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THE PHILIPPINE SPECIES OF RHOTANINI (HOMOPTERA: DERBIDAE) AND THEIR DISTRIBUTION OUTSIDE THE PHILIPPINES[1]

B. Zelazny[2]

Abstract. The generic classification of the Rhotanini is reexamined. In the proposed system the following genera are recognized: *Alara, Sumangala, Muiralevu,* n. gen., *Saccharodite, Dichotropis, Rhotana, Rhotanella,* and *Levu.* Fifty-one species found in the Philippines are described, and 16 of these are reported to have a wider distribution outside the Philippines. The following new combinations are proposed: *Alara fumata* (Melichar), *Alara fusca* (Muir), *Alara hyalina* (Melichar), *Alara kershawi* (Muir), *Alara obscura* (Muir), *Sumangala nigropunctata* (Muir), *Sumangala sufflava* (Muir), *Muiralevu africanus* (Muir), *Muiralevu quadramaculatus* (Muir), *Saccharodite basipunctulata* (Melichar), *Saccharodite coccinea* (Matsumura), *Saccharodite guamana* (Fennah), *Saccharodite kagoshimana* (Matsumura), *Saccharodite laratica* (Muir), *Saccharodite matsumurae* (Muir), *Saccharodite rubra* (Muir), *Saccharodite toroensis* (Matsumura), *Rhotana pavo* (Bierman), *Rhotanella lucida* (Muir), *Rhotanella punctovenosa* (Melichar).

During surveys in the Philippines of sucking insects feeding on coconut palms, small Derbidae belonging to the tribe Rhotanini were frequently collected. Since the taxonomy of this group has received little attention in the past, the Philippine species are here described, and any occurrence of these species outside the Philippines is reported. Reports of *Alara kershawi* (Muir), *Alara fusca* (Muir), and *Rhotana pavo* (Bierman) from the Philippines (Muir 1917) could not be confirmed.

The Rhotanini occur mainly in the Oriental and Australian regions (1 species has been reported from Africa, 2 from Japan). They can be distinguished from other Derbidae by their broad fore wings (tegmina) and the presence of a basal median cell whose length does not exceed the first ⅓ of the tegmen. This cell is formed by the 1st cubital sector (Cu1), either merging with the base of the 1st median sector (Ms1)

1. Specimens examined from the Bishop Museum are the result of fieldwork supported by grants to the museum from the U.S. National Science Foundation (G-2127, G-4774, G-10734, GB-5864), the U.S. National Institutes of Health (AI-01723), the U.S. Army Medical & Research Development Command (DA-MEDDH-60-1, DA-MD-49-193-62-G65, DA-49-193-MD-2601) and a grant to J. L. Gressitt from the Guggenheim Foundation (1955–56).

2. FAO/UNDP Coconut Research and Development Project, PCA, Albay Research Center, Guinobatan, Albay 4908, Philippines.

or connected to it by a crossvein (Fig. 1). Rhotanini usually have an evenly rounded head profile; rarely is the junction of vertex and frons angulated. The facial carinae are foliaceous and usually meet at their bases (near the junction with the vertex). Ocelli are missing or rudimentary. The antennae are simple and short. Subantennal processes and lateral carinae of the pronotum are usually well developed. The tegmen has 4 or 5 costal cells; the radius and the cubitus have 1, the media has 4 sectors; the 1st median sector is usually branched. The tegmina may be powdered, glassy, or unpowdered but opaque (however, the surface texture is difficult to determine in old specimens). Wax-secreting pores are present on a basal section of the costa, the apical margin, and on the base of the cubitus. Other veins may also carry wax pores. In the hindwings the subcosta and cubitus are unbranched, the radius is branched in very few species only, and the media has 2 short sectors. One crossvein connects the subcosta with the radius, another the radius with the media.

The male genitalia are simple compared to those of other Derbidae. The pygofer rarely has lateral or ventral projections. The anal segment is short, rarely bearing appendages. The genital styles are usually oval in shape. They always bear 2 dorsal processes: a fingerlike distal process, its tip curved outwards, and a shorter proximal process, its tip usually pointed and curved inwards. The aedeagus usually has a long curved stem and a shorter apical portion, the stem rarely but the apical portion often bears processes. The apical portion also has frequently membraneous parts and lobes; the shape of these is often difficult to determine since they easily shrivel.

The majority of the Rhotanini examined were loaned by the Bishop Museum or were collected in southern Luzon. The male genitalia were prepared for observation by clearing the abdomen for 3–4 h in 20% KOH. The genitalia were not separated from each other. Faint infuscations and poorly developed veins in the tegmina were made visible by spreading the tegmen between 2 plastic cover slips and observing it against a white illuminated background. Lengths of body and tegmen are given for undistorted specimens only. Deviations from the mean are expressed as standard deviation.

Unless otherwise stated, all specimens examined belong to the Bishop Museum in Hawaii (BISHOP). Other institutions keeping specimens examined are abbreviated as follows: ARC = Philippine Coconut Authority, Albay Research Center, Guinobatan, Albay, Philippines; BMNH = British Museum (Natural History), London, England; EIHU = Entomological Institute, Hokkaido University, Sapporo, Japan; MMB = Moravske Museum, Brno, Czechoslovakia; RNHL = Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands; USNM = U.S. National Museum, Washington, USA.

KEY TO THE GENERA OF RHOTANINI

1. Tegmen with 5 costal cells gradually decreasing in length towards the apex (sectors may be poorly visible), if abruptly decreasing in length then 1st median sector (Ms1) branched distad of middle, or hindwing only about ½ as wide as tegmen; Sc+R fork within basal ⅓ of tegmen; rostrum usually reaching middle of abdomen ..... **Alara**

Tegmen with 4 or 5 costal cells abruptly decreasing in length towards apex; Ms1 branched before its middle or unbranched; hindwing nearly as broad as tegmen; Sc+R fork usually distad of basal ⅓ of tegmen; rostrum usually not reaching middle of abdomen 2

2 (1). Tegmen with base of Cu1 merging with base of Ms1 for a short section; Ms1 unbranched; no small cell at base of Ms1 (Fig. 1a) ..... **Sumangala**

Tegmen with base of Cu1 connected to base of Ms1 by a crossvein (Fig. 1c, d) or connected to or merging with base of Ms1b (Fig. 1b), if Cu1 touching base of Ms1 then Ms1 branched; often with a small cell at base of Ms1 3

3 (2). Tegmen with 4 costal cells; base of Cu1 merging with (Fig. 1b) or connected by a crossvein to base of Ms1b (Fig. 18a), if base of Cu1 touching or connected by a crossvein to main stem of Ms1 then Ms1 unbranched (Fig. 15d), or base of Ms1a angulated and connected to M by a crossvein forming a trapezoid cell (Fig. 14b), or mesonotum all bright orange-red 4

Tegmen with 5 costal cells; base of Cu1 connected to main stem of Ms1 by a crossvein (Fig. 1c, d); Ms1 branched; base of Ms1a usually not angulated and connected to M; mesonotum never all orange-red ... 5

4 (3). Tegmen with base of Ms1a angulated and connected to M by a crossvein, forming a trapezoid cell at base of Ms1 (Fig. 14b), base of Cu1 never merging with base of Ms1b; Sc+R fork very close to base of 1st subcostal sector; mesonotum never with red marks ..... **Muiralevu, n. gen.**

Tegmen rarely with such a trapezoid cell at base of Ms1 but often with a small triangular cell; if trapezoid cell present then either bases of Cu1 and Ms1b merging for a short section, or Sc+R fork distad of base of 1st subcostal sector and mesonotum with red marks ..... **Saccharodite**

5 (3). Facial carinae separated 6

Facial carinae contiguous, at least near their bases 7

6 (5). Tegmina white, heavily powdered; ♂ genital style at the inside near its base almost always with a slender process bearing bristles at tip (apart from the 2 dorsal processes) ..... **Dichotropis**

Tegmina not powdered, or only with some patches powdered; if ♂ genital style with basal, inner process, then without terminal bristles .... **Rhotana** (part)

7 (5). Width of basal costal cell of tegmen ¼ or more of total width of tegmen; 2nd and 3rd subcostal sectors directed basad ..... **Rhotanella**

Basal costal cell of tegmen not that broad; 2nd and 3rd subcostal sectors directed apicad 8

8 (7). Tegmina heavily powdered; M leaves Sc+R usually at or before the first ⅓ of the basal median cell (Fig. 1c) ..... **Levu**

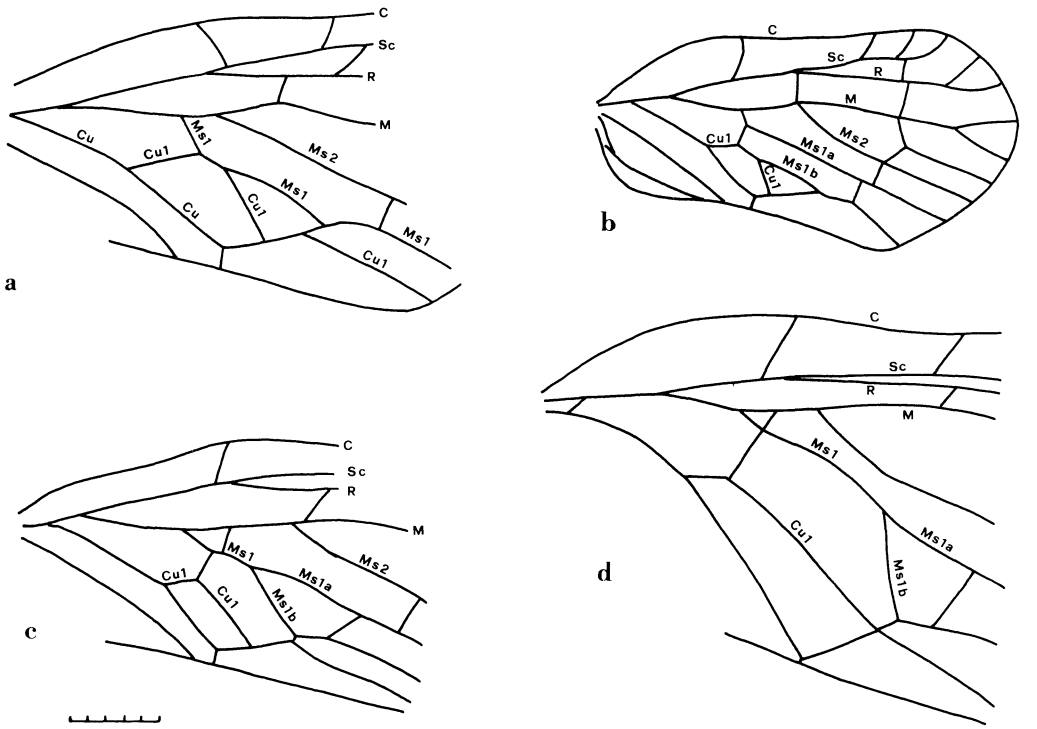

FIG. 1. Tegmen venation: **a,** *Sumangala delicatula*; **b,** *Saccharodite guamana*; **c,** *Levu vitiensis*; **d,** *Rhotana latipennis*. Scale = 0.5 mm.

Tegmina unpowdered, or only with some patches powdered; M leaves Sc+R usually distad of first ⅓ of the basal median cell (Fig. 1d) .... **Rhotana** (part)

Genus **Alara** Distant

Alara Distant, 1911: 643. Type-species: *Alara dux* Distant, by monotypy.
Mecynorhynchus Muir, 1913: 82. Type-species: *Mecynorhynchus kershawi* Muir, by original designation. **New synonymy.**

Vertex in dorsal view an acute triangle; in profile junction of vertex and face rounded; facial carinae contiguous in basal halves; antennae often elongated, about 2× as long as wide; subantennal processes well developed, connected to margins of facial carinae; rostrum long, usually surpassing middle of abdomen; lateral carinae of pronotum well developed. Tegmen oval, costal margin rounded, 5 costal cells, usually broad and gradually decreasing in length towards apex; Sc+R fork usually within first ⅓ of tegmen; basal median cell narrow; Cu1 connected to base of Ms1 by a crossvein (as in type-species) or touching base of Ms1; Ms1 branched, usually near its middle or in distal ½; usually no small cell at base of Ms1; tegmina heavily powdered. In some species hindwing significantly narrower than tegmen.

The rather broad costal cells which gradually decrease in length towards the apex of the tegmen are considered to be the most consistent character by which *Alara* can

be recognized. The very long rostrum, the elongated antennae, and the apical position of the Ms1 fork are also unique among the Rhotanini, but not all members of *Alara* have these characters. Two species have costal cells which abruptly decrease in length towards the apex of the tegmen, as well as Ms1 branching near its base; however, they have very narrow hindwings like other members of *Alara*. Apart from the Philippine species and the type-species, the genus includes *Alara kershawi* (Muir), **new combination** (=*Mecynorhynchus kershawi* Muir, 1913: 82); *Alara fumata* (Melichar), **new combination** (=*Decora fumata* Melichar, 1914a: 102); *Alara fusca* (Muir), **new combination** (=*Mecynorhynchus fuscus* Muir, 1915: 134); and *Alara obscura* (Muir), **new combination** (=*Mecynorhynchus obscurus* Muir, 1915: 134); the types of all have been examined.

KEY TO THE PHILIPPINE SPECIES OF *Alara*

1. Tegmen fuscous or dark gray 2
   Tegmen white ..... **hyalina, n. comb.**
2 (1). Tegmen evenly colored or gradually becoming lighter towards the tips 3
   Tegmen fuscous with bright white tips ..... **alboapicalis, n. sp.**
3 (2). Face in profile evenly colored 4
   Face in profile with a conspicuous purple mark above the eyes ..... **quatei, n. sp.**
4 (3). Stem of ♂ aedeagus with a pair of long, slender processes (Fig. 5b), antennae red ..... **cervus, n. sp.**
   Stem of ♂ aedeagus without such processes, antennae usually stramineous or orange 5
5 (4). Bases of dorsal processes of ♂ genital style broad, nearly touching each other (Fig. 6f) ..... **fulva, n. sp.**
   Bases of dorsal processes of ♂ genital style slender, well separated (Fig. 7g) 6
6 (5). Males with bases of tegmina and most veins red, apex of aedeagus spatulate (Fig. 7e, f) ..... **castanea, n. sp.**
   Males with tegmina stramineous, apex of aedeagus with 2 lobes, the left one short, pointed, and curved to the left side, the right one longer, rounded (Fig. 6d, e) ..... **isabella, n. sp.**

Alara hyalina (Melichar), **new combination** Fig. 2

Mecynorhynchus hyalinus Melichar, 1914: 437, holotype ♂, PI: LUZON I: Laguna Prov, Los Baños, Baker (MMB).

Dr P. Lauterer of the Moravske Museum in Brno has compared the holotype with the specimens from Albay Province, described below, as well as with the illustrations and description of these specimens. He prepared Fig. 2f after the aedeagus of the holotype and provided the following details.

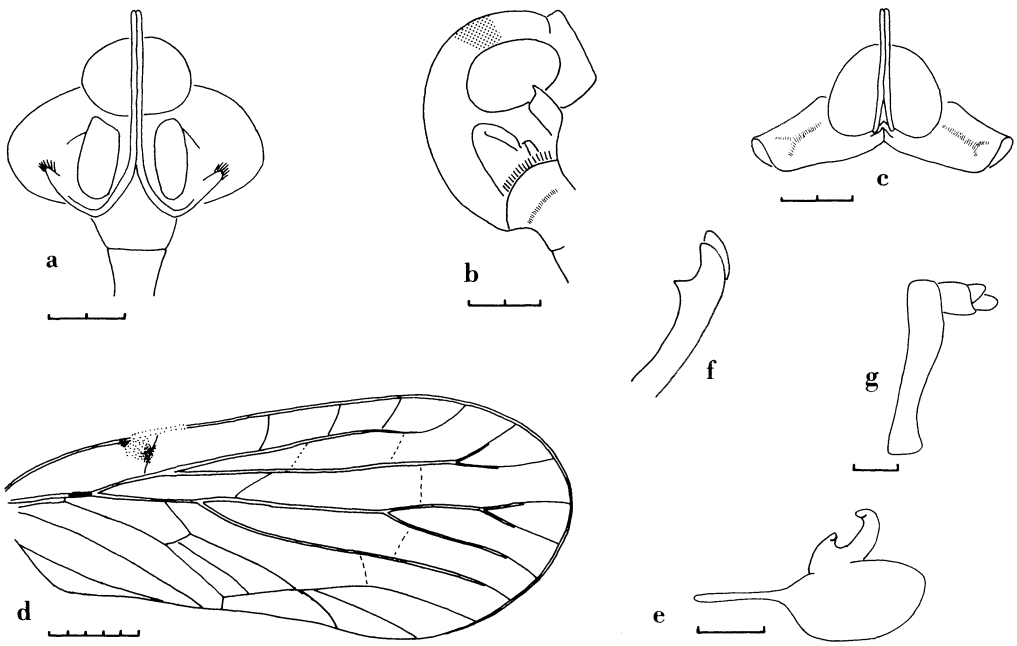

FIG. 2. **a–e, g,** *Alara hyalina,* ♂ specimen from Albay Prov: **a,** frons; **b,** head in side view (dotted area purple); **c,** vertex; **d,** tegmen; **e,** genital style; **g,** pygofer and anal segment. **f,** *Mecynorhynchus hyalinus,* holotype ♂, apex of aedeagus. Scales: a, b, c = 0.2 mm; d = 0.5 mm; e, g = 0.1 mm.

♂, body 1.5 mm, tegmen 2.9 mm. Two orange-red spots, 1 above the eye, and 1 in the tegmen at the base of the costa. Tegmen with base of Sc+R+M keellike elevated and black-brown. Ends of all tibiae (last $^1/_5$ of fore tibiae, last $^1/_{10}$ of hind tibiae, slightly more in middle tibiae) black-brown. Abdomen brick reddish to isabelline.

Specimens from Albay Province (Fig. 2a–e, 2g). Antennae elongated; rostrum reaching end of abdomen. Tegmen 2.3× longer than wide; veins often poorly visible; Cu1 connected to base of Ms1 by a crossvein; Ms1 branched just distad of its middle. *Color* white; a purple to purple-gray mark above eye; tip of clypeus gray; ends of all tibiae black; abdomen of ♂ orange-red but genitalia white; abdomen of ♀ white. Tegmen white, heavily powdered; veins white; the basal section of Sc+R+M elevated and with a dark gray mark; a bright red mark at base of costa just before wax-secreting area; a faintly grayish brown mark surrounding the 1st subcostal sector. *Genitalia.* Male pygofer narrow. Genital styles broad, rounded; dorsal processes broad, close together, apically curved. Stem of aedeagus with a pair of triangular projections just before junction with apical part; apical portion short, bearing 2 rounded lobes. Average size of ♂: body 1.6 ± 0.1 mm, tegmen 2.8 ± 0.1 mm (n = 9); ♀: body 1.7 ± 0.1 mm, tegmen 3.1 ± 0.1 mm (n = 9).

Specimens examined. PI: LUZON I: Albay Prov, Guinobatan, I.1977, 9♂,9♀, J. Patola, D. Quinalayo (ARC & MMB).

Distribution. Philippines (Luzon I).

Remarks. Alara hyalina can be easily recognized by its white color. The marks on the face and the costal base are red to purple in the Albay Province specimens but orange-red in the holotype. This difference may be due to the age of the type.

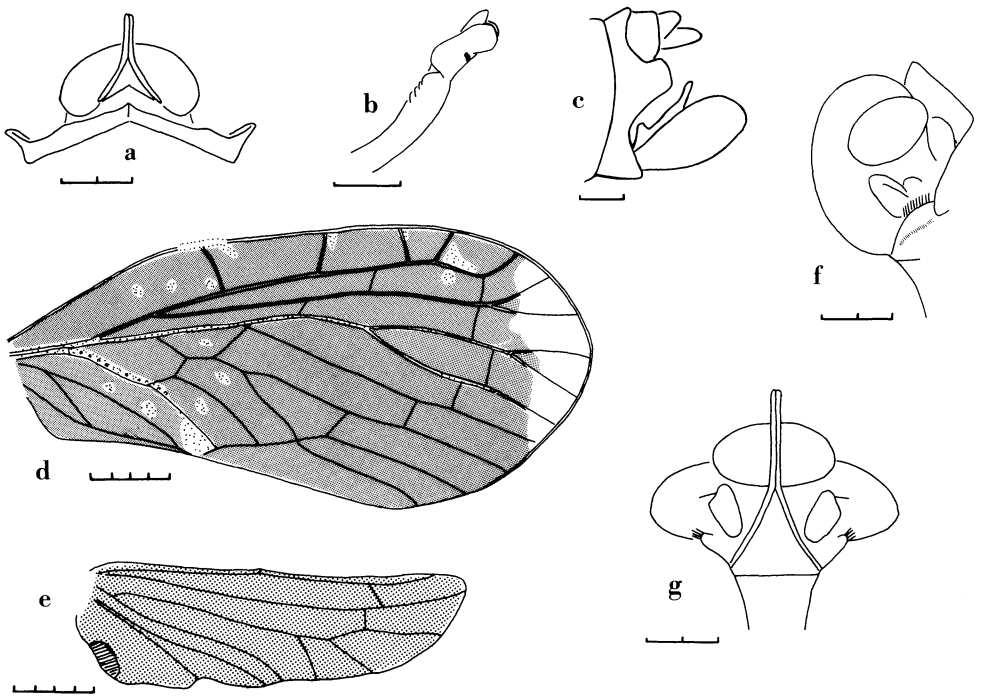

FIG. 3. *Alara alboapicalis,* holotype ♂: **a,** vertex; **b,** apex of aedeagus in side view; **c,** pygofer, anal segment, and genital style; **d,** tegmen; **e,** hindwing; **f,** head in side view; **g,** frons. Scales: a, f, g = 0.2 mm; b, c = 0.1 mm; d, e = 0.4 mm.

Alara alboapicalis Zelazny, **new species** Fig. 3

Holotype (Fig. 3). ♂, body 1.7 mm, tegmen 3.0 mm. Antennae short, not quite reaching eyes; rostrum reaching hind coxae. Tegmen slightly more than 2× as long as wide; Cu1 connected to base of Ms1 by a crossvein; Ms1 branched in its basal ½, a small elongated cell at base of Ms1; hindwings narrow and short, stridulation area large. *Color* reddish brown; underneath stramineous; mesonotum light brown with 2 faint reddish brown longitudinal stripes. Tegmen fuscous, powdered; in basal ⅓ and near costal margin about 13 lighter patches; apical ⅛ of tegmen bright white; costal margin and veins red, apical veins white. Hindwing fuscous; veins and stridulation area red. *Genitalia.* Pygofer narrow, with 2 rounded lateral projections just below anal segment. Genital styles oval; dorsal processes widely separated, proximal one short, distal one elongated, slightly curved and tapering towards apex. Aedeagus with short apical portion, ending in a pair of lateral rounded lobes and central more pointed lobe.

Paratypes. Reddish brown stripes on mesonotum not or only poorly visible in (older) specimens from Los Baños and Mindanao. In life this species carries the wings raised vertically above the body. Average size of ♂: body 1.6 ± 0.1 mm, tegmen 3.1 ± 0.2 mm (n = 16); ♀: body 1.8 ± 0.2 mm, tegmen 3.2 ± 0.2 mm (n = 12).

Holotype ♂, PI: LUZON I: Albay Prov, Daraga, I.1977, B. Zelazny (BISHOP 11,934). Paratypes. PI: LUZON I: Laguna Prov, Los Baños, X.1914, IX.1915, VII,IX.1916, 12♂,11♀, F. Muir (or no collector); Albay Prov: Tabaco, II.1977, 1♂, off abaca, D. Quinalayo; Mayon Volcano, III.1977, 1♂, off coconut palm, B. Zelazny (ARC); Da-

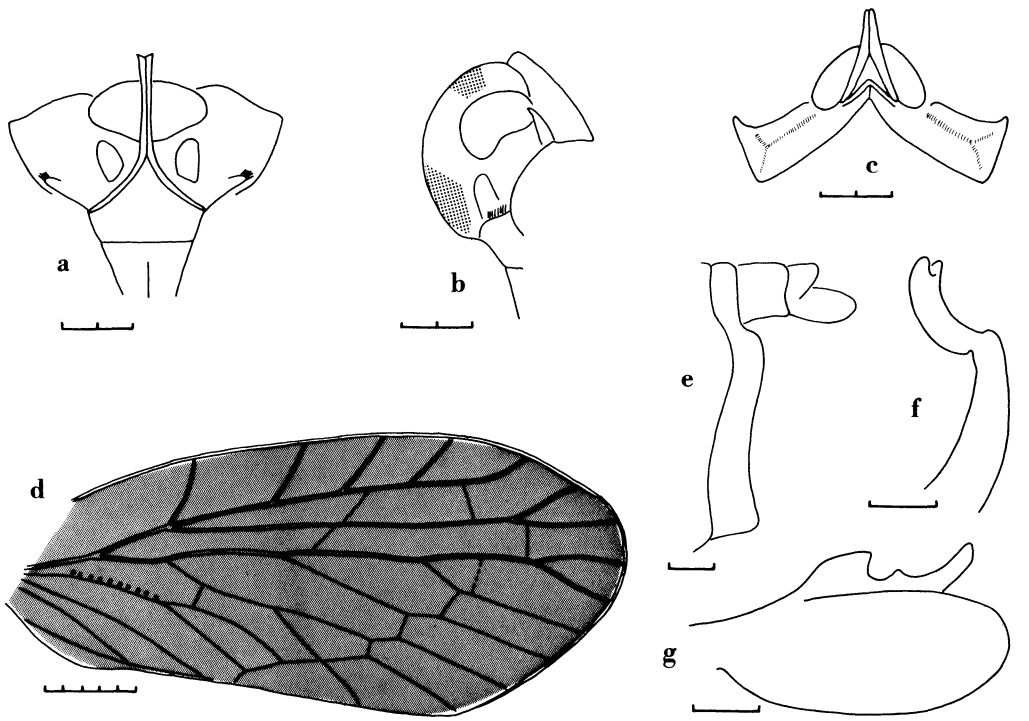

FIG. 4. *Alara quatei,* holotype ♂: **a,** frons; **b,** head in side view (dotted area above eye purple, in front of antenna dark gray); **c,** vertex; **d,** tegmen; **e,** pygofer and anal segment; **f,** apex of aedeagus in side view; **g,** genital style. Scales: a, b, c = 0.2 mm; d = 0.5 mm; e, f, g = 0.1 mm.

raga, I.1977, 3♂,2♀, Zelazny, F. Otilano, W. Imperial (ARC & BISHOP). PI: NEGROS I: Negros Or. Prov, Lk Balinsasayao, 1–7.X.1959, 1♂, C.M. Yoshimoto. PI: MINDANAO I: Lanao del Norte Prov, Kolambugan, 1♂,1♀, Baker; Agusan del Sur Prov, Los Arcos, 19–23.XI.1959, 1♂, malaise trap, L. Quate, C. Yoshimoto.

Distribution. Philippines.

Remarks. Alara alboapicalis can be recognized by the white-tipped tegmen. In tegmen venation and the narrow hindwings it resembles *Alara fumata* (Melichar) from Java, which however, has uniformly infuscated tegmina.

Alara quatei Zelazny, **new species** Fig. 4

Holotype (Fig. 4). ♂, body 1.7 mm, tegmen 3.5 mm. Vertex in dorsal view with a triangular base, apex linear; antennae short, not quite reaching eyes; eyes small; rostrum nearly reaching end of abdomen. Tegmen slightly more than 2× as long as wide; Cu1 connected to base of Ms1 by a crossvein; Ms1 branched just before middle. *Color* gray to brown; head (except for a dark gray portion in front of antennae), lateral parts of pronotum, and metasternum stramineous; a purple mark above eyes; clypeus brown; front and middle legs dark reddish; hind legs stramineous; abdomen dark reddish; genital styles dark gray. Tegmen dark gray, heavily powdered; veins gray, but near the costal and apical margins red. Hindwing including veins dark gray; all margins red. *Genitalia.* Pygofer narrow; slightly produced below anal segment. Genital

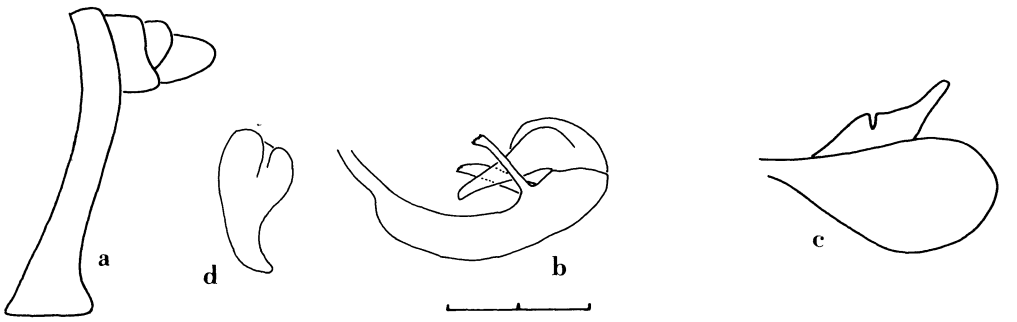

FIG. 5. *Alara cervus,* holotype ♂: **a,** pygofer and anal segment; **b,** aedeagus in side view; **c,** genital style; **d,** apical portion of aedeagus in dorsal view (tip down). Scale = 0.2 mm.

styles oval; proximal dorsal process broad, distal dorsal process short fingerlike, a small hump in between them. Aedeagus with apical portion slender and curved, bearing a pair of terminal short, rounded lobes.

Paratypes. Average size of ♂: body 1.8 ± 0.2 mm, tegmen 3.5 ± 0.1 mm (n = 3).

Holotype ♂, PI: NEGROS I: Negros Or. Prov, Lk Balinsasayao, 1–7.X.1959, L. W. Quate (BISHOP 11,935). Paratypes. PI: [LUZON I?, Laguna Prov?], Benahao [=Mt Banahao?], 1♂, [no further data]; PI: LUZON I: Albay Prov, Mayon Volcano, XI.1976, 1♂, W. Imperial. PI: NEGROS I: Negros Or. Prov, Lk Balinsasayao, 1–7.X.1959, 1♂, C.M. Yoshimoto.

Distribution. Philippines (Luzon I, Negros I).

Remarks. Alara quatei is similar to *Alara obscura* (Muir) from Java but can be distinguished by the uniformly colored legs and tegmina. This species is named in honor of the collector of the holotype, Dr L. W. Quate.

Alara cervus Zelazny, **new species** Fig. 5

Holotype (Fig. 5). ♂, body 2.0 mm, tegmen 2.9 mm. Antennae elongated; rostrum reaching end of abdomen. Right tegmen missing, left tegmen slightly damaged; tegmen nearly 2× as long as broad; Cu1 merging with base of Ms1 for short section; Ms1 branched distad of middle. *Color* reddish brown; proboscis and legs stramineous, but ventral surface of clypeus reddish brown; antennae bright red. Tegmen heavily powdered, dark brown; veins reddish brown; costa and subcostal sectors bright red. Hindwing fuscous with reddish brown veins. *Genitalia.* Pygofer narrow. Genital styles broad, rounded; bases of dorsal processes broad and nearly touching each other. Stem of aedeagus with 2 slender processes, both finely serrated at tips; apical portion thick basally, extending into a flat process curved to left side.

Paratype. Tegmen with Cu1 just touching the base of Ms1.

Holotype ♂, PI: LUZON I: Albay Prov, Guinobatan, I.1977, F. Otilano (BISHOP 11,936). Paratype. MALAYSIA: SARAWAK (Borneo): Kuching, Matang, 450–894 m, 15.IX.1958, 1♂, J.L. Gressitt.

Distribution. Philippines, Borneo.

Remarks. Externally, *Alara cervus* is indistinguishable from *Alara kershawi* (Muir) from Borneo. The males can be easily recognized by the 2 long processes arising from the stem of the aedeagus.

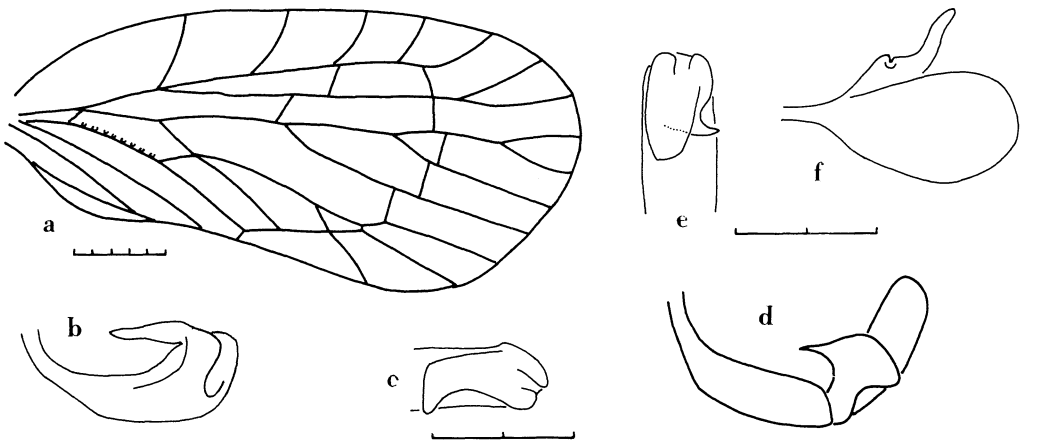

FIG. 6. **a–c, f,** *Alara fulva,* holotype ♂: **a,** tegmen; **b,** aedeagus in side view; **c,** apex of aedeagus in dorsal view; **f,** genital style. **d–e,** *Alara isabella,* holotype ♂: **d,** aedeagus in side view; **e,** apex of aedeagus in dorsal view. Scales: a = 0.5 mm; b–d, e–f = 0.2 mm.

Alara fulva Zelazny, **new species** Fig. 6a–c, f

Holotype (Fig. 6a–c, f). ♂, body 1.7 mm, tegmen 3.1 mm. Similar to *A. cervus.* Tegmen with Cu1 just touching base of Ms1; Ms1 branched near middle. *Color* light brown; 1st antennal segment red, 2nd segment faintly orange. Tegmen heavily powdered; veins reddish to fuscous; base of tegmen red. *Genitalia.* Genital style broad, rounded; bases of dorsal processes broad, nearly merging. Stem of aedeagus thick; apical portion spatulate, curved to left side.

Paratypes. Tegmina of 4 specimens with Cu1 merging with base of Ms1 for short section, in 1 specimen Cu1 connected to base of Ms1 by short crossvein; in some specimens Ms1 branched distad of middle; 1 specimen with orange-red antennae. Average size of ♂: body 1.8 mm ± 0.1 mm, tegmen 2.9 ± 0.1 mm (n = 7).

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Mt Balatukan, 15 km SW of Gingoog City, 1000–2000 m, 27–30.IV.1960, H. Torrevillas (BISHOP 11,937). Paratypes. PI: LUZON I: Laguna Prov, Mt. Makiling, 4♂, Baker (USNM); Camarines Sur Prov, Mt Isarog, 20 km E of Naga, 500–600 m, 4,6.IV.1963, 2♂, light trap, H.M. Torrevillas. PI: BASILAN I: 1♂, Baker.

Distribution. Philippines.

Remarks. Externally *Alara fulva* is indistinguishable from *Alara castanea,* n. sp. The males can be recognized by the broad nearly touching bases of the dorsal processes of the genital style and by the shorter and broader apical portion of the aedeagus.

