

The delphacid genus *Sogatella* and related groups: a revision with special reference to rice-associated species (Homoptera: Fulgoroidea)

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ABSTRACT. The delphacid planthopper genus *Sogatella* Fennah is redefined and a key provided to males of the fourteen included species. The type-species of *Sogatodes* Fennah, *S. molinus* Fennah is considered to be a *Sogatella* species and consequently *Sogatodes* becomes a junior subjective synonym of *Sogatella*. The remaining species of *Sogatodes* are transferred to *Tagosodes* **gen.n.** (type species *T. cubanus* (Crawford) **comb.n.**), *Latis- tria* Huang *et al.* or *Sogatellana* Kuoh. A key is provided to distinguish the four genera. A check list of species in each genus is given. Several species are important rice pests and information on biology and pest status is summarized.

Introduction

Several delphacid (planthopper) species are important pests of cereal crops such as maize, wheat and rice. Some species currently placed in the genera *Sogatella* Fennah and *Sogatodes* Fennah, are serious pests of rice in Asia and south and central America by virtue of the effects of their direct feeding and by their role as vectors of virus disease (e.g. Ou, 1985, and see references in Wilson & Claridge, 1985). There have been considerable difficulties in the identification of species in these genera since their separation is mainly based on small differences in the male genitalia. However, these difficulties in identification have been compounded by taxonomic problems. In Asia it appears that many names have been applied to a small number of species. Also, Okada (1977) realized that names given to *Sogatella* species in Japan might not concur with their usage elsewhere. We now find that the type

species of *Sogatodes*, *S. molinus*, belongs to the genus *Sogatella*. Consequently, *Sogatodes* must be synonymized with *Sogatella* and subsequently there is a need to establish at least one genus in which to place the remaining species. This study has been undertaken to resolve the situation and also to provide names for use in a handbook for the identification of rice planthoppers currently under preparation by M. R. Wilson and M. F. Claridge.

Material studied is deposited in the following collections denoted by the abbreviations given: AMNH: American Museum of Natural History, New York, U.S.A.; BMNH: British Museum (Natural History), London, U.K.; BPBM: Bernice P. Bishop Museum, Honolulu, U.S.A.; KU: Snow Entomological Collection, University of Kansas, Lawrence, U.S.A.; LV: R. Linnavuori collection, Raisio, Somersoja, Finland; LOB: L. O'Brien collection, Tallahassee, Florida, U.S.A.; MA: M. Asche collection, Marburg, West Germany; MAK: Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, West Germany; NCIP: National

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Insect Collection, Pretoria, South Africa; NM: Naturhistorisches Museum, Basel, Switzerland; MNHN: Muséum National d'Histoire Naturelle, Paris, France; USNM: United States National Museum, Washington, U.S.A.; UTS: Theron Collection, University of Stellenbosch, Stellenbosch, South Africa.

In the section 'Distribution and material examined' countries from which specimens have been examined are indicated by *.

Taxonomic history

The species now placed in *Sogatella* are among some of the most widely distributed and taxonomically difficult of any Delphacidae. It is not intended here to provide a full history of *Sogatella* and its species, but some information is given as background to the problem. The type species, *S. furcifera* (Horváth) is listed in Metcalf's (1943) catalogue with ten synonyms and three subspecies, following Muir & Giffard (1924). Those authors, realizing the difficulties of identification, wrote 'The authors cannot protest too strongly against erecting species in this group on color or even slight structural characters. Such species not only lead to confusion, but lead to totally wrong conceptions as to relationship and geographical distribution'. Unfortunately, until Fennah's (1963a) study, no stable generic concept had been established for what he called the 'species-complex known as *Sogata furcifera*'. By that time *furcifera* had been included by various authors in six different genera (*Delphax* Fabr., *Liburnia* Stål, *Sogata* Distant, *Megamelus* Fieber, *Delphacodes* Fieber and *Chloriona* Fieber). As an interim measure until 'a more critical assessment of its relationships could be made' Fennah (1956a) established *Sogatella* as a subgenus of *Chloriona*. In his later study (Fennah, 1963a) almost all the synonyms included under *S. furcifera* by Muir & Giffard (1924) were raised from synonymy and a number of new species were described. Fennah's study has, for 25 years, been regarded as definitive, but the difficulties expressed in our introduction have necessitated that *Sogatella* should be 'revisited'. Okada (1977: 10) expresses one of the problems clearly. In discussing *S. longifurcifera* Esaki & Ishihara, he writes '... *S. longifurcifera* referred to by Japanese researchers is possibly being con-

fused with *S. kolophon*. In addition to this the species re-illustrated by Fennah (1963a) as *S. longifurcifera* strongly resembles the species Japanese researchers call *S. panicicola* in various characters.' Dr R. Kisimoto kindly sent specimens from Japan and examination of his specimens confirmed that Okada's opinion was indeed correct.

A number of *Sogatella* species have been described since 1963. For our study considerably more specimens were available than were examined by Fennah, including several type specimens that he did not see. The results of our study appear to move us back towards the broader species concept of Muir & Giffard. This is not entirely so, as eight of their ten synonyms of *S. furcifera* are considered valid species. The major changes to *Sogatella* outlined in this paper concern the status of *S. vibix* (Haupt) and *S. kolophon* (Kirkaldy) in which eight and seven synonyms respectively are newly proposed. We regard both species as having a wide distribution and the majority of synonyms have arisen from descriptions of new nominal species based on slight morphological differences without proper appreciation of variation within and between populations or without reference to other described species at all. The analytical approach adopted in this study is, by necessity, morphological in emphasis and centred on characters of the male genitalia. Few biological data are available to support species separation in most cases. However, a study of the courtship-songs of the three Asian *Sogatella* species has been made by Uhm *et al.* (1982). They demonstrated species-specific differences in both males and females of *S. furcifera*, *S. vibix* (given as *S. panicicola* (Ishihara)) and *S. kolophon* (given as *S. longifurcifera* Esaki & Ishihara). These data lend support to our morphological concept, especially since we recognize only these three species occurring sympatrically throughout Asia. It would be worthwhile to study the acoustic repertoire of *Sogatella* species in Africa where thirteen species are found, many of them sympatric.

Sogatella belongs to a group of genera that have a slender body shape, narrow vertex and frons and a white or pale yellow longitudinal stripe from the head across the pro- and mesanotum (Fig. 1). This group contains *Latis-tria*, *Matutinus* (recently revised by Fennah, 1972), *Sogatella*, *Sogatellana* and *Tagosodes* gen.n. These

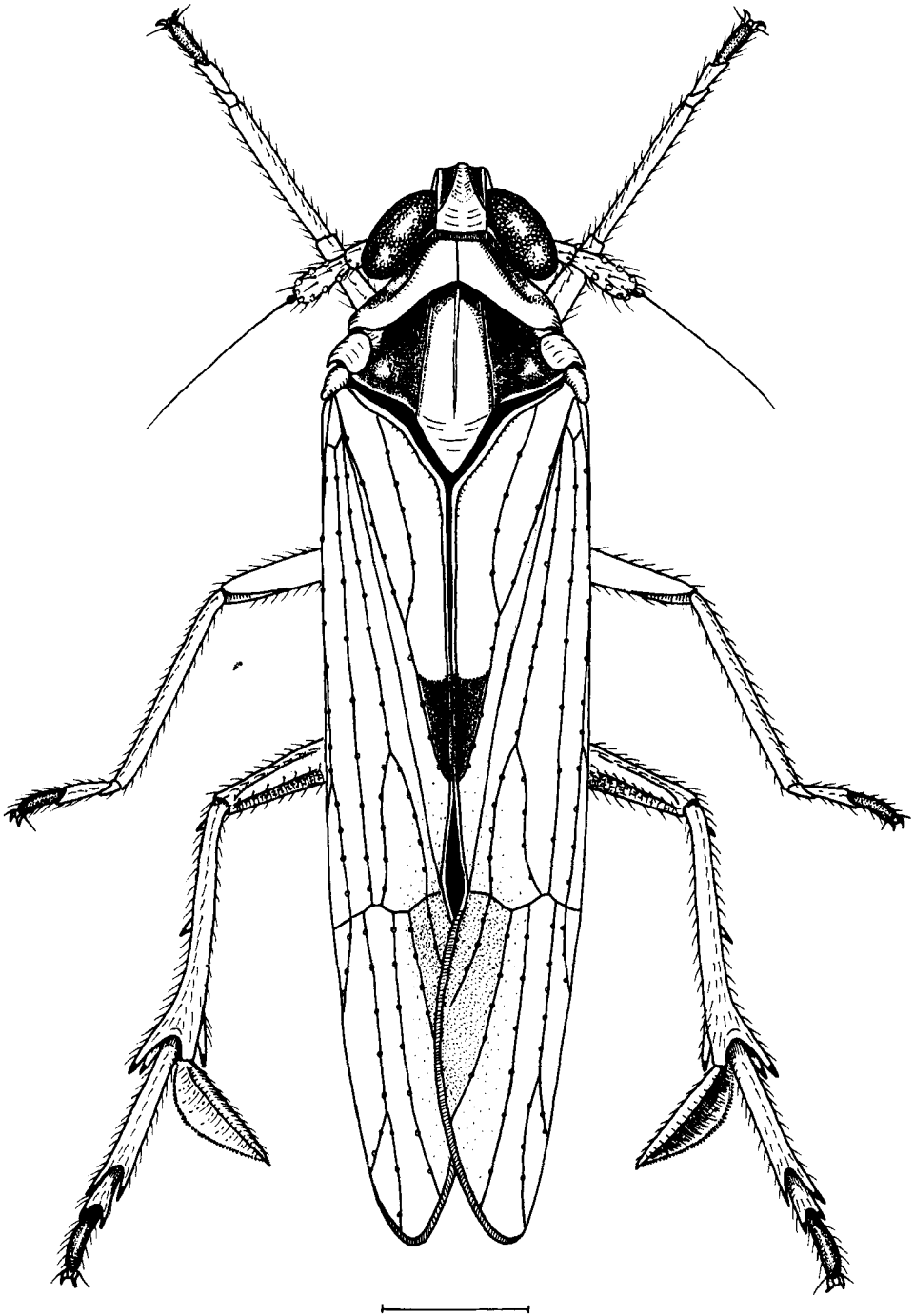


FIG. 1. *Sogatella furcifera* (Horvath), habitus, ♂ from Sulawesi; scale line: 0.5 mm.

genera may mainly be separated by characters of the male genitalia. A key is given below.

Distribution of *Sogatella*, *Tagosodes*, *Latristria* and *Sogatellana* species

(Names here and below in 'Biology' and 'Economic aspects' are as used in accordance with the synonymies and new combinations proposed later in the paper.)

Sogatella species are found throughout the sub-tropical and tropical regions of the world. They are concentrated in Africa where thirteen species are found. Two species, *S. kolophon* and *S. molina*, are found in the Nearctic and Neotropical regions. With our revised concept only three species, *S. furcifera*, *S. kolophon* and *S. vibix*, are found in Asia, the Pacific and Australasia. These are the most widely distributed species; *S. kolophon* is found throughout the entire range of the genus, while *S. vibix* is found in Asia and the Ethiopian region. *S. furcifera* is common throughout Asia and extending to the Middle East.

Tagosodes species are also found throughout the tropics but with more species recognized from the Nearctic region than with *Sogatella*. *Latristria* and *Sogatellana* species are found only in the old world tropics.

Biology and host plants

These genera are entirely grass-associated but little evidence is available for specificity. Mochida & Okada (1971) list the host plants of Japanese Delphacidae, including *Sogatella* species. Unfortunately they fail to differentiate adequately between casual host records and true host plants. However, for *S. furcifera* a considerable list of Gramineae is given from which nymphs were reared to adult under experimental conditions. Lee & Kwon (1980) also give an extensive list of host plants of *S. furcifera*. Ammar (1977) reared *S. vibix* in Egypt, on wheat experimental conditions for eight successive generations. The cultures originated from rice and other Gramineae. Ammar *et al.* (1980) also reared *S. nigeriensis* (recorded as *S. furcifera*) under similar conditions and from the same original hosts. In central America, King & Saunders (1984) record the host plants of *Tagosodes*

cubanus and *T. oryzicolus* as rice, *Echinochloa* and other Gramineae.

S. furcifera is a serious rice pest in Japan but appears unable to overwinter there and undergoes long-distance migration (with *Nilaparvata lugens* (Stål) the brown planthopper) each year from southern China (Kisimoto, 1976, 1987).

Economic aspects of *Sogatella* and *Tagosodes* species

S. furcifera is second only to *Nilaparvata lugens* (Stål) as a rice pest in Asia where it damages the crop by direct feeding. Other species such as *S. nigeriensis* and *S. vibix* are frequently found on rice (e.g. Ammar, 1977; Ammar *et al.*, 1980) but are not considered to be important pests at present. *Tagosodes pusanus* (Distant) is also found commonly on rice in Asia. At present none of these species are known to spread virus diseases to rice. However, *Tagosodes oryzicolus* and *T. cubanus* are well-known vectors of Hoja blanca virus of rice in south and central America, where 50% of the yield may be lost to this disease, and as such are considered important pest species in that region (King & Saunders, 1984). *S. vibix* is the vector of maize rough dwarf virus in the middle east (Harpaz, 1966) and (as *S. longifurcifera*) is reported as a vector of Maize Sterile Stunt in Australia (Greber, 1982). *S. kolophon* is the vector of *Digitaria striate* virus in Australia (Greber, 1979). Julia & Mariau (1982) reported that *S. kolophon* and *Tagosodes cubanus* (as *Sogatodes*) were the vectors of dry bud rot of coconuts in West Africa. The causative agent of the disease is not known.

Key to genera (males only)

1. Anal segment with two pairs of processes (e.g. Figs 136, 137) *Sogatellana*
- Anal segment with one pair of processes (e.g. Figs 21, 112, 126) 2
2. Mediodorsal margin of diaphragm of genital segment forming a broad U-shape (Fig. 20), aedeagus compressed, twisted, with two rows of spines *Sogatella*
- Diaphragm of genital segment different, aedeagus tubular, with irregular teeth and/or teeth in rows 3

- 3. Mediodorsal margin of diaphragm forming a conspicuous caudodorsad directed, shoe-shaped protuberance; anal segment with rather long sinuate processes which originate subdistally; relatively robust species with acute angled transition of frons to vertex *Matutinus*
- Diaphragm of genital segment and processes of anal segment different, small and slender species with transition of vertex to frons either rounded or slightly acute-angled 4
- 4. Diaphragm of genital segment mediodorsally with a sinuate protrusion (Figs 124, 129); parameres, slender (Figs 125, 130), almost reaching the laterodorsal angles of the genital segment *Latistria*
- Diaphragm medio-dorsally with either a raised T-shaped area or a distinct rectangular protusion (Figs 92, 101, 104), or with inverse W-shaped central projection (Fig. 108). Parameres variously shaped but not long and slender *Tagosodes* gen.n.

Sogatella Fennah

Chloriona (Sogatella) Fennah, 1956a: 471. Type species (by original designation), *Delphax furcifera* Horváth, 1899: 372.

Sogatodes Fennah, 1963a: 71. Type species (by subsequent designation by Fennah, 1963b: 166), *Sogatodes molinus* Fennah, 1963a: 72. **Syn.n.**

Diagnosis. Small and slender delphacids. Macropterous males about 2.5–3.5 mm, macropterous females about 3.0–4.00 mm. Vertex rounded onto frons, anterior cell of vertex long, reaching to apex of vertex or bent towards frons.

Coloration. Males with a whitish longitudinal stripe across vertex and the middle portion of pro- and mesonotum; lateral portions of pro- and mesonotum brown or black. Females distinctly lighter than males, yellow to orange, stramineous or light brown.

Sogatella can be distinguished from other externally similar genera by a combination of characters of the male genitalia as follows. We consider these three characters to be constitutive characters for *Sogatella*:

1. The dorsal margin of the diaphragm in the middle possesses two cone-shaped processes which are medially connected by a dorsally slightly concave tuberosity, altogether forming a broad U-shaped structure.
2. The aedeagus is moderately long, slightly

sinuate, after its basal third it is bent dorsad, with the tip curved ventrad, slightly compressed and twisted tapering to the apex. Two rows of small teeth are present ascending from the ventrodorsal third on both sides to the dorsal third. The phallotreme is situated subapically on the left side.

3. The parameres are diverging, in most of the species tapering to apex and distally bifurcated.

Synonymy of Sogatodes with Sogatella

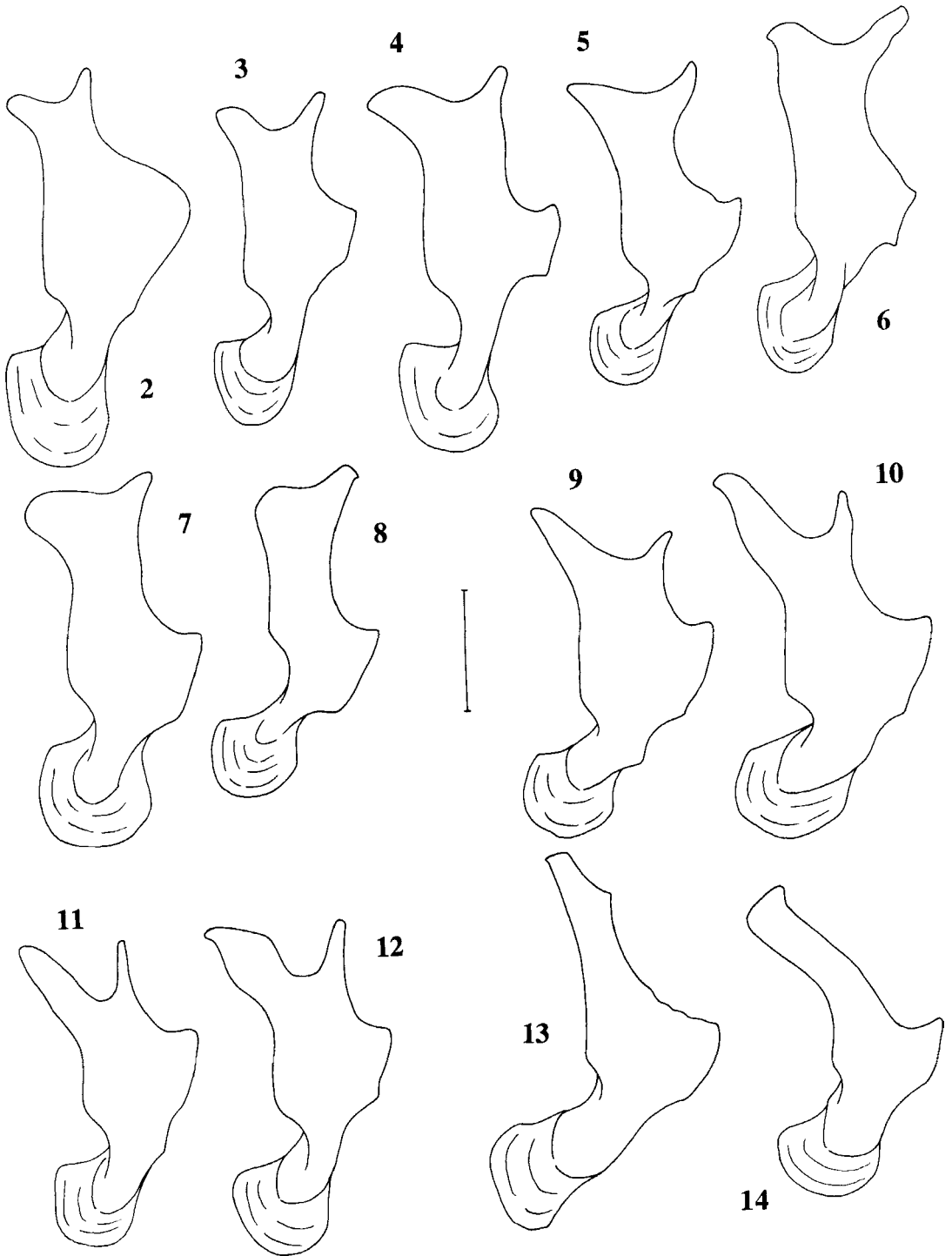
Fennah (1963a) established the genus *Sogatodes* to accommodate the species *Dicranotropis cubanus* Crawford, *Sogata biangulata* Muir, *Sogata orizicola* Muir, *Megamelus approximatus* Crawford, *Sogata brazilensis* Muir, *Sogata nautica* Muir, *Sogata anomala* Muir, *Sogata dorsolineata* Beamer, *Liburnia albolineosa* Fowler and *Sogatodes molinus*. Unfortunately, by an oversight no species was designated as type species. Subsequently, *S.molinus* was designated as type species (Fennah, 1963b).

