

**The Lophopidae (Hemiptera: Fulgoromorpha): Description of three new genera and key to the genera of the family**

ADELINE SOULIER-PERKINS

EP 90 du CNRS, Laboratoire d'entomologie, Muséum National d'Histoire Naturelle,  
45 rue Buffon, 75 005 Paris, France; e-mail: soulier@mnhn.fr

**Hemiptera, Fulgoromorpha, Lophopidae, *Maana*, *Podoschroumpfa*, *Pseudotyxis*, description, key, taxonomy**

**Abstract.** Three new genera containing five new species of Lophopidae are described: *Maana colorata*, *Maana erythina*, *Maana oriomoensis*, *Podoschroumpfa magna* and *Pseudotyxis malimoenensis*. A new key to the genera of Lophopidae is also provided, followed by a checklist of the distribution of the genera and their host plants.

INTRODUCTION

The planthopper family Lophopidae is among the smallest of the nineteen families currently recognised in the Fulgoromorpha. This tropical family is represented in Central and South America by only one genus (Soulie-Perkins, 1997): *Carriona* Muir, 1931, while the 36 other genera (the three new genera included) are present in the Oriental and Australian regions. Two genera, *Lophops* Spinola, 1839 and *Elasmoscelis* Spinola, 1839, broadly distributed in the Orient, have also radiated in Africa (Soulie-Perkins, 1997). Within the Lophopidae, 3 genera are recognised to be of economical interest. The genus *Pyrilla* Stål, 1859 is a pest of sugarcane (Kumarasinghe, 1996) and can sometimes damage a large percentage of the crop, particularly in India. The species *Zophiuma lobulata* Ghauri, 1967 in Papua New Guinea (Smith, 1980), and *Painella simmondsi* Muir, 1931 in the Solomon islands (Stapley, 1976, 1978; Wilson, 1988) appear to be linked to the development of some coconut diseases.

Over the course of time, different authors have tried to build a classification for the Lophopidae. Melichar (1915) recognised 4 tribes, the Lophopini, the Elasmoscelini, the Menoscaini and the Elicaini. His classification is essentially based on the visibility of the frons in dorsal view. Baker (1925), after studying a certain number of genera, proposed 2 subfamilies: the Lophopinae and the Acaninae. The separation of these subfamilies is done with the venation of the tegminae. Muir (1930) looked for a "more natural classification", and discriminated 5 groups using a method of recognition based on the shape of the hind tibia and tarsal segments. Finally, in 1955, Metcalf presented his catalogue with a classification based on that proposed by Melichar (1915). These classifications are not comparable as the genera are found to be distributed into different groups (Table 1). They have been based on one character or a very small set of characters.

Thirteen genera changed status in Table 1. Baker (1925), synonymized the genus *Jivatma* Distant, 1906 with *Menosca* Stål, 1870. Melichar (1915) synonymized

TABLE. 1. History of classification of the Lophopidae.

	Melichar 1915	Baker 1925	Muir 1930	Metcalf 1955		
<i>Lacusa</i>	Lophopini	Lophopinae	groupe 1	Lophopini		
<i>Paracorethrura</i>						
<i>Asantorga</i>						
<i>Acothrura</i>						
<i>Lapithasa</i>						
<i>Serida</i>						
<i>Pyrilla</i>						
<i>Lophops</i>						
<i>Corethrura</i>						
• <i>Augila</i>					Elasmoscelini	Acarinae
<i>Sarebasa</i>						
<i>Elasmoscelis</i>						
<i>Pitambara</i>						
<i>Bisma</i>						
<i>Jugoda</i>						
• <i>Jivatma</i>						
<i>Aluma</i>						
<i>Buxtoniella</i>						
<i>Magia</i>	Menoscaini	groupe 3	Menoscaini			
<i>Kasserota</i>						
<i>Acarina</i>						
<i>Pseudocorethrura</i>						
<i>Makota</i>						
<i>Apia</i>						
<i>Virgilia</i>						
<i>Menosca</i>						
• <i>Hesticus</i>						
<i>Katoma</i>				Elicaini	groupe 4	Elicaini
• <i>Elica</i>						
<i>Epiptyxis</i>						
<i>Zezeja</i>						
• <i>Micromasoria</i>						
• <i>Padanda</i>						
• <i>Ivinga</i>						
<i>Megacarna</i>						
<i>Meloenopia</i>						
<i>Carriona</i>						
<i>Painella</i>	Acarini	groupe 5	Acarini			
• <i>Manchookhonia</i>						
<i>Ridesa</i>						
• <i>Conna</i>						
• <i>Kusuma</i>						
• <i>Silvanana</i>						
• <i>Ucalaya</i>						
• <i>Augilina</i>						
<i>Clonaspe</i>				Augilini	groupe 4	Augilini
<i>Zophiuma</i>						
<i>Onycta</i>						



genera not listed by the author or described after 1955

genera removed from the Lophopidae or no longer valid

*Micromasoria* Kirkaldy, 1904 with *Conna* Walker, 1857. Fennah (1978) transferred the genera *Elica* Walker, 1857 and *Conna* to the Nogodinidae. Fennah (1987) transferred *Augila* Stål, 1870 and *Augilina* Melichar, 1914 to the Issidae. Ghauri (1976) synonymized *Kusuma carinata* Distant, 1906 with *Tambinia maculosa* Distant, 1906 which belongs to the Tropicuchidae. Asche (1985) synonymized *Manchookhonia* Kato, 1933 with *Asiraca* Latreille, 1796 which is in the Delphacidae. The action of Chou et al. (1983) who replaced *Manchookhonia* Kato with *Boresinia* Chou, nom. nov. was unsubstantiated and invalid. The genus *Ivinga* Distant, 1909 was transferred to the Issidae as a subgenus of *Trienopa* Signoret, 1860. The last genus transferred to a different family is *Padanda* Distant, 1906, which is now in the Dictyopharidae (Muir, 1930). O'Brien (1987) synonymized *Ucalaya* Fennah, 1944 with *Carriona* Muir, 1931. Finally, a recent phylogenetic study of the Lophopidae (Soulier-Perkins, 1997) showed that the genera *Silvanana* Metcalf, 1947 and *Hesticus* Walker, 1862 cannot be considered any more as Lophopidae. Currently, this family is divided into 4 groups: *Carriona*<sup>+</sup>, *Makota*<sup>+</sup>, *Bisma*<sup>+</sup> and *Sarebasa*<sup>+</sup> (Soulier-Perkins, 1997). These sequences follow the convention of De Souza Amorin (1982) (ex: A + B + C

= group A<sup>+</sup>). The 3 new genera described here find their place in the group *Bisma*<sup>+</sup> for *Maana* and *Pseudotyxis* and in *Sarebasa*<sup>+</sup> for *Podoschroumpfa*. A key to the genera of the Lophopidae has been provided and illustrated with some habits, allowing an easier identification. A checklist of the genera with their distributions and host plants is provided in Table 2.

#### MATERIAL AND METHODS

The specimens were dry and the preparation of male and female genitalia was based on a modified method of Carayon (1969). The abdomen was removed and boiled for 10–15 min in 5 ml of potassium hydroxide (KOH: 10% solution) containing a few drops of saturated aqueous solution of chlorazol black. The gross dissection and cleaning of the abdomens was performed in 70% alcohol, after which the whole abdomen was transferred to glycerol. The pygofer was separated from the abdomen and examined. The phallic complex was dissected to isolate the processes of the aedeagus and the periandrium. The nomenclature of the male genitalia follows that of Bourgoïn (1988) and Bourgoïn & Huang (1990) and, for the female genitalia, Bourgoïn (1993).

ABBREVIATIONS. BPBM – Bernice P. Bishop Museum, Honolulu, USA; MNHN – Muséum National d'Histoire Naturelle, Paris, France; MZLU – Museum of Zoology, Lund University, Lund, Sweden; SMTD – Staatliches Museum für Tierkunde, Dresden, Germany; ZMAN – Zoologisch Museum, Amsterdam, Netherlands.

