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FLATIDAE OF BORNEO, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES (HOMOPTERA: FULGOROIDEA)

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ABSTRACT. The taxa of the fulgoroid family Flatidae (Homoptera) occurring on the island of Borneo are treated. Seventy-eight species under 33 genera are included with keys, character diagnoses, illustrations and collection data. Two new genera, *Boretsis* Medler and *Ortracis* Medler are described. Twelve new species are described and several new synonymies and new combinations are proposed as detailed below.

The new species described are: *Copsyrna martini* Medler, *Copsyrna merahata* Medler, *Flatula stenula* Medler, *Flatomorpha robusta* Medler, *Melicharia bukitara* Medler, *Melicharia exsarola* Medler, *Melicharia ticula* Medler, *Neodaksha agrossa* Medler, *Nephesa duffelsi* Medler, *Nephesa mazera* Medler, *Boretsis elongata* Medler, and *Seliza intera* Medler.

Cerynia mixana Medler, *new name*, is proposed to replace *Poeciloptera deplana sensu* Medler, not Walker.

Bythopsyrna illocata Melichar is restored as a species distinct from *B. circulata* (Guérin-Méneville).

Microliza Medler is considered as a junior synonym of *Paraflatoptera* Lallemand. The other new synonymies proposed are as follows (junior synonym followed by senior synonym): *Phyllodryas* Kirkaldy = *Idume* Stål, *Phyllodryas calamina* Kirkaldy = *Idume deducta* (Walker), *Cenestra aurora* var. *virescens* Melichar = *Cenestra aurora* (Guérin-Méneville), *Elidiptera puncticeps* Walker = *Cerfennia vetusta* (Walker), *Flata seriosa* Melichar = *Flatida floccosa* (Guérin-Méneville), *Flatoides principalis* (Stål) = *Ortracis conserta* (Walker), *Flatoptera minuta major* Lallemand = *Flatoptera albicosta* (Guérin-Méneville), *Phyma waterstradti* Schmidt = *Lawana pryeri* (Distant), *Pseudoryxa carinulata* Schmidt = *Oryxa melichari* Kirkaldy, and *Atracis maculipennis* Lallemand = *Staliana surrecta* (Walker).

The following new combinations are proposed: *Cenestra infixa* (Melichar), *Nephesa ligata* (Distant) (both from *Bythopsyrna*), *Idume tripars* (Walker) (from *Melicharia*), *Boretsis indigena* (Melichar) (from *Ormenis*), *Paraflatoptera calixis* (Medler), *P. desiris* (Medler), *P. epicis* (Medler) (all three from *Microliza*), *Ortracis conserta* (Walker), *Cerfennina scripta* (Melichar) *C. tabida* (Gerstaecker), *C. variegata* (Lallemand), and *C. vetusta* (Walker) (all five from *Staliana).*

Introduction

Literature on Borneo flatids appearing since publication of the Metcalf Catalog (1957), consists of reports by Medler (1986-1995) on type specimens of species named by Distant, Lallemand, Melichar, Schmidt, Stål and Walker. This article summarizes data on types of all species described from Borneo, along with new data from specimens in depository museums, espe-

cially collections at Amsterdam, Leiden, London and Honolulu. These data were important with respect to recognition of 2 new genera and 12 new species and substantial new information on distribution and affinities of the older known fauna. In large part my taxonomic study was based on diagnostic characters of the head, tegmina, and male and female genitalia. Non-type specimens used for illustrations were labeled *plesiotype* to help recognition by future workers.

The pioneering collections of Flatidae made by Alfred Russel Wallace during his 14 months residence in Sarawak, November 1854 to January 25, 1856, were named by Walker (1857a and b). The Wallace specimens preserved in the BMNH bear SAR [Sarawak] provenance labels only. Probably all came from 9 months collecting at Simunjan [Sadong River]. This locality was described by Wallace (1908, p. 177) as the best for beetles, and very good for other groups, found during 12 years of tropical collecting. Moulton (1912) reported on his visit to Wallace's collecting station on Mt. Serambu, but no specimen of flatid is known to me that can be attributed to that locality.

During the intervening years from Wallace to present, most flatids collected in Borneo have been preserved in various museums. These historical specimens in large part have been used for original data used in this report. It is believed that a significant proportion of extant material was examined. I have given recognition to collectors of specimens cited in this publication according to names found on respective data labels.

The following publications give historical information on collecting expeditions and localities in Borneo that may supplement label data on specimens examined:

Barlow (1969) - Information on collecting activities of John Waterstradt, whose Flatidae from North Borneo were named by Ed. Schmidt.

Distant (1910a, 1910b) - Review of Borneo Flatidae, with synonymies, new genera and species.

Holloway (1976) - Collecting localities of Cambridge Expedition on Mt. Kinabalu, 1965, J.D. Holloway.

Lallemand (1939) - Report on Flatidae collected by Oxford University Expeditions, 1900 and 1932, with new genera and new species, V. Shelford.

Nieuwenhuis (1900, 1904-1907) - Expeditions in Borneo.

Pendlebury & Chasen (1932) - Collection stations of Federated Malay States Museums expedition to Mt. Kinabalu, 1929, H.M.Pendlebury and F.N. Chasen. Note: Many specimens from F.M.S. Museums were transferred to British Museum (Nat. Hist.) and labeled BM 1955-354.

Quate (1962) - Collecting localities of BPBM in Sabah and Sarawak, 1958-1959, J.L. Gressitt, Y. Hirashima, T.C. Maa, L.W. Quate.

Willemse (1938) - Collecting stations of Oxford Expedition to Sarawak, 1932, B.M. Hobby & A.W. Moore.

Methods

Original collection data are normally transcribed exactly as given on labels, except dates are presented in uniform sequence of day, month and year, e.g., 01.vi.1995. Where necessary, updating of old locality names is indicated by brackets [ ].

Whenever possible the available records from "Borneo" have been assigned to the four current geographic political units: - Kalimantan [Indonesia], Brunei, Sabah [British North Borneo] and Sarawak [West Borneo].

To help obtain accurate assignment of locality names not found on available maps, the latitude and longitude of localities given in Gazetteer No. 10, Malaysia, United States Board on Geographic Names, Department of the Interior, Washington, DC, were associated with the respective political unit.

Measurements

Size approximations of specimen length made with ruler are given in 3 stages - small = minus 12 mm, medium = 13-19 mm, large = 20 mm plus. To provide precise morphometric data, all measurements were made at 3x with a binocular microscope fitted with a 20 x 20 grid in a 15x eyepiece. Grid units were converted to mm and recorded according to the following standardized format: Length (overall in side view along the midline from anterior margin of head to posterior margin of tegmen); v (vertex, along the dorsal midline from intergenal transverse carina to anterior margin, including projection of frontal carina); p and m (pronotum and mesonotum along the dorsal midline); f (frons, along the midline from dorsal apex to frontoclypeal suture); t (tegmen, from origin of basal stem to maximal apical margin midway between costal and sutural margins); pcl (postclaval sutural margin, from apex of clavus to apex of sutural angle, or in case of convexity, the intersection of the posterior margin of the arc by a chord projected from the claval suture through apex of the clavus). Width: v (vertex, transversely along the posterior intergenal carina between its junction points with the lateral carinae dorsad of eyes); f (frons, at maximal point, usually, but not always on a plane near antennal insertions); t (tegmen, plane between apex of clavus and costal margin). Parameters of tegmen measurements were illustrated by Medler (1991, Fig. 1).

The hind leg spines are recorded by formula, with data listed in sequence of (1) metatibial lateral spine or spines, (2) metatibial apical spines (3) metatarsal basal segment apical spines: e.g. 1:5:7.

Genitalia drawings were made freehand from NaOH-treated specimens positioned in glycerine in a porcelain spot plate. Accurate dimensions were obtained with the same 20x20 grid used for measurements.

Depository Museums

Codens *sensu* Arnett et al. (1993) are used to specify museums that loaned specimens for examination. The codens along with their associated depository museums are as follows:

AMNH — American Museum of Natural History, New York, NY 10024, USA.
BMNH — The Natural History Museum, London, England.
BPBM — Bernice P. Bishop Museum, J. Linsley Gressitt Center for Research in Entomology, Honolulu, HI 96819, USA.
CAS... — California Academy of Sciences, San Francisco, CA 94118.
EMAU — Zoologisches Institut und Museum, Greifswald, Germany.
HNHM — Hungarian Natural History Museum, Budapest, Hungary.
ISNB — Institut Royal des Sciences Naturelles de Belgique, Bruxelles. Belgium
MCSN — Museo Civico di Storia Naturale "Giacoma Doria", Genoa, Italy.
MMBC — Moravian Land Museum, Department of Entomology, Brno, Czech Republic.
MNHN — Museum National d'Histoire Naturelle, Paris, France.
MVMA — Natural History Museum, Abbotsford, Victoria, Australia.
MZN — Museo di Zoologia di Napoli, Naples, Italy.
NCSU — North Carolina State University Insect Collection, Raleigh, NC 27607, USA.
NHMW — Naturhistorisches Museum, Wien, Austria.
NHRS — Museum of Natural History, Stockholm, Sweden.
RMNH — National Museum of Natural History, Leiden, The Netherlands.
SMTD — Staatliches Museum für Tierkunde, Dresden, Germany.
USNM — US National Museum of Natural History, Washington, DC 20560, USA.
ZILS — Lund University, Museum of Zoology and Entomology, Lund, Sweden.
ZMHU — Museum für Naturkunde der Humboldt-Universität, Berlin, Germany.
ZMPA — Polish Academy of Sciences, Institut of Zoology, Warsaw, Poland.
ZMUA — Zoölogisch Museum, Universiteit van Amsterdam, Amsterdam, The Netherlands.
ZMUC — Zoological Museum, University of Copenhagen, Copenhagen, Denmark.
ZMUH — Universität Zoologisches Institut und Zoologisches Museum, Hamburg, Germany.

Taxonomic treatment

1. Genus ***Flatida*** White
   - 1.1 *Flatida cingulata* (Melichar)
   - 1.2 *Flatida floccosa* (Guérin-Méneville)
   - 1.3 *Flatida montivaga* (Distant)
   - 1.4 *Flatida hilaris* (Gerstaecker)
   - 1.5 *Flatida intacta* (Walker)
2. Genus ***Cerynia*** Stål
   - 2.1 *Cerynia albata* (Stål)
   - 2.2 *Cerynia mixana* Medler, new name
3. Genus ***Cenestra*** Stål
   - 3.1 *Cenestra aurora* (Guérin-Méneville)
   - 3.2 *Cenestra infixa* (Melichar), comb. nov.
4. Genus ***Bythopsyrna*** Melichar
   - 4.1 *Bythopsyrna circulata* (Guérin-Méneville)
   - 4.2 *Bythopsyrna illocata* Melichar, new status
   - 4.3 *Bythopsyrna copulanda* (Distant)
   - 4.4 *Bythopsyrna intermedia* Schmidt
   - 4.5 *Bythopsyrna tineoides* (Olivier)
5. Genus ***Neodaksha*** Distant
   - 5.1 *Neodaksha agrossa* Medler, sp. nov.
6. Genus ***Taparella*** Medler
   - 6.1 *Taparella amata* (Walker)
7. Genus ***Miniscia*** Medler
   - 7.1 *Miniscia maculata* (Melichar)
8. Genus ***Mimophantia*** Matsumura
   - 8.1 *Mimophantia maritima* Matsumura
9. Genus ***Flatosoma*** Melichar
   - 9.1 *Flatosoma diastola* Schmidt
10. Genus ***Phyllyphanta*** Amyot & Serville
    - 10.1 *Phyllyphanta producta* (Spinola)
11. Genus ***Salurnis*** Stål
    - 11.1 *Salurnis dulitana* Lallemand
    - 11.2 *Salurnis kryala* Medler
    - 11.3 *Salurnis marginella* (Guérin-Méneville)
    - 11.4 *Salurnis minuta* Lallemand
12. Genus ***Colobesthes*** Amyot & Serville
    - 12.1 *Colobesthes falcata* (Guérin-Méneville)
13. Genus ***Lawana*** Distant
    - 13.1 *Lawana pryeri* (Distant)
14. Genus ***Cromna*** Walker
    - 14.1 *Cromna acutipennis* Walker
    - 14.2 *Cromna divisa* (Melichar)
15. Genus ***Eumelicharia*** Kirkaldy
    - 15.1 *Eumelicharia radiata* (Distant)
16. Genus ***Flatula*** Melichar
    - 16.1 *Flatula bipunctata* Schmidt
    - 16.2 *Flatula stenula* Medler, sp. nov.
17. Genus ***Flata*** Fabricius
    - 17.1 *Flata guttularis* (Walker)
    - 17.2 *Flata ferrugata* Fabricius
18. Genus ***Oryxa*** Melichar
    - 18.1 *Oryxa melichari* Kirkaldy

19. Genus ***Scarpantina*** Melichar
    19.1 *Scarpantina stigmatica* Melichar
20. Genus ***Nephesa*** Amyot & Serville
    20.1 *Nephesa rosea* (Spinola)
    20.2 *Nephesa grata* Walker
    20.3 *Nephesa truncaticornis* (Spinola)
    20.4 *Nephesa suffusa* (Walker)
    20.5 *Nephesa duffelsi* Medler, sp. nov.
    20.6 *Nephesa mazera* Medler, sp. nov.
    20.7 *Nephesa rorida* (Walker)
    20.8 *Nephesa sandakanensis* Distant
    20.9 *Nephesa ligata* (Distant), comb. nov.
21. Genus ***Copsyrna*** Stål
    21.1 *Copsyrna maculata* (Guérin-Méneville)
    21.2 *Copsyrna martini* Medler, sp. nov.
    21.3 *Copsyrna merahata* Medler, sp. nov.
22. Genus ***Kayania*** Distant
    21.1 *Kayania volens* (Walker)
23. Genus ***Flatoptera*** Melichar
    23.1 *Flatoptera albicosta* (Guérin-Méneville)
    23.2 *Flatoptera depressa* Melichar
    23.3 *Flatoptera virescens* Schmidt
24. Genus ***Idume*** Stål
    24.1 *Idume niveina* (Walker)
    24.2 *Idume tripars* (Walker), comb. nov.
    24.3 *Idume deducta* (Walker)
25. Genus ***Boretsis*** Medler, nov.
    25.1 *Boretsis indigena* (Melichar), comb. nov.
    25.2 *Boretsis elongata* Medler, sp. nov.
26. Genus ***Melicharia*** Kirkaldy
    26.1 *Melicharia baramia* (Distant)
    26.2 *Melicharia ticula* Medler, sp. nov.
    26.3 *Melicharia bukitara* Medler, sp. nov.
    26.4 *Melicharia exsarola* Medler, sp. nov.
27. Genus ***Flatomorpha*** Melichar
    27.1 *Flatomorpha robusta* Medler , sp. nov.
28. Genus ***Seliza*** Stål
    28.1 *Seliza vidua* (Stål)
    28.2 *Seliza intera* Medler, sp. nov.
    28.3 *Seliza variata* Melichar
29. Genus ***Paraflatoptera*** Lallemand
    29.1 *Paraflatoptera transversa* Lallemand
    29.2 *Paraflatoptera calixis* (Medler), comb. nov.
30. Genus ***Atracis*** Stål
    30.1 *Atracis reversa* (Melichar)
    30.2 *Atracis taenia* (Schmidt)
31. Genus ***Cerfennia*** Stål
    31.1 *Cerfennia variegata* (Lallemand), comb. nov.
    31.2 *Cerfennia scripta* (Melichar), comb. nov.
    31.3 *Cerfennia vetusta* (Walker), comb. nov.
    31.4 *Cerfennia tabida* (Gerstaecker), comb. nov.
32. Genus ***Staliana*** Medler
    32.1 *Staliana inaequalis* (Walker)
    32.2 *Staliana intercepta* (Walker)
    32.3 *Staliana obtecta* (Melichar)

32.4 *Staliana surrecta* (Walker)
32.5 *Staliana rivularis* (Distant)
33. Genus ***Ortracis*** Medler, nov.
33.1 *Ortracis conserta* (Walker), comb. nov.

Key to the genera of Flatidae in Borneo

1. Tegmina positioned more or less flat, costal margin often undulate; clypeus directed horizontally; 1 metatibial lateral spine (rarely 2 spines) (Flatoidinae). 30
-- Tegmina positioned vertically, costal margin evenly curved; clypeus not horizontal; 1 or 2 spines (Flatinae). 2
2. Claval vein A2 strongly elevated basally, base of clavus heavily pustulate; postclaval sutural margin convexly raised; pronotum paranotal eminence conical; usually colored all brown or black; size small (Selizini). 29
-- Claval vein A2 not elevated in conjunction with strongly raised postclaval sutural margin; paranotal eminence absent, ridgelike or conical; rarely all brown or black; size variable, small to large. 3
3. Antennal segment I extensible beyond antero-lateral margin of frons; paranotal lobe without eminence. 4
-- Antennal segment I not extensible beyond antero-lateral margin of frons; paranotal lobe with or without eminence. 6
4. Antennal segment II strongly tubular; much longer than segment I; size very large. ..... 1. *Flatida*
-- Antennal segment II not tubular, only slightly longer than segment I; size medium. 5
5. Antennal segment II outer surface with elongate narrow groove; tegmen with strong black lines apically. ..... 2. *Cerynia*
-- Antennal segment II clavate, shorter than segment I; tegmen unmarked. ..... 3. *Cenestra*
6. Pronotum pleural lobe with elongate ridgelike eminence extending from near eye to antero-ventral margin, usually carinate. 12
-- Pronotum pleural lobe without carinate ridgelike eminence. 7
7. Vertex displaced posteriorly by strongly developed frons; dorso-posterior margin delimited by transverse intergenal carina; 1 or 2 metatibial spines. 8
-- Dorsum of head ledgelike; vertex and frons clearly separated by margin; 2 metatibial spines. 11
8. Tegmen with well formed submarginal line extending from clavus apex to pre-costal margin, often connected with Y-stem of veins C + R; 1 or 2 metatibial spines; size small to medium. 26
-- Tegmen without continuous well formed submarginal line; 1 metatibial spine; size medium to large. 9
9. Head, pro- and mesonotum strongly marked with black spots; ovipositor primitive, for piercing. ..... 4. *Bythopsyrna*

-- Head, pro- and mesonotum without black spots; ovipositor modified, non-piercing. 10
10. Frons with horseshoelike carina; tegmen apical margin obliquely truncate, the angles rounded. ..... 6. *Taparella*
-- Frons without horseshoelike carina, or only faint dorsal remnant of such carina; tegmen apical margin widely oval. ..... 5. *Neodaksha*
11. Disc of frons concave, lateral margins thinly carinate; vertex wider than long, anterior margin transverse; tegmen with veins R, S, M arising from basal stem. ..... 7. *Miniscia*
-- Disc of frons convex; anterior margin of vertex obtusely produced; tegmen with veins R, S+M arising from basal stem. ..... 8. *Mimophantia*
12. Head acutely conical; sutural angle of tegmen acutely pointed, apical margin nearly truncate; R+S, M veins arising from basal stem; 1 metatibial spine. 13
-- Head conical, obtuse or truncate; frons convex from intergenal transverse carina; sutural angle convex or angulate, apical margin convex, truncate or oblique; R, S and M veins arising separately at basal node; usually 2 metatibial spines. 14
13. Vertex with median longitudinal carina. ..... 10. *Phyllyphanta*
-- Vertex without median longitudinal carina. ..... 11. *Salurnis*
14. With 2 metatibial lateral spines. 15
-- With 1 metatibial lateral spine. 21
15. In frontal view, lateral margins of frons strongly incurved to clypeus. ..... 9. *Flatosoma*
-- In frontal view, lateral margins of frons evenly curved, or rarely outcurved near antennae 16
16. Sutural and apical margins of tegmen prolonged into acute angle; apex without strong submarginal line. 17
-- Apical margin convex or meeting sutural margin at nearly right angle; submarginal line present or absent 19
17. Head not conical or obtusely produced; size very large. .....12. *Colobesthes*
-- Head conical or obtusely produced; size medium. 18
18. Head broadly conical, bulbous or obtusely rounded; tegmen often white with black markings. ..... 13. *Lawana*
-- Head narrowly conical; color green or stramineous without black markings. ..... 14. *Cromna*
19. Frons and vertex moderately bulbous; sutural and costal angles convex; apex of tegmen with submarginal line; clavus Y-stem elongate. ..... 15. *Eumelicharia*
-- Clavus Y-stem very short or absent. 20
20. Veins R, S+M arising from basal stem; tegmen with many irregular cells filled by large black spots. .....16. *Flatula*
-- Veins R, S, M arising from basal stem; tegmen black spots, if present very small. .....17. *Flata*
21. Margin between frons and vertex thick, tripartite, the median portion protruding convexly; tegmen without black markings. ..... 18. *Oryxa*

-- Margin of frons and vertex not tripartite; tegmen with or without black markings..... 22
22. Anterior margin of head truncate, vertex ledgelike; sutural and apical margins of tegmen meeting at angle of about 90 degrees; submarginal line present..... 19. *Scarpantina*
-- Anterior margin of head convex; vertex displaced by convex dorsal margin of frons; apical margin of tegmen usually not angulate. 23
23. Tegmen without strongly outlined submarginal line; frons with median and lateral carinae. ..... 20. *Nephesa*
-- Tegmen with submarginal line; frons with median carina only. 24
24. Head, thorax and tegmen and submarginal line with boldly outlined black markings; postocular ridge not strongly carinate..... 21. *Copsyrna*
-- Head, thorax and tegmen without black markings. 25
25. Postclaval sutural margin not elevated, sutural angle narrowly convex; dorsal intragenal carina angulate medially. ..... 22. *Kayania*
-- Postclaval sutural margin convex; sutural angle broadly convex; dorsal intragenal carina strongly convex..... .....23. *Flatoptera*
26. Metatibia with one lateral spine; (tegmen with submarginal line; strong diagonal wale originating at R+C; size small, overall length less than 10 mm)..... 24. *Idume*
-- Metatibia with two lateral spines. 27
27. R, S+M veins arising from basal stem. .....25. *Boretsis*
-- R, S, M veins arising from basal stem, sometimes origins obscured by pustules. 28
28. Dorsum of head shorter than pronotum; apical margin of tegmen convex, or oblique if angles subequal; submarginal area and precostal marginal area subequal in width, terminal veins with or without branching in submarginal area; usually distinct wale extending obliquely from R+C Y-stem.....26. *Melicharia*
-- Dorsum of head as long as pronotum; apical margin of tegmen with angles more or less evenly convex; submarginal area wider than precostal margin, terminal veins unbranched or with very few branches between apical margin and submarginal line, diagonal crease extending obliquely from claval apex. ..... 27. *Flatomorpha*
29. Head conical or truncate in dorsal view; veins R, S, M arising from basal stem; 2 metatibial lateral spines.....28. *Seliza*
-- Head truncate in dorsal view; veins R+S, M arising from basal stem; 1 metatibial lateral spine. .....29. *Paraflatoptera*
30. Metatibia with 1 lateral spine. 31
-- Metatibia with 2 lateral spines. ..... 33. *Ortracis*
31. Vertex not longer than wide, pronotum with nipplelike postocular eminence.....30. *Atracis*
-- Vertex as long as or longer than wide; pronotum without nipplelike postocular eminence. 32

32. Pro/mesonotum strongly elevated convexly above horizontal plane of head; vein A1 zigzag or looped, connected to vein A2 by short crossveins; valvulae III narrowed apically, with 3-5 large, spaced teeth. .....31. *Cerfennia*

-- Pro/mesonotum not strongly elevated; vein A1 without loops or zigzag, valvulae III footlike, not narrowed, apical margin with small to medium teeth. ..... 32. *Staliana*

1. Genus *Flatida* White

Poeciloptera (Flatida) White, 1846: 26; Metcalf, 1957: 26. (catalog). Type species: *Poeciloptera (Flatida) tricolor* White.

Phromnia Stål, 1862c: 68. Type species: *Cicada limbata* Fabricius.

Diagnosis: Head about same width as raised anterior margin of pronotum; frons united with vertex, continuously convex from clypeus to transverse thick intergenal carina, which has interocular position near anterior margin of pronotum, lateral margins ridgelike, carinate, strongly concave between antennae; ocelli absent. Antennal segment I extensible well beyond lateral margin of frons, segment II much longer than I. Pronotum anterior margin deeply sulcate medially, disc quadrangular, raised, tricarinate nearly to posterior margin, without postocular eminence. Tegmen about twice longer than wide, apical margin oval convex, precostal margin twice wider than costal cell, longitudinal veins R+S,M or R,S,M arising from basal stem, numerous bifurcations apically, convex submarginal line of crossveins between apex of clavus and C+R stem; wide cell between Cu and claval suture, apex of clavus with short A1 + A2 Y-stem. Female genitalia adapted for piercing. Two metatibial preapical lateral spines. Size large, length usually about 25 mm.

Distribution: Oriental and Afrotropical Regions.

Key to species

1. Tegmen with 3 longitudinal veins arising from basal node; apical margin narrowly black, precostal margin usually orange testaceous, contrasting strongly with uniformly green tegmen. ..... 1.1. *cingulata* (Melichar)

-- Tegmen with 2 longitudinal veins, distinct R+S stem arising from basal node, apical margin not black. 2

2. Tegmen with wide fuscous band extending apically from bulla, then looping back to near apex of clavus; (if tegmen faded, or reddish, or heavily dusted with wax deposit, then view with transmitted light to detect presence of band marking).....3

-- Tegmen without visible trace of looped band; colored green, light brown or pale stramineous. 4

3. Tegmen brown, or tawny red with distinct looped band. ..... 1.2. *floccosa* (Guérin-Méneville)

-- Tegmen red, without looped band, usually with heavy wax deposit. ..... 1.3. *montivaga* (Distant)

4. Mesonotum and clavus orange testaceous, remainder of tegmen green. ..... 1.4. *hilaris* (Gerstaecker)
-- Body and tegmina uniformly concolorous green, stramineous, or light tawny; antenna segment II black; apices of legs fuscous or black, fore and mid tibiae fuscous. ..... 1.5. *intacta* (Walker)

1.1. *Flatida cingulata* (Melichar)

Flata cingulata Melichar, 1901: 211; Medler, 1986h: 326, fig. 27 (type). Holotype: ♀, Philippine Islands, NHRS.
Flatida cingulata: Metcalf, 1957: 30 (catalog).

Diagnosis: Head and thorax pale green stramineous, segment II of antennae black, tegmina dull green, submarginal line weakly developed, extending from claval apex, about half obsolete; costal margin narrowly orange basally, then blending into thin black apical margin and ending at claval apex. R + S stem less than 0.5 mm or absent. Male genitalia illustration (Fig. 2) is redrawn from Medler (1986h, fig. 27). Hind leg spine formula 2:9:7. Length 26 mm.

Specimen examined: SABAH: Kina Balu, 1 ♀ [no other data], ISNB.

Taxonomic note: This species has been recorded previously only from the Philippine Islands. The large size helps to distinguish specimens from uniformly green examples of *Flatida intacta*.

1.2. *Flatida floccosa* (Guérin-Méneville)

Flata floccosa Guérin-Méneville, 1829: pl 58, fig. 8; Melichar, 1901: 208, pl 1, fig. 9 (Borneo); Medler, 1988: 15, fig. I, 2 (type). Neotype: ♂, Java, Soekaboemi, NCSU.
Flata flaccida Walker, 1858a: 50; Melichar, 1901: 208 (synonymy); Medler, 1986f: 211 (recorded); Medler, 1990: 143 (holotype, in error). Holotype: a specimen from Hindustan, not yet recognized.
Phronima (sic) *hamifera* Walker, 1870: 181; Distant, 1892: 283 (synonymy); Medler, 1990: 144 (type). Holotype: ♂, Sumatra, Wallace, BMNH.
Flata hamifera: Melichar, 1901: 211 (Borneo).
Flata seriosa Melichar, 1901: 210. **New syn.** Lectotype (here designated): ♀, Borneo, MMBC.
Phromnia flaccida: Distant, 1906: 400 (Borneo).
Flatida flaccida: Metcalf, 1957: 31 (catalog).
Flatida floccosa: Metcalf, 1957: 32 (catalog).
Flatida seriosa: Metcalf, 1957: 49 (catalog).

Diagnosis: Tegminal markings characteristic; fuscous loop normally present, but may be faded and lost; bulla usually black, but also may be faded. Tegmina of some specimens have pinkish tinge. Characters of male genitalia shown by Medler (1988, fig. 2) are diagnostic. Hind leg spine formula 2:11/12:6. Length 22-28 mm.

Specimens examined: BORNEO: ♂, Coll. MacGillivray, ZMUA; ♂, det. Melichar, as *hamifera*, HNHM; ♂ ♀, det. Melichar, NHRS; ♀, col. Graeffe, det. Karny, as *hamifera*, NHMW; ♂, Staudinger, 1919, det. *bombycoides*, USNM. BRUNEI: ♀, Bukit Pagon, 5520', 15-20.ii.1982, Robinson, (BM 1982-

156); ♀, 20 km E. of Tutong, iii.1989, Martin (BM 1989-89); ♂ ♀, Kuala Belalong, 300 m, x-xi.1992, Martin (BM 1992-172), BMNH; ♂ ♀, det. Melichar, as *seriosa*, HNHM. KALIMANTAN: ♂, Balik Papan, Acc. 1959, Hardonk, ZMUA; 4♀, Mahakkam, 1894, Nieuwenhuis Exped., RMNH. SABAH: ♀, Keningan-Kimanis Rd., 05.27-28N 116.02-03E, 1350-1450 m, 19.xi.1987, de Jong, N Borneo Exped, RMNH; ♀, Danum Valley, 67 km W. Lahard Datu, 150 m, 6.xii.1989, M.J. & J.P. Duffels, ZMUA; ♀, Kinabalu, ZILS; ♂, Mt. Kinabalu, 5500 ft, vii.1951, Traub & Johnson, USNM; ♀, Kinabalu, 1903, Rolle, det. Karny, as *hamifera*, NHMW. SARAWAK: ♀, Bidi, Bau District, 20-249 m, 2.ix.1958, Maa, BPBM; ♂ ♀, Gunong Mulu Nat. Park, Site 7, Long Pala, 50 m, January (BM 1978-206), BMNH.