Several other species have since been transferred to *Sogatodes* or newly described in that genus (see list under *Tagosodes*). For reasons given later in this paper *S.molinus* is regarded as a *Sogatella* species and accordingly all species currently placed in *Sogatodes* have to be placed in other genera. The genus *Tagosodes* is described below to accommodate the bulk of the species while others are transferred to *Latistria*, and *Sogatellana*.

Checklist of Sogatella species and sub-species

More detailed synonyms are given under each species.

- Sogatella albofimbriata* (Muir)
= *Sogata rhodesi* Muir
- Sogatella camptistylis* Fennah
- Sogatella capensis* (Muir)
- Sogatella colorata colorata* (Distant)
- Sogatella colorata nigrior* Fennah
- Sogatella furcifera* (Horváth)
= *Sogata distincta* Distant
= *Sogata pallescens* Distant
= *Sogata kyusyuensis* Matsumura & Ishihara
syn.n.



FIGS 2–14. *Sogatella* spp.; left paramere, maximum view, scale line: 0.1 mm; 2–8: *S. furcifera*-group; 2, *S. furcifera* (Horváth), specimen from Belau Is.; 3, *S. nigriensis* (Muir), specimen from Nigeria; 4, *S. camptistylis* Fennah, specimen from Uganda; 5, *S. capensis* (Muir), specimen from S. Africa (Cape Province); 6, *S. yei* Linnavuori, holotype, Sudan (Equatoria); 7, *S. manetho* Fennah, holotype, Zimbabwe; 8, *S. petax* Fennah, specimen from Tanzania (Zanzibar). 9–12: *S. kolophon*-group; 9, *S. kolophon* (Kirkaldy), paratype, Australia (Queensland); 10, *S. molina* (Fennah), paratype, Mexico; 11, *S. nigriensis* (Jacobi), specimen from Uganda; 12, *S. vibix* (Haupt), specimen from Israel. 13–14. *S. albofimbriata*-group; 13, *S. albofimbriata* (Muir), specimen from Ivory Coast; 14, *S. krugeri* (Muir), specimen from S. Africa (Natal).

- =*Sogata tandojamensis* Qadri & Mirza nomen nudum
- Sogatella kolophon* (Kirkaldy)
 - =*S. kolophon atlantica* Fennah **syn.n.**
 - =*Opiconsiva insularis* Distant **syn.n.**
 - =*Sogata meridiana* Beamer **syn.n.**
 - =*Opiconsiva balteata* Distant **syn.n.**
 - =*Sogatella chenhea* Kuoh **syn.n.**
 - =*Opiconsiva derelecta* distant **syn.n.**
 - =*Delphacodes elegantissima* Ishihara **syn.n.**
 - =*Sogatella nebris* Fennah **syn.n.**
- Sogatella krugeri* (Muir) **comb.n.**
- Sogatella manetho* Fennah
- Sogatella molina* (Fennah) **comb.n.**
- Sogatella nigrigenis* (Jacobi)
- Sogatella nigeriensis nigeriensis* (Muir)
 - =*Sogatella nigeriensis troilos* Fennah **syn.n.**
- Sogatella petax* Fennah
- Sogatella vibix* (Haupt)
 - =*Sogatella catoptron* Fennah **syn.n.**
 - =*Sogatella diachenhea* Kuoh **syn.n.**
 - =*Delphacodes dogensis* Ishihara **syn.n.**
 - =*Delphacodes longifurcifera* Esaki & Ishihara **syn.n.**
 - =*Liburnia matsumurana* Metcalf **syn.n.**
 - =*Sogatella parakolophon* Linnavuori **syn.n.**
- Sogatella yei* Linnavuori
- Species transferred from *Sogatella*:
- Sogatella hedai* Kuoh, 1977 to *Toya* Distant:
 - Toya hedai* (Kuoh) **comb.n.**

Remarks: The type-material of this species could not be studied. The transfer is made on the basis of the drawings of the male genitalia. They appear very similar to the type species of *Toya*, *T. attenuata* Distant.

Sogatella fulva Yang 1989:192 to *Toya*:

Toya fulva (Yang) **comb.n.**

Sogatella lima Yang 1989:199 to *Toya*

Toya lima (Yang) **comb.n.**

Sogatella timaea Fennah, 1969b to

Tagosodes **gen.n.** (see below).

Sogatella wallacei (Muir & Giffard, 1924) to

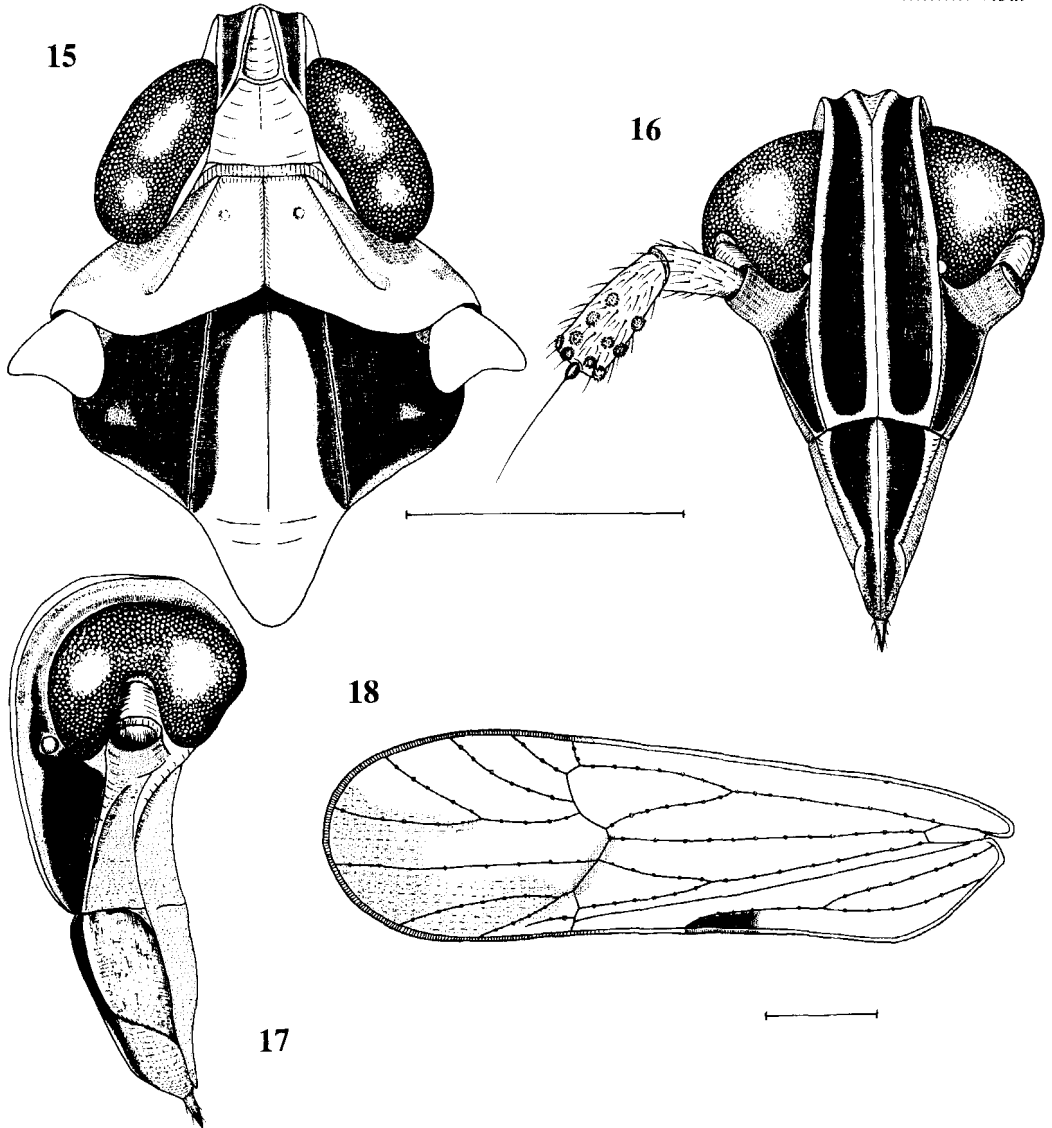
Tagosodes **gen.n.** (see below).

[Mochida & Okada (1971) and Lee & Kwon (1980) include *Delphacodes terryi* and *Sogata sirokata* in *Sogatella*. Neither of these species is a *Sogatella* species under the criteria established here. They are currently placed, respectively in *Toya* (where *terryi* is a synonym of *Toya tuberculosa*) and in *Paracorbulo*.]

Key to *Sogatella* species (males only)

1. Outer and inner angle of the apex of parameres about equally produced or the outer one rounded, apical margin shallowly concave or sinuate (*S. furcifera*-group, Figs 2–8) 2
 - Parameres distinctly bifurcate distally, inner apical process rod-like, outer one strongly produced (*S. kolophon*-group) or parameres thin and elongate, inner distal process strongly reduced or absent (*S. albofimbriata*-group) 8
2. Face with frons and clypeus and genae dark brown (carinae may be stramineous or pale yellow) 3
 - Frons and clypeus stramineous or pale yellow, genae dark brown 5
3. Apex of clavus in forewing with dark brown marking 4
 - Apex of clavus without marking; parameres with apical margin undulate, shallowly concave, outer corner forming a pointed process (Fig. 5) *capensis*
4. Parameres strongly dilated at base with apex relatively small, almost equally bifurcate (e.g. Fig. 2), diaphragm mediodorsally broadly U-shaped (Fig. 20) *furcifera*
 - Parameres not dilated at base, apical part distally about as broad as base (Fig. 3), U-shaped process of diaphragm rather narrow *nigeriensis*
5. Parameres with apical margin distinctly concave, outer apical corner forming a pointed edge or projection (Figs 4, 6) 6
 - Parameres with apical margin shallowly concave, outer apical corner rounded (Figs 7, 8) 7
6. Outer apical corner of parameres less produced than inner forming a short, pointed edge; inner corner strongly produced to a long rod-like process (Fig. 6) *yei*
 - Parameres with outer apical corner more strongly produced than inner forming a long, slightly curved process (Fig. 4) *camptistylis*
7. Outer apical corner of parameres broadly rounded, not distinctly produced, inner apical corner forming a bill-shaped process (Fig. 8) *petax*
 - Outer apical corner of parameres projected to a rounded process, apical margin of parameres almost straight, inner apical corner short and rod-like (Fig. 7) *manetho*
8. Parameres distinctly bifurcate distally, inner apical process rod-like, outer one strongly produced (*S. kolophon*-group, Figs 9–12) 9

- Parameres thin, elongate, inner apical process strongly reduced or absent (*S. albofimbriata*-group, Figs 13-14) 13
- 9. Head with frons, clypeus, genae and anterior part of vertex shiny dark brown *colorata*
- Head otherwise coloured 10
- 10. Frons, clypeus and genae pale yellow or stramineous, in some specimens a slight brown suffusion at lower area of frons and around the ocelli (Figs 35-38) *kolophon*
- Head with dark brown genae (e.g. Fig. 72) . . . 11
- 11. Frons with area between the carinae fuscous or dark brown (Figs 58, 60); forewing with apex of clavus with brown marking (Figs 61, 62) *molina*
- Frons with area between the carinae stramineous or pale yellow, apex of clavus without brown marking 12
- 12. Parameres with outer apical corner produced in a medially distinct broadened process (e.g. Fig. 12) *vibix*



FIGS 15-18. *Sogatella furcifera* (Horváth); 15-17: coloration of head and thorax, ♂ specimen from Borneo (Sarawak), scale line: 0.5 mm; 15, head and thorax, lateral view; 16, head, frontal view; 17, head left lateral view; 18, left forewing, macropterous ♂, Sulawesi, scale line 0.5 mm.

- Outer apical corner of parameres strongly produced in a long, slender process which tapers continuously to apex (Fig. 11) *nigrigenis*
- 13. Parameres with broad base, then narrowing to truncate apex (Fig. 14) *krugeri*
- Parameres narrowing conically to apex, to small edge subapically on inner margin (Fig. 13) *albofimbriata*

***Sogatella furcifera*-group (seven species)**

S.camptistylis, *S.capensis*, *S.furcifera*, *S.manetho*, *S.nigeriensis*, *S.petax*, *S.yei*

Diagnosis. Male genitalia with outer and inner apical angles of parameres about equally produced, or with the outer one rounded, apical margin shallowly concave or sinuate (see Figs 2–8).

***Sogatella camptistylis* Fennah (Fig. 4)**

Sogatella camptistylis Fennah, 1963a: 70, Holotype ♂, UGANDA (BMNH), examined.

Diagnosis. Stramineous with light face, males with dark genae (externally resembling *S.vibix*). Male genitalia similar to those of *S.yei*, but also *S.capensis* and *S.manetho*, but differing from these species in the shape of the parameres (distally shallowly concave, outer tip pronounced and slightly recurved basad).

Distribution. Africa: Uganda.

Only known from the holotype and a second male from Uganda (BMNH).

***Sogatella capensis* (Muir) (Fig. 5)**

Sogata furcifera capensis Muir, 1929b: 212. Lectotype ♂, designated Fennah, 1963a: 57, S. AFRICA (Cape Province) (BMNH) examined.

Diagnosis. Dark fuscous, externally similar to *S.furcifera* and *S.nigeriensis*. Male with shiny dark-brown frons, clypeus and genae. Male genitalia similar to those of *S.nigeriensis*, but differing in the shape of the mediodorsal process of the diaphragm which is broad U-shaped in *S.capensis*, in the tip of the parameres (apically less incised, more truncate, outer corner form-

ing a pointed process) and in the longer processes of the anal segment.

Remarks. *S.capensis* seems to be closely related to *S.nigeriensis*, possibly also to *S.camptistylis* Fennah and *S.manetho* Fennah (see below), the latter two differing in the lighter coloration.

Distribution and material examined. SOUTH AFRICA: Cape Province (Muir, 1929b: 212; Fennah, 1958b: 203; Fennah, 1963a: 57), Natal, SW-Africa (Muir, 1929b: 212; Fennah, 1963a: 57). Additional specimens from South Africa* (BMNH, NICP, UTS).

***Sogatella furcifera* (Horváth) (Figs 1, 2, 15–34)**

Delphax furcifera Horváth, 1899: 372, syntypes (♂ ♀) JAPAN (Hokkaido), not examined.

Sogata distincta Distant, 1912: 191, Lectotype ♂, designated by Fennah, 1963a: 50, INDIA, (BMNH), examined. Syn. by Muir, 1919: 7.

Sogata pallescens Distant, 1912: 192, Lectotype ♂, designated by Fennah, 1963a: 50, INDIA, (BMNH), examined. Syn. by Muir, 1919: 7.

Sogata kyusyuensis Matsumura & Ishihara, 1945: 65, Holotype ♂, JAPAN (Kyushu University, Fukuoka, Japan). **Syn.n.**

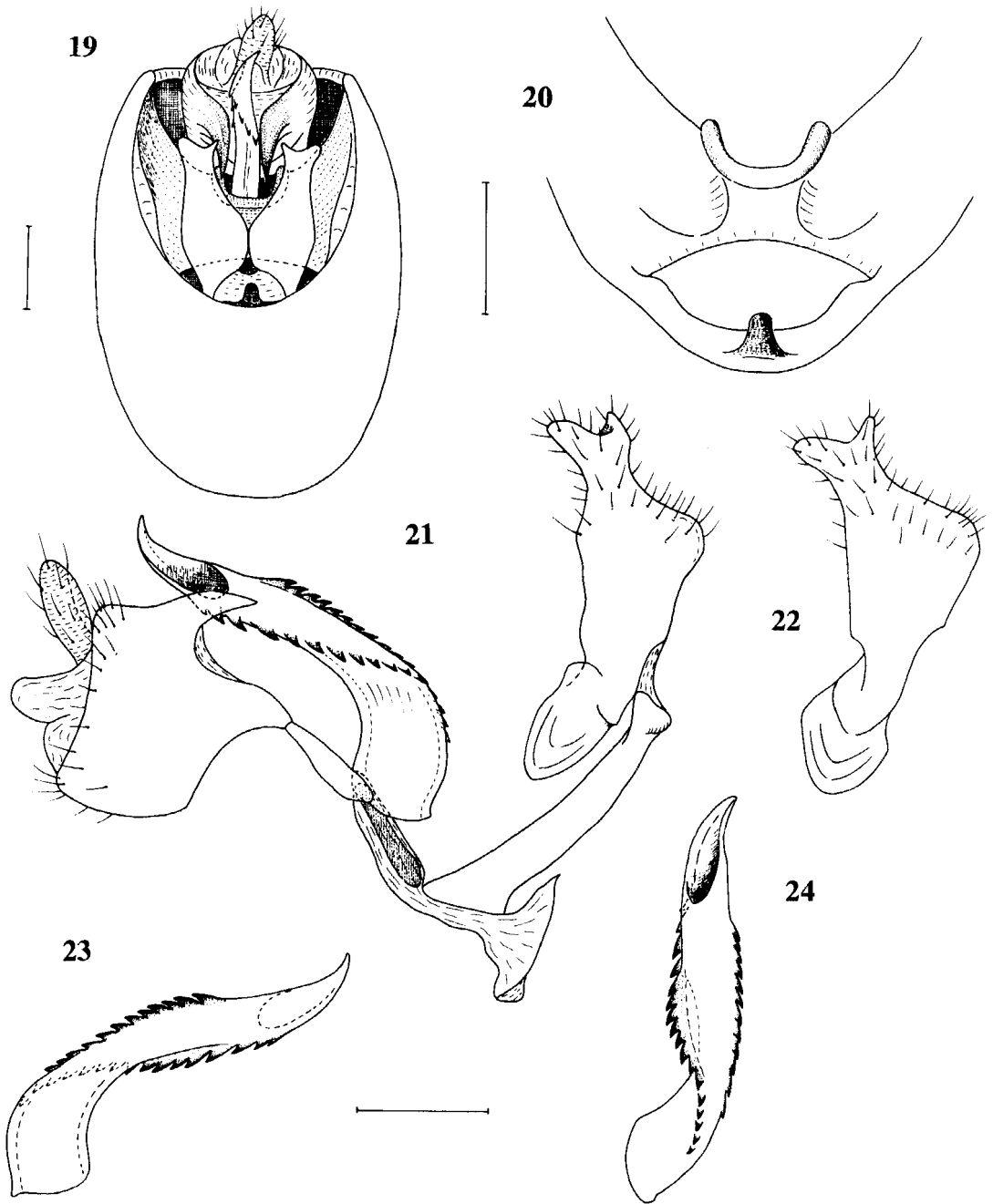
Sogata tandojamensis Qadri & Mirza, 1960: 115, nomen nudum, PAKISTAN, not examined.

Diagnosis. Males with dark frons, clypeus and genae. Tegmina with dark or fuscous marking at tip of clavus, which in females may be less developed or missing.

This species can readily be distinguished from the other *Sogatella* species by structures of the male genitalia; the parameres strongly dilated at base, apex relatively small, almost equally bifurcate (Figs 2, 22, 25–34).

Remarks. The synonymy of *S.kyusyuensis* with *S.furcifera* is based on the examination of the holotype of *S.kyusyuensis*, a brachypterous male. The name, *S.tandojamensis* (Qadri & Mirza, 1960) is invalid based on article 13 (availability of name) of the code of Zoological Nomenclature 1985. The species is, in any case, clearly identical with *S.furcifera*, based on the rather poor illustrations.

S.furcifera shows a wide range of intraspecific variation in several characters such as intensity and extent of coloration and genital structures



FIGS 19–24. *Sogatella furcifera* (Horváth) ♂ genitalia, specimen from India, scale lines 0.1 mm: 19. genitalia in repose, ventrocaudal view; 20. diaphragm of genital segment caudal view; 21. genitalia without genital segment, left lateral view; 22. left paramere maximum view; 23. aedeagus right lateral view; 24. aedeagus ventrocaudal view.

(e.g. parameres) even within the same population (Figs 25–34). In some specimens variation in the shape of the left and right parameres of the same individual was observed (Fig. 34). The degree of intraspecific variation proved to be about the same in all populations studied from various localities (Figs 25–34). However, Fennah (1963a) discussed the status of the two Indian taxa *S. distincta* and *S. pallescens* Fennah (1963a) and considered they might be considered as geographical subspecies of the typical *S. furcifera*. Our study of large numbers (>500 specimens) of *S. furcifera* specimens from India and many other parts of the Oriental Region and Australia has not revealed any evidence for the geographical concentration of any particular morphological or colour configurations which would support the idea of subspecific differentiation in India.