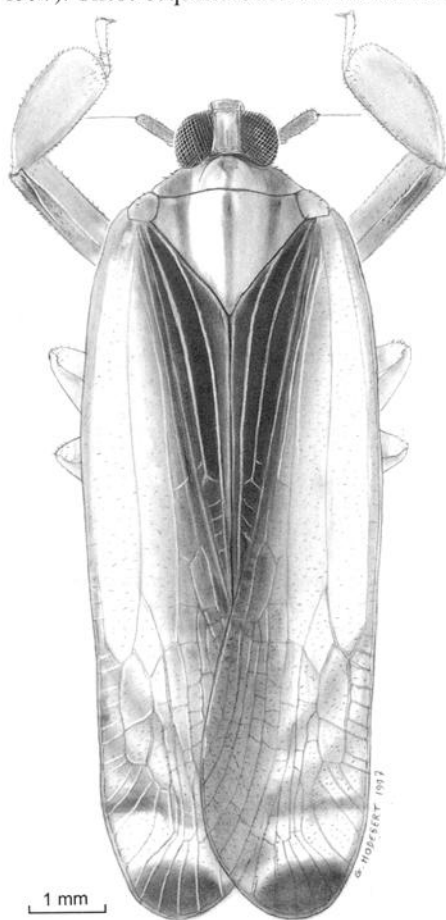


Fig. 1. *Maana colorata* sp. n., habitus.

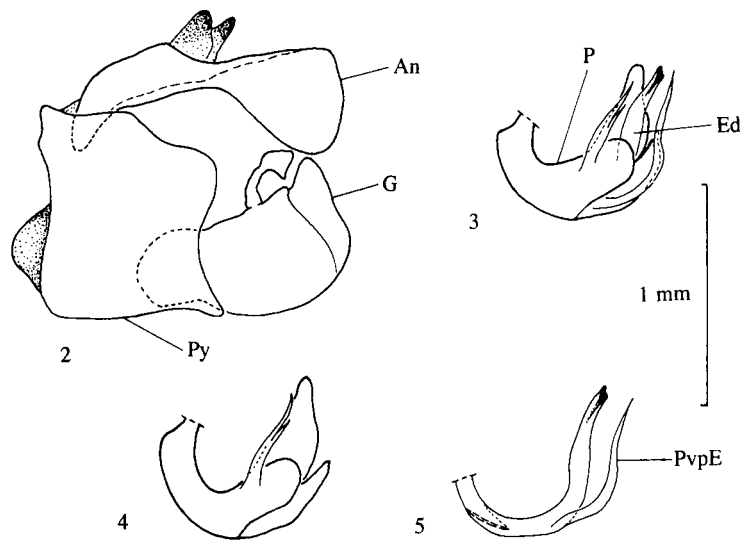
TABLE 2. Distribution of the genera and their host plants.

Genera	Distribution	Host plant
<i>Acarna</i>	New-Guinea, Misoöl	<i>Calamus</i> sp: Arecaceae (on label)
<i>Acothrura</i>	North Vietnam, Thailand	
<i>Aluma</i>	Borneo (Sarawak)	
<i>Apia</i>	Malay peninsula, Sipora and Siberut islands	
<i>Asantorga</i>	Ambon, South Seram	
<i>Bisma</i>	Sri Lanka	
<i>Buxtoniella</i>	Savaii and Upolu islands, Fidji	<i>Pandanus</i> sp: Pandanaceae (on label)
<i>Carriona</i>	Panama, Ecuador, Peru	
<i>Clonaspe</i>	Solomon islands	Palm: Arecaceae; <i>Zingiber</i> : Zingiberaceae (on label)
<i>Corethrura</i>	Malay peninsula, Burma	
<i>Elasmoscelis</i>	Africa, India, Sri Lanka, Java, Japan, China (Guandong and Hainan)	<i>Canthium</i> sp: Rubiaceae; <i>Lonchocarpus laxiflorus</i> : Fabaceae; <i>Kigelia aethiopica</i> : Bignoniaceae (Wilson et al., 1994)
<i>Jugoda</i>	New-Guinea, Key islands	Palm: Arecaceae; Rattan: Arecaceae; <i>Ficus</i> sp: Moraceae (on label)
<i>Kasserota</i>	New-Guinea, Misoöl, Obi, Batjan, Aru	
<i>Lacusa</i>	India, Burma, Thailand, China (Yunnan and Fukien)	
<i>Lapithasa</i>	Philippines, Borneo	
<i>Lophops</i>	Africa, Sri Lanka, South China, Malay peninsula, Siberut island, Sulawesi, Buru, New-Guinea, Solomon islands, Philippines, Australia	Poaceae (Wilson et al., 1994), <i>Saccharum officinarum</i> : Poaceae (on label)
<i>Maana</i>	New-Guinea	Rattan: Arecaceae (on label)
<i>Magia</i>	Australia (Queensland)	Palm: Arecaceae (on label); <i>Archantophoenix alexandrae</i> : Arecaceae (personal observation)
<i>Makota</i>	Borneo	
<i>Megacarna</i>	New-Guinea	<i>Banana</i> : Musaceae (on label)
<i>Menosca</i>	Burma, Borneo, Palawan, Philippines	
<i>Onycta</i>	New-Guinea	Palm: Arecaceae (on label)
<i>Painella</i>	Solomon islands	<i>Cocos nucifera</i> : Arecaceae (on label)
<i>Paracorethrura</i>	North Vietnam (Tonkin), China (Xuangxi)	
<i>Pitambara</i>	India, Sri Lanka, Burma, Vietnam, Philippines, China (Yunnan), Borneo	Bamboo: Poaceae (on label)
<i>Podoschtroumpfa</i>	Cambodia	
<i>Pseudocorethrura</i>	Sulawesi	
<i>Pseudotyxis</i>	Java	
<i>Pyrilla</i>	India, Sri Lanka, Burma, Thailand, South China, Sumatra, Java, Borneo	Poaceae (Wilson et al., 1994), <i>Saccharum officinarum</i> , <i>Oryza sativa</i> : Poaceae. Lemongrass: Poaceae (on label)
<i>Sarebasa</i>	Malay peninsula	Bamboo: Poaceae (on label)
<i>Serida</i>	Burma, Cambodia, North Vietnam, China (Hainan), Sumatra, Java, Borneo, Palawan	Bamboo: Poaceae (on label)
<i>Virgilia</i>	Philippines	<i>Cocos nucifera</i> : Arecaceae (Wilson et al., 1994)
<i>Zelega</i>	Borneo	
<i>Zophiuma</i>	New-Guinea	<i>Cocos nucifera</i> : Arecaceae (Wilson et al., 1994)

DESCRIPTIONS  
Genus *Maana* gen. n.

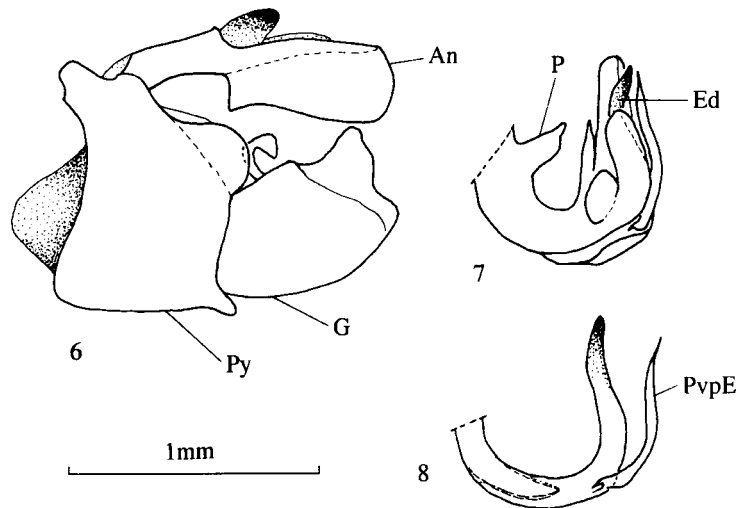
TYPE SPECIES: *Maana colorata* sp. n.

INCLUDED SPECIES: *Maana erythina* sp. n. and *Maana oriomoensis* sp. n.

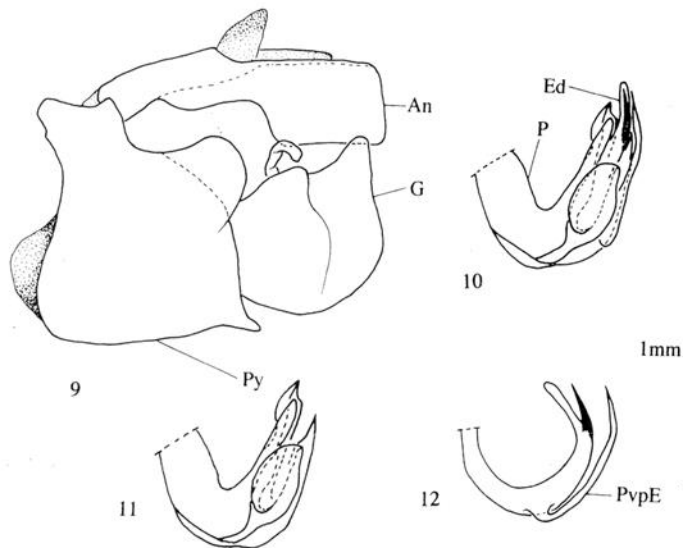


Figs 2-5: *Maana colorata* sp. n., male. 2 – anal tube, gonostyli and pygofer: An – anal tube, G – gonostyli, Py – pygofer; 3 – phallic complex: Ed – aedeagus, P – periandrium; 4 – periandrium; 5 – aedeagus s. l.: PvpE – ventral posterior process of the aedeagus.