Alara castanea Zelazny, **new species** Fig. 7

Holotype (Fig. 7). ♂, body 1.7 mm, tegmen 2.8 mm. Similar to *Alara fulva.* In tegmen Cu1 connected to base of Ms1 by a short crossvein (left tegmen, Fig. 7d) or touching base of Ms1 (right tegmen); Ms1 branching distad of middle. *Color* brown; reddish on margins of facial carinae and around wing bases; antennae and legs stramineous; front tibiae and tarsi tinted with orange; abdomen including genitalia bright red. Tegmen heavily powdered, brown, slightly lighter in apical 1/6; veins reddish to fuscous. Hind-

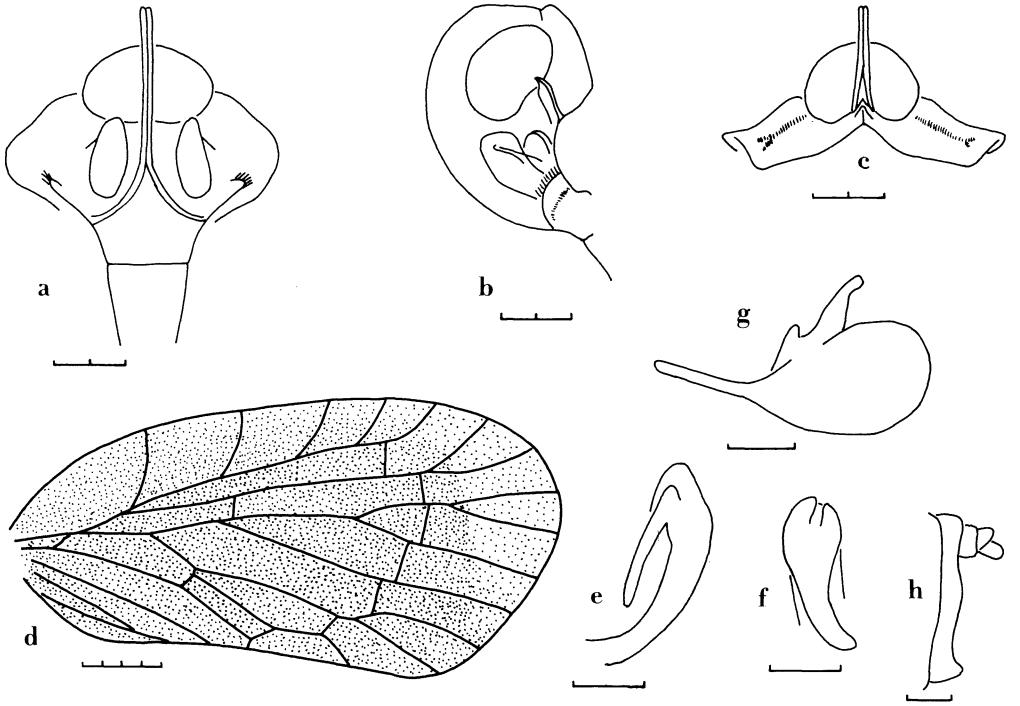

FIG. 7. *Alara castanea,* holotype ♂: **a,** frons; **b,** head in side view; **c,** vertex; **d,** tegmen; **e,** aedeagus in side view; **f,** apex of aedeagus in dorsal view; **g,** genital style; **h,** pygofer and anal segment. Scales: a, b, c = 0.2 mm; d = 0.4 mm; e, f, g, h = 0.1 mm.

wing fuscous with red veins. *Genitalia.* Genital style broad, rounded; bases of dorsal processes slender. Aedeagus with elongated, spatulate apical portion, slightly curved to left side.

Paratypes. In tegmen of most specimens Cu1 connected to base of Ms1 by a short crossvein, in some Cu1 merged with base of Ms1 for a short section. A few specimens have orange-tinted antennae. Females light brown to stramineous, scutellum dark brown; tegmen dark brown, lighter at tip; veins brown but costa reddish. Average size of ♂: body 1.6 ± 0.1 mm, tegmen 2.8 ± 0.1 mm (n = 16); ♀: body 1.8 ± 0.1 mm, tegmen 3.1 ± 0.2 mm (n = 16).

Other specimens. Three specimens from Basilan I with reddish brown color, antennae bright red, and tegmina with Ms1 branching near middle. Tegmen length of ♂: 2.8 ± 0.1 mm (n = 2); ♀: 2.6 mm.

Holotype ♂, PI: LUZON I: Albay Prov, Guinobatan, I.1977, off *Kolowratia sp.,* J. Patola (BISHOP 11,938). Paratypes. PI: LUZON I: Benguet Prov, Baguio, 2♂, Baker; Laguna Prov, Los Baños, II.1914, 2♂ (EIHU & BISHOP); Camarines Sur Prov, Mt Isarog, 20 km E of Naga, 500–600 m, 5–6.IV.1963, 2♂, light trap, H.M. Torrevillas; Albay Prov: Guinobatan, I.1977, 24♂,16♀, J. Patola, F. Otilano (BISHOP & ARC); Ligao, I.1977, 1♂, D. Quinalayo (ARC). PI: NEGROS I: Negros Or. Prov, Lk Balinsasayao, 1–7.IX.1959, 1♂, sweeping at dusk.

Other specimens examined. PI: BASILAN I: 2♂,1♀, Baker (USNM).

Distribution. Philippines.

Remarks. Externally *Alara castanea* is unseparable from *Alara fulva*; however, the male genital style has well-separated dorsal processes with slender bases, and the apical portion of the aedeagus is longer and narrower. The females, which were found associated with males in the field, are lighter than the males and lack the reddish coloration in the facial carinae, tegmen bases, tegmen veins, and abdomen. The 2 paratypes from Los Baños are labelled *Mecynorhynchus kershawi* Muir, and Muir's report (1917) of *M. kershawi* from the Philippines might have been based on this and similar misidentifications.

Alara isabella Zelazny, **new species** Fig. 6d, e

Holotype (Fig. 6d, e). ♂, body 1.8 mm, tegmen 2.9 mm. Similar to *Alara castanea.* Cu1 touching base of Ms1 (left tegmen) or connected to base of Ms1 by a short crossvein (right tegmen); Ms1 branched distad of middle. *Color* stramineous to light brown; above eyes and tip of scutellum dark brown. Tegmen fuscous, gradually becoming lighter in apical ⅓; veins stramineous to fuscous; hindwing very lightly infuscated; veins fuscous. *Genitalia.* Genital style as in *Alara castanea.* Apical portion of aedeagus bearing 2 lobes, left one short, pointed and turned to left side, right one longer, rounded, and membraneous.

Paratypes. In tegmen connection between Cu1 and base of Ms1 variable as in both tegmina of holotype. Females lighter in color than ♂.

Holotype ♂, PI: LUZON I: Camarines Sur Prov, Iriga, VII.1978, off banana, B. Zelazny (BISHOP 11,939). Paratypes. PI: LUZON I: Laguna Prov, Mt Makiling, 1♂, Baker; Camarines Sur Prov, Iriga, VII.1978, 1♀, off banana, B. Zelazny; Albay Prov, Ligao, I.1977, 1♂,4♀, D. Quinalayo, W. Imperial, Zelazny (BISHOP & ARC).

Distribution. Philippines (Luzon I).

Remarks. Externally, *Alara isabella* is indistinguishable from *Alara fusca* (Muir) from Java. However, the males lack the 2 long processes arising from the stem of the aedeagus. The paratype from Mt Makiling has been identified by F. Muir as *Mecynorhynchus fuscus,* and might have been the reason for Muir's report (1917) of *M. fuscus* from the Philippines.

Genus **Sumangala** Distant

Sumangala Distant, 1911:642. Type-species: *Sumangala delicatula* Distant, by monotypy.

Vertex an acute triangle; in profile junction of vertex and face rounded; facial carinae contiguous near bases; antennae short, only slightly longer than wide; subantennal processes well developed, connected to margins of facial carinae; rostrum reaching hind coxae; lateral carinae of pronotum well developed. Tegmen with 5 costal cells, usually 2 long, narrow, and 3 short ones; Sc+R fork before middle of tegmen; basal median cell narrow; bases of Cu1 and Ms1 merging but after a short section separating again; Ms1 unbranched. Tegmina heavily powdered.

Sumangala resembles *Levu* Kirkaldy in size, structure of the head, and shape of the tegmen; however, it can be easily recognized by its tegmen venation, which is unique among the Rhotanini. The 1st median sector is unbranched and merges for a short section with the base of the 1st cubital sector. In life the members of *Sumangala* and *Rhotanella* Fennah differ from the other Rhotanini by carrying the wings in a tectiform position. Members of the other genera carry the wing surfaces on a common

plane (like house flies). The following numbers of species have been observed alive: 3 of *Sumangala,* 2 of *Rhotanella,* 4 of *Alara,* 6 of *Saccharodite* Kirkaldy, 1 of *Rhotana* Walker, and 3 of *Levu.* Unfortunately, the original wing position is rarely preserved in dried specimens. Apart from the Philippine species and the type-species, the genus *Sumangala* includes *Sumangala nigropunctata* (Muir), **new combination** (=*Mecynorhynchus nigropunctatus* Muir, 1917: 104), the type of which has been examined.

KEY TO THE PHILIPPINE SPECIES OF *Sumangala*

1. Tegmen with 4 prominent black marks distad of apex of clavus (Fig. 8d) ..... **nigromaculata, n. sp.**
   Tegmen with no, fewer, or smaller marks distad of apex of clavus 2
2 (1). Tegmen with an irregular large black mark (about the size of the head) touching the clavus tip (Fig. 9a) ..... **sordida, n. sp.**
   Tegmen with no or smaller marks near apex of clavus 3
3 (2). Male aedeagus ending in a pair of slender processes 4
   Male aedeagus without slender processes 5
4 (3). Tegmen about 3 mm long, processes on aedeagus tip pointed (Fig. 10b, i) ..... **josephinae, n. sp.**
   Tegmen about 4 mm long, processes on aedeagus tip rounded at ends (Fig. 11b, d) ..... **furcata, n. sp.**
5 (3). Apical portion of ♂ aedeagus short, less than 2× as long as diameter of aedeagus stem, bearing 2 rounded terminal lobes (Fig. 12d, f–h); tegmen without marks on and near the 1st median sector ..... **sufflava, n. comb.**
   Apical portion of ♂ aedeagus large, more than 2× as long as diameter of aedeagus stem, not bearing terminal lobes (Fig. 13b, c); tegmen with 2 small black marks on and near the 1st median sector (Fig. 13a) .... **otilanoi, n. sp.**

Sumangala nigromaculata Zelazny, **new species** Fig. 8

Holotype (Fig. 8). ♂, body 1.7 mm, tegmen 3.0 mm. Rostrum reaching end of first ⅓ of abdomen. Tegmen 2.2× longer than wide. *Color* white to stramineous; lower margins of facial carinae, antennae, and posterior margin of pronotum light orange; pro- and mesotibiae light orange-brown; anterior parts of abdominal sternites orange. Tegmen white, powdered; a series of 4 very prominent black marks from clavus tip to end of 1st median sector; bands of very light infuscation from 2nd subcostal sector to middle of Ms1, near apical crossveins and along apical margin; darker infuscation around 1st subcostal sector. *Genitalia.* Genital style widening towards apex, which is truncated; proximal dorsal process short and slender; distal dorsal process longer, broadening towards apex, which is curved outwards. Aedeagus with apical portion ending in 2 slightly curved processes, tips rounded.

Paratypes. Abdomen of ♀ stramineous. Average size of ♂: body 1.9 ± 0.1 mm, tegmen 3.3 ± 0.2 mm (n = 3); ♀: body 1.7 ± 0.1 mm, tegmen 3.4 ± 0.0 mm (n = 4).

Holotype ♂, PI: LUZON I: Albay Prov, Tabaco, X.1977, D. Quinalayo (BISHOP 11,940). Paratypes. PI: LUZON I: Laguna Prov, Los Baños, 1♂, F. Muir; Camarines

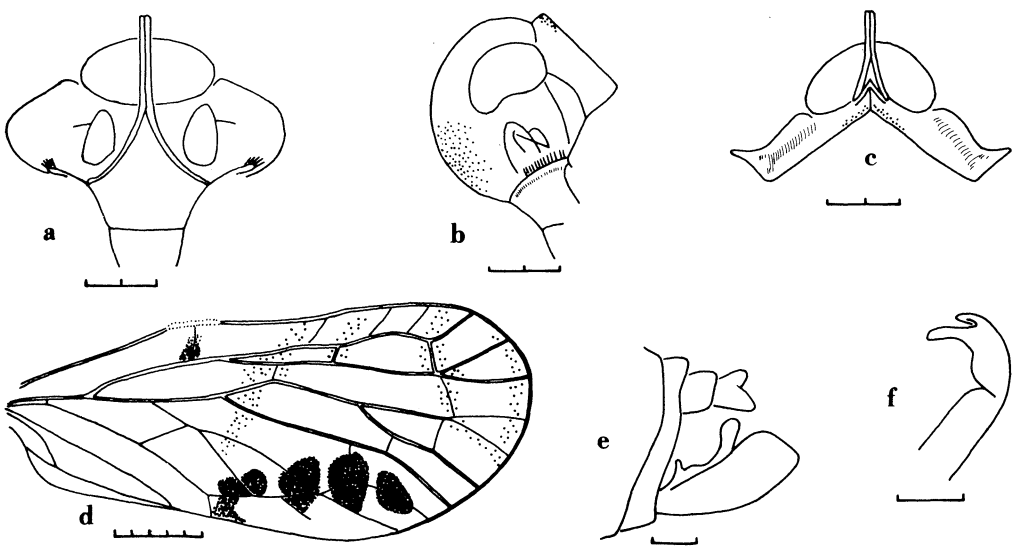

FIG. 8. *Sumangala nigromaculata,* holotype ♂: **a,** frons; **b,** head in side view; **c,** vertex; **d,** tegmen; **e,** pygofer, anal segment, and genital style; **f,** apex of aedeagus in side view. Scales a, b, c = 0.2 mm; d = 0.5 mm; e, f = 0.1 mm.

Sur Prov, Mt Iriga, 500 m, 24.III.1962, 1♂, H.M. Torrevillas; Albay Prov: Tabaco, X.1977, 1♀, J. Patola; Mayon Volcano, III.1977, 2♀, Patola, F. Otilano (ARC); St. Domingo, VI.1977, 1♂, off coconut palm, W. Imperial. PI: MINDANAO I: Misamis Or. Prov: Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 5.X.1965, 1♀, light trap, Torrevillas; Minalwang, 1050 m, 24.III–4.IV.1961, 1♀, Torrevillas; Mt Empagatao, Camp II, 1100 m, 21.IV.1961, 2♂, light trap, Torrevillas; Mt Kibungol, 20 km SE of Gingoog City, 700–800 m, 9–18.IV.1960, 1♂, light trap, W. Torrevillas; Zamboanga del Sur Prov, 11 km NW of Milbuk, 390 m, 5.VIII.1958, 1♂, H.E. Milliron.

Distribution. Philippines.

Remarks. Sumangala nigromaculata can be easily recognized by the 4 conspicuous black marks on the tegmen.

Sumangala sordida Zelazny, **new species** Fig. 9

Holotype (Fig. 9). ♂, body 2.0 mm, tegmen 3.6 mm. Tegmen 2.1× longer than wide. *Color* stramineous; facial carinae and tibiae tinted with orange. Tegmen white, powdered, costal and apical margin orange; an elongated brown-black mark at clavus tip and connected to it a larger irregular mark around middle of 1st median sector, about size of head; lightly infuscated at base of 1st subcostal sector; a small dark mark at junction of media and last median sector; very faintly infuscated near apical crossveins and around basal crossvein between R and M. *Genitalia.* Pygofer narrow. Genital style broadening towards apex, which is truncated; proximal dorsal process short and slender; distal dorsal process fingerlike. Aedeagus with apical portion elongated; tip rounded and slightly curved downwards, its dorsal side with a longitudinal impression, edges forming broad carinae which end abruptly about ⅓ from apex.

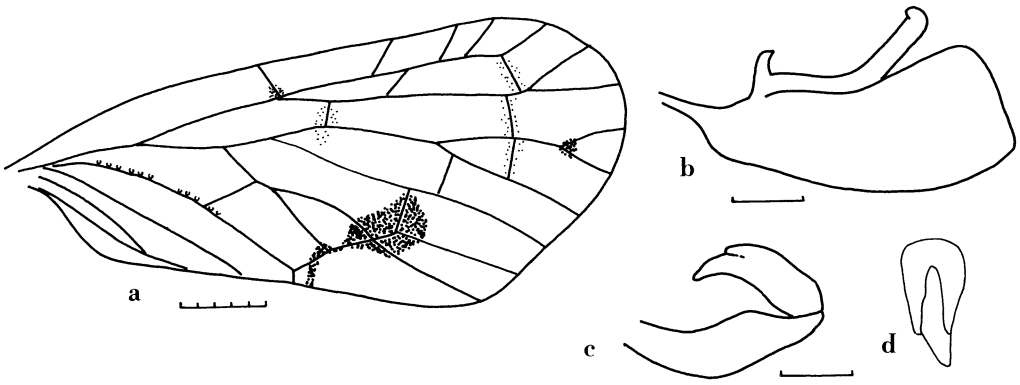

FIG. 9. *Sumangala sordida,* holotype ♂: **a,** tegmen; **b,** genital style; **c,** aedeagus in side view; **d,** apex of aedeagus in dorsal view (tip down). Scales a = 0.5 mm; b, c–d = 0.1 mm.

Paratypes. Average size of ♂: body 2.0 ± 0.1 mm, tegmen 3.4 ± 0.2 mm (n = 3); ♀: body 2.5 mm, tegmen 3.7 mm.

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Pigtibiran, 600 m, 1–13.V.1961, L.M. Torrevillas (BISHOP 11,941). Paratypes. PI: MINDANAO I: Misamis Or. Prov, Mt Empagatao, 1050–1200 m, 19–30.IV.1961, 2♂, light trap, H. Torrevillas; Davao City, Genitalan, 8 km NW of Mt Apo, 690 m, 17.VIII.1958, 1♂,1♀, light trap, H.E. Milliron.

Distribution. Philippines (Mindanao I).

Remarks. Sumangala sordida can be recognized by the large irregularly shaped mark distad of the clavus apex.

Sumangala josephinae Zelazny, **new species** Fig. 10

Holotype (Fig. 10). ♂, body 1.8 mm, tegmen 3.1 mm. Rostrum reaching middle of abdomen. Tegmen 2× as long as wide. *Color* white to stramineous; margins of lower part of facial carinae orange, a separate red mark above eyes; abdomen slightly orange. Tegmina white, powdered; a gray mark at base of 1st subcostal sector; a black elongated mark just distad of clavus tip; a black round mark at junction of media and last median sector; faintly infuscated areas near middle of Ms1, bases of 2nd and 4th subcostal sectors, apical crossveins, and tips of Ms1, Ms2, and Ms3. *Genitalia.* Genital style widening towards apex, which is truncated; proximal dorsal process small; distal dorsal process widening towards apex, which is curved. Aedeagus with a short but wide apical portion, ending in a pair of short, pointed processes.

Paratypes. Except for the (fresh) specimens from Albay, marks on tegmen brown (sometimes faint) instead of black; mark at claval tip often rounded instead of elongated; in many specimens red mark above eyes only poorly visible. Some specimens from Borneo, Sumatra, and Thailand have hind margin of pronotum faintly colored with orange. Abdomen of ♀ stramineous. In most specimens from Borneo, and in the specimens from Sumatra, Thailand, and Celebes, apical portion of aedeagus longer than in the specimens from the Philippines. Average size of ♂: body 1.8 ± 0.2 mm, tegmen 3.0 ± 0.2 mm (n = 65); ♀: body 1.7 ± 0.2 mm, tegmen 3.1 ± 0.2 mm (n = 45).

Holotype ♂, PI: LUZON I: Camarines Sur Prov, Nabua, XI.1978, off coconut palm, J. Patola (BISHOP 11,942). Paratypes. PI: LUZON I: Laguna Prov: Los Baños,

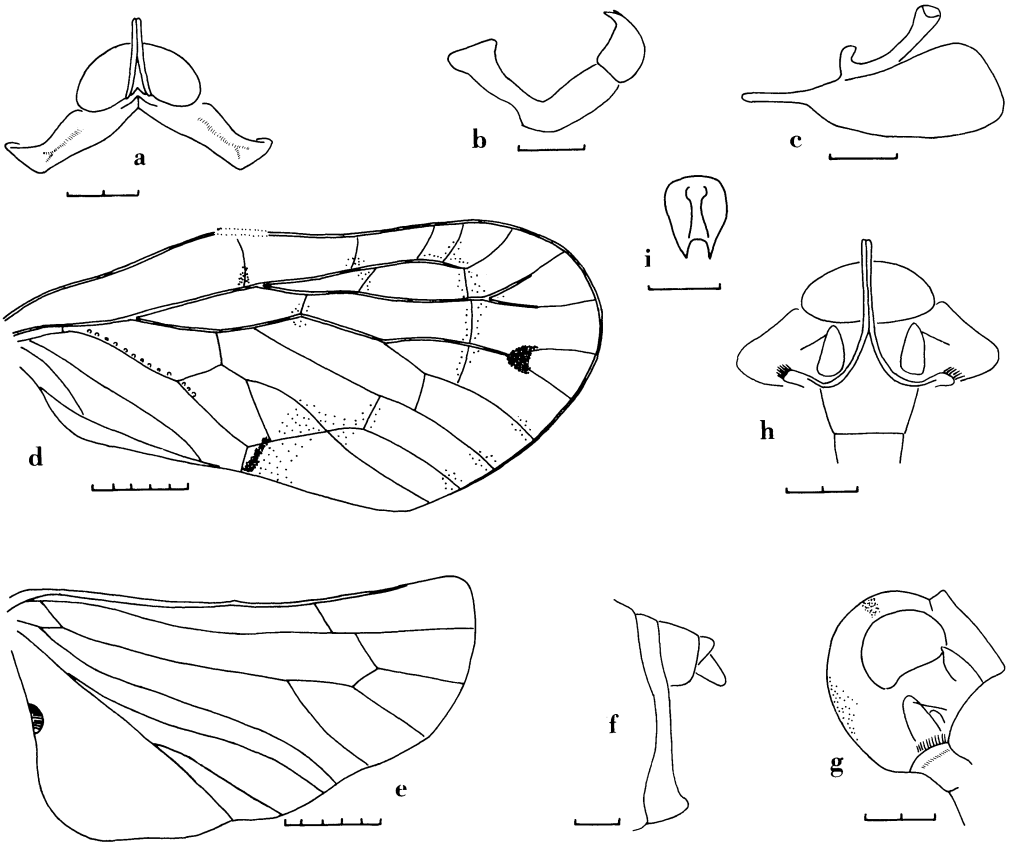

FIG. 10. *Sumangala josephinae,* holotype ♂: **a,** vertex; **b,** aedeagus in side view; **c,** genital style; **d,** tegmen; **e,** hindwing; **f,** pygofer and anal segment; **g,** head in side view (dotted area above eye red, in front of antenna orange); **h,** frons; **i,** tip of aedeagus in apical view (tip down). Scales: a, g, h = 0.2 mm; b, c, f, i = 0.1 mm; d, e = 0.5 mm.

IX.1915, 2♂,1♀, F. Muir; Benahaw [=Mt Banahaw?], 1♂ [no further data]; Camarines Sur Prov: Mt Isarog, 20 km E of Naga, 500–600 m, 6–9.IV.1963, 3♂, H.M. Torrevillas; Mt Iriga, 500 m, 24.III.1962, 2♂, Torrevillas; Iriga, VI.1978, 1♂, off coconut palm, B. Zelazny (ARC); Nabua, XI.1978, 1♂, off coconut, D. Quinalayo (ARC); Albay Prov: Tabaco, II,III.1976, 1♂,1♀, J. Patola, Quinalayo (ARC); Guinobatan, XI.1974, X,XI.1975, I,IV,VI,XI.1976, I,XII.1977, IX.1978, 26♂,4♀, W. Imperial, F. Otilano, Quinalayo, Patola (BISHOP & ARC); Ligao, XI.1976, I.1977, 16♂,3♀, Imperial, Quinalayo, Otilano, Zelazny (BISHOP & ARC); Camalig, IX.1978, 1♂, off coconut, Patola (ARC). PI: MINDANAO I: Misamis Or. Prov, Gingoog City, 12.V.1961, 1♂, light trap, Torrevillas. MALAYSIA: SABAH (Borneo): Tawau, Quoin Hill, 3–29.VII.1962, 1–29.IX.1962, 3.X.1962, 77♂,42♀, light trap and malaise trap, H. Holtman, Y. Hirashima; SE, Forest Camp, 19 km N of Kalabakan, 11–

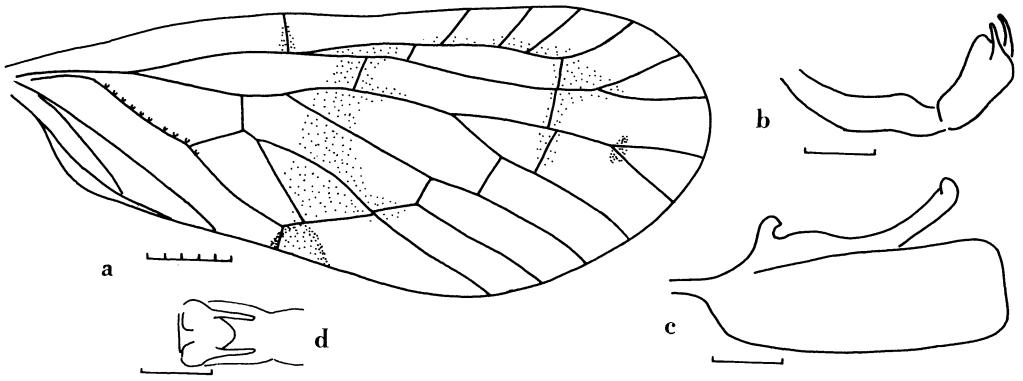

FIG. 11. *Sumangala furcata,* holotype ♂: **a,** tegmen; **b,** aedeagus in side view; **c,** genital style; **d,** tip of aedeagus in apical view. Scales: a = 0.5 mm; b, c, d = 0.1 mm.

30.X.1962, 7–10.XI.1962, 5♂, Hirashima, K.J. Kuncheria. MALAYSIA: SARAWAK (Borneo): Sadong, Kampong Tapuh, 300–450 m, 10.VII.1958, 1♂, T.C. Maa. INDONESIA: SULAWESI (Celebes): Menado, VI–X.1926, 2♂, Pemberton. INDONESIA: SUMATRA: Fort de Kock, 920 m, I.1922, 1924, 2♂,1♀, E. Jacobson (RNHL); Buo, Pad. Bav., III.1914, 1♀, Jacobson (RNHL). THAILAND: NW, Chiang Mai, Fang, 12–19.IV.1958, 1♂, Maa; N, Pangmakampon (Pankampawng), nr Fang, 450 m, 15+16.XI.1957, 1♂, J.L. Gressitt; Banna, 5–10.V.1958, 1♂, light trap, Maa.

Distribution. Philippines, Borneo, Indonesia (Celebes, Sumatra), Thailand.

Remarks. Sumangala josephinae is close to *Su. sufflava* (Muir), *Su. furcata,* n. sp., and *Su. otilanoi,* n. sp. It can be separated from *Su. sufflava,* n. comb. by the dark mark at the base of the 1st subcostal sector and by the pointed processes at the tip of the aedeagus. It can be distinguished from *Su. furcata,* n. sp. by its smaller size, the shorter, pointed processes of the aedeagus, and the less infuscated tegmen; it differs from *Su. otilanoi,* n. sp. by the lack of 2 small marks on and near the 1st median sector and by the processes on the aedeagus. This species is named for my wife, Josephine.

Sumangala furcata Zelazny, **new species** Fig. 11

Holotype (Fig. 11). ♂, body 2.2 mm, tegmen 4.2 mm. Tegmen 2.2× longer than wide. *Color* stramineous; facial carinae, posterior margin of pronotum, and tibiae tinted with orange. Tegmina white, powdered; slightly infuscated at 1st subcostal sector, in a broad band from clavus tip to 1st crossvein between media and radius, and near apical crossveins; a dark gray mark at junction of media and last median sector. *Genitalia.* Genital style truncated at apex; proximal dorsal process short; distal dorsal process fingerlike curved at tip, a slight hump between both processes. Aedeagus with a short apical portion, ending in a central rounded lobe and 2 lateral, well-separated, slender, slightly curved processes, their tips rounded.

Paratypes. Size of ♀: body 2.5 mm, tegmen 4.6 mm.

Holotype ♂, PI: LUZON I: Mountain Prov, Abatan, Bugnias, 60 km S of Bontoc, 1800–2000 m, 1.VI.1964, light trap, H.M. Torrevillas (BISHOP 11,943). Paratypes. PI:

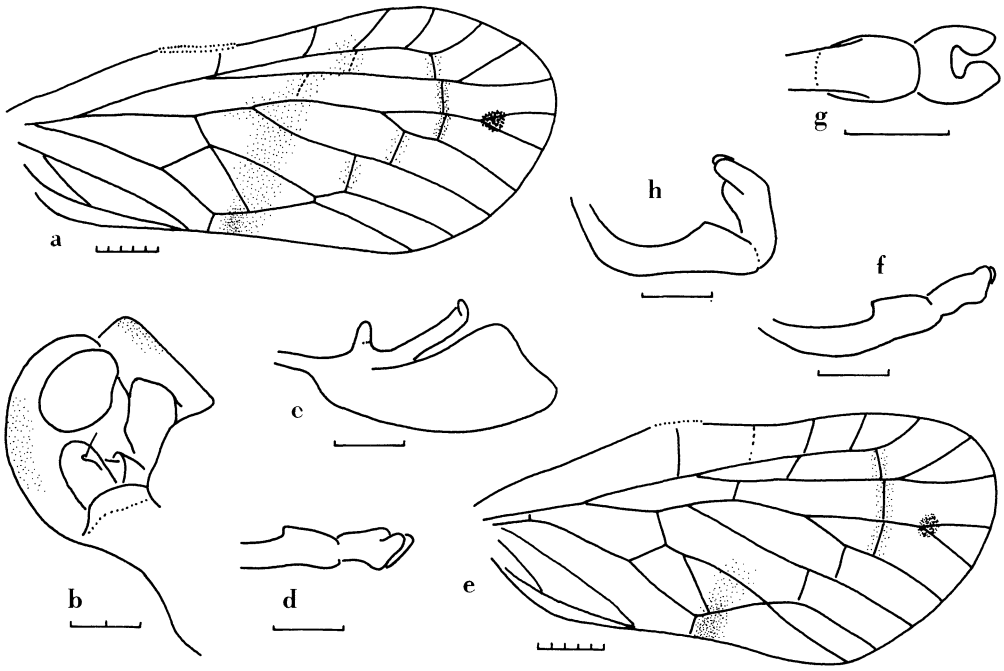

FIG. 12. **a–b,** *Levu sufflava,* lectotype ♀: **a,** tegmen; **b,** head in side view. **c–d,** *Rhotana hopponis,* holotype ♂: **c,** genital style; **d,** apex of aedeagus in side view. **e–g,** *Mecynorhynchus stramineus,* lectotype ♂: **e,** tegmen; **f,** apex of aedeagus in side view; **g,** apex of aedeagus in ventral view. **h,** *Sumangala sufflava,* ♂ specimen from Borneo, aedeagus in side view. Scales: a, e = 0.5 mm; b = 0.2 mm; c, d, f, g, h = 0.1 mm.

LUZON I: same data as holotype, 1♀; Ifugao Prov, Jacmal Bunhian, 24 km E of Mayoyao, 800–1000 m, 9–10.V.1967, 1♂, H.M. Torrevillas. PI: MINDANAO I: Zamboanga del Norte Prov, Dapitan, 1♀, Baker. PI: BASILAN I: 1♂, Baker.

Distribution. Philippines.

Remarks. Sumangala furcata is similar to *Su. josephinae* and *Su. otilanoi,* n. sp. It differs from *Su. josephinae* by its larger size, the more infuscated tegmina, and the aedeagus having longer processes with rounded tips; it differs from *Su. otilanoi,* n. sp. by the tegmen lacking 2 small dark marks on and near the 1st median sector, and by the apical processes on the aedeagus.

Sumangala sufflava (Muir), **new combination** Fig. 12

Levu sufflava Muir, 1913: 84.
Rhotana hopponis Matsumura, 1914: 294. **New synonymy.**
Mecynorhynchus stramineus Muir, 1914: 52. **New synonymy.**

Levu sufflava Muir, lectotype (here designated) (Fig. 12a, b). ♀, body 2.2 mm, tegmen 4.5 mm. Vertex and face evenly rounded; subantennal processes connected to margins of facial carinae; proboscis surpassing posttrochanters; tegmen 2.3× longer than wide; Cu1 just touching base of Ms1. *Color* stramineous;

faintly orange in front of eyes, and at middle of pronotum near hind margin (tibiae and tarsi of fore and middle legs, 1 fore femur, and 1 tegmen missing). Tegmen powdered, white; faintly infuscated in a broad band from clavus tip (here infuscation strongest) to 3rd costal cell; all apical crossveins accompanied by light infuscation; a dark infuscated mark at junction of media and last median sector; veins stramineous; faintly brown in infuscated areas; costa (except for its base) and apical margin orange; hingwings including veins colorless.

Rhotana hopponis Matsumura, considered to be the holotype (Fig. 12c, d). ♂, body 2.1 mm, tegmen 3.0 mm. As above; tegmina mutilated, but most veins recognizable; Cu1 merges with base of Ms1 for a short section. *Color* stramineous; margins of facial carinae orange-red; posterior margin of pronotum orange; tegmina white; a gray mark near apex of clavus; a dark mark at junction of media and last median sector. *Genitalia.* Pygofer narrow. Genital style widening towards apex, which is truncated; proximal dorsal process slender and short; distal process slightly widening towards tip. Stem of aedeagus with an elongated, dorsal projection just before apical portion, its anterior edge abruptly cut off; apical portion short; bearing 2 lateral and 1 central rounded lobe.

Mecynorhynchus stramineus Muir, lectotype (here designated) (Fig. 12e–g). ♂, body 2.2 mm, tegmen 4.0 mm. Shape and coloration as in preceding specimen. Tegmen white, heavily powdered; an infuscated, rectangular mark near clavus tip, infuscation faintly extending to middle of Ms1; a dark brown, round mark at junction of media and last median sector; anterior apical crossveins narrowly lined with faint infuscation. *Genitalia* as above, but apex of aedeagus only with 2 lateral, rounded lobes.

Other specimens. In most specimens tegmen with Cu1 merging with base of Ms1 for a short section; marks on tegmina may be very faint and occasionally are absent. Most ♂ specimens from Borneo have a less prominent and more triangular projection on stem of aedeagus (Fig. 12h), in others shape as illustrated in Fig. 12d, f or intermediate. Average size of ♂: body 2.0 ± 0.2 mm, tegmen 3.3 ± 0.3 mm (n = 80); ♀: body 2.0 ± 0.3 mm, tegmen 3.4 ± 0.3 mm (n = 19).

Specimens examined: *Type data. Levu sufflava,* lectotype ♀, INDONESIA: W Borneo, Mowong, F. Muir (BISHOP 5211). *Rhotana hopponis,* holotype ♂, TAIWAN: Hoppo, 7.VIII.1906, Matsumura (EIHU). *Mecynorhynchus stramineus,* lectotype ♂, TAIWAN: Arisan, 20.X.1912, Nitobe (BISHOP 5218).

Other specimens examined. PI: MINDANAO I: Zamboanga del Sur Prov, 11 km NW of Milbuk, 390 m, 5.VIII.1958, 2♂, H.E. Milliron. TAIWAN: Summoon Lk, V.1958, 1♂, N.L.H. Krauss; Horizha, 10.V.1913, 1♂,1♀, M. Maki. CHINA: S, Fukien, Yungan City, 14.VI.1940, 1♂, T. Maa. THAILAND: N, Pangmakampn (Pankampawng), nr Fang, 450 m, 16.XI.1957, 1♂, J.L. Gressitt; S Banna, Chawang, nr Nabon, 70 m, 5.IX.1958, 1♂, Gressitt; Chiang Mai, Doi Suthep, 900 m, 14.XI.1957, 1♂, Gressitt. VIETNAM: Fyan, 900–1000 m, 9.VIII.1961, 2♂, N.R. Spencer. SINGAPORE: Nee Sung, Forest Reserve, 20 m, 7.XII.1958, 1♂, Gressitt. MALAYSIA (W): Sungei, Linam, 2–20 m, 20.IX.1960, 3♂, Gressitt. MALAYSIA: SABAH (Borneo): SE, Forest Camp, 19 km N of Kalabakan, 60 m, 10.X–21.XI.1962, 90♂,12♀, K.J. Kuncheria, Y. Hirashima; Kalabakan, 10–19.XI.1958, 1♂, light trap, L.W. Quate; SE, Tawau, Quoin Hill, Cocoa Res. Stn., 3–14.VII.1962, 1–26.IX.1962, 13♂,1♀, H. Holtman, Hirashima, Kuncheria; Sandakan Bay (SW), Sapagaya Lumber Camp, 2–20 m, 4–8.XI.1957, 4♂,4♀, Gressitt; W Coast Residency, Ranau, 8 mi [13 km] N, Paring Hot Springs, 500 m, 9–18.X.1958, 9♂, Maa; Paring, Ranau, 10.X.1958, 1♂, at kerosene light, Quate. MALAYSIA: SARAWAK (Borneo): Nanga Pelagus nr Kapit, 180–585 m, 7–14.VIII.1958, 1♂, Maa; Kuching, Matang, 450–894 m, 15.IX.1958, 1♂, Maa. INDONESIA: SUMATRA: Fort de Kock, 920 m, II.1918, IV,XII.1922, 1924, 1925, 14♂,2♀, E. Jacobson (RNHL); Ajr Njuruk, Dempu, 1400 m, VIII.1916, 1♀, Jacobson (RNHL); Gun, Teleman, VI.1917, 1♀, Jacobson (RNHL); Suban Cljam, VII.1916, 1♀, Jacobson (RNHL). INDONESIA: JAVA: Tjuijiroen, Geuv. Kina-Ondern, 1700 m, Malaba Geb., IV.1910, 1♂, H.W. v.d.Weele (RNHL); Buitenzorg, IV.1914, 1♀, F. Muir.