Distribution and material examined. Widespread in the Eastern Palaearctic, the Oriental Region, the Western Pacific and Australia.

Numerous specimens have been examined from various localities in all parts of the distribution.

Palaearctic region: JAPAN: Hokkaido* (BMNH, BPBM), Honshu, Kyushu, Shikoku (e.g. Ishihara, 1949: 63). KOREA* (Nakayama, 1930: 181; Lee & Kwon, 1976: 60; 1977: 103; 1980: 31). U.S.S.R.: Maritime Territory (Vilbaste, 1968: 21; Anufriev & Emeljanov, 1988: 361), Kurile Is. (Anufriev, 1977: 863), Mongolia (Dlabola, 1967: 212; Emeljanov, 1982: 72).

Oriental region: CAMBODIA* (BPBM). CHINA (e.g. Matsumura, 1910a: 17), Fennah, 1956a: 472, Kuoh *et al.*, 1983: 277). FUKIEN* (BPBM). HONG KONG* (BPBM). INDIA* (e.g. Matsumura, 1910b: 17), INDONESIA: Amboyna, Ceram (Muir, 1917: 328), Java* (BMNH, BPBM), Kalimantan* (BMNH, BPBM), Sulawesi* (BMNH, MA), Sumatra* (Muir, 1923: 174) (BMNH, BPBM). LAOS* (BPBM). MALAYSIA: Malay Peninsula* (BPBM) (Kathirithamby, 1981: 15), Sabah* (BPBM), Sarawak* (BMNH, BPBM). NEPAL* (BMNH). PAKISTAN* (Dlabola, 1971: 381) (LOB). PHILIPPINE IS.* Luzon (e.g. Muir, 1917: 328) (BMNH, BPBM), Mindanao (BPBM), Palawan (BPBM). SAUDI ARABIA* (NM). SRI LANKA (CEYLON) (Melichar, 1903: 104; Fennah, 1975: 94), TAIWAN* (e.g. Matsumura, 1910a: 17) (BMNH, BPBM). THAILAND (Hongsaprug,

1987: 195), VIETNAM* (Fennah, 1978: 221).

Pacific region: FIJI IS.: Viti Levu* (Muir, 1917: 328; Fennah, 1950: 42) (BPBM). MICRONESIA: Belau Is. (=Palau Is.)* (BPBM), Guam* (BPBM), Marshall Is.* (BPBM), Ponape Is. (all Fennah, 1956b: 116). RYUKYU IS.* (Clausen, 1931: 45) (BPBM). VANUATU (=NEW HEBRIDES)* (BPBM),

Australian region: AUSTRALIA: Queensland* (Fennah, 1965b: 47) (BPBM, MA), Northern Territory (MA).

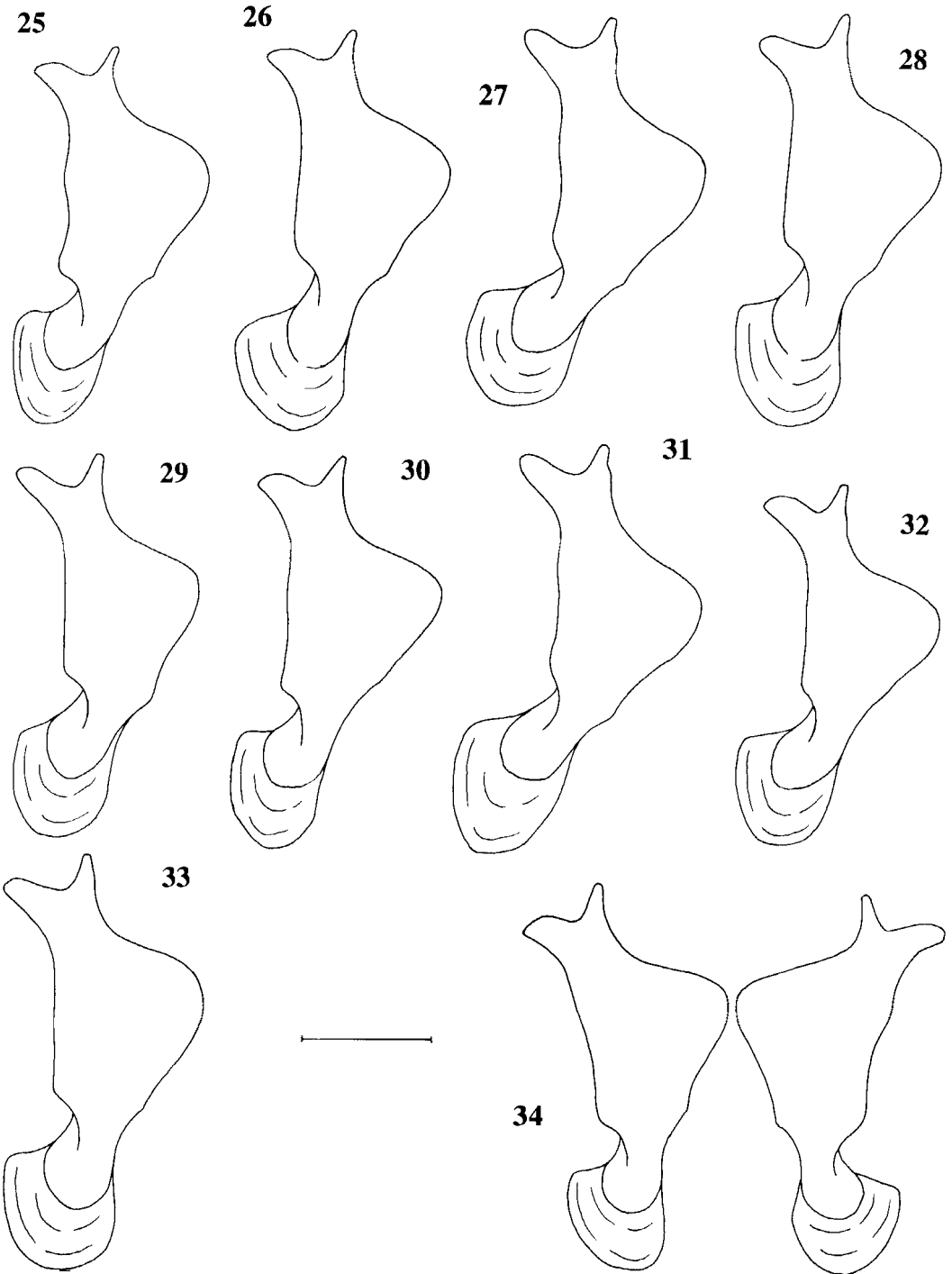
Remarks. The western limits of the distribution of *S. furcifera* are still unclear. We have not seen a single specimen of this species from Africa, Europe or the New World. All specimens from these regions which had been previously identified as *S. furcifera* proved to be other species. Records from Europe (e.g. Oshanin, 1907: 315), N. Africa (e.g. Matsumura, 1910b: 17; Ammar *et al.*, 1980) and tropical Africa (e.g. Matsumura, 1910b: 17) concern either *S. nigeriensis* (Muir) specimens examined from Egypt, Canary Islands, Madeira) or *S. vibix* Haupt (for instance the records from Sicily, Yugoslavia). Records of *S. furcifera* from the New World countries (Muir & Giffard, 1924: 13; Muir, 1926a: 26) in most cases concern *S. molina* (Fennah) or *S. kolophon* (Kirkaldy) (see below). The western-most populations of true *S. furcifera* we could examine originate from Pakistan and Saudi Arabia. Its closest relative, *S. nigeriensis*, is widely distributed in Africa and occurs sympatrically with *S. furcifera* in Saudi Arabia. However, no transition zone (hybrid belt or cline) between these two species has been found. The distribution of *S. furcifera* and *S. nigeriensis* appears to overlap in the Middle East.

Sogatella manetho Fennah (Fig. 7)

Sogatella manetho Fennah, 1963a: 66, Holotype ♂, ZIMBABWE (BMNH), examined.

Diagnosis. Light coloured with pale yellow face. Males with slightly darkened genae. The male genitalia resemble *S. capensis*, but differ in the rather short and apically almost blunt aedeagus, the blunt outer apical process of the parameres (Fig. 7) and in the shape and length of the processes of the anal segment.

Remarks. The configuration of the genitalia suggests that *S. manetho* is the light-coloured



FIGS 25-34. *Sogatella furcifera* (Horváth). intraspecific variation in parameres. scale line 0.1 mm; 25, Japan (Hokkaido) ♂1, 26, same population ♂2; 27, same population ♂3; 28, Belau Is. (Bebelthup I.); Fiji Is. (Viti Levu I.) 30, Borneo (Sarawak); 31, Philippine Is. (Luzon); 32, India; 33, Saudi Arabia; 34, Australia (Queensland), left-right variation in the same individual.

equivalent to *S. capensis*, possibly a close relative. *S. manetho* might replace *S. capensis* geographically in northeast South Africa. *S. petax* may have evolved from *S. manetho*-like forms since it shows similarly-shaped rounded outer apical corners of the parameres.

Distribution and material examined. Southern Africa. At present known only from the type locality in Zimbabwe. Additional material examined: paratypes from the type locality (BMNH).

***Sogatella nigeriensis* Muir (Fig. 3)**

Megamelus furcifer (sic) *nigeriensis* Muir, 1920: 143, Holotype ♂, NIGERIA (BMNH), examined.

Sogatella nigeriensis troilos Fennah, 1963a: 62, Holotype ♂, MADAGASCAR (BMNH), examined. **Syn.n.**

Diagnosis. *S. nigeriensis* is a dark species externally closely resembling *S. furcifera*, but also similar to *S. capensis*. Males possess a dark brown frons and genae. Tegmina with fuscous marking towards the end of clavus. In the male genitalia the U-shaped process at the dorsal margin of the diaphragm rather narrow; parameres comparatively short, inner base moderately produced (not dilated lobe-like as in *S. furcifera*), distal part similar to that in *S. furcifera*, but outer process more strongly developed (Fig. 3). *S. nigeriensis* can be distinguished from *S. capensis* by the dark marking in the apex of the clavus (absent in *S. capensis*). The male genitalia have been figured by Asche (1988: 208).

Remarks. Fennah (1963a) based the subspecies *S. nigeriensis troilos* from Madagascar and the Iles Glorieuses on slight differences in the coloration of the tegmina between continental African populations and the island specimens. In our study we could find lighter coloured 'island-forms' also in populations from mainland Africa, and vice versa fuscous 'continental-forms' in Malagasian populations. Accordingly we cannot accept the validity of *S. nigeriensis troilos* as a separate geographic subspecies.

S. nigeriensis is in all characters very similar to *S. furcifera*, and it is most likely its closest relative geographically replacing *S. furcifera* in the Ethiopian Region. They do appear to overlap in the Middle East to some degree. The syntopic occurrence of *S. furcifera* and *S. nigeriensis* in

Saudi Arabia (see above) lends support to our view that they are distinct species without any morphological transition.

Distribution and material examined. *S. nigeriensis* is widespread in the Ethiopian region the southwestern portion of the Palaearctic (e.g. Canary islands, Madeira, Egypt, Israel) and Madagascar. Numerous specimens from Africa have been examined.

Palaearctic region: AZORES (e.g. Lindberg, 1954a: 8). CANARY IS.* (Linnavuori, 1973: 108), EGYPT* (Linnavuori, 1969: 208; Fennah, 1963a: 61) (BMNH). ISRAEL* (MA), MADEIRA* (e.g. Lindberg, 1961) (BMNH). OMAN* (BMNH). SAUDI ARABIA* (MNHB).

Ethiopian region: ALDABRA* (BMNH). ETHIOPIA* (Fennah, 1969b: 56), GUINEA (Fennah 1958c: 490). ILES GLORIEUSES* (Fennah, 1963a: 61). IVORY COAST* (Asche, 1988: 208). KENYA* (BMNH). MADAGASCAR* (Fennah, 1963a: 61) (BMNH). MALI (Fennah, 1958c: 490). NIGER (Fennah, 1963a: 60). NIGERIA* (Muir, 1920: 143; Medler, 1980), SENEGAL (Fennah, 1961: 311), SOUTH AFRICA: Cape Province, Pondoland, Natal (Muir, 1926b, as *S. furcifera*) (BMNH). SUDAN: Blue Nile, Darfur, Equatoria, Kordofan, Upper Nile (Linnavuori, 1973: 108). TANZANIA* (BMNH). UGANDA* (BMNH). ZAIRE* (BMNH)

***Sogatella petax* Fennah (Fig. 8)**

Sogatella petax Fennah, 1963a: 68, Holotype ♂, EGYPT (BMNH), examined.

Diagnosis. *S. petax* is light stramineous in colour, males with dark genae, externally resembling *S. vibix*. It is readily distinguishable from all other *Sogatella* species by the shape of the parameres which are distally sinuate and with the outer apical angle rounded and not distinctly produced laterad, the inner apical angle almost beak-like and produced mediad (Fig. 8).

Remarks. Within the *S. furcifera*-group *S. petax* seems somewhat isolated by the entirely rounded outer apical angle of the parameres. Of all species included in the *S. furcifera*-group it might be closest related to *S. manetho* which displays a blunt outer apical angle of the parameres (see Fig. 7).

Distribution and material examined. Apparently widespread at least in the eastern part of Africa and parts of the Middle East.

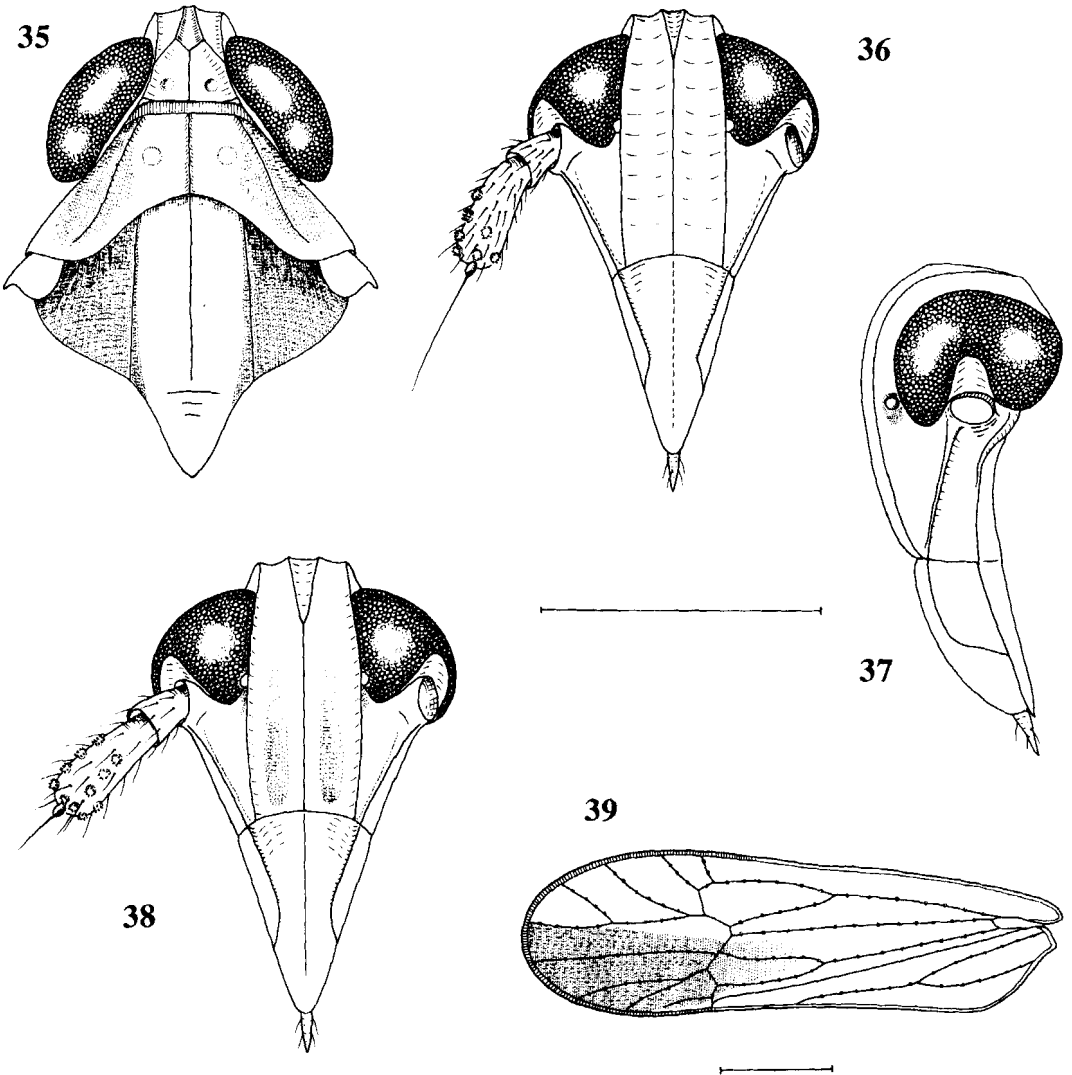
Palearctic region: EGYPT* (Fennah, 1963a: 70; Linnavuori, 1964: 341) (BMNH). JORDAN* (Fennah, 1963a: 70) (BMNH.)

Ethiopian region: SUDAN: Equatoria (Linnavuori, 1973: 109), TANZANIA* (BMNH), NIGERIA* (Medler, 1980: 62) (BMNH).

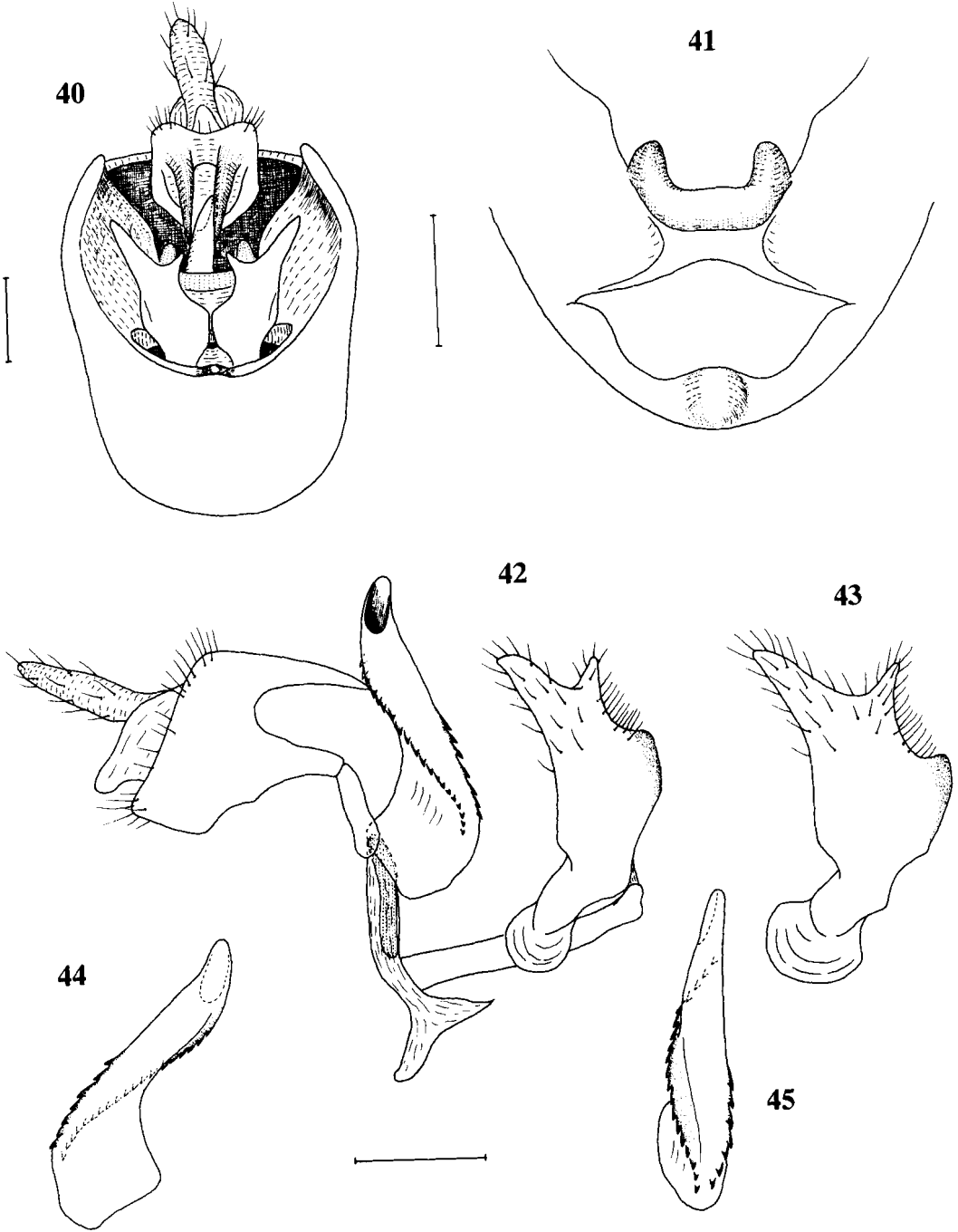
***Sogatella yei* Linnavuori (Fig. 6)**

Sogatella yei Linnavuori, 1973: 109, Holotype ♂, SUDAN (Equatoria), (AMNH), examined.