Taxonomic note: The status of *Flata flaccida* Walker as a junior synonym of *Flata floccosa* Guérin-Méneville (1829) is uncertain. The original description of a specimen from Hindustan gives tegmina with a few minute pustules, but makes no mention of the dark looped band characteristic of *floccosa*. The specimens from Malacca each without abdomen recorded by Medler (1986f, 1990) probably are not bona fide syntypes, notwithstanding attachment of a type label to a specimen that was erroneously designated holotype by Medler. In event the bona fide holotype from Hindustan is irrevocably lost, neotype designation of a specimen collected in the type locality should help solve nomenclature problem.

1.3. *Flatida montivaga* (Distant)

Phromnia montivaga Distant, 1892: 284, pl 13, fig. 5; Melichar, 1901: 208 (synonymy, in error); Medler, 1990: 174 (type). Holotype: ♀, Sabah, Mt. Kina Balu, Whitehead, BMNH.

Flata ferruginea Schmidt, 1904b: 354; Medler, 1995: in press (type, synonymy). Lectotype: ♀, Sarawak, Waterstradt, ZMPA.

Flata ferruginea var. *aeruginosa* Schmidt, 1904b: 355; Medler, 1995: in press (type, synonymy). Holotype: ♀, Sarawak, ZMPA

Flatida ferruginea: Metcalf, 1957: 31 (catalog).

Flatida ferruginea var. *aeruginosa:* Metcalf, 1957: 31 (catalog).

Flatida montivaga: Metcalf, 1957: 43 (catalog).

Diagnosis: Description applies to females; male unknown. Head, thorax and tegmina colored red to variable extent. Tegmina with red more intense basally, heavily dusted with white waxy powder that usually obscures underlying apically looped fuscous band. In such cases examination by transmitted light may reveal a faint characteristic band pattern shared with *floccosa*. Hind leg spine formula 2:10:6. Length 24 mm.

Specimens examined: SARAWAK: Higgins, ♀, '69, coll. Van Volxem, det. Melichar, as *Flata floccosa*, ISNB.

1.4. *Flatida hilaris* (Gerstaecker)

Phromnia hilaris Gerstaecker, 1895: 36. Holotype: ♀, Sumatra, not found at EMAU.
Flatida hilaris: Metcalf, 1957: 33 (catalog).

Diagnosis: Recognized by the orange-red color of the clavus in sharp contrast to light green tegmen.

Measurements: ♀, Laut Island. Length: overall 25.0; v 0.83; f 1.83; p 1.33; m 3.98; t 21.25; pcl 4.98. Width: v 1.00; f 0.50; t 13.78. Hind leg spine formula: 2:9:7.

Specimen examined: BORNEO: Laut Island, ♀, vi.1951, det. Synave, ISNB.

Taxonomic note: In addition to the Borneo specimen, only 3 female specimens from Sumatra are known. Examination of the male genitalia is needed to determine the status of this taxon, which may prove to be only a well marked color variant of *Flatida intacta.*

The record of *Phromnia hilaris* sensu Lallemand (1939: 71) is a misidentification. The ♀ from Sarawak, foot of Mt. Dulit, in BMNH is *Flatida intacta* with uniformly green tegmina.

1.5. *Flatida intacta* (Walker)

Flata intacta Walker, 1851: 435; Medler, 1990: 147 (type). Lectotype: ♂, Silhet, BMNH.
Phromnia intacta: Distant, 1906: 402 (North Borneo).
Flatida intacta: Metcalf, 1957: 34 (catalog).

Diagnosis: Pronotum lateral margins of disc carinate, median carina bifurcate anteriorly, enclosing a sulcate depression on anterior margin. Tegmen with distinct R+S stem arising from basal node, vein R with numerous branches along most of length. Body and tegmina uniformly colored, varying from light stramineous to grass green; antennal segments I and II more or less black, II twice longer than I, all tarsi and pro and meso-tibiae dark fuscous. Female pregenital segment with median rounded triangular knob; male style stubby globular, prominent spine projecting from dorso-apical margin. The lectotype genitalia are illustrated (Fig. 1).

Measurements: ♂ lectotype. Length: overall 21.0; v 0.83; f 1.66; p 1.00; m 2.82; t 18.16; pcl 3.82. Width: v 0.83; f 0.50; t 8.30. Hind leg spine formula: 2:9:5.

Specimens examined: Color pale stramineous, except green where indicated. BORNEO: ♂, Waterstradt, *Flata inornata* det Schmidt, ISNB; ♂, ♀, det. Melichar, HNHM. SABAH: ♂, ♀, Kinabalu, det. Melichar, NHRS; 4 ♂, 6 ♀, Ranau, 1958, Maa; ♂, ♀, color green, Ranau, 1958, Maa; ♂, color green, Ranau, 1958, Quate, BPBM; ♂, Pryer, det. Distant, (BM 1911-383), BMNH. SARAWAK: ♂, color green, foot of Mt. Dulit, 1.ix.1932, Hobby & Moore, *Phromnia hilaris* det Lallemand (BM 1933-254), BMNH; 4 ♀, det. Melichar, NHMW; ♂, Waterstradt, *Flata inornata* det Schmidt, ZMPA.

Taxonomic note: This taxon is widespread in the Oriental Region, but may be separated from congeners by unicolorous green, stramineous or light tawny coloration of tegmen along with strong R+S stem. A study of color variants from different places revealed no recognizable differences in male genital characters and female pregenital segment character of median knob.

2. Genus *Cerynia* Stål

Cerynia Stål, 1862c: 68; Metcalf, 1957: 94 (catalog). Type species: *Flata albata* Stål.

Diagnosis: Frons and vertex continuously convex from clypeus to transverse intergenal carina positioned above eyes; width same as anterior margin of pronotum; lateral margins raised, sharply carinate, ocelli present; antennal segment I extensible beyond lateral margin of frons, segment II about same length as I, with excavation on outside surface. Pronotum raised, anterior margin convex, carinate, with median depression, disc tricarinate nearly to posterior margin, no postocular eminence. Tegmen apex broadly convex, sutural angle less rounded than costal angle, submarginal line of crossveins from apex of clavus to costal angle; three longitudinal veins, R,S,M, arising from basal stem, sometimes a very short R+S stem; vein Cu not positioned close to claval suture. Female genitalia adapted for piercing, anal plate elongated, lateral margins folded along median line. Two metatibial lateral spines. Size medium.

The distinctive tegminal pattern of subapical black lines enables easy recognition of this genus.

Distribution: Oriental Region.

Key to species

1. Tegmen apical margin with two brown bands. ..... 2.1. *albata* (Stål)
-- Tegmen apical margin with one brown band. ..... 2.2. *mixana* Medler

2.1. *Cerynia albata* (Stål)

Flata albata Stål, 1854: 247; Medler, 1986h: 325 (type). Lectotype: ♀, Malacca, NHRS.
Poeciloptera deplana Walker, 1857b: 162; Walker, 1858c: 335; Lectotype: ♂ not found, BMNH.
Cerynia albata: Stål, 1862: 68; Melichar, 1923: 24 (Sarawak); Lallemand, 1939: 72 (Sarawak: Kuching); Metcalf, 1957: 96 (catalog).
Cerynia albata var *deplana:* Melichar, 1901: 219 (Sarawak); Metcalf, 1957: 96 (catalog).
Cerynia deplana: Medler, 1990: 140 (synonymy).

Diagnosis: Head, thorax and adjacent parts of tegmina stramineous, basal stramineous coloration of tegmina blending with apical white hyaline color to variable extent; sometimes membrane dusted with white waxy powder. Antennae, apex of rostrum, tarsi and pro- and mesotibiae usually dark fuscous. Distinctive tegmen pattern of sinuate black lines and pair of dusky apical bands are illustrated (Fig. 59).

Measurements: ♂, ♀ *deplana* det Melichar, NHMW. Length: Overall 15.0, 17.0; v 0.66, 0.83; f 1.33, 1.49; p 0.66, 0.83; m 2.32, 2.32; t 12.95, 15.27; pcl 4.65, 5.31. Width: v 0.66, 0.75; f 0.75, 0.83; t 7.47, 7.80. Hind leg spine formula: 2:6:4, 2:6:4/pad.

Specimens examined: BORNEO: 2♂, 2♀, 1886, Baczes, var *deplana*, det Melichar, NHMW. BRUNEI: ♂, Kuala Belalong, 300 m, x.1992, Martin (BM 1992-172), BMNH. SARAWAK: 2♂,3♀, Bidi, Bau District, 90-240 m, 2.ix.1958, Maa (male genitalia shown, Fig. 10); ♂, ♀, Merirai Val., Kapit District, secondary forest, 30-300 m., vii-viii.1958, Maa; ♂, Nanga Pelagus, secondary forest, 180-585 m, 7-14.viii.1958, Maa; BPBM; ♂, ♀, Lubok Jifa, 1°12'N 110°48'E, 6-10.xi.1976, Cranston (BM 1977-19); BMNH; ♀, var. *deplana*, det. Melichar, MCSN.

Taxonomic note: Tegmina of Walker's type male of *deplana* were described as pale testaceous at the base and with two dark apical bands. Specimens from Borneo in the NHMW determined *deplana* by Melichar (1901: 219) have tegmina orange yellow basally along with two circular dark apical bands (Fig. 59). Melichar's color variants are within the range of variation found in the *albata* population. The male genitalia of *deplana* sensu Melichar in NHMW (Fig. 11) and a typical representative of *albata* sensu Medler with pale testaceous tegmina in BPBM (Fig. 10) have same characters of the aedeagus.

2.2. *Cerynia mixana* Medler, n. name

Poeciloptera deplana Medler, 1990: 140 (misidentified, not Walker 1857).
Cerynia mixana Medler, replacement name for *deplana* Medler, 1990: 140.

Diagnosis: Morphological characters same as given for genus. Separated from congeners by tegmen apical margin with only one smoky band (Fig. 60). Differs from *Cerynia monacha* (Gerstaecker), the only other taxon with one apical smoky band, by presence of 3 black apical lines, whereas *monacha* has only a single short dashlike line at the claval apex. Male specimen from Borneo unknown, therefore, a male from Sumatra selected as plesiotype for illustration of genitalia (Fig. 12).

Measurements: ♂ plesiotype. Length: Overall 14.0; v 0.66; f 1.25; p 0.66; m 1.99; t 10.79; pcl 3.32. Width: v 0.71; f 0.62; t 6.64. Hind leg spine formula: 2:7:4.

Specimens examined: SARAWAK: Holotype ♀, Wallace, BMNH. SUMATRA: Plesiotype ♂, Tandjong Morawa, Serdang, det *fulgida* Bierman, ZMUA.

Taxonomic note: The female syntype of *deplana* Walker in BMNH was determined lectotype in error by Medler (1990: 140). This specimen had a single brown marginal band at apex of the tegmen that does not agree with the original description of a male having "two pale brown curved bands, one

submarginal, parallel to the other which is marginal." Probably the original series consisted of a male and female, because Walker (1858c: 335) listed examples a, b, Sarawak, in original material.

3. Genus *Cenestra* Stål

Cenestra Stål, 1862c: 68; Metcalf, 1957: 114 (catalog). Type species: *Poecilloptera* (sic) *aurora* Guérin-Méneville.

Diagnosis: Frons convex, extended dorso-posteriorly to intergenal transverse carina positioned above eyes, width about same as anterior margin of raised disc of pronotum; antennal segment I scarcely extensible beyond sharply carinate lateral margin, segment II shorter than I, ocelli small, indistinct. Pronotum anterior and lateral margins carinate, slight crease behind anterior margin, without longitudinal median carina, without postocular eminence. Tegmen twice longer than wide, oval convex apically, 3 longitudinal veins, R, S, M, arising from basal stem, giving rise to numerous terminal veins at apical margin, no submarginal line of crossveins, vein Cu not close to claval suture. Frons, pro- and mesonotum with distinctive pattern of stripes and large spots. Spot pattern mimics *Copsyrna*. However, lateral stripes are present on frons in *Cenestra*, but only median stripe is found in *Copsyrna*. Female genitalia adapted for piercing. Two metatibial lateral spines. Size medium to large.

Distribution: Indo-Malaysian Region.

Key to species

1. Tegmen without black arcuate bands apically. ..... 3.1. *aurora* (Guérin-Méneville)
-- Tegmen with apical and preapical black arcuate bands. ..... 3.2. *infixa* (Melichar)

3.1. *Cenestra aurora* (Guérin-Méneville)

Poecilloptera (sic) *aurora* Guérin-Méneville, 1834: 469; Medler, 1988: 12, fig. I, 3 (type). Lectotype: ♀, Bengala, MZN. Plesiotype: ♂, Indonesia, Java, Preanger, ZMUA.

Flata matutina Walker, 1851: 437; Medler, 1990: 150 (type). Lectotype: ♀, Java, BMNH.

Cenestra aurora: Stål, 1862c: 68 (combination); Melichar 1901: 222, pl 2, fig. 11; Melichar, 1923: 25, pl 2, fig. 18; Metcalf, 1957: 115 (catalog).

Cenestra matutina: Stål, 1862b: 490 (combination).

Cenestra aurora var. *matutina:* Melichar, 1901: 223; Metcalf, 1957: 116 (catalog); Medler, 1990: 150 (synonymy).

Cenestra aurora var. *virescens* Melichar, 1901: 223; Metcalf, 1957:116 (catalog). **New syn.** Holotype: ♂, Borneo, MMBC.

Diagnosis: Morphological characters as given for genus. Tegmina of specimens from Borneo had reddish color similar to specimens from Java, and resembled the example pictured by Melichar (1923, Fig. 18). Genitalia of a specimen from Toppus, Borneo, ZMUA, are illustrated (Fig. 13). No differ-

ences in characters were found between the Borneo specimen and the Java plesiotype of *aurora* (Guérin-Méneville) shown by Medler (1988, Fig. 3). A male specimen without locality label from Haglund's collection in NHRS, determined v.*virescens* by Melichar, has similar genitalia also. Subspecies status of color variants in this genus was not supported by study of male genital characters.

Measurements: ♂ plesiotype, ♀ lectotype. Length: Overall 19.0, 23.0; v 0.58, 0.62; f 1.25, 1.58; p 0.83, 1.00; m 2.32, 3.15; t 15.60, 20.92; pcl 6.31, 6.97. Width: v 0.91, 1.08; f 0.87, 1.12; t 7.97, 10.62. Hind leg spine formula: 2:5:5, 2:5:5.

Specimens examined: BORNEO: ♂, Toppus, coll Mjöberg, var. *matutina* Walker, det. Gravestein, ZMUA. SARAWAK: ♀, Gunong Mulu Nat Park, G. Api summit, 1710 m, 26.iv.1978, Holloway, (BM 1978-206), BMNH.

3.2. *Cenestra infixa* (Melichar), comb. nov.

Bythopsyrna infixa Melichar, 1901: 227; Medler, 1986c: 114 (type). Holotype: ♀, Borneo, Xantus, HNHM.

Diagnosis: Head and body orange stramineous. Frons convex, longer than broad, lateral margins carinate, poorly developed median carina, antennal segment II with sensory pits; pronotum convex anteriorly, with median longitudinal carina and pair of round spots, without postocular eminence; mesonotum with median and lateral longitudinal carinae, 2 pairs of bilateral black spots, tegulae black. Tegmen base color reddish orange, 2 fuscous convex bands apically, the premarginal discal band shortened, not reaching claval apex. Hind leg spine formula 2:5:5. Length 16 mm.

Specimen examined: Known only from holotype ♀ at HNHM.

Taxonomic note: The dark spots and bands give superficial appearance similar to *Bythopsyrna*, but the species is excluded by presence of two metatibial lateral spines. Orange and red coloration of tegmina is normal in *Cenestra*. Study of male genitalia is necessary for confirmation of generic placement.

4. Genus *Bythopsyrna* Melichar

Bythopsyrna Melichar 1901: 224; Metcalf, 1957: 103 (catalog). Type species: *Poeciloptera circulata* Guérin-Méneville.

Diagnosis: Frons convex, dorso-posterior margin same width as anterior margin of pronotum, intergenal transverse carina positioned above eyes, lateral margins raised moderately, sharply carinate, flanged outward above antennae, then strongly narrowed to clypeal margin, antennal segment II short, about two-thirds longer than segment I, punctate apically, ocelli weak, ventral rim of eye socket carinate. Pronotum disc bluntly triangular, sloping to humped mesonotum, anterior margin carinate, sulcate medially, with remnant of median longitudinal carina, lateral margin carinate, curving ven-

trally without reaching posterior margin, no postocular eminence. Tegmen broadly oval apically, costal and sutural angles of same configuration, apical margin with dense array of terminal veins arising from submarginal line; precostal margin and cell C approximately same width at bulla; 3 longitudinal veins arising from basal stem, several strong basal branches of vein R entering cell C, strong crossvein connecting basal stem and Cu; vein S forked near bulla, S2 forked about same distance from basal stem as M fork, Cu without fork; Y-stem at apex of clavus of moderate length. Bold pattern of dark fuscous black spots or bars on head and thorax, and heavy fuscous/black bands on tegmen, such as pictured by Melichar (1923, Fig. 20). Ovipositor adapted for piercing, valvulae III with filelike array of very small submarginal teeth, segment X large, ovate, width: length about 1:1. One metatibial lateral spine close to apical array of spines. Size medium to large.

Distribution: Oriental Region.

Key to species

1. Frons with single median longitudinal dark brown band. 4
-- Frons with two longitudinal dark brown bands separated by narrow median unmarked space. 2
2. Tegmen almost completely dark pruinose, white crescent arising from site of R + C; hind wing smoky. ..... 4.5. *tineoides* (Olivier)
-- Tegmen with bold pattern of brown/black longitudinal bands or crescents; hind wing not smoky. 3
3. Inner dark brown band of tegmen strongly hooked apically. .....4.4. *intermedia* Schmidt
-- Inner dark brown band of tegmen not hooked apically. .....4.3. *copulanda* (Distant)
4. Longitudinal dark brown band along vein R of tegmen broken by unmarked bulla; basal cell not dark, tegmen usually infused with orange basally. ..... 4.2. *illocata* Melichar
-- Longitudinal dark brown band along vein R of tegmen usually intact; basal cell brown or black. .....4.1. *circulata* (Guérin-Méneville)

4.1. *Bythopsyrna circulata* (Guérin-Méneville)

Poeciloptera circulata Guérin-Méneville, 1844: 361; Walker, 1851: 446 (Sarawak); Walker, 1870: 182 (Borneo); Medler, 1988: 13, fig. I, 4 (type). Type (presumed lost): Malaysia Coast, Delessert. Plesiotype: ♂, Indonesia, Solok Padang, ZMUA.

Bythopsyrna circulata: Melichar, 1901: 225, pl 2, fig. 6; Lallemand, 1939: 72 (Sarawak, Mt. Dulit); Metcalf, 1957: 103 (catalog).

Bythopsyrna dohrni Schmidt, 1904a: 188; Medler, 1995: in press (type, synonymy). Lectotype: ♂, Sumatra, Sinabong, ZMPA.

Bythopsyrna dohrni borneensis Schmidt, 1909: 191; Medler, 1995: in press (type, synonymy). Holotype: ♀, North Borneo, ZMPA.

Diagnosis: Morphological characters as given for genus. Extreme variability occurs in dark brown crescents, loops, bands and margins of tegmina. Ex-

tensive melanism may obscure marking patterns, and usual clear areas of membrane may be infused with orange color. Median longitudinal band on frons is consistent. Plesiotype genitalia (Fig. 5) are reproduced from Medler (1988, Fig. I, 4). Shape of valvulae III is shown (Fig. 41). Hind leg spine formula 1:6:8. Length 20-24 mm.

Specimens examined: SABAH: ♀, Tenompok, 1959, Maa, BPBM; ♂, Mt. Kinabalu, Marei Parei, 5000 ft [1524 m] 2.v.1929, Pendlebury (ex F.M.S. Mus., BM 1955-354); ♀, RGS Exped, BM 1978-206, BMNH. SARAWAK: ♀, Lavana [Lavan Sungai], 1500 m, Mjoberg, ZMUA; 2 ♀, coll. Pfeiffer, ♂, coll. Mayr, det. Melichar, NHMW.

4.2. *Bythopsyrna illocata* Melichar, n. status

Bythopsyrna illocata Melichar, 1901: 226; Synave, 1980: 7 (type); Medler, 1986d: 166 (type, synonymy). Lectotype: ♂, Sumatra (W), 69, Higgins, ISNB.

Bythopsyrna violacea Schmidt, 1904a: 209; Medler, 1995: in press (type, synonymy). Holotype: ♀, North Borneo, ZMPA.

Diagnosis: This species is closely related to *B. circulata*, but differences in color pattern of the tegmen enable recognition. Valvulae III somewhat globular (Fig. 40), not widened apically as found in *circulata*. Rows of small filelike teeth are developed submarginally on the interior surface. Lectotype genitalia (Fig. 4) reproduced from Medler (1987c, fig. 4). Hind leg spine formula 1:6:6. Length 18-20 mm.

Specimens examined: SABAH: ♀, Mt Kinabalu, Kenokok, 3,300 ft [1,005 m], 23.iv.1929, Pendlebury (ex F.M.S. Museum, BM 1955-354), BMNH.

Taxonomic note: Medler (1986d) designated *illocata* as junior synonym of *circulata* based on close similarity of male genital characters. However, further study indicated that markings of tegmina and characters of female genitalia enable segregation of taxa. Restoration of species status is proposed herewith for *illocata*.

4.3. *Bythopsyrna copulanda* (Distant)

Cenestra copulanda Distant, 1892: 285; Medler, 1990: 167 (type). Holotype: ♀, Java, BMNH. Plesiotype: ♂, Sabah, Tenompok, BPBM, here designated.

Bythopsyrna copulanda: Melichar, 1901: 227, pl 2, fig. 8 (combination); Metcalf, 1957: 105 (catalog).

Diagnosis: Frons with pair of longitudinal black fasciae, united basally, slightly narrowing dorsally, fasciate black markings continued across pronotum and mesonotum, two very large black spots on each side of mesonotum, pronotum without postocular eminence. Fuscous/black marking pattern of tegmen is illustrated (Fig. 55). Plesiotype genitalia are illustrated (Fig. 70).

Measurements: ♂ plesiotype. Length: Overall 14.0; v 0.33; f 1.33; p 0.46; m 1.99; t 12.28; pcl 4.32. Width: v 0.91; f 1.00; t 5.81. Hind leg spine formula: 1:5:4/pad.

Specimens examined: SABAH: plesiotype ♂, Tenompok, 30 mi E of Jesselton, 1460 m, 10-19.ii.1959, Maa, BPBM. SARAWAK: ♂, Mt. Murud, 6,500 ft [1,981 m], Dr. E. Mjoberg, Kalabit Exped., NHRS.

4.4. *Bythopsyrna intermedia* Schmidt

Bythopsyrna intermedia Schmidt, 1913: 191; Lallemand, 1939: 72 (Sarawak, Mt. Dulit, as *copulanda*); Medler, 1995: in press (type). Lectotype, ♀, Borneo, Malinau, ZMPA. Plesiotype, ♂, Sabah, Bundu Tukan, BPBM, here designated.

Diagnosis: Frons with pair of narrow longitudinal dark brown fasciae, united basally, slightly diverging dorsally, fasciate dark markings continued across pronotum and mesonotum, two very large spots on each side of mesonotum, pronotum without postocular eminence. Fuscous/black marking pattern of tegmen illustrated (Fig. 54). Plesiotype genitalia are illustrated (Fig. 71).

Measurements: ♂ plesiotype. Length: Overall 17.0; v 0.50; f 1.49; p 0.54; m 2.32; t 14.94; pcl 4.65. Width: v 0.91; f 1.08; t 7.47. Hind leg spine formula: 1:5:4/pad.

Specimens examined: SABAH: Plesiotype ♂, ♂, 5♀, Bundu Tukan, 18.ii.1959, Maa; BPBM. KALIMANTAN: Lectotype ♀, Malinau, 3°35'N, 116°40' E, nr Mt. Molu, iv.1910, ZMPA.

4.5. *Bythopsyrna tineoides* (Olivier)

Fulgora tineoides Olivier, 1791: 576; Type: Unknown.

Poeciloptera obscura Walker, 1857a: 92; Medler, 1986f: 211 (Sarawak, det Walker, misidentified). Lectotype: ♀, Sarawak, Wallace, MVMA.

Copsyrna leucophaea Stål, 1870: 772; Medler, 1986h: 330, fig. 15 (type, synonymy). Lectotype: ♂, Philippines, Semper, NHRS.

Bythopsyrna tineoides: Melichar, 1901: 227, pl 2, fig. 2 (combination); Lallemand, 1939: 72 (Sarawak, Kuching, Mt. Dulit).

Hansenia kirbyi: Kirkaldy, 1913: 23 [♂, Muir] (listed); Metcalf, 1957: 120 (listed). (Misidentified, not *kirbyi* Melichar).

Diagnosis: This species is easily recognized by dark pruinose tegmina, often heavily dusted with white wax. Two widely separated longitudinal fasciae and carinate lateral margins of frons dark brown. White subapical crescent originating near costal margin, best seen from underside of tegmen. Hind leg spine formula 1:5;6. Size smallest in the genus, length 12-14 mm.

Specimens examined: BORNEO: Baram River, *Copsyrna* det. Breddin (1900: 199); ♂, coll. MacGillavry; ♂, ♀, *leucophaea* det Melichar, NHRS. KALIMANTAN: ♂, ♀, Barabei, 1883, Pool, *leucophaea* det. Melichar, ZMUA; ♂, Mahakkam, Nieuwenhuis, ZMUA; ♂, ♀, Pontianak, Muir, BPBM. SARAWAK: ♀, det. Melichar, HNHM; ♀, Bidi, Bau Dist, Maa, BPBM; ♂, Wallace; ♀, Lubok Jita, 6-10.xi.1976, Cranston (BM 1977-19), BMNH; ♀, coll. Baezes, det. Melichar, NHMW.

Taxonomic note: Two species that strongly mimic *Bythopsyrna* are transferred to other genera, namely, *B. infixa* Melichar to *Cenestra* and *B. ligata* Distant to *Nephesa.*

5. Genus *Neodaksha* Distant

Neodaksha Distant 1910b: 328; Metcalf, 1957: 153 (catalog); Type species: *Flata quadriguttata* Walker, 1870: 179.

Diagnosis: Frons convex, lateral margins raised, carinate, slightly wider at clypeal margin than at dorsal posterior margin formed by intergenal transverse carina, frons with faint trace of horseshoelike carina, median longitudinal carina not crossing dorsal surface; pronotum anterior margin carinate, lateral margin of disc carinate half distance to mesonotum, then curving ventrally on side of prothorax nearly to postocular eminence, which is shallow and broadly triangular. Mesonotum with thin median and lateral longitudinal carinae. Tegmen broadly convex apically, costal and sutural angles with similar convexity, strong pattern of terminal cross veins, but no submarginal line; veins R, S, M arising from basal stem, bulla shallow, S and M forks approximately same distance from basal stem, Cu without fork. Precostal margin: costal cell 3:1 at bulla; cell M: cell Cu 3:1 at M2 fork. Ovipositor modified, pair of triangular processes with basal spheroids replacing normal valvulae I and III; segment X hinged to large platelike interface with strongly raised median carina. One metatibial lateral spine. Size large.

Distribution: Indomalayan and New Guinea Subregions.

5.1. *Neodaksha agrossa* Medler, sp. nov.

Diagnosis: Morphology conforms with description of the genus. Color uniformly tawny, except brown apex of pro- and mesotibiae. The complete absence of tegminal markings distinguishes this species from congeners in New Guinea that have red or black spots or bars. Illustration of holotype tegmen (Fig. 66) shows broad shape, 3 three longitudinal veins arising from basal stem, branching of terminal veins near apical margin, and wide separation of vein Cu from claval suture. Holotype genitalia (Fig. 42) are not fitted for piercing plant tissue for oviposition. This modification, which is found in many New Guinea genera, is associated with a large abdominal plate against which the anal segment articulates. Male unknown.

Measurements: ♀ holotype. Length: Overall 22.0; v 0.83; f 1.83; p 0.91; m 2.82; t 18.59; pcl 3.32. Width: v 1.25; f 1.66; t 11.29. Hind leg spine formula: concealed [1:7:4/pad, from paratype].

Holotype: ♀, S. BORNEO, *intacta* (Walk), det Melichar, coll. A. Jacobi; De La R, *Paratella*, SMTD. *Paratypes*: ♀, BORNEO, 899, det Melichar, coll A. Jacobi (SMTD); ♀, [IRIAN JAYA]: Ifar, 12-57, No. 34, G. den Hoed, *Poeciloflata* det Gravestein, 1960 (ZMUA); Irian Jaya: Maffin Bay, 27.vi.44,

E. S. Ross Coll (CAS); Irian Jaya: Etnabaai, 23.xi.1939, K.N.A.G. 1939, Nieuw Guinea Exp (RMNH).

Taxonomic note: The holotype and paratype from Dresden were found mixed with type material of *Paratella discoidalis* Melichar and *Paratella miniata* Melichar described from Borneo. Both species were designated junior synonyms of *Nephesa amata* Walker by Medler (1986a).