Distribution. Taiwan, China, Thailand, Vietnam, Philippines, Indonesia, Malaysia.

Remarks. Muir did not state in the original descriptions of *Levu sufflava* and *Mecynorhynchus stramineus* how many specimens were examined. The Bishop Museum contains only 1 type-specimen of each species, and these specimens are here designated as lectotypes. The Matsumura collection contains only 1 specimen labelled "*Rhotana hopponis*" (Dr S. Takagi, pers. commun.), although it does not bear any type-label, the other inscriptions leave no doubt that it is Matsumura's holotype.

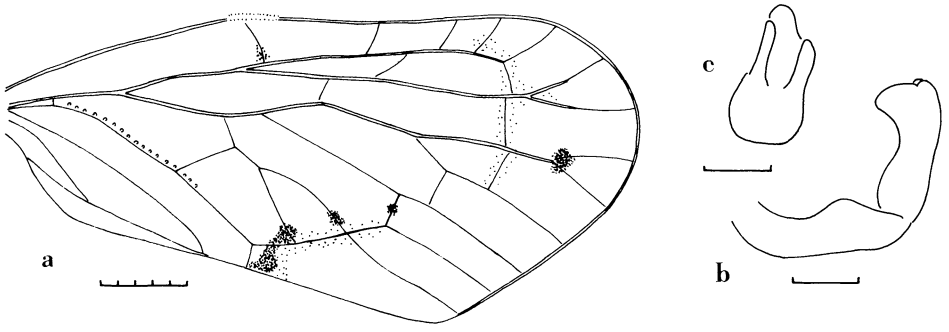

FIG. 13. *Sumangala otilanoi,* holotype ♂: **a,** tegmen; **b,** aedeagus in side view; **c,** tip of aedeagus in apical view (tip up). Scales: a = 0.5 mm; b, c = 0.1 mm.

The ♀ lectotype of *Levu sufflava* differs from most specimens identified as *Sumangala sufflava* by its large size (tegmen 4.5 mm long), by the tegmen being faintly infuscated near the junction of M and Ms2, and by Cu1 not merging with the base of Ms1. However, some male specimens from Borneo, Sumatra, and Java have tegmina with venation and infuscation like this. The largest specimen examined from Borneo (a male) has a tegmen length of 3.9 mm; a male from Sumatra has a tegmen length of 4.2 mm, and a female from Java 4.1 mm.

Sumangala sufflava is closely related to *Su. josephinae,* and females of both species are not always easy to separate. The most consistent external difference is the absence of infuscation around the 1st subcostal sector in *Su. sufflava,* which usually also shows brighter coloration on the facial margins and lacks a separate red mark above the eyes. The males of *Su. sufflava* can be easily recognized by their rounded lobes on the apex of the aedeagus and the projection on the aedeagus stem.

Sumangala otilanoi Zelazny, **new species** Fig. 13

Holotype (Fig. 13). ♂, body 2.0 mm, tegmen 3.6 mm. Similar to *Sumangala josephinae. Color* white; margins of facial carinae and tibiae light brown. Tegmen white, powdered; dark gray at base of 1st subcostal sector; an elongated black mark at clavus tip; smaller round black marks at middle of 1st median sector, at apical crossvein between Ms1 and Ms2, and at junction of media and last median sector; very faintly infuscated near apical crossveins. *Genitalia.* Apical portion of aedeagus large, tip rounded and curved inwards; dorsal side with a longitudinal impression, its edges forming 2 broad carinae which end abruptly before apex.

Paratypes. Average size of ♂: body 2.0 ± 0.1 mm, tegmen 3.4 ± 0.1 mm (n = 17); ♀: body 2.2 mm, tegmen 3.9 mm.

Holotype ♂, PI: LUZON I: Albay Prov, Guinobatan, I.1977, F. Otilano (BISHOP 11,944). Paratypes. PI: LUZON I: Albay Prov: Tabaco, II.1977, 1♂, off abaca, D. Quinalayo (ARC); Mayon Volcano, III.1977, 11♂,1♀, off coconut palm, F. Otilano, Quinalayo, W. Imperial, J. Patola, B. Zelazny (BISHOP & ARC); Guinobatan, I.1976, I,XII.1977, 5♂, Otilano (ARC); Ligao, XI.1976, I.1977, 2♂,1♀, Otilano, Patola, Quinalayo (BISHOP & ARC).

Distribution. Philippines (Luzon I).

Remarks. Sumangala otilanoi is related to *Su. josephinae* and *Su. furcata* from which it differs by the presence of 2 small black marks on and near the 1st median sector, and the absence of any apical processes on the male aedeagus. The structure of the aedeagus is similar to that of *Su. sordida,* which, however, has a large dark mark in the middle of the tegmen. This species is named in honor of the collector of the holotype, the late Mr F. Otilano.

Muiralevu Zelazny, **new genus**

Type-species: *Levu africana* Muir.

Facial carinae foliaceous, contiguous at bases; in profile vertex curves evenly into frons; rostrum usually reaching post trochanters; antennae small, oval, barely reaching eyes; subantennal processes well developed, connected to margins of facial carinae; lateral carinae of pronotum well developed. Tegmen elongated, about 2.2–2.4× longer than wide; with 2 long and 2 short costal cells; Sc+R fork near base of 1st subcostal sector; basal median cell narrow, Sc+R leaves M near base of that cell; Ms1 branched at or just distad of apex of basal median cell, base of Ms1a angulated and connected to M by a crossvein forming a small trapezoid cell; base of Cu1 touching or connected by a crossvein to main stem of Ms1. In some species (including type-species) hindwings with tip of R branched. Male pygofer often with pointed, lateral projections. Color stramineous or brown; tegmina without red veins or marks, no dark spots on base of Sc+R. The gender of this genus is masculine.

Muiralevu is related to *Saccharodite* Kirkaldy; it also has tegmina with only 4 costal cells, and, as in most species of *Saccharodite,* Ms1 branches at or near the apex of the basal median cell. However, species of *Muiralevu* have more slender tegmina with the bases of Cu1 and Ms1b never merging or connected to each other by a crossvein (as in most species of *Saccharodite*). In *Muiralevu* the base of Cu1 touches or is connected by a crossvein to the main stem of Ms1, the base of Ms1a is angulated and connected by a crossvein to M, forming a trapezoid cell. This vein pattern can be found in only a very few species of *Saccharodite,* which then can be separated from species of *Muiralevu* by having a more distal position of the Sc+R fork, red marks on the mesonotum, or dark spots on the base of Sc+R. *Muiralevu* also shows similarities to *Levu* Kirkaldy which, however, has tegmina with 5 costal cells and almost never the base of Ms1a angulated and connected to M by a crossvein. Pointed lateral projections on the male pygofer can be found in only one other genus of Rhotanini, *Rhotana* Walker. Hindwings with the tip of R branched are unknown among other Rhotanini.

The genus includes *Muiralevu quadramaculatus* (Muir), **new combination** (=*Levu quadramaculata* Muir, 1915: 135); *Levu africana* Muir, 1926: 233 changes to *Muiralevu africanus* (Muir), **new combination.** The types of these 2 species have been examined.

Muiralevu philippinensis Zelazny, **new species** Fig. 14

Holotype (Fig. 14). ♂, tegmen 3.2 mm. Rostrum slightly surpassing posttrochanters. Tegmen 2.4× longer than wide; Sc+R fork at base of 1st subcostal sector; bases of Cu1 and Ms1 connected by a crossvein; apical ½ of left tegmen missing. Left hindwing slightly damaged (tip of R missing), apical ½ of right hindwing missing. *Color* stramineous; right fore leg tinted with orange-brown; right middle leg missing; left fore

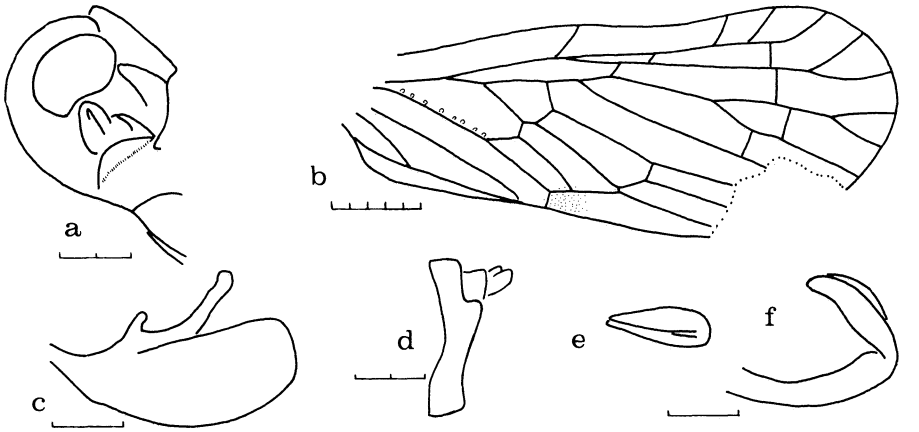

FIG. 14. *Muiralevu philippinensis,* holotype ♂: **a,** head in side view; **b,** tegmen; **c,** genital style; **d,** pygofer and anal segment; **e,** apex of aedeagus in dorsal view; **f,** aedeagus in side view. Scales: a, d = 0.2 mm; b = 0.5 mm; c, e–f = 0.1 mm.

and middle legs covered by mounting board. Tegmen and hindwing colorless, except for a faintly infuscated mark distad of clavus tip of tegmen. *Genitalia.* Pygofer with small rounded, lateral projections just below anal segment; genital style oval, proximal dorsal process short, slender, distal dorsal process elongated. Apical portion of aedeagus elongated, tapering towards tip, bearing 2 contiguous, flat lobes.

Holotype ♂, PI: BASILAN I, Baker (USNM).

Distribution. Philippines (Basilan I).

Remarks. Muiralevu philippinensis is characterized by its small size and the nearly colorless tegmina.

Genus **Saccharodite** Kirkaldy

Saccharodite Kirkaldy, 1907: 127. Type-species: *Saccharodite sanguinea* Kirkaldy, by monotypy.

Muiralyricen Metcalf, 1946: 114. Type-species: *Muiralyricen ruber* Metcalf, by original designation. **New synonymy.**

Malpa Metcalf, 1954: 11. Type-species: *Malpa appressa* Metcalf, by original designation. **New synonymy.**

Saccharodite (*Genestiella*) Fennah, 1969: 70. Type-species: *Saccharodite* (*Genestiella*) *thia* Fennah, by original designation.

Vertex in dorsal view an acute triangle; in profile junction of vertex and frons rounded or angulated; facial carinae contiguous in basal halves; antennae short, slightly longer than wide; subantennal processes well developed, may or may not be connected to margins of facial carinae; rostrum reaching hind coxae; lateral carinae of pronotum well developed. Tegmen with costal margin often sinuate; 4 narrow costal cells, 2 long basal and 2 short apical ones; Sc+R fork near middle of tegmen; 1st median sector branched at apex of basal median cell; in most species proximal branch (Ms1b) merging with base of Cu1 for a short section (Fig. 1b); rarely a crossvein between base of Cu1 and either base of Ms1b (Fig. 18a) or main stem of Ms1 (Fig. 18e) and rarely Ms1 unbranched (Fig. 15d), this venation can be interpreted as Cu1 and Ms1b merging completely except for their bases. Tegmina usually glassy or very lightly powdered, rarely heavily powdered. Often with red marks on body and tegmen veins; often with 2–4 piceous or dark brown spots on base of Sc+R.

Saccharodite, like *Muiralevu,* has tegmina with only 4 costal cells. However, *Saccharodite* can be recognized almost always by the tegmina having the bases of Cu1 and Ms1b merged or connected to each other by a crossvein. If the base of Cu1 is connected to the main stem of Ms1 by a crossvein then, usually, either Ms1 is unbranched (Fig. 15d) or the base of Ms1a is not angulated and not connected to M by a crossvein (as in *Muiralevu*). Very few species of *Saccharodite* have a vein pattern similar to that of *Muiralevu*; these species can be recognized by the tegmina having a more distal position of the Sc+R fork, or dark spots on the base of Sc+R, or by red marks on the mesonotum. Apart from the tegmen venation, many species of *Saccharodite* can be recognized by the unpowdered, glassy tegmina (found in only one other genus of Rhotanini, *Rhotana* Walker), by the junction of vertex and face being angulated in profile, by the subantennal processes not being connected to the margins of the facial carinae (also found in some species of *Levu* Kirkaldy), and by the base of Sc+R in the tegmen bearing 2–4 dark spots.

Unfortunately, the type(s) of *Saccharodite sanguinea* Kirkaldy seems to be lost and the identity of *Saccharodite* will remain in doubt unless it is found or a comprehensive collection of Javanese Rhotanini becomes available. The generic concept given above is based on Fennah's (1969) redescription of *Saccharodite.* Fennah considered the "hyaline tegmina" and the "blood-red colour" of *Sa. sanguinea* as indications of the identity of *Saccharodite.* Indeed, only 2 of the known genera of Rhotanini show these characters, *Rhotana* and the genus described here as *Saccharodite.* Kirkaldy emphasized that *Saccharodite* is close to *Rhotana* but has different venation; he also mentioned that the tegmina of *Saccharodite* are broader than those of *Levu* and with different venation, 2 more characters which agree with Fennah's concept of *Saccharodite.* All points considered together, it appears that *Saccharodite sanguinea* could not belong to any other known genus of Rhotanini. However, it should be pointed out that the description "hyaline tegmina" is not always accurate, since Rhotanini tend to loose their powder when they dry up, e.g., fresh specimens of *Alara hyalina* (Melichar) have heavily powdered tegmina.

Saccharodite appears to be the largest genus among the Rhotanini. It might be possible to divide it into different subgenera, as suggested by Fennah (1969). However, this will have to wait until the identity of the type-species has been established.

The tegmina of the holotype of *Muiralyricen ruber* Metcalf are missing; however, Metcalf's illustrations establish the identity of this genus without doubt. Fennah (1956) considered *Muiralyricen ruber* Metcalf to be a subspecies of *Levu matsumurae* Muir, which he renamed *Levu matsumurae guamana* Fennah (since *Levu rubra* is preoccupied); however, both species differ in size, coloration, and structure of the male genitalia, and are here considered to be separate species. *Muiralyricen ruber* Metcalf would then change to *Saccharodite rubra,* which however is preoccupied by *Saccharodite rubra* (Muir, 1913), see below, and the correct name for this species thus becomes *Saccharodite guamana* (Fennah), **new combination.**

Apart from the Philippine species and the type-species, the genus includes *Saccharodite opalina* (Distant); *Saccharodite iridipennis* (Melichar); *Saccharodite laratica* (Muir), **new combination** (=*Levu laratica* Muir, 1913: 85); *Saccharodite rubra* (Muir), **new combination** (=*Levu rubra* Muir, 1913: 85); *Saccharodite matsumurae* (Muir), **new combination** (=*Levu matsumurae* Muir, 1915: 135); *Saccharodite toroensis* (Matsumura), **new combination** (=*Rhotana toroensis* Matsumura, 1914: 296); *Saccharodite kagoshimana* (Matsumura), **new combination** (=*Rhotana kagoshimana* Matsumura, 1914: 294); *Saccharodite casca* Fennah; and *Saccharodite thia* Fennah. The types of all have been examined.

KEY TO THE PHILIPPINE SPECIES OF *Saccharodite*

1. Tegmen with Ms1 unbranched (Fig. 15d), heavily powdered ..... **coccinea, n. comb.**
   Tegmen with Ms1 branched, base of the proximal branch (Ms1b) usually merging for a short section with base of Cu1 (Fig. 1b), tegmen lightly powdered or glassy 2
2(1). Tegmen with basal median cell about as broad as basal cell between Sc+R and M (Fig. 1b) 3
   Tegmen with basal median cell about 2× as wide as basal cell between Sc+R and M 4
3(2). Frons and genae in front of antennae dark red ..... **metcalfi, n. sp.**
   Frons and genae stramineous ..... **basipunctulata, n. comb.**
4(2). Tegmen with 3 branches of the Cu1–Ms1 complex reaching hind margin (e.g., Fig. 18a) 5
   Tegmen with only 2 branches of the Cu1–Ms1 complex reaching hind margin (e.g., Fig. 21a) 7
5(4). Mesonotum orange-red ..... **separata, n. sp.**
   Mesonotum white to stramineous 6
6(5). Tegmen with media and its sectors white to stramineous, except for an orange-brown mark at the M–Ms3 fork ..... **quinalayoi, n. sp.**
   Tegmen with most parts of M, Ms1, Ms2 and Ms3 bright orange-red ..... **luzonensis, n. sp.**
7(4). Mesonotum uniformly red to orange-red, the lateral corners and scutellum stramineous 8
   Mesonotum stramineous or with a central red mark 9
8(7). Clypeus stramineous, center of pronotum red ..... **rhinoceros, n. sp.**
   Apex of clypeus red, center of pronotum stramineous . **cornicula, n. sp.**
9(7). Apex of scutellum with a red dot or with red marks, but rest of mesonotum stramineous 10
   Apex of scutellum stramineous (base may be red) 11
10(9). Tip of scutellum with a small red dot, face with 2 red marks in front and above the eyes ..... **inermis, n. sp.**

Apex and sides of scutellum (rarely whole of scutellum) red, face without red marks ..... **basicolorata, n. sp.**

11(9). Mesonotum with a red, usually rhomboid mark (Fig. 24c) 12
Mesonotum stramineous 15

12(11). Apical portion of ♂ aedeagus with a long and slender process at its base (Fig. 24g, h) ..... **imperiali, n. sp.**
Apical portion of ♂ aedeagus without such a long and slender basal process 13

13(12). Apical portion of ♂ aedeagus with 2 short, curved and pointed processes at its base (Fig. 25b) ..... **spinosa, n. sp.**
Apical portion of ♂ aedeagus without basal processes 14

14(13). Apical portion of ♂ aedeagus with left terminal lobe rounded (rarely angulated, Fig. 26d, e) ..... **virgata, n. sp.**
Apical portion of ♂ aedeagus with left terminal lobe bearing a pointed process (Fig. 27c, d) ..... **terebra, n. sp.**

15(11). Tegmen with veins orange-red ..... **rubrovenis, n. sp.**
Tegmen with only few veins orange-red 16

16(15). Proboscis with a red mark at or near its tip 17
Proboscis stramineous 18

17(16). Terminal segment of proboscis red ..... **rubirostrata, n. sp.**
Proboscis with a red mark just before the apex ..... **millironi, n. sp.**

18(16). Legs, thoracic pleura, and sternites with some red marks, some veins of tegmen orange-red 19
Body uniformly light yellow, veins of tegmen stramineous .. **lutea, n. sp.**

19(18). Apical portion of ♂ aedeagus with 2 curved and pointed processes at its base (Fig. 32c, d) ..... **bicornis, n. sp.**
Apical portion of ♂ aedeagus without basal processes (Fig. 33c) ..... **misamensis, n. sp.**

Saccharodite coccinea (Matsumura), **new combination** Fig. 15

Rhotana coccinea Matsumura, 1940: 47, holotype ♀, FORMOSA: Kotosho (Botel Tabago), T. Kano (whereabouts of specimen unknown).

The following description and Fig. 15 were based on specimens from the Philippines (Albay Province). The specimens from Hong-Kong, Laos, Thailand, Borneo, and New Guinea appear to be identical.

Vertex in dorsal view narrow; lateral carinae foliaceous, meeting at apex; in profile face slightly angulated at junction of vertex and frons, and at junction with subantennal processes, giving face a nearly rectangular outline; facial carinae contiguous up to level of antennae; subantennal processes connected to margins of facial carinae; antennae short, not reaching eyes; rostrum reaching end of first ¼ of abdomen; lateral carinae of pronotum foliaceous. Tegmen 2.3× longer than wide; costal margin nearly straight; 2 long basal and 2 short apical costal cells; Sc+R fork distad of middle of tegmen; basal median cell narrow, M leaves Sc+R near base of that cell; basal cell between Sc+R and M narrow, about ½ as wide as basal

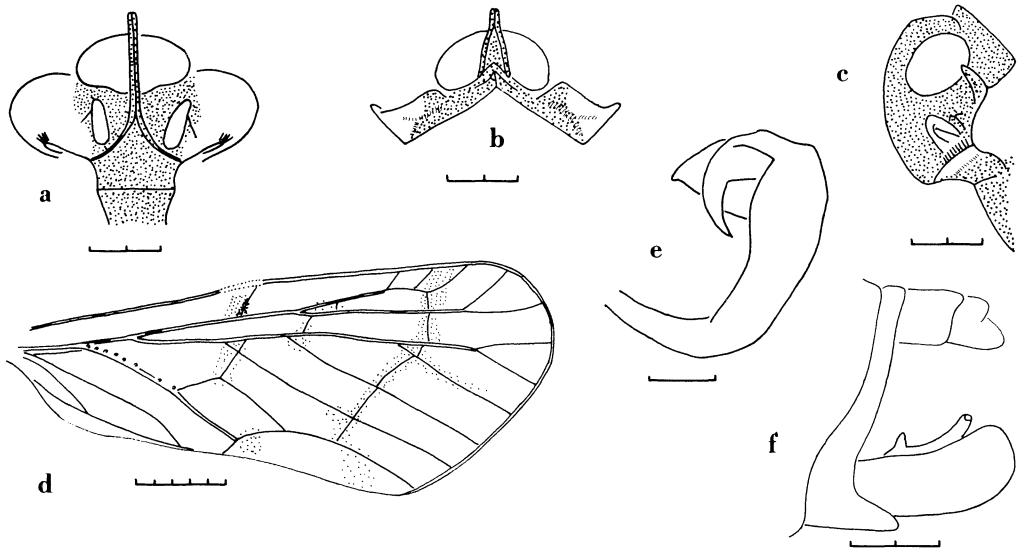

FIG. 15. *Saccharodite coccinea*, ♂ specimen from Albay Prov: **a,** frons; **b,** vertex; **c,** head in side view (dotted areas in a, b and c, bright red); **d,** tegmen; **e,** aedeagus in side view; **f,** pygofer, anal segment, and genital style. Scales: a, b, c, f = 0.2 mm; d = 0.5 mm; e = 0.1 mm.

median cell; Ms1 unbranched. *Color* blood red; subantennal processes, lateral carinae and lateral margins of pronotum, basal parts of fore and middle legs, hind legs except tarsi, and tegulae white; apical part of rostrum, fore and middle legs distad of middle of femora, and tarsi of hind legs lightly reddish orange; antennae gray; ♂ pygofer blood red, genital styles reddish brown; ♀ genitalia brown. Tegmen white, heavily powdered; faintly infuscated near bases of Ms1 and Ms2 and apical crossveins; veins in these parts blood red; 1st subcostal sector accompanied by dark gray; remaining veins white; 2–3 dark brown marks on the base of Sc+R. *Genitalia.* Pygofer of ♂ with rounded ventral projection. Genital style with proximal dorsal process short, distal dorsal process elongated. Aedeagus broadening toward apex, which bears 2 lobes, right one broad with a small pointed tip, left one more slender, curved and pointed. Average size of ♂: body 1.7 ± 0.1 mm, tegmen 3.0 ± 0.3 mm (n = 15); ♀: body 1.8 ± 0.1 mm, tegmen 3.2 ± 0.2 mm (n = 31).

Specimens examined. PI: LUZON I: Manila, 8.IX.1945, 1♀, H.E. Milliron; Laguna Prov, Mt Makiling, 2♀, Baker; Los Baños, IX.1915, 1♀; Albay Prov: Guinobatan, XII.1977, 1♂, F. Otilano (ARC); Camalig, I.1977, 1♀, off coconut palm, Otilano; Daraga, I.1977, 2♂, off coconut palm, W.S. Imperial, D. Quinalayo (BISHOP & ARC). PI: NEGROS I: Negros Or. Prov, Lk Balinsasayao, 1–7.X.1959, 1♂, light trap, L.W. Quate. PI: PALAWAN I: Tarumpitao Pt., 21.V.1958, 1♀, light trap, Milliron; 16 km S of Tarumpitao Pt., 28.V.1958, 1♂, Milliron. PI: MINDANAO I: Agusan del Sur Prov, Los Arcos, 19–23.XI.1959, 1♀, Quate; Misamis Or. Prov: Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 27.IX.1965, 1♂, light trap, H. Torrevillas; Mt Balatukan, 15 km SW of Gingoog, 1000–2000 m, 27–30.IV.1960, 2♂, light trap, Torrevillas; Gingoog City, 26–27.IV.1960, 12.V.1961, 4♂, Torrevillas; Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 18.VII.1965, 21,30.VIII.1965, 1♂,4♀, Torrevillas. HONG KONG: Taipokan, Kowloon, 20.VI.1964, 3–8.VII.1964, 23–28.VIII.1965, 2,22.IX.1965, 3♂,13♀, Lee Kit Ming, Hui Wai Ming, W.J. Voss. LAOS: Vientiane Prov, Ban Van Heua, X.1965, 1♂, native collector. THAILAND: NW, Chiang Mai, Fang, 12–19.IV.1958, 1♀, T.C. Maa; Trang Prov, Khaophappha, Khoachang, 200 m, 11–15.I.1964, 2♀, G.A. Samuelson; Banna, 5–10.V.1958, 2♀, light trap, Maa. MALAYSIA: SABAH (Borneo): Tawau, Quoin Hill, 3–7.VII.1962, 1♂,5♀, light trap, H. Holtman; Tawau town, at beach, 9.XI.1958, 1♂, Maa; Sandakan Bay (SW), Sapagaya Lumber Camp, 2–20 m, 7.XI.1957, 1♀, light trap, J.L. Gressitt. INDONESIA: SUMATRA: Sinabang, Simalur, II,VI.1913, 2♀, Edw. Jacobson (RNHL). IRIAN: NEW GUINEA

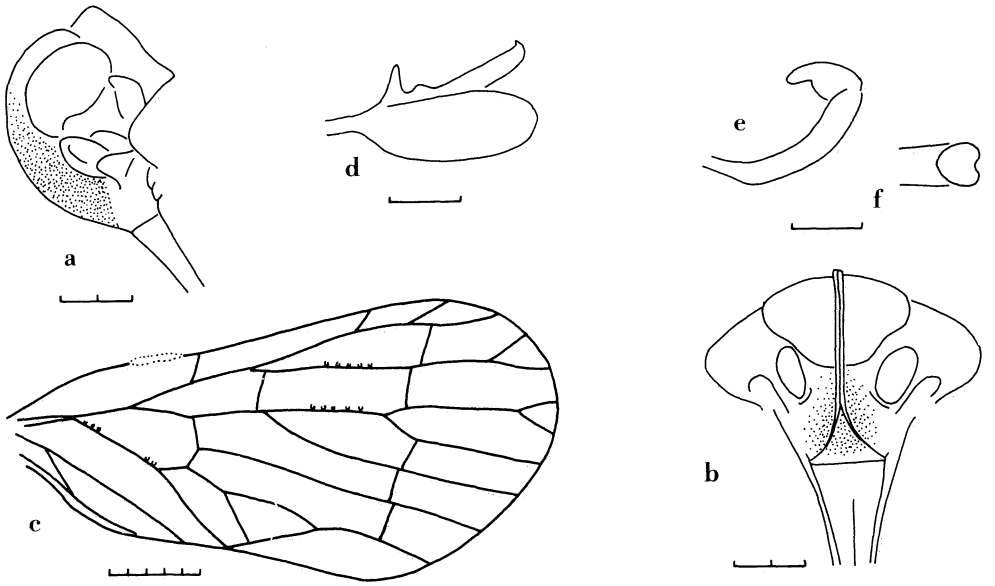

FIG. 16. *Saccharodite metcalfi*, holotype ♂: **a,** head in side view; **b,** frons (dotted areas in a and b, dark red); **c,** tegmen; **d,** genital style; **e,** aedeagus in side view; **f,** apex of aedeagus in dorsal view. Scales: a, b = 0.2 mm; c = 0.5 mm; d, e–f = 0.1 mm.

(NW): Star Range, 2360 m, Bivak 40, 29.VII.1959, 1♀, Neth. New Guinea Expedition (RNHL). PNG: NEW GUINEA (SE): Kuinga, Fly Riv, 4–5.IX.1957, 2♀, W.W. Brandt; Cape Rodney, 10 m, 2–4.XI.1960, 1♂, malaise trap 9:30–18:00, Gressitt; Western Distr, Oriomo Riv, 3 m, 1,4,16.VIII.1964, 6♂,4♀, light trap, H. Clissold; Ruka, 9 m, 12.VIII.1964, 1♀, light trap, Clissold. PNG: BISMARCK ARCH.: NEW BRITAIN: Gazelle Penin., Kerawat, 60 m, 10.IX.1955, 1♀, Gressitt.

Distribution. Formosa, Hong Kong, Laos, Thailand, Philippines, Borneo, Indonesia (Sumatra), New Guinea, New Britain.

Remarks. According to Dr S. Takagi, the female holotype of *Rhotana coccinea* Matsumura is not among the other Derbidae of the Matsumura collection. However, it seems possible that it is mixed up with another group. The original description is detailed and agrees fully with the specimens examined.

Saccharodite coccinea can be recognized by the unbranched 1st median sector in the tegmen and the blood red color of its body. The heavily powdered tegmina with Ms1 unbranched, the rectangular profile of the head, and the ventral projection of the male pygofer put *Sa. coccinea* apart from most other species of *Saccharodite.* However, the relationship to *Saccharodite* is apparent by the tegmina having only 4 costal cells, the Sc+R fork near the middle of tegmen, and dark spots on the base of Sc+R.

Saccharodite metcalfi Zelazny, **new species** Fig. 16

Holotype (Fig. 16). ♂, body 1.8 mm, tegmen 3.0 mm. In profile junction of vertex and face rounded; subantennal processes not connected to margins of facial carinae; rostrum reaching middle of abdomen; tegmen about 2× longer than wide; basal median cell narrow, M leaves Sc+R before middle of that cell;

basal cell between Sc+R and M nearly as wide as basal median cell, central sections of media and radius with rows of wax secreting pores. *Color* stramineous; margins of facial carinae dark gray; frons and facial carinae in front of eyes dark red; antennae tinted with orange; mesonotum light brown; margins of tegulae dark gray; mesopleura faintly orange; fore legs, and tibiae and tarsi of middle and hind legs reddish gray; rest of middle and hind legs stramineous; basal ¾ of abdomen dark red, apical ¼ stramineous. Tegmen glassy; veins colorless; no dark spots on base of Sc+R. *Genitalia.* Pygofer narrow. Genital styles small; proximal dorsal process slender, upright; distal dorsal process broad, elongated, and pointed at tip; a small hump between both processes. Aedeagus short; apical portion without processes or lobes.

Paratypes. Average size of ♂: body 1.7 ± 0.1 mm, tegmen 3.1 ± 0.1 mm (n = 5); ♀: body 2.3 ± 0.2 mm, tegmen 3.8 ± 0.1 mm (n = 7).

Holotype ♂, PI: MINDANAO I: Davao City, IX.1978, off coconut palm, B. Zelazny (BISHOP 11,945), Paratypes. PI: MINDANAO I: Misamis Or. Prov: Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14,30.VIII.1965, 2♂,1♀, H. & L. Torrevillas; Minalwang, 1050 m, 24.III–4.IV.1961, 8♀, at light, H. Torrevillas; Minubanan, 1050–1200 m, 5–9.IV.1961, 1♀, H. Torrevillas; Mt Kibungol, 20 km SE of Gingoog City, 700–800 m, 9–18.IV.1960, 1♂, W. Torrevillas; Davao City, IX.1978, 2♂, off coconut palm, B. Zelazny (ARC).

Distribution. Philippines (Mindanao I).

Remarks. Saccharodite metcalfi resembles *Saccharodite guamana* (Fennah) and *Saccharodite basipunctulata* (Melichar) in head structure, tegmen shape and venation. It can be easily recognized by the dark red marks on the head and the colorless tegmina. This species is named in honor of the late Dr Z. P. Metcalf, who greatly contributed to the knowledge of the homoptera.

Saccharodite basipunctulata (Melichar), **new combination** Fig. 17

Rhotana basipunctulata Melichar, 1914: 438.
Malpa appressa Metcalf, 1954: 11. **New synonymy.**
Saccharodite (Genestiella) trocmus Fennah, 1970: 66. **New synonymy.**

The holotype of *Rhotana basipunctulata* Melichar [PI: LUZON I: Laguna Prov: Los Baños, Baker (MMB)] was compared by Dr P. Lauterer of the Moravske Museum in Brno with specimens from Albay Province, which are described below, as well as with the illustrations (Fig. 17) and the description of these specimens. He provided the following details of the holotype.

♀, body 2.3 mm, tegmen 3.3 mm. Margins of facial carinae faintly orange-red; tegmen with last subcostal sector and 2 sections of the costa (1 opposite the Sc+R fork, 1 adjacent to the last subcostal sector) orange-red; the following veins faintly orange-brown: the Sc+R fork, M–Ms2 fork, bases of Ms1, Ms1a and Ms1b, apex of Cu, the apical crossveins between Sc and Ms2 as well as sections of main veins adjoining these.

Malpa appressa Metcalf, holotype (Fig. 17m, n). ♀, tegmen 3.1 mm. In profile, junction of vertex and face slightly angulated; subantennal processes not connected to facial carinae. Tegmen with basal median cell about as wide as basal cell between Sc+R and M. *Color* stramineous, faintly brownish in front of eyes; antennae brown; in front of antennae and sides of pronotum near hind margin faintly orange. Tegmen glassy; lightly infuscated from clavus tip to apex of basal median cell, from base of Ms2 to 2nd costal cell, along apical crossveins, and near apical margin; veins stramineous, but some parts of Sc, R, and M light brown and faintly tinted with orange, last subcostal sector and 3 short sections of costa red; 2 brown spots on base of Sc+R.

Albay Province specimens (Fig. 17a–k). In profile, junction of vertex and frons slightly angulated; suban-

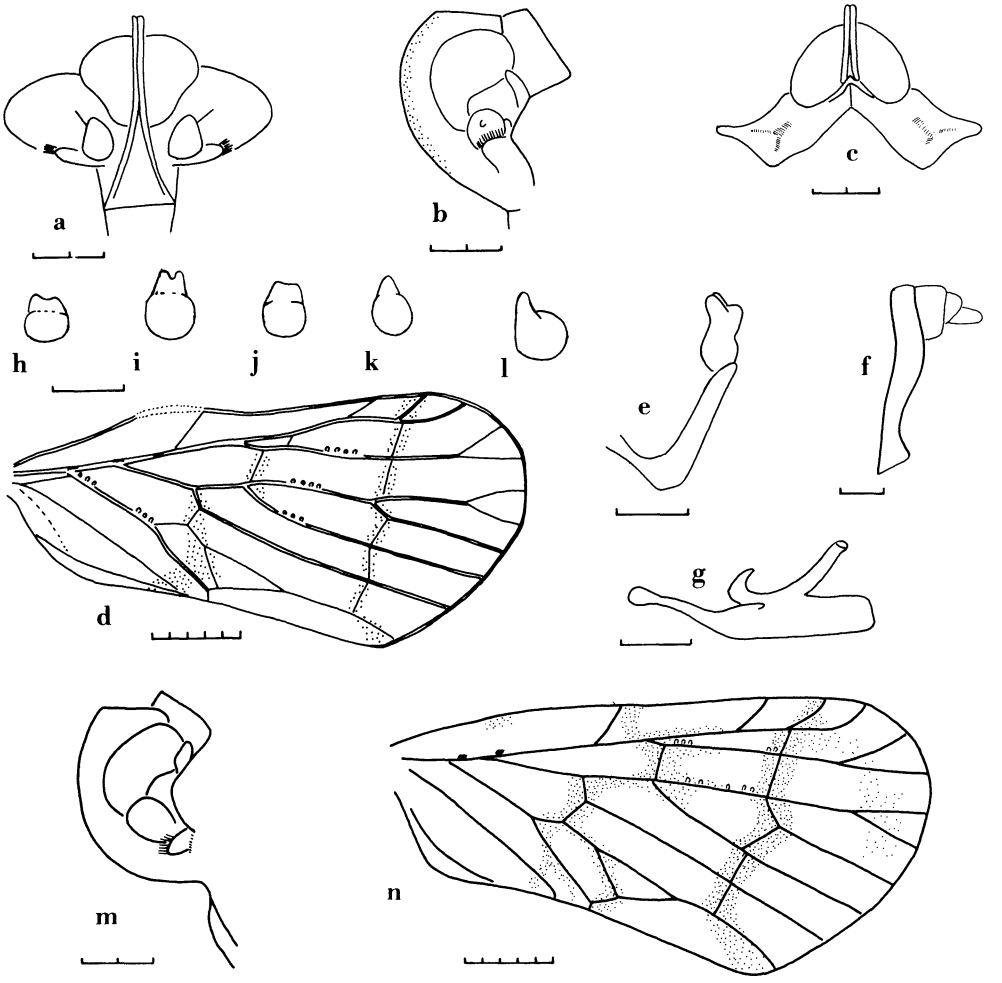

FIG. 17. **a–l,** *Saccharodite basipunctulata,* ♂ specimen from Albay Prov: **a,** frons; **b,** head in side view; **c,** vertex; **d,** tegmen; **e,** aedeagus in side view; **f,** pygofer and anal segment; **g,** genital style; **h–k,** apices of aedeagi of ♂ specimen from Albay Prov, in dorsal view (tips up); **l,** apex of aedeagus of ♂ specimen from New Guinea in dorsal view (tip up). **m, n,** *Malpa appressa,* holotype ♀: **m,** head in side view; **n,** tegmen. Scales: a, b, c, m = 0.2 mm; d, n = 0.5 mm; e, f, g, h–l = 0.1 mm.

tennal processes not connected to margins of facial carinae; rostrum surpassing posttrochanters. Tegmen with basal cell between Sc+R and M about as wide as basal median cell; basal median cell narrow, M leaves Sc+R near base of that cell; central sections of radius and media, and a basal section of 2nd median sector with wax pores. *Color* white to stramineous; margins of facial carinae in front of eyes slightly orange-red; tibiae yellow to faint orange. Tegmen slightly powdered; very faintly infuscated from clavus tip to base of 1st median sector, near base of 2nd median sector, and along apical crossveins; in these infuscated areas veins pale yellow, pale orange, or (in some specimens) orange; 2–3 sections of costa orange-red; last subcostal sector either completely or only with base orange-red; in some specimens section of subcosta adjoining last subcostal sector orange-red; 2, rarely 3, piceous spots on base of Sc+R. *Genitalia.* Male

pygofer narrow. Genital style narrow, apical margin slightly truncated; dorsal processes slender. Aedeagus with a short apical portion, bearing 2, rarely 1, short membraneous lobes. In some specimens apical lobes are shrivelled or not at all recognizable.