Diagnosis. *S. yei* externally resembles *S. vibix* (Haupt) but differs from this and all other *Sogatella* species in the shape of the male genitalia. The parameres have a very short



FIGS 35-39. *Sogatella kolophon* (Kirkaldy): 35-38: colour patterns of head and thorax. ♂ specimen from Australia (Queensland), scale lines: 0.5 mm; 35, ♂ 1, head and thorax dorsal view; 36, ♂ 1, head frontal view; 37, ♂ 1, head and thorax dorsal view; 38, ♂ 2, same population, head frontal view. 39, left forewing, macropterous ♂, Australia (Queensland), scale line 0.5 mm.



FIGS 40–45. *Sogatella kolophon* (Kirkaldy), ♂ genitalia, specimen from Australia (Queensland), scale line 0.1 mm; 40, genitalia in repose ventrocaudal view; 41, diaphragm of genital segment caudal view; 42, genitalia without genital segment, left lateral view; 43, left paramere maximum view; 44, aedeagus right lateral view; 45, aedeagus ventrocaudal view.

pointed outer apical corner and a long, rod-like inner process (Fig. 6).

Remarks. Within the *S. furcifera*-group *S. yei* is very similar to *S. camptistylis* from Uganda in the shape of the apical part of the parameres. It possesses a less produced outer apical process and a more strongly developed inner apical process than found in *S. camptistylis*. These two species appear to be closely related.

Distribution and material examined. Only known from the holotype collected in Sudan (Equatoria).

***Sogatella kolophon*-group (five species)**

S. colorata, *S. kolophon*, *S. molina*, *S. nigrigenis*,
S. vibix

The group is defined by the male genitalia in which the parameres are distally bifurcate with the apical margin shallowly or deeply concave, inner angle short and stick-like, and the outer angle strongly produced (Figs 9–12).

***Sogatella colorata* (Distant)**

Opiconsiva colorata Distant, 1917: 301, Lectotype ♂, designated by Fennah, 1963a: 63, SEYCHELLES IS. (BMNH), examined.

Sogatella colorata: Fennah, 1963a: 62.

Diagnosis. *S. colorata* differs from all other *Sogatella* species by the homogeneous shiny castaneous or dark brown coloration of frons, genae, anterior portion of vertex, pronotum and mesonotum (except for a fine white stripe in middle line). The male genitalia are very similar to those of *S. kolophon*.

Remarks. *S. colorata* appears to be closely related to *S. kolophon*, both species occurring sympatrically. As we have not seen any kind of transition in the coloration of the two taxa we assume that *S. colorata* represents a good species which might have derived from *S. kolophon*-like ancestors that have undergone adaptive radiation on the Seychelles Islands.

Distribution and material examined. Known only from the Seychelles Is.; Lectotype and other specimens examined (BMNH).

***Sogatella colorata nigrrior* Fennah**

Sogatella colorata nigrrior Fennah, 1963a: 64, Holotype ♂, MAURITIUS (BMNH), examined.

Diagnosis. Fennah separated the Mauritian populations from the nominate of *S. colorata* mainly by darker coloration of the postclypeus and by a yellow rather than castaneous coloration of the first antennal segment.

Remarks. We have not seen enough material of both taxa to be able to judge the range of intraspecific variation. Provisionally we follow Fennah and regard the Mauritian population as a separate subspecies.

Distribution and material examined. Mauritius (Fennah, 1963a: 64). Holotype only, examined.

***Sogatella kolophon* (Kirkaldy)**

(Figs 9, 35–56)

Delphax kolophon Kirkaldy, 1907: 157, Holotype ♂, AUSTRALIA, (Queensland), (BPBM), examined.

Sogatella kolophon atlantica Fennah, 1963a: 58, Holotype ♂, ST HELENA (BMNH) examined. **Syn.n**

Opiconsiva insularis Distant, 1917: 303, Lectotype ♂, designated by Fennah, 1963a: 60, SEYCHELLES IS. (BMNH), examined.

Syn.n.

Sogatella kolophon insularis: Fennah, 1963a: 59. *Sogata meridiana* Beamer, 1952: 111, Holotype ♂ U.S.A. (Florida), (KU), examined. **Syn.n.**

Sogatella kolophon meridiana: Fennah, 1963a: 59.

Opiconsiva balteata Distant (in part), 1917: 302, Lectotype ♂, designated by Fennah, 1963a: 64, SEYCHELLES IS. (BMNH), examined.

Syn.n.

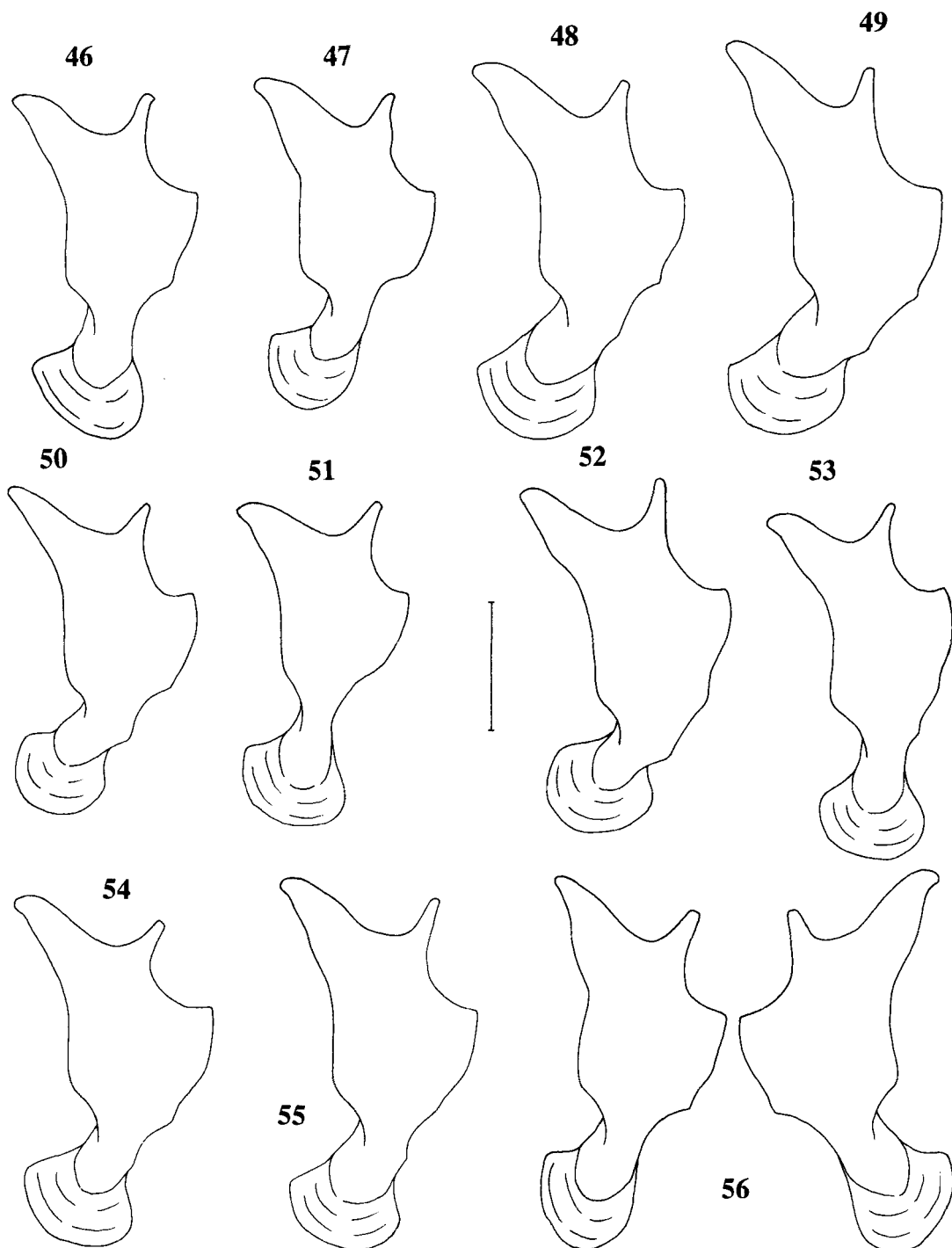
Sogatella belateata: Fennah, 1963a: 64.

Sogatella chenhea Kuoh, 1977: 440, Holotype ♂, CHINA (Kwangtung), (Anhui Agric. College), not examined. **Syn.n.**

Opiconsiva derelicta Distant, 1917: 303, Holotype ♂, SEYCHELLES IS. (BMNH), examined. **Syn.n**

Sogatella derelicta Fennah, 1963a: 62.

Delphacodes elegantissima Ishihara, 1952: 45, Holotype ♂, JAPAN, (Shikoku) (Ehime Univ., Matsuyama, Japan), not examined. **Syn.n.**



FIGS 46–56. *Sogatella kolophon* (Kirkaldy), intraspecific variation in parameres, scale line 0.1 mm; 46, Sulawesi. ♂1; 47, Sulawesi. same population. ♂2; 48, Sulawesi. same population, ♂3; 49, Sulawesi. same population, ♂4; 50, Australia (Queensland); Japan (Hokkaido); 52, Pitcairn I.; 53, Galapagos Is. (Santa Cruz I.); 54, Mexico; 55, S. Africa (Pondoland), paratype of *S. nebris* Fennah; 56, Philippine Is. (Luzon I.), left–right variation in the same individual.

Sogatella elegantissima Fennah, 1963a: 76.

Sogatella nebris Fennah, 1963a: 67, Holotype ♂, SOUTH AFRICA (Pondoland) (BMNH), examined. **Syn.n.**

Diagnosis. *S.kolophon* is small and slender in general appearance. In colour it is light yellow to pale stramineous; males with yellow face and genae, in some specimens a small brown or red spot around or below the ocelli and a brown mark in the lower half of the frons (Figs 35–38); tegmina hyaline, in apical half with a grey or light brown suffusion of varying extent (Fig. 39).

Male genitalia. Laterodorsal angles of the genital segment slightly produced, mostly bent mediad; outer apical angle of the parameres strongly produced, more or less continuously tapering to its apex, in some specimens slightly sinuate, not distinctly dilated in middle part; inner angle of parameres relatively short and stout; apical margin of parameres shallowly concave (Figs 9, 43, 46–56). Aedeagus comparatively short, sinuate, apically not acutely tapering, tip in most specimens blunt, left row with 15–22 teeth, right row with 5–8 teeth (>100 specimens examined) (Figs 42, 44, 45). *S.kolophon* can be separated from all other species of the genus by a combination of characters such as coloration of head and wings (it is the only species with light genae in males), the shape of the parameres and the apically blunt aedeagus.

Remarks. *S.kolophon* is the most widely distributed of all *Sogatella* species. There is variation in the intensity of coloration of head (see Figs 36, 38) and tegmina and in the structures of the male genitalia e.g. parameres (see Figs 46–56). Fennah (1963a) used the shape of the caudal margin of the genital segment in lateral view, especially the form of the laterodorsal angles, to discriminate the subspecies *S.kolophon atlantica*, *S.kolophon insularis* and *S.kolophon meridiana*. However, in examining large numbers of *S.kolophon* specimens from various localities we found that the outline of the caudal margin is highly variable, even within the same population. Moreover, the shape of this structure is strongly affected by shrinking during the drying process of the specimen. In all the characters examined the three subspecies lay well within the range of variation of Australian, Oriental and Pacific populations and we cannot see any reason to retain the concept of the geographical subspecies.

The specific synonymies proposed here of *O.balteata*, *O.derelicta* and *S.nebris* with *S.kolophon* are based on the examination of type-material. The synonymy of *S.chenheia* and *D.elegantissima* we deduce from the original descriptions and drawings. The characters given there do not separate these species from the range of intraspecific variation of *S.kolophon*. In the case of *S.chenheia*, all Chinese specimens of the *S.kolophon*-group we have examined proved to be either *S.kolophon* or *S.vibix* (Haupt), the latter being clearly distinct by other characters (see below).

Within the *S.kolophon*-group the species seems closely related to the African species *S.nigrigenis* (Jacobi), the Seychelles species *S.colorata*, and the New World species *S.molina* (Fennah) by the shape of the male genitalia.

Distribution and material examined. Widely distributed in Australia, the Oriental Region, the Pacific, the Ethiopian Region, the Atlantic Islands, the New World and the eastern Palaearctic. It is most commonly found in the tropics.

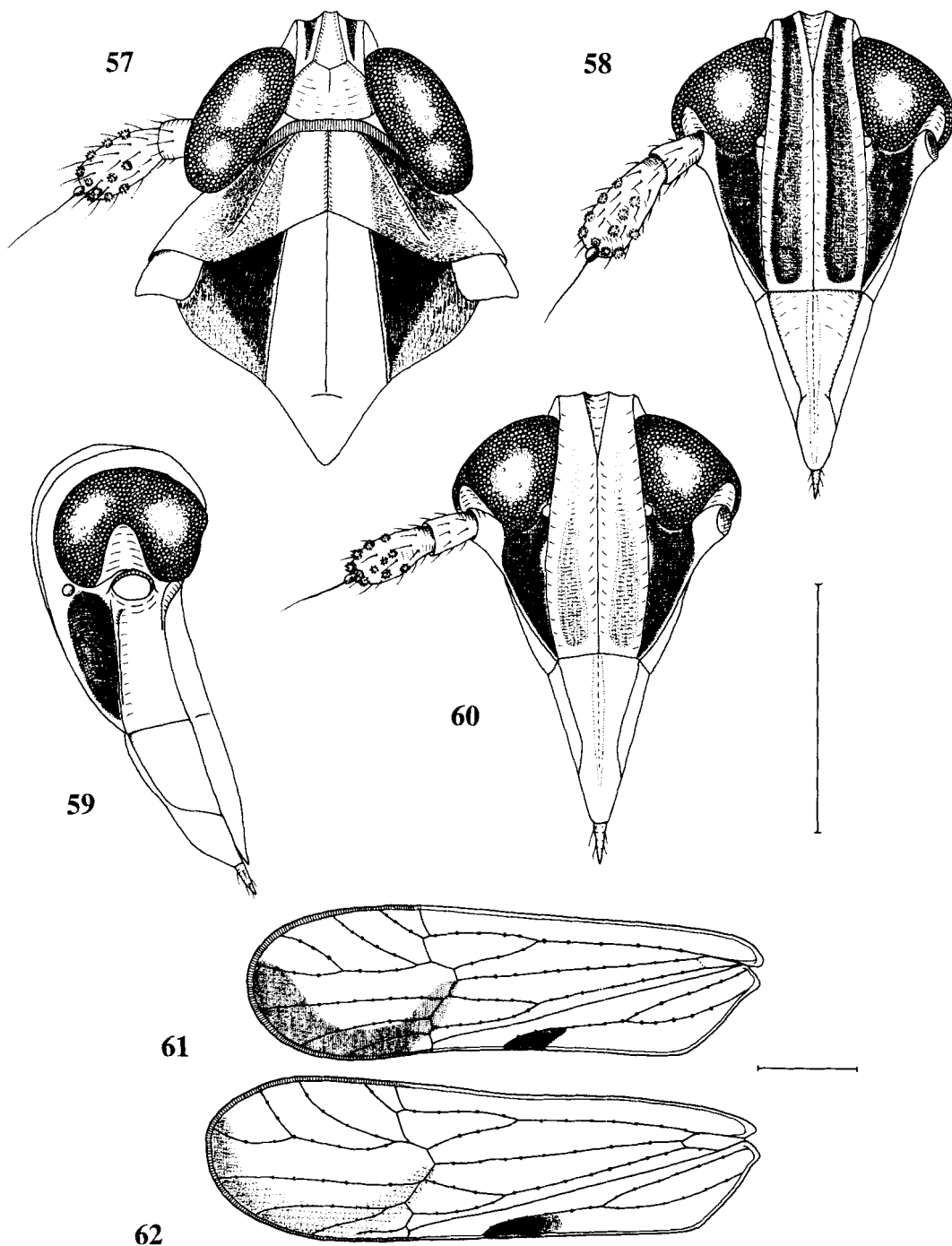
Numerous specimens (>300) have been examined from various localities in all parts of the distribution.

Palaearctic region: AZORES (e.g. Lindberg, 1960: 3). CANARY IS.* (MA). JAPAN* (Ishihara, 1952: 45, as *Delphacodes elegantissima*) (BPBM). KOREA* (BMNH).

Ethiopian region: CAPE VERDE IS.* (Lindberg, 1958: 151, as *Sogata furcifera* 'Rasse colophon' (sic); Fennah, 1963a: 59) (BMNH). IVORY COAST* (Julia & Mariau 1982: 517; Asche, 1988: 206) (MNHP, MA). NIGERIA* (Medler, 1980: 62). SOUTH AFRICA: Natal, Pondoland, Transkei, Zululand (Fennah, 1963a: 68, as *S.nebris*), Swaziland* (UST).

Malagasian region: MAURITIUS, Iles Glorieuses (Fennah, 1964: 140, as *S.kolophon insularis*). RODRIGUES I.* (BMNH)

Oriental region: CAMBODIA* (BPBM). CHINA: Anhwei, Fukien* (BMNH, BPBM), Kwangsi, Kwangtung, Yunnan (Kuoh, 1977: 440, as *S.chenheia*, Kuoh *et al.*, 1983: 116). HONG KONG* (BPBM). INDIA* (LOB). INDONESIA: Java* (BPBM). Kalimantan* (BPBM), Sulawesi (BMNH, MA), Sumatra* (BPBM). LAOS* (BPBM). MALAYSIA: Malay Peninsula* (BPBM), Sabah* (BPBM), Sarawak* (BPBM). PAPUA NEW GUINEA* (BPBM). PHILIPPINE IS.: Luzon* (Muir, 1916: 385), Mindanao* (BPBM) Palawan*



FIGS 57-62. *Sogatella molina* (Fennah); 57-60, coloration of head and thorax. ♂ specimens from Bermuda Is., scale lines: 0.5 mm; 57, ♂ 1, head and thorax dorsal view; 58, ♂ 1, head frontal view; 59, ♂ 1, left lateral view; 60, ♂ 2, same population, head frontal view. 61-62, coloration of forewings, macropterous males, scale line 0.1 mm: 61, Bermuda Is.; 62, Mexico, paratype.

(BPBM). SEYCHELLES IS.* (Distant, 1917: 302–303, as *Opiconsiva insularis*, *O. balteata* partim, *O. derelicta*; Fennah, 1963a: 60: 62: 64). SRI LANKA (CEYLON) (Fennah, 1963a: 58). THAILAND* (BPBM). VIETNAM* (Fennah, 1978: 16) (BPBM).

Pacific region: BELAU IS. (=PALAU)* (Fennah, 1956b: 117; 1971a: 573) (BPBM). BONIN IS.* (Fennah, 1956b: 116; 1971a: 572) (BPBM). FIJI IS.: Viti Levu* (Kirkaldy, 1907: 157) (BPBM). GALAPAGOS IS.* (Fennah, 1967b: 76) (BPBM). GUAM* (Fennah, 1956b: 117) (BPBM). HAWAII IS.* (Fennah, 1963a: 58) (BPBM). MANGAREVA IS.* (Fennah, 1958a: 194–195) (BPBM). MARQUESAS IS.* (Fennah, 1958a: 194–195). MARSHALL IS.* (Fennah, 1956b: 117) (BPBM) ENIWETOK ATOLL (Japtan I.) (Fennah, 1971a: 573), Gilbert Is. (Makarei I.) (Fennah, 1971a: 573). MICRONESIA: Caroline atolls* (Fennah, 1956b: 117) (BPBM). Pohnpei Is. (Ponape)* (Fennah, 1956b: 117) (BPBM), Truk Is. (Ton I.)* (Fennah, 1956b: 117) (BPBM), Yap Is. (Map I.)* (Fennah, 1956b: 117; 1971a: 573) (BPBM). NEW CALEDONIA* (Fennah, 1969a: 35) (BPBM). NORTHERN MARIANA IS.: Saipan I. (Fennah, 1956b: 116) (BPBM) PITCAIRN I.* (Fennah, 1958: 194–195) (BPBM). SOCIETY IS.: Raiatea I.* (Fennah, 1958a: 194–195) (BPBM). SOLOMON IS.: Guadalcanal I.* (BMNH, BPBM), Malaita I. (BPBM), New Georgia Is.* (BPBM). TONGA IS.* (Fennah, 1967a: 46) (BPBM, MA). WESTERN SAMOA: Savaii I.* (MA), Upolu I.* (MA)

Australian region: AUSTRALIA: Queensland* (Kirkaldy, 1907: 157; Fennah, 1965b: 47) (BPBM, MA), Northern Territory*, Kakadu NP (MA).