6. Genus *Taparella* Medler

Taparella Medler, 1989: 29. Type species: *Nephesa amata* Walker.

Diagnosis: Head truncate; vertex about 4 times wider than long, posterior margin delimited by transverse intergenal carina, anterior margin separated from frons by frontal U-shaped carina; frons with strong median longitudinal carina connected to U-carina dorsally; postocular eminence triangular, thick; tegmen with 3 longitudinal veins arising from basal stem, apical margin oblique, angles convex. One metatibial lateral spine. Size medium.

Distribution: Papua New Guinea, Irian Jaya, Borneo.

6.1. *Taparella amata* (Walker)

Nephesa amata Walker, 1870: 175; Medler, 1990: 133 (type). Lectotype: ♀, Irian Jaya, Weigeo, BMNH. Plesiotype: ♂, Irian Jaya, Hollandia-Kotanica, BPBM.

Paratella discoidalis Melichar, 1902: 120; Medler, 1986a: 112 (type, synonymy). Lectotype: ♀, Borneo, 906; SMTD.

Paratella miniata Melichar, 1902: 120; Medler, 1986a: 112 (type, synonymy). Lectotype: ♀, Borneo, 905, SMTD

Paratella amata: Metcalf, 1957: 374 (catalog).

Taparella amata: Medler, 1989: 29, fig. 16, 21 (plesiotype, combination); Medler 1991b: 113, fig. 1, 20, 22-24 (review).

Diagnosis: Morphology same as given for the genus. Illustration of tegmen (Fig. 68) reproduced from Medler (1991b, Fig. 1). Color extremely variable, tegmina ranging from unicolorous white, pink, orange, to dark red, margins may be black or fuscous to varying extent. Genitalia of plesiotype M are illustrated (Fig. 14).

Hind leg spine formula 1:6:6. Length 15-17 mm, males slightly smaller than females.

Specimens examined: Known from Borneo only by records of *discoidalis* (Melichar) and *miniata* (Melichar), which were treated as color variant synonyms of *amata* by Medler (1986a: 112).

7. Genus *Miniscia* Medler

Miniscia Medler, 1991a: 22. Type species: *Phlebopterum maculatum* Melichar.

Diagnosis: Frons lateral margins slightly raised, disc slightly concave, without median carina, dorsal margin convex; clearly delimiting anterior margin of ledgelike vertex. Vertex flat, without median carina, posterior margin marked by indistinct transverse intergenal carina. Pronotum lateral

margin carinate, curved laterally and ventrally, without connection to triangular, conelike, elevated postocular eminence. Tegmen postclaval sutural margin elevated, nearly right angled with truncate apical margin, submarginal line irregular, apical cells width: length ratio approximately 1:5, costal angle widely convex, 3 longitudinal veins, R, S, M, arising from basal stem, vein S once forked, vein branches M1 and M2 elongated, reaching nearly as far as claval apex without forking, vein Cu simple, joining postclaval submarginal line beyond claval apex. Clavus with numerous pustules basally and along sutural margin. Ovipositor modified, valvulae I small nonsclerotized lobes, valvulae III margins without spines. Two metatibial lateral spines. Size small.

Distribution: Indomalayan subregion.

7.1. *Miniscia maculata* (Melichar)

Phlebopterum maculatum Melichar, 1902: 2, pl 4, fig. 4; Medler, 1986c: 114 (type); Medler, 1991: 23 (plesiotype). Holotype: ♀, N. Celebes [Sulawesi], Tolitoli, HNHM. Plesiotype: ♂, Sulawesi Utara, Dumoga-Bone National Park, BPBM.

Miniscia maculata: Medler, 1991: 23, fig. 16 (combination).

Diagnosis: Morphology conforms with generic description. Dorsum of pro- and mesonotum with 4 bright red or orange stripes, narrow lateral stripes along margins of pronotum sometimes lost, narrow black margin of tegmen bordered with red, interspersed with white pustules; maculated appearance of tegmen given by clear white spaces in cells; black spot at apex of clavus. Hind leg spine formula 2:5:5. Length 8.5-9.5 mm.

Specimen examined: BRUNEI: ♀, Kuala Belalong, 300 m, x.1992, Martin (BM 1992-172), BMNH.

8. Genus *Mimophantia* Matsumura

Mimophantia Matsumura 1900: 212; Metcalf, 1957: 190 (catalog). Type species: *Mimophantia maritima* Matsumura.

Diagnosis: Frons wide basally, narrowed dorsally, convex, with short median carina at dorsal margin; vertex obtusely conical, slightly longer than pronotum, anterior margin derived from transverse intergenal carina; pronotum disc flat, anterior margin carinate medially, lateral margin blunt ridgelike, postocular eminence well defined small cone. Tegmen with veins R, S + M arising from basal stem; postclaval margin slightly drawn out apically, sutural angle acute; strong submarginal apical line. Valvulae III narrowed apically, 5-6 interspaced teeth on ventral margin. Two metatibial lateral spines. Size small.

Distribution: Widespread along Pacific Rim from Japan to Australia.

8.1. *Mimophantia maritima* Matsumura

Mimophantia maritima Matsumura, 1900: 212; Melichar, 1902: 17, pl 5, fig. 5; Metcalf, 1957:191 (catalog). Syntypes: Japan, Akashi, Kobe. Location(s) unknown.

Diagnosis: Morphological characters as given for genus. Color brown, sometimes darker brown stripes on dorsum of head and thorax, and darker band across corium to sutural angle. Costal vein and apical submarginal line curved continuously from claval apex.

Measurements: ♀ syntype. Japan, ZMUH. Length: Overall 6.0; v 0.58; f 1.00; p 0.50; m 0.91; t 4.81; pcl 0.66. Width: v 0.66; f 0.87; t 2.49. Hind leg spine formula: 2:8:16. Females slightly longer than males.

Specimen examined: SABAH: Paring, Ranau, 10.x.1958, coll. T.C. Maa, BPBM.

9. Genus *Flatosoma* Melichar

Flatosoma Melichar, 1901: 244; Metcalf, 1957: 61 (catalog). Type species: *Flatosoma signoreti* Melichar.

Diagnosis: The general habitus of this genus is well depicted by the colored illustration of *Flatosoma signoreti* given by Melichar (1923, Fig. 24). Frons convex, margined dorso-posteriorly by strong transverse intergenal carina above eyes, width same as anterior margin of pronotum, median longitudinal carina present, lateral margins raised, carinate, flared outward in front of antennae, then strongly incurved to margin of clypeus, antennal segment I shorter than II, ocelli present. Pronotum disc raised quadrangularly, anterior and lateral margins carinate, pleural lobes well developed, postocular eminence extending strongly ridgelike along antero-ventral margin, carinate. Tegmen parabolic apically, submarginal line of crossveins from claval apex to vein C; 3 longitudinal veins apparently arising from basal stem, actually very short R+S stem when seen under high magnification, cell between veins C and R very wide with numerous crossveins arising from R, wide cell also between M and Cu with network of crossveins; without apical submarginal line. Female genitalia adapted for piercing. Metatibial lateral spines variable - usually 1, rarely 2 on one leg only. Size large.

Distribution: Oriental Region.

9.1. *Flatosoma diastola* Schmidt

Flatosoma comma Melichar, 1901: 245, pl 12, fig. 14 (misidentified, not *Poeciloptera comma* Walker, 1851).

Flatosoma diastola Schmidt, 1909: 189 (new name for *Flatosoma comma* (Melichar, not *Poeciloptera comma* Walker); Metcalf, 1957: 62 (catalog). Holotype: ♀, Borneo [Kalimantan]: Barabei, 1883, A. Pool, ZMUA. Plesiotype: ♂, Brunei: Rampayoh, T. W. Harman, BMNH, here designated.

Flatosoma melichari Distant, 1910b: 321 (new name for *Flatosoma comma* Melichar); Medler, 1990: 173 (type). Holotype: ♀, Sandakan, BMNH.

Diagnosis: Morphological characters as given for genus. Body and tegmina stramineous, tibiae and tarsi black; disc of tegmen with small black crescent positioned on crossvein connecting inner branches of veins M1 and M2. Plesiotype genitalia are illustrated (Fig. 15).

Measurements: ♂ plesiotype, ♀ holotype. Length: Overall 21.0, 23.0; v 0.33, 0.54; f 1.66, 1.83; p 1.49, 1.25; m 3.98, 4.15; t 18.43, 19.42; pcl 0.33, [lost]. Width: v 1.16, 1.16; f 1.41, 1.33; t 10.79, 11.62. Hind leg spine formula: 1:6:9, 1:6:8.

Specimens examined: BRUNEI: Plesiotype ♂, Rampayoh, 125 m, 3.iii. 1982, T.W.Harman, det M.R.Wilson 1984; SABAH: ♂, ♀, Rumidi, 16-30.ix. 1973; ♀, Sandakan, S.W., 97/22; BMNH; ♂, 16 Km NE Tenam, 5°12'N 115°59'E, 270 m, 22.xi.1987, Huisman & de Jong (N. Borneo Exped.), RMNH. SARAWAK: ♂, Bau, (BM 1931-150), ♀, Kuching, (BM 1931-150); BMNH.

10. Genus *Phyllyphanta* Amyot & Serville

Phyllyphanta Amyot & Serville, 1843: 523; Metcalf, 1957: 180 (catalog); Medler, 1992: 3 (review). Type species: *Poeciloptera producta* Spinola.

Diagnosis: Head acutely conical, smooth except sharp dorsal carina on vertex, transverse basal carina of vertex only visible laterally above eyes. Frons longer than wide, without median carina, lateral margins with sharply carinate raised edges, widest where flared above antennal sockets. Pronotum slightly overhanging base of vertex, anterior margin with slight median concavity, sharp median longitudinal carina, postocular eminence ridgelike, sharp. Mesonotum wider than head including eyes, disc with 3 longitudinal carinae, median carina sharply raised. Tegmen coriaceous, sutural angle drawn out, pointed, costal angle obtusely convex, apical margin oblique from sutural margin apex to costal angle, no submarginal line. Costal cell at bulla twice wider than precostal area, with network of crossveins, two longitudinal veins (R+S, M) arising from basal stem, R+S stem forking at bulla, Cu and M veins forked at same plane, vein Cu forked, branch Cu1 extending to apical margin, branch Cu2 joining postclaval submarginal alignment at claval apex; margins of tegmen with dark fuscous pigment spots between vein terminations; postclaval sutural margin with 10-12 cells containing small black spots, spot at claval apex small. Valvulae I bladelike, enclosed by valvulae III that have ventral margins lined with small spines. One metatibial lateral spine. Size medium.

Distribution: Oriental Region.

10.1. *Phyllyphanta producta* (Spinola)

Poeciloptera producta Spinola, 1839: 432; Medler, 1991a: 28 (type). Neotype: ♂, Batavia, ZMUC.

Phyllyphanta producta: Melichar, 1902: 55, pl 4, fig. 3 (Borneo); Lallemand, 1939: 72 (Sarawak, Mt. Dulit); Medler, 1992: 5, fig. 1-4 (review).

Diagnosis: Morphological characters same as given for genus. Overall color green or yellow green, bulla often shiny black, costal, apical and sutural margins with black dashes. Hind leg spine formula 1:7:7. Length 17.5-19 mm.

Specimens examined: Recorded by Medler (1992: 5). KALIMANTAN: Balik Papan, Barabai, Martapoera, Pengaran, Sengeoigi. SABAH: Banguey Isl, Danum Valley, Jesselton, Kota Kinabalu, Quoin, Tawau, Tuaran. SARAWAK: Bidi, Gunong Mulu Nat. Park, Keningan, Kuching, Long Pala, Mengalum Isl, Mt. Dulit, Ong Tiang Swee Road, Ragoeman, Santu-bora, Simanggang, Telok Ayer.

New records: BRUNEI: ♂, Kuala Belalong, 300 m, x.1992, Martin (BM 1992-172), BMNH. SABAH: ♂, 16 km NE Tenam, 5°12'N, 115°59'E, 270 m, 22.xi.1987, Huisman & de Jong (N Borneo Exped.), RMNH.

11. Genus *Salurnis* Stål

Salurnis Stål, 1870: 773; Metcalf, 1957: 193 (catalog); Medler, 1992: 7 (review). Type species: *Salurnis granulosa* Stål.

Diagnosis: Head conical, no dorsal longitudinal carina, transverse intergenal carina concealed by anterior margin of pronotum, only visible where joined to lateral carinae; frons without median carina, lateral carinae sharp and raised, flared laterad above antennal bases. Pronotum slightly overhanging base of vertex, anterior margin slightly concave medially, disc shallowly depressed, median longitudinal carina weak or absent, postocular eminence raised, triangular, ventral arm carinate, extending ridgelike to anteroventral margin of lateral lobe; mesonotum with 3 to 4 longitudinal carinae. Tegmen with sutural apex acutely angulate, submarginal line not present; 2 longitudinal veins (R+S, M) arising from basal stem; costal cell at bulla twice wider than precostal area, with reticulated crossveins; vein Cu forked, Cu1 either oblique and united with M2, or branch extending to apical margin, Cu2 united at apex of clavus with postclaval submarginal line; veins A1 and A2 not joined in Y-stem at apex of clavus, or if joined, then Y-stem very short, ladderlike crossveins along claval suture. Color green or green orange, strongly contrasting patterns of dark brown or black spots in cells along postclaval margin, usually much larger dark spot at apex of clavus, interveinal spots or dashes along costal, and apical and margins. Ovipositor fitted for piercing. One metatibial lateral spine. Size small.

Distribution: Oriental Region.

Key to species

1. Mesonotum with median longitudinal carina well defined; 1 lateral carina on each side of mesonotum. 3
-- Mesonotum with median longitudinal carina absent or obscure; 2 lateral carinae on each side of mesonotum. 2
2. Head acutely conical, apex sharply pointed. ..... 11.2. *kryala* Medler

-- Head obtusely conical, apex bluntly pointed.
..... 11.3. *marginella* (Guérin-Méneville)

3. Vein Cu1 oblique, united with vein M2 in short stem.
.....11.1. *dulitana* Lallemand

-- Vein Cu forked normally, branch Cu1 not united with vein M2.
..... 11.4. *minuta* Lallemand

11.1. *Salurnis dulitana* Lallemand

Salurnis dulitana Lallemand, 1939: 72; Medler, 1987c: 37, fig. 3, (type); Medler, 1992: 9, fig. 18 (type). Lectotype: ♀, Sarawak, Mt. Dulit, BMNH.

Diagnosis: Conforms with generic description. Distinguished by red coloring on apex of head, pro- and mesonotum, and margins of tegmen, along with acute head, 3 mesonotal carinae, shape and markings of tegmen, and characters of the male genitalia. Illustration of paralectotype ♂ genitalia (Fig. 76) is reproduction from Medler (1992, Fig. 18), Hind leg spine formula 1:6:6/7. Length 12-13 mm.

Specimens examined: Recorded by Medler (1992: 9). SARAWAK: Mt. Dulit.

New record: BRUNEI: ♀, Kuala Belalong, 300 m, xi.1992, Martin, (BM 1992-172), BMNH.

11.2. *Salurnis kryala* Medler

Salurnis kryala Medler, 1992: 13, fig. 16. Holotype: ♂, Sabah, Tawau, BPBM.

Diagnosis: Morphological characters as given for genus. Obtusely angled head and diagnostic characters of the male genitalia help distinguish this uniformly green or yellow green species. Illustration of holotype ♂ genitalia (Fig. 29) is reproduction from Medler (1992, Fig. 16). Hind leg spine formula 1:7:8. Length 9-9.5 mm.

Specimens examined: Recorded by Medler (1992: 13). KALIMANTAN: Sampit. SABAH: Kalabakan, Sanuakan, Tanjung Aru Beach, Tawau. SARAWAK: Miri, Telang, Telok Ayer.

New record: SABAH: ♀, Keningan-Nabawan Rd., 5°N 116°E, 350 m, 17.xi.1987, Huisman & de Jong (N Borneo Exped.), RMNH.

11.3. *Salurnis marginella* (Guérin-Méneville)

Ricania marginella Guérin-Méneville, 1829, pl 58, fig. 6; Medler, 1988: 17 (type). Holotype (no abdomen): Cochin China, MZN. Plesiotype: ♂, S. China, Fukien, BPBM.
Nephesa marginella: Walker, 1857b: 161 (Sarawak).
Flata marginella: Atkinson, 1886: 69 (Borneo).
Salurnis marginellus: Melichar, 1902: 41, pl 5, fig. 6; Medler, 1992: 13, Fig. 15 (review).

Diagnosis: Morphology conforms with generic description. Head short, obtuse; mesonotum with 4 carinae. Color orange green, or testaceous when faded; tegmen heavily marked with dark brown or black spots along margins.

Illustration of plesiotype ♂ genitalia (Fig. 28) is reproduced from Medler (1988, Fig. 6). Hind leg spine formula 1:7:9. Length 9-10 mm.

Specimens examined: Recorded by Medler (1992: 13). KALIMANTAN: Sampit. SARAWAK: Telang.

11.4. *Salurnis minuta* Lallemand

Salurnis dulitana minuta Lallemand, 1939: 73; Medler, 1987c: 39 fig. 7 (type); Medler, 1992: 9, fig. 11 (review). Lectotype: ♀, Sarawak, BMNH. Plesiotype: ♂, Sabah, Liawan, BPBM.

Diagnosis: Morphology same as given for genus. Head acute; tegmen green, marginal spots black. Illustration of plesiotype ♂ genitalia (Fig. 30) is reproduction from Medler (1992, Fig. 11). Hind leg spine formula 1:6:6/7. Length 9.5-10 mm.

Specimens examined: Recorded by Medler (1992: 9). SABAH: Kalabakan, Liawan, Sandakan. SARAWAK: Mt. Dulit, Mt. Mulu Natl Park; Ong Tiang Swee Road, Simanggang.

12. Genus *Colobesthes* Amyot & Serville

Colobesthes Amyot & Serville, 1843: 522; Melichar, 1902: 42; Metcalf, 1957: 149 (catalog). Type species: *Poecilloptera* (sic) *falcata* Guérin-Méneville.

Diagnosis: Frons convex, merged dorsally with vertex, dorso-posterior margin delimited by transverse intergenal suture positioned above eyes, slightly wider than anterior margin of pronotum, lateral margins raised, carinate. Pronotum depressed medially at anterior margin, lateral carina of disc curved ventrally at half distance to posterior margin, margin of pleural lobe strongly ridged, carinate, forming part of triangular eminence below eye. Tegmen widely triangular, sutural and apical margins meeting at acute angle, 3 longitudinal veins arising together from basal stem, strong network of terminal veins and crossveins. Ovipositor adapted for piercing. Two metatibial lateral spines. Size large, length averaging 30 mm.

Color illustration given by Melichar (1923, Fig. 25) enables recognition of this genus.

Distribution: Oriental Region.

12.1. *Colobesthes falcata* (Guérin-Méneville)

Poecilloptera (sic) *falcata* Guérin-Méneville, 1834: 469, pl 3, fig. 5; Medler, 1988: 15, fig. 1 (type). Holotype: ♀, Malaysia Coast, MZN.

Colobesthes falcata: Amyot & Serville, 1843: 523; Melichar, 1923: 38, pl 2, fig. 25 (Borneo); Metcalf, 1957: 151 (catalog).

Colobesthes albiplana Walker, 1857a: 92; Melichar, 1902: 43; Medler 1990: 133 (type). Holotype: ♀, Birmah [Burma], BMNH.

Flata (Colobesthes?) semanga Distant, 1892: 285, pl 13, fig. 6; Melichar, 1902: 43 (Borneo); Lallemand, 1939: 72 (Sarawak, Kuching); Metcalf, 1957: 152 (catalog); Medler, 1990: 180 (type). Holotype: ♂, Malaysia, Wellesley Province, Pinang, BMNH.

Diagnosis: The tegmina range in white, stramineous or green colors, and usually have a coating of white waxy dust that clumps in scattered dotlike spots. The green variant (*semanga* Distant) presents strong bands and single larger spot. Waxy spots are less obvious but still discernible in stramineous and bleached specimens. Variants cannot be differentiated on the basis of male genitalia characters. Hind leg spine formula, 2:6:8-2:7:9. Length, 25-35 mm.

Specimens examined: BORNEO: ♀, ZMUA; 2♂, S.O., Wahnes & Schönberg, *semanga* det. Melichar; ♀, Telang, 1081, Grabowsky, ZMHU; ♂, ♀ (no data), BPBM; ♂, ♀, 259-95, coll. Fallou, *semanga* det. Melichar; 2♂, ♀, 1898, coll. Noualhier, *semanga* det. Melichar, MNHN; ♂, ♀ (without data), *semanga* det. Melichar, NHRS. BRUNEI: ♀, Rolle, ZMHU; ♀, det. Melichar, HNHM; 3♂, ♀, Kuala Bellalong, 300 m. x-xi.1992, Martin (BM 1992-172), BMNH. SARAWAK: ♂, ♀, Tawau, Holtmann; ♀, Liawan, Maa, BPBM.

13. Genus *Lawana* Distant

Phyma Melichar, 1902: 43 (preoccupied by *Phyma* Gistel, 1848). Type species: Invalid designation of 2 species by Melichar.

Lawana Distant, 1906: 420 (new name for *Phyma* Melichar, 1902; Metcalf, 1957: 202 (catalog). Type species: *Flata candida* Fabricius.

Daksha Distant, 1906: 425; Metcalf, 1957: 147 (catalog); Medler, 1990: 24 (type). Type species: *Colobesthes marginata* Walker.

Diagnosis: Head bluntly conical; mesonotum humped; frons shallowly convex, displacing vertex dorsally, dorso-posterior margin delimited by transverse intergenal carina, lateral margin not raised, antennal segment I shorter than II. Postocular eminence a carinate ridge. Tegmen with 3 longitudinal veins arising from basal stem, apical margin truncate, costal angle rounded, postclaval sutural margin acutely angled; apex of tegmen with many crossveins that form well developed submarginal line along postclaval sutural margin and irregular segments of 2-4 apical submarginal lines; clavus apex with short Y-stem; vein Cu not forked, merging with submarginal line arising from apex of clavus. Tegmen usually heavily dusted with white wax; wide variation in fuscous or black markings. Female pregenital segment VII with prominent conical projection medially. Two metatibial lateral spines. Size medium to large.

Distribution: Oriental and Afrotropical Regions.

13.1. *Lawana pryeri* (Distant)

Flata (Colobesthes) pryeri Distant, 1880: 153; Medler, 1990: 177 (type). Lectotype: ♀, Sabah, Sandakan, BMNH. Paralectotype: ♂, N. Borneo [Sabah], Pryer, Distant Coll. (B.M. 1911-383), BMNH

Phyma hyalina Schmidt, 1904a: 197; Medler, 1995, in press, fig. 13 (type). Lectotype: ♂, North Borneo, ZMPA

Phyma waterstradti Schmidt, 1904a: 211; Medler, in press (type). Lectotype: ♀, North Borneo, ZMPA. **New syn.**

Daksha pryeri: Distant, 1910b: 327 (combination); Metcalf, 1957: 148 (catalog).

Lawana hyalina: Distant, 1910b: 326 (combined); Metcalf, 1957: 211 (catalog).
Lawana guttifascia: Lallemand, 1939: 72 (Sarawak, Kuching, misidentified).
Lawana waterstradti: Metcalf, 1957: 214 (catalog).
Lawana guttifascia: Medler, 1990: 177 [synonymy, error].

Diagnosis: Morphological characters given for genus apply to this species. Overall appearance white with strong fuscous markings apically on tegmen, postclaval sutural margin dark fuscous, widened into triangular spot at claval apex, 3-4 irregular submarginal smoky brown bands across tegmen apex, brown apical margin and vein terminals concolorous. Dark fuscous diagonal band across disc may be lost or represented by remnant dash or spot in cell M basad of clavus apex. Specimens sampled for wide variation in tegminal markings all had the same genitalia as illustrated for the paralectotype of *pryeri* (Fig. 18a). The anal segment bifid apex (Fig. 18b) is a diagnostic character state that can be seen without recourse to dissection.

Measurements: ♂ paralectotype. Length: Overall 18.0 mm; v 0.50; f 1.83; p 0.83; m 3.32; t 15.60; pcl 6.64. - Width: v 1.33, f 1.74, t 8.96. Hind leg spine formula: 2:6:8.

Specimens examined: BRUNEI: ♂, Temburong Dist, ridge NE of Kuala Belalong, 300 m, x.1992, Martin (BM 1992-172); ♂, Ulu Temburong, 1000', 19-22.ii.1982, Robinson, (BM 1982-156), BMNH. KALIMANTAN: ♀, Z.O. Afd. Borneo, Barabei, 1883, *Phyma optata* det Melichar 1902, ZMUA. 2♀, S.O. Borneo, Wahnes & Schonberg, *Phyma guttifascia* det Melichar, misidentified, Humboldt Museum; ♀, Z.O. Borneo, Pengaron, Martapoera, BMNH. SABAH: ♂,♀, Danum Valley, 70 km W Lahad Data, 150 m, 15.xii.1989 (69), M & J Duffels, ZMUA. ♂♀, Kalabakan, 19 km N, 10-12.x.1962, Hirashima; ♀, Mt. Kinabalu, Tenompok, 2.xi.1958, Maa; ♂, Tawau, Quoin Hill, Cocoa Res Sta., 5.ix.1962, Hirashima; ♂, Liawan, 14-19.i.1959, Maa, 1959; ♂, Sandakan Bay (SW), Sapagaya Lumber Camp, 2-20 m, 8.xi.1957, Gressitt, BPBM. ♂, Tenon, 16 km NE, 180 m, viii.1986, Huisman; ♂, Nabawan, 7 km S, 5.02N 116.27E, 400 m, 14.xi.1987, Huisman & de Jong; ♂, Ranau, 12 km NNE, Poring Hot Spring, 6.03N 116.42E, 550 m, 10.xi.1987, Huisman & de Jong, RMNH. 2♂, Bettotan, nr Sandaken, vii-viii.1927; ♂ Samawang, nr Sandakan, 14.vii.1927, ex FMS Mus (BM 1955-354); Sandakan Dist, Rumidi, R. Labuk, 16-30.ix.1973, BMNH. ♂, 20 km E Telupid, 14.viii.1983, Hevel & Steiner, USNM. SARAWAK: ♀, Gunong Matang, 120 m, 13.ix.1958, Gressitt, BPBM. 3♂, 2♀, Gunong Mulu Nat Park, ii-iv.1978, J.D.Holloway, RGS Mulu Exp. (BM 1978-206), BMNH. BORNEO: 2♂, 2♀, coll Noualhier 1898; ♂, I. Banguey, Sept., coll Noualhier 1898, *Phyma guttifascia* var, det Melichar, MNHN.

Taxonomic note: This widespread and common species in Borneo has had considerable confusion in application of names. There is close resemblance to well marked specimens of *Lawana guttifascia* in the Philippines, and very

wide variation exists in color markings. In such cases reliable determination of the species requires study of the male genitalia.

Schmidt (1904a: 198) listed *Phyma optata* Melichar from Borneo, without supporting data. This record is probably a misidentification, as no example of *Lawana optata* was found in material examined from Borneo.

14. Genus *Cromna* Walker

Cromna Walker, 1857a: 85; Metcalf, 1957: 188 (catalog). Type species: *Cromna acutipennis* Walker.

Phyllyphanta Distant, 1906: 414 (misidentified); Metcalf, 1957: 180 (misidentified, in part).

Diagnosis: Head conical; lateral margin of frons strongly carinate, flared outward basally; lateral triangular remnants of vertex posterior to strong intergenal transverse carina. Pronotum triangular, strongly raised longitudinal medium carina and sharp lateral carina curving from interior margin to near postocular eminence, mesonotum tricarinate. Tegmen with 3 longitudinal veins arising from basal stem, middle of disc with or without tangled knot of cross veins derived from branches of vein M; apical margin truncate, meeting postclaval sutural margin at acute angle; irregular segments of lines of apical crossveins not forming continuous submarginal line; C and M cells reticulated, Cu not forked, terminating at apex of clavus, very short Y-stem in apex of clavus. Two metatibial lateral spines. Size medium.

Distribution: Southeast Asia.

Key to species

1. Tegmen disc without dark knot of crossveins; lengthwise rows of white spots with variable sizes. ..... 14.1. *acutipennis* Walker
-- Tegmen disc apically with dark knot of crossveins; waxy white spots inconspicuous. ..... 14.2. *divisa* (Melichar)

14.1. *Cromna acutipennis* Walker

Cromna acutipennis Walker, 1857a: 85; Medler, 1986: 208 (type). Lectotype: ♀, Malacca, MVMA.

Phyllyphanta producta Melichar, 1902: 184 (misidentified, in part).

Phyllyphanta albidosparsa Distant, 1910b: 329, pl 22, fig. 5; Metcalf, 1957: 182 (catalog); Medler, 1990: 164 (type, synonymy). Lectotype: ♀, Brunei, BMNH.

Phyllyphanta cornutipennis: Metcalf, 1957: 189 (error).

Diagnosis: Overall color of head, thorax and tegmen faded green. Large white wax spots aligned lengthwise across disc of tegmen, smaller white wax spots in cells C, M and clavus; round fuscous spot near apex of clavus close to but not connected with dark fuscous postclaval sutural margin. Pattern of wax spots is not shown clearly in illustration of tegmen by Distant (1910b, Fig. 5). Mesonotum tricarinate, each lateral carina bordered on disc by narrow faint red line. Hind leg spine formula: 2:6:7. Length 18 mm.