Other specimens. Specimens from Sumatra, W Malaysia, Thailand, Laos, Sri Lanka, and most specimens from Borneo very similar to Albay Province specimens; in some, last subcostal sector of tegmen narrowly lined with red; in all 3 specimens from Sri Lanka only base of last subcostal sector of tegmen orange-red (as in some specimens from Albay Prov). About ½ of specimens from New Guinea and ⅔ of those from Solomon Is also very similar to Albay Province specimens. However, most of remaining specimens from these 2 locations with orange-red (instead of pale orange) veins in faintly infuscated areas of tegmina, and hindwing veins often with red sections, a number of specimens with tegmen coloration in between these 2 forms. The following variations in coloration and tegmen venation are uncommon: all specimens from Caroline Is (2♂,1♀) with tegmen infuscation slightly darker and very few sections of tegmen veins tinted with orange, hind margin of pronotum faintly orange (holotype of *Malpa appressa* Metcalf also belongs to this color form); 1♂ from New Britain, and 1♀ from Solomon Is as in preceding form but hind margin of pronotum without orange; 3♂ from Solomon Is similar to Albay Prov specimens but all veins colorless, only last subcostal sector faintly orange and 2 sections of costal margin red; 1♂ and 1♀ from New Guinea similar to Albay Prov specimens, but last subcostal sector of tegmen broadly lined with bright red; some specimens from Borneo (3♂,1♀) and New Guinea (2♂) with fore and middle tibiae reddish to orange-red; 2♂ and 1♀ from New Guinea and 1♀ from W Malaysia with a small triangle at base of Ms1 of tegmina. The membraneous lobes on the apex of the ♂ aedeagus are often shrivelled and unrecognizable; specimens with undistorted aedeagi show various forms of apical lobes, 2 large lobes, 2 small lobes, 1 large and 1 small lobe, or 1 lobe only (Fig. 17l). No relationship was apparent between these forms and the variation in coloration of the tegmen veins.

Average size of ♂: body 1.6 ± 0.2 mm, tegmen 2.7 ± 0.4 mm (n = 22); ♀: body 2.1 ± 0.2 mm, tegmen 3.2 ± 0.4 mm (n = 189).

Specimens examined. Malpa appressa, holotype ♀, CAROLINE IS: Truk Is, Dublon I, 21.XII.1935, sweeping, Z. Ono (BISHOP 2751). Other specimens. PI: LUZON I: Laguna Prov: Los Baños, X.1915, 1♀, F. Muir; Mt Makiling, 1♀, Baker; Camarines Sur Prov, Mt Iriga, 500–600 m, 6.IV.1962, 1♀, H.M. Torrevillas; Albay Prov: Tabaco, XI.1976, 8♂,2♀, F. Otilano, W. Imperial, D. Quinalayo, B. Zelazny (ARC); Ligao, XI.1976, 6♂,3♀, Imperial, Quinalayo, Otilano, Zelazny (ARC); Guinobatan, XII.1976, I.1977, 3♂,4♀, off abaca and coconut palm, J. Patola, Zelazny (ARC); Mayon Volcano, I.1977, 1♀, off coconut palm, Quinalayo (ARC). PI: NEGROS I: Negros Or. Prov, Lk Balinsasayao, 1–7.X.1959, 1♂, C.M. Yoshimoto. PI: MINDANAO I: Bukidnon Prov, Mt Katanglad, 1480 m, 26–30.X.1959, 1♀, L.W. Quate. LAOS: Vientiane Prov, Ban Van Heua, 30.II.1967, 30.IX.1967, 15.X.1967, 3♀, native collector. THAILAND: N, Pangmakampon (Pankampawng), nr Fang, 450 m, 15,16.XI.1957, 3♂,1♀, J.L. Gressitt; Chiang Mai, Doi Suthep, 900 m, 14.XI.1957, 1♀, Gressitt; Trang Prov, Khaophappha Khaochang, 200 m, 11–15.I.1964, 3♀, malaise trap, G.A. Samuelson. MALAYSIA (W): Selangor, nr Kuala Lumpur, 9.IX.1958, 1♀, Gressitt; Sungei Linam, 2–20 m, 20.IX.1960, 1♂, Gressitt. MALAYSIA: SABAH (Borneo): SE, Forest Camp, 19 km N of Kalabakan, 60 m, 14–30.X.1962, 6♂,10♀, K.J. Kuncheria, Y. Hirashima; Tawau, Quoin Hill, Cocoa Res. Stn., 225 m, 23.IX.1962, 2♀, malaise trap, Hirashima. MALAYSIA: SARAWAK (Borneo): Kuching, Matang, 450–894 m, 15.IX.1958, 1♂, T.C. Maa. INDONESIA: SUMATRA: Fort de Kock, 920 m, XI.1921, 1♀, E. Jacobson (RNHL); Air Njunok Dempu, 1400 m, VIII.1916, 1♀, Jacobson (RNHL). INDONESIA: AMBON I: I.1908, 1♀, F. Muir. IRIAN: New Guinea (NW): Swart Val, W Ridge, 1900–2000 m, 19.XI.1958, 1♀, Gressitt; Ifar, 300–600 m, 22.VI.1959, 1♀, Gressitt; Waris, S of Hollandia, 450–500 m, 19–23.VIII.1959, 3♂, T.C. Maa; Vogelkop, Bomberi, 700–900 m, 4.VI.1959, 1♂, Gressitt; Nabire, S Geelvink Bay, 0–30 m, 2–9.VII.1962, 4♀, malaise trap, Gressitt & J. Sedlacek; Ifar, Cyclops Mts, 300–500 m, 23–29.VI.1962, 2♂, Gressitt; Wisselmeren, Urapura, Kamo Val, 1530 m, 10.VIII.1955, 1♀, Gressitt; Star Mts, Sibil Val, 1245 m, 18.X–8.XI.1961, 1♂, malaise trap, S. & L.W. Quate; Central Mts, Archbold Lk, 760 m, 26.XI–3.XII.1961, 1♂, Quate; Star Range, Sibil, 1260 m, 1.V–21.VI.1959, 2♂,4♀, Neth. New Guinea Exped. (RNHL); Star Range, 1500 m, Ok Tenma, 18,19.V.1959, 3♀, Neth. New Guinea Exped. (RNHL); Star Range, 1800 m, Tenma Sigin, 22.V.1959, 1♀, Neth. New Guinea Exped. (RNHL); Star Range, 1300–1500 m, Bivak 39, 39A, 30.VI.1959, 3.VII.1959, 2♀, Neth. New Guinea Exped. (RNHL). PNG: NEW GUINEA (NE): Bainyik, nr Maprik, 225 m, 20,21.VI.1961, 1♂,18♀, malaise trap, J.L. & M. Gressitt; Maprik, 14.X.1957, 1♀, light trap, Gressitt; nr Busu Riv, NE of Lae, Sangeman Vill, 25 m, 30.VIII.1957,

3♀, light trap, D. Elmo Hardy; Busu Riv, E of Lae, 100 m, 13,14.IX.1955, 3♀, light trap, Gressitt; Lae, 10 m, 6.VII.1957, 1♂,1♀, Hardy; Bubia, Markham Val, 50 m, 19.IX.1955, 1♂, Gressitt; Wum, Upper Jimmi Val, 840 m, 17.VII.1955, 1♂, light trap, Gressitt; Korop, Upper Jimmi Val, 1300 m, 12.VII,1955, 1♂, Gressitt; Taenga, Upper Jimmi Val, 1200 m, 14.VII.1955, 1♂, Gressitt; Karimui, 2–3.VI.1961, 5♀, malaise trap, Gressitt & Gressitt; Karimui, S of Goroka, 1000 m, 3.VI.1961, 1♂, Gressitt & Gressitt; Morobe Distr, Ulap, 800–1100 m, IX.1958, 1♀, N.L.H. Krauss; Morobe Distr, Wau, 1200 m, 14.VI.1961, 2♂, malaise trap, Gressitt; Wau, Kunai Crk, 1230 m, 28.V.1965, 1♂, malaise trap, Sedlacek; Wau, Hospital Crk, 1250 m, 7.IV.1965, 1♂, malaise trap, Gressitt; Wau, 1200–1250 m, 21.IV.1962, 28.V.1965, 22–24.VI.1965, 11.VIII.1965, 22.X.1965, 24.I.1967, 1♂,7♀, malaise trap, J. & M. Sedlacek, R. Straatman; Ambunti, Sepik Riv, 200 m, 1–7.V.1963, 5♂,4♀, light trap, Straatman; Finisterre Range, Saidor, Matoko, 28.VIII–5.IX.1958, 1♀, W.W. Brandt; Mt Missim, 7°15′S 146°48′E, 1600 m, 25.IV.1966, 2♀, malaise trap, Gressitt, O.R. Wilkes; Aiyura, 1600 m, 9.VI.1966, 1♀, malaise trap, Gressitt & Gressitt; W Highlands, Goiburung, E of Korn Farm, 1560–1650 m, 16.X.1958, 19.X.1959, 3♂, *Alpinia,* Gressitt; Kamang, nr Minj, 1840 m, 21.V.1966, 1♀, malasie trap, Gressitt; Baiyer Riv, 1150 m, 17.X.1958, 1♂, Gressitt; Umboi I, 1 km N of Awelkom, 600 m, 21–28.II.1967, 4♀, light trap, G.A. Samuelson; Umboi I, ca 8 km WNW of Lablab, 300 m, 8–19.II.1967, 2♀, light trap, Samuelson; Korn Farm, 1560 m, 19.X.1959, 1♀, Gressitt. PNG: NEW GUINEA (SE): Kokoda, 28–29.III.1956, 1♀, Gressitt; Daradae, nr Javarere, Musgrove Riv, 100 m?, 3.X.1958, 1♂, Gressitt; W Distr, Oriomo Govt. Stn., 26–28.X.1960, 2♀, malaise trap, Gressitt; S Highlands, N of Mendi, 1800 m, 8.X.1958, 1♂,1♀, Gressitt; Aiyurop, nr Mendi, 1530 m, 7.X.1958, 2♂, Gressitt; Central Distr, 3.2 km S of Vanapa Riv, Brown Rd, 20–24.V.1965, 1♂,1♀, W.A. Steffan & Y.M. Huang; 6 km S of Vanapa Riv, Brown Rd, 200 m, 26.V.1965, 1♂, malaise trap, Steffan & Huang; Mamai Pltn., E of Port Glasgow, 150 m, 17.II.1965, 1♀, light trap, Straatman; Cape Rodney, 2–4.XI.1960, 1♀, malaise trap, Gressitt; Betege, 20 km NW of Koroba, 1600 m, 21.IX.1963, 1♂, light trap, Straatman. PNG: BISMARCK ARCH.: NEW BRITAIN: Gazelle Penin, Malmalwau-Vunakanau, 5–11.V.1956, 1♀, light trap, Gressitt; Warongoi Val, 100 m, 24.V.1956, 2♂, Gressitt; Bainings, St. Paul's, 350 m, 8.IX.1955, 1♂, Gressitt; Mt Sinewit, 900 m, 7–16.XI.1962, 2♀, light trap, Sedlacek; Gisiluve, Nakanai Mts, 1050 m, 25.VII.1956, 1♂, E.J. Ford. PNG: BISMARCK ARCH.: NEW IRELAND (SW): ridge above "Camp Bishop," 15 km up Kait Riv, 250–450 m, 9–13.VII.1956, 2♂,2♀, Gressitt; "Camp Bishop," 15 km up Kait Riv, 125 m, 7.VII.1956, 1♂, Ford; Gilingil Pltn., 2 m, 6.VII.1956, 1♂, Gressitt; Kavieng, 2.VII.1959, 1♂, Gressitt. SOLOMON IS: San Cristobal, Kira-Kira, 0–200 m, 5–20.XI.1964, 45♀, light & malaise traps, Straatman; NW, Malaita, Dala, 50 m, 6–30.VI.1964, 23♀, malaise trap, Straatman, J. & M. Sedlacek; Santa Ysabel: Molao, 1.VII.1960, 3♀, C.W. O'Brien; Tatamba, 0–50 m, 10.VI.1960, 2.IX.1964, 3♀, O'Brien, Straatman; Buala, 17–20.VII.1964, 2♀, light trap, Straatman; Guadalcanal: Tambalia, 30 km W of Honiara, 20–27.V.1964, 2♂,9♀, light and malaise traps, Straatman, Sedlacek; Suta, 500–1200 m, 27.VI.1956, 1♂, Gressitt; Nini Crk, 35 km SE of Honiara, 8.V.1964, 1♂, light trap, Straatman; Roroni, 35 km E of Honiara, 10 m, 12.V.1964, 2♂, Straatman; Florida Is: Nggela I, Haleta, 250 m, 17.X.1964, 2♀, malaise trap, Straatman; Buka I, Cagan, 40 m, 16.VI.1956, 1♀; New Georgia Group: Kolombangara I: Kukundu, SW Coast, 1–12 m, 10.VII.1959, 2♀, Gressitt; Sandfly Harbor, 2 m, 9.VII.1964, 1♀, malaise trap, J. & M. Sedlacek; Gizo I, 100 m, 17,20.VII.1964, 2♀, malaise trap, J. & M. Sedlacek; New Georgia I, Munda, 1–30 m, 20.VII.1959, 1♀, Gressitt; Choiseul I, Kitipi Riv, 80 m, 13.III.1964, 2♀, malaise trap, P. Shanahan; Choiseul I, Kolombangara Riv, 60 m, 20.III.1964, 2♀, light trap, Shanahan; Vella Lavella, Pusisama, 17–18.XI.1963, 1♀, malaise trap, Shanahan. CAROLINE IS: Truk Is: Tol I, Mt Uniböt, 25–50 m, 30,31.XII.1952, 2♂, under bark of dead *Artocarpus,* Gressitt; Dublon, 9.I.1936, 1♀, Z. Ono. SRI LANKA [Ceylon]: Peradeniya, I.1911, 1♂,2 unknown sex, Distant (BMNH).

Distribution. Philippines, Indonesia, New Guinea, Solomon Is, Caroline Is, Malaysia, Thailand, Laos, Sri Lanka.

Remarks. It is concluded that *Saccharodite basipunctulata* (Melichar) is a common, widely distributed species showing some variation in tegmen coloration and in the apex of the male aedeagus. It is characterized by the colorless body (rarely with faint orange marks on head and pronotum or with orange or reddish fore and middle tibiae), and by the tegmina having a narrow basal median cell, orange-red sections

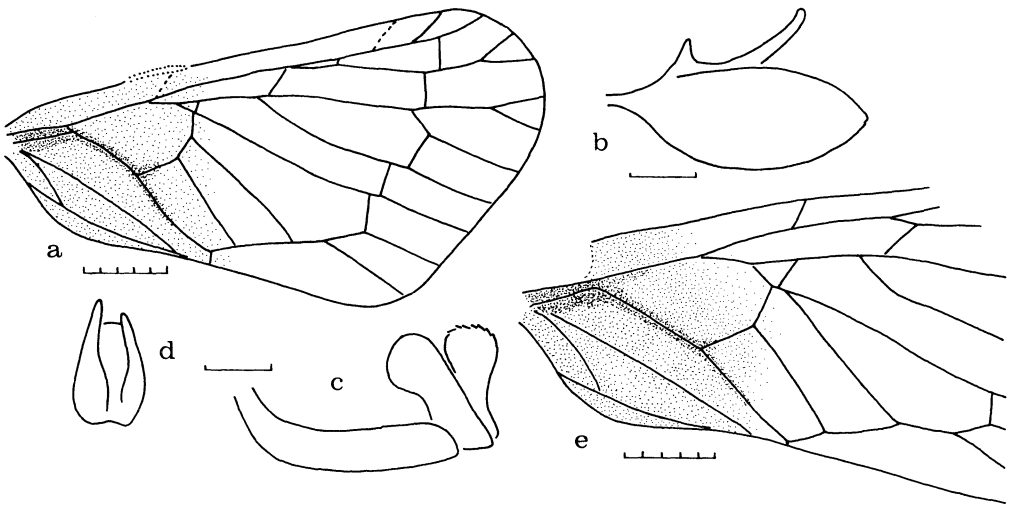

FIG. 18. *Saccharodite separata*: **a–d,** holotype ♂: **a,** tegmen (densely dotted areas near Cu red); **b,** genital style; **c,** aedeagus in side view; **d,** apical portion of aedeagus in caudal view (tip up); **e,** specimen from Basilan I, tegmen base. Scales: a, e = 0.5 mm; b, c–d = 0.1 mm.

on C and the last subcostal sector, and bands of faint infuscation, in which the veins may be pale orange (most common), orange, or orange-red, while the remaining veins are colorless. The synonymy of *Saccharodite* (*Genestiella*) *trocmus* was based on Fennah's (1970) detailed description.

Saccharodite separata Zelazny, **new species** Fig. 18

Holotype (Fig. 18a–d). ♂, body: 2.6 mm, tegmen: 4.4 mm. In profile vertex curves evenly into frons; subantennal processes connected to margins of facial carinae; rostrum slightly surpassing hind coxae. Right tegmen missing; left tegmen with Cu1 connected to base of Ms1b by a crossvein; near hind margin Cu1 and Ms1b merging for a short section, then separating again; basal median cell broad, M leaves Sc+R distad of middle of that cell; basal cell between Sc+R and M less than ½ as wide as basal median cell. *Color* of head and rostrum stramineous, except for margins of facial carinae in front of eyes and a large mark on frons, which are orange; prothorax stramineous but most parts of pronotum reddish; rest of thorax and abdomen orange-red; hind legs stramineous (fore and middle legs missing). Tegmen glassy; basal ⅓ slightly infuscated, veins in this part orange-red; most of Cu narrowly lined with red; base of Sc+R without dark spots. Hindwing with veins in basal ⅓ red, in apical ⅔ colorless. *Genitalia.* Pygofer narrow. Genital style oval, slightly pointed; dorsal processes slender. Aedeagus with apical portion consisting of 2 flat lobes broadening towards their ends, right one slightly shorter and serrated along apical margin.

Paratypes. Two lateral light patches on scutellum; middle legs stramineous, fore legs faintly tinted with orange; ♂ with right apical lobe of aedeagus narrower; ♀ with abdominal tergites and pleura orange-red, sternites and genitalia stramineous, and with base of Cu1 in tegmen connected to base of Ms1 (not Ms1b) by a crossvein (Fig. 18e). Tegmen of ♂ 4.3 mm, of ♀ 4.4 mm.

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 30.VIII.1965, L. Torrevillas (BISHOP 11,946). Paratypes. PI: MINDANAO I: Zamboanga, 1♂, Baker (USNM). PI: BASILAN I: 1♀, Baker (USNM).

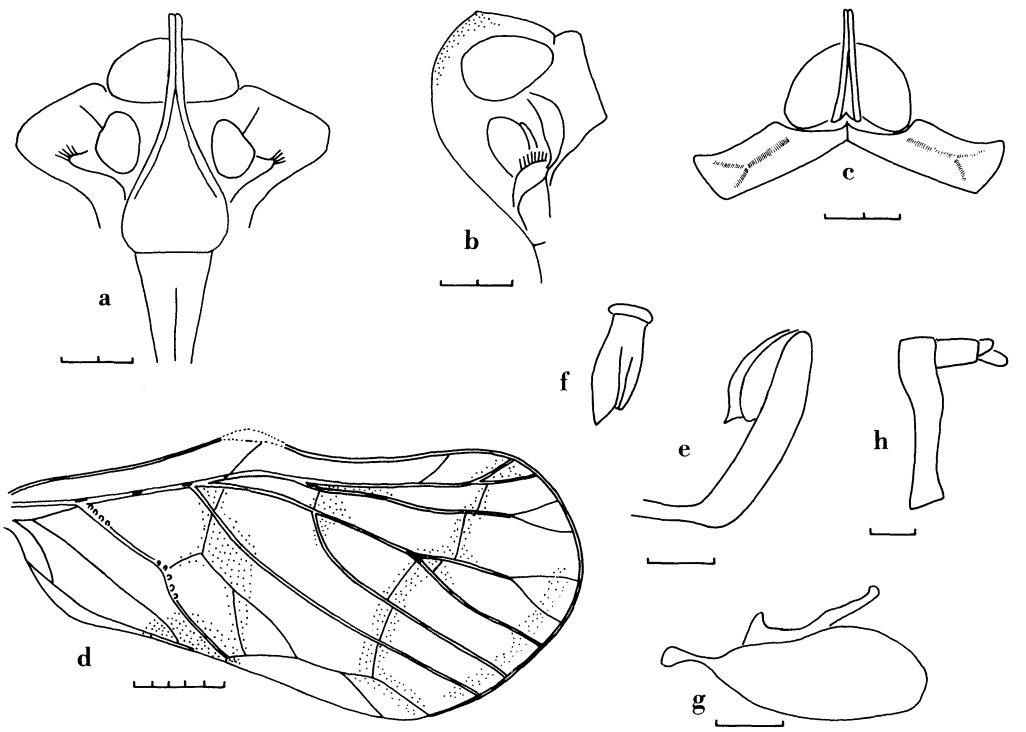

FIG. 19. *Saccharodite quinalayoi,* holotype ♂: **a,** frons; **b,** head in side view; **c,** vertex; **d,** tegmen; **e,** aedeagus in side view; **f,** apex of aedeagus in dorsal view (tip down); **g,** genital style; **h,** pygofer and anal segment. Scales: a, b, c = 0.2 mm; d = 0.5 mm; e–f, g, h = 0.1 mm.

Distribution. Philippines (Mindanao I, Basilan I).

Remarks. Saccharodite separata is characterized by the tegmina not having the bases of Cu1 and Ms1b merged. However, it is closely related in structure and coloration to some species of *Saccharodite* from Borneo, which show the common tegmen venation.

Saccharodite quinalayoi Zelazny, **new species** Fig. 19

Holotype (Fig. 19). ♂, body 2.0 mm, tegmen 3.3 mm. In profile junction of vertex and frons slightly angulated; subantennal processes connected to margins of facial carinae by a ridge; rostrum slightly surpassing hind coxae. Tegmen about 2× as long as wide; costal margin sinuate; basal median cell broad, M leaves Sc+R near apex of that cell; basal cell between Sc+R and M about ⅓ as wide as basal median cell; Cu1 merging with base of Ms1b, then separating, merging again, and just before hind margin separating once more. *Color* white to stramineous; facial carinae above eyes and fore tibiae tinted with orange; fore femora with a red longitudinal stripe; fore tarsi red; middle femora with 2 small red marks. Tegmen glassy; very faintly infuscated from base of 1st median sector to clavus tip, near Sc+R fork, near base of 2nd median sector, along apical crossveins, and before apical margin; veins white to stramineous; parts of costa, subcosta, radius, and hind margin orange; last subcostal sector and adjoining parts of costa orange-red; junction of media and 3rd median sector conspicuously dark orange-brown; Sc+R base with 4 dark brown spots. *Genitalia.* Genital style oval; proximal dorsal process short, distal one longer and slightly

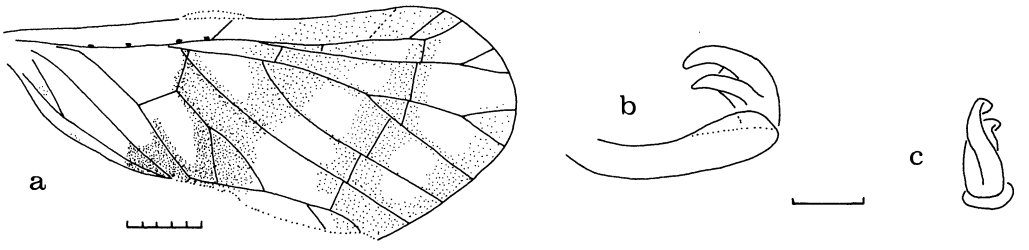

FIG. 20. *Saccharodite luzonensis,* holotype ♂: **a,** tegmen; **b,** aedeagus in side view; **c,** apex of aedeagus in dorsal view (tip up). Scales: a = 0.5 mm; b–c = 0.1 mm.

curved at tip. Apical portion of aedeagus partly membraneous, ending in 2 lobes, the right one longer with a pointed tip.

Paratypes. Average size of ♂: body 2.0 ± 0.1 mm, tegmen 3.2 ± 0.1 mm (n = 15); ♀: body 2.1 ± 0.2 mm, tegmen 3.2 ± 0.2 mm (n = 10).

Holotype ♂, PI: LUZON I: Albay Prov, Jovellar, I.1977, off banana, D. Quinalayo (BISHOP 11,948). Paratypes. PI: LUZON I: Camarines Sur Prov: Mt Iriga, 500–600 m, 6.IV.1962, 1♂, H.M. Torrevillas; Nabua, XI.1978, 1♂, off coconut palm, D. Quinalayo (ARC); Albay Prov: Ligao, XI.1976, 1♂, F. Otilano; Guinobatan, X.1975, I,VI,XII.1976, I.1977, 8♂,7♀, Quinalayo, Otilano, J. Patola, B. Zelazny (BISHOP & ARC); Mayon Volcano, III.1977, 1♀, off coconut palm, Otilano (ARC); Camalig, I.1977, 2♂, off coconut palm and *Kolowratia sp.,* W.S. Imperial, Quinalayo (BISHOP & ARC); Jovellar, I.1977, 2♂,2♀, off banana, Quinalayo, Otilano, Imperial, Zelazny (ARC); Daraga, IV.1978, 1♀, Zelazny (ARC); Legaspi, II.1977, 1♂,2♀, off cacao and coconut palm, Quinalayo, Otilano (BISHOP & ARC). PI: MINDANAO I: Misamis Or. Prov, Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14.VIII.1965, 1♂, Torrevillas.

Distribution. Philippines.

Remarks. Saccharodite quinalayoi can be recognized by the tegmen having Cu1 and Ms1b separately reaching the hind margin, by its conspicuously marked junction of M and Ms3, and by its pale color. This species is named in honor of the collector of the holotype, Mr D. Quinalayo.

Saccharodite luzonensis Zelazny, **new species** Fig. 20

Holotype (Fig. 20). ♂, body 2.1 mm, tegmen 3.5 mm. In profile vertex and frons slightly angulated; subantennal processes connected to margins of facial carinae by a ridge; rostrum reaching hind coxae. Tegmen with basal median cell broad, M leaves Sc+R near apex of that cell; basal cell between Sc+R and M about ⅓ as wide as basal median cell; Cu1 merging with base of Ms1b, after a short section separating, then merging again, and before hind margin separating once more. *Color* white; margins of facial carinae near bases orange; mesopleuron with an orange mark; metapleuron with a red dot; fore legs stramineous, but a red, longitudinal stripe on fore femora and fore tarsi; middle femora with a few red marks; hind femora with 1 red mark. Tegmen glassy; broadly infuscated from clavus tip to 2nd costal cell, along apical crossveins, and along hind margin; most parts of R, Ms1, Ms2, and Ms3 and parts of C, Sc, M, the last subcostal sector, and the apical margin bright orange-red; 4 reddish brown dots on base of Sc+R; hindwings mutilated; the preserved parts colorless, but apical sections of Sc, R, and M bright red. *Genitalia.*

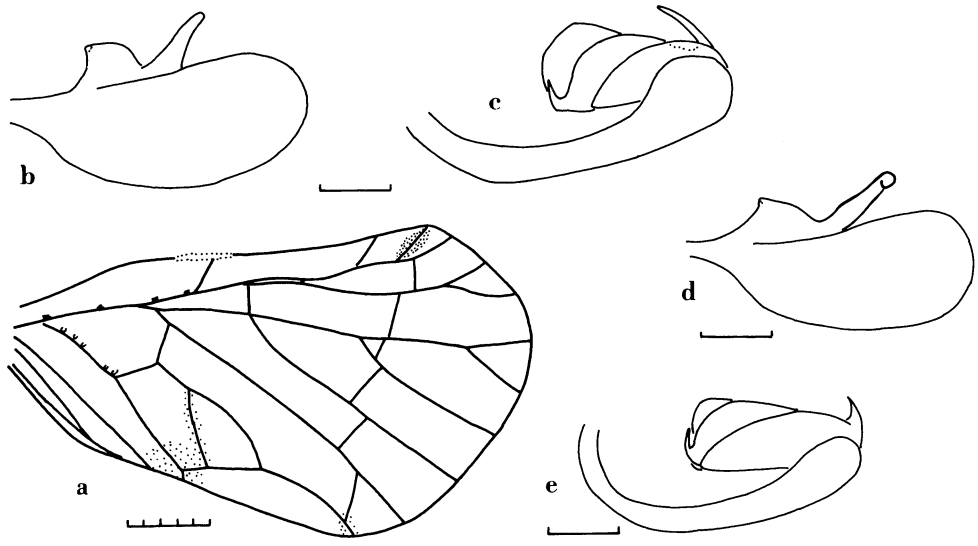

FIG. 21. **a–c,** *Saccharodite rhinoceros,* holotype ♂: **a,** tegmen; **b,** genital style; **c,** aedeagus in side view. **d–e,** *Saccharodite cornicula,* holotype ♂: **d,** genital style; **e,** aedeagus in side view. Scales: a = 0.5 mm; b–c, d, e = 0.1 mm.

Pygofer narrow. Genital style oval, dorsal processes slender. Stem of aedeagus slightly widening on left side before apical portion; apical portion bearing 2 lobes, both curved to right side, and with rounded tips.

Holotype ♂, PI: LUZON I: Camarines Sur Prov, Mt Isarog, Pili, 800 m, 27.IV.1965, light trap, H.M. Torrevillas (BISHOP 11,949).

Distribution. Philippines (Luzon I).

Remarks. Saccharodite luzonensis is related to *Saccharodite quinalayoi* by its structure and wing venation. It can be easily separated by its more colorful tegmina and hindwings.

Saccharodite rhinoceros Zelazny, **new species** Fig. 21a–c

Holotype (Fig. 21a–c). ♂, body 1.9 mm, tegmen 3.2 mm. In profile junction of frons and vertex slightly angulated; subantennal processes not connected to margins of facial carinae; rostrum reaching hind coxae. Tegmen with basal median cell broad, M leaves Sc+R near apex of that cell; basal cell between Sc+R and M less than ½ as wide as basal median cell. *Color* orange-red, but the following areas stramineous: apical parts of facial carinae, clypeus and labium, subantennal processes, antennae, lateral parts of pronotum, tegulae, some patches on thoracic pleura, 2 lateral patches on mesonotum, and all of scutellum. Fore legs stramineous; middle and hind legs with coxae, trochanters, and basal ⅔ of femora orange-red, rest stramineous. Tegmen glassy; very faintly infuscated near apex of clavus; in this area veins orange, remaining veins light brown to stramineous; last subcostal sector accompanied by light infuscation tinted with orange, this vein and adjacent part of costa orange; very base of tegmen red; 4 dark brown marks on base of Sc+R. Hindwing with veins stramineous to orange. *Genitalia.* Pygofer narrow. Genital style oval; proximal dorsal process broad, its tip curved inwards; distal dorsal process elongated. Aedeagus with a large apical portion consisting of 3 lobes, the right one large, rounded, bearing a long, slender, slightly curved process at its base, the central one ending in a curved hornlike process, the left one short.

Paratypes. Average size of ♂: body 2.0 ± 0.1 mm, tegmen 3.2 ± 0.1 mm (n = 15); ♀: body 1.9 ± 0.0 mm, tegmen 3.2 ± 0.1 mm (n = 2).

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 30.VIII.1965, L. Torrevillas (BISHOP 11,950). Paratypes. PI: MINDANAO I: Lanao del Norte Prov, Kolambugan, 1914, 1♀, Baker; Misamis Or. Prov, same locality as holotype, 18.VII.1965, 14,22.VIII.1965, 5♂, H. Torrevillas. MALAYSIA: SABAH (Borneo): Tawau, Quoin Hill, Cocoa Res. Stn., 29.IX.1962, 1♂, Y. Hirashima; Forest Camp, 19 km N of Kalabakan, 60 m, 10–30.X.1962, 16.XI.1962, 17♂, K.J. Kuncheria, Hirashima. MALAYSIA: SARAWAK (Borneo): Gunong Matang, 120 m, 13.IX.1958, 1♂, J.L. Gressitt; Matang 450–894 m, 15.IX.1958, 1♂, Gressitt & T.C. Maa.

Distribution. Philippines (Mindanao I), Borneo.

Remarks. Saccharodite rhinoceros resembles *Saccharodite cornicula,* n. sp. in structure and coloration but has a stramineous clypeus, a red center of the pronotum, and much longer processes on the apical portion of the male aedeagus.

Saccharodite cornicula Zelazny, **new species** Fig. 21d, e

Holotype (Fig. 21d, e). ♂, body 2.0 mm, tegmen 3.4 mm. Very similar to *Saccharodite rhinoceros,* but apex of clypeus and a longitudinal stripe on fore femora red; pronotum stramineous. *Genitalia.* Pygofer narrow. Genital style oval; proximal dorsal process broad, distal dorsal process elongated, curved outwards. Aedeagus similar to that of *Sa. rhinoceros,* but processes on base of right apical lobe and at tip of central apical lobe smaller; central apical lobe bears minute teeth.

Paratypes. Average size of ♂: body 2.0 ± 0.0 mm, tegmen 3.4 ± 0.2 mm (n = 5).

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14.VIII.1965, H. Torrevillas (BISHOP 11,951). Paratypes. PI: LUZON I: Laguna Prov, Mt Makiling, 2♂, Baker (USNM). PI: MINDANAO I: Misamis Or. Prov, same locality as holotype, 18.VII.1965, 22.VIII.1965, 3♂, H. & L. Torrevillas.

Distribution. Philippines.

Remarks. Saccharodite cornicula resembles closely *Saccharodite rhinoceros* but is slightly larger, has a red clypeus tip, a stramineous pronotum, and much smaller processes on the apical portion of the male aedeagus.