Nearctic region: BERMUDA IS.* (BMNH). USA.: Florida*, Texas, Georgia (Beamer, 1952: 111, as *Sogata meridiana*) (KU).

Neotropical region: EQUADOR* (BPBM). JAMAICA, MONTSERRAT, SANTA LUCIA, VENEZUELA (all Fennah, 1959: 259). GUYANA, MEXICO* (both Fennah, 1963a: 59) (USNM).

Atlantic ocean: ST HELENA I.* (Fennah, 1963a: 59; 1976: 266; as *S. kolophon atlantica* and 1976: 267, as *S. nebris*) (BMNH).

***Sogatella molina* (Fennah) comb.n.**
(Figs 10, 57–69)

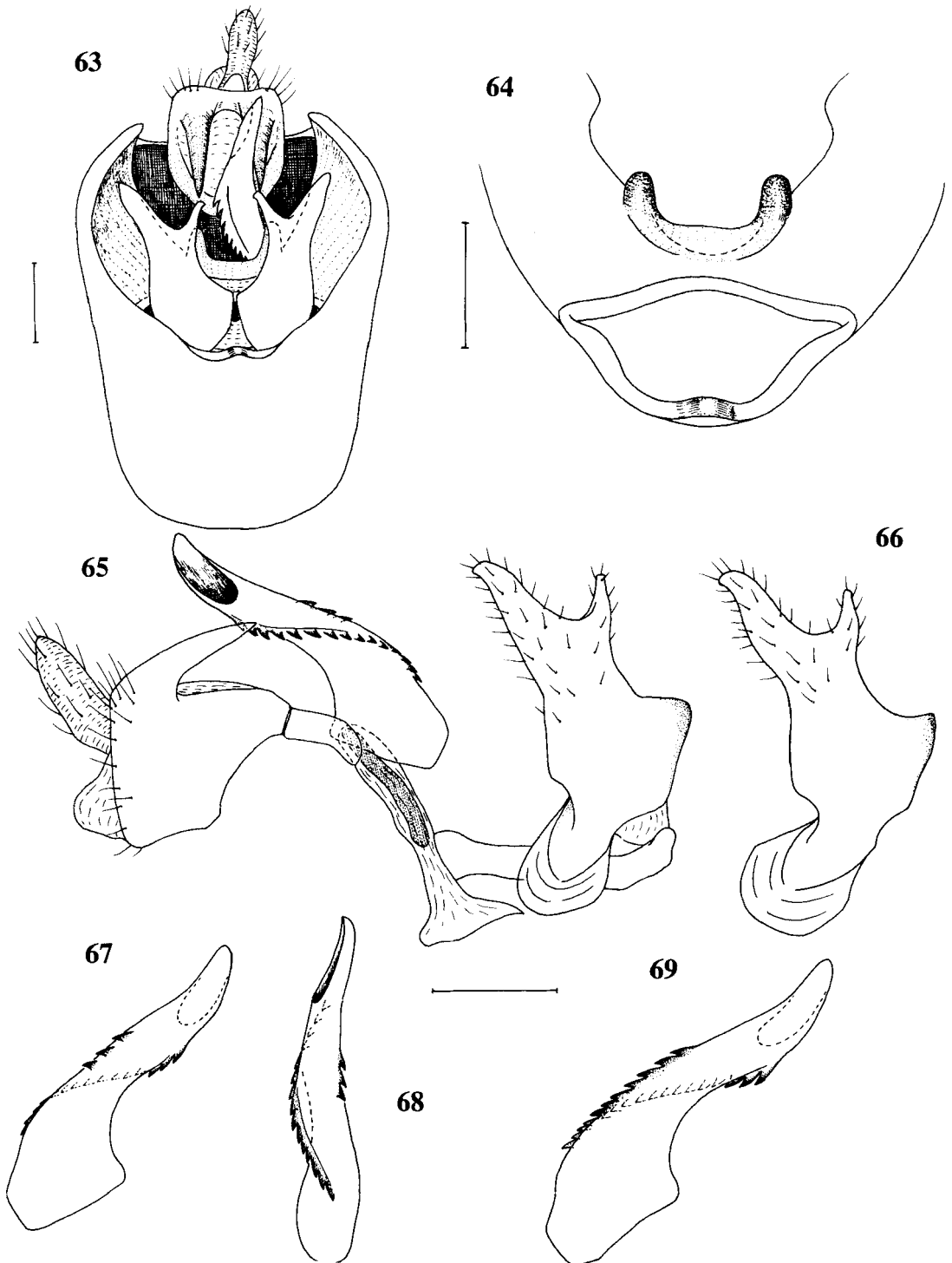
Sogatodes molinus Fennah, 1963a: 72, Holotype ♂, MEXICO, (BMNH), examined.

Diagnosis. Externally, *S. molina* appears somewhat similar to *S. furcifera*. The vertex and middle carina of frons white or pale yellow; genae and compartments of frons light brown, in specimens from Bermuda less intense (Figs 57–60). Tegmina with a distinct light brown or in most specimens dark brown spot in this posterior angle of the clavus (Figs 61, 62); tegmina hyaline or slightly infumed, from apex of clavus to apex of tegmina a brown band-like suffusion (in specimens from Mexico and Florida less developed or almost missing (see Figs 61, 62), at apex area between the ends of the veins in some specimens lighter or hyaline. Male genitalia (Figs 63–69) resembling those of *S. kolophon*, but outer distal process of parameres longer and straight; aedeagus with an acute tip (blunt in *S. kolophon*). Externally the species can be distinguished from other *Sogatella* species by the coloration of the head as mentioned above combined with the presence of a brown spot at claval apex.

Remarks. *S. molinus* is transferred here from *Sogatodes* to *Sogatella* for the following reasons: Fennah (1963a) discriminated *Sogatodes* from the genera *Sogatella* and *Matutinus* mainly by the form of the ovipositor and by the carination of the thorax. However, re-examination of the holotype of the type-species *Sogatodes molinus* revealed the presence of the complete set of characters that we consider define the genus *Sogatella*. Moreover, it appears that the shape of the dorsal margin of the ovipositor and its dentation varies in other species included in *Sogatodes* and even in closely related *Sogatella* species, and is a rather weak character. Therefore we consider *Sogatodes molinus* congeneric with *Sogatella*. Consequently, the genus *Sogatodes* falls in synonymy with *Sogatella* as discussed above.

Within the *S. kolophon*-group *S. molina* resembles *S. kolophon*, *S. nigrigensis* from Africa and *S. colorata* from the Seychelles in the shape of the male genitalia.

Distribution and material examined. *S. molina* is exclusively a New World species. MEXICO* (Fennah, 1963a: 73) (BMNH). CAYMAN IS.



FIGS 63–69. *Sogatella molina* (Fennah). ♂ genitalia, scale line 0.1 mm; 63–68, Mexico, paratype, 69, specimen from Bermuda Is.; 63, genitalia in repose ventrocaudal view; 64, diaphragm of genital segment caudal view; 65, genitalia without genital segment left lateral view; 66, left paramere maximum view; 67, aedeagus (Mexico) right lateral view; 68, aedeagus (Mexico) ventrocaudal view; 69, aedeagus (Bermuda) right lateral view.

(Fennah, 1971b: 321). U.S.A.: Florida* (USNM). BERMUDA IS.* (BMNH).

***Sogatella nigrigenis* (Jacobi)** (Fig. 11)

Delphax nigrigenis Jacobi, 1917: 530, KENYA.

Type material assumed deposited in either Humboldt Museum, Berlin or Dresden Museum, not examined.

Sogatella nigrigenis Fennah 1963a: 55.

Diagnosis. In external appearance similar to *S.vibix* in possessing dark genae but differing in the shape of the parameres. Male genitalia almost as in *S.kolophon*, but laterodorsal angles of genital segment broadly rounded and the tip of the aedeagus acutely tapering (as in *S.furcifera*). Outer distal process of the parameres continuously tapering, straight. Stramineous, genae and abdomen dark brown.

Remarks. Fennah (1963a) apparently did not examine the type material of *S.nigrigenis* but his interpretation of the species based on specimens from Uganda has been followed. Within the *S.kolophon*-group the relationships of this species are unclear: it resembles *S.vibix* in the coloration of head and tegmina, and *S.kolophon* in the shape of the parameres, also in other characters it combines the configuration of these two species.

Distribution and material examined. Only known at present from East Africa: KENYA* (Jacobi, 1917: 530), UGANDA* (Fennah, 1963a: 56) (BMNH), SUDAN: Blue Nile, Equatoria (Linnavuori, 1973: 108) (AMNH).

***Sogatella vibix* (Haupt)** (Figs 12, 70–91)

Liburnia vibix Haupt, 1927: 13, Lectotype ♂, paralectotype ♀ (here designated), ISRAEL (collection Haupt, Jena, East Germany), examined.

Sogatella suezensis Linnavuori, 1964: 341, mis-identification [not *suezensis* Matsumura 1910. Nast, 1975 transferred *Delphax suezensis* to *Toya*].

Sogatella catoptron Fennah, 1963a: 54, Holotype ♂, ISRAEL (BMNH), examined. **Syn.n.**

Sogatella diachenhea Kuoh, 1977: 441, Holotype ♂, CHINA (Shantung) (Anhui Agric. College), not examined. **Syn.n.**

Delphacodes dogensis Ishihara, 1952: 47, Holotype ♂, JAPAN (Shikoku) (Ehime Univ., Matsuyama, Japan), not examined. **Syn.n.**

Delphacodes longifurcifera Esaki & Ishihara, 1947: 41, Holotype ♂, JAPAN (Kyushu) (Kyushu Univ., Fukuoka, Japan), examined. **Syn.n.**

Sogatella longifurcifera Fennah, 1963a: 53.

Liburnia matsumurana Metcalf, 1943: 364, ITALY (Sicily), not examined. [given as nom.nov. for *Delphax furcata* Matsumura, 1910b: 34 (nec *Delphax furcata* Provancher, 1872)] **Syn.n.**

Sogatella matsumurana: Nast, 1975: 2.

Delphacodes panicicola Ishihara, 1949: 51, Holotype ♂, JAPAN (Honshu) (Ehime Univ., Matsuyama, Japan), examined, syn. with *S.longifurcifera* by Ding *et al.* (1981).

Sogatella panicicola Fennah, 1963a: 76.

Sogatella parakolophon Linnavuori, 1973: 108, Holotype ♂, SUDAN (Equatoria), (AMNH), examined. **Syn.n.**

Diagnosis. In coloration *S.vibix* is stramineous or pale yellow. Males have dark brown genae similar to *S.nigrigenis*. *S.vibix* differs from other *Sogatella* species in the shape of the male genitalia. The parameres have the outer process of the apical bifurcation dilating from base to middle then tapering to apex with dorsal margin forming a blunt angle (Figs 12, 77, 81–91).

Remarks. *S.vibix* individuals vary in size, coloration and genital structures to a very similar extent in all populations studied (see variation of parameres Figs 84–91) The synonymies of *S.catoptron*, *S.parakolophon* and *D.longifurcifera* (this species was damaged) and the conspecificity of *D.panicicola* are based on the examination of the holotypes, the synonymy of *S.matsumurana* on the study of topotypic material from Sicily. The synonymies of *S.diachenhea* and *D.dogensis* we deduce from the original descriptions and illustrations. The figure of *S.diachenhea* (Kuoh, 1977: 442, Fig. 2) shows the lateral view of the head with the genae pale rather than dark coloured as is typical for *S.vibix*. The shape of the parameres figured by Kuoh and the fact that in almost all populations studied (including some from China) lighter coloured specimens could be found, convinces us that this species is synonymous with *S.vibix*.

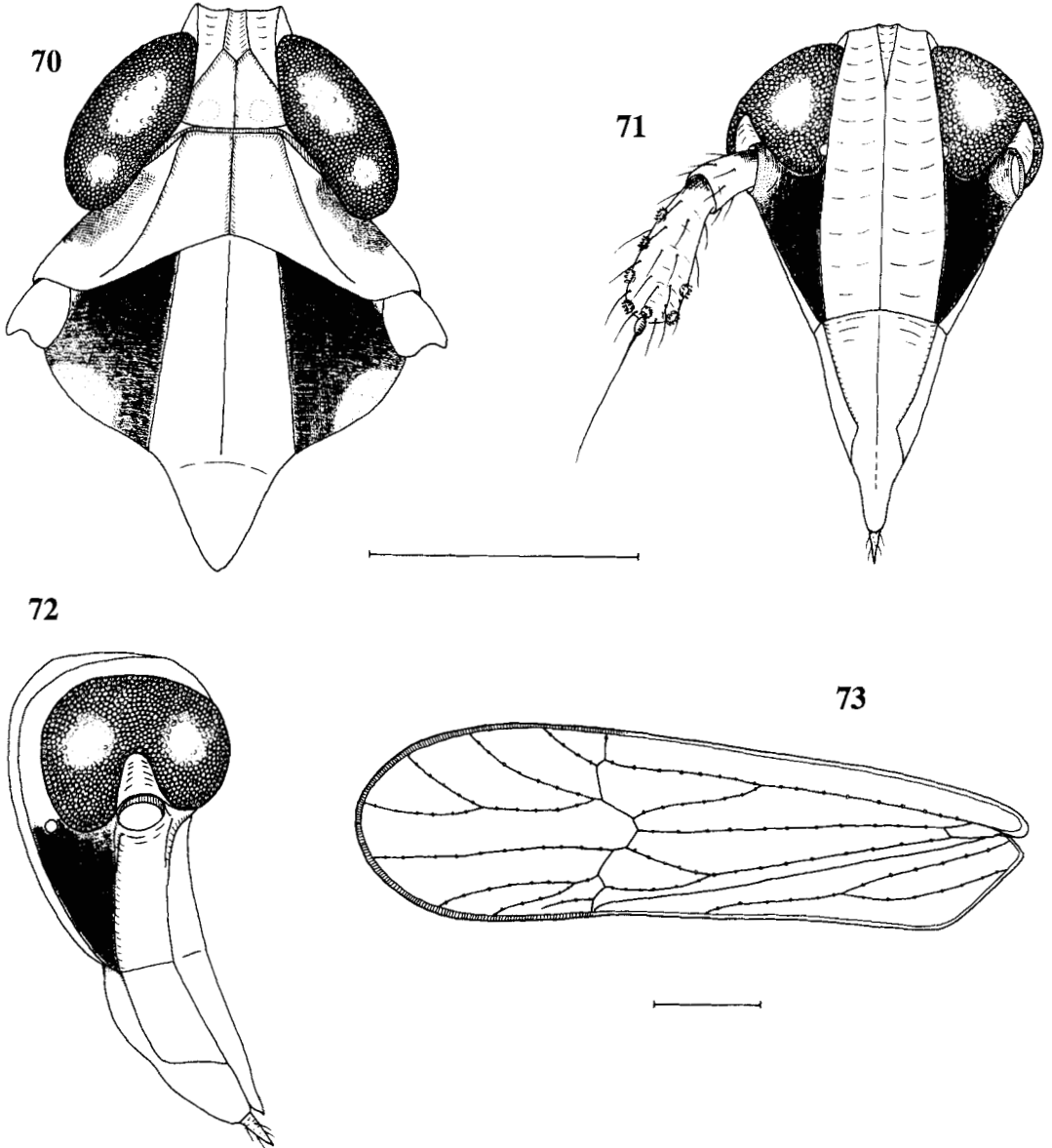
Externally *S. vibix* resembles *S. nigrigenis*; however, at present closer relationship to any particular species of the *S. kolophon* group cannot be assessed.

Distribution and material examined. *S. vibix* is widely distributed in the Palaearctic region, the Ethiopian Region, the Oriental Region, Australia and the Western Pacific. It is absent in the New World. The records of *S. vibix* from the

Azores (Lindberg, 1941: 26; 1954a: 8; 1960: 33) Madeira (Lindberg, 1961: 62), the Canary Is. (Lindberg, 1954b: 184) and the Capeverde Is. (Lindberg, 1958: 152) concern either *S. kolophon* or *S. nigeriensis*.

Numerous specimens (>400) from various localities in all parts of the species occurrence have been examined.

Palaearctic region: AFGHANISTAN*



FIGS 70-73. *Sogatella vibix* (Haupt); 70-72, coloration of head and thorax, ♂ specimen from Israel, scale line 0.5 mm; 70, head and thorax, dorsal view; 71, head frontal view; 72, head left lateral view. 73, left forewing, macropterous ♂ from Israel, scale line 0.5 mm.

(Dlabola, 1971: 381; 1972: 203) (MAK). CYPRUS (Lindberg, 1948: 126). EGYPT* (Linnavuori, 1964: 341; 1969: 208, as *Calligypona (Sogatella) suzezensis*; 1964, *loc. cit.* as *C. (Sogatella) catoptron*; Fennah, 1963a: 55, as *S. catoptron*). GREECE* (Dlabola, 1979a: 25, as *Sogatella suzezensis*; Asche & Remane, 1982: 263; Asche & Hoch, 1982: 60; Drosopoulos, Asche & Hoch, 1986: 32). IRAN (Dlabola, 1960: 5; 1971: 381). IRAQ* (CLV). ISRAEL* (Haupt, 1927: 13; Linnavuori, 1962: 26; Fennah, 1963a: 52; 55, as *S. catoptron*). ITALY: Sicily* (Oshanin, 1907: 315, as *Delphax furcifera*; Matsumura, 1910b: 34 as *Delphax furcata*; Haupt, 1924: 229, as *D. furcata*; Servadei, 1958: 9; 1967: 82, as *Liburnia matsumuriana* (sic); Nast, 1975: 2, as *S. matsumurana*). JAPAN: Kyushu* (Esaki & Ishihara, 1947: 47 and Ishihara, 1949: 50, as *D. longifurcifera*), Shikoku (Ishihara, 1952: 47, as *Delphacodes dogensis*: 45, as *D. panicicola*), Honshu* (Ishihara, 1949: 51 and 1952: 45, as *D. panicicola*). JORDAN (Fennah, 1963a: 55, as *S. catoptron*; Dlabola, 1965: 427). KOREA* (Lee & Kwon, 1977: 103 and 1980: 32, as *S. longifurcifera* and *S. panicicola*). LEBANON* (Dlabola, 1965: 427; Asche & Hoch, 1986: 18). MONGOLIA (Dlabola, 1967: 212). MOROCCO* (Lindberg, 1963: 32). TURKEY: Anatolia* (Dlabola, 1971: 381; 1981: 155; Lodos & Kalkandelen, 1980: 112, as *Toya suzezensis*; Asche, 1982: 83) (MA). SAUDI ARABIA (Dlabola, 1979b: 117, as *Sogatella suzezensis*). U.S.S.R.: Ukraine, Krim (Logvinenko, 1970: 628; 1975: 127, as *Sogatella suzezensis*), Maritime Territory (Vilbaste, 1968: 21, as *S. longifurcifera*: 22, as *S. panicicola*; Anufriev & Emeljanov, 1988: 361, as *S. longifurcifera*). YUGOSLAVIA (Jankovic, 1975: 123, as *Sogata vibix*; Jankovic & Papovic, 1981: 129, as *Sogatella suzezensis*).

Ethiopian region: SUDAN: Northern Province, Blue Nile, Upper Nile, Kordofan, Bhar el Ghazal, Equatoria* (Linnavuori, 1973: 108, as *S. suzezensis* and as *S. parakolophon*).

Oriental region: BISMARCK IS.: New Ireland I.* (BPBM), New Britain I.* (BPBM). BOUGAINVILLE I.* (BPBM). CAMBODIA* (BPBM). CHINA: Shantung (Kuoh,

1977: 442; 1983: 117, as *S. diachenhea*), Anhui* (BMNH), Fukien* (BPBM). INDIA* (LOB). INDONESIA: Ceres* (BPBM), Irian Jaya* (BPBM), Java* (BPBM) Kalimantan* (BPBM), Sulawesi* (BMNH, MA), Sumatra* (BPBM). LAOS* (BPBM). PAKISTAN* (Dlabola, 1971: 381) (LOB). PHILIPPINE IS.: Luzon*, Mindanao*, Palawan* (BPBM). SINGAPORE* (BPBM). THAILAND* (BPBM). TAIWAN (Fennah, 1963a: 55 as *S. longifurcifera*). VIETNAM (Fennah, 1978: 222 as *S. longifurcifera*).