Specimens examined: SABAH: ♂, Bettotan, nr Sandakan, 22.viii.1927, C.B.K. & H.M.P, FMS Mus (BM 1955-354), BMNH; ♀, Tenompok, Maa, BPBM.

14.2. *Cromna divisa* (Melichar)

Phyma divisa Melichar, 1902: 48; Medler, 1986c: 113 (type); Medler, 1986d: 164, fig. 4 (type). Lectotype: ♂, Borneo, MNHN.
Daksha pryeri: Distant, 1910b: 327 (synonymy, in error).
Lawana divisa: Medler, 1986d: 164 (combination).

Diagnosis: Overall color light brown; tegmen veins and crossveins orange brown in sharp contrast to light brown membrane, lengthwise rows of white waxy spots; veins R and M thickened carinalike, prominent wide cell positioned between Cu and strongly bowed vein M2, dark knotlike entanglement of small veins and crossveins in apical median area of tegmen. Genitalia of lectotype illustrated by Medler (1986d, fig. 4). Hind leg spine formula 2:6:7. Length: 20 mm.

Specimens examined: BORNEO: Syntypes ♂,♀, MMBC. BRUNEI: ♂, coll. Haglund, NHRS.

15. Genus *Eumelicharia* Kirkaldy

Walkeria Melichar, 1901: 250 (preoccupied by *Walkeria* Fleming, 1823). Type species: *Flata radiata* Distant.
Eumelicharia Kirkaldy, 1906: 156 (replacement name for *Walkeria* Melichar); Metcalf, 1957: 258 (catalog). Type species: *Flata radiata* Distant.

Diagnosis: Head bulbous, frons with median longitudinal carina; convex, displacing vertex dorsally, triangular remnants of vertex next eyes posterior to dorso-posterior margin of frons which is delimited by transverse intergenal carina; pronotum anterior margin with faint median carina, which extends ventrally on side of prothorax nearly to postocular eminence; mesonotum humped, disc convex, lateral margins carinate. Tegmen with 3 longitudinal veins arising from basal stem; C cell slightly wider than precostal margin at bulla; apical margin oval, costal angle widely convex, sutural angle narrowly convex, postclaval sutural margin slightly convex, numerous crossveins apically, but not forming continuous submarginal line; vein Cu with oblique cross vein to M2, without apical fork, terminating at apex of clavus. Valvulae III with thick row of small teeth along ventral margin. Two metatibial lateral spines. Size large.

Distribution: Southeastern Asia.

15.1. *Eumelicharia radiata* (Distant)

Flata radiata Distant, 1892: 284; Medler, 1990: 178, Fig. 9 (type). Holotype: ♀, Sarawak, BMNH. Plesiotype: ♂, Sarawak, BMNH.
Walkeria radiata: Melichar, 1901: 250, pl 3, fig. 4.
Eumelicharia radiata: Kirkaldy, 1906: 156; Metcalf, 1957: 259 (catalog).

Diagnosis: Conforms with morphological characters given for genus. Tegmen stramineous, with 2 orange fasciae extending about halfway from base to apex; one in cell C alongside vein R, the other covering vein Cu. Illustration of plesiotype genitalia (Fig. 17) reproduced from Medler (1990, fig. 59). Hind leg spine formula 2:7:9.

Length 24 mm.

Specimens examined: BORNEO: ♂, 175, AMNH; ♀, coll. Haglund, det. Melichar, NHRS. BRUNEI: ♀, BMNH. SARAWAK: ♀, Bidi, 4019, 1907-1908, Brooks, (BM 1936-681), BMNH; ♀, Ranau, 500 m, 28.ix-7.x.1958, Maa, BPBM; ♀, Kinabalu, 547, ZILS.

16. Genus *Flatula* Melichar

Flatula Melichar, 1902: 62; Metcalf, 1957: 413 (catalog); Medler, 1992: 180, fig. 1. Type species: *Flatula cribrata* Melichar.

Diagnosis: Frons convex, slightly concave at dorsal margin, median carina elongate, united dorsally with transverse intergenal carina that separates frons from vertex in antero-dorsal position; vertex a narrow ledge between carina and anterior margin of pronotum. Pro-mesonotum moderately humped, median carina strong, lateral margin carinate, carina curving ventrally to almost connect with postocular ridge, mesonotum disc bordered by shallow lateral carinae. Tegmen with two longitudinal veins, R, S+M; apex with 2 zigzag submarginal lines, most terminal veins forking at apical submarginal line, cells between submarginal lines large, irregular, width: length about 1:3; distinctive pattern of many black spots varying from small round isolated spots to large irregular spots filling cells. Ovipositor fitted for piercing. Two metatibial lateral spines. Size medium.

Distribution: Indomalayan Subregion.

Key to species

1. Frons, pro- and mesonotum with bilateral black spots. Tegmen post claval margin strongly convex, apical margin oblique, sinuate. ..... 16.1. *bipunctata* Schmidt
-- Frons, pro- and mesonotum without strong pattern of black spots. Tegmen postclaval margin slightly convex, apical margin convex. ..... 16.2. *stenula* Medler, sp. nov.

16.1. *Flatula bipunctata* Schmidt

Flatula bipunctata Schmidt, 1904b: 363; Metcalf, 1957: 413; (catalog); Medler, 1995: in press (type). Holotype: ♀, Brunei [North Borneo], ZMPA.

Diagnosis: Vertex, mesonotum and basal third of tegmen orange stramineous; frons, prothorax and legs pale testaceous; majority of cells in tegmen filled with dark brown/black spots, widely variable in shape and size, unmarked cells dusted with white wax, postclaval sutural and apical margin

black. Apex of tegmen illustrated (Fig. 56). Head, pro- and mesonotum illustrated to show pattern of black spots (Fig. 44).

Measurements: ♀, Brunei, BMNH. Length: Overall 13.0; v 0.33; f 1.66; p 0.83; m 2.82; t 10.79; pcl 3.32. Width: v 1.04; f 1.41; t 5.31. Hind leg spine formula: 2:6:6.

Specimens examined: BRUNEI: ♀, Temburong, L.P. 298, 300 m, 21.ii.1982, Harman, BMNH. NORTH BORNEO: ♀, holotype, Waterstradt, ZMPA.

16.2. *Flatula stenula* Medler, sp. nov.

Diagnosis: This species conforms with generic diagnosis, and resembles *Flatula cribrata* Melichar in spotted appearance. It can be distinguished by convex apex of tegmen and different characters of the holotype genitalia (Fig. 32). Overall color brown, mesonotum dark brown, 2 brown fasciae extended across apical half of tegmen, margins outlined more or less by white wax filled cells. Dark brown pigment filling numerous cells of variable shapes and sizes, large round smoky spots aligned in submarginal cells. Apex of tegmen is illustrated (Fig. 57).

Measurements: ♂ holotype and ♀ allotype. Length: Overall 10.5, 11.5; v 0.17, 0.17; f 1.25, 1.33; p 0.58, 0.66; m 2.32, 2.49; t 7.80, 9.46; pcl 2.32, 2.32. Width: v 0.95, 1.08; f 1.25, 1.37; t 3.98, 4.32. Hind leg spine formula: 2:6:6, 2:6:6.

Holotype: ♂, SABAH: Kinabalu National Park, Poring, 570 m, 18.ix. 1983, G. F. Hevel, et al., USNM. *Allotype:* ♀, and *paratype:* ♀, Sabah: Quoin Hill, 3-7.vii.1962, H. Holtmann, BPBM.

17. Genus *Flata* Fabricius

Flata Fabricius, 1798: 511; Spinola, 1839: 421 (logotype); Metcalf, 1957: 154 (catalog). Type species: *Poeciloptera stellaris* Walker, 1851 [replacement name for *Cicada ocellata* Fabricius, 1775, preoccupied by *Cicada ocellata* DeGeer.]

Diagnosis: Frons convex, narrow dorsal margin delimited by slightly convex antero-dorsal transverse intergenal carina; median carina of frons connected to dorsal transverse carina, lateral margin not raised, antennal segment I shorter than II; margins of frons and pronotum mostly parallel, usually produced anteriorly at diverging angle; vertex reduced to narrow ledge parallel to anterior margin of pronotum, strong ridgelike median carina extending from frons across pro- and mesonotum to scutellum; strongly raised on pronotum, almost crestlike. Pronotum lateral margin carinate, carina extending latero-ventrally nearly to postocular ridge. Mesonotum moderately humped anteriorly, 3 longitudinal carinae. Tegmen with 3 longitudinal veins arising from basal stem, irregular array of crossveins apically, usually weak but distinct alignment forming submarginal line from claval apex to terminus of C + R stem; Cu once forked, the branches joining postclaval submarginal line. Apex of clavus without A1 + A2 Y-stem. Female pre-

genital segment VII with median concave notch on margin, ovipositor adapted for piercing, valvulae III with teeth in row on ventral margin. Two metatibial lateral spines. Size medium.

Distribution: Oriental Region.

Key to species

1. Tegmen with scattered black spots; tegmen postclaval apical angle convex..... 17.1. *guttularis* (Walker)
-- Tegmen without black spots; tegmen postclaval apical angle nearly right angled. ..... 17.2. *ferrugata* Fabricius

17.1. *Flata guttularis* (Walker)

Nephesa guttularis Walker, 1857b: 160; Medler, 1990: 144, fig. 3 (type). Holotype: ♂, Sarawak, BMNH.
Flata guttularis: Stål, 1862b: 490 (combination).
Cryptoflata guttularis: Melichar, 1902: 20, pl 3, fig. 21 (Sarawak); Distant, 1906: 435, fig. 229; Lallemand, 1939: 73 (Sarawak, Kuching, Mt. Dulit); Metcalf, 1957: 270 (catalog), Datta, 1979: 10, figs. 4-6.

Diagnosis: Morphological characters as given for genus. Color green or faded, testaceous, tegmen often with white waxy powder that may partially obscure scattered small round dark spots; postclaval margin apical angle convex (Fig. 61). Holotype genitalia (Fig. 7) reproduced from Medler (1990, Fig. 3). Hind leg spine formula 2:6:7.

Length 12 mm.

Specimens examined: BRUNEI: ♀, Kuala Belalong, 300 m, x.1992, Martin (BM 192-172), BMNH. KALIMANTAN: ♀, Sangay, 1 Oct 1894, Dr. Niewenhuis Borneo Expedition, RMNH. SARAWAK: ♀, 1865, Doria coll., *guttularis* det Melichar, MCSN; 2 ♂, foot of Mt. Dulit, jct rivers Tinjar & Lejok, light trap, 29.viii.1932, *Cryptoflata guttularis*, det Lallemand, (BM 1933-254), BMNH.

17.2. *Flata ferrugata* Fabricius

Flata ferrugata Fabricius, 1803: 50; Metcalf, 1957: 167 (catalog). Holotype: ♀, Tranquebar, coll. S. & T.L., ZMUC.

Diagnosis: Morphological characters as given for genus. Tegmen stramineous without wax deposits, veins red-orange; strong network of short crossveins; vein S displaced against vein M by bulla, apparently forming a very short S+M stem; irregular array of apical crossveins, weak submarginal line arising from claval apex; post claval sutural apical angle almost right angled (Fig. 62). Hind leg spine formula 2:6:6.

Length 13 mm.

Specimens examined: SARAWAK: ♀, Gunong Mulu Park, RGS Mulu Expedition, Holloway; ♀, Gunong Mulu Park, 150 m, Kerrangas, iii-iv, 1978; 2♀, Gunong Mulu Park, Site 25, G. Api, 900 m. April, Holloway, [BM 1978-206], BMNH.

18. Genus *Oryxa* Melichar

Oryxa Melichar, 1902: 50; Metcalf, 1957: 215 (catalog). Type species: *Oryxa melicharia* Kirkaldy [replacement name for *Cicada truncata* Melichar, not Linnaeus (misidentified)].

Pseudoryxa Schmidt, 1904a: 200; Metcalf, 1957: 218 (catalog). **New syn.** Type species: *Pseudoryxa carinulata* Schmidt.

Diagnosis: Tegmen shape similar in acute prolongation of sutural angle to that of *Lawana*, but head morphology much different. Frons slightly concave, lateral margins carinate, only slightly raised, dorsal margin obscurely trilobate, the lobes formed by sutures arising from intergenal transverse carina as illustrated (Fig. 47). Pronotum lateral margin carinate, carina extending medially nearly to postocular carinate ridge which terminates at antero-ventral margin of pleural lobe. Veins R, S, and M arising from basal stem; vein Cu not forked, well separated from claval suture to form wide cell C; numerous discal crossveins loosely aggregated into 2 diagonal bands, several crossveins forming small spotlike junction on branches of vein R, crossveins in apex of tegmen irregular, not aligned. Ovipositor adapted for piercing. One metatibial lateral spine. Size medium.

Distribution: Borneo, Sumatra, Malaysia.

18.1. *Oryxa melichari* Kirkaldy

Oryxa truncata Melichar, 1902: 50 (misidentified, not *Cicada truncata* Linnaeus). Lectotype: ♂, Borneo, Noualhier, MNHN.

Oryxa extendens Melichar, 1902: 51; Metcalf, 1957: 215 (catalog); Medler, 1986d: 164 (Lectotype ♂). Lectotype: ♀, Borneo, Noualhier, MNHN. Paralectotype: ♀, Sumatra, Frühstorfer, 27587, EMAU, here designated.

Pseudoryxa carinulata Schmidt, 1904a: 201; Metcalf, 1957: 218 (catalog). **New syn.** Holotype: ♀, Indonesia, Soekaranda, ZMPA.

Oryxa melichari Kirkaldy, 1913: 22 (new name for *truncata* Melichar); Metcalf, 1957: 215 (catalog).

Lawana lilacina Jacobi, 1915: 172; Metcalf, 1957: 212 (catalog); Medler, 1986a: 110, fig. 7 (synonymy). Holotype: ♂, Indonesia, Sumatra, SMTD.

Pseudoryxa rubrinervosa Distant (unpublished), Sarawak, Medler, 1990: 179. **Nomen nudum**.

Diagnosis: Morphology same as given for genus. Overall color light brown, membrane of tegmen translucent, veins red brown; disc centrally with small irregular dark red brown spot formed by knotlike segments of crossveins; other red brown segments of crossveins on disc give appearance of 2 diagonal cross bands. Genitalia of a male from Borneo in HNHM, *truncata* det Melichar, are illustrated (Fig. 6).

Measurements: ♂, Pahang, BMNH, ♀, paralectotype, EMAU. Length: Overall 16.0, 16.0; v 0.42, 0.54; f 1.91, 2.08; p 0.83, 0.83; m 2.99, 3.15; t 14.11, 13.28; pcl 5.31, 6.31. Width: v 1.25, 1.33; f 1.70, 1.66; t 8.30, 9.30. Hind leg spine formula: 1:6:7, 1:6:6.

Specimens examined: BORNEO: ♂, *truncata* det. Melichar, HNHM; 2♂, 1898, coll Noualhier, *truncata* det Melichar, MNHN; ♂ ♀, coll Haglund, *truncata* det Melichar, NHRS.

Taxonomic note: Nomenclature in this genus has been a problem because of lack of agreement among authors on the status of *Cicada truncata* Linnaeus, designated by Melichar as type of the genus. According to Kirkaldy (1913: 22) *Oryxa truncata* sensu Melichar is a misidentification of *Cicada truncata* Linnaeus. Kirkaldy's replacement name *melichari* represents the only valid species recognized in the genus.

19. Genus *Scarpantina* Melichar

Scarpantina Melichar, 1901: 243; Metcalf, 1957: 145 (catalog). Type species: *Scarpantina stigmatica* Melichar.

Diagnosis: Frons convex, merged with vertex, dorso-posterior margin delimited by intergenal transverse carina, lateral carinae slightly raised, ocelli large, disc of frons without median carina, lateral margins abruptly incurved from near antennae to clypeal margin, antennal segment I shorter than II; pronotum anterior margin about same width as posterior margin of head, lateral margins thick, disc almost square, postocular eminence thickened ridge extending to antero-ventral margin of pleural lobe. Tegmen broad, widest apically, sutural angle drawn out, pointed and with spot as shown by Melichar (1902, Fig. 11); veins R, S, and M arising from basal stem together, multibranched, terminals numerous, many crossveins, no distinctive submarginal line; cell between M and Cu fairly wide. Ovipositor adapted for piercing. One metatibial lateral spine. Size large.

Distribution: Borneo.

19.1. *Scarpantina stigmatica* Melichar

Scarpantina stigmatica Melichar, 1901: 243, pl 3, fig. 11; Medler, 1987b: 538, fig. 5 (type). Holotype: ♂, Borneo, NHMW.

Diagnosis: Conforms to morphological characters given for genus. Overall color green, tegmen with distinctive black discal spot. Holotype genitalia illustrated by Medler (1987b, fig. 5). Hind leg spine formula 1:6:6, not 2 metatibial spines as given by Melichar (1901: 243).

Length 19 mm.

Specimens examined: Known only from the holotype.

20. Genus *Nephesa* Amyot & Serville

Nephesa Amyot & Serville, 1843: 527; Metcalf, 1957: 383 (catalog). Type species: *Ricania rosea* Spinola.

Diagnosis: Frons convex, anterior-dorsal margin with 3 carinae, the median carina twice longer than lateral pair, posterior-dorsal margin delimited by transverse intergenal carina; vertex reduced to narrow remnant along anterior margin of pronotum. Pronotum median carina thick and sharp, lateral carina curving ventrally to almost reach sharply carinate postocular ridge. Tegmen maximum width apically, apical margin rectangularly or obliquely truncate, postclaval sutural margin straight to apex; veins R, S, and M arising from basal stem, basal connection of veins R and Cu to apex of basal stem broadly U-shaped (Fig. 63), vein Cu without fork, joining postclaval submarginal line at apex of clavus; clavus apex with short Y-stem. Disc of tegmen with many crossveins in reticulate pattern, but apical alignment weak and irregular pseudoline, postclaval margin submarginal line strongly developed. Ovipositor adapted for piercing, valvulae III ventral margin with linear or oval array of small or medium spines. One metatibial lateral spine.

Size medium to large.

The frontal aspect of wide truncate head with median and 2 lateral carinae dividing upper margin into 3 parts is diagnostic character state, but carinae sometimes reduced and not easily recognized. Strongly developed wide U-pattern of R and Cu veins arising from basal stem is characteristic of species in *Nephesa*, and related genera. Colors and marking patterns in this genus are extremely variable, and when color is dark brown the markings may superficially resemble those found in closely related *Copsyrna* and *Bythopsyrna*.

Distribution: Indomalayan Region, Philippine Islands.

Key to species

1. Tegmen with margins widely black, longitudinal black band medially. ..... 20.9. *ligata* (Distant)
-- Tegmen without black margins and longitudinal black band. 2
2. Tegmen apical margin sharply oblique; sutural angle markedly obtuse. ..... 20.3. *truncaticornis* (Spinola)
-- Tegmen apical margin moderately oblique, or truncate; sutural angle variable..... 3
3. Tegmen sutural angle rounded; red brown or with brown pigmentation on margins and disc, scattered white spots of wax usually distinct. 4
-- Tegmen sutural angle 90 degrees; pigmentation variable, light green, pink or stramineous but never brown or black, scattered white wax spots absent..... 8
4. Tegmen with large dark round spot near apex of the clavus. ..... 20.7. *rorida* (Walker)
-- Tegmen without large dark round spot near apex of clavus. 5

5. Tegmen with white clear spot on brown discal area, wide white band along sutural margin. ..... 20.8. *sandakanensis* Distant
-- Tegmen without brown and white markings as described.....6
6. Tegmen olive green, without extensive red or brown membrane color. ..... 20.5. *duffelsi* Medler, sp. nov.
-- Tegmen uniformly red or light brown. 7
7. Tegmen cells more or less filled with minute red dots. ..... 20.6. *mazera* Medler, sp. nov.
-- Tegmen cells without red dots, or very few scattered red dots. ..... 20.4. *suffusa* Walker
8. Valvulae III elongate, patch of small teeth concealed on inner surface. Distribution: Java and Sumatra. ..... 20.1. *rosea* (Spinola)
-- Valvulae III oval, pad of filelike teeth exposed on apical surface. Distribution: Borneo, Malaysia, Philippine Islands. ..... 20.2. *grata* Walker

20.1. *Nephesa rosea* (Spinola)

Ricania rosea Spinola, 1839: 400. Holotype: ♂, Java, Serville, NHMW.

Nephesa rosea: Amyot & Serville, 1843: 528; Metcalf, 1957: 390.

Poeciloptera completa Walker, 1851: 451; Stål, 1862b: 490 (*rosea*); Medler, 1990: 138 (type). Holotype: ♀, Java, BMNH.

Poeciloptera extricata Walker, 1858a: 52; Distant, 1910b: 332 (*rosea*); Medler, 1990: 142 (lectotype, synonymy). Lectotype: ♀, no label data; paralectotype: ♀, 68.4, Sarawak, BMNH.

Diagnosis: Dense network of veins is normally colored some shade of rose red. This imparts overall pink appearance to tegmina. Dilution or loss of red color may be due to dusting of white wax or fading of pigment. Faded specimens infrequently retain thin red margins. As color is extremely variable, ranging through rose, tawny yellow, pale green and white, study of male and female genitalia is required for positive identification. Valvulae III elongate oval, adpressed, small spines along ventral margin mostly concealed but well developed along inner surface.

Basal part of tegmen of specimen from Java in the BPBM is illustrated (Fig. 63). Costa (C), Radius (R), Sector (S), Media (M) and Cubitus (Cu) veins are indicated.

Specimens examined: Based on study of considerable material determined as *rosea* by previous workers, I found that valid records of *rosea* Spinola applied only to specimens from Java and Sumatra. Consequently, distribution of the species in Borneo was not established.

20.2. *Nephesa grata* Walker

Nephesa grata Walker, 1857b: 160; Walker, 1858b: 107 (Borneo); Lallemand, 1939: 75 (Sarawak, Mt. Dulit); Metcalf, 1957: 388 (catalog); Medler, 1990: 144 (type, *rosea*, in error). Lectotype [no abdomen]: Sarawak, Wallace; paralectotype: ♀, Sarawak, 68.4, Wallace, BMNH.

Nephesa aegrota Melichar, 1902: 105 (*rosea*, in error); Metcalf, 1957: 385; (catalog); Medler, 1986d: 163; Medler, 1986h: 324, fig. 25; Medler, 1990: 138 (synonymy). Lectotype: ♂, Palawan, NHRS.

Nephesa aurantiaca Schmidt, 1904a: 211, Metcalf, 1957: 386 (catalog). Holotype: ♂, North Borneo, ZMPA.

Diagnosis: Sutural and apical margins of tegmen meeting at nearly right angle. Variable colors and marking patterns described for *N. rosea* apply also this species. Males of the two species can be distinguished reliably only by reference to genitalia characters. However, females are easily separated by major difference in shape of valvulae III. Genitalia of female from Borneo in BPBM is illustrated (Fig. 43).

Specimens examined: BORNEO: ♀, 50, Staudinger, *rosea* det Melichar (1902: 105), NHRS. BRUNEI: ♀, Om S. Selanjak, 8-9.iii.1984, Helps (BM 1984-296); 3♂, 1♀, Kuala Belalong, 300 m, x-xi.1992, Martin (BM 1992-172), BMNH. KALIMANTAN: ♀, Mahakkan, 1894, (Borneo Exped), RMNH; ♀, S.O. Borneo, Wahner & Schönberg, *ferrugata* det Melichar, ZMHU. SABAH: ♂, Bettotan, 3.viii.1927, ♂ 352 only data, [ex FMS Museum, BM 1955-354]; ♂, Kretam, 7.vii.1950, Hedley [BM 1950-417]; ♀, Mt. Kinabalu, Kiau, 3000 ft, iv.1929, ex FMS; ♂, 3525, ♂, 2♀, Sandakan, 16-30.iv.1973; ♀, Bryan, (BM 1931-150), ♂, Sandakan Dist., Rumidi, R. Labuk, 16-30.ix.1973, BMNH; ♂, 12.5 Km S Nabawan, 5°02'N 116°27'E, 400 m, 16.xi.198, Huisman & de Jong; ♂, 16 km NE Tenom, 5°12'N 115°59'E, 270, 22.xi.1987, Huisman & de Jong; ♀, 23 Km W of Sandakan, Sepilok, 5°49'N 118°06'E, 0-100 m, 1.xi.1987, Huisman & de Jong: RMNH. SARAWAK: ♀, Baram, 9.11.20, 44, Moulton; Gunong Mulu Natl Park, ♂, Mulu Camp 1, viii, 150 m, 385470, ♂, Melinau Gorge, 150 m, iii-iv.1978, ♀, Long Pala, 70 m, iii, 324450, [RGS Mulu Exped., BM 1978-206], ♂, foot of Mt. Dulit, 6.ix.1932, det *grata* Lallemand, [Oxford Univ Exped, BM 1933-254], BMNH; ♀, Telang, xii.81, Grabowsky, det *ferrugata* Melichar, ZMHU; ♂, 2♀, Telok Ayer, Muir, det *rosea* Kirkaldy; ♀, Gunong Matang, 1958, Maa; BPBM.

20.3. *Nephesa truncaticornis* (Spinola)

Poeciloptera truncaticornis Spinola, 1839: 429, pl 16, fig. 3. Holotype: ♀, Java, coll. Serville, coll. Signoret, NHMW, here designated.

Nephesa truncaticornis: Stål, 1870: 773 (Borneo); Melichar, 1902: 103, pl 3, fig. 6 (Borneo); Metcalf, 1957: 392 (catalog).

Colobesthes rectilinea Walker, 1870: 180; Medler, 1990: 157 (type). Lectotype: ♀, Sumatra, Wallace, BMNH.

Nephesa rectilinea: Distant, 1910b: 332 (combined); Lallemand, 1939: 74 (Sarawak, Mt. Dulit); Metcalf, 1957: 388 (catalog).

Nephesa aurora Kirkaldy, 1913: 23; Metcalf, 1957: 386; Medler, 1987a: 119 (type, synonymy). Holotype: ♀, Amboina, BPBM.

Diagnosis: Tegmen shape distinctive; strongly obtuse apical margin clearly illustrated by Melichar (1902, Fig. 6). Color clear pale blue green, translucent, costal margin narrowly pink, apical and sutural margins nar-

rowly pale yellow brown. Pro- and mesotibiae and tarsi black, femora with black spot at apical margin. Aedeagus with thick dorsal process arising apically, directed basally, dorsal edge of process bearing 4-5 strong spaced out spines. Valvulae III globular, without extension basally along ovipositor blades, pad of small teeth on inner surface of ventral margin.

Measurements: Holotype ♀. Length: Overall 27.0; v 0.58; f 1.91; p 0.91; m 3.65; t 25.00; pcl 8.50. Width: v 1.66; f 2.20; t 10.00. Spine formula: 1:6:6.

Specimens examined: BORNEO: ♂, Noualhier, 1898, MNHN. BRUNEI: ♂ ♀, Haglund coll, NHRS. SARAWAK: ♂ ♀, Gunong Mulu Park, W. Melinau Gorge, 150 m, iii-iv.1978, Kerrangas, Holloway, RGS Mulu Exped, (BM 1978-206), BMNH. Specimens verifying the Lallemand (1939) record were not found.

20.4. *Nephesa suffusa* (Walker)

Poeciloptera suffusa Walker, 1851: 446; Medler, 1990: 161 (type). Lectotype: ♂, Java, BMNH.

Nephesa brunnea Melichar, 1902: 104; Biermann, 1908: 161, pl. 4, Fig. 7; Distant, 1910b: 332 (combination); Metcalf, 1957: 392 (catalog). Lectotype: ♂, paralectotype: ♀ (no other data), ZMUA, here designated.

Diagnosis: Morphology of head and tegmina as given for genus. Overall appearance uniformly reddish-brown, rarely tawny. Habitus color illustration given by Bierman (1908, Fig. 7). Tegmen normally with distinctive scattering of white wax pustules; membrane across discal area with semicircular crease. Apical submarginal area defined by zigzag alignment of short cross veins, from which about 40 terminal veins arise. Vein Cu not forked, but connected to M vein and suture by numerous crossveins. Valvulae III elliptical in lateral view, basal margin not extended along blades of ovipositor, filelike pad of small spines concealed on inner surface of ventral margin. Sternite VII apical margin evenly concave. Aedeagus with dorsal slender process arising apically, directed basally and strongly recurved. Spine formula 1:7:9. Size variable, with males 2-4 mm shorter than females.

Measurements: Lectotype ♂. Length: Overall 21.0; v 0.33; f 1.74; p 0.83; m 3.32; t 16.60; pcl 5.96. Width: v 1.45; f 1.87; t 7.64. Spine formula: [leg lost].

Specimen examined: SABAH: ♀, Tawau, Quoin Hill, Cocoa Res. Sta., light trap, 5.ix.1962, Hirashima, BPBM.

20.5. *Nephesa duffelsi* Medler, sp. nov.

Diagnosis: Head, antennae and pronotum tinged with purple, side of mesonotum up to lateral longitudinal carina deep purple, median longitudinal carina white, about 2 times wider on pronotum than on mesonotum. Venter of body light stramineous, dusted heavily with white waxy deposits. Pro- & mesotibiae light purple, all tarsi green. Tegmen costal margin narrowly blue green, turning black along costal angle, apical and postclaval margins

black; precostal area orange red, veins red, corium dark olive green, veins purple, cells in basal half of tegmen with noticeable scattering of minute red dots, which are gradually lost in apical half. Weak semicircular crease crossing membrane from claval apex to veins R+C. Subapical and precostal areas of equal width, the latter incurved for short distance basad of R+C, strong postclaval submarginal line originating at claval apex, all submarginal areas containing numerous veins, about 45 terminals along apical margin. Two to 3 dozen large pustules with white wax spots scattered over tegmen, with greater concentration basally. Valvulae III elliptical, ventral margin extended along full length of ovipositor blades, basal margin truncate, filelike pad of small teeth on inner side of apico-ventral margin, edge with hairlike setae. Segment VII of abdomen with median U-shaped projection.