Saccharodite inermis Zelazny, **new species** Fig. 22

Holotype (Fig. 22). ♂, body 1.7 mm, tegmen 3.3 mm. In profile junction of vertex and face rounded; subantennal processes connected to margins of facial carinae; rostrum reaching hind coxae. Tegmen 2.1× longer than wide; basal median cell broad, M leaves Sc+R near apex of that cell; basal cell between Sc+R and M less than ⅓ as wide as basal median cell. *Color* stramineous; 2 red dots in front and above eyes; apex of frons with an orange-red mark connected to a red mark at clypeus base; apex of clypeus red; base of scutellum with a faint red mark, very tip with a small but conspicuous bright red dot; thoracic pleura dotted with red; front femora each with 2 longitudinal red stripes; a red dot each on middle and hind femora; junctions of femora and tibiae on all legs red; abdomen stramineous with few red marks on tergites and sternites. Tegmen glassy; very faintly infuscated in a broad band extending from clavus tip to end of 1st costal cell, and along apical crossveins; veins in these areas orange-brown; 3rd subcostal

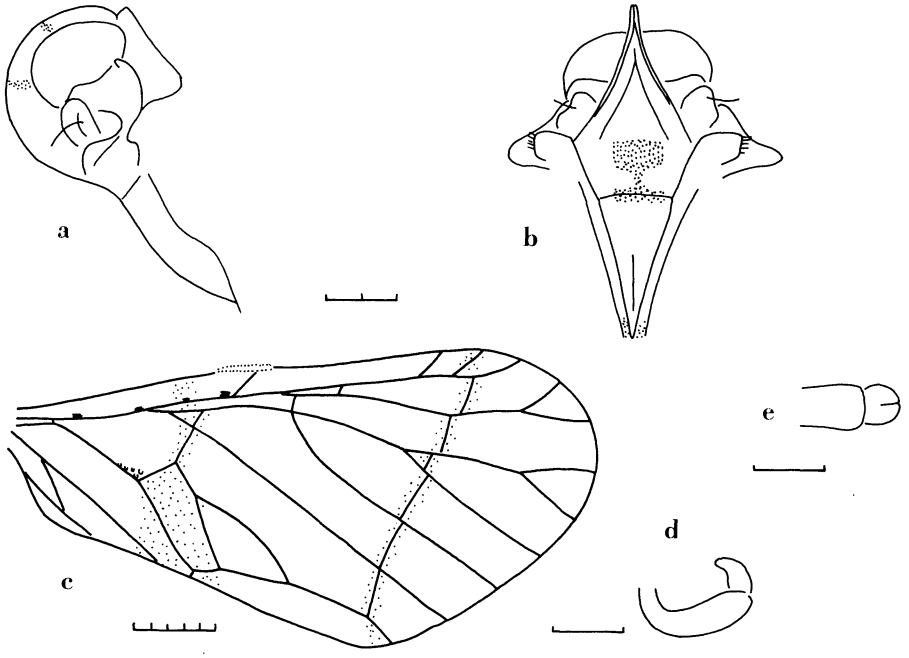

FIG. 22. *Saccharodite inermis,* holotype ♂: **a,** head in side view (dotted areas red); **b,** frons (dotted area orange-red); **c,** tegmen; **d,** aedeagus in side view; **e,** aedeagus in apical view. Scales: a–b = 0.2 mm; c = 0.5 mm; d, e = 0.1 mm.

sector and 3 short sections of costa red; remaining veins stramineous; 4 dark reddish brown spots on base of Sc+R. *Genitalia.* Pygofer narrow. Genital style oval; dorsal processes slender, widely separated. Aedeagus small; apical portion short, with central impressed line, without lobes or processes.

Paratypes. In most specimens there is no faint reddish mark on scutellum base. Average size of ♂: body 1.8 ± 0.1 mm, tegmen 3.4 ± 0.1 mm (n = 4).

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 22.VIII.1965, L. Torrevillas (BISHOP 11,952). Paratypes. PI: MINDANAO I: Misamis Or. Prov, same locality as holotype, 14,22,30.VIII.1965, 4♂,1♀, L. & H. Torrevillas.

Distribution. Philippines (Mindanao I).

Remarks. Saccharodite inermis is characterized by the conspicuous red dot on the scutellum tip, and by the small and simple male aedeagus.

Saccharodite basicolorata Zelazny, **new species** Fig. 23

Holotype (Fig. 23). ♂, body 2.1 mm, tegmen 3.4 mm. In profile junction of vertex and face rounded; subantennal processes not connected to margins of facial carinae; rostrum reaching hind coxae. Tegmen 2× as long as wide; basal median cell broad, M leaves Sc+R near apex of that cell; basal cell between Sc+R and M ½ as wide as basal median cell. *Color* stramineous; vertex, facial carinae in front of eyes, and central part of pronotum faintly tinted with orange; lateral and apical parts of scutellum, metanotum, and abdominal tergites bright red. Tegmen glassy; basal ⅓ faintly infuscated; basal parts of cubital veins orange-

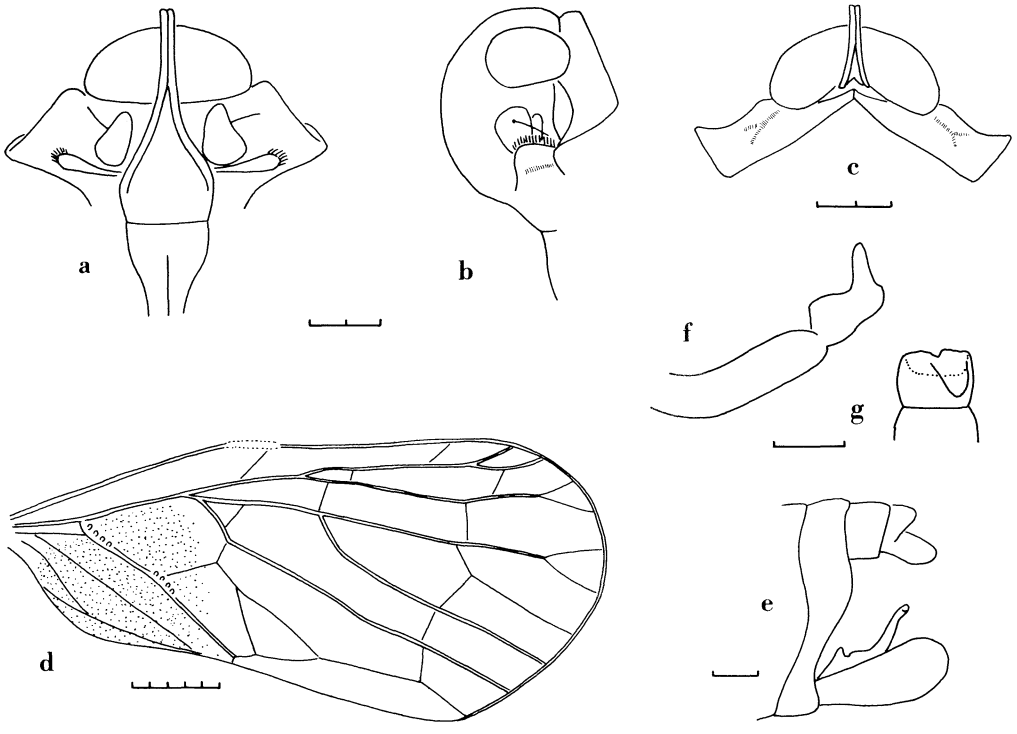

FIG. 23. *Saccharodite basicolorata,* holotype ♂: **a,** frons; **b,** head in side view; **c,** vertex; **d,** tegmen; **e,** pygofer, anal segment, and genital style; **f,** aedeagus in side view; **g,** apex of aedeagus in dorsal view. Scales: a–b, c = 0.2 mm; d = 0.5 mm; e, f–g = 0.1 mm.

red; short sections of costal margin near last subcostal sector, and hind margin near clavus tip red; all other veins stramineous; 4 faint dark spots on base of Sc+R. Hindwing with veins in basal ⅓ and stridulation area red; other veins colorless. *Genitalia.* Pygofer narrow. Genital style oval; dorsal processes widely separated, slender, an inconspicuous hump in between them. Aedeagus with apical portion short and broad, its left side bearing a fingerlike membraneous lobe.

Paratypes. In some specimens from Mindanao all of the scutellum is red, in a few specimens, red color also extends to apical parts of mesonotum, in other specimens only scutellum tip is red. In 10 specimens apical sections of cubital veins orange-red but basal parts stramineous. The fingerlike, membraneous process on apex of aedeagus varies in size; in some specimens it is shrivelled, in others no process could be seen at all. Average size of ♂: body 2.1 ± 0.1 mm, tegmen 3.6 ± 0.3 mm (n = 33); ♀: body 2.0 ± 0.2 mm, tegmen 3.5 ± 0.2 mm (n = 7).

Holotype ♂, PI: LUZON I: Albay Prov, Mayon Volcano, XI.1976, coconut palm, D. Quinalayo (BISHOP 11,953). Paratypes. PI: LUZON I: Ifugao Prov, Liwo, 8 km E of Mayoyao, 1000–1300 m, 13.IV.1967, 7–8.VI.1967, 2♂, light trap, H.M. Torrevillas; Camarines Sur Prov, Mt Isarog, Pili, 500–800 m, 3–5,13,21–29.IV.1965, 29♂,1♀, light trap, Torrevillas; Albay Prov: Mayon Volcano, XI.1976, III.1977, 4♀, off coconut palm, W. Imperial, D. Quinalayo, J. Patola (BISHOP & ARC); Tabaco, II.1976, III.1977, 3♀, Quinalayo, Imperial (BISHOP & ARC). PI: MINDANAO I: Mi-

samis Or. Prov: Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 15.IX.1965, 1♂, light trap, H. Torrevillas; Mt Empagatao, 1050–1200 m, 19–30.IV.1961, 5♂,1♀, light trap, H.M. & W. Torrevillas; Mt Balatukan, 15 km SW of Gingoog, 1000–2000 m, 27.IV–5.V.1960, 8♂, H. Torrevillas; Mt Kigungol, 20 km SE of Gingoog City, 700–800 m, 9–18.IV.1960, 3♂, W. Torrevillas; Minalwang, 1050 m, 24.III–4.IV.1961, 1♀, H. Torrevillas; Bukidnon Prov, Mt Katanglad, 1250 m, 26.X.1959, 1♂, L. Quate & C. Yoshimoto.

Distribution. Philippines.

Remarks. Saccharodite basicolorata can be recognized by the red and dark marks around the wing bases.

Saccharodite imperiali Zelazny, **new species** Fig. 24

Holotype (Fig. 24). ♂, body 2.0 mm, tegmen 3.1 mm. In profile vertex meeting frons at an angle of 120°; subantennal processes slightly angulated, connected to margins of facial carinae by a ridge; rostrum slightly surpassing hind coxae. Tegmen 1.7× longer than wide; costal margin sinuate; Sc+R fork slightly distad of middle of tegmen; basal median cell broad; a tiny triangle at base of 1st median sector; basal cell between Sc+R and M less than ½ as wide as basal median cell. *Color* cream to stramineous; in profile facial carinae orange to orange-red, coloration strongest near junction of vertex and frons, fading towards clypeus; frons uniformly orange; posterior ½ of mesonotum but not scutellum with a blood red rhomboid mark, its lateral corners slightly extended forward; anterior part of mesonotum with 2 lateral and 1 central faintly orange marks; thoracic pleura with a few orange and red marks; middle coxae and middle and hind femora each with a red mark. Tegmen glassy; very faintly infuscated along apical crossveins, and near clavus tip; veins stramineous, but the following parts orange-red or orange-brown: last subcostal sector, apical crossvein between subcosta and radius, basal and apical crossveins between radius and media, and sections of costa, subcosta, radius, and media adjacent to these veins, veins near junction of M and Ms1, sections of hind margin, and cubital veins adjacent to clavus tip; 4 piceous spots on base of Sc+R. Hindwing colorless but part of claval vein red. *Genitalia.* Pygofer narrow. Genital style oval; proximal dorsal process broad, its tip curved inwards; distal process elongated, tapering at end, its tip curved outwards; a small triangular projection in between both processes. Aedeagus stem with membraneous, folded section on dorsal side just before apical portion; apical part large bearing 3 lobes, right lobe rounded, with a long and slender process at its base, central lobe pointed at end, left lobe elongated, partly membraneous.

Paratypes. Most of the older specimens do not show any faint orange marks on anterior part of mesonotum. Average size of ♂: body 2.1 ± 0.1 mm, tegmen 3.3 ± 0.1 mm (n = 27); ♀: body 2.0 ± 0.2 mm, tegmen 3.2 ± 0.2 mm (n = 4).

Holotype ♂, PI: LUZON I: Albay Prov, Guinobatan, XI.1975, W. Imperial (BISHOP 11,954). Paratypes. PI: LUZON I: Camarines Sur Prov, Mt Isarog, Pili, 600–800 m, 26.IV.1963, 5,27.IV.1965, 3♂, light trap, H.M. Torrevillas; Albay Prov: Ligao, XI.1976, 4♂,1♀, W. Imperial, F. Otilano, D. Quinalayo (ARC & BISHOP); Guinobatan, XI.1975, I.1976, X–XII.1976, 30♂,3♀, Otilano, B. Zelazny, J. Patola. PI: MINDANAO I: Agusan del Sur Prov, Los Arcos, 20,21.X.1959, 1♂, light trap, L. Quate & C. Yoshimoto; Misamis Or. Prov: Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 15,26.IX.1965, 9.X.1965, 5♂, light trap, Torrevillas; Mt Balatukan, 15 km SW of Gingoog City, 1000–2000 m, 27.IV–5.V.1960, 2♂, Torrevillas; Gingoog, 26,27.IV.1960, 1♂, Torrevillas; Hindangon, 20 km S of Gingoog City, 600–700 m, 20–24.IV.1960, 1♂, Torrevillas; Mt Empagatao, 1050–1200 m, 19–30.IV.1961, 2♂,

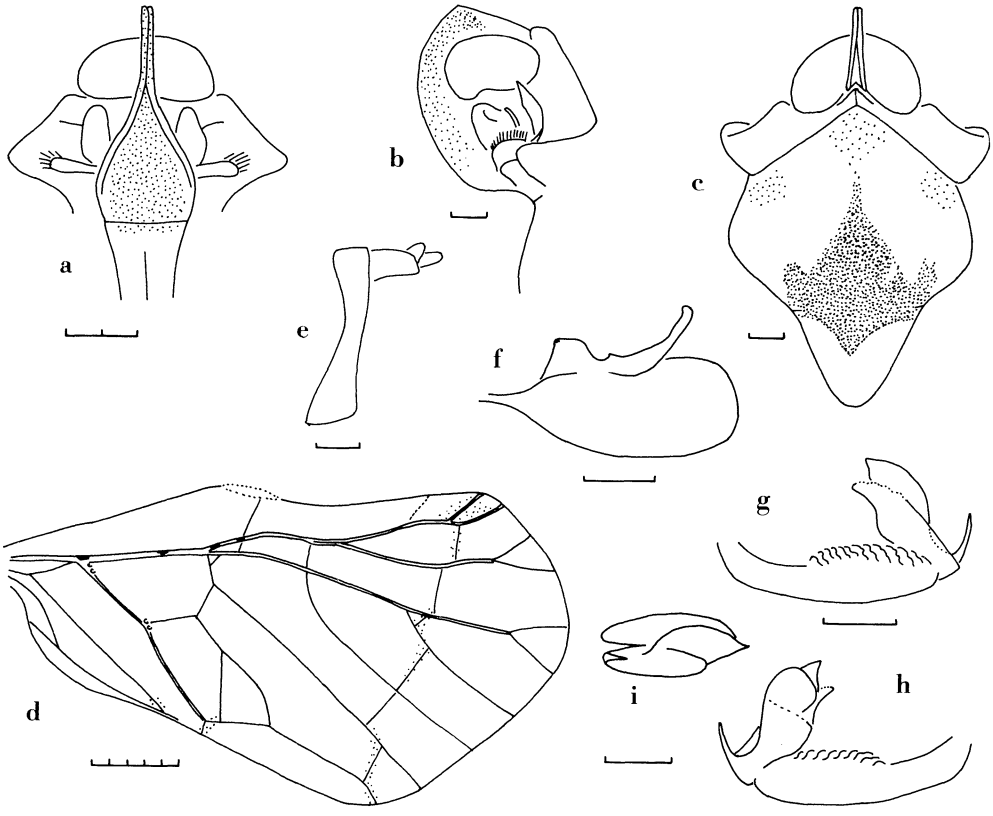

FIG. 24. *Saccharodite imperiali,* holotype ♂: **a,** frons (dotted area orange); **b,** head in side view (dotted area orange to orange-red); **c,** head, pro- and mesonotum in dorsal view (densely dotted area red, lightly dotted areas pale orange); **d,** tegmen; **e,** pygofer and anal segment; **f,** genital style; **g,** aedeagus left side; **h,** aedeagus right side; **i,** apex of aedeagus in dorsal view (tip at right). Scales: a = 0.2 mm; b, c, e, f, g, h–i = 0.1 mm; d = 0.5 mm.

light trap, Torrevillas; Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 18.VII.1965, 14–30.VIII.1965, 37♂, malaise trap, H.M. & L. Torrevillas; Zamboanga del Sur Prov, 11 km NW of Milbuk, 390 m, 5.VIII.1958, 3♂, H.E. Milliron. MALAYSIA: SABAH (Borneo): SE, Forest Camp, 19 km N of Kalabakan, 19.X.1962, 1♂, K.J. Kuncheria.

Distribution. Philippines, Borneo.

Remarks. Saccharodite imperiali is closely related to *Sa. virgata,* n. sp., *Sa. terebra,* n. sp., and *Sa. spinosa,* n. sp.; all 4 species have a conspicuous bright red rhomboid mark on the mesonotum. *Sa. imperiali* can be recognized by the uniformly orange-colored frons and the long, slender process at the base of the right apical lobe of the aedeagus. The male genitalia are very similar to those of *Saccharodite kagoshimana* (Matsumura) from Japan, which, however, lacks the bright red mark on the mesonotum. This species is named in honor of the collector of the holotype, Mr W. Imperial.

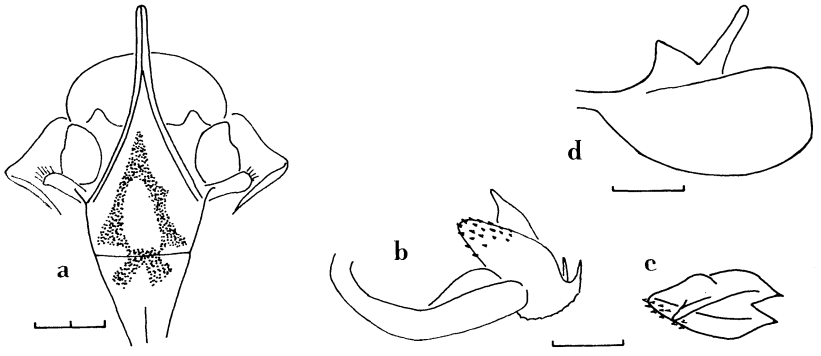

FIG. 25. *Saccharodite spinosa,* holotype ♂: **a,** frons (dotted areas red); **b,** aedeagus in side view; **c,** apex of aedeagus in dorsal view (tip at left); **d,** genital style. Scales: a = 0.2 mm; b–c, d = 0.1 mm.

Saccharodite spinosa Zelazny, **new species** Fig. 25

Holotype (Fig. 25). ♂, body 1.9 mm, tegmen 3.8 mm. Very similar in shape and coloration to *Sa. imperiali.* Frons stramineous with 2 broad red bands meeting at bases; junction of clypeus and frons faintly red; no faint orange marks on anterior part of mesonotum. Tegmen as in *Sa. imperiali,* but veins near junction of M and Ms1 stramineous; 3 piceous spots on base of Sc+R. *Genitalia.* Genital style oval; proximal dorsal process broad, distal dorsal process elongated. Aedeagus with apical portion conical, bearing minute teeth on left side near tip; 2 short and pointed processes attached to base, their outer sides slightly serrated; right side bears a dorsal, pointed process directed to left, and an additional small, rounded lobe.

Paratypes. In all paratypes the red bands on frons are broader, combining to a triangular mark with a stramineous center. Half of ♂ have shorter processes at base of apical portion of aedeagus. Average size of ♂: body 2.1 ± 0.2 mm, tegmen 3.5 ± 0.4 mm (n = 4); ♀: body 2.1 mm, tegmen 3.2 mm.

Holotype ♂, PI: MINDANAO I: Bukidnon Prov, 1250 m, Mt Katanglad, 26.X.1959, light trap, L. Quate & C. Yoshimoto (BISHOP 11,955). Paratypes. PI: LUZON I: Camarines Sur Prov, Mt Iriga, 500 m, 28.IV.1962, 1♂, H. Torrevillas. PI: MINDANAO I: Misamis Or. Prov: Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 22.IX.1965, 1♂, light trap, Torrevillas; Mt Balatukan, 15 km SW of Gingoog City, 1000–2000 m, 21,27–30.IV.1960, 2♂,1♀, Torrevillas. MALAYSIA: SABAH (Borneo): W Coast Residency, Ranau, 8 mi [13 km] N of Paring Hot Springs, 500 m, 9–18.X.1958, 2♂, T.C. Maa.

Distribution. Philippines, Borneo.

Remarks. Saccharodite spinosa is closely related to *Sa. imperiali, Sa. virgata,* n. sp., and *Sa. terebra,* n. sp.; it can be recognized by the broad red bands on the frons, and by the 2 short, pointed processes at the base of the apical portion of the aedeagus. The male genitalia resemble those of *Saccharodite toroensis* (Matsumura) from Formosa, but the aedeagus of *Sa. spinosa* has small teeth on the left side, near the apex.

Saccharodite virgata Zelazny, **new species** Fig. 26

Holotype (Fig. 26a–d). ♂, body 2.0 mm, tegmen 3.2 mm. In shape and coloration very similar to *Sa. imperiali.* Anterior part of mesonotum without central faint orange mark; frons with 2 fine red longitudinal

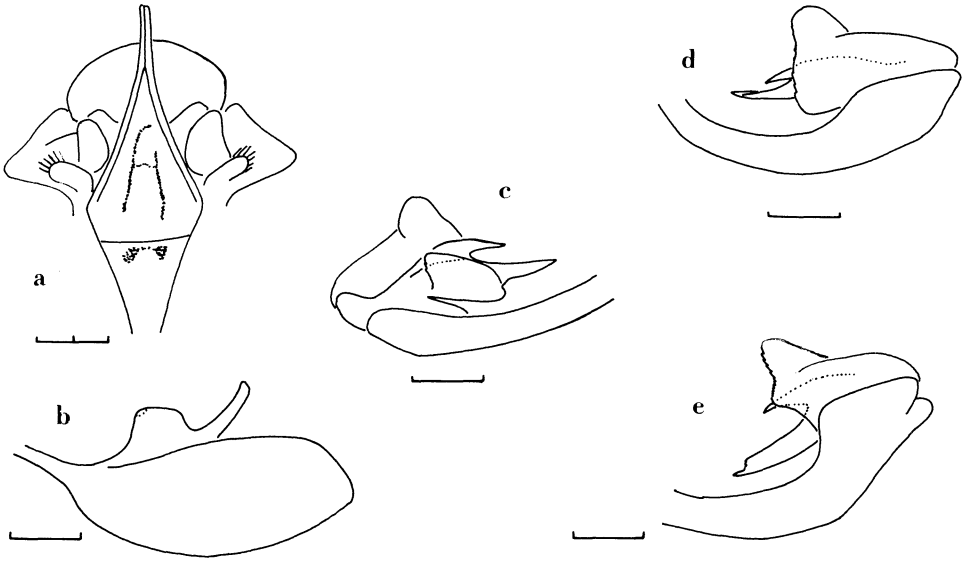

FIG. 26. *Saccharodite virgata*: **a–d,** holotype ♂: **a,** frons (dotted areas red or orange-red); **b,** genital style; **c,** aedeagus right side; **d,** aedeagus left side; **e,** ♂ specimen from Mindanao, aedeagus left side. Scales: a = 0.2 mm; b, c, d, e = 0.1 mm.

lines; junction of frons and clypeus with 2 orange-red dots. Last subcostal sector of tegmen lined with red.

Genitalia. Pygofer narrow. Genital style oval, slightly pointed at tip; proximal dorsal process broad, its tip pointed and curved inwards; distal dorsal process fingerlike, slightly narrowing towards apex. Aedeagus with stem widening on left side just before apical part; apical portion consisting of 2 parts, a left part with a rounded lobe widening and finely serrated at end, and a right part with a small rounded lobe at its base, near tip extending into 2 pointed processes, upper one shorter; an additional small membraneous lobe attached to right side.

Paratypes. Aedeagus of specimens from Luzon as in holotype; however, in specimens from Mindanao, lower process on right side of apical portion broader, narrowing abruptly near tip, its apical margin finely serrated (Fig. 26e). One ♂ specimen from Zamboanga has the left apical lobe of aedeagus nearly rectangular in outline, the apical, serrated margin being nearly straight. Average size of ♂: body 2.3 ± 0.2 mm, tegmen 3.2 ± 0.2 mm (n = 21); ♀: body 2.0 ± 0.3 mm, tegmen 3.2 ± 0.2 mm (n = 5).

Holotype ♂, PI: LUZON I: Albay Prov, Mayon Volcano, XII.1976, F. Otilano (BISHOP 11,956). Paratypes. PI: LUZON I: Camarines Sur Prov: Mt Isarog, 750–800 m, 26.IV.1963, 5.IV.1965, 3♂, light trap, H.M. Torrevillas; Mt Iriga, 500–600 m, 6.IV.1962, 1♂, Torrevillas; Albay Prov: Mayon Volcano, XII.1976, 3♂,1♀, off coconut palm, W. Imperial, B. Zelazny (ARC & BISHOP); Guinobatan, XI.1975, I,IX,X,XII.1976, 2♂,4♀, F. Otilano, Imperial, J. Patola (ARC & BISHOP); Ligao, XI.1976, 3♂, Imperial, Otilano, Zelazny (ARC & BISHOP). PI: MINDANAO I: Agusan del Sur Prov, Los Arcos, 19–23.XI.1959, 2♂, light trap, L. Quate & C. Yoshimoto; Misamis Or. Prov: Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14,22,30.VIII.1965, 9♂, malaise trap, H.M. & L. Torrevillas; Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 15.IX.1965, 1♂, light trap, Torrevillas; Zamboanga

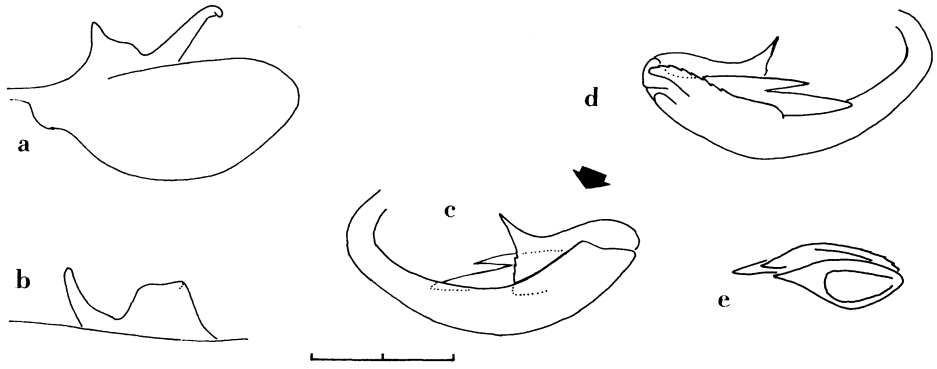

FIG. 27. *Saccharodite terebra,* holotype ♂: **a,** left genital style; **b,** dorsal processes of right genital style; **c,** aedeagus left side (arrow indicates direction of view in e); **d,** aedeagus right side; **e,** apex of aedeagus in dorsal view, tip at left (see arrow in c). Scale = 0.2 mm.

del Sur Prov, Lemesahan, 600 m, 7.IX.1958, 4♂, light trap, H.E. Milliron; 11 km NW of Milbuk, 390 m, 5.VIII.1958, 3♂, Milliron. PI: [no locality], 1958, 1♂, Milliron. MALAYSIA: SABAH (Borneo): SE, Forest Camp, 19 km N of Kalabakan, 60 m, 10,11,19,26,30.X.1962, 16.XI.1962, 10♂, malaise trap, K.J. Kuncheria, Y. Hirashima; Tawau, Quoin Hill, 3–7.VII.1962, light trap, 1♂, H. Holtman.

Distribution. Philippines, Borneo.

Remarks. Saccharodite virgata is closely related to *Sa. imperiali*; *Sa. spinosa,* and *Sa. terebra,* n. sp.; it can be distinguished from the first 2 by the fine red lines on the frons and by the absence of processes at the base of the apical portion of the aedeagus. On the other hand it is externally indistinguishable from *Sa. terebra,* n. sp., from which it differs by bearing on the left side of the apex of the aedeagus a rounded lobe without a pointed process.

Saccharodite terebra Zelazny, **new species** Fig. 27

Holotype (Fig. 27). ♂, body 2.5 mm, tegmen 3.8 mm. Very similar to *Sa. virgata.* No lateral faint orange marks on anterior part of mesonotum. Left side of apical portion of aedeagus with a broad lobe, extending dorsally into a long, slender, and pointed process; right side with a small rounded process at base, apically extending into 2 pointed processes, the ventral one longer; attached to right side an elongated, membraneous, and serrated process directed caudad.

Paratypes. Small variations in structure of apical part of aedeagus have been noted: in most specimens the membraneous, serrated process attached to the right side is shorter than in the holotype; in many specimens from Borneo and Malaysia the right side bears 2 apical processes as in the holotype, but the ventral process is shorter than in the holotype and less pointed. Average size of ♂: body 2.2 ± 0.2 mm, tegmen 3.2 ± 0.3 mm (n = 31).

Other specimens. Eight ♂ from Mt Apo School with red rhomboid mark on mesonotum small or reduced to a narrow horizontal band, crossing mesonotum just before scutellum; red marks on frons and legs smaller and fainter. Average length of tegmen: 3.5 ± 0.2 mm (n = 8).

Holotype ♂, PI: MINDANAO I: Bukidnon Prov, 1250 m, Mt Katanglad, 26.X.1959, light trap, L. Quate & C. Yoshimoto (BISHOP 11,957). Paratypes. PI: MIN-

DANAO I: Agusan del Sur Prov, Los Arcos, 19–23.XI.1959, 3♂, S. Quate & C. Yoshimoto; Misamis Or. Prov: Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 9,15.IX.1965, 2♂, light trap, H.M. Torrevillas; Mt Balatukan, 15 km SW of Gingoog, 1000–2000 m, 21,27–30.IV.1960, 1–5.V.1960, 4♂, Torrevillas; Mt Empagatao, 1050–1200 m, 19–30.IV.1961, 2♂, light trap, Torrevillas; Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14.VIII.1965, 2♂, Torrevillas. MALAYSIA: SABAH (Borneo): Forest Camp, 19 km N of Kalabakan, 60 m, 11,19,27,30.X.1962, 7–10,16.XI.1962, 28♂, K.J. Kuncheria, Y. Hirashima; Tawau, Quoin Hill, Cocoa Res. Stn., 6.IX.1962, 1♂, malaise trap, Hirashima; W Coast Residency, Ranau, 8 mi [13 km] N of Paring Hot Springs, 500 m, 9–18.X.1958, 1♂, T.C. Maa; Sandakan Bay (SW), Sapagaya Lumber Camp, 2–20 m, 5.XI.1957, 1♂, J.L. Gressitt. MALAYSIA: SARAWAK (Borneo): Ban Distr, Bidi, 90–240 m, 2.IX.1958, 1♂, Maa; SW of Tapuh, 4–9.VII.1958, 1♂, Maa; Sadong, Kampong Tapuh, 300–450 m, 4–9.VII.1958, 1♂, Maa; Gunong Matang, 120 m, 12.IX.1958, 1♂, Gressitt; Kuching, Stapok Forest Reserve, 30 m, 16.IX.1958, 1♂, Gressitt & Maa; MALAYSIA (W): Johore, 8 mi [13 km] N of Batu Pahat, J. Baharu Gunong, 27.X.1961, 1♂, Kuncheria; Sungei, Linam, 2–20 m, 20.IX.1960, 1♂, Gressitt; SE, Pahang, Taman, 5 m, 18.IX.1960, 1♂, Gressitt.

Other specimens examined. PI: MINDANAO I: Davao City, Mt Apo School, 15 km SW of Davao, 500 m, 22–31.X.1965, 7–9.XI.1965, 8♂, D. Davis (USNM).

Distribution. Philippines (Mindanao I), Malaysia.

Remarks. Saccharodite terebra is indistinguishable externally from *Sa. virgata*; the males can be recognized by the left apical lobe of the aedeagus extending into a prominent, pointed process.

Saccharodite rubrovenis Zelazny, **new species** Fig. 28

Holotype (Fig. 28). ♂, body 1.6 mm, tegmen 3.1 mm. In profile junction of vertex and frons rounded; subantennal processes connected to margins of facial carinae by a ridge; rostrum slightly surpassing hind coxae. Tegmen slightly mutilated; basal median cell broad, M leaves Sc+R near middle of that cell; basal cell between Sc+R and M less than ½ as wide as basal median cell. *Color* light brown to stramineous; margins of facial carinae in front and above eyes, an oval mark on frons, base of clypeus and some dots on thoracic pleura orange-brown; a ring on rostrum just before apical segment, elongated marks on middle and hind femora, and middle and hind tarsi red (front legs missing); abdomen bright red. Tegmen glassy; lightly and uniformly infuscated except for lighter areas in costal cells, clavus, and near apical margin; claval veins colorless, other veins orange-red, turning white just before apical margin; 2 reddish brown spots on base of Sc+R. Hindwings mutilated. *Genitalia.* Pygofer narrow. Genital style oval; proximal dorsal process conical, distal dorsal process elongated. Aedeagus with apical portion broad, bearing 2 rounded, slightly curved lobes.

Paratype. Orange marks on frons and base of clypeus faint.

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Mt. Empagatao, 1050–1200 m, 19–30.IV.1961, H. Torrevillas (BISHOP 11,958). Paratype. PI: MINDANAO I: Misamis Or. Prov, Mt Empagatao, 25.IV.1961, 1♂, H.M. Torrevillas.

Distribution. Philippines (Mindanao I).

Remarks. Saccharodite rubrovenis can be recognized by the infuscated tegmina and their orange-red veins.

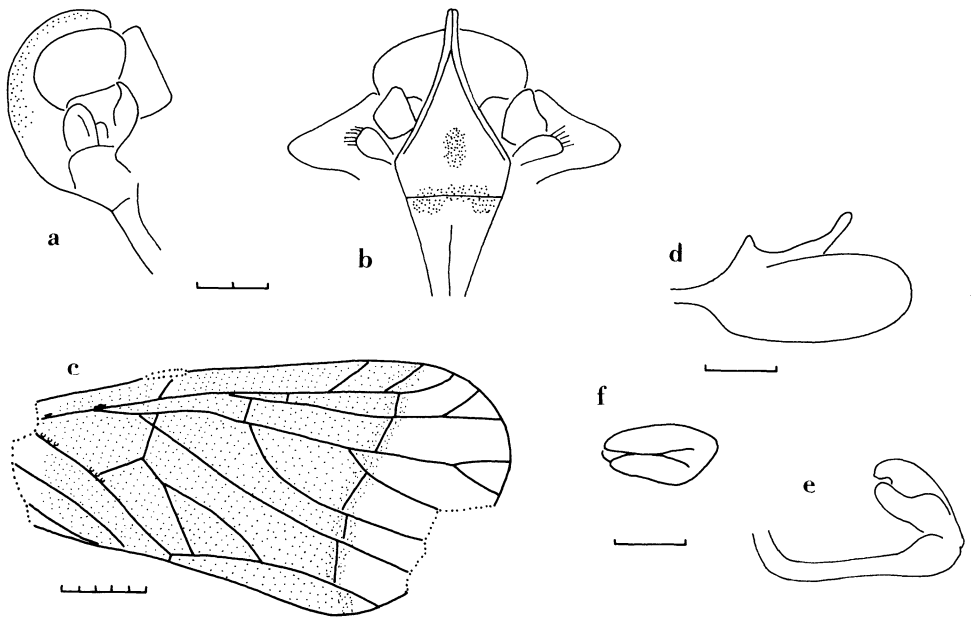

FIG. 28. *Saccharodite rubrovenis,* holotype ♂: **a,** head in side view; **b,** frons (dotted areas in a and b, orange-brown); **c,** tegmen; **d,** genital style; **e,** aedeagus in side view; **f,** apex of aedeagus in dorsal view (tip at left). Scales: a–b = 0.2 mm; c = 0.5 mm; d, e–f = 0.1 mm.

Saccharodite rubirostrata Zelazny, **new species** Fig. 29

Holotype (Fig. 29). ♂, body 2.2 mm, tegmen 3.7 mm. In profile junction of vertex and face rounded, face slightly produced in front of antennae; subantennal processes connected to margins of facial carinae by a low ridge; rostrum reaching hind coxae. Basal median cell of tegmen broad, M leaves Sc+R near apex of that cell; basal cell between Sc+R and M very narrow; 2nd median sector strongly curved. *Color* light brown to stramineous; margins of vertex and facial carinae orange-brown; apical segment of labium bright red; front legs and all tarsi reddish; middle and hind femora with some red marks; middle and hind tibiae tinted with orange; abdomen stramineous, last 4–5 sternites with a few red marks. Tegmen glassy; very lightly infuscated from clavus tip to base of Ms1, in apical costal cells, near base of 2nd median sector, and near apical crossveins; 3rd subcostal sector and surrounding areas red; costal, apical and hind margin (except clavus margin) orange-red; other veins stramineous, but most parts of radius, some parts of media, and an apical section of Cu1 tinted with orange; 3 small brown spots on base of Sc+R. Hindwings including veins colorless. *Genitalia.* Pygofer narrow. Genital style slightly truncated at end; dorsal processes widely separated; proximal one conical, distal one elongated, directed caudad. Aedeagus short and thick; apical portion with a broad, partly membraneous, ventral lobe, narrowing abruptly near tip, and a slender dorsal lobe, originating on right side but crossing to left side, covered with minute teeth.