Pacific region: BONIN IS. (Fennah, 1971: 574, as *S. longifurcifera*). FIJI IS.: Viti Levu I. (1 male paratype of *D. kolophon*, misidentification, BPBM). NEW CALEDONIA (Fennah, 1969: 34, as *S. longifurcifera*). RYUKYU IS.* (BPBM). SOLOMON IS.: Choiseul I.* (BPBM) Guadalcanal I.* (BMNH, BPBM), Malaita I. (BPBM), New Georgia Is* (BPBM), Santa Isabel I.* (BPBM). TONGA IS.: Vavau I.* (Fennah, 1967a: 46, as *S. longifurcifera*) (BPBM), Tongatapu I. (MA). VANUATU: Espiritu Santo I. (BPBM).

Australian region: AUSTRALIA: Queensland* (Fennah, 1965b: 47, as *S. longifurcifera* (BPBM, MA), Northern Territory* (MA).

Sogatella albofimbriata-group (two species)

S. albofimbriata, *S. krugeri*

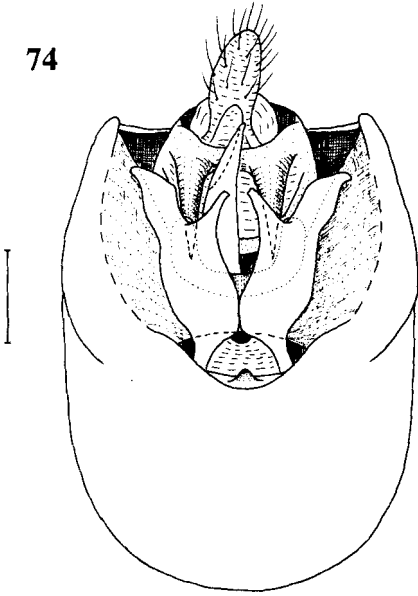
Diagnosis. Male genitalia with parameres slender to apex, elongate, in repose almost reaching the dorsolateral angles of the genital segment and the inner distal process almost absent or only forming a very small edge (Figs 13, 14).

Sogatella albofimbriata (Muir) (Fig. 13)

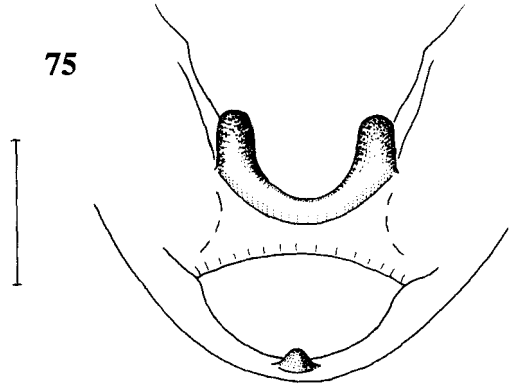
Sogata albofimbriata Muir, 1926b: 33, Holotype ♂, SOUTH AFRICA (Cape Province), (BMNH), examined.

FIGS 74–80. *Sogatella vibix* (Haupt), ♂ genitalia, scale line: 0.1 mm; 74–79, specimen from India, 80, lectotype ♂ from Israel; 74, genitalia in repose ventrocaudal view; 75, diaphragm of genital segment caudal view; 76, genitalia without genital segment, left lateral view; 77, left paramere, maximum view; 78, aedeagus (India), right lateral view; 79, aedeagus (India), ventrocaudal view; 80, aedeagus (Israel), right lateral view.

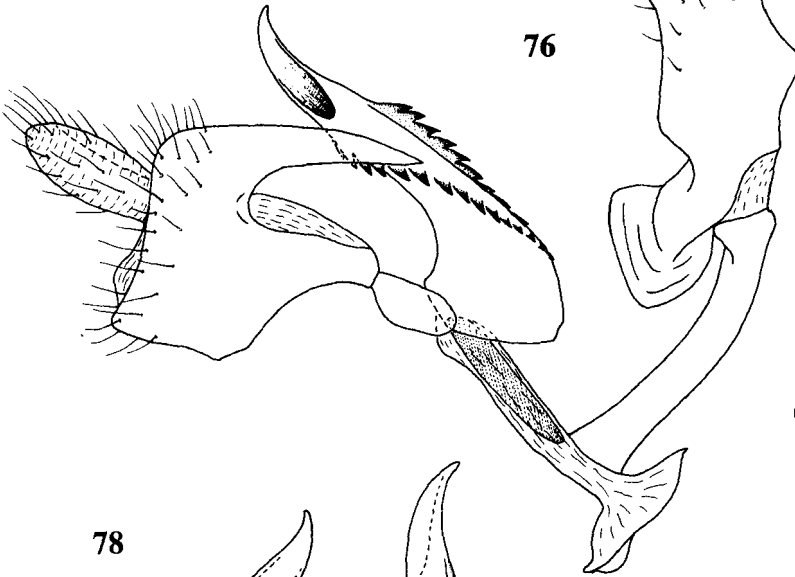
74



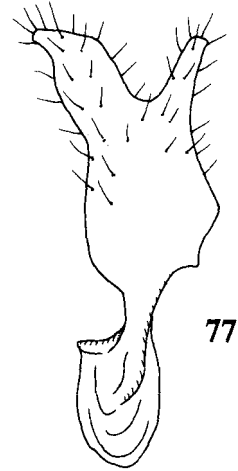
75



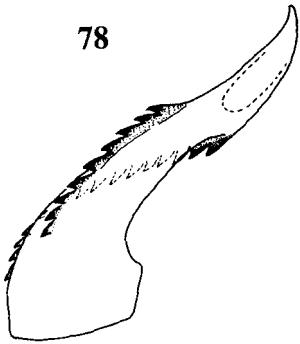
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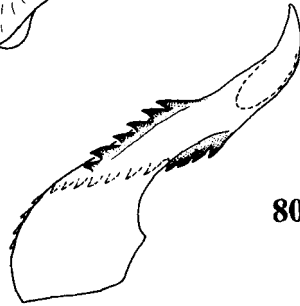
78



79



80



Chloriona albofimbriata: Fennah, 1958b: 204.
Chloriona (Sogatella) albofimbriata Fennah, 1958c: 490.
Sogatella albofimbriata Fennah, 1964: 141.
Sogatodes albofimbriatus Medler, 1980: 62.
Sogata rhodesi Muir, 1929b: 208, Holotype ♂, SOUTH AFRICA (Natal) (BMNH), examined. Synonymized by Asche, 1988: 206.

Diagnosis. *S.albofimbriata* is a small and slender *Sogatella* species. Genae dark brown, frons stramineous or light brown, median carina overlaid by a broad white stripe which continues over all parts of vertex; lateral portions of pronotum pale yellow. Tegmina hyaline, slightly infumated, a broad brown longitudinal band from base to apex extending from inner margin to media. Differing from all other *Sogatella* species by the structures of the male genitalia: Laterodorsal margin of genital segment slightly produced and rounded, edges slightly bent medially; lateral processes of the dorsal margin of the diaphragm rather long, directed dorsad; parameres broad at base, conically narrowing to apex, subapically on the inner margin a distinct edge (Fig. 13); aedeagus as long as parameres, on left side a row of numerous minute teeth, on right side a row of about 12–15 teeth. male genitalia figured in Asche (1988).

Remarks. As discussed in Asche (1988), it is difficult to decide evolutionary trends in the parameres of the genus, i.e. whether the *S.albofimbriata*-like form marks the beginning or the endpoint for the forked parameres of the *S.kolophon* or the *S.furcifera* type. Moreover, similarly elongate parameres are also found in some non-*Sogatella* species, e.g. in some *Toya* species. Within *Sogatella*, *S.albofimbriata* is apparently closely related to *S.krugeri*.

Distribution and material examined. Ethiopian region and Mauritius. SOUTH AFRICA: Cape Province* (Muir, 1926b: 33; 1929b: 213), Zululand (Muir, 1929: 213 as *S.rhodesi*, Fennah, 1958b: 204) (BMNH), Swaziland* (UST). MAURITIUS* (Fennah, 1964: 141) (BMNH). SENEGAL (Fennah, 1958c: 490). NIGERIA* (Medler, 1980: 62). IVORY COAST* (Asche, 1988: 206) (MNNH, MA, BMNH). OMAN* (BMNH).

***Sogatella krugeri* (Muir) comb.n.** (Fig. 14)

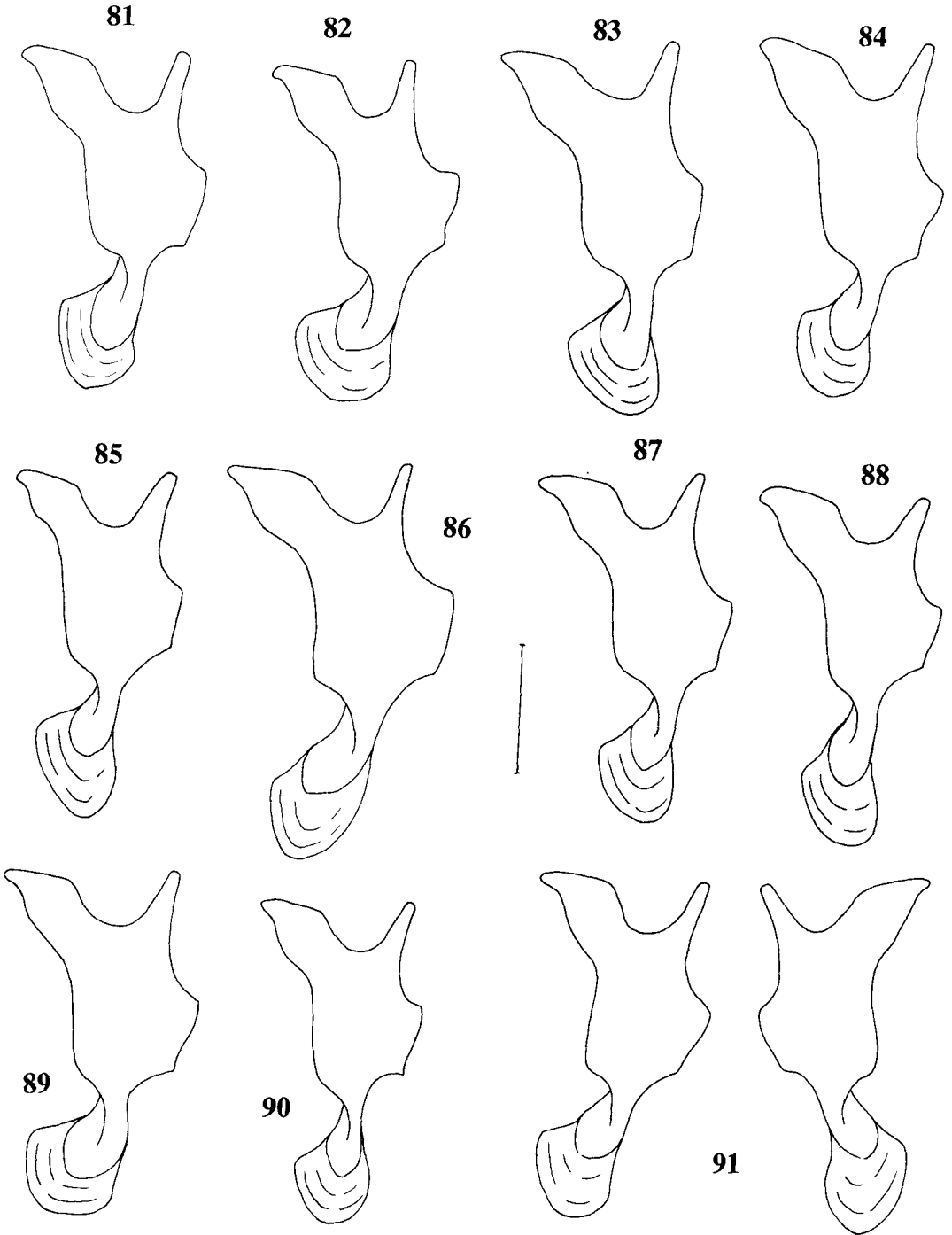
Sogata krugeri Muir, 1929b: 209, Holotype ♂, SOUTH AFRICA (Cape Province) (BMNH), examined.

Diagnosis. Externally *S.krugeri* is very similar to *S.albofimbriata*, but somewhat smaller. It differs from all other *Sogatella* species by the structure of the male genitalia and the shape of the vertex. The laterodorsal angles of the genital segment not produced, but broadly rounded, angles not bent medially, the lateral arms of the U-shaped diaphragm process moderately long. Parameres with a broad base then narrowing to apex, almost straight, outer margin slightly sinuate, apically truncate, inner angle of apex slightly produced medially (Fig. 14). Aedeagus twisted with an oblique row of about 20 very fine teeth on the left side, from right to ventral side a short row of 3–4 teeth.

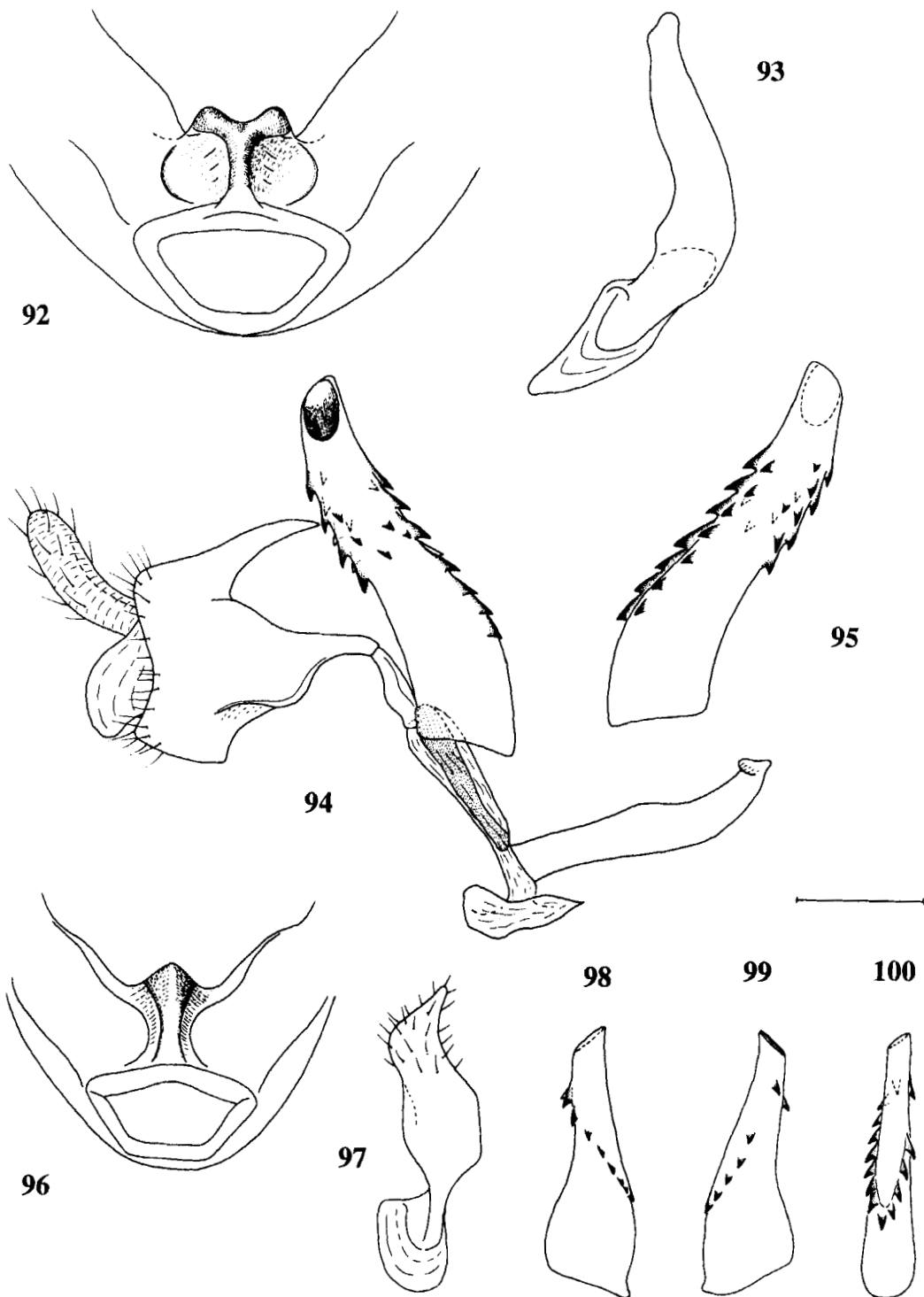
Vertex very narrow and acutely produced (1.7 times longer in mid-line than broad at base), separated from frons by a weak transverse carina. Vertex white, area of frons, genae and lateral portion of pronotum dark brown, post- and anteclypeus pale yellow, carinae of frons white or pale yellow. Tegmina similar to *S.albofimbriata* with a broad longitudinal brown suffusion covering the inner half.

Remarks. The systematic position of *S.krugeri* is somewhat difficult. By virtue of the coloration and the male genitalia it is placed easily into the *Sogatella* concept and within it is clearly related to *S.albofimbriata*. However, *S.krugeri* differs from other *Sogatella* species by the acutely produced head and the vertex separated from the frons by a transverse carina. In this character it resembles *Delphax eupompe* Kirkaldy (here placed in *Latristria* see below), but in this species the diaphragm structure is not of the *Sogatella* form and the phallotreme is subapically on the right side and not subapically left as in all *Sogatella* species (see Figs 124–133).

Distribution and material examined. AL-DABRA* (BMNH). TANZANIA* (BMNH). SOUTH AFRICA: Cape province* (Muir, 1929: 209), Natal* (UTS).

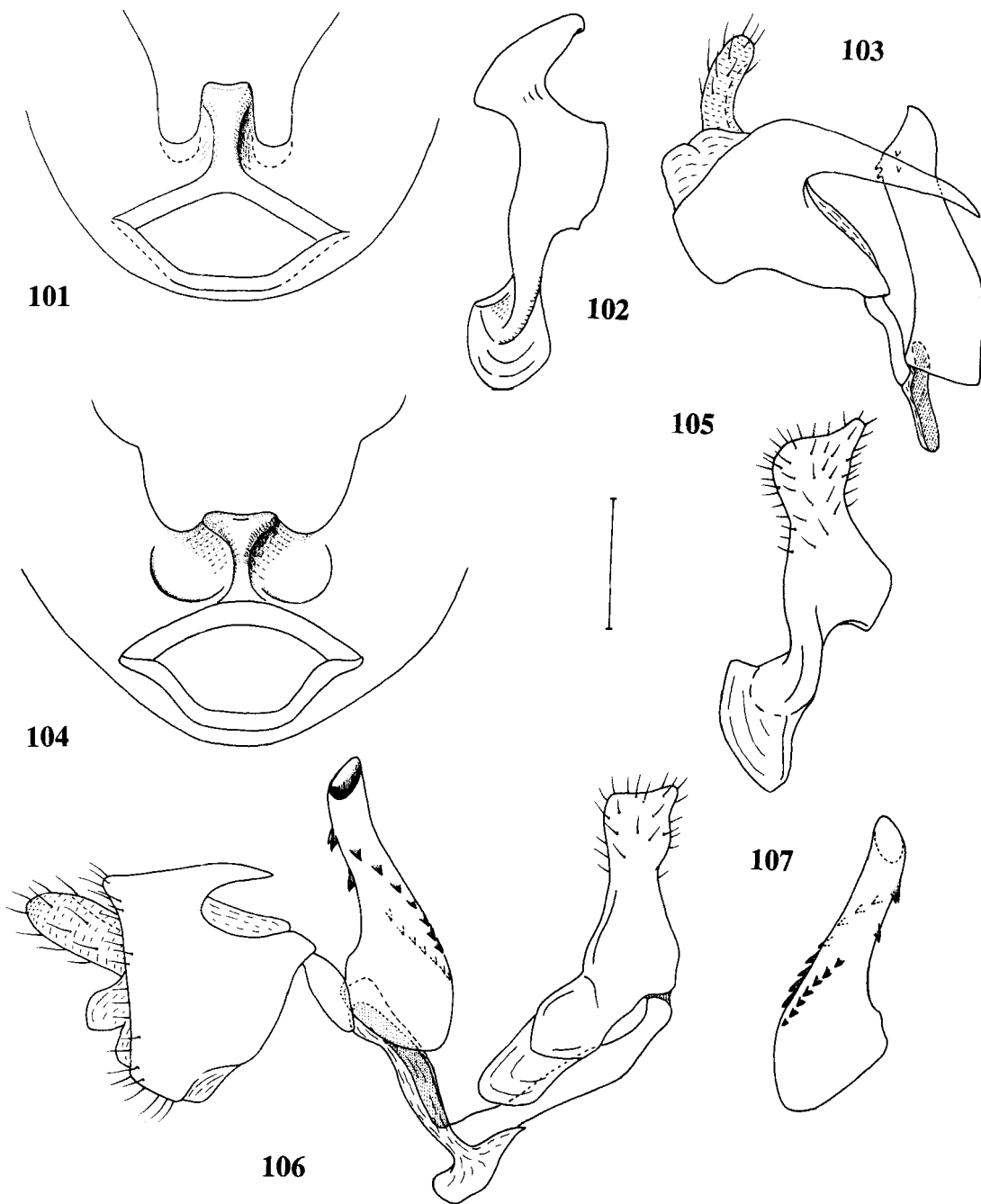


FIGS 81–91. *Sogatella vibix* (Haupt), intraspecific variation of parameres, scale line 0.1 mm; 81, Israel, lectotype; 82, Israel, ♂1; 83, Israel, same population ♂2; 84, Israel, same population, ♂3; 85, Egypt; 86, Sudan (Equatoria), holotype of *S. parakolophon* Linnavuori; 87, Japan (Hokkaido); 88, Philippine Is. (Luzon); 89, Solomon Is. (Guadalcanal); 90 Tonga Is. (Tongatapu I.); 91, Saudi Arabia, left–right variation in the same variation.