Vertex slightly longer than wide, rectangular with all margins carinate. Median carina present. Frons not clearly observable in dorsal view. Latero-frontal margins not continuously carinate from vertex-frons suture to frontoclypeal suture. Sublateral carinae and median carina present but faintly marked. Frons wider than long at gena level. Lateral carinae of clypeus absent. Labium short, not reaching metatrochanters, apex cut perpendicularly to



Figs 6-8: *Maana erythina* sp. n., male. 6 – pygofer, anal tube and gonostyli; 7 – phallic complex; 8 – aedeagus s. l. Lettering as in Figs 2-5.



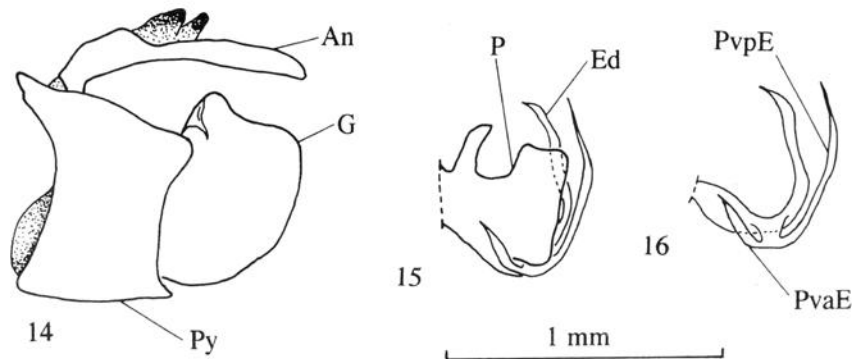
Figs 9–12: *Maana oriomoensis* sp. n., male. 9 – pygofer, anal tube and gonostyli; 10 – phallic complex; 11 – perianthrium; 12 – aedeagus s. l. Lettering as in Figs 2–5.



Fig. 13. *Podoschtoumpfa magna* sp. n., habitus.

longitudinal axis. Ocellar carina present. Gena prominent, but genal carinae absent. In frontal and dorsal views, compound eyes very prominent laterally and longer than vertex. Antenna with foramen touching compound eye's base and pedicel 3 times longer than diameter. Metathorax with median carina paired. Fore tibia and femur flattened. Hind tibia bearing laterally 2 strong spines and apically 9 spines not as strong as lateral ones. Lateral spines restricted to terminal half part of tibia. First segment of hind tarsus bearing 9 small spines that form a triangular zone. Venation of tegmina with Sc + R, M and Cu separated at base. Costal vein distinct from costal margin and only few transverse veins are present in between.

COLOURATION. Two transverse red stripes observable in frontal view, on frons at eye level and on clypeus near frontoclypeal suture. In posterior view, lobes of anal tube in female are glossy black to dark brown.



Figs 14–16: *Podoschtoumpfa magna* sp. n., male. 14 – pygofer, anal tube and gonostyli; 15 – phallic complex; 16 – aedeagus s. l. PvaE – ventral anterior process of the aedeagus, otherwise lettering as in Figs 2–5.

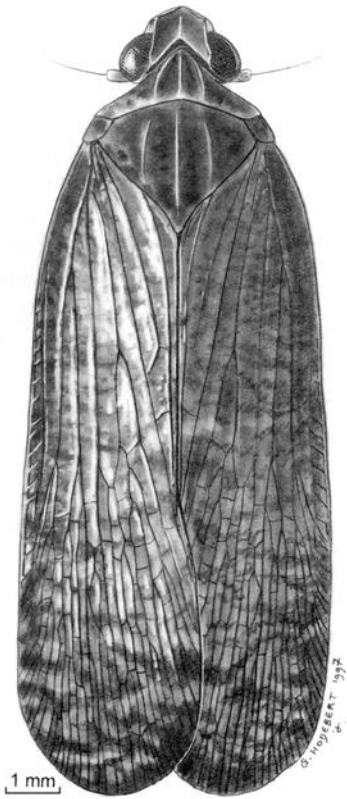


Fig. 17: *Pseudotyxia malimoenensis* sp. n., habitus.

SIZE. Total length, 8 to 9 mm for the males and 10 to 11 mm for the females.

FEMALE. Anal tube with large apical lobes oriented latero-ventrally. Gonoplasts bilobate with dorsal lobe slightly reduced. Gonospiculum absent and gonapophysis VIII reduced.

MALE. Anal tube developed posteriorly and laterally, covers phallic complex. Pygofer nearly as wide as high. Gonostyli bearing distinctive process on dorsal margins. Dorsal perianthium with numerous folds.

REMARKS. Like its sister group *Jugoda*, this genus occurs in New Guinea. Species in both genera are among the smallest species found in this region with a total length always less than 12 mm. Three characters allow a quick separation of these genera from each other. *Maana* has a double median mesothoracic carina while a simple carina is present in *Jugoda*. The antennal foramen is well separated from the compound eye in *Jugoda* while in *Maana* the foramen touches the base of the compound eye which seems to curl around its dorsal margin. The lateral carinae of the vertex of *Jugoda* are foliaceous which is not the case for *Maana*.

ETYMOLOGY. Genus named after the collector J.C. Maa. Gender feminine.

DISTRIBUTION. New Guinea.

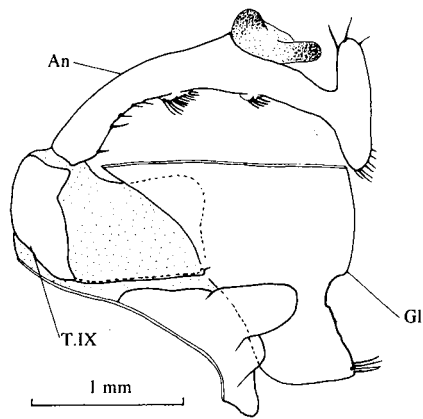


Fig. 18: *Pseudotyxis malimoenensis* sp. n., external female genitalia. An – anal tube, Gl – gonopods, T.IX – tergite IX.

SIZE. Total length of males: 8 mm and females: 11 mm.

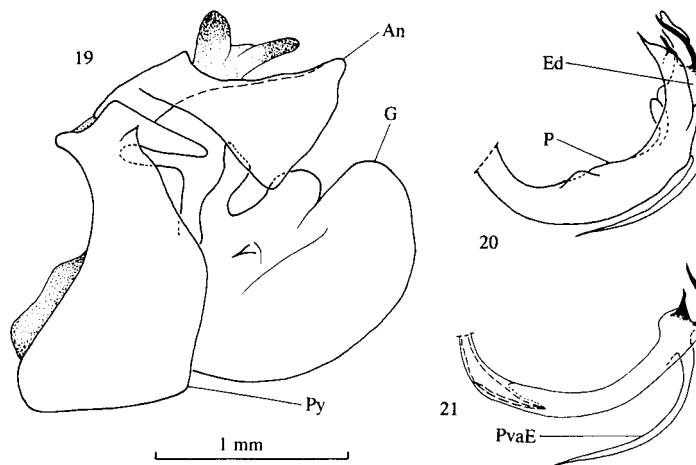
FEMALE. Seventh abdominal segment with strong medio-ventral extension whose apex is oriented posteriorly.

MALE. Extended apical part of anal tube rounded ventrally. Dorsal margin of pygofer truncated posteriorly (Fig. 2). Dorsal periandrium bearing a pair of processes oriented dorsally; each process bifurcated, slender apically (Figs 3–4). Aedeagus prolonged over insertion point of processes (Fig. 5). Anterior ventral processes of aedeagus absent. Posterior ventral processes present, as long as aedeagus prolongation. Gonostyli bearing dorsal lanceolate extension oriented posteriorly. Dorsal margins of gonostyli extended posteriorly into a protruding dorsally oriented structure.

*Maana colorata* sp. n.

