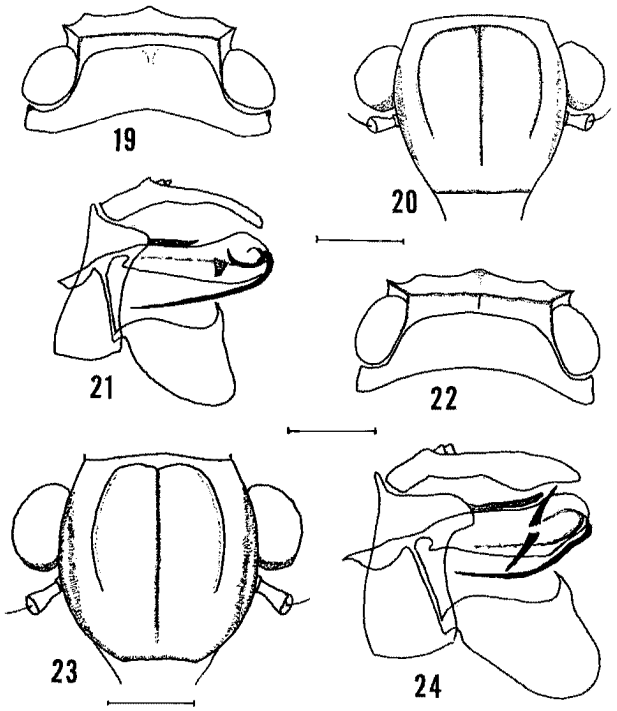
The species is represented by the unique holotype, which has distinctive genitalia (Fig. 18).

Measurements. From holotype. Length: overall 8.0; v 0.25; f 1.25; p 0.50; m 1.49; t 7.47; pcl 2.16. Width: v 0.83; f 1.08; t 3.32. Hind leg spine formula: 1:5:7.

Type data. Holotype ♂ (BPBM 14,036), PAPUA NEW GUINEA: West Sepik Prov: Eliptamin Vall, 1,200–1,350 m, 16–31.VII.1959 (W.W. Brandt). Deposited in BPBM.

Trisephena estrias Medler, **new species** Figs. 19–21

Description. Morphology of frons, vertex, and pronotum as in generic diagnosis (Figs. 19–20). Frontal carinae moderately raised on the disc, longitudinal median carina extending basad nearly full length of frons, dorsal portion of U-shaped carinae not sharply raised, slightly concave medially at junction with median carina, separated spatially from vertex by narrow shelflike convexity of frons. Transverse carina anteriorly delimiting margin of vertex extending straight, uninterrupted across dorsum, arising from convex anterodorsal margins of genae. Color light stramineous, membrane of tegmina semiopaque, without red markings.



Figs. 19–24. Holotype: **19**, *Trisephena estrias*, head; **20**, same, frons; **21**, same, genitalia; **22**, *Trisephena metrior*, head; **23**, same, frons; **24**, same, genitalia. Scale = 0.5 mm.

This species is closely related to *metrior*, but distinguished by different character states of the genitalia (Fig. 21).

Measurements. From paratype ♂. Length: overall 7.5; v 0.17; f 1.00; p 0.37; m 1.25; t 6.64; pcl 1.83. Width: v 0.79; f 1.00; t 3.32. Hind leg spine formula: 1:6:7.

Type data. Holotype ♂ (BPBM 14,038), PAPUA NEW GUINEA: Madang Prov: Wanuma, 600–720 m, VII.1968 (N.L.H. Krauss). Deposited in BPBM. The holotype tegmina are damaged. Paratypes: PAPUA NEW GUINEA: Western Prov: 2♂, Lk Murray, 8.XII.1972, white light (P.I. Imlay) (BPBM).

Trisephena metrior Medler, **new species** Figs. 22–24

Description. Morphology of frons, vertex, and pronotum as in generic diagnosis (Figs. 22–23), closely resembling *estrias*. Weakly defined U-carinae of frons meeting raised median carina at slight angle, separated from anterior margin of vertex by narrow convex dorsum of frons, anterior margin of vertex truncate, transverse carina arising at genae straight, uninterrupted medially. Head and body stramineous, tegmina green to faded dull green, red markings limited to oblique vein at widest part of Cu triangular cell and a few other crossveins.

This species is distinguished from *estrias* and other congeners by definitive character states of the genitalia (Fig. 24).