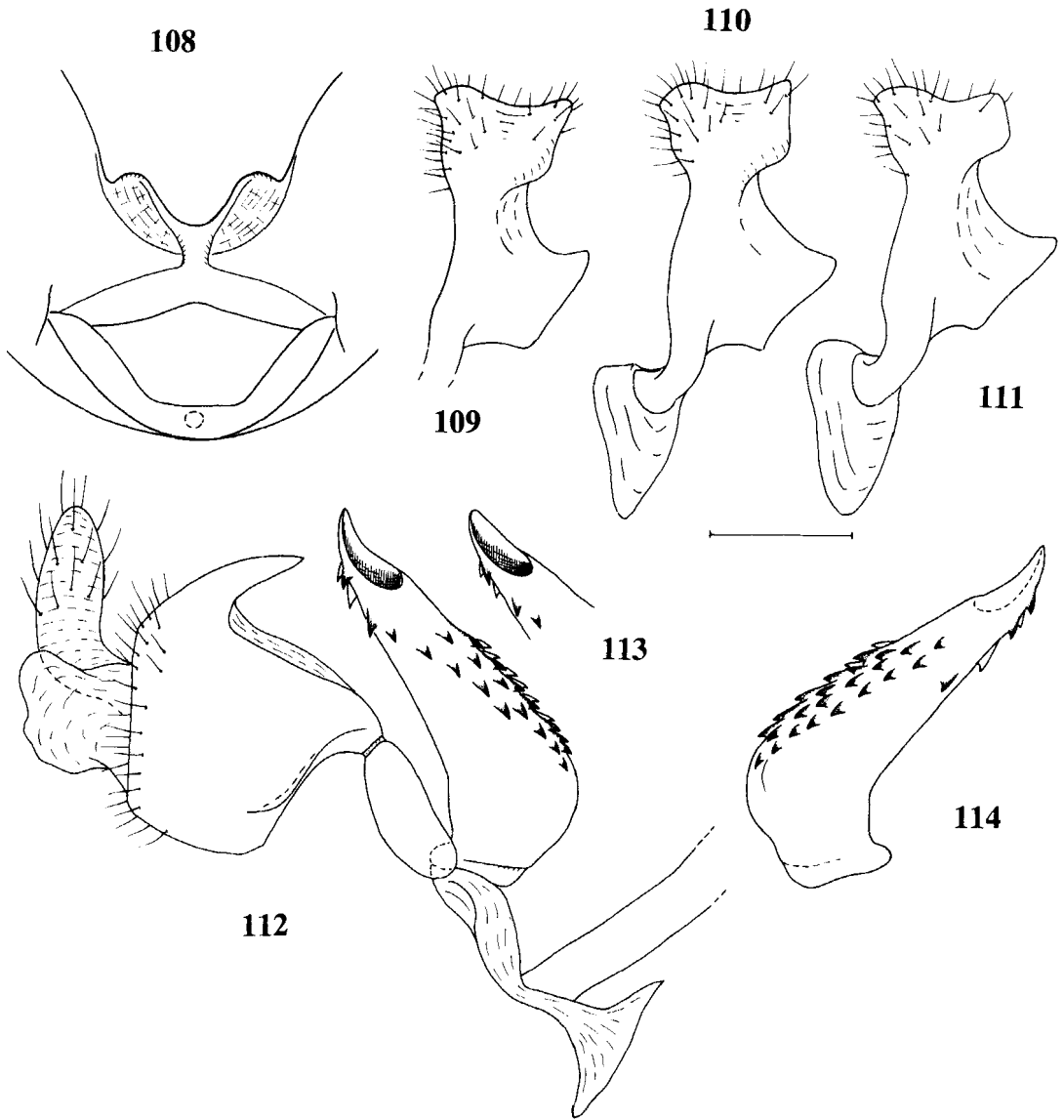
FIGS 92-95. *Tagosodes anomalus* (Muir) ♂ genitalia, holotype from Brazil, genitalia mounted in balsam on slide, scale line 0.1 mm; 92, diaphragm of genital segment, caudal view; 93, left paramere, left lateral view; 94, genitalia without genital segment and parameres, left lateral view; 95, aedeagus right lateral view.

FIGS 96-100. *Tagosodes cubanus* (Crawford). ♂ genitalia, specimen from Ivory Coast, scale line 0.1 mm; 96, diaphragm of genital segment, caudal view; 97, left paramere maximum view; 98, aedeagus, left lateral view; 99, aedeagus right lateral view; 100, aedeagus, ventrocaudal view.



FIGS 101–103. *Tagosodes nautica* (Muir). ♂ genitalia, paratype from Guyana, genitalia mounted in balsam on slide, scale line 0.1 mm; 101, diaphragm of genital segment, caudal view; 102, left paramere, maximum view; 103, genitalia without genital segment and parameres, left lateral view (basal parts of aedeagus and connective missing).

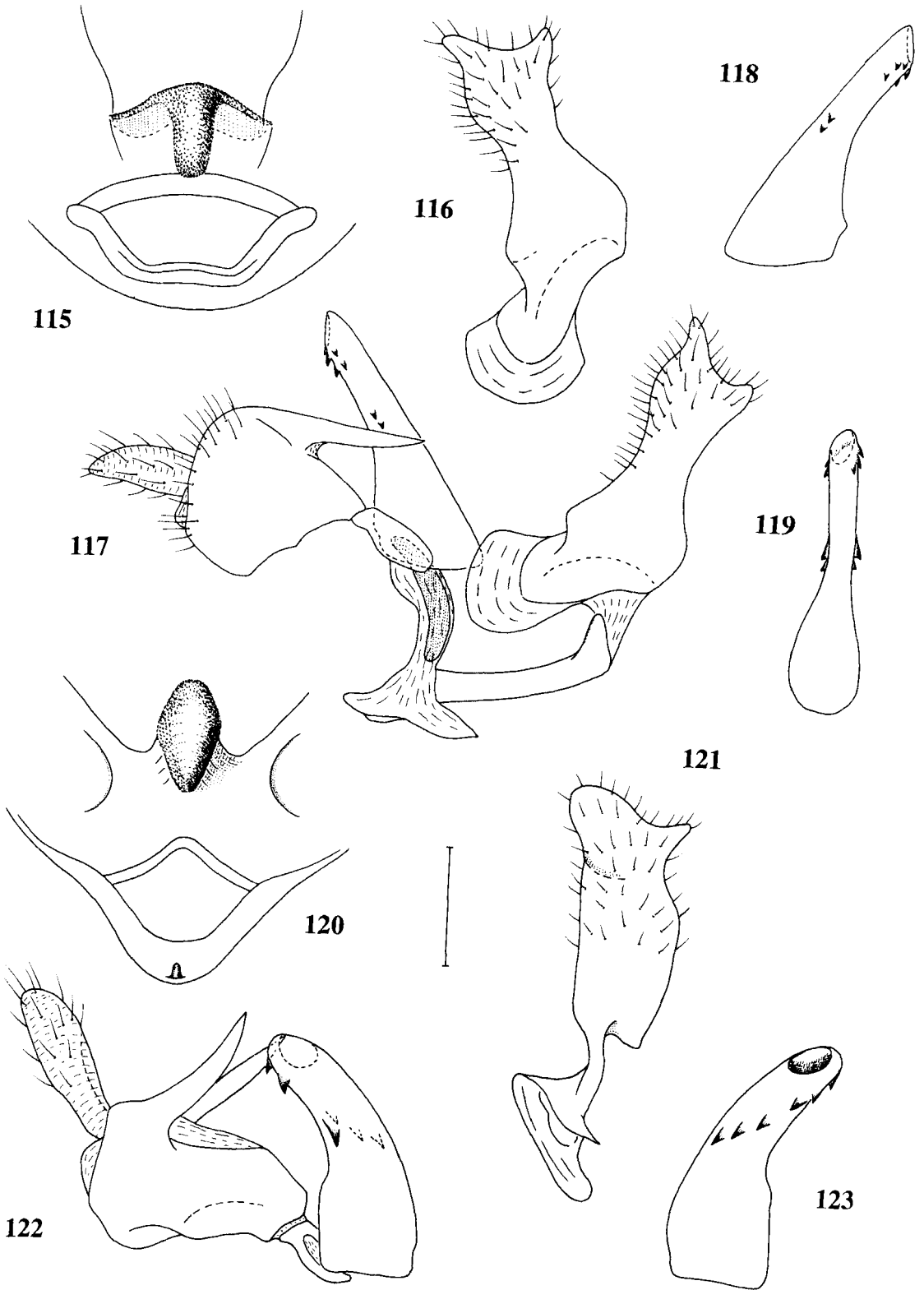
FIGS 104–107. *Tagosodes nicias* (Fennah). ♂ genitalia, specimen from Papua New Guinea, scale line 0.1 mm; 104, diaphragm of genital segment caudal view; 105, left paramere, maximum view; 106, genitalia without genital segment, left lateral view; 107, aedeagus, right lateral view.



FIGS 108–114. *Tagosodes orizicolus* (Muir), ♂ genitalia, scale line 0.1 mm; 109, holotype from Guyana, all others paratypes; 108, diaphragm of genital segment, caudal view; 109, left paramere, maximum view (undissected holotype); 110, left paramere, maximum view (paratype 1); 111, left paramere, slightly bent caudad (paratype 1); 112, genitalia without genital segment, caudal view (paratype 1); 113, tip of aedeagus (paratype 2); 114, aedeagus right lateral view (paratype 1).

FIGS 115–119. *Tagosodes pusanus* (Distant), ♂ genitalia, specimen from Sulawesi, scale line 0.1 mm; 115, diaphragm of genital segment caudal view; 116, left paramere maximum view; 117, genitalia without genital segment lateral view; 118, aedeagus right lateral view; 119, aedeagus, dorsal view.

FIGS 120–123. *Tagosodes wallacei* (Muir & Giffard), ♂ genitalia, paratype from Cuba, mounted in balsam on slide, scale line 0.1 mm; 120, diaphragm of genital segment, caudal view; 121, left paramere, maximum view; 122, genitalia without genital segment and parameres, left, lateral view (basal part of the aedeagus and connective missing, position of processes of anal segment probably due to embedding in balsam); 123, aedeagus, right lateral view.



Tagosodes gen.n.

Type species: *Dicranotropis cubanus* Crawford, 1914: 595.

Description. Small delphacids, about 3–4 mm in length (including tegmen). In external characters similar to *Sogatella* species.

Vertex slender, almost parallel sided, about 1.4–1.7 times longer in middle line than at base; posterior compartments shallowly concave with median carina weak or absent; anterior cell long and slender, anteriorly ending at tip of vertex or reaching down onto frons; vertex and frons forming a slightly acute angle, transition of vertex to frons mostly rounded. Frons high and slender, about 2 times or a little more as high as maximum width; widest at or shortly before the frontoclypeal suture; median carina prominent, especially at the transition of vertex to frons. Post- and anteclypeus with distinct median carina. Rostrum attaining the hindcoxae. Antennae: Second joint about 1.8–2 times longer than first; arrangement of antennal sensory field 16/7. Male drumming organ with elongate apodemes of the second abdominal sternite directed dorsad. Post-tibial spur foliaceous with numerous minute teeth on its hind margin similar to that of *Sogatella* species. Proportions of the hind tarsi, tegmina and wings as in *Sogatella* species.

Coloration. Along the middle line from the anterior cell of vertex to the caudal tip of the mesonotum a white band, the pro- and mesonotum parts laterad of that band brown or black.

Male genitalia. Genital segment ring-like, in caudal view subcircular or oval; laterodorsal angles not excessively produced; central part of diaphragm raised, mediodorsal margin either caudodorsad produced in a T-shaped (Figs 92, 104) or triangular (Fig. 96) area, in a distinct rectangular (Fig. 101) or in a U- or W-shaped protrusion (Fig. 108), or central part bulbous oval or ridged and with numerous minute teeth (Figs 115, 120); opening for the parameres of broad trapezoid shape (e.g. Fig. 96). Anal segment with two spinose processes originating at the laterodorsal angles on the ventral side, processes medially approaching each other, in lateral view slightly curving ventrad. Parameres variously shaped, with broad base, slender middle section and dilated apical area; mostly diverging from base, then at least inner apical angle converging to middle. Aedeagus tubular, only slightly com-

pressed, if at all; from its base slightly bent dorsad; teeth irregular and/or forming rows; phallosome apically or subapically on left or right side.

Diagnosis. *Tagosodes* species resemble *Sogatella* species in coloration and external appearance but differ in the structure of the male genitalia. In particular the diaphragm never forms a broad U-shape as in *Sogatella* but displays various different configurations as detailed above. The aedeagus is much less compressed, if at all, compared with *Sogatella*; the teeth may be in rows but in most species additional irregularly spaced teeth occur; the aedeagus is never twisted as found in *Sogatella* but often forms a simple, more or less straight tube. *Tagosodes* may be separated from *Matutinus* and *Latistria* mainly by the shape of the diaphragm of the genital segment (forming a shoe-shaped structure in *Matutinus* and a sinuate bilobed cross plate in *Latistria*). *Tagosodes* species can be readily separated from *Sogatellana* species by having only one pair of anal segment processes rather than two in *Sogatellana*.

Remarks. Several species groups are recognized within *Tagosodes* based on the form of the diaphragm structure and some of these groups may be monophyletic and may later be found to have generic status. Further work is necessary to re-describe some of the species included below and further re-arrangement cannot be ruled out.

List of included species (alphabetical order)*Tagosodes albifacies* (Caldwell) **comb.n.**

Sogata albifacies Caldwell, 1951, in Caldwell & Martorell 1951: 173 (Puerto Rico)

Tagosodes albolineosus (Fowler) **comb.n.**

Liburnia albolineosus Fowler, 1905: 135 (Mexico).

Tagosodes anomalus (Muir) **comb.n.**

(Figs 92–95)

Sogata anomala Muir, 1926a: 27, Holotype ♂, (Brazil), (BPBM), examined.

Tagosodes approximatus (Crawford) **comb.n.**

Megamelus approximata Crawford 1914: 622 (Nicaragua).

Tagosodes baina (Ding & Kuoh) **comb.n.**

Himeunka baina Ding & Kuoh, 1981, in Kuoh *et al.*, 1981: 24 (China).

Tagosodes biangulatus (Muir) **comb.n.**

Sogata biangulata Muir, 1929a: 84 (Argentina).

Tagosodes candiope (Fennah) **comb.n.**

Sogatodes candiope Fennah, 1975: 97 (Sri Lanka).

Tagosodes cubanus (Crawford) **comb.n.** (type species) (Figs 96–100)

Dicranotropis cubanus Crawford, 1914: 595 (Cuba).

Megamelus flavolineatus Muir 1920: 143 (Nigeria). (mentioned by Muir & Giffard, 1924: 12, syn. by Wolcott, 1923: 273).

Delphacodes pallidivitta Fennah, 1945: 433, Holotype ♂ (USNM), paratype ♂♂ (Trinidad) (BMNH), examined. **Syn.n.**

Chloriona (Sogatella) panda Fennah, 1958c: 491 (Ivory Coast), syn. mentioned in Fennah, 1969b: 56.

Remarks. *T. cubanus* is found in south and central America and also in West Africa. Male genitalia illustrated by Asche (1988).

Tagosodes dorsolineatus (Beamer) **comb.n.**

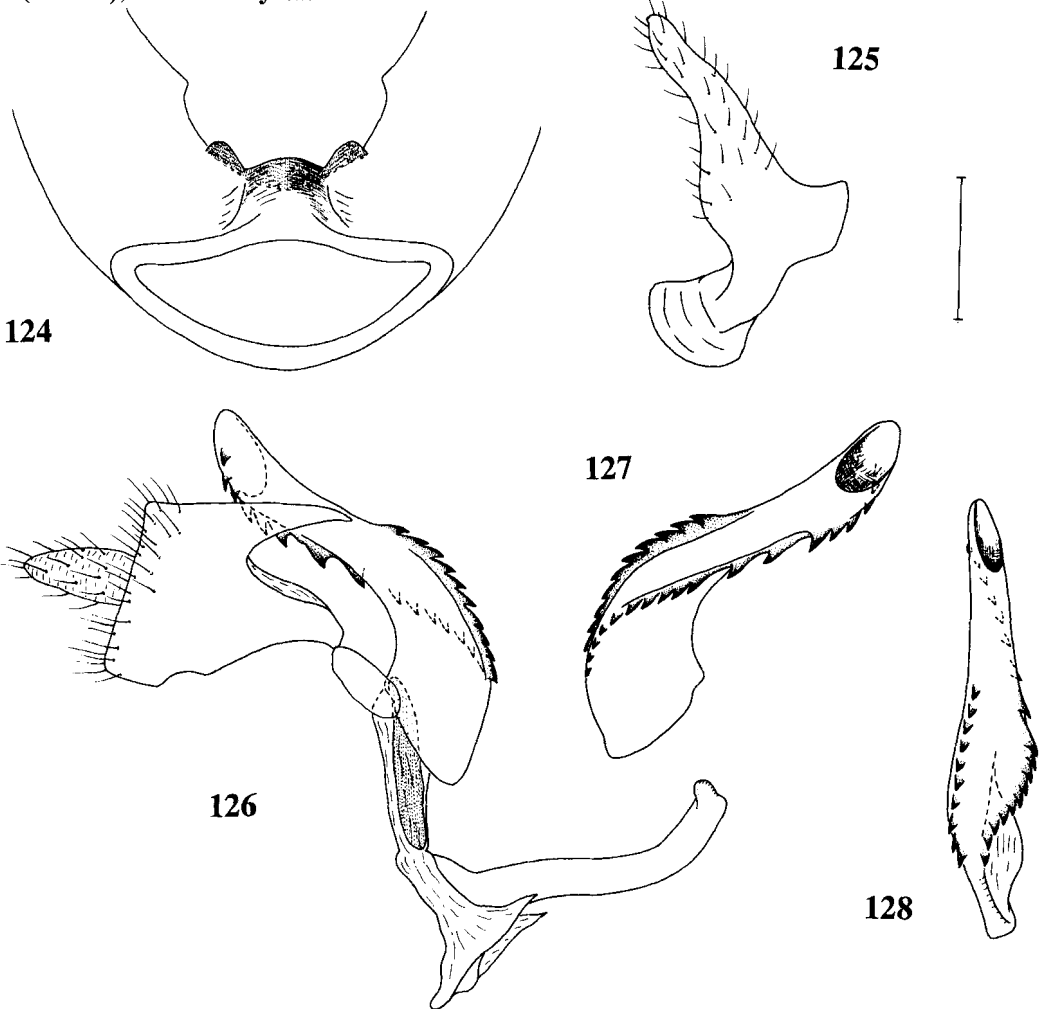
Sogata dorsolineatus Beamer, 1952: 112 (U.S.A.: Texas).

Tagosodes elpenor (Fennah) **comb.n.**

Sogatodes elpenor Fennah, 1964: 139 (Mauritius).