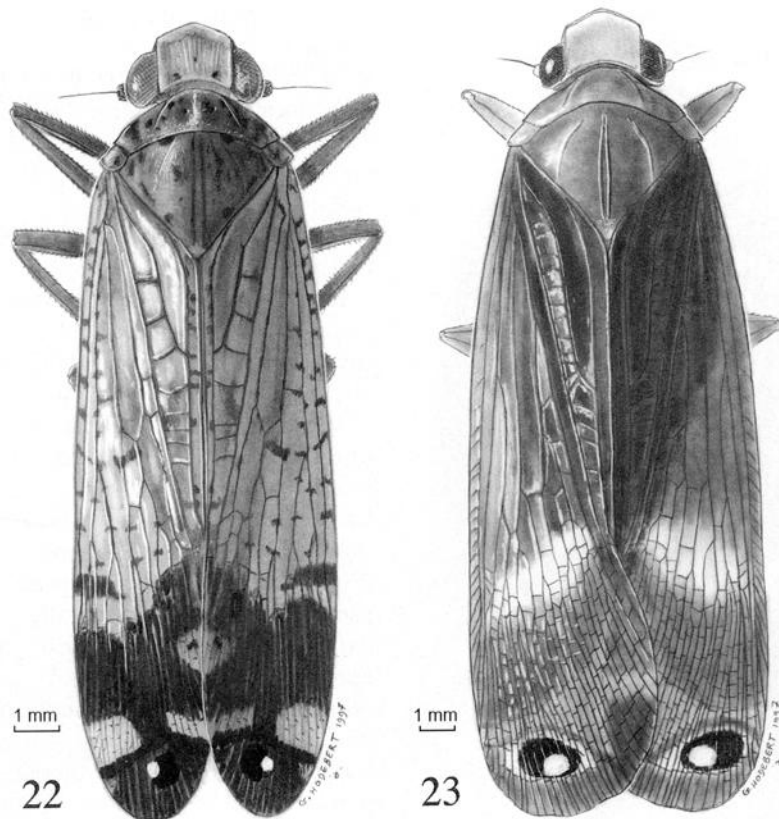
Labium short, last segment slightly longer than wide. Prothorax short with straight posterior margin, lateral discal carinae present and diverging posteriorly and median carina present underneath a reddish stripe. Mesothorax with lateral carinae prolonging lateral discal carinae of prothorax (Fig. 1). Fore tibia and femur strongly flattened, foliaceous.

COLOURATION. Transverse reddish stripe present on vertex, near anterior margin. Three antero-posterior reddish stripes present on prothorax and prolonged on mesothorax. Fore legs reddish brown. Tegmina: veins M, Cu and A1 reddish, apex and clavus, brown.



Figs 19–21: *Pseudotyxis malimoenensis* sp. n., male. 19 – pygofer, anal tube and gonostyli; 20 – phallic complex; 21 – aedeagus s. l. Lettering as in Figs 2–5.





Figs 22, 23: Habitus. 22 – *Onycta tessellata* (Distant, 1888); 23 – *Zophiuma pupilata* (Stål, 1863).

HOLOTYPE: ♂, “New Guinea (NW) Waris, S. of Hollandia, 23.viii.1959, J.C. Maa collector”. Deposited in BPBM.

PARATYPES: 15 specimens. Netherlands New Guinea: Waris, 450–500 m, south of Hollandia, J.C. Maa lgt.: 4 ♀ and 6 ♂ 16.–23.viii.1959 (1 ♀ and 1 ♂ in MNHN and 3 ♀ and 5 ♂ in BPBM); 1 ♀ 8.–15.viii.1959 (BPBM); 1 ♂ 24.–31.viii.1959 (MNHN). New Guinea north-west Waris, south of Hollandia, 23.viii.1959, J.C. Maa lgt.: 3 ♀ (1 in MNHN and 2 in BPBM).

OTHER SPECIMENS: Netherlands New Guinea: Bodem, 100 m, 11 km south-east of Oerberfaren, 7.–17.vii.1959, J.C. Maa lgt.: 2 ♂. Netherlands New Guinea: Djoebaren, 80 m, 90 km south-east of river Tor, 17.vii.1959, J.C. Maa lgt.: 1 ♂ (BPBM).

ETYMOLOGY. Species name “colorata” means “coloured” in Latin, referring to the bright colours of this species.

DISTRIBUTION. New Guinea.

*Maana erythina* sp. n.

Similar to *Maana colorata* with some differences in colouration, male genitalia and female seventh abdominal segment.

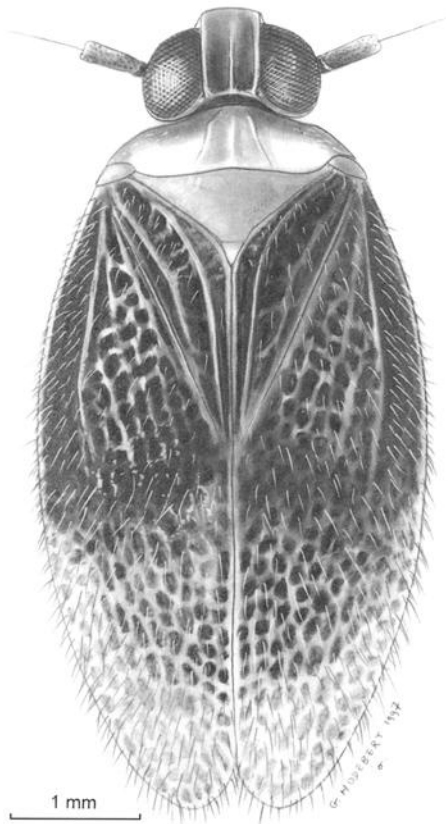


Fig 24. *Buxtoniella hopkinsi* Muir, 1927, habitus.

COLOURATION. Red patch located in the middle of the vertex. Part of frons visible in dorsal view bearing reddish transverse stripe located close to frons-vertex suture. Tegminae, veins M, Cu and A1 reddish, red colour extending like spots on each side of A1.

SIZE. Total length of males: 9 mm and females: 10 mm.

FEMALE. Medio-ventral extension of seventh abdominal segment with three small nipples oriented ventrally, one median and one lateral on each side.

MALE. Extended apical part of anal tube truncated ventrally; prolonged part representing over half total length of anal tube. Dorsal margin of pygofer truncated posteriorly but with rounded posterior extension (Fig. 6). Anteriorly, median extension of perianthrium protruding dorsally and posteriorly (Fig. 7). Medial pair of processes oriented dorsally, pointed apically; aedeagus prolonged over insertion point of processes. Anterior ventral processes of aedeagus rudimentary. Posterior ventral processes present, nearly as long as aedeagus prolongation itself (Fig. 8). Gonostyli bearing slim dorsal extension inflated apically, oriented posteriorly.

Dorsal margins of gonostyli extended into a protruding dorsally oriented structure.

HOLOTYPE: ♂, "New Guinea (NE): Maprik, 160 m, Oct. 15, 1957, J.L. Gressitt collector". Deposited in BPBM.

PARATYPES: 6 specimens. New Guinea: north-east Bainyik, near Maprik, 225 m, 20.vi.1961 (on *Calamus*), 21.vi.1961 (on rotan) and 20.-21.vi.1961 (on palm.), J.L. Gressitt lgt.: 3 ♀ (BPBM). New Guinea: north-east Angoram, 20-50 m, 15.viii.1969 (on slender leaf rattan), J.L. Gressitt lgt.: 2 ♀ (1 in MNHN and 1 in BPBM). New Guinea: North-east Wewak, Sepik District, 30 m, 26.vi. 1961 (on rotan), J.L. Gressitt lgt.: 1 ♂ (MNHN).

ETYMOLOGY. Species name derived from the Greek "erythros", referring to the red coloration of some body regions.

DISTRIBUTION. New Guinea.

#### *Maana oriomoensis* sp. n.

Labium short, last segment as long as wide. Prothorax short with posterior margin slightly concave in middle. Lateral discal carinae present and diverging posteriorly, median carina present and clearly observable. Fore tibia and femur flattened but not foliaceous.



Fig. 25. *Carriona panamensis* O'Brien, 1987, habitus.

over insertion point of processes and bifurcated apically with one end rounded and the other pointed. Anterior ventral processes of aedeagus absent. Posterior ventral processes present and nearly as long as aedeagus prolongation itself (Fig. 12). Gonostyli bearing a dorsal slim extension oriented posteriorly, with dorsal margins forming posteriorly a protruding dorsally oriented structure.

HOLOTYPE: ♂, "New Guinea: Papua W. District Oriomo Govt. Sta., 26.–28.X.1960, J.L. Gressitt collector". Deposited in BPBM.

PARATYPES: 6 specimens. Papua New Guinea: west District Oriomo Govt. Sta., 26.–28.x.1960 (on palm), J.L. Gressitt lgt.: 3 ♀ and 2 ♂ (1 ♀ and 1 ♂ in MNHN and 2 ♀ and 1 ♂ in BPBM).