Paratypes. Average size of ♂: body 2.2 ± 0.1 mm, tegmen 3.6 ± 0.1 mm (n = 3); ♀: body 2.0 mm, tegmen 3.4 mm.

Holotype ♂, PI: MINDANAO I: Zamboanga del Sur Prov, 3.2 km NW of Milbuk, 150 m, 4.VIII.1958, light trap, H.E. Milliron (BISHOP 11,959). Paratypes. PI: [no locality] 1958, 2♂ H. Milliron. PI: MINDANAO I: Zamboanga del Sur Prov: 3.2 km NW of Milbuk, 150 m, 4.VIII.1958, 1♀, light trap, Milliron; Milbuk, 4,9–10.VIII.1958, 2♂, light trap, Milliron.

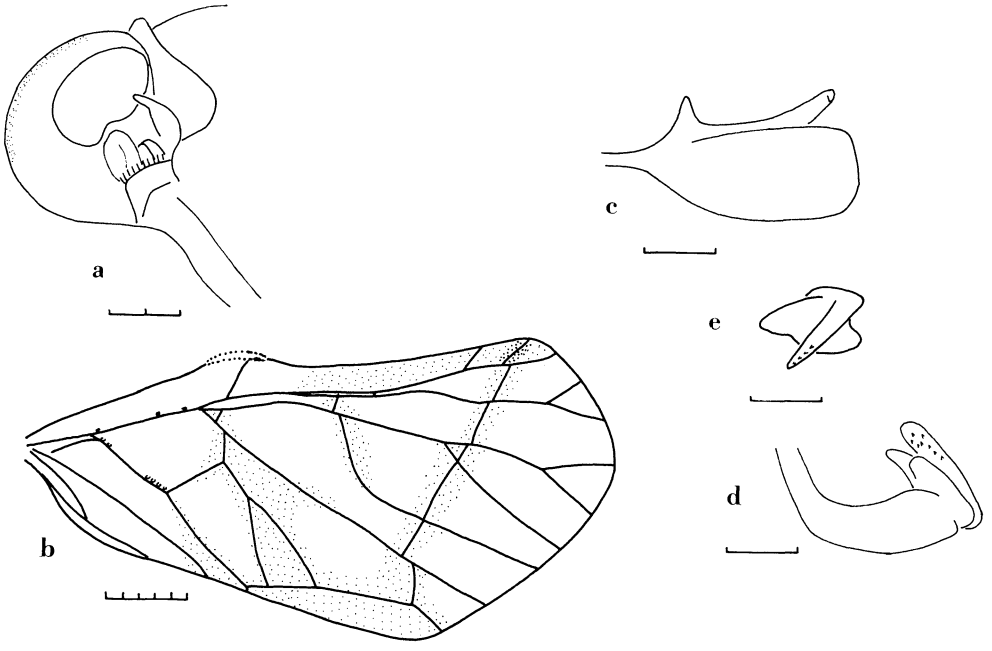

FIG. 29. *Saccharodite rubirostrata,* holotype ♂: **a,** head in side view; **b,** tegmen; **c,** genital style; **d,** aedeagus in side view; **e,** apex of aedeagus in dorsal view (tip at left). Scales: a = 0.2 mm; b = 0.5 mm; c, d, e = 0.1 mm.

Distribution. Philippines (Mindanao I).

Remarks. Saccharodite rubirostrata resembles *Sa. millironi,* n. sp. in the produced profile and the curved 2nd median sector of the tegmen. It can be easily recognized by the bright red apical segment of the labium.

Saccharodite millironi Zelazny, **new species** Fig. 30

Holotype (Fig. 30). ♂, body 2.0 mm, tegmen 3.4 mm. In profile junction of vertex and face faintly angulated; face slightly produced in front of antennae; subantennal processes connected to margins of facial carinae by a low ridge; rostrum reaching hind coxae. Tegmen 2.2× longer than wide; basal median cell broad, M leaves Sc+R near middle of that cell; basal cell between Sc+R and M about ⅓ as wide as basal median cell; 2nd median sector strongly curved. *Color* stramineous; a red ring on proboscis just before apical segment; front legs orange-red; 2 red rings each on middle and hind tibiae; abdomen stramineous. Tegmen glassy; very faintly infuscated in apical costal cells, from clavus tip to apex of basal median cell, around base of 2nd median sector, near apical crossveins, and near apical margin; costal, apical, and hind margin (except for clavus margin) orange-red; veins stramineous, but following sections orange-red: subcosta except at base, 2nd, and 3rd subcostal sector, sections of radius and media which are near junctions with other veins, a basal section of Ms1, and a central section each on Cu1, Ms1, and Ms2; 3 small brown spots on base of Sc+R. Hindwing colorless except for costal and hind margins, and sections of veins near hind margin which are red. *Genitalia.* Pygofer narrow. Genital style oval; proximal dorsal process conical; distal dorsal process elongated. Stem of aedeagus bearing a long and spatulate process on its left side; apical portion small, partly membraneous, bearing 2 short, rounded lobes.

Paratypes. The ♂ from the Solomon Is shows no significant differences compared with the Philippine

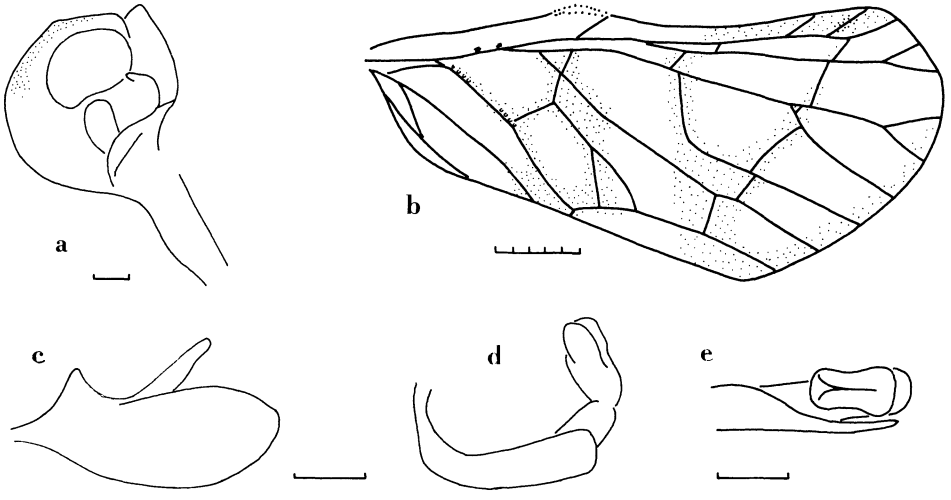

FIG. 30. *Saccharodite millironi,* holotype ♂: **a,** head in side view; **b,** tegmen; **c,** genital style; **d,** aedeagus in side side view; **e,** apex of aedeagus in dorsal view. Scales: a, c–d, e = 0.1 mm; b = 0.5 mm.

specimens. Average size of ♂: body 2.2 ± 0.1 mm, tegmen 3.6 ± 0.2 mm (n = 13); ♀: body 2.4 mm, tegmen 3.6 mm.

Holotype ♂, PI: MINDANAO I: Zamboanga del Sur Prov, Lemesahan, 600 m, 7.IX.1958, light trap, H.E. Milliron (BISHOP 11,960). Paratypes. PI: MINDANAO I: Agusan del Sur Prov, Los Arcos, 19–23.XI.1959, 2♂, light trap, S. Quate, C. Yoshimoto; Misamis Or. Prov: Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14,15,18,30.VIII.1965, 7♂, H.M. & L. Torrevillas; Hindangon, 20 km S of Gingoog City, 600–700 m, 20–24.IV.1960, 2♂, H. Torrevillas; Mt Empagatao, 1050–1200 m, 19–30.IV.1961, 1♂, light trap, Torrevillas; Pigtibiran, 1–13.V.1961, 1♂, light trap, Torrevillas; Davao City, Genitalan, 8 km NW of Mt Apo, 690 m, 17.VIII.1958, 1♂,1♀, light trap, H.E. Milliron; Zamboanga del Sur Prov: 11 km NW of Milbuk, 390 m, 5.VIII.1958, 2♂, Milliron; Milbuk, 9–10.VIII.1958, 1♂, Milliron. SOLOMON IS: San Cristobal, Bweinaniawarikiapu, 12.VIII.1960, 1♂, light trap, C.W. O'Brien.

Distribution. Philippines (Mindanao I), Solomon Is (?).

Remarks. Saccharodite millironi comes closest to *Sa. rubirostrata* in head structure and wing venation. It stands apart by having a red ring before the apex of the proboscis, while the apex itself is stramineous, and by the spatulate branch of the stem of the aedeagus. The occurrence of this species in the Solomon Is needs confirmation. This species is named in honor of the collector of the holotype, Mr H. E. Milliron.

Saccharodite lutea Zelazny, **new species** Fig. 31

Holotype (Fig. 31). ♂, body 2.0 mm, tegmen 3.4 mm. In profile junction of vertex and face rounded; subantennal processes barely connected to margins of facial carinae; rostrum reaching hind coxae. Tegmen nearly 2× as long as wide; basal median cell wide, M leaves Sc+R near apex of that cell; basal cell between

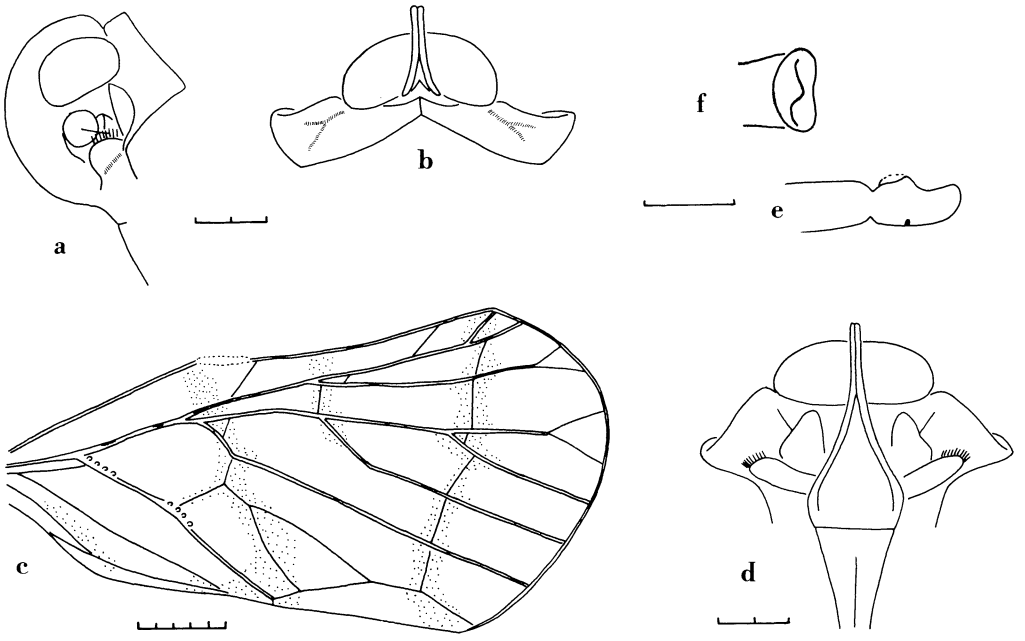

FIG. 31. *Saccharodite lutea,* holotype ♂: **a,** head in side view; **b,** vertex; **c,** tegmen; **d,** frons; **e,** apex of aedeagus in side view; **f,** tip of aedeagus in apical view. Scales: a–b, d = 0.2 mm; c = 0.5 mm; e–f = 0.1 mm.

Sc+R and M less than ½ as wide as basal median cell. *Color* light yellow; margins of facial carinae faintly orange. Tegmen glassy; faintly infuscated from clavus tip to end of 1st costal cell, near Sc+R fork, and near apical crossveins; veins stramineous; 3 brown spots along base of Sc+R. Hindwing colorless. *Genitalia.* Pygofer narrow. Genital style oval; proximal dorsal process short and slender; distal dorsal process fingerlike. Aedeagus with apical portion short, without lobes or processes.

Paratypes. In a number of ♂ specimens, apical portion of aedeagus bears a round membraneous process on left side, similar to aedeagus of *Sa. basicolorata.* In other specimens process shrivelled or absent. Average size of ♂: body 2.0 ± 0.2 mm, tegmen 3.5 ± 0.2 mm (n = 5); ♀: body 2.0 ± 0.2 mm, tegmen 3.4 ± 0.0 mm (n = 5).

Holotype ♂, PI: LUZON I: Albay Prov, Tabaco, XI.1976, D. Quinalayo (BISHOP 11,961). Paratypes. PI: LUZON I: Camarines Sur Prov, Mt Isarog, Pili, 800 m, 23.IV.1965, 1♂, light trap, H.M. Torrevillas; Albay Prov: Tabaco, XI.1976, II.1977, 2♂,3♀, J. Patola, F. Otilano, D. Quinalayo, W. Imperial (BISHOP & ARC); Mt Mayon, 16 km NW of Legaspi, 900–1000 m, 6.V.1962, 2♂, Torrevillas. PI: MINDANAO I: Misamis Or. Prov: Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 16.X.1965, 1♂, light trap, Torrevillas; Mt Balatukan, 15 km SW of Gingoog City, 1000–2000 m, 27.IV–5.V.1960, 3♂, Torrevillas. MALAYSIA: SABAH (Borneo): SE, Forest Camp, 19 km N of Kalabakan, 10,30.X.1962, 5♂,1♀, K.J. Kuncheria; Tawau, Quoin Hill, Cocoa Res. Stn., 225 m, 11.IX.1962, 1♂, Kuncheria.

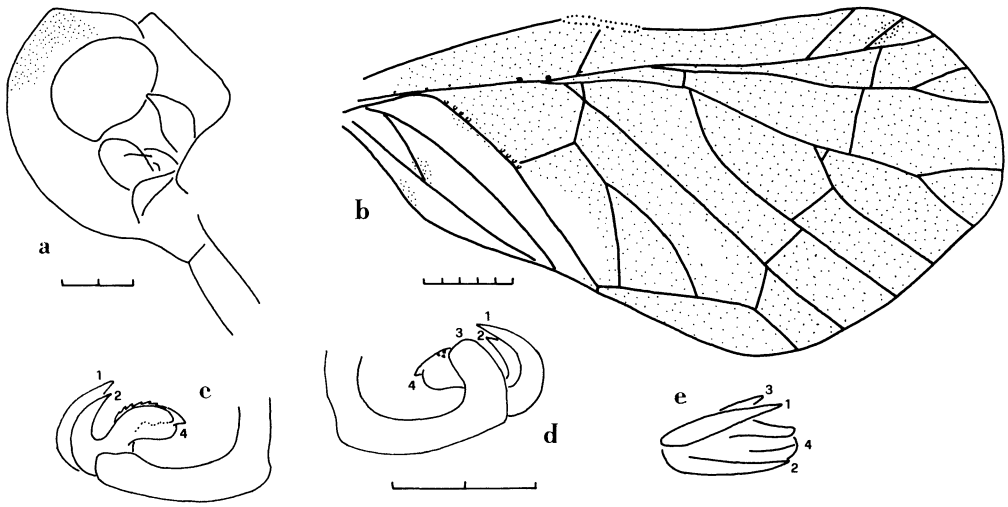

FIG. 32. *Saccharodite bicornis,* holotype ♂: **a,** head in side view; **b,** tegmen; **c,** aedeagus right side; **d,** aedeagus left side; **e,** apex of aedeagus in dorsal view (tip at right) (numbers refer to the lobes shown in c and d). Scales: a, c–e = 0.2 mm; b = 0.5 mm.

Distribution. Philippines, Borneo.

Remarks. Saccharodite lutea resembles *Sa. basicolorata* in head structure, tegmen venation, and male genitalia; it can be recognized by its uniform light yellow color.

Saccharodite bicornis Zelazny, **new species** Fig. 32

Holotype (Fig. 32). ♂, body 2.3 mm, tegmen 3.7 mm. In profile junction of vertex and face slightly angulated; subantennal processes connected to margins of facial carinae by a low ridge; proboscis reaching hind coxae. Tegmen 2× as long as wide; basal median cell broad, M leaves Sc+R near apex of that cell; basal cell between Sc+R and M very narrow. *Color* stramineous; margins of facial carinae above eyes orange; front and middle femora with red stripes; hind femora with a few red spots; fore and middle tibiae each with a red ring around base, and apices tinted with red; hind tibiae with a red dot at base; fore and middle tarsi reddish; abdomen stramineous with a few red marks. Tegmen glassy; faintly infuscated, except for clavus; veins stramineous but the following veins red or orange-red: most parts of costal margin, last subcostal sector, central parts of subcosta, radius, media, Ms1a, Ms2, cubital crossvein, and hind margin near its junction with apical margin; a series of tiny dark spots on base of Sc+R. Hindwing colorless; veins colorless but a central section of costa, hind margin, apical parts of radius and media, and median sectors orange-red. *Genitalia.* Pygofer narrow. Genital style oval; proximal dorsal process conical; distal dorsal process slender. Stem of aedeagus on left side with a large rounded process just before apical portion; apical part with 2 long, curved, and pointed processes arising from its base; on dorsal side 2 elevated longitudinal carinae, left one covered with minute teeth and extending into a short pointed terminal process.

Paratypes. Two specimens; both with a faint orange mark on junction of frons and clypeus; one of them also with a faint orange longitudinal mark on frons. Genitalia as in holotype. Average size of ♂: body 2.2 ± 0.1 mm, tegmen 3.5 ± 0.3 mm (n = 2).

Holotype ♂, PI: MINDANAO I: Zamboanga del Sur Prov, 11 km NW of Milbuk,

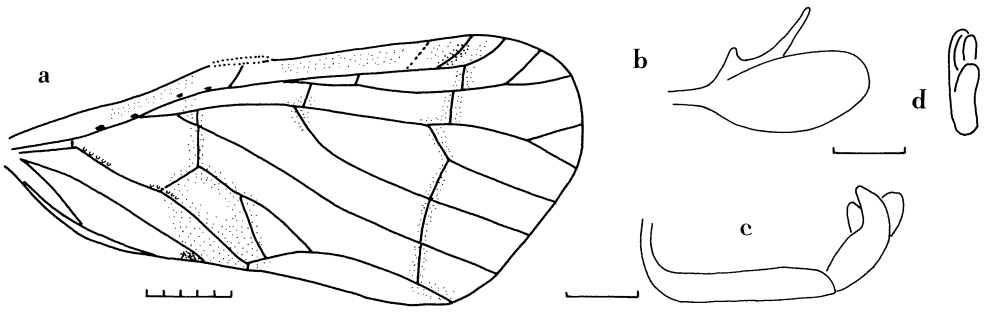

FIG. 33. *Saccharodite misamensis,* holotype ♂: **a,** tegmen; **b,** genital style; **c,** aedeagus in side view; **d,** apical portion of aedeagus in caudal view (tip up). Scales: a = 0.5 mm; b, c, d = 0.1 mm.

390 m, 5.VIII.1958, H.E. Milliron (BISHOP 11,962). Paratypes. PI, MINDANAO I: Misamis Or. Prov, Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14,22.VIII.1965, 2♂, H. & L. Torrevillas.

Distribution. Philippines (Mindanao I).

Remarks. Saccharodite bicornis resembles *Sa. misamensis,* n. sp. It can be separated by the tegmina having the central parts of Ms1 and Ms2 orange-red and no red mark near the 3rd subcostal sector. The males can be easily recognized by the 2 prominent pointed processes at the base of the apical part of the aedeagus.

Saccharodite misamensis Zelazny, **new species** Fig. 33

Holotype (Fig. 33). ♂, body 2.1 mm, tegmen 3.4 mm. In profile junction of vertex and face angulated; subantennal processes connected to margins of facial carinae by a low ridge; rostrum reaching hind coxae. Tegmen 2.2× longer than wide; basal median cell broad, M leaves Sc+R near middle of that cell; basal cell between Sc+R and M less than ½ as wide as basal median cell. *Color* stramineous to light brown; margins of facial carinae, an oblique mark above eyes, front tibiae and tarsi orange; a very faint triangular orange mark near junction of frons and clypeus; front femora with 2 red longitudinal stripes; middle femora with 2, hind femora with 1 red mark. Tegmen glassy; a brown mark at clavus tip; very faintly infuscated in costal area, from clavus tip to apex of basal median cell, and along apical crossveins; 3rd subcostal sector lined with red; veins stramineous to light orange; a section of costa next to 3rd subcostal sector, 3rd subcostal sector, and a portion of hind margin near clavus tip orange-red; 4 reddish brown spots on base of Sc+R. Hindwing including veins colorless. *Genitalia.* Pygofer narrow. Genital style oval. Aedeagus with a slender stem; apical portion ending in 3 short, rounded, partly membraneous lobes, 1 dorsal and 2 lateral.

Paratypes. Average size of ♂: body 1.9 ± 0.1 mm, tegmen 3.1 ± 0.2 mm (n = 10).

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Mt Empagatao, 1050–1200 m, 19–30.IV.1961, light trap, H.M. Torrevillas (BISHOP 11,963). Paratypes. PI: MINDANAO I: Misamis Or. Prov: Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14,18,21,22,30.VIII.1965, 8♂, malaise trap, H.M. & L. Torrevillas; Mt Empagatao, 1050–1200 m, 19–30.IV.1961, 2♂, light trap, H.M. Torrevillas.

Distribution. Philippines (Mindanao I).

Remarks. Saccharodite misamensis resembles *Sa. bicornis* and *Sa. laratica* (Muir); it can be separated from *Sa. bicornis* by the red mark around the 3rd subcostal sector of the tegmen, the uniformly colored median veins, the colorless hindwings, and the simple apical portion of the aedeagus; it can be distinguished from *Sa. laratica* by the 2 red marks on the middle femora (red stripes in *Sa. laratica*), the presence of a red mark around the last subcostal sector and a fuscous mark near the clavus tip (absent in *Sa. laratica*), and by the 3 rounded lobes on the apex of the aedeagus (in *Sa. laratica* 2 lobes, the right one pointed).

Genus **Dichotropis** Muir

Dichotropis Muir, 1913: 83. Type-species: *Dichotropis amboinensis* Muir, by original designation.

Vertex about 2× longer than wide, its lateral carinae not meeting; in profile junction of vertex and face evenly rounded; facial carinae separated; antennae short, only slightly longer than wide; subantennal processes well developed, connected to margins of facial carinae; rostrum reaching or surpassing hind coxae; lateral carinae of pronotum well developed. Tegmen broad, rounded; 2 long and 3 short costal cells; Sc+R fork slightly before middle of tegmen; basal median cell narrow; Cu1 connected to base of Ms1 by a crossvein; Ms1 branched in its basal ½; tegmina white, usually with some small dark marks, heavily powdered. Anal segment of ♂ usually with 2 prominent lateral processes; in most species ♂ genital style with a fingerlike process at inside near base, bearing bristles at tip (apart from usual pair of dorsal processes).

Dichotropis resembles some species of *Rhotana* in head structure and tegmen venation. It stands apart by the heavily powdered and more rounded tegmina, and by the inner basal process on the genital style, which bears bristles at the tip.

Dichotropis amboinensis Muir Fig. 34

Dichotropis amboinensis Muir, 1913: 84, lectotype (here designated) ♂, INDONESIA: AMBON I, F. Muir (BISHOP 5149).

The lectotype has been examined, but drawings of it are not available at present and the distribution of this species has not yet been studied in detail (the distribution seems to include New Guinea and Australia). Only one specimen from the Philippines has been examined (Fig. 34), which shows the following details.

♂, body 2.4 mm, tegmen 4.4 mm. Rostrum reaching end of first ¼ of abdomen. Tegmen slightly less than 2× as long as wide. *Color* stramineous to light green; margins of facial carinae, rostrum, and tibiae light brown. Tegmen white, powdered; a black mark just distad of clavus apex. *Genitalia.* Anal segment of ♂ large; its ventral side sinuate; a pair of prominent lateral processes arising near apex. Genital style truncated at end; bases of dorsal processes broad and connected to each other, the proximal process broad and rounded, the distal one slender except for its base, the very tip deflected; an additional fingerlike process arising from base at inner side, its tip bearing bristles. Aedeagus with apical portion flat, about 3× longer than wide, slightly extended ventrally, dorsally with 2 small rounded lobes, the left one slightly longer.

Specimen examined. PI: LUZON I: Albay Prov, Mayon Volcano, III.1977, 1♂, J. Patola.

Remarks. Dichotropis amboinensis Muir is characterized by the tegmen having a dark mark at the hind margin just distad of the clavus tip.

Genus **Rhotana** Walker

Rhotana Walker, 1857: 1960. Type-species: *Rhotana latipennis* Walker, by monotypy.
Genestia Stål, 1858: 450. Type-species: *Genestia vitriceps* Stål, by monotypy.
Decora Bierman, 1910: 19. Type-species: *Decora pavo* Bierman, by monotypy. **New synonymy.**

In profile junction of vertex and face rounded; facial carinae contiguous in their basal halves, just touching at their bases, or separated; antennae short; subantennal processes well developed or rudimentary; rostrum usually not surpassing hind coxae; lateral carinae of pronotum well developed or rudimentary. Tegmen with 5 costal cells; costal margin and apical section of subcosta may be strongly sinuate; Sc+R fork usually before middle of tegmen; basal median cell often broad, M leaves Sc+R usually near the middle or apex of that cell; Cu1 connected to base of Ms1 by a crossvein; Ms1 branched in its basal ½. Tegmen glassy or with some opaque portions; not powdered, or only with some patches powdered. Tegmina and hindwings often with elaborate color patterns. Male pygofer may have prominent lateral projections.

Rhotana comes closest to *Levu* Kirkaldy and the 2 genera are not always easy to separate. Often a number of characters have to be considered to place a species. In the key, *Rhotana* is separated from *Levu* by its unpowdered tegmina. However, this is not always a reliable character in old specimens, and since fresh specimens of only a few species were available it was not clear how consistent this character is. In general, members of *Rhotana* are larger and more colorful, the tegmina are broader, the basal median cell is usually wider, M usually leaves Sc+R near the middle or apex of that cell (always near the base in *Levu*).

The synonymy of *Genestia* Stål has been suggested by a number of authors including Stål himself. Stål's description is not sufficient to recognize the genus, and the type of *Genestia vitriceps* seems to be lost. However, the British Museum contains specimens from Ceylon which are labelled *Genestia vitriceps* and which agree with Stål's description. These clearly belong to *Rhotana*.

The differences between *Rhotana* and *Decora* are here considered insufficient to justify 2 separate genera. *Decora pavo* has the facial carinae slightly separated (contiguous basally in *Rhotana latipennis*); in the tegmen the apical section of the subcosta is nearly straight (sinuate in *R. latipennis*), and M leaves Sc+R near the base of the basal median cell (near its middle in *R. latipennis*). However, a group of species, which are all apparently closely related to *Decora pavo* (e.g., they all have 3 to 4 pairs of black marks on the tegmen just distad of clavus apex) exists; all show considerable variation in the position of the facial carinae (separated, just touching, or contiguous basally), the shape of the subcosta, and the position of the M–Sc+R fork. In some species the facial carinae may be just separated in some individuals and just touching basally in others. *Rhotana pavo* (Bierman), **new combination,** is therefore considered to be the correct name for *Decora pavo* Bierman.

Key to the Philippine species of *Rhotana*

1. Hindwing with a conspicuous red mark and next to it a black area containing a white dot 2
   Hindwing without red mark 3

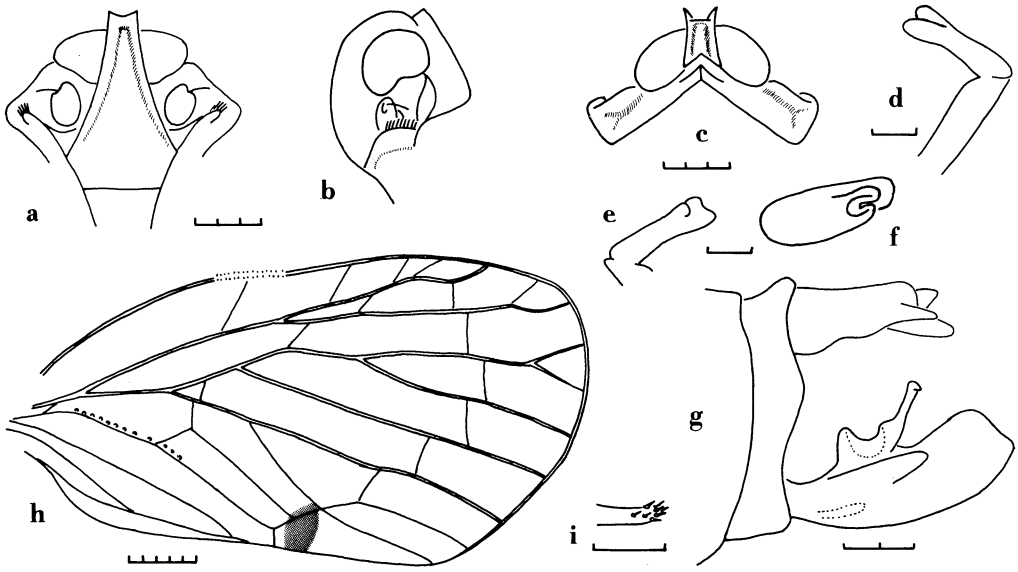

FIG. 34. *Dichotropis amboinensis*, ♂: **a,** frons; **b,** head in side view; **c,** vertex; **d,** apex of aedeagus left side; **e,** apex of aedeagus right side; **f,** apex of aedeagus in dorsal view (tip at right); **g,** pygofer, anal segment, and genital style; **h,** tegmen; **i,** inner basal process of genital style. Scales: a–b, c = 0.3 mm; d, e–f, i = 0.1 mm; g = 0.2 mm; h = 0.5 mm.

2 (1). First median sector of tegmen broadly lined with red ... **mindanaoensis, n. sp.**
First median sector of tegmen not lined with red ..... **excelsa**
3 (1). Tegmen darkest near apices of Cu1, Ms1, and Ms2, this area containing 3 white dots ..... **marmorata, n. sp.**
Tegmen not colored in this way 4
4 (3). Tegmen completely or with most areas infuscated 5
Tegmen colorless or faintly infuscated, with small dark marks 6
5 (4). Tegmen with veins broadly lined with infuscations, leaving the centers of most cells colorless ..... **torrevillasi, n. sp.**
Tegmina evenly gray-brown ..... **concolor, n. sp.**
6 (4). Most tegmen veins orange; 8 black marks near hind margin, around the cubital and median apical crossveins ..... **stigmosa, n. sp.**
Tegmen veins stramineous, only 1 mark near hind margin .... **ornata, n. sp.**

Rhotana mindanaoensis Zelazny, **new species** Fig. 35

Holotype (Fig. 35). ♂, body 3.0 mm, tegmen 4.9 mm. Vertex narrow, more than 2× longer than wide; facial carinae contiguous in basal halves; rostrum not reaching hind coxae; subantennal processes and lateral carinae of pronotum poorly developed. Tegmen 1.8× longer than wide; costal margin and apical section of subcosta sinuate; basal median cell broad, M leaves Sc+R just before middle of that cell; Ms1 branched in basal ⅓, both branches nearly parallel; Ms2 curved towards Ms1. *Color* light brown to stra-

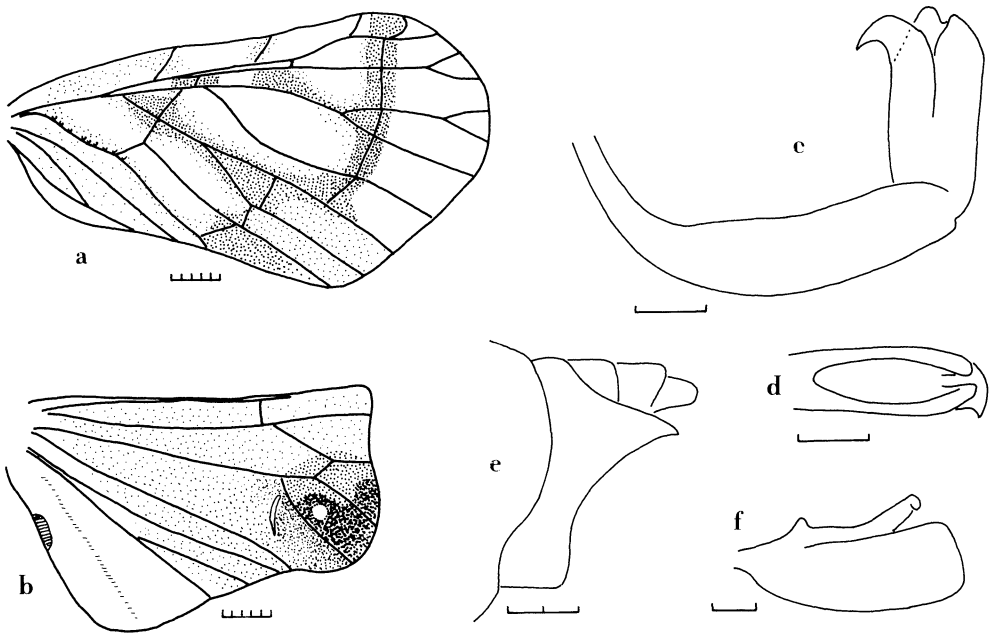

FIG. 35. *Rhotana mindanaoensis,* holotype ♂: **a,** tegmen (densely dotted areas red, lightly dotted areas infuscated); **b,** hindwing (dotted area in front of black mark red); **c,** aedeagus in side view; **d,** apical portion of aedeagus in caudal view (tip at right); **e,** pygofer and anal segment; **f,** genital style. Scales: a, b = 0.5 mm; c, d, f = 0.1 mm; e = 0.2 mm.

mineous; margins of facial carinae and hind margin of pronotum orange; last 2 abdominal tergites orange-red. Tegmen not powdered; apical crossveins and basal ⅔ of Ms1 broadly lined with orange-red; some red areas between radius and media; an area distad of clavus faintly red; red areas lined with light infuscation, additional areas with light infuscation in costal cells, clavus, and along Cu; veins orange-red, near apical margin stramineous. Hindwing lightly infuscated, basal part of clavus lighter and an area around median sectors darker; a small round hyaline dot between the 2 median sectors, a hyaline crescent between 1st median sector and cubitus; a red mark at apex of media in front of dark infuscated area. *Genitalia.* Pygofer with a pair of prominent, lateral, pointed projections. Apex of genital style slightly truncated; proximal dorsal process slender and short; distal dorsal process elongated. Aedeagus with apical portion about 2× as long as wide, ending in 3 short lobes, 2 dorsal rounded lobes and a ventral, pointed lobe curved downwards.

Paratypes. Size of ♀: body 2.8 mm, tegmen 4.6 mm.

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 15.VIII.1965, malaise trap, H.M. Torrevillas (BISHOP 11,966). Paratypes. PI: MINDANAO I: Misamis Or. Prov, same locality as holotype, 15.VIII.1965, 1♀, malaise trap, H.M. Torrevillas; Agusan del Sur Prov, S. Francisco, 10 km SE, 12.XI.1959, 2♂, L.W. Quate.

Distribution. Philippines (Mindanao I).

Remarks. Rhotana mindanaoensis is closely related to *Rhotana excelsa* Melichar; however, it has the 1st median sector of the tegmina lined with red, the hindwings are

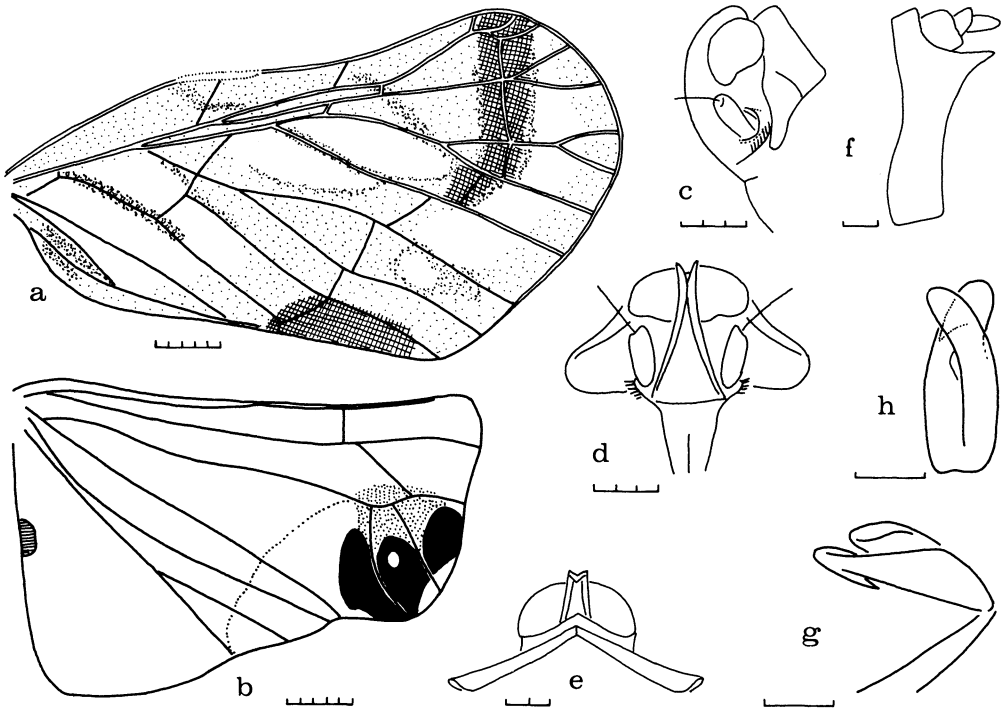

FIG. 36. *Rhotana excelsa,* ♂ specimen from Albay Prov: **a,** tegmen (areas covered by crossed lines red, lightly dotted areas faintly yellow, densely dotted areas infuscated); **b,** hindwing (dotted area red, area surrounded by dotted line covered with white powder); **c,** head in side view; **d,** frons; **e,** vertex; **f,** pygofer and anal segment; **g,** aedeagus in side view; **h,** apex of aedeagus in dorsal view (tip up). Scales: a, b = 0.5 mm; c, d = 0.3 mm; e = 0.2 mm; f, g, h = 0.1 mm.

more strongly infuscated, the dark mark around the median sectors is poorly defined, and a hyaline crescent is present just before the 1st median sector. The terminal lobes of the aedeagus are smaller and do not overlap.