Tagosodes flaviceps (Muir) **comb.n.**

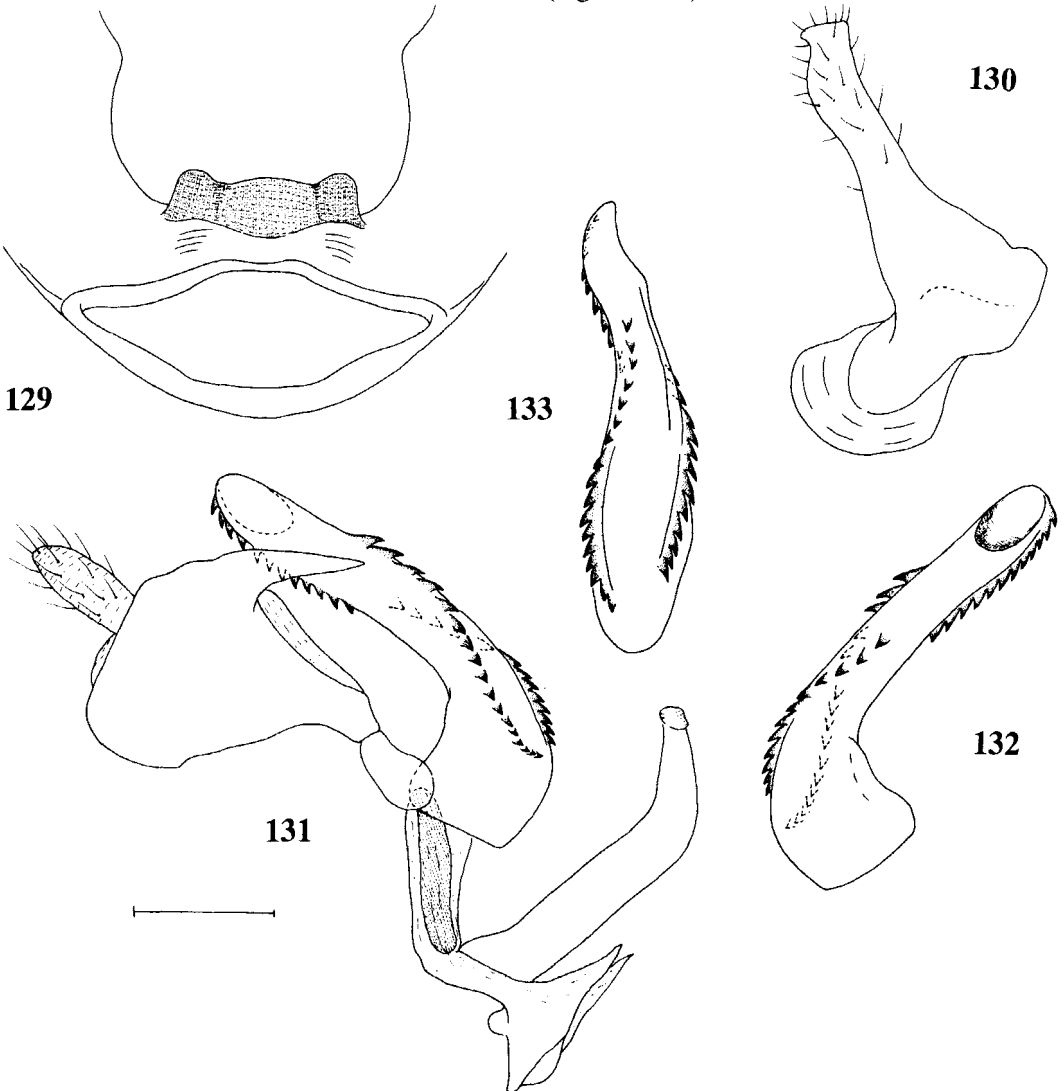
Sogata flaviceps Muir, 1929b: 210, Holotype ♂



FIGS 124–128. *Latistria eupompe* (Kirkaldy) ♂ genitalia, specimen from Australia (New South Wales), compared with holotype ♂, scale line 0.1 mm; 124, diaphragm of genital segment, caudal view; 125, left paramere, maximum view; 126, genitalia without genital segment and parameres, left lateral view; 127, aedeagus, right lateral view; 128, aedeagus, ventrocaudal view.

(South Africa: Zululand) (BMNH), examined.
Tagosodes incanus (Yang) **comb.n.**
Sogatodes incanus Yang, 1989: 176, Holotype ♂ (Taiwan) not examined.
Tagosodes melicerta (Fennah) **comb.n.**
Chloriona (Sogatella) melicerta Fennah, 1958c: 490 Holotype ♂ (Portugese Guinea) (MNHN), examined.
Sogatodes neomphalus Asche, 1988: 209, Holotype ♂ (Ivory Coast) (MNHN) examined.
Syn.n.

Remarks. Male genitalia illustrated by Asche (1988).
Tagosodes nauticus (Muir) **comb.n.** (Figs 101–103)
Sogata nautica Muir, 1926a: 26, Holotype ♂ (Guyana) (BPBM), examined.
Tagosodes nicias (Fennah) **comb.n.** (Figs 104–107)
Sogatodes nicias Fennah, 1965b: 45 (Papua New Guinea).
Tagosodes orizicolus (Muir) **comb.n.** (Figs 108–114)



FIGS 129–133. *Latistria placitus* (Van Duzee), male genitalia, specimen from Belau Is.: Babelthuap I., scale bar 0.1 mm; 129, diaphragm of genital segment caudal view; 130, left paramere maximum view; 131, genitalia without genital segment and parameres left lateral view; 132, aedeagus right lateral view; 133, aedeagus ventrocaudal view.

Sogata orizicola Muir, 1926a: 27 (Guyana).
Sogata brazilensis Muir, 1926a: 26 (Brazil),
 syn. by Fennah 1965a: 215.

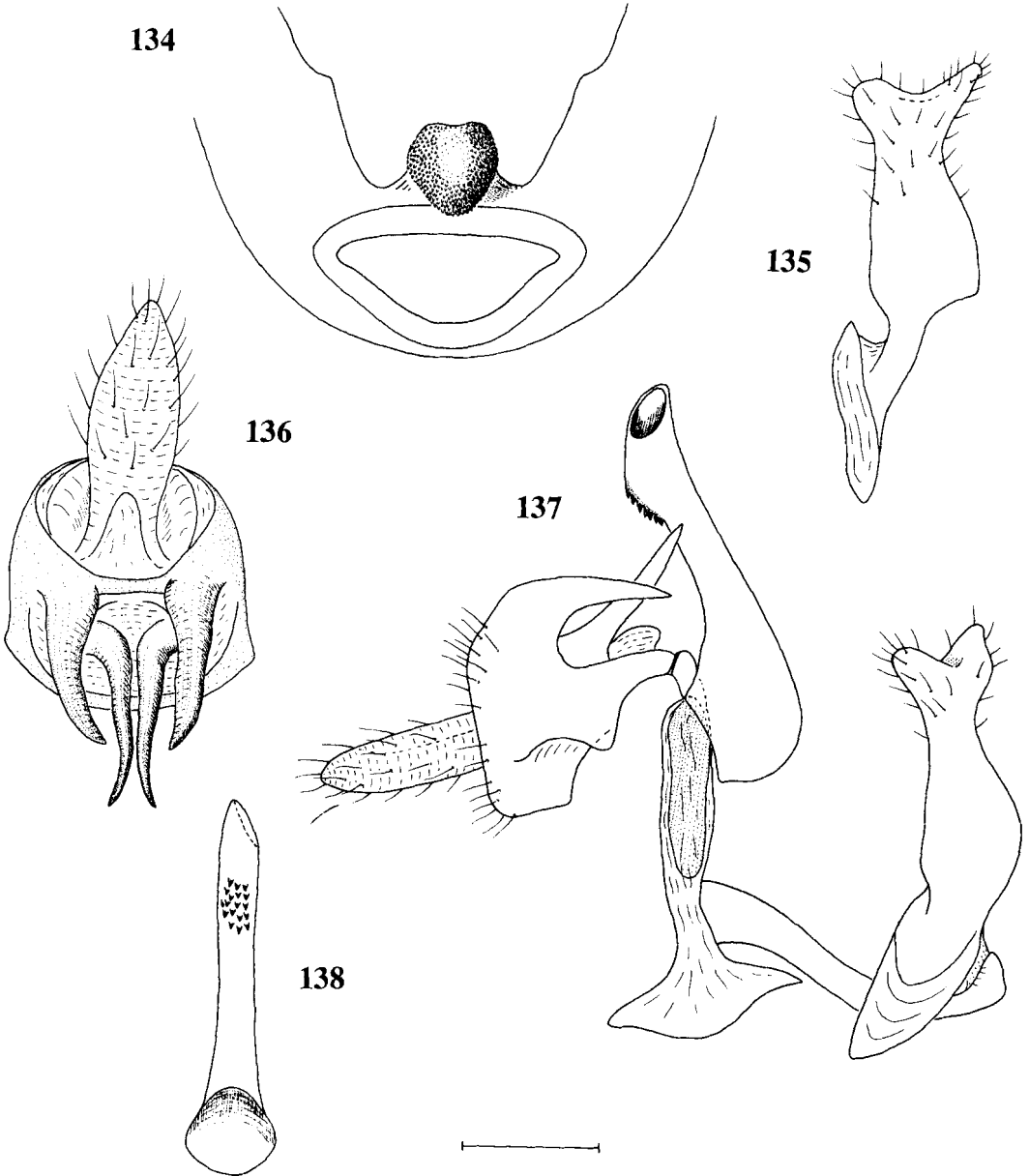
Remarks. It appears that the species presently known as *S. orizicola* may consist of several closely related species that may be found in South America. Further work is necessary on this topic.

Tagosodes pusanus (Distant) **comb.n.**
 (Figs 115–119)

Sogata pusana distant, 1912: 191 (India).

Kelisia fieberi Muir, 1917: 331 (Philippines),
 syn. by Fennah, 1971a: 574.

Unkana formosella Matsumura, 1935: 72
 (Taiwan), syn. by Fennah, 1971a: 574.



FIGS 134–138. *Sogatellana geranor* (Kirkaldy), ♂ genitalia, holotype from Australia (Queensland), scale line 0.1 mm; 134, diaphragm of genital segment, caudal view; 135, left paramere, maximum view; 136, anal segment, ventrocaudal view; 137, genitalia without genital segment, left lateral view; 138, acedeagus dorsal view.

Sogata striatus Qadri & Mirza, 1960: 117 (Pakistan) nomen nudum.

Himeunka chibana Tian & Kuoh, 1981, in Kuoh *et al.*, 1981: 193 (China). **Syn.n.**

Sogatodes assimilis Yang 1989: 178 (Taiwan). **Syn.n.**

Remarks. The name *Sogata striatus* Qadri & Mirza is considered invalid under article 13 of the code of Zoological Nomenclature (1985). Based on the drawings in Qadri & Mirza (1960) the species is, in any case, identical with *T. pusanus*. The synonymy of *Himeunka chibana* is based on the drawings and description given by Tian & Kuoh in Kuoh *et al.* (1981). *Sogatodes*

assimilis Yang was described from just one specimen differing from *pusanus* only in proportions of the frons and coloration of the tegmina. We regard this as merely variation in this widespread species.

Tagosodes sternalis (Distant) **comb.n.**

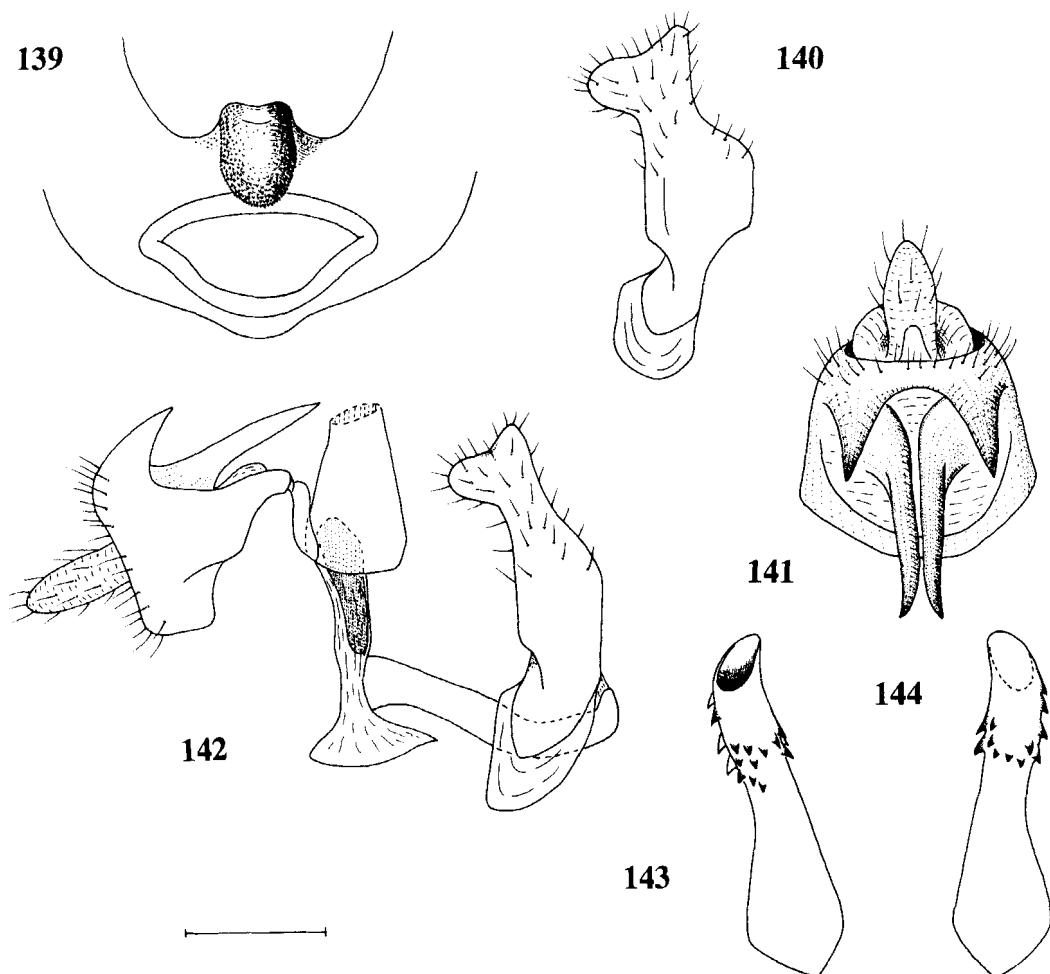
Sogata sternalis Distant, 1916: 139 (Sri Lanka).

Tagosodes timaea (Fennah) **comb.n.**

Sogatella timaea Fennah, 1969b: 56 (Sudan).

Tagosodes wallacei (Muir & Giffard) **comb.n.** (Figs 120–123)

Sogata wallacei Muir & Giffard, 1924: 13 (Guyana).



FIGS 139–144. *Sogatellana quadrispinosa* (Muir), ♂ genitalia, holotype and another non-type specimen from Singapore, scale line 0.1 mm; 139, diaphragm of genital segment, caudal view (holotype); 140, left paramere, maximum view (holotype); 141, anal segment, ventrocaudal view (non-type specimen); 142, genitalia without genital segment, left lateral view, tip of aedeagus broken and missing (holotype); 143, aedeagus, left lateral view (non-type specimen); 144, aedeagus, right lateral view (non-type specimen).

Latristria Huang et al.

Latristria Huang et al., 1980: 166; type species
L. testacea Huang et al., 1980: 166 by original
designation.

Diagnosis. *Latristria* species externally resemble small slender *Sogatella* species, especially the *S. albofimbriata* group with anteriorly a somewhat acute vertex. However, *Latristria* differs from *Sogatella* and all other genera displaying the white longitudinal stripe across the vertex, pro- and mesonotum in the shape of the diaphragm which mediodorsally forms a broad plate-like protusion with rounded lobe-like lateral edges (Figs 124, 129). The parameres are long and slender with tapering or truncate apex, parameres in repose almost reaching the laterodorsal corners of the genital segment.

Remarks. A similarly shaped diaphragm in combination with elongate parameres is found in some species currently placed in *Toya* Distant; however, these species lack the white dorsal stripe and they differ considerably in bodily proportions. Further studies are necessary to further elucidate relationships in these groups of species.

Included species (alphabetical order)

Latristria eupompe (Kirkaldy) **comb.n.**
(Figs 124–128)

Delphax eupompe Kirkaldy 1907: 162 (Australia, Fiji)

Delphax ochrias Kirkaldy 1907: 157 (Australia, Fiji). **Syn.n.**

Sogatodes infestus Yang, 1989: 172. **Syn.n.**

Remarks. This species is clearly placed in *Latristria* by virtue of the form of the male genitalia with the tapering apex to the parameres. It is possible that one of the listed Chinese species will be a synonym of either of *L. eupompe* or *L. placitus* (see below). *Delphax ochrias* was described from brachypterous females. Studies in Sulawesi and Australia have shown that the short-winged females of *L. eupompe* are of different colour to the males; they are stramineous and resemble in all characters the holotype female of *Delphax ochrias*. On this basis the synonymy is proposed here. The synonymy of *S. infestus* Yang is made on the basis of the original drawings.

Latristria flavotestacea Kuoh

Latristria flavotestacea Kuoh, 1980, in Huang et al., 1980: 168 (China).

Latristria fuscipennis Huang & Ding
Latristria fuscipennis Huang & Ding, 1980, in Huang et al., 1980: 167 (China).

Latristria placitus (Van Duzee)
(Figs 129–133)

Sogata placitus Van Duzee, 1937: 120 (Caroline Is.).

Chloriona (Sogatella) euterpe Fennah, 1956b: 118 (Mariana Is.), syn. by Fennah, 1969a: 21.

Sogatodes eupompe Yang, 1989: 170 misident.

Latristria testacea Huang & Ding

Latristria testacea Huang & Ding, 1980, in Huang et al., 1980: 166 (China).

Sogatellana Kuoh

Sogatellana Kuoh in Huang et al., 1980: 169.
Type species *S. marginata* Kuoh by original
designation.

Diagnosis. Resembles *Sogatella* in coloration and body proportions. Differs from all other related genera of the *Sogatella*-group by the possession of two pairs of processes on the ventral side of the anal segment (Figs 136, 137, 141, 142).

Remarks. The possession of the two pairs of anal segment processes is apparently also found in the type species of *Himeunka*. If so the two genera may be synonymous.

Included species (alphabetical order)

Sogatellana costata Ding

Sogatellana costata Ding, 1985: 432 (China).

Sogatellana fusca Tian & Ding

Sogatellana fusca Tian & Ding, 1980, in Huang et al., 1980: 170 (China: Jiangsi).

Sogatellana geranor (Kirkaldy) **comb.n.**

(Figs 134–137)

Delphax geranor Kirkaldy, 1907: 158 (Australia).

Delphax sponsa Kirkaldy, 1907: 148, Holotype ♀ (Australia) (BPBM), examined. **Syn.n.**

Sogatellana quadrispinosa (Muir) **comb.n.**

(Figs 139–144)

Sogata 4-spinosa Muir, 1919: 526, Holotype ♂, (Singapore) (BPBM), examined.

Sogatellana marginata Kuoh

Sogatellana marginata Kuoh, 1980, in Huang et al., 1980: 169 (China: Guangdong).

Sogatellana semicirculara Yang

Sogatellana semicirculara Yang, 1989: 196 (Taiwan).
Sogatellana yunnanana (Ding) **comb.n.**
Himeunka yunnanana Ding, 1985: 431 (China: Yunnan).

Himeunka Matsumura & Ishihara

Himeunka Matsumura & Ishihara, 1945: 70.
 Type species *H. tateyamaella* Matsumura by subsequent designation.

Remarks. Kuoh *et al.* (1981) revised *Himeunka* with descriptions of two new Chinese species, *H. baina* and *H. yunnanana*, in addition to a re-description of what he considered to be *H. tateyamaella*. One of the Chinese species (*H. baina*) does not display the 4 processes of the anal segment and is transferred to *Sogatellana* (see above). The other species, *H. yunnanana*, possesses all essential characters of *Sogatellana* and is transferred to this genus. Unfortunately we have not seen any specimens of *H. tateyamaella* but the illustrations given by Kuoh *et al.* (1981) clearly represent *H. tateyamaella* as a *Sogatellana* species by virtue of the two pairs of anal segment processes in the male genitalia. If this is the case then *Sogatellana* becomes a junior synonym of *Himeunka* and the species listed above would become *Himeunka* species. This situation will not be resolved until the type material of *H. tateyamaella* can be compared with *Sogatellana* species.

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