OTHER SPECIMEN: New Guinea north-east, Bainyik, near Maprik 225 m, 20.–21.vi.1961 (on palm), J.L. Gressitt lgt.: 1 ♀ (BPBM).

ETYMOLOGY. Species named after the district Oriomo.

DISTRIBUTION. New Guinea.

#### Genus *Podoschtroumpfa* gen. n.

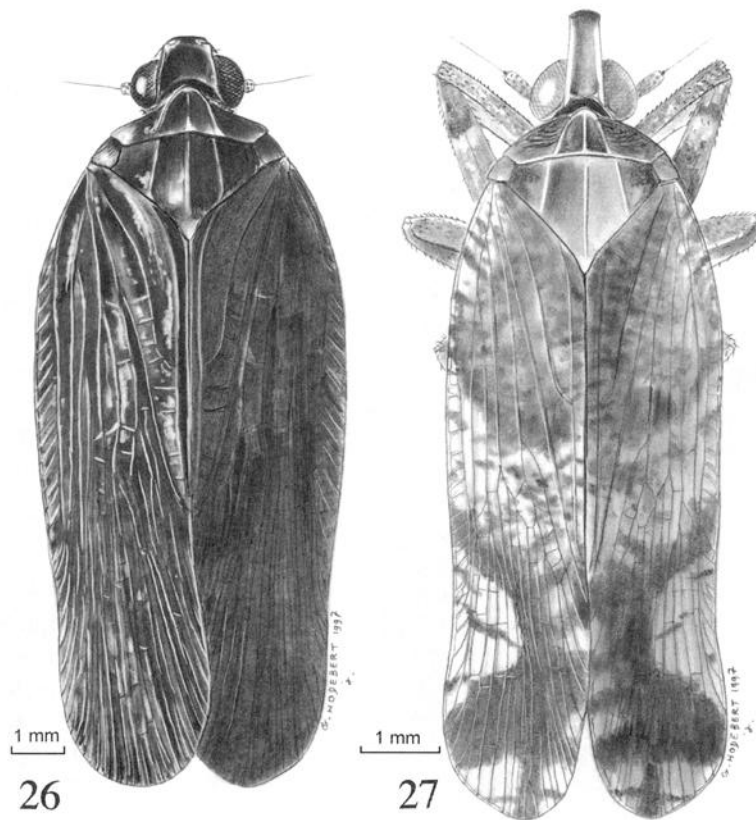
TYPE SPECIES: *Podoschtroumpfa magna* sp. n. Monotypic genus.

COLOURATION. Three antero-posterior reddish stripes present on mesothorax, one laterally oriented reddish stripe present on prothorax. Fore legs creamy white with a longitudinal reddish stripe, and with apex of tibia, femur and tarsus brown. Tegminae with clavus and apex light brown.

SIZE. Total length of males: 9 mm and females: 10 mm.

FEMALE. Medio-ventral extension of seventh abdominal segment with two small symmetric nipples oriented ventrally.

MALE. Extended apical part of anal tube truncated ventrally. Dorsal margin of pygofer truncated posteriorly but with posterior rounded extension (Fig. 9). Dorsal perianthrium bearing a pair of processes oriented dorsally (Figs 10–11). Each process finger-like and rounded apically. Aedeagus prolonged

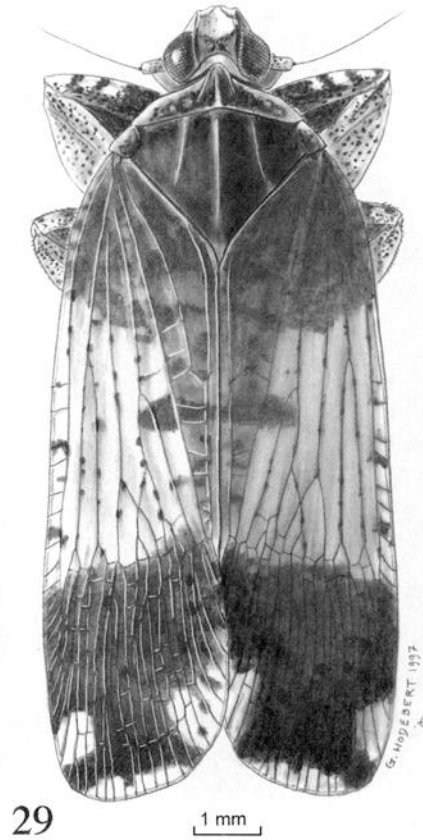
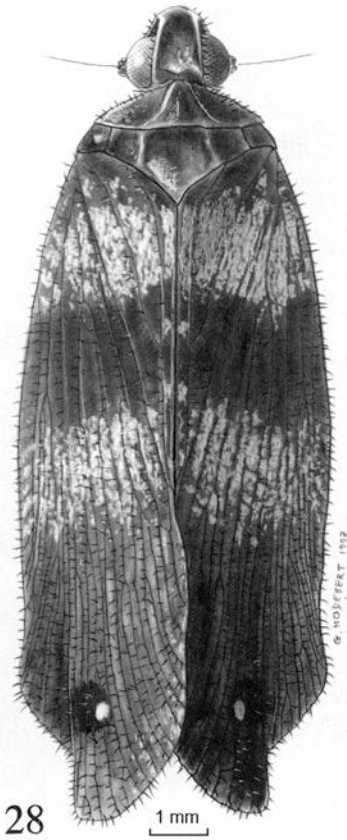


Figs 26, 27: Habitus. 26 – *Aluma ocellata* Distant, 1909; 27 – *Bisma greeni* Distant, 1906.

Vertex with fine carina on its circumference. Median carina present. Frons longer than wide and bearing sublateral and median carinae. Lateral margins of the frons carinate from vertex-frons suture to frontoclypeal suture. Frons narrow, only slightly enlarged at gena level. Clypeus tricarinate. Labium short, not reaching hind trochanters, apex cut perpendicularly to longitudinal axis. Compound eyes supported by callus. Lateral ocelli present. Ocellar and genal carinae absent. Fore and mid legs flattened but not foliaceous. Hind tibia bearing laterally 2 to 3 strong spines and apically numerous small spines. Apex of first segment of hind tarsus bearing a pad of microsetae and a series of small spines. Venation of tegmina with Sc + R, M and Cu separated at base. Sc and R become separated close to base. Costal vein clearly distinct from costal margin, with numerous transverse veins between them.

SIZE. Total length of the males: 8 mm and females: 9 to 10 mm.

FEMALE. Anal tube greatly produced at apex into vertically oriented expansions covering all genitalic bloc. Gonoplacs bilobate with dorsal lobes partially reduced. Gonapophysis VIII and IX reduced. Gonospiculum and posterior vaginal process absent. Bursa copulatrix with ornamentation of type "Pyrilla" (Soulier-Perkins & Bourgoïn, 1998).



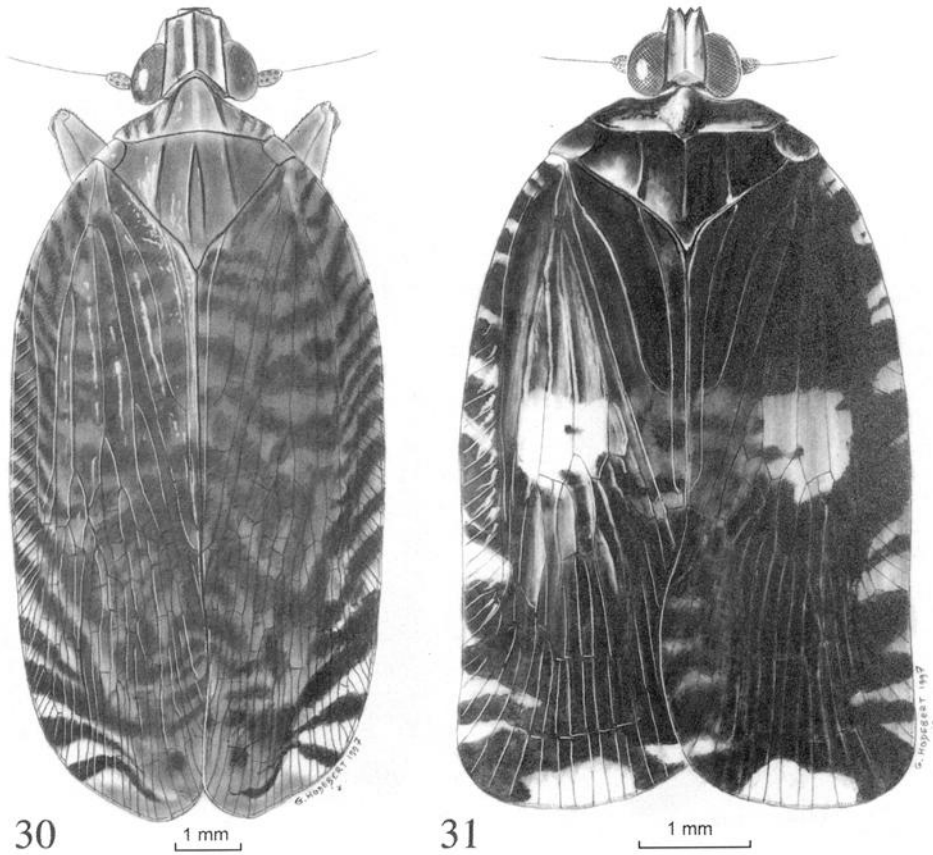
Figs 28, 29. Habitus. 28 – *Pseudocorethrura funebris* (Stål, 1863); 29 – *Makota illustris* Distant, 1909.