Male unknown.

Measurements: Holotype ♀. Length: Overall 27.0; v 0.25; f 1.99; p 1.00; m 4.15; t 20.75; pcl 8.30. Width: v 1.83; f 2.32; t 9.96. Spine formula: 1:6:8.

Holotype: ♀, SABAH: Danum Valley, 70 km W of Lahad Datu, Field Centre nr Main Trail East, 150 m, 3.xii.1989, sample Sab 55, primary forest margin along road at light, M.J. & J.P. Duffels, ZMUA.

Taxonomic note: This large and handsome species belongs to the *suffusa* complex of genera that have characteristic pustules on the tegmen that produce spots of white wax. The species is distinguished in the female sex by shape of valvulae III and median projection on apical margin of abdominal segment VII.

20.6. *Nephesa mazera* Medler, sp. nov.

Diagnosis: Overall appearance red, this due to uniformly red veins and dense maculation of red dots in cells of tegmen. Head and thorax ochraceous, tegmen membrane orange red, apical and postclaval sutural margins red. Pustules for wax production present on tegmen, colored red same as veins and dots, but white wax spots absent. Illustration of holotype genitalia (Fig. 8) shows uniquely curved ventral process arising independently basad of slender dorsal apical process; apical half of anal segment with large median keel.

Female unknown.

Measurements: Holotype ♂. Length: Overall 22.0; v 0.33; f 1.83; p 0.83; m 3.82; t 19.59; pcl 7.14. Width: v 1.49; f 1.99; t 7.80. Spine formula: 1:7:9.

Holotype: ♂, SARAWAK: Gunong Mulu Nat. Park, Site 17, May, Nr. Long Melinau, 50 m, 313441, low secondary forest, MV on river bank, Holloway, RGS Mulu exped. [BM 1978-206], BMNH.

20.7. *Nephesa rorida* (Walker)

Poeciloptera rorida Walker, 1857b: 161; Medler, 1990: 158 (type). Lectotype: ♀, Sarawak, Wallace, BMNH. Plesiotype: ♂, Sabah, Rumidi, BMNH, here designated.

Nephesa rorida: Melichar, 1902: 106 (combination); Lallemand, 1939: 75 (Sarawak); Metcalf, 1957: 389 (catalog).

Diagnosis: Habitus closely similar to illustration of *intrusa* given by Melichar (1902, Fig. 7), but differing in characters of the male genitalia. Tegmina with pustules producing white wax spots in common with related species in the *suffusa* complex.

Pair of dark brown stripes extending from frons to apex of mesonotum in strongly marked specimens may be absent in faded examples, such as plesiotype male used for illustration of genitalia (Fig. 75). Valvulae III elliptical, basal margin exposing ovipositor blades.

Measurements: Plesiotype ♂. Length: Overall 22.0; v 0.50; f 1.91; p 1.00; m 3.65; t 18.26; pcl 6.31. Width: v 1.58; f 2.16; t 7.64. Spine formula: 1:7:9.

Specimens examined: KALIMANTAN: ♀, Dr. Nieuwenhuis, Mahakkam, 1894, RMNH. SABAH: ♂, plesiotype, Sandakan Dist., Rumidi, R. Labuk, 16-30.ix.1973, Pruett [BM 1975-590]. SARAWAK: ♀, Foot of Mt. Dulit, Junction of Rivers Tinjar & Lejok, 2.ix.1932, Hobby & Moore, Oxford Univ. Exped., [BM 1933-254), BMNH.

20.8. *Nephesa sandakanensis* Distant

Nephesa sandakanensis Distant, 1910b: 333, pl 22, fig. 11; Metcalf, 1957: 391 (catalog); Medler, 1990: 180 (type). Holotype: ♂, Sandakan, BMNH.

Diagnosis: Distinctive pattern of markings on tegmen illustrated by Distant (1910b, Fig. 11). Any external resemblance to *rorida* is superficial, as indicated by uniquely different characters of the holotype genitalia. Apex of aedeagus enlarged, giving rise to thick process with 3 heavy spines basally and terminal pair of antlerlike prongs. Ventral keel of aedeagus very wide, produced apically into strong downcurved spine; anal segment in lateral view nearly right angled, apical half elongated, deeply bifid at apex.

Measurements: Holotype ♂. Length: Overall 20.0; v 0.33; f 1.83; p 0.87; m 3.32; t 16.27; pcl 5.81. Width: v 1.41; f 1.91; t 6.97. Spine formula: 1:7:9.

Specimen examined: SABAH: ♂, Sandakan, (BM 1975-590); ♀, Pryer, coll. Distant; BMNH.

20.9. *Nephesa ligata* (Distant), comb. nov.

Cenestra ligata Distant, 1892: 285, pl 13, fig. 3; Medler, 1990: 172 (type). Holotype: ♀, Malaysia, Perak, BMNH. Plesiotype: ♂, Sumatra, Soekaranda, ZMPA, here designated.

Bythopsyrna ligata: Melichar, 1901: 226, pl 2, fig. 9 (Borneo); Schmidt, 1904a: 189 (♂ Soekaranda); Melichar, 1923: 26 (Borneo); Metcalf, 1957: 107 (catalog).

Diagnosis: Frons, pronotum, mesonotum, and tegmen with dark brown or black stripes or bands in bold patterns that superficially mimic markings in some species of *Bythopsyrna*, particularly *B. copulanda* Distant. Holotype tegmen illustrated by Distant (1892, fig. 3). The markings probably mislead earlier authors who assigned *ligata* to *Bythopsyrna*. The species transferred to *Nephesa* on the basis of strong postocular ridge and 3 carinae on convex dorsal margin of frons. Markings of head and thorax are illustrated (Fig. 46).

Measurements: Plesiotype ♂. Length: Overall 17.5; v 0.37; f 1.66; p 0.66; m 2.99; t 14.94; pcl 4.48. Width: v 1.29; f 1.62; t 5.96. Spine formula: 1:6:7.

Specimens examined: BRUNEI: ♂, Kuala Belalong, 300 m, x.1992, Martin, (BM 1992-172), BMNH. SABAH: ♂, 60 Km W of Lahad Datu, 4°58'N 117°48'E, 150 m, Huisman & de Jong, RMNH; ♂, East Coast Residency, 1878-1898, Pryer, Oxford Univ. Museum; ♂, 20 km E Telupid, 14.viii.1983, Hevel & Steiner, USNM. SARAWAK: ♂, Tenompok, Maa, BPBM.

21. Genus *Copsyrna* Stål

Copsyrna Stål, 1862c: 69; Metcalf, 1957: 109 (catalog). Type species: *Poeciloptera maculata* Guérin-Méneville.

Diagnosis: Frons convex, extending dorso-posteriorly to intergenal transverse carina near anterior margin of pronotum, lateral margins carinate, strong median longitudinal carina nearly full length of frons. Displaced vertex concealed by anterior margin of pronotum, consisting of small triangular remnants adjacent to eyes. Pronotum anterior and lateral margins carinate, lateral carina extending ventrally about half length of side of pronotum, postocular eminence strongly raised ridge nearly reaching postero-ventral margin of lateral lobe. Tegmen with veins R, S, M arising together from basal stem, vein R basally emitting several thick branches into cell C, which may connect with vein C, vein Cu not forked, joining postclaval submarginal line at claval apex; apical margin of tegmen convex, 3 submarginal lines of crossveins weakly developed and aligned irregularly, fuscous bands associated with submarginal lines. Ovipositor adapted for piercing, anal plate elongate, lateral margins curled ventrally, valvullae III narrowed apically, marginal teeth in a small cluster. One metatibial lateral spine. Size medium.

Distribution: Indomalayan Region.

Taxonomic note: This genus was placed next after *Bythopsyrna* in the Metcalf Catalog. There is close superficial resemblance of black markings in the 2 genera, but *Copsyrna* has diagnostic morphological characters such as ridgelike postocular eminence, tegmina and genitalia, that indicate more natural relationship in the *Nephesa* complex of genera.

Key to species

1. Frons without black median bar. .....21.2. *martini* Medler, sp. nov.
-- Frons with black median bar. 2

2. Tegmen white, filled with large irregular fuscous spots.
..... 21.1. *maculata* (Guérin-Méneville)
-- Tegmen deep red, without fuscous spots.
..... .21.3. *merahata* Medler, sp. nov.

21.1. *Copsyrna maculata* (Guérin-Méneville)

Poeciloptera maculata Guérin-Méneville, 1829, pl 58, fig. 7; Walker, 1857b: 161 (Sarawak); Medler, 1988: 15, fig. I, 6 (plesiotype). Lectotype (no abdomen) (locality unknown), MZN. Plesiotype: ♂, Indonesia, W. Java, RMNH.

Poeciloptera maculata var.: Walker, 1857b: 161; Medler, 1990: 150 (type). Holotype: ♂, Sarawak, BMNH.

Copsyrna maculata: Stål, 1862: 69; Melichar, 1901: 224, pl 2, fig. 10 (Borneo); Melichar, 1923: 24, pl 2, fig. 19.

Copsyrna ochracea Distant, 1892: 286; Medler, 1990: 176 (type). Lectotype: ♀, Malaysia, Sungei Ujong, BMNH.

Diagnosis: Morphological characters as given for genus. No difficulty in recognition with use of colored figure given by Melichar (1923, pl 19). The distinctive pattern of black markings on head, thorax and tegmen is consistent among specimens throughout the wide distribution range of the species. Extent of infusion of orange color in the basal portion of tegmen is variable, but some color is usually retained in the cell on each side of the basal stem. Size variation in different populations notable, with lengths ranging from 13 mm to 23 mm. Hind leg spine formula: 1:6:7.

Specimens examined: BORNEO: ♂, ♀, coll. Fallou, 259-95; ♀, Noulhier, 1898, det. Melichar 1902, MNHN; ♀, det. Melichar 1902, NHRS. SABAH: 3♀, Tenom-Keningan Rd, 3.1 Km, 240 m, 26.vi.1986, Huisman, RMNH. SARAWAK: 2♂, 2♀, Bidi, 90-240 m, 3.ix.1958, Maa, Bishop Museum; 2♀, Wallace, *Poeciloflat* det. Walker, 1857b, MVMA.

21.2. *Copsyrna martini* Medler, sp. nov.

Diagnosis: Frons with strong median carina and remnants of short lateral carinae near dorsal margin marked by transverse intergenal carina, ocelli not developed, postocular eminence ridgelike, extending to ventral margin of lateral lobe. Bilateral pairs of large black spots on pronotum anterior margin, at end of lateral carina below eye, and on mesonotum 3 medial, 2 lateral and one at margin of tegula. Tegmen with bold network of dark brown veins on waxy white or reddish background, apical margin narrowly dark red, precostal margin greenish white, suffused with red, disc with intricate mixture of large and small cells, color variable, 3 irregular and poorly defined submarginal lines. Origin of S and M longitudinal veins from basal stem obscured by pustules, bulla shining black. Genitalia of holotype are illustrated (Fig. 73).

Measurements: Holotype ♂. Length: Overall 16.0; v 0.29; f 1.83; p 0.83; m 3.15; t 13.62; pcl 4.98. Width: v 1.16; f 1.66; t 5.81. Spine formula: 1:6:8.

Holotype: ♂, BRUNEI: Temburong District, Kuala Belalong, 300 m, x.1992, J.H. Martin coll. (BM 1992-172), BMNH.

Taxonomic note: This strikingly marked flatid has a pattern of black spots on head and thorax similar to *maculata*, but tegmina are uniquely different in regard to vein reticulations, cell shapes and sizes, and coloration.

21.3. *Copsyrna merahata* Medler, sp. nov.

Diagnosis: Head, thorax and abdomen stramineous, tegmen deep red, without fuscous spots, precostal margin ivory, most of marginal space filled by black band extending along precostal margin. Frons convex from clypeal margin to dorso-posterior transverse intergenal carina, disc with median longitudinal black stripe overlaying strong carina about half length of frons.

Pro- and mesonotum with bold black spots arranged in pattern typical for the genus (Fig. 45). Tegmen about twice longer than wide, apical margin convex, submarginal line from claval apex to R+C stem, submarginal space about 0.85 mm from crossveins to margin. Tegmen basally with distinct R-C oblique crossvein arising from vein R near node of R+S+M basal stem and forming orange colored triangular cell. Several additional cells formed by crossveins arising from R may be orange colored also. First fork of vein M basad of first fork of vein S; no distinct Cu-M oblique crossvein, but several crossveins at right angle to vein Cu may be present. Clavus A1-A2 Y-stem absent; cell at apex of clavus larger than other cells along sutural margin.

Measurements: Holotype ♀. Length: Overall 16.25; v 0.42; f 1.49; p 0.58; m 2.41; t 13.94; pcl 5.48. Width: v 1.00; f 1.16; t 5.81. Spine formula: 1:5:5.

Holotype: ♀, SABAH: Nr Kinabalu, 1929, ex Fed. Malay State, (BM 1955-354), BMNH.

22. Genus *Kayania* Distant

Kayania Distant, 1910b: 334; Metcalf, 1957: 279 (catalog). Type species: *Nephesa volens* Walker.

Diagnosis: Frons strongly carinate medially, convexly rounded dorsally, merged with vertex, postero-dorsal margin marked by intergenal transverse carina, lateral margins carinate, flared outward over antennae, incurved to clypeal margin, antennal segment I shorter than II; lateral margins of pronotal disc carinate 1/2 distance to posterior margin, postocular ridge shallow, not carinate. Tegmen illustrated by Distant (1910b, Fig. 18). Length about twice width, apical margin nearly straight, costal angle narrowly rounded, sutural angle right angled, R, S, and M arising together from basal stem, line of crossveins from R+C stem to claval apex delimiting wide submarginal area containing nearly 40: 60 single: branched terminal veins; distinctive undulate crease across tegmen basad of submarginal vein; distinct space between Cu and sutural vein. Ovipositor adapted for piercing. One metatibial lateral spine.

Distribution: Borneo Subregion.

22.1. *Kayania volens* (Walker)

Nephesa volens Walker, 1857b: 161; Medler, 1990: 164 (type). Holotype: ♀, Sarawak, BMNH. Plesiotype: ♂, Sarawak, Gunong Matang, 120 m, 15.ix.1958, Gressitt, BPBM.

Kayania volens: Distant, 1910b: 334, pl 22, fig. 18; Lallemand, 1939: 72 (Sarawak: Kuching); Metcalf, 1957: 279 (catalog).

Melicharia tripars: Singh-Pruthi, 1925: 216, pl 27, fig. 224. (Misidentified).

Diagnosis: Morphological characters as given for genus. Overall color stramineous, contrasting coloration of tegmen seen only in burnished green veins and narrow line of interveinal fuscous spots along apical, costal and sutural margins. Plesiotype genitalia are illustrated (Fig. 31a). In a sample of 5 specimens, the aedeagus dorsal process of 3 males was short as illustrated, but in 2 males the process was elongated (Fig. 31b). There were no external differences.

Measurements: Plesiotype ♂. Length: Overall 12.0; v 0.37; f 1.33; p 0.66; m 2.49; t 10.29; pcl 2.99. Width: v 1.00; f 1.25; t 5.96. Spine formula: 1:6:6.

Specimens examined: KALIMANTAN: ♀, C. Borneo, Sg. Pajau, 1925, Mjöberg, ZMUA. SABAH: ♀, Sandakan, Baker, USNM. SARAWAK: ♂, Gunong Tamabo, Baram River, 7.ii.1920, Moulton, (ex F.M.S. Museum, BM 1935-354); ♀, Santubong, 1°43'N 110°19'E, 27.x-3.xi.1976, Cranston, (BM 1977-19); 3♂, Kuching, 1900-1901, 10098, 10102, 10110, Shelford, det. Lallemand; ♂, Gunong Mulu Nat Park, Site 12, 200 m, 2.ii.1978, 386469; ♀, Site 22, 150 m, iv.1978, 421578, Holloway, RGS Mulu exped. (BM 1978-206); BMNH; ♂, ♀, Kuching, 20.vi.1900, Shelford, det. Lallemand, ISNB.

23. Genus *Flatoptera* Melichar

Flatoptera Melichar, 1901: 248; Metcalf, 1957: 364 (catalog). Type species: *Poeciloptera albicosta* Guérin-Méneville.

Diagnosis: Frons convex dorsally, extended to posterior margin of head, vertex displaced; transverse intergenal carina slightly angulate, shallow depression medially between carina and convex anterior margin of pronotal disc; frons wider than long, median longitudinal carina dorsal, less than half length of frons; rostrum broad apically, apex with pair of cuplike structures; postocular eminence of pronotum strongly raised ridge. Tegmen about twice longer than wide, submarginal line complete from costal vein to apex of clavus. Ovipositor adapted for piercing.

Specimens usually with one preapical metatibial black tipped spine, rarely 2 spines. Normally 3 longitudinal veins arising from the basal stem, but short R+S stem may be found. The green coloration subject to fading to orange and yellow, thin red markings on body and tegmen variable. Size medium to large.

Distribution: Indomalayan Region.

Key to species

1. Head and thorax stramineous; tegmen brown or testaceous. 2
-- Head, thorax and tegmina green or yellow green; white halo spots and red margins of tegmina variable. ..... 23.3. *virescens* Schmidt
2. Head and thorax orange, tegmen smoky brown, costal margin white or contrasting ochraceous. ..... 23.1. *albicosta* (Guérin-Méneville)
--Head, thorax and tegmina light brown, costal margin not white or contrasting. ..... 23.2. *depressa* Melichar

23.1. *Flatoptera albicosta* (Guérin-Méneville)

Poeciloptera albicosta Guérin-Méneville, 1844: 360; Medler, 1988: 12, fig. I, 5 (plesiotype). Type specimen of Guérin-Méneville from Malacca not found. Plesiotype: ♂, Malaysia, SE Pahang, BPBM. Plesiotype: ♀, Malacca, NHRS, here designated.

Flatoptera albicosta: Melichar, 1901: 249, pl 7, fig. 10 (combination); Metcalf, 1957: 364 (catalog).

Flatoptera minuta major Lallemand, 1939: 73. Lectotype: ♀, Sarawak, Mt. Dulit, 4000 ft, moss forest, 19.x.1932, Hobby & Moore; paralectotype: ♀, foot of Mt. Dulit, junction of Rivers Tinja & Lejok, light trap, 4.x.1932, Hobby & Moore; BMNH; here designated. **New syn.**

Diagnosis: Morphology conforms with generic description. Head and thorax stramineous, sharply contrasting with smoky brown tegmen; precostal margin ochraceous or white. Hind leg uniformly yellowish brown, front and middle legs tibiae/tarsi black. Plesiotype male genitalia given by Medler (1988, fig. 5). Dorsal view shown by Melichar (1901, Fig. 10) based on female from Malacca, NHRS, here designated as plesiotype. The figure clearly shows tegmen with R+S vein arising from basal stem.

Measurements: ♂ ♀ plesiotypes. Length: Overall 16.0, 19.0; v 0.29, 0.33; f 1.91, 1.83; p 0.91, 1.08; m 2.99, 3.15; t 12.28, 16.00; pcl 1.66, 2.00. Width: v 1.33, 0.83; f 1.66, 1.66; t 6.14, 8.00. Spine formula: 1:8:8, 1:8:7.

Specimens examined: KALIMANTAN: ♂, Mahakkam, 1894, (Nieuwenhuis Exped), RMNH. SABAH: ♀, Tawau, Quoin Hill, Cocoa Res Sta, 24.ix.1962, Hirashima; ♀, Tawau, Quoin Hill, 3-7.vii.1962, Holtmann, BPBM.

23.2. *Flatoptera depressa* Melichar

Flatoptera depressa Melichar, 1901: 249; Lallemand, 1939: 73 (Sarawak, Mt. Dulit); Metcalf, 1957: 365 (catalog); Medler, 1987b: 536, fig. 9 (type). Holotype: ♀, Borneo, NHMW.

Diagnosis: Without sharply contrasting color between head/thorax and tegmen. Tegmen uniformly light brown, reddish brown or testaceous, without white precostal margin. Hind leg spine formula 1:8:7. Size largest in the genus, length 20-22 mm.

Specimens examined: SABAH: 2♂, Rumidi, R. Labuk, 16-30.ix.1973, Pruett, (BM 1975-690); ♂, Bettotan, 24.vii.1927, Pendlebury, (BM 1955-

354); Sandakan, 16-30.ix.1973, attacking *Shorea leprosula*; BMNH; SARAWAK: ♀, Foot of Mt Dulit, junction Rivers Tinjor & Lejok, 28.vii.1932, Hobby & Moore, Oxford Exped, det Lallemand; ♀, Gunong Mulu, Camp 4, 1780 m, i.1978, Holloway, (BM 1978-206); ♀, Gunong Mulu, Site 11, 150 m, ii.1978, Holloway, (BM 1978-206), BMNH; ♀, Nanga Pelogus nr. Kapit, 585 m, 7-14.viii.1958, Maa, BPBM.

23.3. *Flatoptera virescens* Schmidt

Flatoptera virescens Schmidt, 1904b: 358; Metcalf, 1957: 365 (catalog). Holotype: ♀, North Borneo, Waterstradt, ZMPA. Plesiotype: ♂, Brunei, Kuala Belalong, Martin, BPBM, here designated.

Flatoptera minuta Schmidt, 1911: 222; Lallemand, 1939: 73 (Sarawak); Metcalf, 1957: 365 (catalog). Holotype: ♂, Sabah, Marapok Mtns, 11.ix.1909, ZMPA.

Diagnosis: Overall color olivaceous green. Tegmen veins green, costal margin narrowly ivory green, apical margin narrowly black, overlaying slightly wider red, centers of scattered white spots with green pustules; Tibia I black, margins red. Coloration variable; faded green or testaceous, black and red markings reduced or lost.

Measurements: ♂ plesiotype, ♀holotype. Length: Overall 13.0, 16.0; v 0.17, 0.17; f 1.49, 1.83; p 0.66, 1.00; m 2.32, 3.32; t 11.12, 13.62; pcl 2.16, 2.89. Width: v 1.25, 1.49; f 1.37, 1.74; t 5.64, 6.64. Spine formula: 1:7:7, 1:7:6.

Specimens examined: BRUNEI: ♀, Ula Temburong, 300 m, 20.vii.1979, Allen, (BM 1979-1); ♀, 2♂, Kuala Belalong, 300 m, x.1992, Martin (BM 1992-172); ♀, Temburong, 300 m, 16.ii.1982, Harman, BMNH. SABAH, Danum Valley, 70 km W Lahad Data, 150 m: ♀, 1.xii.1989 (sample 50), ♂, 15.xii.1989 (sample 69), ♂, 16.xii.1989 (sample 71); ♂, Sepilak Forest Res. Centre, 25 km W Sandakan, 24.xi.1989 (sample 41), M.J. & J.P. Duffels, ZMUA.

24. *Genus Idume* Stål

Idume Stål, 1866: 238 (species not included); Melichar, 1902: 27 (species included); Metcalf, 1957: 381 (catalog). Type species: *Idume plicata* Melichar. Junior synonym of *Nephesa deducta* Walker.

Phyllodryas Kirkaldy, 1913: 22; Metcalf, 1957: 353 (catalog). **New Syn.** Type species: *Phyllodryas calamina* Kirkaldy. Junior synonym of *Nephesa deducta* Walker.

Diagnosis: Frons convex, margined dorso-posteriorly by transverse intergenal carina next to pronotum, median longitudinal carina extending nearly full length of frons. Vertex displaced, triangular remnants concealed beneath anterior margin of pronotum. Pronotum lateral carina extending ventrally on side to nearly reach conical postocular eminence, longitudinal carina absent on disc of pronotum, also absent on disc of mesonotum. Tegmen apical margin uniformly convex, strong submarginal line from claval apex to costal margin, terminal veins not forking in apical submarginal space; precostal and apical submarginal areas approximately same width (1:1); strong diagonal wale

starting from point 1/2 distance between R+C junction and apex of costal angle, ending near submarginal crossveins at 1/3 width of tegmen, S vein twice forked, 3 branches at plane of R+C junction, Cu vein once forked, both branches joining postclaval submarginal line; longitudinal veins R, S, M arising from basal stem. Ovipositor adapted for piercing. One metatibial lateral spine. Size small.

Distribution: Indomalayan Region.

Key to species

1. Tegmen precostal margin narrowly fuscous; aedeagus without crescent process dorsally. 2
-- Tegmen concolorous; aedeagus apically with crescent shaped dorsal process. ..... 24.3. *deducta* (Walker)
2. Ventral process of aedeagus Y-forked. ..... 24.2. *tripars* (Walker)
-- Ventral process of aedeagus without Y-fork. ..... 24.1 *niveina* (Walker)

24.1. *Idume niveina* (Walker)

Poeciloptera niveina Walker, 1857a: 92; Medler, 1990: 151 (type). Holotype (no abdomen): [Mount Ophir], Wallace, BMNH. Plesiotype: ♂, Sabah, Paring Hot Springs, Maa, BPBM.
Melicharia niveina: Distant, 1910b: 322 (combination); Metcalf, 1957: 324 (catalog).
Idume niveina: Medler, 1990: 151 (combination).

Diagnosis: Morphological characters as given for genus. Overall color pale stramineous, strongly contrasting fuscous band along precostal margin of tegmen from near base to costal angle. Genitalia of plesiotype male are illustrated (Fig. 19). The lack of recurved crescentlike dorsal apical process of the aedeagus is reliable character for positive identification in certain cases where the dark costal band has faded.

Measurements: ♂ plesiotype and ♀, from Sabah. Length: Overall 8.5, 8.75; v 0.21, 0.21; f 1.00, 1.00; p 0.33, 0.33; m 1.66, 1.74; t 6.81, 7.14; pcl 1.83, 1.99. Width: v 0.75, 0.75; f 1.04, 1.08; t 3.49, 3.49. Hind leg spine formula: both 1:5:5.

Specimens examined: SABAH [British N. Borneo]: 4♂2♀, W. Coast Residency, Ranau, 8 mi N Paring Hot Springs, 500 m, 8-18.x.1958, Maa; ♂, Ranau, 500 m, 22-25.i.1959, Maa; BPBM.

Taxonomic note: Poeciloptera niveina sensu Distant (1910b: 322) and *sensu* Medler (1990: 151) was treated as senior synonym of *Idume deducta* Walker in error.

24.2. *Idume tripars* (Walker), comb. nov.

Nephesa tripars Walker, 1857b: 161; Medler, 1990: 162 (type). Lectotype: ♀, Sarawak, Wallace, BMNH. Plesiotype: ♂, Sarawak, Merirai Valley, 1-6.viii.1958, Maa, BPBM, here designated.

Melicharia tripars: Distant, 1910b: 322 (combination); Metcalf, 1957: 326 (catalog).

Diagnosis: Morphological characters conform with generic diagnosis. Pronotum without median carina, mesonotum with median carina, lateral carinae weak, not raised. Body beneath and tegmina pale stramineous, costal margin narrowly fuscous, dark color extending to apex of clavus. The plesiotype genitalia are illustrated (Fig. 21). The apex of ventral process of aedeagus differs from *niveina* in Y-fork shape; otherwise the two species are closely similar.

Measurements: ♂ plesiotype. Length: Overall 7.5; v 0.25; f 1.00; p 0.29; m 1.49; t 6.47; pcl 1.33. Width: v 0.66; f 0.91; t 2.99. Hind leg spine formula: 1:5:5.

Specimens examined: SARAWAK: plesiotype ♂, Merirai Valley, 1-6.viii.1958, Maa, BPBM; lectotype ♀ and paralectotype ♀, Sarawak, Wallace, BMNH.

Taxonomic note: *Melicharia tripars* sensu Singh-Pruthi (1925: 216, pl 27, fig. 244) was misidentified. His figure of the male genitalia shows the same characters as the plesiotype male of *Kayania volens* (Walker), here illustrated (Fig. 31a).

24.3. *Idume deducta* (Walker)

Nephesa deducta Walker, 1857b: 161; Distant, 1910b: 322 (synonymy, in error); Metcalf, 1957: 321 (catalog); Medler, 1986: 208, fig. 3 (type); Medler, 1990: 140 (type, synonymy, in error). Lectotype: ♂, Sarawak, Wallace, MV.

Nephesa deducta var.: Walker, 1858a: 108; Medler, 1990: 140 (synonymy, in error).

Idume plicata Melichar, 1902: 28; Lallemand, 1939: 75 (Sarawak, Kuching, Mt. Dulit); Metcalf, 1957: 381 (catalog); Ghauri, 1973: 543, figs 9-10; Medler, 1986h: 332, fig. 21 (synonymy); Medler, 1987b: 536 (paralectotype, Borneo). Lectotype: ♂, Sarawak, NHRS.

Phyllodryas calamina Kirkaldy, 1913: 22; Metcalf, 1957: 354 (catalog); Medler, 1987a: 120, fig. 21 (cited as junior synonym of *Poeciloptera niveina* Walker, 1857, in error.); **New Syn.** Lectotype: ♂, West Borneo [Sarawak], Telok Ayer, BPBM.