Rhotana excelsa Melichar Fig. 36

Rhotana excelsa Melichar, 1914: 437, lectotype (here designated) ♂, PI: LUZON I: Laguna Prov, Los Baños, Baker (MMB).

The lectotype was examined by Dr P. Lauterer of the Moravske Museum in Brno. He compared it with specimens from Albay Province (common form), which are described below, as well as with the illustrations (Fig. 36) and the description of these specimens. He examined the genitalia of the ♂ paralectotype and found them to agree with those of the Albay Province specimens. He provided the following details of the lectotype.

♂, body 2.7 mm, tegmen 4.4 mm. Rostrum barely reaching the hind coxae. Tegmen 1.8× longer than wide. Antennae missing. Margins of vertex, margins of facial carinae, frons, clypeus, most of 8th abdominal

tergite, and a small mark on 7th tergite orange-red. Tegmen with a light brown, distinctly bordered, broad band accompanying the apical crossveins from Sc to Ms2; band continues fainter, more yellowish along apical crossvein between Ms1 and Ms2, and along basal parts of Ms1, Ms1a, and Ms1b; 2 darker marks, one covering apex of 1st costal cell and base of 1st subcostal sector, the other extending from 2nd subcostal sector to M, just before M-Ms3 fork; a red mark around last subcostal sector and apex of Sc; apex of costa and some sections of apical margin red.

Specimens from Albay Province (common form) (Fig. 36): Vertex in dorsal view 1.4× longer than wide, lateral carinae elevated, contiguous at apices; facial carinae touching near middle of eyes; subantennal processes very small; rostrum reaching hind coxae; lateral carinae of pronotum poorly developed. Tegmina 1.9× longer than wide; costal margin and apical section of Sc sinuate; Sc+R fork before middle of tegmen; basal median cell broad, M leaves Sc+R near middle of that cell; a large triangle at base of 1st median sector; Ms1 branched in its basal ⅓, both branches and Cu1 nearly parallel. *Color* white to stramineous; carinae of vertex and face, posterior margin of pronotum, as well as last 2 abdominal tergites orange-red. Tegmen glassy; a broad red band accompanying apical crossveins, extending from last subcostal sector up to Ms2 or in some specimens up to Ms3; usually a large, faintly red area distad of clavus; most parts of tegmen faintly yellow; infuscated as in lectotype; base of Cu also lined with infuscation; veins stramineous, red in red areas; costa and apical margin red. Hindwing produced at end of median sectors, here a conspicuous black mark, impressed where median sectors enter it, and with a central white dot; in front of black area a bright red mark, basad of it a large area covered with white powder; hind margin near apex of cubitus red. *Genitalia.* Pygofer with a pair of prominent, pointed, lateral projections just below anal segment. Genital style with dorsal processes widely separated, proximal one small and slender, distal one elongated. Aedeagus with apical portion elongated, ending in 2 rounded, overlapping lobes, the left bearing a prominent hooklike process, directed ventrad.

Other specimens. Coloration of specimens from Mindanao as in common form from Albay Prov. Four ♂ from Mt Makiling (i.e., few kilometres away from lectotype-locality) as in lectotype: frons and clypeus light orange-red, tegmina with only a small red area, around last subcostal sector. Three ♂ and 3♀ from Albay Prov as in lectotype but with frons and clypeus stramineous. Two ♂ from Albay Prov with tegmina lacking any red marks, but last subcostal sector and an apical section of Sc red. Hindwings with red mark about ⅓ of normal size and located between 2nd median sector and apex of M; sections of media and median sectors in front of black area red (red veins in area which is usually covered by red mark); just basad of black mark a short, narrow black stripe.

Average size of ♂: body 2.7 ± 0.3 mm, tegmen 4.4 ± 0.4 mm (n = 20); ♀: body 2.7 ± 0.2 mm, tegmen 4.3 ± 0.3 mm (n = 11).

Specimens examined. PI: LUZON I: Laguna Prov, Mt Makiling, 4♂ Baker (USNM); Albay Prov: Guinobatan, VI,X,XII.1976, I,II.1977, 7♂,3♀, off abaca, or with light trap, F. Otilano, F.G. Orbigo, J. Patola, B. Zelazny (ARC); Tabaco, XII.1976, 1♂,1♀, Patola, W.S. Imperial (ARC); Ligao, XI.1976, 2♂,1♀, D. Quinalayo, Otilano (ARC); Mayon Volcano, XII.1976, III.1977, 2♂,2♀, off coconut palm, Imperial, Quinalayo, Otilano, Zelazny (ARC); Daraga, I.1977, 1♀, off coconut palm, Zelazny (ARC); Legaspi, III.1977, 1♂,1♀, off coconut palm and banana, Quinalayo, Zelazny (ARC); St. Domingo, III.1977, 1♂,3♀, off abaca, Quinalayo, Imperial, Zelazny (ARC). PI: MINDANAO I: Misamis Or. Prov: Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 27.VIII.1965, 1♂, H.M. Torrevillas; Balason, 4–7.IV.1960, 1♂, light trap, W. Torrevillas; 21 km W of Gingoog City, 800–1000 m, 17.X.1965, 1♂, H.M. Torrevillas.

Distribution. Philippines.

Remarks. The Melichar collection contains 2 male specimens labelled "excelsa M., det Melichar" in Melichar's handwriting, 1 from Los Baños and 1 from Mt Makiling (Dr P. Lauterer, pers. commun.). There is no doubt that these are Melichar's syntypes (possibly the only ones); the specimen from Los Baños is here designated as lectotype, the specimen from Mt Makiling as paralectotype. The lectotype, paralectotype and other specimens from Laguna Province differ from the common form found in Albay Province by the orange-red-colored frons and clypeus, and by the tegmina lacking a red

band accompanying the anterior apical crossveins. Some specimens from Albay show the same tegmen coloration. The male genitalia were identical in all color forms.

It is concluded that *Rhotana excelsa* Melichar shows some variation in the coloration of frons and clypeus, considerable variation in the coloration of the tegmen, but no variation in the structure of the male aedeagus, and little variation in the coloration of the hindwings. *R. excelsa* resembles most closely *R. mindanaoensis,* from which it differs by the tegmina never having the 1st median sector lined with red, the hindwings bearing a clearly defined black mark, but not infuscated otherwise, and the aedeagus bearing overlapping terminal lobes.

Rhotana marmorata Zelazny, **new species** Fig. 37

Holotype (Fig. 37). ♂, body 3.1 mm, tegmen 5.0 mm. Facial carinae contiguous at bases; in profile face slightly produced in front of subantennal processes; rostrum reaching posttrochanters; subantennal processes and lateral carinae of pronotum well developed. Tegmen 2.1× longer than wide; costal margin and apical section of Sc slightly sinuate; Sc+R fork at middle of tegmen; basal median cell narrow, M leaves Sc+R before middle of that cell; Ms1 branched at apex of basal median cell; a crossvein connects Ms1a with M, forming a trapezoid cell at base of Ms1. *Color* stramineous to light brown; mesonotum, an oblique band on genae, and a central longitudinal band on frons and clypeus dark brown; labium and fore tibiae reddish brown; fore tarsi and 2nd pair of legs missing; a reddish brown band from tegmen base to apex of clypeus. Tegmen glassy, but a round central patch and 3 small dots near apical sections of Cu1, Ms1a, and Ms1b covered with white powder; a U-shaped dark brown mark in basal ⅓, opening towards clavus; middle ⅓ dark brown, an oval area near hind margin darker, bearing 3 small light dots (covered with white powder), a lighter round patch between Ms1a and Ms2 (also covered with white powder), and a smaller elongated lighter area in 2nd costal cell next to costal margin; apical ⅓ infuscated near apical crossveins, between media and 3rd median sector, and near apical margin; last subcostal sector accompanied by red; veins stramineous in basal ⅓, red in apical ⅔; however, 1st and 3rd subcostal sectors stramineous. Hindwing faintly infuscated near subcostal, radial, and median veins; veins stramineous in basal ⅓, reddish brown in apical ⅔; apical and hind margin red. *Genitalia.* Pygofer narrow. Genital style with proximal dorsal process short, conical; distal dorsal process elongated, curved outwards at tip. Aedeagus wtih apical portion large, ending in 2 rounded overlapping lobes.

Paratypes. In most specimens dark band on genae less distinct than in holotype. Fore tarsi and middle tibiae and tarsi reddish brown. In 1 specimen tegmen with only 2 small white dots near hind margin, and with veins in apical ⅔ partly red, partly stramineous. Average size of ♂: body 3.0 ± 0.3 mm, tegmen 4.7 ± 0.2 mm (n = 9); ♀: body 3.1 mm, tegmen 4.6 mm.

Holotype ♂, PI: MINDANAO I: Agusan Prov, S. Francisco, 10 km SE, 12.XI.1959, L.W. Quate (BISHOP 11,965). Paratypes. PI: BASILAN I: 1♂, Baker. PI: JOLO I: nr base of Mt Dahao, 150 m, 2.IX.1958, 1♂, H.E. Milliron; 1♂ (no data, among Philippine material). MALAYSIA: SABAH (Borneo): Sandakan Bay (SW), Sapagaya Lumber Camp, 2–20 m, 4.XI.1957, 1♂, J.L. Gressitt; W Coast Residency, Ranau, 500 m, 28.IX–7.X.1958, 1♂, sweeping, T.C. Maa; Linawan, 14–19.I.1959, 1♂, sweeping, Maa. MALAYSIA: SARAWAK (Borneo): Kapit Distr, Merirai Val, 1–6.VIII.1958, 1♂, Maa; Nanga Pelagus, nr Kapit, 180–585 m, 7–14.VIII.1958, 1♂, Maa. INDONESIA: SUMATRA: Buo, Pad. Bov., II.1914, 4♂, Edw. Jacobson (RNHL); Muara Kiawai VI.1915, 1♀, Jacobson (RNHL). INDONESIA: SULAWESI: Tondano, [1859], 1♀, Wallace (BMNH).

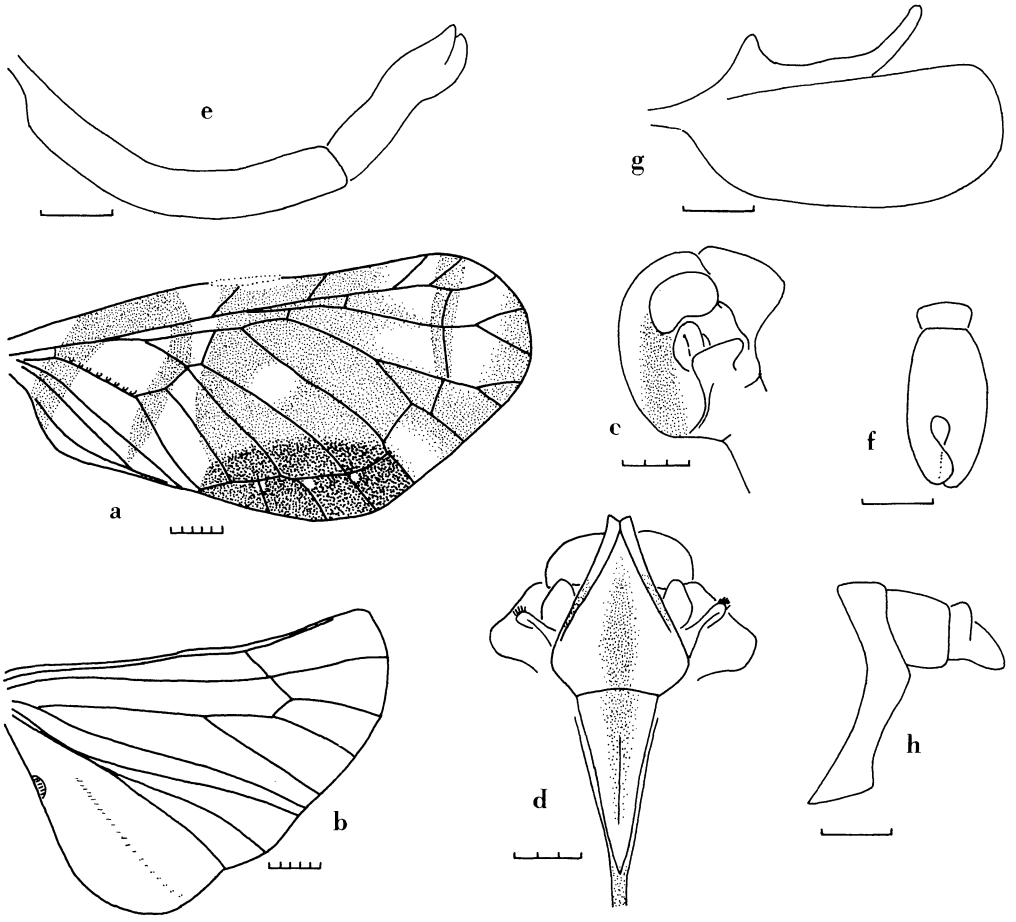

FIG. 37. *Rhotana marmorata,* holotype ♂: **a,** tegmen; **b,** hindwing; **c,** head in side view; **d,** frons (dotted areas in c and d, brown); **e,** aedeagus in side view; **f,** apical portion of aedeagus in caudal view (tip down); **g,** genital style; **h,** pygofer and anal segment. Scales: a, b = 0.5 mm; c, d = 0.3 mm; e, f, g, h = 0.1 mm.

Distribution. Philippines (Mindanao I, Basilan I, Jolo I), Borneo, Indonesia (Sumatra, Sulawesi).

Remarks. Rhotana marmorata, like *Rhotana pellax* Fennah from Samoa, has a large darkly infuscated area in the tegmen distad of the clavus apex, bearing 3 white dots. It can be easily distinguished from that species by the head markings and the structure of the male aedeagus.

Rhotana torrevillasi Zelazny, **new species** Fig. 38a–c, e–h

Holotype (Fig. 38 a–c, e–h). ♂, body 2.8 mm, tegmen 4.2 mm. Facial carinae contiguous up to lower margins of eyes; rostrum reaching hind coxae; subantennal processes well developed, lateral carinae of

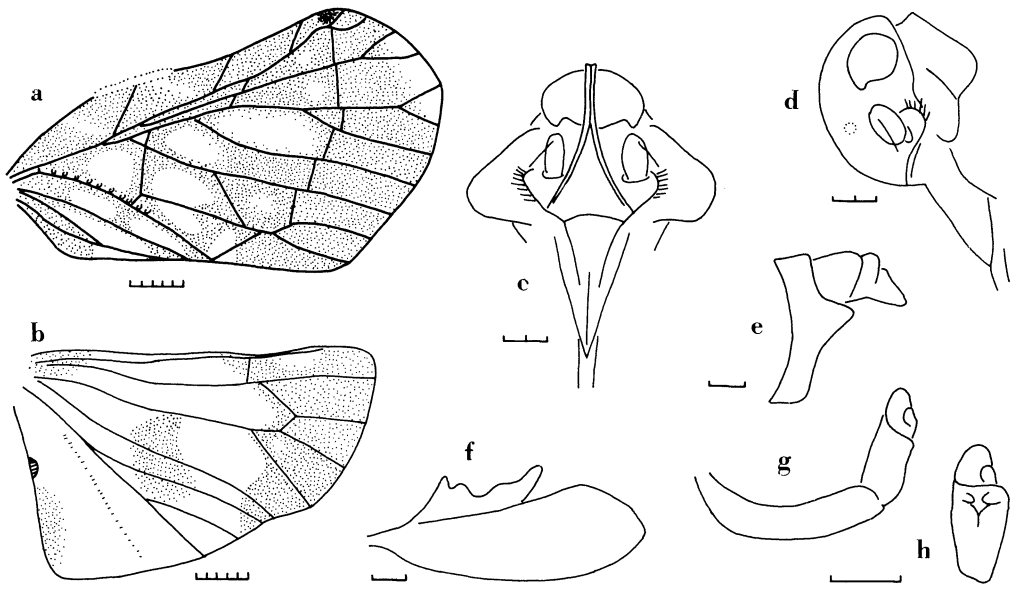

FIG. 38. **a–c, e–h,** *Rhotana torrevillasi,* holotype ♂: **a,** tegmen; **b,** hindwing; **c,** frons; **e,** pygofer and anal segment; **f,** genital style; **g,** aedeagus in side view; **h,** apical portion of aedeagus in caudal view (tip up). **d,** *Rhotana concolor,* holotype ♂, head in side view. Scales; a, b = 0.5 mm; c, d = 0.2 mm; e, f, g–h = 0.1 mm.

pronotum poorly developed. Tegmen 1.8× longer than wide; apical section of subcosta strongly sinuate; Sc+R fork before middle of tegmen; basal median cell broad; M leaves Sc+R near middle of that cell; Ms1 branched at the end of basal ⅓, Ms1a continues in same direction as main stem, Ms1b merges with apical part of Cu1 for a short section. *Color* stramineous to light brown, mesonotum (except for scutellum, and central and lateral carinae) darker; a central, faintly orange, longitudinal band on frons and clypeus. Tegmen glassy; in basal ⅔ all veins broadly lined with infuscation; distad of apical crossveins uniformly infuscated; a brown-black mark just before last subcostal sector; veins tinted with orange-red, but claval and cubital veins stramineous; last subcostal sector red. Hindwing lightly infuscated at costal base, near hind margin next to stridulation area, around middle of cubital and claval veins, and in apical ⅓; veins colorless, but apical part of media orange-red, the 2 median sectors brown. *Genitalia.* Pygofer with a pair of rounded, lateral projections below anal segment. Genital style elongated, apical margin obliquely truncated; proximal dorsal process short with a hump at base; distal dorsal process slightly more elongated with a swollen base. Apical portion of aedeagus abruptly narrowing before tip, ending in a spatulate, ventral lobe; on right side near tip an irregular, shrivelled, membraneous lobe.

Paratypes. One specimen has longitudinal band on frons and clypeus colored bright orange. Another specimen has hindwings with apical ⅔ of subcosta and radius, as well as apical part of claval vein orange-red, but coloration of media and median sectors as in holotype. In some specimens right apical lobe of aedeagus not shrivelled, slightly shorter than spatulate terminal lobe and somewhat pointed. Average size of ♂: body 2.8 ± 0.1 mm, tegmen 4.5 ± 0.2 mm (n = 4); ♂: body 2.1 mm, tegmen 4.1 mm.

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 18.VII.1965, H. Torrevillas (BISHOP 11,967). Paratypes. PI: [no locality] 1958, 3♂, H. Milliron. PI: MINDANAO I: Misamis Or. Prov: 1♂, same data as holotype; Mt Empagatao, Camp II, 1100 m, 21.IV.1961, 1♀, light trap,

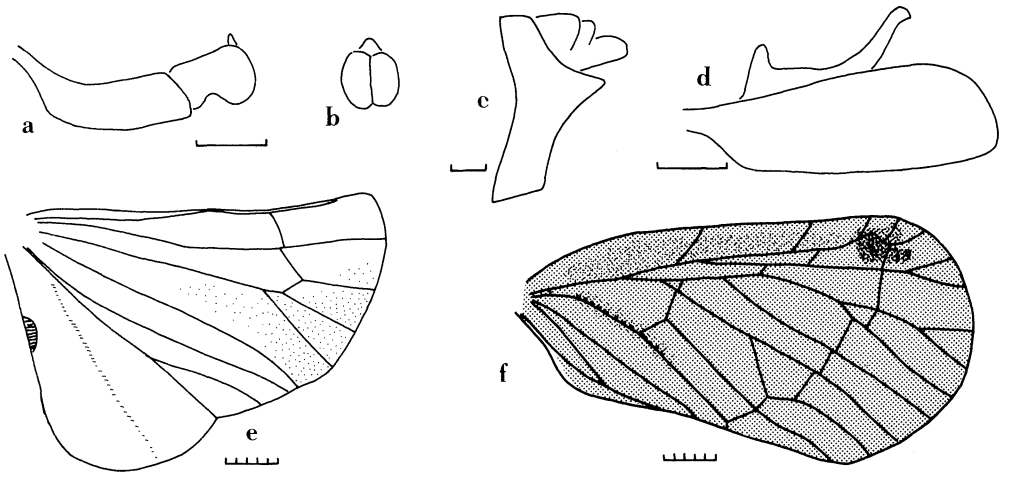

FIG. 39. *Rhotana concolor,* holotype ♂: **a,** aedeagus in side view; **b,** apical portion of aedeagus in caudal view (tip up); **c,** pygofer and anal segment; **d,** genital style; **e,** hindwing; **f,** tegmen. Scales: a–b, c, d = 0.1 mm; e, f = 0.5 mm.

H. Torrevillas; Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 17.X.1965, 1♂, Torrevillas; Zamboanga del Sur Prov, 3.2 km NW of Milbuk, 150 m, 4.VIII.1958, 2♂, Milliron.

Distribution. Philippines (Mindanao I).

Remarks. Rhotana torrevillasi is characterized by its relatively small size, its tegmen veins being broadly lined with infuscation, and by the brown-black mark near the last subcostal sector of the tegmen. This species is named in honor of the collector of the holotype, Mr H. Torrevillas.

Rhotana concolor Zelazny, **new species** Fig. 38d, 39

Holotype (Fig. 38d, 39). ♂, body 3.0 mm, tegmen 4.7 mm. Facial carinae contiguous in basal halves; subantennal processes well developed, lateral carinae of pronotum poorly developed; rostrum reaching hind coxae. Tegmen 1.9× longer than wide; costal margin nearly straight; apical section of Sc strongly sinuate; Sc+R fork before middle of tegmen; basal median cell broad, M leaves Sc+R near middle of that cell; a tiny triangle at base of 1st median sector; Ms1 branched before middle, distal branch continues in direction of main stem, proximal branch approaches apical part of Cu1, and is angulated (≈110°) at the junction with the cubital crossvein. *Color* stramineous to light brown; rostrum, tibiae, and tarsi dark brown; mesonotum also dark brown but 2 lateral patches, central and lateral carinae, and scutellum lighter. Tegmen uniformly infuscated, costal area and base of cubitus slightly darker; a dark mark around apical crossvein between subcosta and radius; a red mark around and between last 2 subcostal sectors; veins red, except for claval veins and very base of Cu1 which are faintly infuscated. Hindwing very faintly infuscated, clavus lighter, around 1st and 2nd median sector darker; veins faintly infuscated, tinted with orange-red near costal margin. *Genitalia.* Pygofer with a pair of prominent, pointed, lateral projections. Genital style elongated, obliquely truncated at apex, no hump at base of proximal dorsal process. Aedeagus short; apical portion short, rounded; at end impressed along middle; on dorsal side near tip a small conical lobe.

Paratypes. Average size of ♂: body 2.9 ± 0.1 mm, tegmen 4.6 ± 0.1 mm (n = 4).

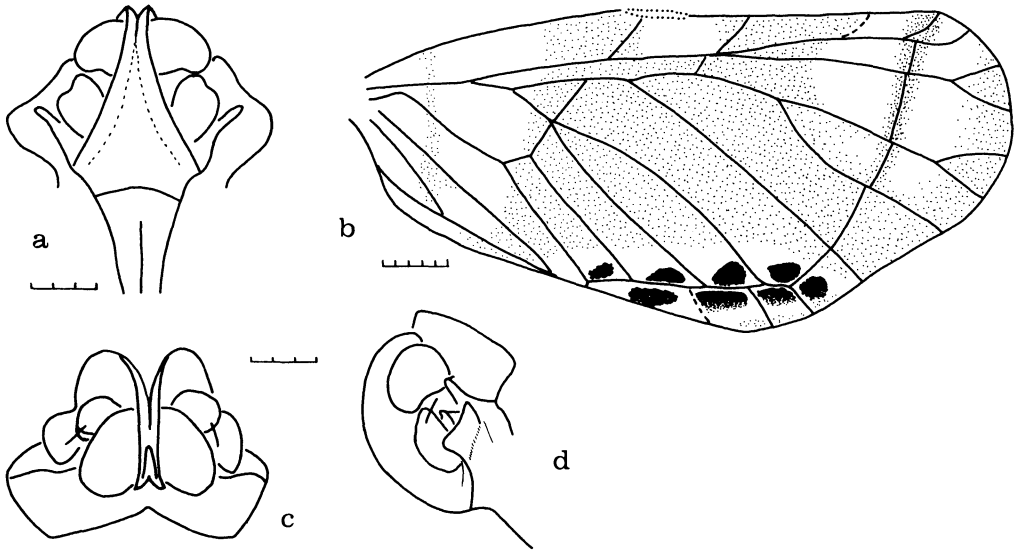

FIG. 40. *Rhotana stigmosa,* holotype ♀: **a,** frons; **b,** tegmen; **c,** vertex; **d,** head in side view. Scales: a, c–d = 0.3 mm; b = 0.5 mm.

Holotype ♂, MALAYSIA: SABAH (Borneo): Sandakan Bay (NW), Sepilok For. Res., 1–10 m, 29.X.1957, light trap, J.L. Gressitt & T.C. Maa (BISHOP 11,968). Paratypes. PI: MINDANAO I: Bukidnon Prov, Mt Katanglad, 1250 m, 4–9.VII.1959, 1♂, L.W. Quate. MALAYSIA: SARAWAK (Borneo): Kuching, Matang, 450–894 m, 15.IX.1958, 3♂, light trap, J.L. Gressitt & T.C. Maa.

Distribution. Philippines (Mindanao I), Borneo.

Remarks. Rhotana concolor can be recognized by its uniformly colored tegmina.

Rhotana stigmosa Zelazny, **new species** Fig. 40

Holotype (Fig. 40). ♀, tegmen 5.1 mm. Facial carinae not quite meeting at bases; subantennal processes well developed, 1st part, next to facial carinae, much narrower than 2nd part near pronotum; rostrum reaching hind coxae; lateral carinae of pronotum poorly developed. Tegmen 2.0× longer than wide, Sc+R fork before middle of tegmen; basal median cell elongated, M leaves Sc+R at end of basal ⅓ of that cell; Ms1 branched at apex of basal median cell. *Color* stramineous; margins of facial carinae and a longitudinal stripe on clypeus light brown; labium dark brown. Tegmen with 8 dark marks near hind margin, around apical crossveins between Cu, Cu1, Ms1b, Ms1a, and Ms2; area adjoining these marks white, rest of tegmen faintly infuscated, but lighter areas across tegmen base, in 2nd costal cell, and in anterior apical part of tegmen; darker around last subcostal sector and around anterior apical crossveins; following veins orange-red: 2nd and 4th subcostal sector, tips of Sc, R, and M, all median sectors and their crossveins, apical ½ of Cu1, and apical and hind margin; remaining veins stramineous. Hindwing colorless.

Holotype ♂, PI: LUZON I: Laguna Prov, Los Baños, X.1914 (USNM).

Distribution. Philippines (Luzon I).

Remarks. The holotype bears the label "*Decora pavo*?" and appears to be 1 of 2 specimens from the Philippines considered by Muir (1917: 104) to be that species.

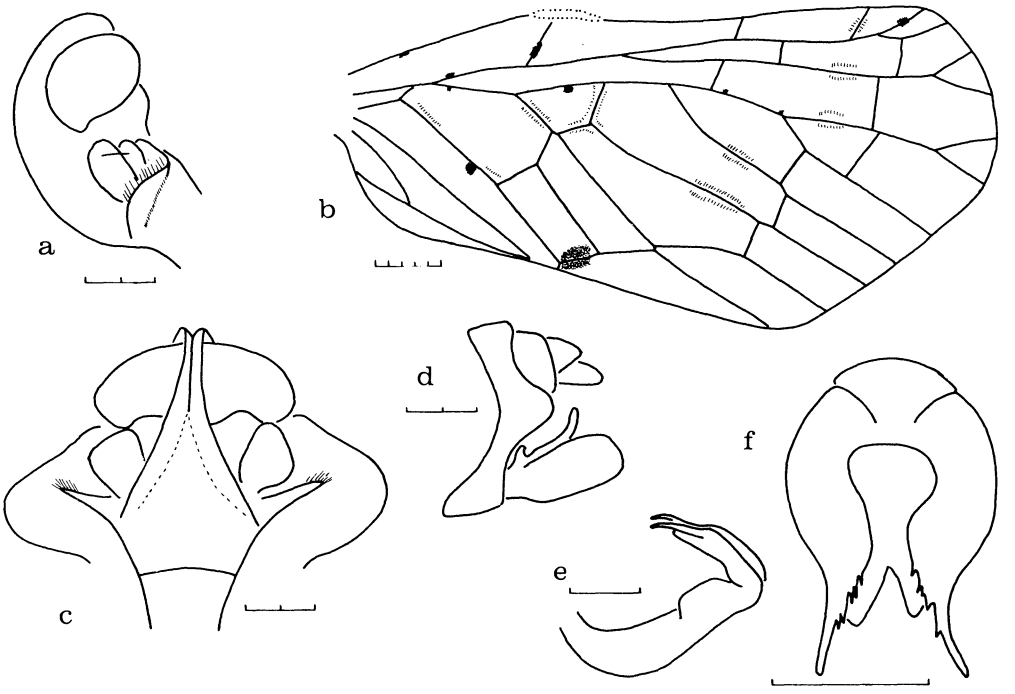

FIG. 41. *Rhotana ornata,* holotype ♂: **a,** head in side view; **b,** tegmen; **c,** frons; **d,** pygofer, anal segment and genital style; **e,** aedeagus in side view; **f,** apex of aedeagus in dorsal view. Scales: a, c, d = 0.2 mm; b = 0.5 mm; e, f = 0.1 mm.

Rhotana stigmosa differs from *R. pavo* (Bierman) by the stramineous fore tibiae, the marks near the hindmargin of the tegmen being smaller and more elongated, and by many tegmen veins being red (in *R. pavo* only the veins separating the dark tegmen marks are red).

Rhotana ornata Zelazny, **new species** Fig. 41

Holotype (Fig. 41). ♂, tegmen 5.1 mm. Facial carinae contiguous up to lower level of eyes; rostrum reaching hind coxae; subantennal processes and lateral carinae of pronotum well developed. Tegmen 2.1× longer than wide; Sc+R fork before middle of tegmen; basal median cell broad, M leaves Sc+R at base of that cell; Ms1 branched at apex of basal median cell, base of Ms1a angulated and connected to M by a crossvein, forming a trapezoid cell. *Color* white to stramineous; faint, brownish, longitudinal stripes on mesonotum on each side of central carina. Tegmen with wax secreting pores on short sections of C, last subcostal sector, R, M, Ms1, Ms2, and Cu, and along apical margin; colorless except for a dark mark distad of clavus tip and small brown spots in the following locations: 1 on base of C, 1 each on 1st and 4th subcostal sectors, 1 on base of Sc+R, 4 on M (2 of these very small), and 1 on Cu; veins white to stramineous, but tip of last subcostal sector and a short, adjoining section of C orange. Hindwing colorless. *Genitalia.* Pygofer with rounded, lateral projections; genital style elongated, slightly truncated at end, proximal dorsal process short and slender, distal dorsal process elongated. Aedeagus stem slightly widening before apical part; apical portion flat, ending in 2 slender, slightly curved processes, their inner margins covered with minute teeth.

Paratypes. Average length of tegmen of ♂: 5.0 ± 0.1 mm (n = 4); ♀: 5.1 mm.

Holotype ♂, PI: MINDANAO I: Davao City, Mt Apo School, 15 km SW of Davao, 500 m, 22–31.X.1965, D. Davis (USNM). Paratypes. PI: MINDANAO I: Misamis Or. Prov: Dinawihan Gingoog, 26 km E of Gingoog City, 100–300 m, 14.VIII.1965, 1♂, H. Torrevillas; Mt Empagatao, 1050–1200 m, 19–30.IV.1961, 1♂, light trap, Torrevillas; 3♂,1♀, same data as holotype (USNM); Davao City, Carriedo Rest House, 20 km SW of Davao, 1000 m, 1–7.XI.1965, 1♂, D. Davis (USNM).

Distribution. Philippines (Mindanao I).

Remarks. Rhotana ornata is characterized by its light tegmina, bearing few, small dark marks, and by the 2 long, slender apical processes on the aedeagus.

Genus **Rhotanella** Fennah

Rhotanella Fennah, 1970: 67. Type-species: *Rhotanella thyrsis* Fennah, by original designation.

Vertex in dorsal view an acute triangle; in profile junction of vertex and frons rounded; facial carinae contiguous near bases; subantennal processes and lateral carinae of pronotum well developed; antennae slightly longer than wide; rostrum short, not or just reaching hind coxae. Tegmen broad, oval; 1 long, 2 medium long, and 2 short costal cells; 2nd and 3rd costal sectors directed basad; costal cells very broad, especially basal one, its width being ¼ or more of total width of tegmen; Sc+R fork near middle of tegmen; base of Cu1 connected to base of Ms1 by a crossvein; Ms1 branched in basal ½; tegmen unpowdered, opaque, with small glassy areas.

Rhotanella closely resembles *Rhotana* but has much broader costal cells. In life members of *Rhotanella* carry their tegmina in a tectiform position, as do members of *Sumangala.*

Rhotanella lucida (Muir), **new combination** Fig. 42

Levu lucida Muir, 1915: 136.

Holotype (Fig. 42a, b). ♀, body 2.4 mm, tegmen 4.2 mm. In side view vertex curves narrowly into frons, profile somewhat triangular; facial carinae touching at bases; subantennal processes angulated, connected to margins of facial carinae. Tegmen 2.1× longer than wide; basal costal cell ⅓ to ¼ as wide as total width of tegmen; 2nd and 3rd subcostal sectors directed basad; Sc+R fork slightly distad of middle of tegmen; basal median cell elongated; a large triangle at base of 1st median sector. *Color* stramineous; sides of scutellum light brown; fore and middle femora with longitudinal red stripes; fore tibiae and tarsi tinted with red. Tegmen stramineous, not powdered; a brown band across base and along costal and apical margin, small lighter stripes in 3rd costal cell next to costal margin; basal ⅓ of tegmen slightly, apical ⅔ strongly opaque but some clear, slightly elevated areas just before apical margin; veins stramineous but the following veins orange to orange-red: costa, apical margin, M, Ms2, Ms3, Ms4, apical ½ of Ms1, central sections of Sc and R, and tips of Sc, last subcostal sector, R, and radial sector; central sections of Cu, Cu1, Ms1a, and Ms1b with faint brown spots. Hindwing including veins colorless.

Other specimens examined (Fig. 42c–f). ♂ with pygofer narrow. Genital style widening towards apex, which is truncated; dorsal processes close together; proximal one short, very broad and curved; distal one fingerlike with a hump at base (Fig. 42c). Aedeagus abruptly thickening before apical portion, at base of this thick portion a group of minute teeth; apex with 3 small lobes, the lateral, dorsal ones pointed and curved outwards, the central, ventral one rounded (Fig. 42d, e). However, ♂ from Mt Makiling with thick portion of aedeagus stem lacking small teeth; terminal, lateral processes longer, sinuate, their ends curved towards each other (Fig. 42f). Tegmen length of ♂: 4.2 mm (Sumatra and Mt Makiling), 3.5 mm (Albay Prov); of ♀: 3.9 mm (Mt Makiling), 3.5 mm (Albay Prov).