MALE. Anal tube long. Pygofer higher than wide. Aedeagus prolonged over insertion point of processes. Ventral anterior and posterior processes of aedeagus present.

REMARKS. This genus has the fore femur bearing a regular longitudinal succession of brown points, similar to the points observed for the genera *Acothrura* and *Paracorethrura*. [*Podoschtroumpfa* + (*Acothrura* + *Paracorethrura*)] is a monophyletic group (Soulier-Perkins, 1997). *Podoschtroumpfa* distinctly differs from the other two genera by its size (length up to 10 mm, whereas the smallest specimens of the other two genera have a minimum length of 13 mm), and its tegminae which are light brown whereas the other two genera are brighter in colours such as yellow or red. Frons slightly enlarged at gena level (strongly so in *Acothrura* or *Paracorethrura*). Vertex longer than wide, its anterior margin tends to curve anteriorly (in *Paracorethrura* and *Acothrura* it is wider than long and its anterior margin tends to be straight).

ETYMOLOGY. Arbitrary combination of letters. Gender feminine.

DISTRIBUTION. Cambodia.

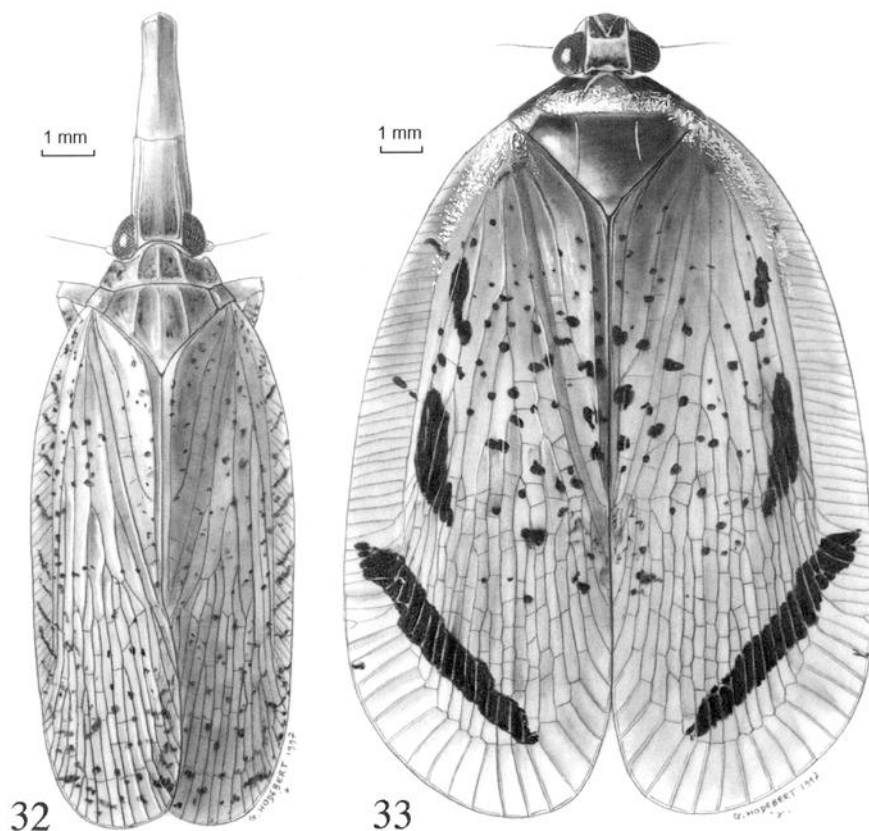


Figs 30, 31. Habitus. 30 – *Apia lineolata* Distant, 1909; 31 – *Elasmoscelis* sp.

*Podoschtroumpfa magna* sp. n.

Vertex longer than wide, posterior and anterior margins curved anteriorly and linked by a median carina (Fig. 13). Sublateral carinae of frons clearly observable and parallel; median carina of frons present but small. Three strong carinae on clypeus, lateral carinae prolonging those of the frons and median carina stretching from frontoclypeal suture to anteclypeus. Gena nearly flat. Small light brown callus supporting compound eye. Pedicel of antenna slightly longer than diameter. Prothorax tricarinate with anterior margin strongly curved behind compound eyes. Median carina reaching anterior and posterior prothoracic margins. Mesothorax tricarinate with median carina prolonging prothoracic median carina. Hind tibia bearing 3 stout lateral spines with dark brown apices located 2/3 along the length of tibia. Numerous small spines with dark brown apices organised in tight rows observable on apex of hind tibia. First segment of hind tarsus with an oval pad of microsetae.

COLOURATION. General colour, light brown with the exception of the frons which is green with three orange-reddish vertical stripes, one on median carina and two in between



Figs 32, 33: Habitus. 32 – *Pyrilla protuberans* Stål, 1859; 33 – *Paracorethrura iocnemis* (Jacobi, 1905).

sublateral carinae and lateral margins. Dark brown spot on both sides of prothoracic and mesothoracic median carinae.

SIZE. Total length of males: 8 mm and females: 9 to 10 mm.

MALE. Anal tube reaching posterior margins of gonostyli, without any lateral or ventral extensions. Pygofer higher than wide with dorsal margin regularly sloping posteriorly (Fig. 14). Anteriorly, median extension of periandrium protruding dorsally (Fig. 15). Posteriorly, periandrium margin straight and vertical. Ventral anterior processes of aedeagus as long as elongated part of aedeagus and both pointed at apices (Fig. 16). Anterior ventral processes of aedeagus twice shorter than those posterior, pointed at apices. Gonostyli higher than wide, with anterior part of dorsal margins bearing a small latero-ventrally oriented process.

HOLOTYPE: ♂, "Cambodia: Kirirom, 700 m, 1.–6.IV.1961, N.R. Spencer collector". Deposited in BPBM.

PARATYPES: 7 specimens. Cambodia: Kirirom, 700 m, 31.iii.1961 to 1.–7.iv.1961, N.R. Spencer lgt.: 1♂ and 5♀ (2♀ and 1♂ in MNHN and 4♀ in BPBM). Cambodia: Kirirom, 700 m, 1.–6.iv.1961, N.R. Spencer lgt.: 1♀ (BPBM).

ETYMOLOGY. Species name derived from the Latin "magna" (large).

DISTRIBUTION. Cambodia.



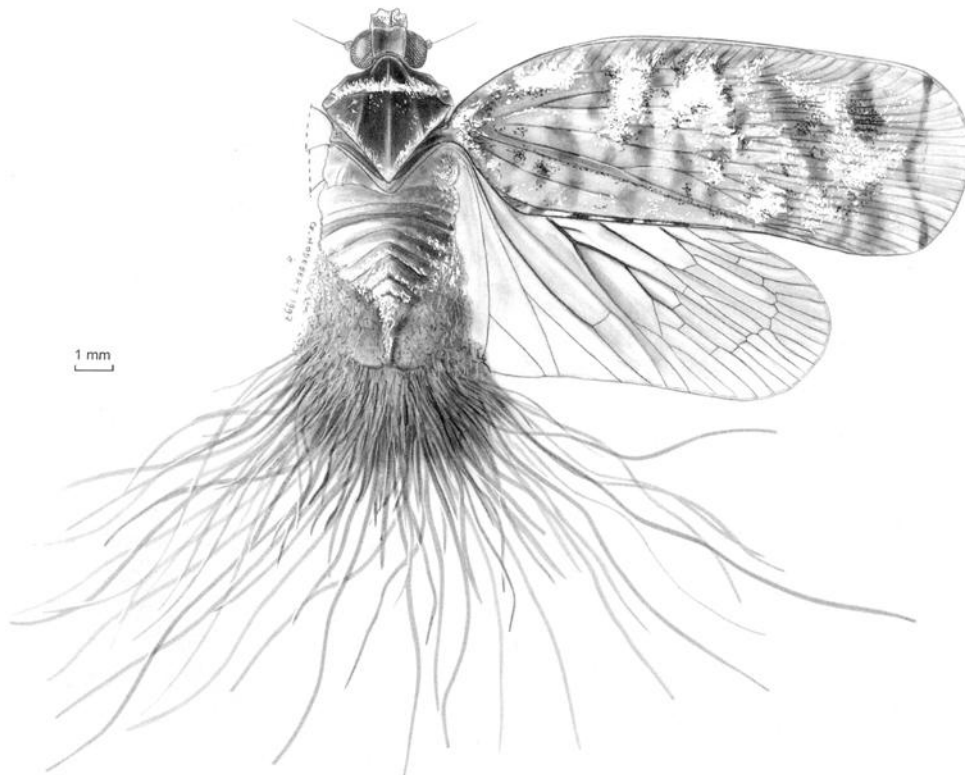


Fig. 34: *Corethrura fuscovaria* Hope, 1843, habitus.