Measurements (♂, ♀). From holotype and allotype. Length: overall 9.0, 9.5; v 0.17, 0.17; f 1.16, 1.16; p 0.42, 0.42; m 1.49, 1.58; t 5.31, 7.97; pcl 1.83, 2.16. Width: v 0.83, 0.83; f 1.16, 1.16; t 3.49, 3.98. Hind leg spine formula: 1:6:6; 1:6:7.

Type data. Holotype ♂ (BPBM 14,037), PAPUA NEW GUINEA: East Sepik Prov: Bainyik, S of Maprik, 150 m, 4.I.1960 (T.C. Maa); allotype ♀, West Sepik Prov: Kumur, Upper Jimi Vall, 1,000 m, 13.VII.1955 (J.L. Gressitt). Both deposited in BPBM. Paratypes: PAPUA NEW GUINEA: East Sepik Prov: ♂, Bainyik, nr. Maprik, 225 m, 21.VI.1961 (Gressitt); ♀, Wagu, Upper Sepik, ½ way between Green & Yellow Riv, 180 m, 5.VII.1963 (Straatman); ♀, Wum, Upper Jimi Valley, 840 m, 18.VII.1955 (Gressitt) (BPBM). Western Highlands Prov: ♀, Baiyer Riv, 1,150 m, 17.X.1958, *Castanea*-like tree (Gressitt); ♀, Tsenga, Upper Jimi Vall, 1,200 m, 13.VII.1955 (Gressitt) (BPBM). INDONESIA: IRIAN JAYA: 3♂, Sabron, Cyclops Mts, Camp 2, 2,000 ft [610 m], VII.1936 (L.E. Cheesman) BM 1936–271 (BMNH).

Trisephena zestreya Medler, **new species** Figs. 25–26, 33–34

Description. Morphology of frons, vertex, and pronotum as in generic diagnosis (Figs. 25–26). This species is distinguished from other strongly red-spotted species in the genus by the straight anterior margin of vertex, elevated post-claval suture (Fig. 33), R+S venation (Fig. 34), and aedeagus basal process inconspicuous or absent (Fig. 27).

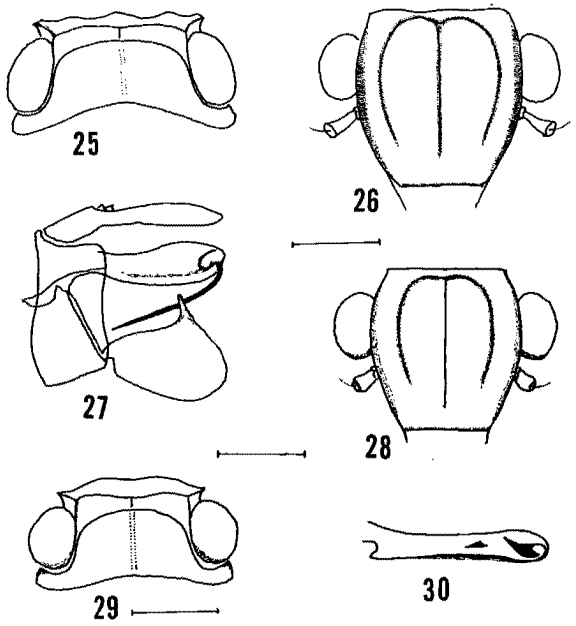
Measurements (♂, ♀). From holotype and allotype. Length: overall 8.0, 8.5; v 0.17, 0.17; f 1.00, 1.04; p 0.33, 0.33; m 1.33, 1.49; t 6.31, 6.97; pcl 1.99, 2.16. Width: v 0.79, 0.79; f 1.00, 1.04; t 5.82, 3.15. Hind leg spine formula: 1:7:8; 1:6:7.