Specimens examined. Levu lucida Muir, holotype ♀, INDONESIA: JAVA (no further data) (BISHOP 5207). Other specimens. PI: LUZON I: Laguna Prov: Mt Makiling, 1♂,1♀, Baker (USNM); Los Baños, IX.1915, 1♂; Albay Prov: Jovellar, I.1977, 1♂, off coconut palm, D. Quinalayo (ARC); Guinobatan, V.1976, 1♀, light

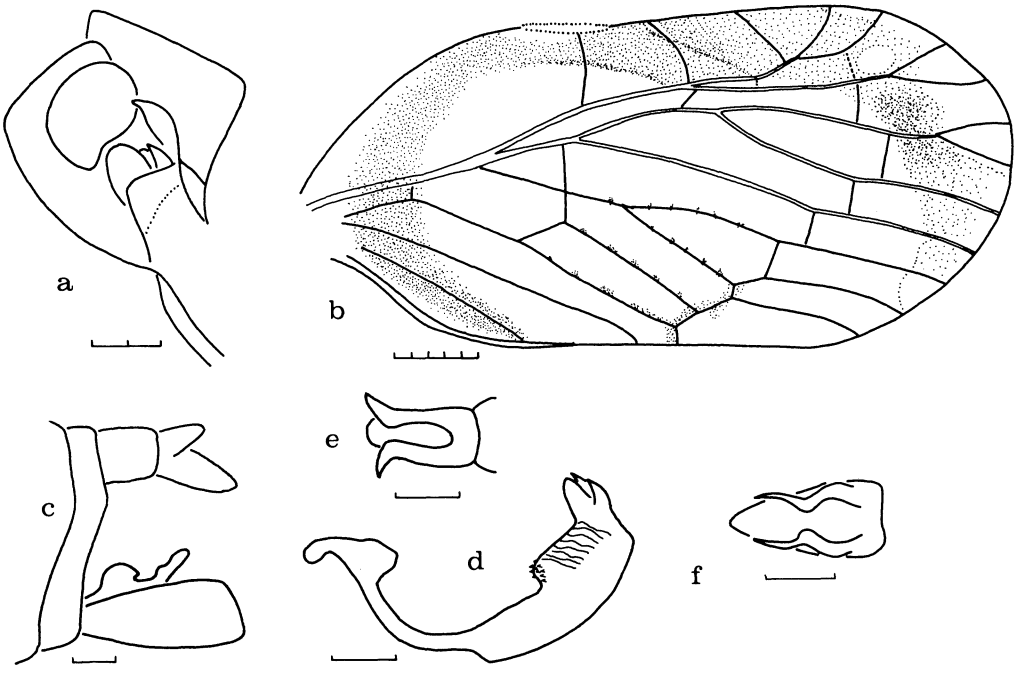

FIG. 42. **a–b,** *Levu lucida,* holotype ♀: **a,** head in side view; **b,** tegmen. *Rhotanella lucida*: **c–e,** ♂ specimen from Albay Prov: **c,** pygofer, anal segment, and genital style; **d,** aedeagus in side view; **e,** apex of aedeagus in dorsal view; **f,** ♂ specimen from Mt Makiling, apex of aedeagus in dorsal view. Scales: a = 0.2 mm; b = 0.5 mm; c, d, e, f = 0.1 mm.

trap (ARC); Ligao, VII.1979, 1♂, coconut palm, B. Orlina (ARC). INDONESIA: SUMATRA: Fort de Kock, 920 m, 1925, 1♂, E. Jacobson (RNHL).

Distribution. Philippines (Luzon I), Indonesia.

Remarks. In the original description Muir did not specify the number of types studied; however, he later (1917: 103) stated that this species was based on 1 female specimen from Java. The original description gives "Poespoe, East Java" as the exact type-locality. *Rhotanella lucida* can be easily recognized by the ringlike infuscation on the tegmen. No differences were detected between the males from Albay Province and Los Baños and the male from Sumatra.

Rhotanella lautereri Zelazny, **new species** Fig. 43a–g

Holotype (Fig. 43a–g). ♂, body 2.3 mm, tegmen 3.5 mm. In side view vertex and face produced in front and above eyes, profile somewhat rectangular; subantennal processes rounded; rostrum just reaching hind coxae. Tegmen 1.7× longer than wide; costal margin sinuate; basal costal cell nearly ⅓ of total width of tegmen. *Color* white to stramineous; 2 gray lines radiating from eye to margins of frons and vertex; a tiny fuscous spot each at middle of central carinae of pronotum and mesonotum; red longitudinal stripes along fore legs and middle femora; bases of middle tibiae, hind femora, and hind tibiae red. Abdominal sternites orange-red. Tegmen infuscated; lighter in basal costal cells and along claval and apical margins; 2 dark

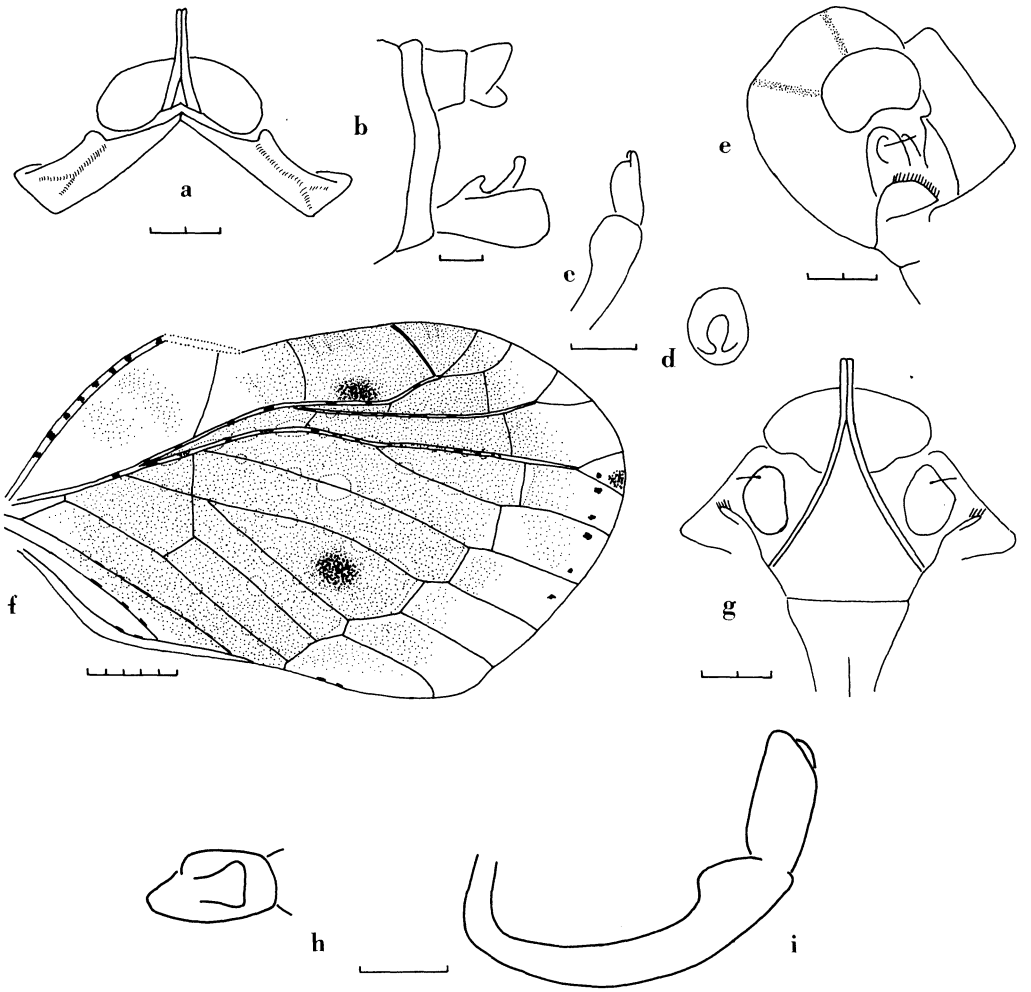

FIG. 43. **a–g,** *Rhotanella lautereri,* holotype ♂: **a,** vertex; **b,** pygofer, anal segment, and genital style; **c,** apex of aedeagus in side view; **d,** apex of adeagus in dorsal view (tip down); **e,** head in side view; **f,** tegmen; **g,** frons. **h, i,** *Levu irrorata,* holotype ♂: **h,** apex of aedeagus in caudal view; **i,** aedeagus in side view. Scales: a, e, g = 0.2 mm; b, c–d, h–i = 0.1 mm; f = 0.5 mm.

brown round marks, 1 between the 2 branches of 1st median sector, 2nd in the 3rd costal cell adjacent to subcosta; 3rd and 4th costal cells with small light triangles adjacent to costal margin; small round white dots along most veins, in between them veins darker; 8 piceous spots along base of costa and 6 more just before apical margin; fainter spots on claval veins; a small brown mark at apical margin between M and Ms4; claval veins, basal parts of cubitus, and 1st and 2nd median sector light brown or stramineous; other veins red. Hindwing colorless but veins in apical ½ red. *Genitalia.* Pygofer narrow. Genital style widening towards apex, which is truncated; proximal dorsal process short; distal dorsal process elongated. Aedeagus widening before apical portion; apical part small, rounded, bearing 2 small lobes at tip.

Paratypes. Average size of ♂: body 2.2 ± 0.1 mm, tegmen 3.8 ± 0.2 mm (n = 2); ♀: body 2.4 ± 0.3 mm, tegmen 3.5 ± 0.2 mm (n = 5).

Holotype ♂, PI: LUZON I: Albay Prov, Mayon Volcano, III.1977, W. Imperial (BISHOP 11,971). Paratypes. PI: LUZON I: Albay Prov: Tabaco, X.1976, II.1977, 2♀, D. Quinalayo, J. Patola (ARC & BISHOP); Guinobatan, XII.1976, VIII.1977, XII.1977, 3♀, Patola, F. Otilano (ARC & MMB); Mayon Volcano, II.1977, 2♂, off coconut palm and bamboo, Quinalayo, B. Zelazny (ARC & MMB).

Distribution. Philippines (Luzon I).

Remarks. Rhotanella lautereri is closely related to *Rhotanella punctovenosa* (Melichar); however, it is smaller, has a round mark on the tegmen between the 2 branches of the 1st median sector, and the aedeagus bears 2 small terminal lobes. This species is named in honor of Dr P. Lauterer, who has contributed greatly to the knowledge of the homoptera.

Rhotanella punctovenosa (Melichar), **new combination** Fig. 43h, i

Rhotana punctovenosa Melichar, 1914: 437, lectotype ♀ (here designated), PI: LUZON I: Laguna Prov, Los Baños, Baker (MMB).
Levu irrorata Muir, 1917: 103. **New synonymy.**

Dr P. Lauterer of the Moravske Museum in Brno has compared the lectotype of *Rl. punctovenosa* with 2 paratypes of the species described above as *Rhotanella lautereri* and with Fig. 43. He noted the general similarity between both species and described the following differences and details.

♀, body 2.7 mm, tegmen 4.2 mm. Mesonotum with 2 diffuse light brown spots at the base of scutellum (in addition to a small dark dot in the middle of the central carina of mesonotum). Tegmen light brown, lighter in clavus and before apical margin, areas around 1st and 2nd subcostal sectors darker; no round mark between 2 branches of 1st median sector; a diffuse dark brown mark at the middle of Cu1; R and M purple-red; white spots along veins not very clear; 8 dark brown dots just before apical margin (2 per cell) between end of Sc and Ms4. No differences in ♀ genitalia detectable.

Levu irrorata Muir, lectotype (here designated) (Fig. 43h, i). ♂, body 3.0 mm, tegmen 4.4 mm. Very similar to *Rhotanella lautereri* but larger and with slightly different coloration as follows: 2 dark brown marks on base of scutellum; tegmen without mark between both branches of 1st median sector, but with a diffuse brown mark around middle of Cu1, and another faint mark around 2nd subcostal sector; just before apical margin a row of 15 dark spots (2 per cell), extending from apex of subcosta to apex of Ms1; next to apical margin 3 faint dark marks, between M and Ms4, and next to apices of Ms3 and Ms2. *Genitalia.* Pygofer narrow. Genital style widening towards its end which is truncated, proximal dorsal process short and conical, distal dorsal process elongated. Aedeagus abruptly widening before apical portion; apical part tapering towards tip, with small hump on left side.

Other specimens. Tegmen often with mark on middle of Cu1 not clearly defined. Length of ♂: body 3.0 ± 0.0 mm, tegmen 4.2 ± 0.0 mm (n = 2); average size of ♀: body 3.0 ± 0.2 mm, tegmen 4.0 ± 0.1 mm (n = 6).

Specimens examined. Levu irrorata, lectotype ♂, PI: MINDANAO I: Lanao del Norte Prov, Iligan, Baker (BISHOP 5205). Other specimens. PI: LUZON I: Albay Prov, St. Domingo, IX.1978, 1♀, off coconut, J. Patola (ARC); Camarines Sur Prov, Mt Iriga, 500–600 m, 29.IV.1962, 1♀, H. Torrevillas. PI: PALAWAN I: Eran Pt, 8 km SW of Tarumpitao Pt, 31.XII.1959–4.I.1960, 1♀, L.W. Quate. PI: MINDANAO I: Kolambugan Prov, 2♂,4♀, Baker (BISHOP & USNM).

Distribution. Philippines.

Remarks. Melichar did not specify on how many specimens his description of *Rhotana punctovenosa* was based. The Melichar collection in Brno contains only 1 specimen

bearing a type label (P. Lauterer, pers. commun.), which is here designated as lectotype. Muir gives 3 type-localities for *Levu irrorata,* indicating that 3 or more syntypes were present. However, the Bishop Museum contains only 1 specimen bearing a type label, which is here designated as lectotype. The lectotype of *Rhotana punctovenosa* differs from the lectotype of *Levu irrorata* by having fewer dark dots near the apical margin.

Rhotanella punctovenosa is closely related to *Rl. lautereri*; however, it is slightly larger, the base of the scutellum has 2 brown marks, the tegmen lacks a dark round mark between the 2 branches of the 1st median sector, but has a series of dark dots near the anterior part of the apical margin, between Sc and M (in *Rl. lautereri* dots between apices of M and Ms2). The apex of the aedeagus lacks 2 small terminal lobes.

Genus **Levu** Kirkaldy

Levu Kirkaldy, 1906: 434. Type-species: *Levu vitiensis* Kirkaldy, by monotypy.

In profile junction of vertex and face rounded; facial carinae contiguous in their basal halves; antennae short, only slightly longer than wide; subantennal processes well developed, usually connected to margins of facial carinae; rostrum usually surpassing hind coxae; lateral carinae of pronotum well developed. Tegmen with costal margin straight; 5 narrow costal cells, usually 2 long and 3 short ones; Sc+R fork before middle of tegmen; basal median cell narrow, M leaves Sc+R at or before first ⅓ of that cell; Cu1 connected to base of Ms1 by a crossvein; Ms1 branched in its basal ½; tegmen powdered.

Levu is closely related to *Rhotana.* Its members are usually smaller in size, have powdered, more slender, little colored tegmina with a narrow basal median cell and M leaving Sc+R near base of that cell. *Levu* apparently was named after the Fijian island of Viti Levu. Since the name is of nonclassical origin and Kirkaldy did not specify the gender in its original description, the gender of *Levu* should be considered masculine (Article 30b (ii) of the ICZN).

Key to the Philippine species of *Levu*

1. Veins of tegmen red ..... **bicolensis, n. sp.**
   Veins of tegmen stramineous or white 2
2 (1). Tegmen with a crossvein connecting the bases of 1st and 2nd median sectors 3
   Tegmen without such a crossvein (but a crossvein might connect the base of the 1st median sector and the media) 5
3 (2). Center of frons red ..... **rubrofrontalis, n. sp.**
   Center of frons stramineous 4
4 (3). Pleura of mesothorax without red marks ..... **patolai, n. sp.**
   Pleura of mesothorax with red mark ..... **rubropleuralis, n. sp.**
5 (2). Apical portion of ♂ aedeagus about 4× longer than wide (in side view) ..... **elongatus, n. sp.**
   Apical portion of ♂ aedeagus about 2× longer than wide, ending in 2 curved lobes ..... **muiri, n. sp.**

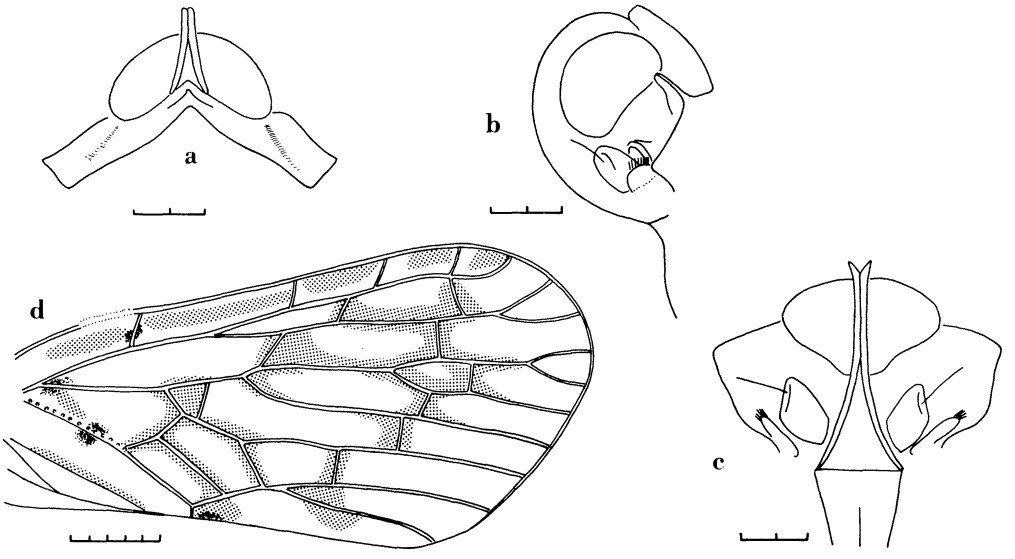

FIG. 44. *Levu bicolensis,* holotype ♀: **a,** vertex; **b,** head in side view; **c,** frons; **d,** tegmen. Scales: a, b, c = 0.2 mm; d = 0.5 mm.

Levu bicolensis Zelazny, **new species** Fig. 44

Holotype (Fig. 44). ♀, body 2.4 mm, tegmen 3.6 mm. Subantennal processes not connected to margins of facial carinae; apical part of labium mutilated, but length of mandibular stylet suggests that rostrum reached to end of first ⅓ of abdomen. Tegmen 2.2× longer than wide; Ms1 with a small triangle at base; Ms1 branched ⅓ from its base. *Color* white to stramineous; margins of facial carinae and a longitudinal stripe along clypeus orange; mesonotum with a brown central, longitudinal stripe, and 2 brown, poorly defined lateral marks. Tegmen smoky gray, powdered; infuscated near veins except in apical portion; spots of slightly darker infuscations near 1st subcostal sector, fork of M and Sc+R, middle of cubitus, and distad of clavus tip; veins red except in apical part where they are white. Hindwing white; veins red, bordered by narrow zones of infuscation.

Holotype ♀, PI: LUZON I: Albay Prov, Ligao, XI.1976, J. Patola (BISHOP 11,972).

Distribution. Philippines (Luzon I).

Remarks. Levu bicolensis resembles *Levu halosydne* Kirkaldy from Fiji in the red veins of the tegmina, but can be easily separated from that species by the dark tegmina.

Levu rubrofrontalis Zelazny, **new species** Fig. 45

Holotype (Fig. 45). ♂, body 1.7 mm, tegmen 3.4 mm. Subantennal processes connected to margins of facial carinae; rostrum reaching middle of abdomen. Tegmen 2.3× longer than wide; Ms1 branched ⅓ from base; Ms2 angulated at base and connected to base of Ms1 by a crossvein. *Color* white to stramineous; a small grayish mark above eyes; a small red mark in front of antennae and a broad bright red longitudinal stripe on frons; mesonotum brown, mesoscutellum dark brown; central carina and apical ½ of clypeus dark purple-brown; fore legs missing; propleura red; abdomen light brown, genital styles dark gray, Tegmen white, powdered; very slightly infuscated in a broad band from clavus tip to 1st subcostal sector, near basal crossvein between radius and subcosta, and along anterior apical crossveins; veins white but

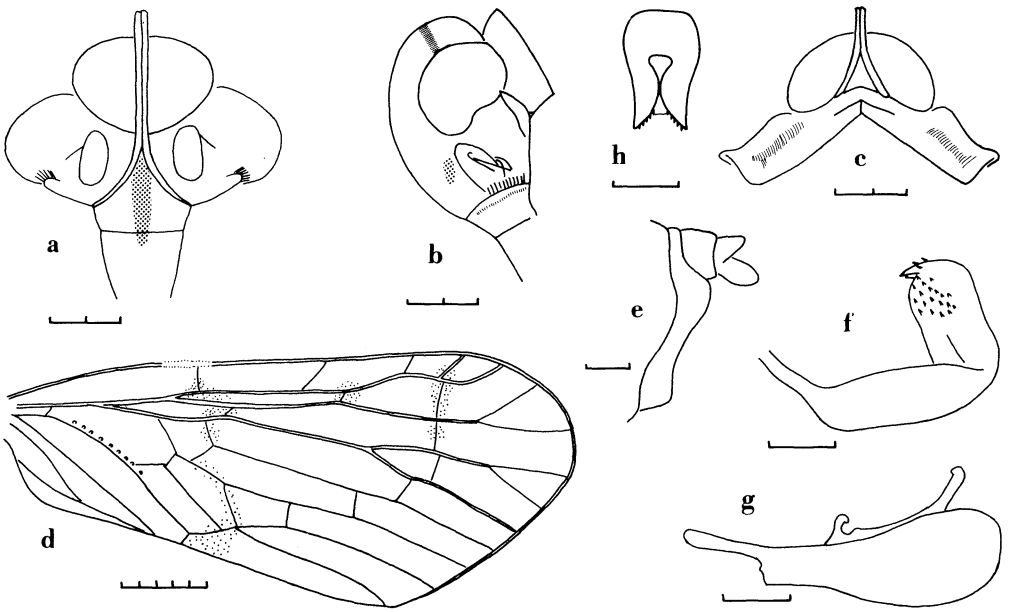

FIG. 45. *Levu rubrofrontalis,* holotype ♂: **a,** frons (dotted area red); **b,** head in side view (stripe above eye gray, dotted area in front of antenna red); **c,** vertex; **d,** tegmen; **e,** pygofer and anal segment; **f,** aedeagus in side view; **g,** genital style; **h,** apex of aedeagus in dorsal view (tip down). Scales: a, b, c = 0.2 mm; d = 0.5 mm; e, f, g, h = 0.1 mm.

costa light orange. *Genitalia.* Pygofer inconspicuously produced below anal segment. Genital style elongated, apical margin rounded; dorsal processes widely separated, proximal one short curved inwards and pointed at tip, distal one elongated and curved outwards at tip, a small hump between both processes. Apical portion of aedeagus thick, covered with minute teeth on inner side, ending in a pair of short, pointed processes.

Paratypes. Tibiae and tarsi of fore legs purple-gray. Abdomen of ♀ light green, genitalia light brown. Length of ♂: body 1.8 mm, tegmen 3.4 mm; average length of ♀: body 2.0 ± 0.1 mm, tegmen 3.8 ± 0.1 mm (n = 4).

Holotype ♂, PI: LUZON I: Albay Prov, Mayon Volcano, XI.1976, F. Otilano (BISHOP 11,973). Paratypes. PI: LUZON I: Albay Prov: Ligao, I.1977, 1♂,2♀, J. Patola, D. Quinalayo (ARC & BISHOP); same data as holotype, 1♀, F. Imperial; Tabaco, II.1976, 1♀, Patola (ARC).

Distribution. Philippines (Luzon I).

Remarks. Levu rubrofrontalis can be distinguished from other members of *Levu* by the bright red stripe on the frons.

Levu patolai Zelazny, **new species** Fig. 46

Holotype (Fig. 46). ♂, body 1.6 mm, tegmen 2.9 mm. Subantennal processes connected to margins of facial carinae; rostrum reaching middle of abdomen. Tegmen 2.2× longer than wide; venation as in *L. rubrofrontalis. Color* white to light green; mesonotum and abdomen light brown; a faint gray mark above eyes; legs stramineous, fore and middle tibiae faintly tinted with red; abdomen light green, genitalia white.

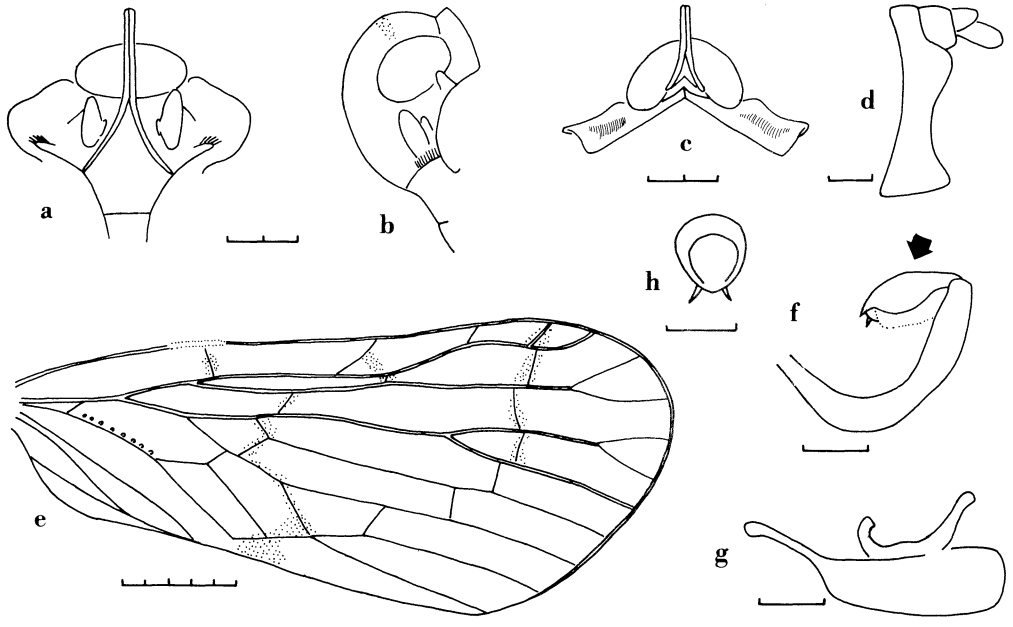

FIG. 46. *Levu patolai,* holotype ♂: **a,** frons; **b,** head in side view; **c,** vertex; **d,** pygofer and anal segment; **e,** tegmen; **f,** aedeagus in side view (arrow indicates direction of view in h); **g,** genital style; **h,** apex of aedeagus in dorsal view, tip down (see arrow in f). Scales: a–b, c = 0.2 mm; d, f, g, h = 0.1 mm; e = 0.5 mm.

Tegmen white, powdered; very faintly infuscated from clavus tip to basal crossvein between radius and media, near 1st and 2nd subcostal sectors, and from last subcostal sector to crossvein between M and Ms3; veins white, lightly infuscated in infuscated portions; costa and apical margin orange. *Genitalia.* Pygofer slightly produced at sides, just below anal segment. Genital style elongated; proximal dorsal process slender, tip curved inwards and pointed; distal dorsal process longer, slightly curved outwards. Aedeagus with apical portion rounded, ending in 2 short pointed processes.

Paratypes. Crossvein between Cu and Cu1, as well as last subcostal sector faintly orange.

Holotype ♂, PI: LUZON I: Albay Prov, Guinobatan, I.1976, J. Patola (BISHOP 11,974). Paratypes. PI: LUZON I: Ifugao Prov, Jacmal Bunhian, 24 km E of Mayoyao, 800–1000 m, 1–10.V.1967, 1♀, L.M. Torrevillas; Albay Prov, Guinobatan, I.1976, 1♂, F. Otilano.

Distribution. Philippines (Luzon I).

Remarks. Levu patolai is closely related to *L. rubrofrontalis* and *L. rubropleuralis,* n. sp.; however, it lacks red marks on the frons and the thoracic pleura. This species is named in honor of the collector of the holotype, Dr J. Patola.

Levu rubropleuralis Zelazny, **new species** Fig. 47a–c

Holotype (Fig. 47a–c). ♂, body 1.4 mm, tegmen 2.5 mm. Very similar to *L. patolai.* Tegmen without a crossvein between M and Ms3; in left tegmen crossvein between Cu1 and base of Ms1 much shorter than in *L. patolai,* in right tegmen this crossvein as in *L. patolai. Color.* Two dark gray marks on facial carinae,

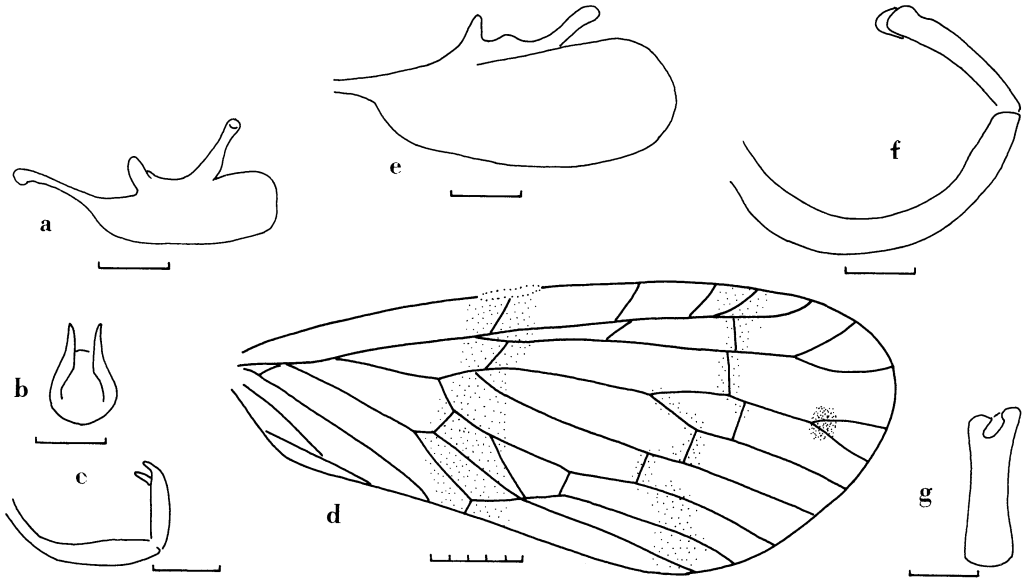

FIG. 47. **a–c,** *Levu rubropleuralis,* holotype ♂: **a,** genital style; **b,** apical portion of aedeagus in caudal view (tip up); **c,** aedeagus in side view. **d–g,** *Levu elongatus,* holotype ♂: **d,** tegmen; **e,** genital style; **f,** aedeagus in side view; **g,** apex of aedeagus in dorsal view (tip up). Scales: a, b, c, e, f, g = 0.1 mm; d = 0.5 mm.

in front and above eyes; mesopleura with conspicuous red mark. Tegmen white, powdered; faintly infuscated from clavus tip to 1st subcostal sector, near 2nd subcostal sector, and near apical crossveins, veins white; light brown in infuscated areas; costa, end of subcosta, and apical crossvein between Cu and Cu1 orange, last subcostal sector and adjacent part of costa red. *Genitalia.* Pygofer slightly produced at sides, just below anal segment. Genital style elongated; proximal dorsal process short, a small hump at base; distal dorsal process longer, slightly curved outwards. Aedeagus with apical portion slender, ending in 2 processes, tips rounded.

Paratypes. One ♂ has only a faint red mark on mesopleuron. Most ♀ with stronger infuscations on tegmina than ♂; abdomen of ♀ light green, genitalia stramineous. Average size of ♂: body 1.6 ± 0.1 mm, tegmen 3.0 ± 0.1 mm (n = 2); ♀: body 1.9 ± 0.1 mm, tegmen 3.5 ± 0.2 mm (n = 17).

Holotype ♂, PI: LUZON I: Albay Prov, Quinobatan, I.1977, J. Patola (BISHOP 11,975). Paratypes. PI: LUZON I: Albay Prov, Guinobatan, I,II,IV.1977, 3♂,15♀, J. Patola, F. Otilano (ARC & BISHOP). PI: MINDANAO I: Agusan del Sur Prov: Los Arcos, 19–23.XI.1959, 1♂, L.W. Quate; S. Francisco, 10 km SE, 17.XI.1959, 1♀, C.M. Yoshimoto; Misamis Or. Prov, Mt Kibungol, 20 km SE of Gingoog City, 700–800 m, 9–18.IV.1960, 1♀, H. Torrevillas.

Distribution. Philippines.

Remarks. Levu rubropleuralis comes closest to *L. patolai.* It can be recognized by the red mark on the mesopleura, the 2 gray marks on the face, the tegmen lacking a crossvein between M and Ms3, the male genital style having a small hump at the base of the proximal dorsal process, and the apical portion of the aedeagus being more slender, its apical processes longer and with rounded tips.

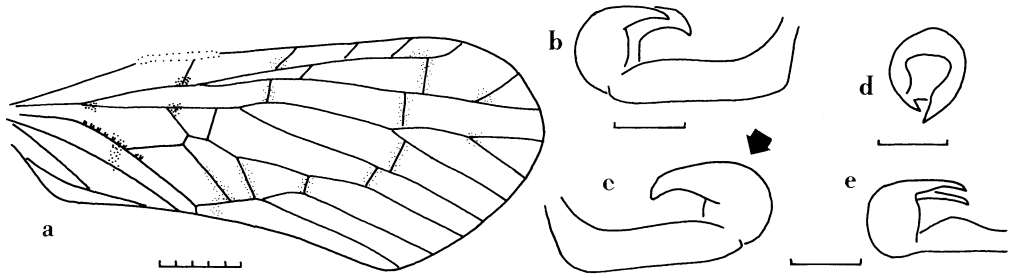

FIG. 48. *Levu muiri*: **a–d,** holotype ♂: **a,** tegmen; **b,** aedeagus right side; **c,** aedeagus left side (arrow indicates direction of view in d); **d,** apex of aedeagus in dorsal view, tip down (see arrow in c); **e,** specimen from Los Baños, aedeagus right side. Scales: a = 0.5 mm; b–c, d, e = 0.1 mm.

Levu elongatus Zelazny, **new species** Fig. 47d–g

Holotype (Fig. 47d–g). ♂, body 2.0 mm, tegmen 3.6 mm. Subantennal processes connected to margins of facial carinae; proboscis surpassing hind coxae. Tegmen 2.3× longer than wide; venation similar to that of *L. rubrofrontalis* but no small cell at base of Ms1; right tegmen missing. *Color* stramineous to light brown. Tegmen white, powdered; a dark, infuscated mark at fork of media and last median sector; a faintly infuscated broad band from clavus tip to 1st subcostal sector, and a narrow band along apical crossveins; veins stramineous in basal ⅔, tinted with orange in apical ⅓. *Genitalia.* Genital style oval; a small hump between both dorsal processes. Aedeagus with apical portion in side view about 4× longer than wide; apex with 2 small rounded lobes, the right one slightly larger.

Paratypes. Infuscated bands on tegmina darker than in holotype, especially near costal margin. Tegmen length of ♂: 3.1 ± 0.0 mm (n = 2); ♀: 4.0 mm.

Holotype ♂, PI: MINDANAO I: Misamis Or. Prov, Mt Pomalihi, 21 km W of Gingoog City, 800–1000 m, 5.X.1965, H.M. Torrevillas (BISHOP 11,976). Paratypes. PI: BASILAN I: 2♂,1♀, Baker (USNM).

Distribution. Philippines (Mindanao I, Basilan I).

Remarks. Levu elongatus can be recognized by the infuscations on the tegmina and the long and slender apical portion of the aedeagus.

Levu muiri Zelazny, **new species** Fig. 48

Holotype (Fig. 48a–d). ♂, body 1.9 mm, tegmen 3.3 mm. Subantennal processes not connected to margins of facial carinae; proboscis reaching middle of abdomen. Tegmen 2.3× longer than wide; Sc+R fork opposite junction of M and Ms1; Ms1 branched ⅓ from base; a crossvein between M and base of Ms1 forming a trapezoid cell. *Color* light brown to stramineous. Tegmen white, powdered; spots of infuscation at base of 1st subcostal sector, base of M, middle of Cu, and junction of M and Ms1; crossveins and adjacent sections of main veins brown; remaining veins stramineous; costa near junction with last subcostal sector orange-red. *Genitalia.* Pygofer with small, lateral, rounded projections. Genital style similar to that of *Levu elongatus.* Aedeagus with a large and broad apical portion, ending in 2 curved and pointed lobes, right one slightly smaller.

Paratypes. One ♂ with apical portion of aedeagus bearing 2 processes of equal length which are more slender than those of holotype (Fig. 48e). Average size of ♀: body 2.1 ± 0.1 mm, tegmen 3.7 ± 0.2 mm (n = 5).

Holotype ♂, PI: LUZON I: Laguna Prov, Los Baños, X.1915, F. Muir (BISHOP 11,977). Paratypes. PI: LUZON I: Laguna Prov, Los Baños, X.1914, IX,X.1915, 1♂,5♀, F. Muir.

Distribution. Philippines (Luzon I).

Remarks. Levu muiri can be recognized by the tegmen having a crossvein between M and the base of Ms1, infuscated crossveins, and 2 curved and pointed lobes at the apex of the aedeagus. It comes closest to *L. vitiensis* Kirkaldy and *L. pallescens* Metcalf, which, however, differ in the tegmen markings and in the structures of the aedeagi. This species is named in honor of the late Dr F. Muir, who contributed greatly to the knowledge of the Fulgoroidea and who collected this species.

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