#### Genus *Pseudotyxis* gen. n.

TYPE SPECIES: *Pseudotyxis malimoenensis* sp. n. Monotypic genus.

Vertex wider than long, with median carina. Anterior and posterior margins carinate and curved anteriorly. Posterior margin inverted-V-shaped. Lateral margins carinate, straight and parallel. Frons longer than wide with lateral margins carinate continuously from vertex-frons suture to frontoclypeal suture. Sublateral and median carinae of frons clearly observable. Clypeus tricarinate. Labium long, extending beyond hind trochanters, with terminal segment longer than wide. Gena not swollen. Subocular callus present. Fore and mid legs long with flattened femur and long and slightly flattened tibia. Hind legs long and slender, bearing laterally 3 strong spines and apically 9 spines. Apex of the first segment of hind tarsus bearing a small number of spines that form a triangular zone. Venation of tegmina with Sc and R fused along a short length. M and Cu distinct from their bases. Costal vein distinct from costal margin and transverse veins present.

SIZE. Total length (tegminae included) 13 to 15 mm.

FEMALE. Anal tube with apical lobes generally oriented vertically. Lobes protruding dorsally and ventrally in comparison to anal tube plane. Two in-line median protuberances covered with setae are present ventrally (Fig. 18). Gonopods well developed, particularly the dorsal lobes.



MALE. Anal tube extended apically and laterally. Pygofer higher than wide. Aedeagus with ventral anterior processes present and ventral posterior processes absent. Dorsal margin of gonostyli of irregular form when viewed laterally.

REMARKS. This genus is closely related to *Menosca*. In both genera the posterior margin of the vertex is curved anteriorly, but in *Pseudotyxis* the posterior margin is of an inverted V-shape. Lateral ends of anterior prothoracic margin are carinate in *Menosca*, whereas these carinae are absent in *Pseudotyxis*. Female genitalia: Both genera possess a pair of bilobate gonoplacs but the upper lobes are twice larger than the lower lobes in *Pseudotyxis* whereas the upper lobes are smaller than the lower lobes in *Menosca*. The female anal tubes also differ: In *Menosca* the anal tube is shorter than the height of the apical lobes whereas in *Pseudotyxis* the anal tube is much longer than the height of the apical lobes.

ETYMOLOGY. Generic name derived from the Greek "pseudo" (falsely) and "tyxis" which is the ending of a genus name within the Lophopidae. Gender feminine.

DISTRIBUTION. Java.

*Pseudotyxis malimoenensis* sp. n.

Larger part of frons at gena level. Sublateral and median carinae of frons joined close to frons-vertex suture. Clypeus tricarinate, with lateral carinae prolonging those of the frons and median carina prolonging that of frons to the apex of anteclypeus. Subocular callus weakly developed. Pedicel of antenna longer than its diameter. Prothoracic carinae joined anteriorly. Prothorax with anterior margin medially protruding and posterior margin concave. Mesothorax tricarinate. Hind tibia bearing apically 9 strong spines divided in two groups (5 and 4). Apex of first hind tarsal segment bearing 11 to 12 spines that form a triangular zone.

COLOURATION. Small white patches present along nearly the entire length of sublateral carinae of frons, between carinae and lateral margins; otherwise frons homogeneously cream. General colour light brown to yellowish, apical part of tegminae with irregular darker pattern.

SIZE. Total length (tegminae included) 13 to 15 mm.

MALE. Extended part of anal tube V-shaped ventrally. Pygofer twice higher than wide, with an incision on the dorsal half of the posterior margin (Fig. 19). Dorsal periandrium with a pair of small rounded processes located medio-posteriorly, and a pair of processes with sharp apices located latero-posteriorly (Fig. 20). Aedeagus prolonged over insertion point of processes, its enlarged apex bearing two pointed and slender protuberances. Ventral anterior processes present, long and slender (Fig. 21). Dorsal margins of gonostyli of irregular form, protruding dorsally into a hook-shaped structure. Gonostyli bearing upon its external surface a small anteriorly oriented pointed process.

HOLOTYPE: ♂, "Java. Malimoen, II 1939, Mrs M.-E. Walsh". Deposited in MZLU.

PARATYPES: 8 specimens. Java. Malimoen, ii.1939, Mrs M.-E. Walsh: 3♂ and 2♀ (1♀ and 1♂ in MNHN and 1♀ and 2♂ in MZLU). Mount Guntur, Garoet west Java, 1,350 m, Overbeck lgt.: 2♀ (SMTD). Nederlands Indie, west Java 1800', Tjimerang, 9.xi.1939, J.M.A. Groenendael: 1♀ (ZMAN).

ETYMOLOGY. Species name refers to the type locality.

DISTRIBUTION. Java.

## Key to the genera of Lophopidae

(with the exception of four unobtainable genera: *Ridesa* Schumacher, 1915,  
*Epiptyxis* Gerstaecker, 1895, *Katoma* Baker, 1925 and *Meloenopia* Metcalf, 1952)

- 1 Apical spines of first hind tarsal segment, forming a triangular zone ..... 2
- Apical spines of first hind tarsal segment separated by a pad of microsetae ..... 24
- 2 Ocellar carinae present ..... 3
- Ocellar carinae absent ..... 10
- 3 Tegminae with at least 60% of their surface transparent; costal vein not distinct from the costal margin ..... 4
- Tegminae with at least 80% of their surface coloured; costal vein and costal margin distinct from each other ..... 7
- 4 Lateral margins of frons carinate from vertex-frons suture to frontoclypeal suture ..... *Magia* Distant, 1907
- Lateral margins of frons not completely carinate; carinae absent at gena level ..... 5
- 5 Lateral clypeal carina present ..... *Kasserota* Distant, 1906
- Lateral clypeal carina absent ..... 6
- 6 In lateral view: distance between compound eye and frontal suture at least equal to compound eye diameter ..... *Acarna* Stål, 1863
- In lateral view: distance between compound eye and frontal suture clearly shorter than compound eye diameter ..... *Onycta* Fennah, 1955 (Fig. 22)
- 7 Labium short; not reaching hind trochanters ..... 8
- Labium long; extending beyond hind trochanters ..... 9
- 8 Foramen of antenna separated from compound eye base ..... *Jugoda* Melichar, 1915
- Foramen of antenna touching compound eye base ..... *Maana* gen. n. (Fig. 1)
- 9 Tegminae with apical white eyespot confined by dark rings ..... *Zophiuma* Fennah, 1955 (Fig. 23)
- Black tegminae without eyespot ..... *Megacama* Baker, 1925
- 10 Genal carinae present ..... 11
- Genal carinae absent ..... 15
- 11 Frons bearing sensorial protuberances ..... *Asantorga* Melichar, 1915
- Frons without sensorial protuberances ..... 12
- 12 Frons with transverse coloured stripes ..... 13
- Frons without transverse coloured stripes ..... *Virgilia* Stål, 1870
- 13 Angle between clypeal axis and vertex plane less than 22° ..... 14
- Angle between clypeal axis and vertex over 40° ..... *Clonaspe* Fennah, 1955
- 14 Main veins on tegminae non-recognisable; general aspect of tegminae coarsely reticulate ..... *Buxtoniella* Muir, 1927 (Fig. 24)
- Main veins on tegminae recognisable ..... *Painella* Muir, 1931
- 15 Lateral ocelli absent; male genitalia without corpus connectivi; female genitalia with membranous vagina ..... *Carriona* Muir, 1931 (Fig. 25)
- Lateral ocelli present; male genitalia with corpus connectivi; female genitalia with thick vagina walls or presence of sclerites in the vagina ..... 16
- 16 Sublateral carinae of frons swollen ..... *Aluma* Distant, 1909 (Fig. 26)
- Sublateral carinae of frons not swollen, or absent ..... 17
- 17 Median carina of frons present ..... 20
- Median carina of frons absent ..... 18
- 18 Sublateral carinae of frons not observable ..... 19
- Sublateral carinae of frons clearly observable ..... *Bisma* Distant, 1906 (Fig. 27)
- 19 Tegminae with apical eyespots; vertex slightly longer than wide; frons dark brown ..... *Pseudocorethrura* Melichar, 1915 (Fig. 28)
- Tegminae without any apical eyespots; vertex three times longer than wide; frons yellowish ..... *Zelega* Melichar, 1915
- 20 Lateral carinae of vertex foliaceous ..... *Makota* Distant, 1909 (Fig. 29)