Type data. Holotype ♂ (BPBM 14,039), PAPUA NEW GUINEA: Morobe Prov: Wau, 1,200 m, 2.V.1965 (J.& M. Sedlacek); allotype ♀, Wau, 1,100–1,200, VII.1968 (N.L.H. Krauss). Both deposited in BPBM. Paratypes: PAPUA NEW GUINEA: East Sepik Prov: ♀, Bainyik, S of Maprik, 150 m, 12.VI.1960 (Maa) (BPBM). Madang Prov: ♀, Nobonob Hill, 7 km NW Madang, 5° 10′S, 145° 45′E, 22.II.1987 (Penny) (CAS); ♀, Wanuma, Adelbert Mts, 800–1,000 m, 26.X.1958, grasses (Gressitt) (BPBM). Morobe Prov: ♂, Boana Mission, Huon Pen, 900 m, 4–5, IX.1956 (Ford); ♀, Wau, 1,200 m, 31.VII.1961 (Sedlacek); ♀, Wau, 1,200 m, 7.VI.1962 (Sedlacek); ♂, Wau, 1,100–1,200, VI.1968, on *Lantana camera*; ♀, VII.1968 (Krauss) (BPBM); ♀, Wau, 10 km S, 22.V.1988, St. 054 (Van Stalle No. 27363) (IRSN). West Sepik Prov: ♀, Torricelli Mts, Mobitei, 750 m, 16–31.III.1959 (Brandt) (BPBM). INDONESIA: IRIAN JAYA: 2♂, ♀, Araucaria Camp, 800 m, 11–19.III.1939 (Toxopeus); ♂, Bernhard Camp, 750 m, 27.III.1939 (Toxopeus); ♂, ♀, Rattan Camp, 1,200 m, 6.II.1939, 4.III.1939 (Toxopeus) [Netherlands Indies-America Exped.] (RNHL); ♀, Genjam, 40 km W of Hollandia, 100–200 m, 1–10.III.1960 (Maa); ♂, Hollandia area, W Sentani, Cyclops Mts, 150–250 m, 17.VI.1959 (Maa) (BPBM); ♀, Hollandia, Humboldt Bay, IV.1936 (Cheesman) BM 1936–271 (BMNH); ♀, Hollandia, rain forest clearing, 250 ft [75 m], ♀, 12.XII.1944, ♂, 18.I.1945, ♂, ♀, 7–9.II.1945, ♀, 19.III.1945, 2♂, 2♀, V.1945 (H. Hoogstraal) (NCSU); ♀, Ifar, E end Cyclops Mts, 150 m, 18.X.1957 (Gressitt); ♂, ♀, Ifar, Cyclops Mts, 300 m, 21.VI.1959 (Maa); 2♀, Ifar, 300–600 m, 20–22.VI.1959 (Maa); 2♂, Ifar, Cyclops Mts, 400–550 m, 23.VI.1959 (Maa) (BPBM); ♀, Mt. Lina, Cyclops Mts, 3,500 ft [1,070 m], III.1936 (Cheesman) BM 1936–271; ♂, Sabron, Cyclops Mts, Camp 2, 2,000 ft [610 m], VI.1936, 2♂, 4♀, VII.1936 (Cheesman) BM 1936–271 (BMNH); ♀, Waris, S of Hollandia, 450–500 m, 24–31.VII.1959 (Maa) (BPBM).

Widely distributed, with more numerous collection records in Irian Jaya than for other species in the genus.

Trisephena anomala Medler, **new species** Figs. 28–32

Description. Morphology of frons, vertex, and pronotum as in generic diagnosis (Figs. 28–29). The unique narrow convex shape apically of the tegmen (Fig. 32) differs from all



Figs. 25–30. Holotype: **25**, *Trisephena zestreya*, head; **26**, same, frons; **27**, same, genitalia; **28**, *Trisephena anomala*, frons; **29**, same, head; **30**, same, aedeagus. Scale = 0.5 mm.

congeners. Tegminal development of the R+S stem is shared with *zestreya,* along with scattered red spots and pustules. The union of veins M_2 and Cu to form a joint stem shown (Fig. 31) appears to be a venation pattern found only in this species. Holotype genitalia (Fig. 30) is disassociated aedeagus, which is only part available, other structures being lost.