Diagnosis: Frons convex to dorsum of head, delimited posteriorly by intergenal transverse carina, longitudinal median carina extending almost full length of frons; pro- and mesonotum orange, lighter color medially, giving appearance of 2 longitudinal stripes, faint suggestion of orange color at sides of mesothorax. tegmen with orange tinge. Color intensity variable, sometimes faded, colorless. Male specimen from Sarawak, Sadong, BPBM, used for body measurements and illustration of tegmen (Fig. 65), which shows diagnostic submarginal line and diagonal wale. Lectotype genitalia are illustrated (Fig. 20).

Measurements: ♂ Sarawak. Length: Overall 8.0; v 0.25; f 1.00; p 0.33; m 1.41; t 6.14; pcl 1.49. Width: v 0.62; f 0.95; t 3.32. Hind leg spine formula: 1:5:5.

Specimens examined: SABAH: ♂, Ranau, 17.x.1958, Maa; ♂, Sandakan Bay (SW), Sapagaya Lumber Camp, 2-20 m, 2.xi.1957, Maa; BPBM. SARAWAK: ♀, Bau, 90-240 m, 29-30.vii.1958, Maa; 3♂, 2♀, Bidi, 90-240 m, 2.ix.1958, Maa; ♀, Gunong Matang, 120 m, 13.ix.1958, Gressitt; ♂, 3♀, Gunong Matang, 120 m, 13.ix.1958, Maa; ♀, Kuching, Matang, 450-894 m, 15.ix.1958, Gressitt; ♂, Kuching, Santubong, 797-1500 m, 18-30.vi.1958, Maa; ♂, Lundu District, Kampong Pueh, 690-1500 m, 6-12.vi.1958, Maa; 3♀, 4♂, Sadong Kampong Tapuh, 300-450 m, 4-10.vii.1958, Maa; 9♂, 4♀, paratypes, Telok Ayer, *calamina* det Kirkaldy); BPBM. SARAWAK: 2♀, Gunong Mulu Nat. Park, W. Melinau Gorge, 150 m., iii-iv.1978, Holloway (BM 1978-206); BMNH; 2♂, 1♀, Semengoh For. Res., 15 mi. So. Kuching, 15-20.ix.1966, Clarke USNM.

25. *Boretsis* Medler, gen. nov.

Type species: Ormenis indigena Melichar, here designated.

Diagnosis: Frons convex, margined dorso-posteriorly by transverse intergenal carina next to pronotum, median longitudinal carina extending nearly full length of frons. Vertex displaced, triangular remnants concealed beneath anterior margin of pronotum. Pronotum lateral carina extending ventrally on side of pronotum to nearly reach conical postocular eminence, longitudinal carina absent on disc of pro- and mesonotum. Tegmen illustrated (Fig. 67): apical margin uniformly convex, strong submarginal line from claval apex to costal margin, none of terminal veins forking in apical submarginal area; this area slightly wider than precostal marginal area (1.25:1); short weak diagonal wale at costal angle basad of submarginal line. vein S twice forked, 3 branches at plane of R+C junction; vein Cu once forked, both branches entering postclaval submarginal line; 2 longitudinal veins R + S, M arising from basal stem. Ovipositor adapted for piercing. Two metatibial lateral spines. Size small.

Distribution: Philippines, Indomalayan Region.

Key to species

1. Overall appearance bronze stramineous, tegmen margins infuscated; male genitalia ventral process short; posterior margin of female segment VII without median process; Philippine Islands. ..... 25.1. *indigena* (Melichar)
-. Colored green olivaceous or light buff; without contrasting markings; male genitalia ventral process elongated; posterior margin of female segment VII with median spine. ..... 25.2. *elongata* Medler, sp. nov.

25.1. *Boretsis indigena* (Melichar), comb. nov.

Ormenis indigena Melichar, 1902: 86; Medler, 1986h: 330 (type); Medler, 1994: 220, fig. 4 (type). Lectotype: ♀, Philippine Islands, Semper, NHRS. Paralectotype: ♂, Philippines Islands, Semper, NHRS.

Diagnosis: Overall color reddish bronze; tegmen margins dark fuscous from apex of clavus to costal margin, ending in margin at opposite end of diagonal wale. Female ovipositor lacking median spine on posterior margin of segment VII. Paralectotype genitalia are illustrated (Fig. 23): ventral process of aedeagus short. Hind leg spine formula 2:6:7. Length 8 mm.

Specimens examined: SABAH: ♂, W Coast Residency, Ranau, 8 mi Paring Hot Springs, 500 m, 8-11.x.1958, Maa, BPBM. PHILIPPINES: Many specimens. Catbalogan, ZMUA; Camarines Sur, Luzon, Mindanao, BPBM; Samar, NCSU.

Taxonomic note: Ormenis indigena Melichar was catalogued by Metcalf (1957: 322) as junior synonym of *Anaya fuscomarginata* Melichar (1902: 78), in error.

25.2. *Boretsis elongata* Medler, sp. nov.

Diagnosis: Tegmina illustrated (Fig. 67), color olivaceous, veins green, margins stramineous; mesonotum luteous, median and each lateral longitudinal carina accentuated as ivory white stripes; median carina half length of frons; postocular eminence of pronotum small, conical. Tegmina of specimens may be dull white due to color fading. Holotype ♂ genitalia illustrated (Fig. 22): elongated ventral process of aedeagus diagnostic. Allotype ♀ genitalia illustrated (Fig. 37): median spine on posterior margin of segment VII diagnostic.

Measurements: ♂ holotype, ♀ allotype. Length: Overall 8.5, 9.00; v 0.25, 0.29; f 1.00, 1.00; p 0.37, 0.33; m 1.83, 1.83; t 6.97, 7.30; pcl 1.83, 1.83. Width: v 0.83, 0.83; f 1.08, 1.16; t 3.49, 3.65. Hind leg spine formula: both 2:6:6.

Holotype: ♂, [SABAH] British N. Borneo: Keningan [Keningau], 12-17.i.1959, T.C. Maa; *Allotype:* ♀, same labels as holotype; BPBM. *Paratypes.* BRUNEI: ♂, Kuala Belalong, 300 m, xi.1992, Martin (BM 1992-172); 3♂, Bukit Sulang nr. Lamumin, N.E. Stork, 20.vii-10.ix.1982, fogging, [B.M. 1982-388]; ♂, Ulu Temburong, 300 m, ii-iii.1982, Day, [B.M. 1983-75]; BMNH. SABAH: ♂, Tawau District, Kalabakan Primary Forest, 8-15.xi.1958, Quate; ♂, 10.xi.1958, Maa; ♂ 19 km n of Kalabakan, 27.x.1962, Hirashima; ♀, 30 mi West of Tawau, Kalabakan R., 9-18.xi.1958, Maa; 24♂, 20♀, Keningan, 12-17.i.1959, Maa; 2♂ 2 ♀, Ranau, 500 m, 28.ix-7.x.1958, 8-11.x.1958, 22-25.i.1959, Maa; ♂, 2♀, Singkor, 19.i.1959, Maa; 11♂, 8♀, Liawan, 14-17.i.1959, Maa; ♀, Sandakan Bay (SW), Sapagaya Lumber Camp, 2-20 m, 4.xi.1957, Gressitt; BPBM; ♂, 1 km S. of Kundasang, 1530 m, 27.viii.1983, Hevel & Steiner; ♂, 9 km NW Beaufort, 10.viii.1983, Hevel

& Steiner; USNM. SARAWAK: 3♂, 2♀, Kuching, Santubong, 797-1500 m, 26.vi.1958, Maa; Bishop Museum; ♂, ♀, Gunong Mulu Nat. Park, Long Pala base camp, ii-iii.1978, RGS Mulu expedition, Eastop [B.M. 1978-411]; 2♀, Mt. Dulit, 4000 ft, moss forest, 19.x.1932, ISNB.

26. *Melicharia* Kirkaldy

Melicharia Kirkaldy, 1900: 294; Metcalf, 1957: 320. Type species: *Melicharia sinhalana* Kirkaldy (new name for *Poeciloptera quadrata* Kirby, 1891, not *Poeciloptera quadrata* Walker, 1851).

Ormenis Melichar, 1902: 64 (misidentified in part, not *Ormenis* Stål, 1862c: 68).

Diagnosis: Frons convex, margined dorso-posteriorly by transverse intergenal carina next to pronotum, median longitudinal carina extending nearly full length of frons. Vertex displaced, triangular remnants concealed beneath anterior margin of pronotum. Pronotum lateral carina extending ventrally on side of pronotum to nearly reach triangular postocular eminence, longitudinal carina weak or absent on disc of pro- and mesonotum. Tegmen apical margin slightly convex, costal angle narrowly convex, sutural angle about a right angle, strong submarginal line from claval apex to costal margin, submarginal area narrow, terminal veins distad and basad of submarginal line with few forks, diagonal wale in area of costal angle weak or absent; longitudinal veins R, S, M arising from basal stem, vein S1 simple, vein S2 multiple branched, vein Cu once forked, both branches joining postclaval submarginal line; Ovipositor adapted for piercing. Two metatibial lateral spines.

Size small.

Distribution: Oriental Region.

Key to species

1. Tegmen with 2 submarginal lines; black spot at apex of clavus. ..... 26.1. *baramia* (Distant)
-- Tegment with 1 submarginal line; without black spot at apex of clavus. ..2
2. Discal veins strongly reticulate basad of submarginal line, wale absent; costal margin narrowly red. ..... 26.2. *ticula* Medler, sp. nov.
-- Discal veins basad of submarginal line straight, aligned with terminals in submarginal area, cells elongate, wale present; costal margin not thinly red. 3
3. Precostal margin black. ..... 26.3. *bukitara* Medler, sp. nov.
-- Precostal margin not black. ..... 26.4. *exsarola* Medler, sp. Nov.

26.1. *Melicharia baramia* (Distant)

Ormenis (?) baramia Distant, 1910b: 322, pl 22, fig. 12; Medler, 1990: 166 (type). Holotype: ♀ [anal plate missing], Northwest Borneo [Sarawak], Baram, BMNH.

Melicharia baramia: Melichar, 1923: 71 (combined); Metcalf, 1957: 321 (catalog).

Diagnosis: Frons about as long as wide, median longitudinal carina faint, in profile frons convex, ending dorsally at intergenal carina at anterior mar-

gin of pronotum; vertex concealed by pronotum except triangular remnants adjacent to eyes. Pronotum postocular eminence conical. Tegmen about twice longer than broad, apical margin convex, costal and sutural angles with similar configuration; two submarginal lines, outer connected with C, inner reaching apex of clavus, about 17 terminal veins in inner submarginal area, about 25 terminals reaching margin of apical submarginal area, only 4 terminals forked. Three longitudinal veins (R, S, M) arising from basal stem, veins S and M forking at same distance from basal stem, S with 3, M with 4 branches, Cu once forked. Head, pronotum and mesonotum virescent, tegmina pale greenish, costal and sutural margins pale stramineous, a fuscous spot at apex of clavus. Length, 8.5 mm, hind leg spine formula, 2:6:7.

Taxonomic note: Tegmen illustrated by Distant (1910b, Fig. 12) shows 2 submarginal lines and black spot at apex of clavus that characterize the species. This taxon is not closely related to other species of *Melicharia* in Borneo that have one submarginal line, but further disposition requires knowledge of the male genitalia.

Known only from the holotype.

26.2. *Melicharia ticula* Medler, sp. nov.

Diagnosis: Morphological characters conform with generic diagnosis. Strong median longitudinal carina extending full length of frons. Head, pro- and mesonotum green stramineous, tegmina green, precostal, apical and postclaval margins narrowly red, precostal margin with ivory white band between red margin and green tegmen. Veins strongly outlined, heavily reticulated basad of submarginal line; wale absent; vein S displaced against M and obscured basally by pustules.

The 3 females are in relatively poor condition, having been in liquid preservative before pinning. In 2 specimens the orange color of the veins and thin red costal margin have been accentuated, but 1 specimen is bleached. Holotype genitalia are illustrated (Fig. 16).

Measurements: ♂ holotype, ♀ allotype. Length: Overall 9.0, 9.0; v 0.17, 0.33; f 1.00, 1.00; p 0.42, 0.42; m 1.66, 1.49; t 7.30, 7.30; pcl 1.99, 2.32. Width: v 0.91, 0.83; f 1.00, 1.00; t 3.65, 3.32. Hind leg spine formula: 2:6:5, 2:6:6.

Holotype: ♂, BRITISH N. BORNEO: Mt. Kinabalu, Tenompah, 2.xi.1958, Faunula of Bamboo Hut, Lot #5, T. C. Maa, BPBM. *Allotype:* ♀, *paratypes:* 2♀, BORNEO: SARAWAK: Mt. Murud top, Dr. E. Mjoberg, Kalabit Exp., [1924-333], BMNH.

26.3. *Melicharia bukitara* Medler, sp. nov.

Diagnosis: Morphological characters as given for genus. Frons of holotype with strong full length median carina. Submarginal line delimiting apical area same width as precostal margin. Terminal veins not raised, giving finely corrugated appearance to apical margin; veins across disc strongly reticu-

lated, wale present. Overall color fuscous from above, clypeus, legs, and ventral aspect pale testaceous; tegmina light fuscous, corium translucent, costal margin and clavus opaque dark fuscous. Holotype genitalia are illustrated (Fig. 77). Allotype light brown, tegmen bronzelike, frons and dorsum testaceous, mesonotum with dark brown median band, costal margin and clavus darker brown than rest of tegmen. Tegmen of ♀ slightly wider than ♂ but with same texture of membrane and vein corrugation, wale weakly developed. Valvulae III elongated, tapered apically, apico- ventral margin with small teeth and fine setae.

Measurements: ♂ holotype, ♀ allotype. Length: Overall 8.0, 8.5; v 0.25, 0.25; f 0.91, 1.00; p 0.33, 0.33; m 1.49, 1.66; t 6.31, 6.64; pcl 2.32, 1.99. Width: v 0.75, 0.75; f 0.87, 0.87; t 2.82, 3.32. Hind leg spine formula: 2:6:6, 2:6:7.

Holotype: ♂, BORNEO: Butik [Bukit] Raja, über 2200 m, 15-20.xii.1924, ZMUH. *Allotype:* ♀, BRUNEI: Bukit Retak, 1440 m, S.L. Sutton [1980-73], BMNH.

26.4. *Melicharia exsarola* Medler, sp. nov.

Diagnosis: Tegmen submarginal line well defined, delimiting relatively narrow apical marginal area equal in width to precostal margin, wale arising from near R+C junction, no crease extending from claval apex; 3 longitudinal veins (R,S,M) arising from basal stem, densely multibranched apically, the terminal branches elongate, only slightly raised above surface of membrane, giving densely striate appearance. Valvulae III apex convex, small teeth on margin interspersed with hairlike setae. Holotype genitalia are illustrated (Fig. 78).

Color is variable and unreliable for determinations.

Characters of the male genitalia should be relied upon for accurate determination especially when stramineous specimens are strongly faded.

Measurements: ♂ holotype, ♀ allotype. Length: Overall 8.5, 9.5; v 0.17, 0.25; f 1.00, 1.00; p 0.42, 0.42; m 1.66, 1.83; t 6.81, 7.80; pcl 1.83, 2.49. Width: v 0.83, 0.83; f 1.08, 1.08; t 3.32, 3.49. Hind leg spine formula: both 2:6:6.

Holotype: ♂, BRITISH N. BORNEO [SABAH]: Tenompok, 15.ii.1959, T.C. Maa; *Allotype:* ♀, British N. Borneo: Tenompok, 1460 m, Jesselton, 30 mi E, 10-19.ii.1959, T.C.Maa, BPBM. *Paratypes:* ♀, same label as holotype, 10-14.ii.1959; ♀, same label as allotype, 2♀, 26-31.i.1959; ♀, Mt. Kinabalu, Kam-baranga, 2140 m, 22-30.x.1958, L.W. Quate; BPBM. SARAWAK: ♂, Mt. Dulit, 4000 ft (1219 m], moss forest, 25.x.1932; ♂, same label, except 14.x.1932; det. *Idume plicata* Lallemand, ISNB. ♂, SARAWAK: Gunong Mulu Nat Park, Site 14, Camp 2.5 Mulu, 1000 m, 413461, J.D. Holloway, RGS Mulu Exped. [BM 1978-206]; 2 ♂ 2 ♀, N. Borneo: Mt. Kinabalu, Mesilau Cave, 6,200 ft (1890m), 6-7.iv.1964, S. Kueh, Royal Soc. Exped. [BM

1964-250]; ♂, Sarawak: Mt. Dulit, 4000 ft (1219 m), moss forest, 25.x.1932, Hobby & Moore, Oxford Univ Exp [BM 1933-254], BMNH.

27. *Flatomorpha* Melichar

Flatomorpha Melichar, 1902: 28; Metcalf, 1957: 275 (catalog). Type species: *Flatomorpha inclusa* Melichar.

Diagnosis: Frons convex, lateral margin carinate and raised above disc, median carina 1/2 length, dorso-posterior margin of frons limited by slightly convex intergenal carina; vertex concealed by anterior margin of pronotum; obscure median carina on pro- and mesonotum; lateral carina of pronotum curved ventrally to reach ventral plane of eye, no postocular eminence. Tegmen of *inclusa* lectotype ♂ illustrated (Fig. 64). Veins R, S, M arising from basal stem, origin of veins S and M obscured by pustules, S vein forked twice, the second fork on branch S2, vein Cu forked, the branches joining submarginal vein of postclaval margin; tegmen apical margin evenly convex, submarginal line strong, apical submarginal area about twice wider than precostal marginal area (1:.06), terminal veins without forks between submarginal line and diagonal crease arising at apex of clavus. Ovipositor adapted for piercing. Two metatibial lateral spines. Size small.

Distribution: Oriental Region.

27.1. *Flatomorpha robusta* Medler, sp. nov.

Diagnosis: Morphological characters as given for genus. In dorsal view, frons slightly longer than pronotum, lateral dark brown fasciae tapering nearly full length of frons, dark brown stripe along median carina; median dark brown band extending from pronotum to apex of mesonotum. Markings of head and thorax are illustrated (Fig. 48a, 48b). Body stramineous, overall appearance of tegmina mottled brown, longitudinal fuscous bands and patches interspersed with dull ivory color of membrane, precostal margin and sutural margin dark brown. Valvulae III margin with 3 ventral, 2 dorsal well separated teeth.

Measurements: Holotype ♀. Length: Overall 11.0; v 0.37; f 1.33; p 0.42; m 2.16; t 9.30; pcl 2.16. Width: v 0.91; f 1.25; t 5.31. Hind leg spine formula: 2:6:5.

Holotype: ♀, BRITISH N. BORNEO [SABAH]: Sandakan Bay (SW), Sapagaya Lumber Camp, 2-20 m, 5.x.1957, Gressitt, BPBM.

Taxonomic note: Flatomorpha Melichar is closely related to *Anaya* Distant (1906). The type species of *Anaya* is *Flatoides mesochlorus* Walker, which is represented by the holotype ♀, BMNH. The genus was originally described as having tegmina with two submarginal lines. The type specimen actually has one submarginal line and a secondary crease, such as here illustrated for *F. inclusa* (Fig. 64).

A revisionary study of *Anaya*, *Flatomorpha*, and other ormenislike genera is necessary for disposition of the many named and unnamed species that are known to exist in the Oriental Region.

28. Genus *Seliza* Stål

Seliza Stål, 1862b: 303; Metcalf, 1957: 404 (catalog); Medler, 1991a: 31 (Sulawesi). Type species: *Poeciloptera vidua* Stål.

Diagnosis: Color variable from light brown to very dark brown. Head conical or obtuse, posterior margin delimited by intergenal transverse carina, distad of which there is a narrow segment of displaced vertex largely concealed by anterior margin of pronotum. Pronotum lateral margin of disc thickened, but without carinate extension latero-ventrally, postocular eminence strongly conical, no median longitudinal carina on pro-and mesonotum. Tegmen illustrated (Fig. 69), claval vein A2 raised basally, heavily pustulate, smooth area in center of clavus between veins A1 and A2, Y-stem thickened and raised, postclaval sutural margin strongly convex, apical margin slightly concave between convex costal and sutural angles with similar configuration; submarginal line running from R+C stem on costal margin to claval apex; 3 longitudinal veins, R, S, M, vein R crossing strongly raised bulla, without fork, veins S and M once forked about same distance from base, vein Cu forked, both branches joining postclaval submarginal line at claval apex. Ovipositor fitted for piercing. 2 metatibial lateral spines.

Size small, length less than 10 mm.

Distribution: Oriental Region.

Key to species

1. Head conical, apex with strong median carina on frons.....2
-- Head nearly truncate, weak median carina on frons. .....28.3. *variata* Melichar
2. Head longer, acutely produced; apical ventral process of aedeagus elongate, reaching pygofer; margin of female segment VII not notched. .....28.1. *vidua* (Stål)
-- Head shorter, obtusely produced; apical ventral process of aedeagus short, extending no more than halfway to pygofer; female segment VII with strong median notch. .....28.2. *intera* Medler, sp. nov.

28.1. *Seliza vidua* (Stål)

Poeciloptera vidua Stål, 1854: 248; Medler, 1986d: 336 (type). Holotype: ♀, Malaysia, Malacca, NHRS. Plesiotype: ♂, Brunei, Bukit Retak, BMNH.

Seliza vidua: Stål, 1862b: 312 (combined); Melichar, 1902: 137 pl 7, fig. 11; Lallemand 1939: 75 (Sarawak, Mt. Dulit); Metcalf, 1957: 410 (catalog); Medler, 1991a: 31, (plesiotype).

Diagnosis: Easily recognized by conical shape of head as illustrated (Fig. 51). Head, pronotum and base of tegmen olivaceous, mesonotum reddish brown; tegmen characteristic shape as illustrated (Fig. 69); color dark fuscous

except basally and along median length of precostal margin, very dark brown round spot nearly filling space in cell M between forks of veins M and Cu, second brown spot at base of branch M1 may or may not be distinct, dark brown smooth area in clavus apicad of basal pustules. Extent and shades of brown color variable, but overall dark brown appearance generally prevails. Genitalia of a specimen from Sandakan in the BPBM are illustrated (Fig. 33). Characters are the same as plesiotype from Bukit Retak in the BMNH.

Measurements: ♂, Sandakan. Length: overall 7.00; v 0.50; f 1.08; p 0.42; m 1.49; t 5.31; pcl 1.66. - Width: v 0.66; f 0.83; t 2.16. Hind leg spine formula: 2:7:8.

Specimens examined: BRUNEI: Plesiotype ♂, Bukit Retak, 1440 m, Sutton, BMNH. SABAH: 3♂, 2♀, Keningan, 12-17.i.1959, Maa; ♂, Liawan, 14 - 19.i.1959, Maa; (no abdomen), Ranau, 500 m, 28.ix - 7.x.1958, Quate; ♂, Sandakan hotel, 50 m, 25.x.1957, Gressitt; ♂, Sandakan, i.1927, Pemberton; ♀, Tawau, Quoin Hill, 3-7.vii.1962, Holtmann; BPBM; ♂, Mt. Kinabalu, Kiau, 3000 ft, 2.v.1929 (ex F.M.S. Mus, BM 1955-354); ♂, Tawau, Agric Sta., ex cocoa, 5.v.1965, Tay, *vidua* det. Ghauri (BM-1966-3); BMNH; ♀, Sandakan, Baker, USNM. SARAWAK: (no abdomen), Kuching, Santubong, 797-1500 m, 18-30.vi.1958, Maa; ♀, Matang, 450-894 m, 15.ix.1958, Gressitt & Maa; ♀, Sadong Kampong, Tapuh, 300-450 m, 4-9.vii.1958, Maa; BPBM; ♀, foot of Mt. Dulit, Jct rivers Tinjar & Lejok, 3.x.1932, light trap, Oxford Univ Exped, *vidua* det. Lallemand (BM 1933-254); BMNH.

28.2. *Seliza intera* Medler, sp. nov.

Diagnosis: Close similarity to *vidua* in brown coloration, basal spots in tegmen and smooth dark brown area in apical half of clavus. Distinguished by short triangular shape of head (Fig. 49), characters of the male genitalia (Fig. 35) and small median notch on margin of allotype segment VII (Fig. 39).

Measurements: Holotype ♂, allotype ♀. Length: overall 7.50, 8.00; v 0.42, 0.37; f 1.00, 1.08; p 0.42, 0.42; m 1.49, 1.83; t 5.31, 6.14; pcl 1.49, 1.66. - Width: v 0.71, 0.79; f 0.95, 0.95; t 1.99, 2.82. Hind leg spine formula: 2:7:7, 2:7:6.

Holotype: ♂, SABAH [BRITISH N BORNEO]: Tawau, Quoin Hill, Cocoa Res Sta., light trap, 3.ix.1962, Y. Hirashima, BPBM. *Allotype:* ♀, SARAWAK: 1907-1909, C.J. Brooks, (BM 1936-681), BMNH. *Paratype:* ♀, Sarawak: Foot of Mt. Dulit, Jct rivers Tinjar & Lejok, light trap 5, 25.ix.1932, Oxford Univ. Exped, *Seliza* sp det Lallemand, (BM 1933-254), BMNH.

28.3. *Seliza variata* Melichar

Seliza variata Melichar, 1902: 137, pl 7, fig. 8; Lallemand, 1939: 75 (Sarawak, Mt. Dulit); Medler, 1986h: 336 (type). Holotype: ♀, Java, NHRS Plesiotype: ♂, Sarawak, Mt Dulit, BMNH, here designated.

Diagnosis: Closely related to *vidua* in size, shape, and coloration, but with truncated head, as illustrated (Fig. 50). The male genitalia differ from *vidua* principally in shape of segment IX, which lacks the basal projection, and by presence of small spurlike protuberance on ventral margin of the aedeagus. Plesiotype ♂ genitalia are illustrated (Fig. 34).

Measurements: ♂ plesiotype. Sarawak. Length: overall 8.00; v 0.25; f 1.08; p 0.42; m 1.58; t 5.96; pcl 1.49. - Width: v 0.75; f 1.00; t 2.82. Hind leg spine formula: 2:6:6.

Specimens examined: BORNEO: ♂, Muller, RMNH. SARAWAK: ♂, foot of Mt. Dulit, junction of rivers Tinjar & Lejok, 8.x.1932, light trap, 60 ft, Oxford Univ. Exped., *Seliza variata* det Lallemand, (BM 1933-254), BMNH.

29. Genus *Paraflatoptera* Lallemand

Paraflatoptera Lallemand, 1939: 74; Metcalf, 1957: 383 (catalog). Type species: *Paraflatoptera transversa* Lallemand.

Microliza Medler, 1991a: 32. Type species: *Microliza epicis* Medler. **New syn.**

Diagnosis: Frons convex, dorsum narrowly rounded, posterior margin delimited by intergenal transverse carina; displaced vertex reduced to narrow strip at anterior margin of pronotum. Pronotum disc flat, lateral margin carinate, strongly upturned, postocular eminence conical, mesonotum disc flat, lateral carinae well developed. Tegmen apical margin convex, costal and sutural angles with similar configuration, submarginal line present, 2 longitudinal veins, R+S and M, vein Cu forked, both branches joining submarginal line of postclaval sutural margin. Ovipositor fitted for piercing. One metatibial lateral spine. Size small.

Distribution: Borneo, Sulawesi, Philippine Islands.

Taxonomic note: Genitalia of new material from Borneo showed that specimens of *Flatoptera* and *Microliza* were congeneric. Species of the junior synonym are here transferred to *Paraflatoptera*, necessitating the following **new combinations**: *P. calixis* (Medler), *P. desiris* (Medler), *P. epicis* (Medler).

29.1. *Paraflatoptera transversa* Lallemand

Paraflatoptera transversa Lallemand, 1939: 74. Holotype: ♀, Sarawak, Mt. Dulit, BMNH. Plesiotype: ♂, Brunei, Kuala Belalong, BMNH, here designated.

Diagnosis: Color predominantly yellow, pronotum laterally and mesonotum dark brown; tegmen with large triangular brown spot extending from middle part of precostal margin, smaller triangular brown spot originating at claval suture, the two spots connected by narrow brown band on disc, apical margin smoky brown with about 12 white spots spaced in submargin, also

about 12 small white pustular spots scattered in discal crossband. The plesiotype genitalia are illustrated (Fig. 24).

Measurements: ♂ plesiotype, ♀ holotype. Length: overall 7.50, 9.00; v 0.37, 0.33; f 0.83, 0.83; p 0.50, 0.50; m 1.49, 1.99; t 6.47, 7.47; pcl 1.66, 1.99. - Width: v 0.58, 0.71; f 0.91, 1.00; t 3.49, 3.82. Hind leg spine formula: 1:5:6, 1:5:5.

Specimens examined: BRUNEI: ♂, Temburong Dist., Kuala Belalong, 300 m, x.1992, Martin (BM 1992-172), BMNH. SARAWAK: Holotype ♀, Mt. Dulit, 4000 ft, moss forest, light trap, 28.x.1932, Hobby & Moore (BM 1933-254), BMNH.

29.2. *Paraflatoptera calixis* (Medler), comb. nov.

Microliza calixis (Medler), 1991a: 33, fig. 30. Holotype: ♀, Kalimantan Timur, Mahakkam, RMNH.

Diagnosis: This species differs from *transversa* in having brown and ivory white markings on tegmina. Head and mesothorax brown, pronotum brown laterally. Tegmen with brown hourglass-like band crossing disc, 5 rectangular brown spots alternating with white spots in submarginal area, small white pustular spots scattered in precostal margin and apical part of clavus. Valvulae III with 4 uniformly small teeth on apical margin. Hind leg spine formula 1:5:6, length 8.5 mm.

Specimens examined: Known only from the holotype.