– Lateral carinae of vertex clearly visible but not foliaceous	21
21 Mesothoracic median carina present and paired	<i>Apia</i> Distant, 1909 (Fig. 30)
– Mesothoracic median carina simple or not observable	22
22 Vertex very long, at least as long as maximum mesothoracic length	<i>Lapithasa</i> Melichar, 1914
– Vertex shorter than maximum mesothoracic length	23
23 Total length of specimen greater than 13 mm; posterior margin of vertex inverted-V-shaped	<i>Pseudotyxis</i> gen. n. (Fig. 17)
– Total length of specimen less than or equal to 12 mm; posterior margin of vertex curved anteriorly but not inverted-V-shaped	<i>Menosca</i> Stål, 1870
24 Pad of microsetae on first hind tarsal segment longitudinally striated	<i>Elasmoscelis</i> Spinola, 1839 (Fig. 31)
– Pad of microsetae not striated	25
25 Frontal disc longitudinally deeply concave, gutter-shaped	26
– Frontal disc not longitudinally deeply concave	29
26 In dorsal view, length of vertex and frons longer than 1/4 of insect's total length	<i>Pyrilla</i> Stål, 1859 (Fig. 32)
– In dorsal view, length of vertex and frons less than 1/4 of insect's total length	27
27 Total length of insect (with tegmina) shorter than 14 mm	28
– Total length of insect longer than 15 mm	<i>Corethrura</i> Hope, 1843 (Fig. 34)
28 Gonapophysis IX reduced to a membranous median lobe; posterior ventral process of aedeagus slender, apically acute and regularly curved	<i>Lophops</i> Spinola, 1939
– Gonapophysis IX reduced and paired; posterior ventral process of aedeagus short and hook-shaped	<i>Serida</i> Walker, 1857
29 Median anterior margin of prothorax anteriorly protuberant	<i>Pitambara</i> Distant, 1906
– Median anterior margin of prothorax regularly rounded	30
30 Fore femur with regular line of brown spots	31
– Fore femur without regular line of brown spots	33
31 General colour light brown; frons green bearing longitudinal orange stripes; total length less than or equal to 10 mm	<i>Podoschtroumpfa</i> gen. n. (Fig. 13)
– Specimen generally of bright colour; frons without longitudinal orange stripes; total length longer than 10 mm	32
32 Prothoracic median carina present	<i>Acothrura</i> Melichar, 1915
– Prothoracic median carina absent, brown spots on fore femur slightly protuberant	<i>Paracorethrura</i> Melichar, 1915 (Fig. 33)
33 Fore femur and tibia foliaceous; median carina on the frons absent	<i>Lacusa</i> Stål, 1862
– Fore femur and tibia flattened but not foliaceous; median carina on the frons present even if rudimentary	<i>Sarebasa</i> Distant, 1909

ACKNOWLEDGEMENTS. For the loan of material, I would like to thank G. Nishida (BPBM) and the curators of SMTD, MZLU and ZMAN. I also wish to thank G. Hodebert for drawing the habitus illustrations, and to T. Bourgoïn and L. O'Brien for their precious advice.

#### REFERENCES

- ASCHE M. 1985: Zur Phylogenie der Delphacidae Leach, 1815 (Homoptera: Cicadina: Fulgoromorpha). *Marbg. Entomol. Publ.* 2: 398 pp.
- BAKER C.F. 1925: Some Lophopidae (Fulgoroidea) of the Indo-Malayan and Papuan regions. *Treubia* 6: 271–296.
- BOURGOÏN T. 1988: A new interpretation of the homologies of the Hemiptera male genitalia, illustrated by the Tettigometridae (Hemiptera, Fulgoromorpha). In Vidano C. & Arzone A. (eds): *Proc. 6th Auchen. Meeting, Turin, Italy, 7–11 Sept. 1987*. CNR-IPRA, Turin, pp. 113–120.
- BOURGOÏN T. 1993: Female genitalia in Hemiptera Fulgoromorpha, morphological and phylogenetic data. *Ann. Soc. Entomol. Fr.* 29: 225–244.

- BOURGOIN T. & HUANG J. 1990: Morphologie comparée des genitalia mâles des Trypetimorphini et remarques phylogénétiques (Hemiptera: Fulgoromorpha: Tropiduchidae). *Ann. Soc. Entomol. Fr.* **26**: 555–564.
- CARAYON J. 1969: Emploi du noir chlorazol en anatomie microscopique des insectes. *Ann. Soc. Entomol. Fr.* **5**: 179–193.
- CHOU I., CHAO H. & CHIANG S. 1983: Modification of insect scientific names connected with “Manchukuo”. *Entomotaxonomia* **5**: 66.
- DE SOUZA AMORIN D. 1982: Classificação por sequencição: Uma proposta para a denominação dos ramos retardados. *Rev. Bras. Zool.* **1**: 1–9.
- FENNAH R.G. 1978: The higher classification of the Nogodinidae (Homoptera, Fulgoroidea) with the description of a new genus and species. *Entomol. Mon. Mag.* **113**: 113–119.
- FENNAH R.G. 1987: A recharacterisation of the Ommatidiotini (Hem.-Hom., Fulgoroidea, Issidae, Calicelinae) with the description of two new genera. *Entomol. Mon. Mag.* **123**: 243–248.
- GHAURI M.S. 1976: The genus Numicia from economic plants in the Oriental region (Homoptera: Fulgoroidea). *Syst. Entomol.* **1**: 9–13.
- KUMARASINGHE N.C. & WRATTEN S.D. 1996: The sugarcane planthopper *Pyrilla perpusilla* (Homoptera: Lophopidae): a review of its biology, pest status and control. *Bull. Entomol. Res.* **86**: 485–498.
- MELICHAR L. 1915: Monographie der Lophopinen. *Ann. Mus. Nat. Hungar.* **13**: 337–385, Figs 1–22.
- MUIR F. 1930: On the classification of the Fulgoroidea. *Ann. Mag. Nat. Hist.* **6**: 461–478.
- O'BRIEN L. 1987: A synopsis of the new world Lophopidae (Homoptera, Fulgoroidea). *Fla. Entomol.* **70**: 493–499.
- SMITH E.S. 1980: *Zophiuma lobulata* Ghaury (Homoptera: Lophopidae) and its relation to the finschhafen coconut disorder in Papua New Guinea. *P. N. G. Agric. J.* **31**: 37–45.
- SOULIER-PERKINS A. 1997: Systématique phylogénétique et test d'hypothèses biogéographique chez les Lophopidae (Hemiptera, Fulgoromorpha). Thesis, MNHN, Paris, 128 pp.
- SOULIER-PERKINS A. & BOURGOIN T. 1998: Copulatory mechanisms and sexual selection in the Lophopidae (Hemiptera, Fulgoromorpha). *Ann. Soc. Entomol. Fr.* **34**: 149–162.
- STAPLEY J.H. 1976: Annual report of entomologist for 1976. *Rep. Min. Agric. Lands (Solomon Islands)*, 28 pp.
- STAPLEY J.H. 1978: Annual report of entomologist for 1978. *Rep. Min. Agric. Lands (Solomon Islands)*, 27 pp.
- WILSON M.R. 1988: Records of Homoptera Auchenorrhyncha from palms and associations with disease in coconuts. *Oléagineux* **43**: 247–251.
- WILSON S.W., MITTER C., DENNO R.F. & WILSON M.R. 1994: Evolutionary Patterns of Host Plant Use by Delphacid Planthoppers and their Relatives. In Denno R.F. & Perfect T.J. (eds): *Planthoppers, Their Ecology and Management*. Chapman & Hall, London, pp. 7–113.

Received February 20, 1998; accepted June 3, 1998