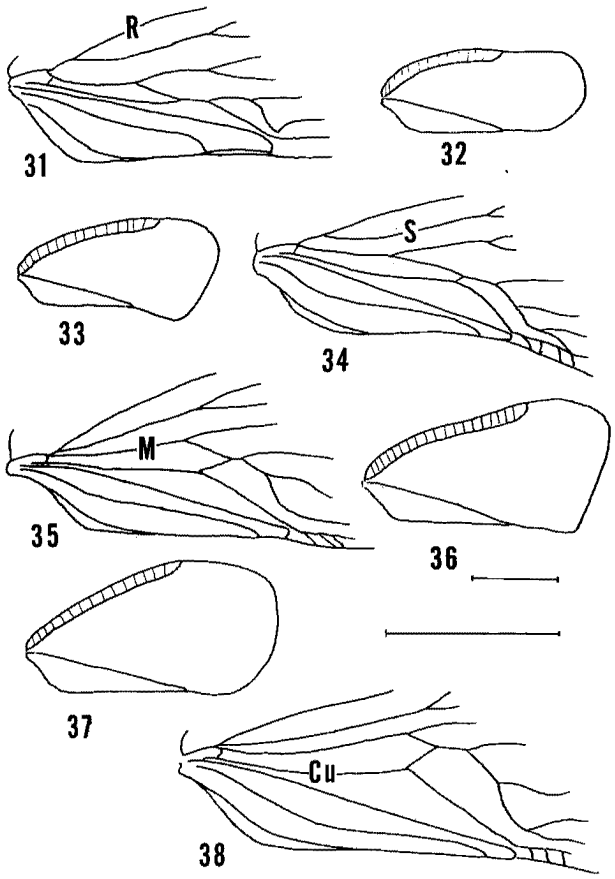
Measurements (♂, ♀). From holotype and allotype. Length: overall 8.0, 8.5; v 0.17, 0.17; f 0.91, 1.00; p 0.37, 0.37; m 1.33, 1.49; t 6.64, 7.47; pcl 1.66, 1.83. Width: v 0.66, 0.75; f 0.83, 1.00; t 2.52, 2.99. Hind leg spine formula: both 1:6:7.

Type data. Holotype ♂ (BPBM 14,040), PAPUA NEW GUINEA: East New Britain Prov: Mt Sinevit, Gazelle Pen, 900 m, 7–16.XI.1962 (J. Sedlacek); allotype ♀, Madang Prov: Wanuma, Adelbert Mts, 800–1,000 m, 23.X.1958, *Pipturus* (J. L. Gressitt). Both deposited in BPBM. The holotype tegmina are damaged; tegmen illustrations (Figs. 31–32) were taken from the allotype. Paratypes: PAPUA NEW GUINEA: East New Britain Prov: ♂, Mt Sinevit, Gazelle Pen, 900 m, 10.XI.1962, light trap (Sedlacek) (BPBM). Madang Prov: ♀, Kassam, 48 km E of Kainantu, 1,350 m, 7.XI.1959 (Maa); 2♀, Wanuma, Adelbert Mts, 800–1,000 m, 24–25.X.1958, *Pipturus* (Gressitt) (BPBM).

Taxonomic Notes on Australian Genera with Tricarinate Frons

Aflata Melichar (1902)

Type species. *Aflata stali* Melichar (1902), by monotypy. Lectotype ♀, Adelaide, designated by Medler (1986). Male genitalia illustrated by Fletcher (1979); other diagnostic features and generic key given by Fletcher (1988).



Figs. 31–38. Tegmen: **31**, *Trisephena anomala*, allotype, principal veins, R = radius; **32**, same, outline sketch; **33**, *Trisephena zestreya*, holotype, outline sketch; **34**, same, principal veins, S = sector; **35**, *Trisephena rubeola*, holotype, principal veins, M = media; **36**, same, outline sketch; **37**, *Sosephena rinkela*, allotype, outline sketch; **38**, same, principal veins, Cu = cubitus. Scale = 0.5 mm, Figs. 31, 34, 35, 38; 3.0 mm, Figs. 32, 33, 36, 37.

Burnix Medler (1988)

Type species. *Euphanta insignis* Lallemand (1935), by original designation. Lectotype ♂, Burnside, designated by Medler (1988). Male genitalia illustrated by Medler (1988).

Euphanta Melichar (1902)

Type species. *Poeciloptera munda* Walker (1851), by subsequent designation of Distant (1910). Holotype ♀, New Holland, reported in BMNH by Medler (1990). Diagnostic features and generic key given by Fletcher (1988). *Euphanta munda* (Walker) recorded in Papua New Guinea by Medler (1989), but all other name combinations of *Euphanta* in New Guinea synonymized with *Colgar* Kirkaldy by Medler (1989).

Euryphantia Kirkaldy (1906)

Type species. *Euryphantia cinerascens* Kirkaldy (1906), by original designation. Holotype ♀, Bundaberg, seen in BPBM by Medler (1987). Male genitalia illustrated by Fletcher (1980);

other diagnostic features and key given by Fletcher (1988). Recorded in Papua New Guinea by Medler (1989).

Lesabes Medler (1988)

Type species. *Neomelicharia handschini* Lallemand (1935), by original designation. Holotype ♀, Darwin, seen in Basel Natural History Museum by Medler (1988). Male genitalia illustrated by Medler (1988); other diagnostic features and distributions given by Medler (1988).

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