30. Genus *Atracis* Stål

Atracis Stål, 1866: 237; Medler, 1988: 18 (revised); Medler, 1991a: 24 (Sulawesi, key). Type species: *Flata pyralis* Guérin-Méneville.

Uxantis, Stål, 1870: 775 (subgenus); Metcalf, 1957: 466 (catalog). Type species: *Atracis consputa* Stål.

Diagnosis: Frons convex, lateral margins raised, frons and vertex separated by definable margin consisting of dorsal U-carina of frons and intergenal transverse carina, the two carinae interconnected medially (Fig. 53); vertex disc depressed posterior to anterior margin; genae in front of eyes marked with black dashlike fasciae characteristic of all species in the genus. Dorsum of pronotum nearly flat, lateral margin carinate anteriorly, this carina extended ventrally on side of pronotum and disappearing before reaching conical postocular eminence; mesonotum slightly humped anteriorly. Tegmen apical margin oblong convex, veins R+S and M arising from basal stem, bulla elevated, often pustulate, veins C+R stem convex, submarginal cross veins indistinct, irregular; vein Cu without fork, bypassing claval apex, terminating at apical margin; claval suture terminating at broad apex of clavus, no submarginal line of postclaval cross veins arising from wide claval apex. Ovipositor derived, valvulae modified, without distinct teeth, anal segment ovate, very large. One metatibial lateral spine. Size medium to small.

Distribution: Oriental Region.

Key to species

1. Overall appearance red, this coloration imparted largely by pigmentation of veins and numerous tiny dots dispersed on pronotum and membrane of tegmina.....30.1. *reversa* (Melichar)
-- Overall appearance dark brown, this coloration imparted by pigmentation of numerous tiny dots dispersed on pronotum and membrane of tegmina, and saddlelike concentration of veins and crossveins. ..... 30.2. *taenia* (Schmidt)

30.1. *Atracis reversa* (Melichar)

Uxantis reversa Melichar, 1902: 164, pl 7, fig. 21; Lallemand, 1939: 75 (Sarawak, Mt. Dulit); Medler, 1986c: 115 (type). Lectotype: ♀, Singapore, Biro, HNHM.

Atracis reversa: Medler, 1988: 18 (combination); Medler, 1993: 41, fig. 10 (plesiotype). Plesiotype: ♂, Sumatra, Montes Battak, HNHM.

Diagnosis: Dorsum of head wider than long, frons forming slightly concave rounded anterior margin, separated from vertex by intergenal transverse carina. Dorsal view of head and thorax illustrated (Fig. 53) to supplement habitus figure of Melichar (1902, Fig. 21). Tegmina with network of red veins and crossveins interspersed with numerous small red dots; transverse saddle marking not developed; apex of tegmen convex, only slightly rolled from costal margin. A male specimen was not available for comparative study of genital characters relative to plesiotype from Sumatra illustrated by Medler (1993e, Fig. 10). Length: 10.5-11.5 mm. Spines: 1:5:6.

Specimens examined: SABAH: ♀, Bettotan, nr Sandakan, 28.vii.1927; ♀, Kudat, 6.ix.1927, C.B.K. & H.M.P., FMS, [BM 1955-354], BMNH; ♀, Sandakan Bay (SW), Sapagaya Lumber Camp, 2-20 m, 2.xi.1957, *Calamus* [*Daemonorops*], Gressitt, BPBM. SARAWAK: ♀, Kampong Pueh, Lundu District, 690-1500 m, 6-12.vi.1958, Maa, MB 65, BPBM: 2♀, Gunong Mulu, Foot of Mt. Dulit, 1.ix.1932, 4.x.1932, *Uxantis reversa* det Lallemand, BMNH.

30.2. *Atracis taenia* (Schmidt)

Uxantis taenia Schmidt, 1904a: 206; Metcalf, 1957: 470 (catalog); Medler, 1995, in press (type). Holotype: ♀, Sumatra, Soekaranda, ZMPA. Plesiotype: ♂, Brunei, Kuala Belalong, Martin, BMNH, here designated.

Atracis taenia: Medler, 1988: 18 (combination).

Diagnosis: Dorsal margin of frons with median carina, pronotum strongly pustulate, postocular eminence conical. Tegmen precostal margin basally with short median line of crossveins, apical margin parabolic, strongly rolled inward from costal margin; dark brown and black veins and minute reddish brown dots of tegmen along with saddlelike black markings from bulla to costal margin and zigzag wide band from claval suture to bulla gives the species a much darker appearance than closely related *reversa*.

Genitalia of plesiotype ♂ are illustrated (Fig. 74).

Measurements: ♂ plesiotype, ♀ Sarawak. Length: overall 10.0, 12.0; v 0.25, 0.33; f 1.16, 1.49: p 0.58, 0.66; m 1.83, 1.99; t 8.30, 10.79; pcl 2.66, 2.82. Width: v 0.79, 0.33; f 1.04, 1.20; t 3.65, 3.32. Hind leg spine formula: 1:5:6, 1:5:9.

Specimens examined: BRUNEI: Plesiotype ♂, Temburong District, ridge NE of Kuala Belalong, 300m, x.1992, Martin, [BM 1992-172], BMNH. SARAWAK: 2 ♀, Gunong Mulu Natl. Park, Site 5, Camp 4, Mulu, 1780 m. i.1978, Holloway [BM 1978-206]; INDONESIA: ♀, holotype, Sumatra, Soekaranda, i.1894, Dohrn, ZMPA.

31. Genus *Cerfennia* Stål

Cerfennia Stål, 1870: 774 (subgenus); Metcalf, 1957: 473 (catalog). Type species: *Flatoides (Cerfennia) philippinus* Stål.

Rabocha Melichar, 1923:109; Metcalf, 1957: 473. Type species: *Flatoides philippinus* Stål.

Diagnosis: Frons and vertex clearly separated along anterior margin by transverse intergenal carina, frons elongated, mostly flat, slightly convex at dorsal apex; vertex anteriorly convex; usually longer than wide, disc depressed, surface irregular, anterior margin thick, median longitudinal suture sulcate anteriorly; dorsal margin of eye close to dorsal margin of gena; pronotum disc irregular, anterior margin thick, in lateral view its surface below plane of mesonotum, extent of hump variable; postocular eminence absent, anterior margin of pleural lobe thin. Tegmen costal margin undulate; veins R+S,M rising from basal stem, bulla raised, often pustulate; apical margin convex, submarginal line of cross veins extending from C+R stem to apex of clavus; vein Cu not forked, terminus joining submarginal vein of postclaval sutural margin; vein A1 slightly raised basally, vein A2 strongly looped, connected to A1 along sutural margin by short and thickened cross veins, Y-stem of clavus strongly thickened, apex of clavus as wide as postclaval submarginal area. Valvulae III elongate, bowed, apex narrowed, bearing few large teeth. One post-tibial lateral spine. Size medium.

Distribution: Oriental Region.

Key to species

1. Head short, about as long as wide (1:1.1). ..... 31.1. *variegata* (Lallemand)
-- Head longer than wide. 2
2. Pro-mesonotum upraised by moderate to strong hump. 3
-- Pro-mesonotum not humped, dorsum plane flat..... 31.2. *scripta* (Melichar)
3. Mesonotum with cruciform marking, lateral carinae weak. ..... 31.3. *vetusta* (Walker)
-- Mesonotum without cruciform markings, lateral carinae strong, connecting Y-shaped with anterior median carina. ....31.4. *tabida* (Gerstaecker)

31.1. *Cerfennia variegata* (Lallemand), comb. nov.

Atracis variegata Lallemand, 1939: 76; Synave, 1980: 15 (type); Medler, 1987c: 40 (type). Lectotype: ♀, Sarawak, Mt. Dulit, 4000 ft., moss forest, light traps, 25.x.1932, Hobby & Moore. Paralectotype: ♀, same labels as lectotype, 24.x.1932, [BM 1933-254], BPBM. Paralectotype: ♀, ISNB; here designated.

Ståliana variegata: Medler, 1988: 18 (combination).

Diagnosis: Head short, length and width about equal; pro- and mesonotum moderately humped; Anal vein 1 with 2-3 loops connecting to vein A-2; apex of clavus moderately thickened.

Specimen examined: SABAH [North Borneo (SE)]: ♀, Kalabakan, 19 km N, 60 M, 23.X.1962, Hirashima, BPBM.

31.2. *Cerfennia scripta* (Melichar), comb. nov.

Atracis scripta Melichar, 1902: 188, pl 8, fig. 18; Lallemand, 1939: 75 (Sarawak); Holotype: ♀, Borneo, MMBC. Plesiotype: ♂, Borneo, Muller, ZMUA, here designated.

Ståliana scripta: Medler, 1988: 18 (combination).

Diagnosis: Head conical, frons widening from clypeal margin; vertex with full length median sulcus; pronotum and mesonotum on same plane, no hump; no postocular eminence, antero-ventral margin paper thin, uprolled; lateral carinae of mesonotum thick, discal area between depressed; vein A 1 with 2-3 loops, connected to vein A 2 by thick crossveins, Y-stem thickened, apex of clavus blunt. Strong black fasciate marking extending from middle of mesonotum to anterior margin, pronotum without marks on lateral margins. Width of dark brown transverse markings crossing bulla or basal part of tegmina variable, or absent.

Measurements: ♂ plesiotype, ♀ ZMUA. Length: overall 15.5, 16.0; v 1.00, 1.00; f 1.83, 1.83: p 0.87, 0.83; m 2.32, 2.49; t 12.28, 12.95; pcl 2.16, 2.16. Width: v 0.91, 0.83; f 1.49, 1.33; t 5.81, 4.98. Hind leg spine formula: 1:6:8, 1:6:8.

Specimens examined: BORNEO: ♀, holotype, MMBC; KALIMANTAN: ♂, plesiotype, Borneo, Muller; SABAH: ♀, Sungai Darling, 60 km W Sandakan, 26.xi.1989, M & J Duffels, ZMUA; SARAWAK: 3♀, Foot of Mt. Dulit, det. Lallemand, 1937 [BM 1932-254] BMNH.

31.3. *Cerfennia vetusta* (Walker), comb. nov.

Eurybrachys vetusta Walker, 1857b: 156; Medler, 1990: 164 (type). Lectotype: ♂, Sarawak, Wallace, BMNH.

Elidiptera puncticeps Walker, 1858b: 73; Medler, 1990: 156 (type). Holotype: ♂, Sarawak, Wallace, BMNH. **New syn.**

Atracis vetusta: Distant, 1910b: 336 (combination); Metcalf, 1957: 496 (catalog).

Atracis puncticeps: Distant, 1910b: 336 (combination); Metcalf, 1957: 493 (catalog).

Ståliana vetusta: Medler, 1988: 18 (combination).

Ståliana puncticeps: Medler, 1988: 18 (combination).

Diagnosis: Vertex obtusely conical, anterior margin formed by intergenal transverse carina, entire length of vertex with median longitudinal suture that becomes sulcate anteriorly forming deep notch at apex; frons with sharp median carina on dorsal half. Pronotum postocular eminence absent, anteroventral margin paper thin, rolled upwards; mesonotum moderately humped anteriorly, dorsum depressed, disc bordered anteriorly and laterally by thick carinae, median longitudinal carina absent on anterior sloping margin, present on dorsum, dark brown cruciate fasciae along carinae. Tegmen overall color olivaceous, minute spots and mottling of darker brown scattered at random, noticeably concentrated at junction of R+S veins, apex of clavus, short connections between zigzag vein A 1 and straight veins 2 along sutural margin of clavus; transverse dark brown band may or may not extend across bulla; vein A 1 distinctly looped, connected to vein A 2 by thickened crossveins, apex of clavus blunt, Y-stem strongly elevated and thickened. Centering at bulla, vein R elevated ridgelike above plane of vein C and wide precostal margin.

Measurements: ♂, holotype, *puncticeps*. Length: overall 18.0; v 1.16; f 2.49; p 1.00; m 3.15; t 13.78; pcl 2.66. Width: v 0.91; f 1.66; t 6.31. Hind leg spine formula: 1:6:7.

Note: The ♂ lectotype of *vetusta* was damaged, with head and prothorax lost and colors faded; therefore the ♂ holotype of *puncticeps* was used for measurements and illustration of head and genital characters.

Specimen examined: BRUNEI: ♂, Ulu Temburong, 1000 ft [305 m], LP 298, 19-22.ii.1982, Robinson, (BM 1982-156); SARAWAK: lectotype ♂, Wallace; holotype ♂, *puncticeps*, Wallace, BMNH.

31.4. *Cerfennia tabida* (Gerstaecker), comb. nov.

Atracis tabida Gerstaecker, 1895: 34; Melichar, 1902: 191 (Borneo); Metcalf, 1957: 496 (catalog). Holotype: ♀, Sumatra, Frühstorfer, II 27387, EMAU. Plesiotype: ♂, Brunei, Kuala Belalong, Martin, BMNH.
Ståliana tabida: Medler, 1988: 18 (combination).

Diagnosis: Overall color reddish brown; black markings laterally on pronotum apicad of tegulae, medially on convex anterior margin of mesonotum and extending Y-shaped along lateral carinae. Tegmen with wide black band along vein R; discal cells dark brown opposite strongly raised claval apex and post claval sutural margin. In lateral view, pro- and mesonotal hump prominent. Frons narrowed dorsally, bottle-shaped, median carina usually well developed. Males and females dimorphic in size and coloration, intensity and distribution of fuscous markings variable.

Genitalia of plesiotype ♂, from Brunei, Kuala Belalong (Fig. 3a, 3b) and holotype ♀, from Sumatra (Fig. 36) are illustrated.

Measurements: ♂ lectotype, ♀ paralectotype. Length: overall 13.0, 18.5; v 0.83, 1.08; f 1.83, 2.16: p 0.58, 0.91; m 2.66, 2.49; t 10.29, 14.28; pcl 2.32, 3.32. Width: v 0.75, 0.87; f 1.25, 1.49; t 3.65, 5.96. Hind leg spine formula: 1:6:7, 1:6:8.

Specimens examined: BRUNEI: ♂, Temburong District, Kuala Belalong, 300 m, x.1992, Martin, (BM 1992-172), BMNH; KALIMANTAN: ♀, Borneo, 1886, Baczes, *tabida* det Melichar, NHMW; ♀, Sambas, 1891, Borscha, RMNH. SARAWAK: ♀, Gunong Mulu Nat Park, Melinau Gorge, Site 22, 150 m, 421578, iv.1978, Holloway, RGS Mulu exped (BM 1978-206), BMNH.

32. Genus *Staliana* Medler

Atracis Metcalf, 1957: 478 (not Stål, 1866) (catalog).
Staliana Medler, 1988: 18 (new name for *Atracis* Auctorum, not Stål). Type species: *Elidiptera inaequalis* Walker

Diagnosis: Frons shallowly convex, lateral margin not raised, dorsal margin between frons and vertex carinate, vertex convex anteriorly, a transverse ridge adjacent to anterior margin of pronotum, median longitudinal suture with Y-division apically. Pronotum with median carina, anterior margin carinate, lateral margin thickened, no postocular eminence; mesonotum with very shallow longitudinal carinae. Tegmen elongate, costal margin undulate, irregular submarginal line, membrane surface very rough, irregular, veins R+S, M, vein R crossing pustulate bulla, vein Cu one forked, both branches entering postclaval submarginal line. Ovipositor fitted for piercing, valvulae III teeth often strong, arranged in single or double row. One metatibial lateral spine. Size medium.

Distribution: Oriental Region.

Key to species

1. Median longitudinal suture of vertex with weak Y-terminals positioned very close to apical margin of vertex. 3
-- Median longitudinal suture of vertex with strong Y-terminals not close to apex of vertex, nearly aligned with genal angles. 2
2. Frons with short median carina strongly protruding at apex; F valvulae III with very small teeth on margin. ..... 32.4. *surrecta* (Walker)
-- Frons without protruding median apical carina; F valvulae III with 5-6 large teeth on margin. ..... 32.5. *rivularis* (Distant)
3. Apical margin of vertex evenly convex, lateral margins slightly incurved at junction with anterior angles of genae. 4
-- Apical margin of vertex obtusely conical, lateral margins strongly concave at junction with genal angle. ..... 32.3. *obtecta* (Melichar)
4. Mesonotum with median longitudinal sulcus; fuscous color pattern in basal 1/3 of tegmen, when present. ..... 32.1. *inaequalis* (Walker)
-- Mesonotum without median longitudinal sulcus; fuscous color pattern in apical 1/3 of tegmen, when present. ..... 32.2. *intercepta* (Walker)

32.1. *Staliana inaequalis* (Walker)

Elidiptera inaequalis Walker, 1858b: 74; Medler, 1986h: 328 (type); Medler, 1990: 146, fig. 14 (type). Lectotype: ♂, Sarawak, Wallace, BMNH.

Elidiptera inaequalis var b Walker, 1858b: 74; Medler 1990: 146 (type). Syntype: ♀, Borneo, BMNH.

Atracis inaequalis: Stål, 1866: 250 (Sarawak); Melichar, 1902: 198 (Sarawak); Lallemand, 1939: 76 (Sarawak, Mt Dulit); Metcalf, 1957: 486 (catalog).

Staliana inaequalis: Medler, 1988: 18 (combination).

Diagnosis: Anterior margin of vertex conical, carinate rim formed by intergenal transverse carina, full length median longitudinal sulcus; frons conical dorsally, triangular on each side of apex laterally, short thick median carina. Pro- and mesonotum forming dorsal hump anteriorly, disc of mesonotum flat, weak median posterior sulcus, lateral margins of disc delimited by lateral carinae. Tegmen with large pustules on bulla and basally in clavus along slightly raised vein A2; costal margin undulate, vein R elevated above vein C, the area between strongly angled from precostal margin, R+C stem entering apical submarginal line that terminates at wide claval apex; two longitudinal veins, R+S, M, arising from basal stem, vein segments crossing bulla much darker brown than fuscous veins and crossveins. Ventral and apical margins of valvulae III armed with about 6 strong black teeth. Lectotype genitalia illustrated (Fig. 25): aedeagus tripartite, components consisting of elongate ventral keel and tubular channel enclosing inner shaft bearing apical spinelike process directed ventrally.

Measurements: ♂ lectotype, ♀ paralectotype. Length: overall 12.0, 12.5; v 0.83, 1.00; f 1.87, 1.49: p 0.66, 0.54; m 2.49, 1.99; t 9.96, 9.50; pcl 2.82, 2.00. Width: v 0.91, 0.83; f 1.16, 1.08; t 4.65, 4.50. Hind leg spine formula: 1:6:7, 1:5:7.

Specimens examined: SARAWAK: paralectotype ♀, 148, Stevens, det Melichar (1902:198), NHRS; lectotype ♂, Wallace; ♂, 1910-16, Lewis, det. Izzard 1938; ♂, ♀, Mt. Dulit, 4000 ft [1219 m], 26.ix-2.x.1932, Hobby & Moore, Oxford Univ. Exped. [BM 1933-254], det. Izzard 1938; 2♀, Gunong Mulu Nat Park, Site 25, April, G. Api, 900 m, 427550, lower montane forest, Holloway, RGS Mulu Exped, [BM 1978-206], BMNH.

32.2. *Staliana intercepta* (Walker)

Eurybrachys intercepta Walker, 1857b: 156; Medler, 1990: 148 (type). Lectotype, (abdomen lost), Sarawak, Wallace, BMNH. Plesiotype: ♂, Sabah, Kalabakan, BPBM here designated.

Atracis intercepta: Distant, 1910b: 336, pl 22, fig. 15; Metcalf, 1957: 488 (catalog).

Staliana intercepta: Medler, 1988: 18 (combination).

Diagnosis: Frons shallowly conical dorsally, bordering triangular area formed by lateral margin of gena and convex intergenal apical margin between frons and vertex. Median longitudinal suture of vertex forking near apex, anterior margin thinly carinate, disc depressed medially, posterior margin with thick raised transverse carina extending between carinate lat-

eral margins above eyes; pronotum lateral margins strongly carinate, no postocular eminence, antero-ventral margin thin, upcurled. Tegmen with about six large pustules at junction of R+S veins, similar large pustules aligned basally along vein A2, apex of tegmen parabolic, discal area veins strongly reticulated, submarginal crossveins in irregular line. Shape and markings of tegmen illustrated by Distant (1910b, Fig. 15). Overall color greenish testaceous, head and thorax brown, underparts of body stramineous; tegmen irregularly infuscated, as illustrated by Distant (1910b, Fig. 15). Genitalia of the plesiotype are illustrated (Fig. 26).

Measurements: ♂ plesiotype. Length: overall 13.0; v 1.00; f 1.74; p 0.58; m 2.16; t 10.13; pcl 1.00. Width: v 0.83; f 1.75; t 4.48. Hind leg spine formula: 1:5:7.

Specimens examined: SABAH: Plesiotype ♂, Kalabakan, primary forest, 10.xi.1958, Maa, BPBM. SARAWAK: lectotype (no abdomen), Wallace, BMNH.

32.3. *Staliana obtecta* (Melichar)

Atracis obtecta Melichar, 1902:1 89; Metcalf, 1957: 491 (catalog). Holotype: ♀, Borneo, MMBC. Plesiotype: ♂, Brunei, Kuala Belalong, Martin, BMNH, here designated.
Staliana obtecta: Medler, 1988: 18 (combination).

Diagnosis: Head obtusely conical, vertex length and basal width equal, margin between frons and vertex formed by intergenal carina, median anterior section of margin shallowly convex, the rim thinly carinate, fronto-lateral margins ridgelike, concave from apical angles of genae; median longitudinal carina of vertex with Y-division apically, branches forming shallow groove along apical rim. Lateral carinae of pronotum and mesonotum and short segment of median longitudinal carina strongly black fasciate; abdomen and legs greenish. Tegmen with or without grayish waxy deposit, fuscous spots and lines variable, veins strongly outlined by brown flecks, clear space may or may not be present near C + R junction, stem outcurved in costal margin to originate Apical submarginal line. Valvulae III elongate, widest at base, dorsal margin straight, ventral margin curved, fitted apically with 4 teeth; anal segment small, circular, with shallow median notch. Genitalia of the plesiotype are illustrated (Fig. 72). Inner basal extension on anal segment is unique character of the species, length of apical ventral process variable.

Measurements: ♂ plesiotype. Length: overall 13.0; v 0.83; f 1.66; p 0.66; m 2.32; t 9.96; pcl 2.32. Width: v 0.83; f 1.25; t 4.32. Hind leg spine formula: 1:6:7.

Specimen examined: BORNEO: Holotype ♀, MMBC. BRUNEI: Plesiotype ♂, Temburong District, Kuala Belalong, 300 m, xi.1992, Martin, (BM 1992-172); SARAWAK: ♂, Doria, 1865, MCSN; ♂, Gunong Mulu Nat Park, Mulu, Camp 2.5, Site 14, 1000 m, 413461, ii.1978, Holloway, RGS Mulu exped (BM 1978-206), BMNH.

32.4. *Staliana surrecta* (Walker)

Eurybrachys surrecta Walker, 1857b: 156; Medler, 1990: 161 (type). Lectotype (abdomen lost): Sarawak, Wallace, BMNH. Plesiotype: ♂, Sarawak, Mt. Dulit, BMNH, here designated.

Atracis surrecta: Distant, 1910b: 336, pl 22, fig. 13 (type); Lallemand, 1939: 75 (Sarawak, Mt Dulit).

Atracis surrecta var a. Distant, 1910b: 336 (Sabah, Sandakan); Lallemand, 1939: 75 (Sarawak, Mt Dulit). Lectotype: ♂, Sabah, Sandakan, Pryer, BMNH.

Atracis maculipennis Lallemand, 1939: 76. Holotype: ♀, Sarawak, Foot of Mt. Dulit, Junction of Rivers Tinjar & Lejok, light trap, 7.x.1932, Hobby & Moore (BM 1933-254), BMNH. **New syn.**

Staliana maculipennis: Medler, 1988: 18 (combination).

Staliana surrecta: Medler, 1988: 18 (combination).

Diagnosis: Anterior margin of vertex convex, carinate, frons protruding medially due to short median carina, which is close to but not touching anterior carina of vertex derived from transverse intergenal carina. Head and thorax illustrated (Fig. 52a, 52b) showing median suture of vertex branching apically at plane of origin of transverse intergenal carina, apex depressed. Overall red brown body and tegmina, with or without conspicuous brown/black spot basally in clavus between suture and vein A1; segment of vein R+S crossing bulla very dark brown. Distinctive basal spot of tegmen illustrated by Distant (1910b, Fig. 13) may be absent. Valvulae III uniquely globular, margins without teeth, apex of anal segment v-shaped, snugly resting between dorsal margins of valvulae (Fig. 38). Genitalia of plesiotype and deeply concave apex of anal segment illustrated (Fig. 27a, 27b). The aedeagus greatly differs from congeners, lacking ventral or dorsal processes usually present in flatoid species.

Measurements: ♂ plesiotype. Length: overall 13.0; v 0.91; f 1.66; p 0.71; m 2.32; t 10.79; pcl 2.49. Width: v 0.83; f 0.91; 3.9800. Hind leg spine formula: 1:6:6.

Specimens examined: BRUNEI: ♀, Temburong District, ridge NE of Kuala Belalong, 300 m, x.1992, Martin, [BM 1992-172], BMNH. SABAH: ♀, Sandakan, 16-30.ix.1973, Pruett, [BM 1975-590], BMNH; ♀, Tawau, 26.ix.1962, Hirashima, BPBM. SARAWAK: 6♂, 4♀, Foot of Mt. Dulit, [BM 1978-206]; ♀, Gunong Mulu, Site 28 nr Long Pala, May, 50 m, 328428, Holloway, RGS Mulu Exped, [BM 1978-206], BMNH.

Taxonomic note: Two specimens of *surrecta* and 8 specimens of *surrecta* var a. recorded by Lallemand (1939: 75) from Mt. Dulit were examined. No differences were found in characters of the male genitalia between species and variety. Except for the large black spot at base of tegmen, the holotype of *maculipennis* also could not be distinguished from *surrecta*. The genitalia of a plesiotype ♂ of *surrecta*, lectotype ♂ of *surrecta* var a Distant, and plesiotype ♂ of *maculipennis* are conspecific.

32.5. *Staliana rivularis* (Distant)

Atracis rivularis Distant, 1910b: 336, pl 22, fig. 14; Metcalf, 1957: 494 (catalog); Medler, 1990: 179 (type). Holotype: ♀, Sarawak, Kuching, BMNH

Staliana rivularis, Medler, 1988: 18 (combination).

Diagnosis: Frons longer than wide, parallel margined, blunt median projection dorsally not as wide as genal margins, strong short median carina at apex; vertex apical margin produced medially, conical, not as wide as lateral margins, median sulcus from base of vertex dividing at plane of intergenal transverse carina, forming subapical depression; pronotum anterior margin carinate at corners; posterior margin sloping, mesonotum anteriorly with strong median hump. Overall color dark fuscous, mottled to varying extent by darker brown markings. Distinctive dark brown band across tegmen basally illustrated by Distant (1910b, Fig. 14). This band may be present or faded or scarcely discernible. Costal margin undulate, precostal margin very wide basally, narrowed at R+C to same width as apical submarginal area. Margin of valvulae III with 5-6 large black teeth.

Specimen examined. SARAWAK: Holotype ♀, Kuching; ♀, Mt. Murud, 6-7000 ft [1829-2134 m], Mjöberg, Kalabit Exped. [BM 1924-333]; ♀, Gunong Mulu Nat Park, Kerrangas, W. Melinau Gorge, 150 m, iii-iv.1978, Holloway, RGS Mulu Exped. [BM 1978-206], BMNH.

Taxonomic note: The following species previously placed in *Staliana* are reassigned, as follows:

S. conserta (Walker) - See *Ortracis conserta* (Walker).
S. puncticeps (Walker) - See *Cerfennia vetusta* (Walker).
S. scripta (Melichar) - See *Cerfennia scripta* (Melichar).
S. variegata (Lallemand) - See *Cerfennia variegata* (Lallemand).
S. vetusta (Walker) - See *Cerfennia vetusta* (Walker).
S. tabida (Gerstaecker) - See *Cerfennia tabida* (Gerstaecker).

33. *Ortracis* Medler, gen. nov.

Type species: Eurybrachys conserta Walker, here designated.

Diagnosis: Head longer than wide, median suture of vertex full length, deeply sulcate at apex; intergenal transverse carina convex, thickened, forming raised anterior margin. Frons wide basally, narrowed apically, sharp median elevated carina extending on dorsal half; pronotum apical margin convex, carinate, reaching halfway to mesonotum, shallow carinate medially, depressed apically, elevated posteriorly, without postocular eminence, anteroventral margin of pleural lobe carinate, without paperlike expansion; surface of mesonotum disc uneven, not raised humplike. Tegmen narrow, elongate, costal margin not undulate. 2 longitudinal veins, R+S and M, arising from basal stem, submarginal line about same width as apex of clavus. Vein A1 undulate, with 6 interconnections to vein A2; Y stem not especially thick-

ened; apical margin parabolic, post claval margin not convex; thick network of crossveins apically.

Distribution: Indomalayan Region.

31.1. *Ortracis conserta* (Walker), comb. nov.

Eurybrachys conserta Walker, 1857b: 155; Medler, 1990: 139 (type). Lectotype: ♂, Sarawak, Wallace, BMNH.
Flatoides principalis Stål, 1865: 159; Melichar, 1902: 208, pl 9, fig. 6; Medler, 1986h: 332 (type). Holotype: ♀, Malacca, Ligor, NHRS. **New syn.**
Atracis conserta: Distant, 1910b: 336 (combination); Metcalf 1957: 481 (catalog).
Rabocha principalis: Melichar, 1923: 110 (combination).
Cerfennia principalis: Metcalf, 1957: 475 (catalog).
Staliana conserta: Medler, 1988: 18 (combination).

Diagnosis: Overall appearance brown, with mixtures of light and dark brown blotches; dark brown line across tegmen basally, and laterally on pronotum. Rostrum appears inordinately elongate, about 4.25 mm long. Genitalia of lectotype illustrated (Fig. 9).

Measurements: ♂ lectotype (*conserta* Walker), ♀ holotype (*principalis* Stål). Length: overall 20.0, 21.0; v 1.00, 1.49; f 3.32, 2.66; p 1.16, 1.16; m 3.32, 3.32; t 16.43, 16.0; pcl 3.32, 3.50. Width: v 1.00, 1.00; f 2.16, 2.08; t 6.14, 6.25. Hind leg spine formula: both 2:6:8.

Specimen examined: Known only from the lectotype ♂ and holotype ♀.

Taxonomic note: O. conserta (Walker) and its junior synonym, *O. principalis* (Stål), superficially resemble members of the genus *Cerfennia*, but the taxon can be excluded by presence of 2:6:8 hind leg spine formula. Melichar's illustration of *principalis* (1902, fig. 6) is reproduced to show general habitus of taxon's tegmen (Fig. 58).

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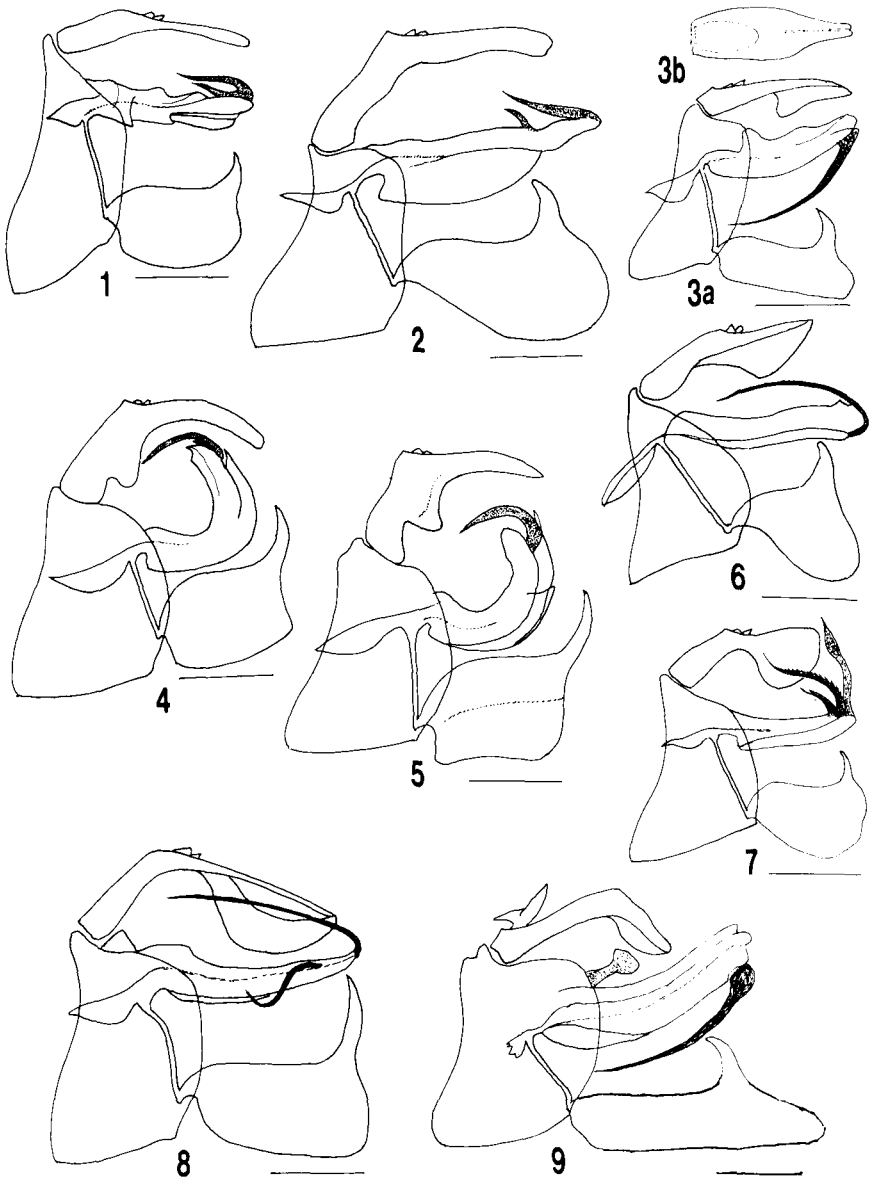
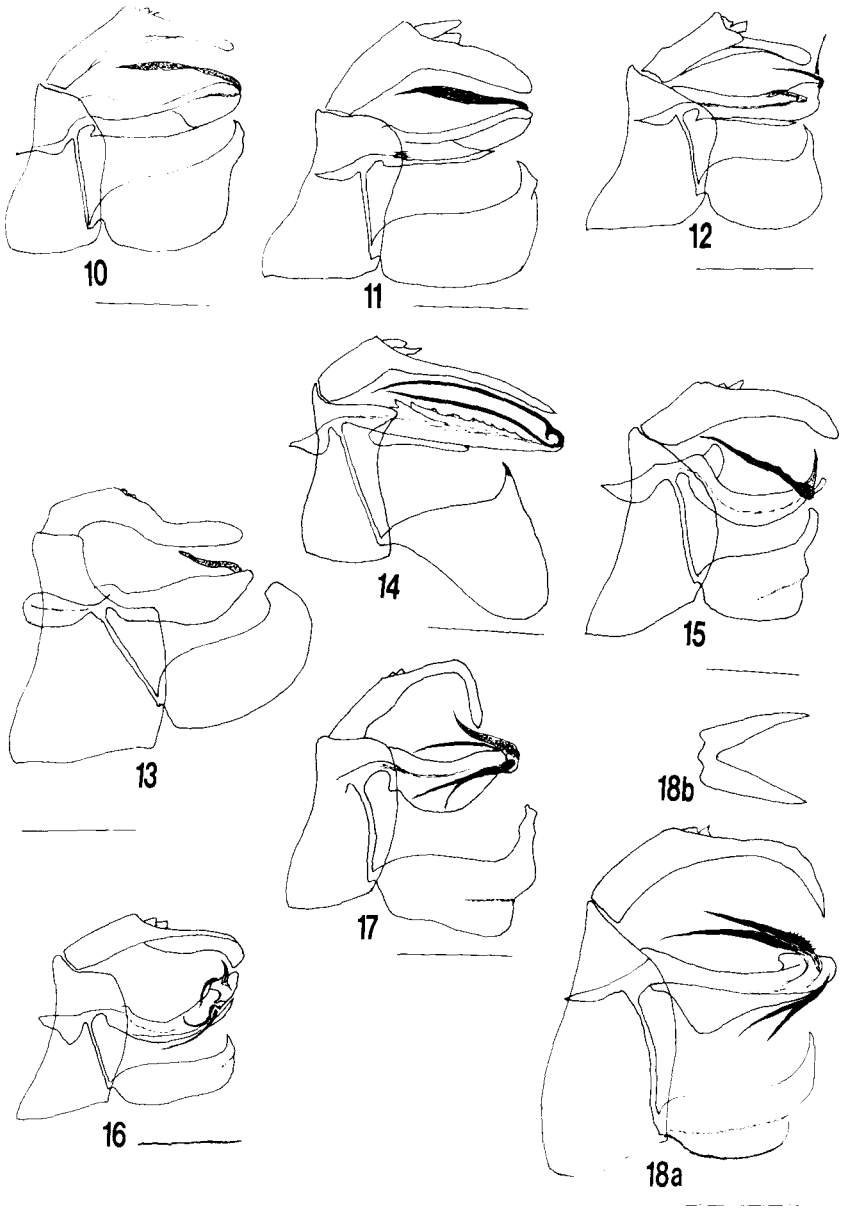
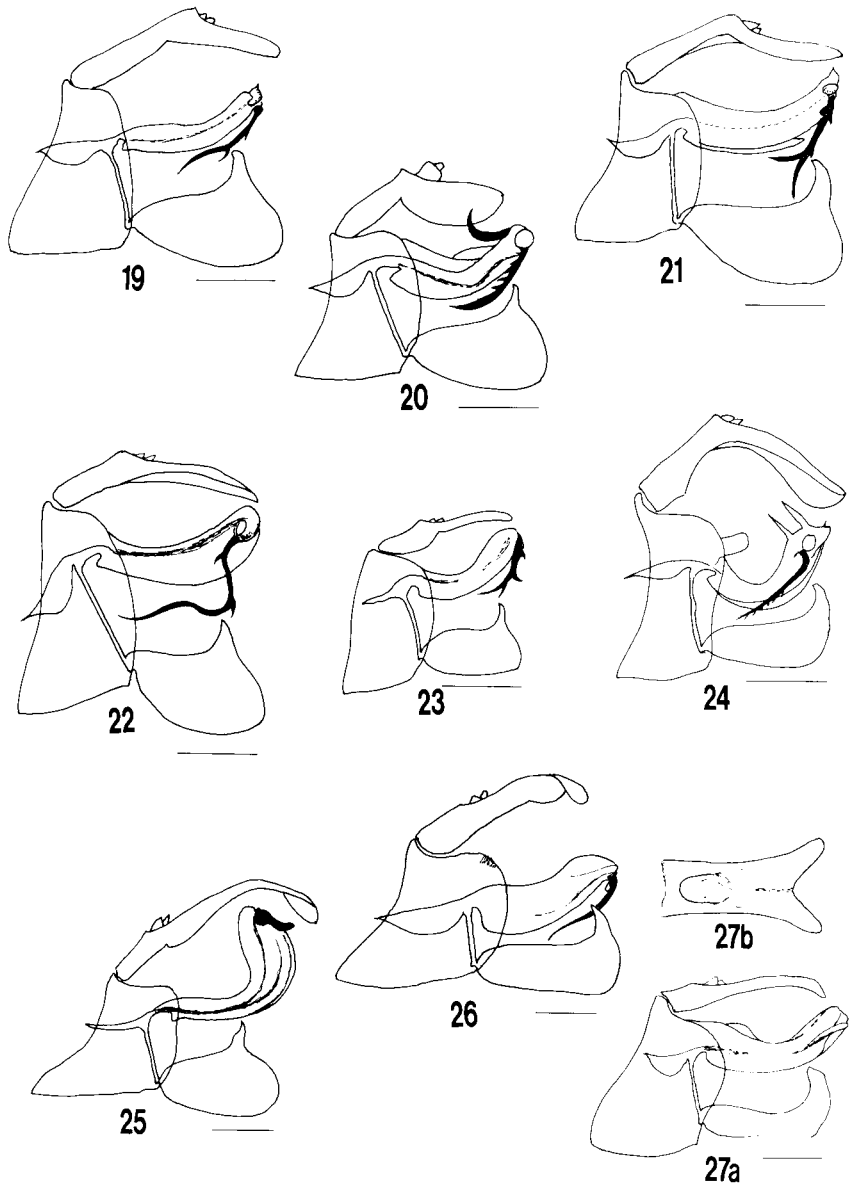


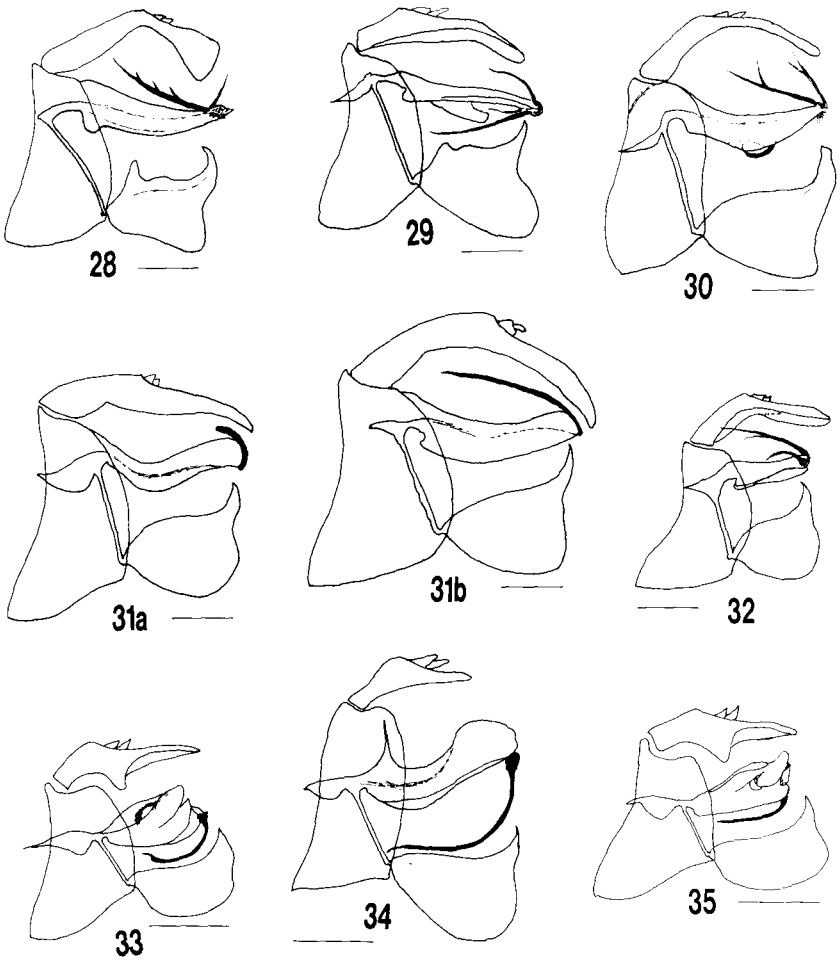
Figs. 1-9. Male genitalia, left lateral view: 1, *Flatida intacta* (Walker); 2, *Flatida cingulata* (Melichar); 3a, *Cerfennia tabida* (Gerstaecker); 3b; anal segment, dorsal view; 4, *Bythopsyrna illocata* Melichar; 5, *Bythopsyrna circulata* (Guérin-Méneville); 6, *Oryxa melichari* Kirkaldy; 7, *Flata guttularis* (Walker); 8, *Nephesa mazera* Medler; 9, *Ortracis conserta* (Walker). Scale bar = 1 mm.



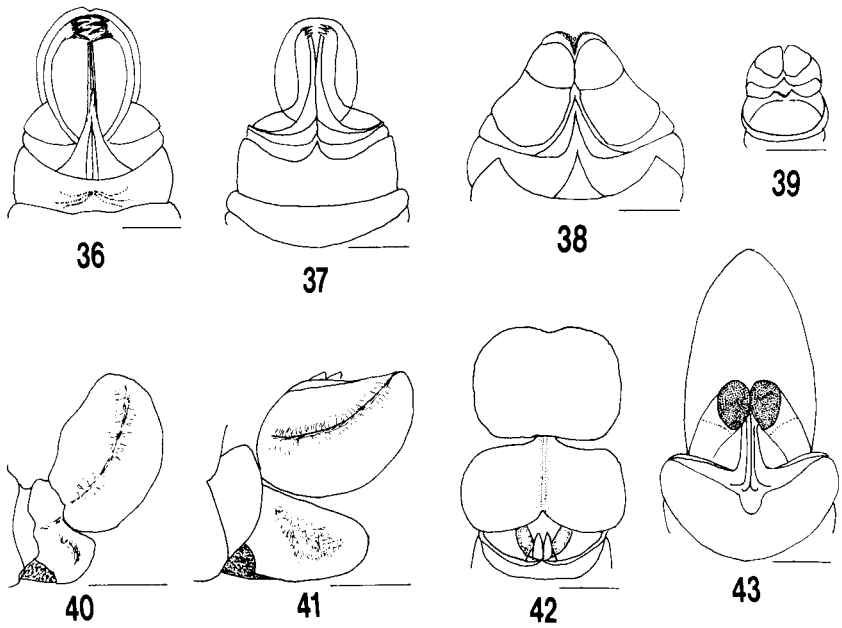
Figs. 10-18b. Male genitalia, left lateral view: 10, *Cerynia albata* (Walker); 11, *Cerynia deplana* (Walker), sensu Melichar; 12, *Cerynia mixana* Medler; 13, *Cenestra aurora* (Guérin-Méneville); 14, *Taparella amata* (Walker); 15, *Flatosoma diastola* Schmidt; 16, *Melicharia ticula* Medler; 17, *Eumelicharia radiata* (Distant). 18a, *Lawana pryeri* (Distant); 18b, apex of anal segment, caudal view. Scale bar = 1 mm.



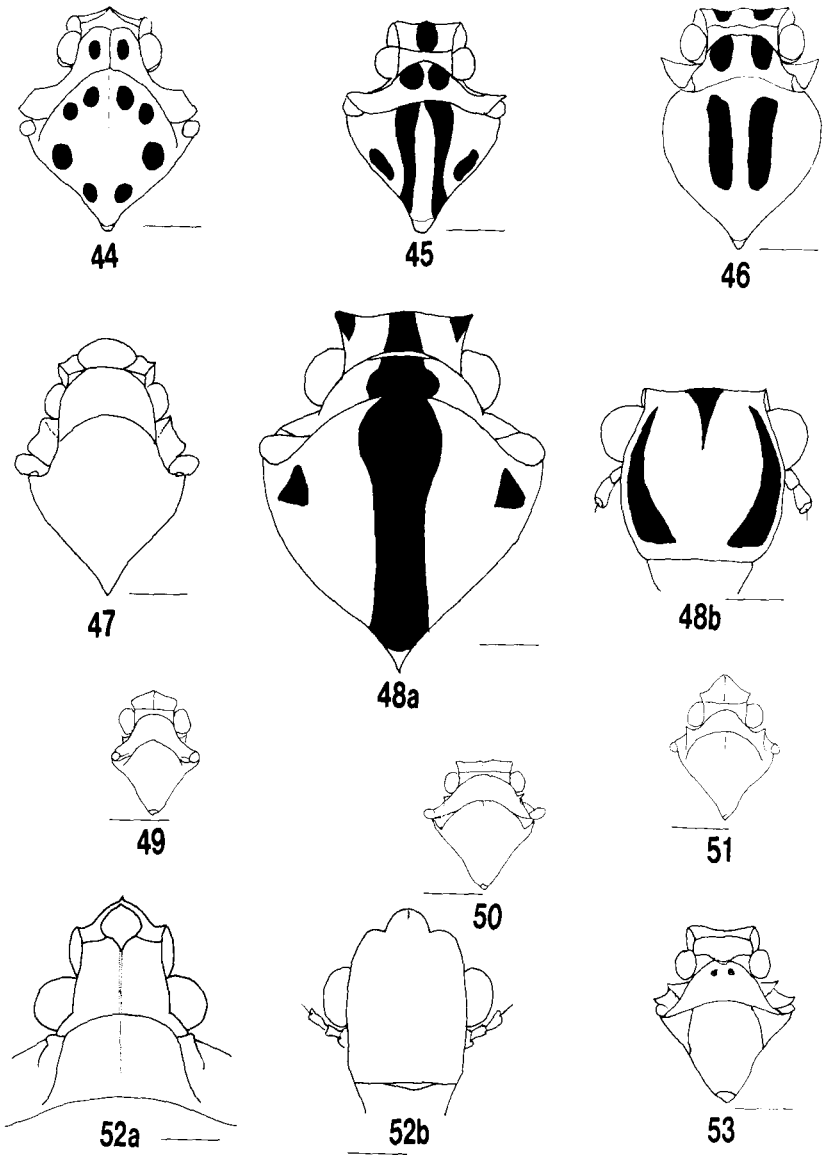
Figs. 19-27b. Male genitalia, left lateral view: 19, *Idume niveina* (Walker); 20, *Idume deducta* (Walker); 21, *Idume tripars* (Walker); 22, *Retsia elongata* Medler; 23, *Retsia indigena* (Melichar); 24, *Paraflatoptera transversa* Lallemand; 25, *Staliana inaequalis* (Walker); 26, *Staliana intercepta* (Walker); 27a, *Staliana surrecta* (Walker); 27b, dorsal view of anal segment. Scale bar = 0.5 mm.



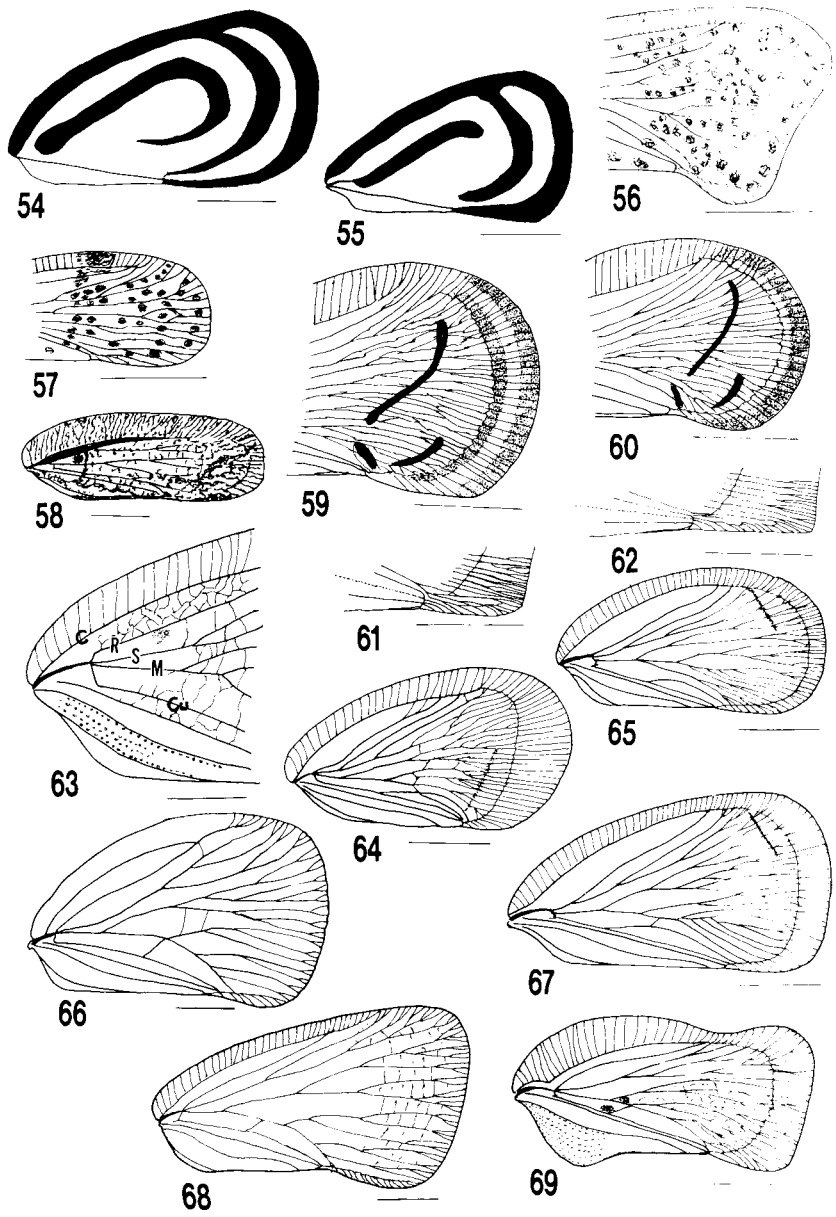
Figs. 28-35. Male genitalia, left lateral view: 28, *Salurnis marginella* (Guérin-Méneville); 29, *Salurnis kryala* Medler; 30, *Salurnis minuta* Lallemand; 31a, *Kayania volens* (Walker); 31b, *K. volens*, variant; 32, *Flatula stenula* Medler; 33, *Seliza vidua* Stål; 34, *Seliza variata* Melichar; 35, *Seliza intera* Medler. Scale bar = 0.5 mm.



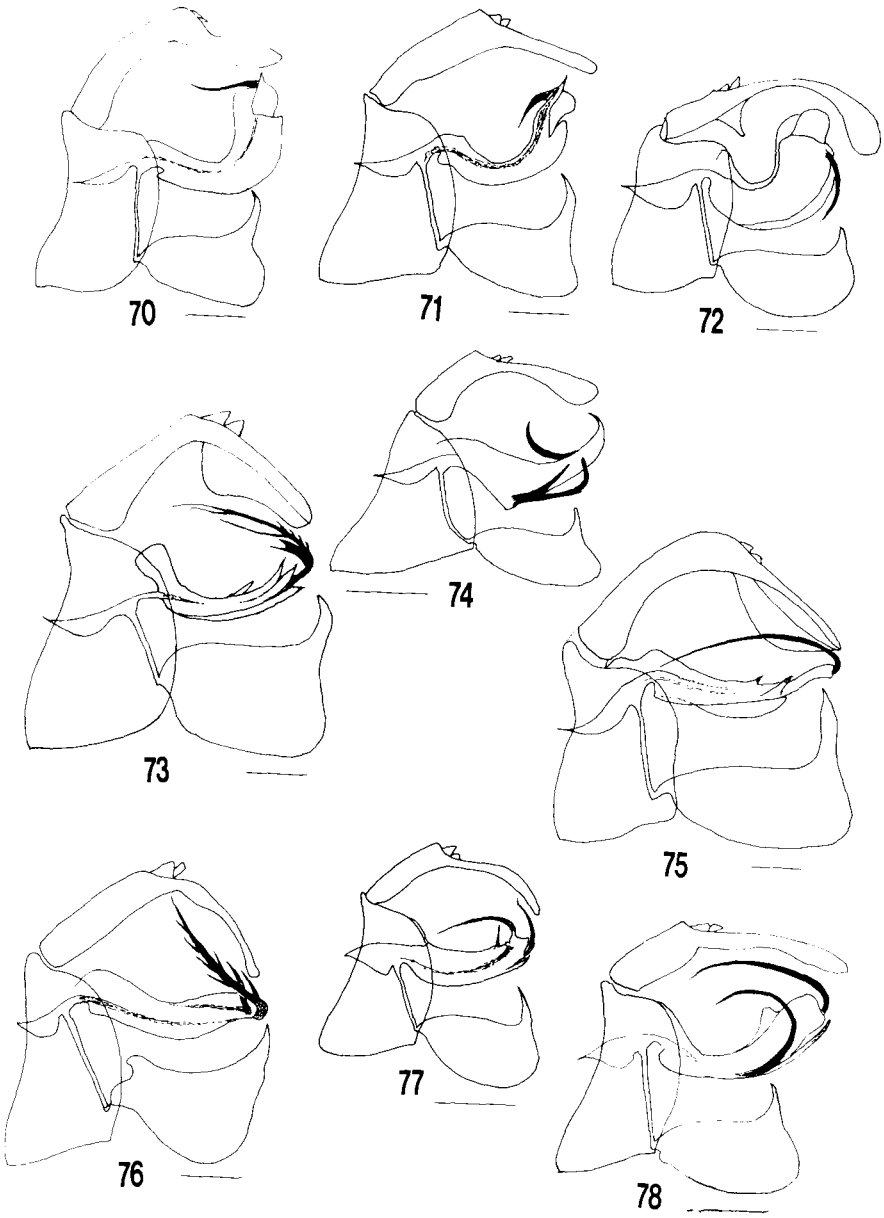
Figs. 36-43. Female genitalia, left lateral view of: 36, *Cerfennia tabida* (Gerstaecker); 37, *Retsina elongata* Medler; 38, *Staliana surrecta* Walker; 39, *Seliza intera* Medler; 40, *Bythopsyrna illocata* Melichar; 41, *Bythopsyrna circulata* (Guérin-Méneville); 42, *Neodaksha agrossa* Medler; 43, *Nephesa grata* (Walker). Scale bar = 0.5 mm.



Figs. 44-53. Head and thorax, dorsal view of: 44, *Flatula bipunctata* Schmidt; 45, *Copsyrna merahata* Medler; 46, *Nephesa ligata* (Melichar); 47, *Oryxa melichari* Kirkaldy; 48a, *Flatomorpha robusta* Medler; 48b, frons; 49, *Seliza intera* Medler; 50, *Seliza variata* Melichar; 51, *Seliza vidua* Stål; 52a, *Staliana surrecta* (Walker); 52b, frons; 53, *Atracis reversa* (Melichar). Scale bar = 0.5 mm.



Figs. 54-69. Left tegmen of: 54, *Bythopsyrna intermedia* Melichar; 55, *Bythopsyrna copulanda* Distant; 56. *Flatula bipunctata* Schmidt; 57, *Flatula stenula* Medler; 58, *Ortracis conserta* (Walker); 59, *Cerynia deplana* (Walker); 60, *Cerynia mixana* Medler; 61, *Flata guttularis* Walker; 62, *Flata ferrugata* Walker; 63, *Nephesa rosea* (Spinola). C=Costa, R=Radius, S=Sector, M=Media, Cu=Cubitus. 64, *Flatomorpha inclusa* Melichar; 65, *Idume deducta* (Walker); 66, *Neodaksha agrossa* Medler; 67, *Retsia elongata* Medler; 68, *Taparella amata* (Walker); 69, *Seliza vidua* Stål. Scale bar = 4 mm.



Figs. 70-78. Male genitalia, left lateral view of: 70, *Bythopsyrna copulanda* Distant; 71, *Bythopsyrna intermedia* Schmidt; 72, *Staliana obtecta* (Melichar); 73, *Copsyrna martini* Medler; 74, *Atracis taenia* (Schmidt); 75, *Nephesa* rorida (Walker); 76, *Salurnis dilutana* Lallemand; 77, *Melicharia bukitara* Medler; 78, *Melicharia exsarola* Medler. Scale bar = 0.5 mm.

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Synonyms are in *italics*

Index to Species

Synonyms are in italics