

**Meenoplidae of Taiwan
(Homoptera : Fulgoroidea)**

Shun Chern Tsaur*, Chung Tu Yang* and Michael R. Wilson**

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* Department of Entomology, National Chung Hsing University.

** Commonwealth Institute of Entomology, London, UK.

臺灣縞飛蝨科(同翅目：飛蝨總科)

曹順成 楊仲圖 M. R. Wilson

摘要

臺灣產縞飛蝨科種類以前僅有二亞科三屬四種記錄，本文計述二亞科五屬九種之成蟲及二種之若蟲，其中有一新屬，四新種，一新記錄種，四舊記錄種。

本文研究之種類計有：

- I. *Kermesiinae* 亞科……三屬，三新種
 ，一新記錄種
 ，二舊記錄種
 ，二種若蟲。

1. *Nisia* 屬……一新記錄種，一舊記錄種及一種若蟲。
 2. *Eponisiella* 屬……一新種。
 3. *Eponisia* 屬……二新種，一舊記錄種及一種若蟲。
- II. *Meenoplineae* 亞科……二屬，一新種，二舊記錄種。
 1. *Metanigrus* 屬……為新屬，一新種。
 2. *Anigrus* 屬……二舊記錄種。

ABSTRACT

Only 4 meenoplid species belonging to 3 genera, 2 subfamilies recorded in Taiwan previously. The present paper deals with 9 species of adults and 2 species of nymphs which represent 2 subfamilies, 5 genera. (1) The subfamily Kermesiinae includes 3 genera, 3 new species, 2 known species, 1 newly recorded, and 2 species of nymphal stages. (2) Meenoplineae contains 2 genera, 1 new species, 2 known species. Among the total amount of 9 species, 2 genera and 4 species are new to science, 1 species is newly recorded in the fauna of Taiwan, and 4 species are known. Keys are given to the subfamilies, the genera and the species of adults. New genus: *Metanigrus* Tsaur and Yang. New species: *Eponisia macula* Tsaur and Yang, *Eponisia woodwardi* Tsaur and Yang, *Eponisiella matsumurai* Tsaur and Yang. New synonymy: *Anigrus nigricans* (Matsumura) and *A. metalces* Fennah are reduced to Syns. of *A. frequens* (Matsumura). *Nisia australiensis* Woodward and *N. carolinensis* Fennah are new status.

INTRODUCTION

The Meenopliidae is a small family of fulgoroidea, containing 10 genera and 105 species, included in 2 subfamilies: Meenoplineae Fieb., 1872 and Kermesiinae Kirk., 1906. On evidences so far obtained, they belong to a group which include Achilidae, Achilixiidae, and Kinnaridae. The fundamental characters shared by this group are (1) a simple egg, (2) a cryptic nymphal life, (3) a reduced or obsolete ovipositor, (4) a tubular phallobase and a greatly reduced or obsolete phallus, (5) a long second post-tarsal joint, (6) a rostrum with a long apical segment, (7) a primitive tegminal venation (except in a few very special genera) (Fennah, 1950a). They were formerly included as a subfamily of Cixiidae but also included with Derbidae. They are confined to the Old World and most species are found in the tropics and subtropics.

This family was established by Fieber in 1866 to include a single species from Greece. Since that time the list of genera and species has been increased by the work of Kirkaldy and Muir principally in the Pacific area; by Distant, Muir, and Jacobi in the Ethiopian region; by Distant and Melichar in India; by Kirkaldy and Woodward in Australia; by Synave in Africa; by Linnavuori in USSR; by Fennah in various areas; by Stalle in Belgium; and by Matsumura in Taiwan and Japan; and now being revised by Wilson.

Three genera and 4 species (we agree with Emeljanov, 1984, excluding *Kotonisia* Matsumura, 1938, from Meenopliidae) had been

recorded from Taiwan (Matsumura, 1914).

This paper deals with 9 species of adults and 2 species of nymphs which represent 5 genera, among them 4 species and 1 genus are new to science. Two species (*Nisia australiensis* & *N. carolinensis*) have been noted as minor rice pests, other are found on herb. Specimens are deposited at the Department of Entomology, National Chung Hsing University, Taichung, Taiwan, and National Taiwan University, Taipei, Taiwan, Republic of China and British Museum (Natural History), London, UK. All the meenoplid material available for study is collected by the senior author except otherwise stated, in various areas of Taiwan.

LIST OF MEENOPLID SPECIES OF TAIWAN

I. Subfamily Kermesiinae

1. *Nisia carolinensis* Fennah, 1971 n. status
2. *N. australiensis* Woodward, 1957 n. status
3. *Eponisiella matsumurai* Tsaur and Yang n. sp.
4. *Eponisia woodwardi* Tsaur and Yang n. sp.
5. *E. guttula* (Matsumura)
6. *E. macula* Tsaur and Yang n. sp.

II. Subfamily Meenoplineae

7. *Metanigrus yami* Tsaur and Yang n. sp.
8. *Anigrus formosanus* (Matsumura)
9. *A. frequens* (Matsumura)
(=*A. nigricans* (Matsumura))
(=*A. metalces* Fennah)

FIRST PART: GENERAL

I. Adult Morphology

Meenoplidae are small Homoptera, being 2.5 mm to 6.5 mm in size. Their coloration are various from white to brown. It has been fairly easy to investigate a number of external characters not previously used in meenoplid

taxonomy; some of these are found to be taxonomically useful and discussed below.

Head: (Fig. 1, A-D)

The head usually small and connected with the prothorax at the posterior border, opisthognathous with strongly convex eyes. Vertex

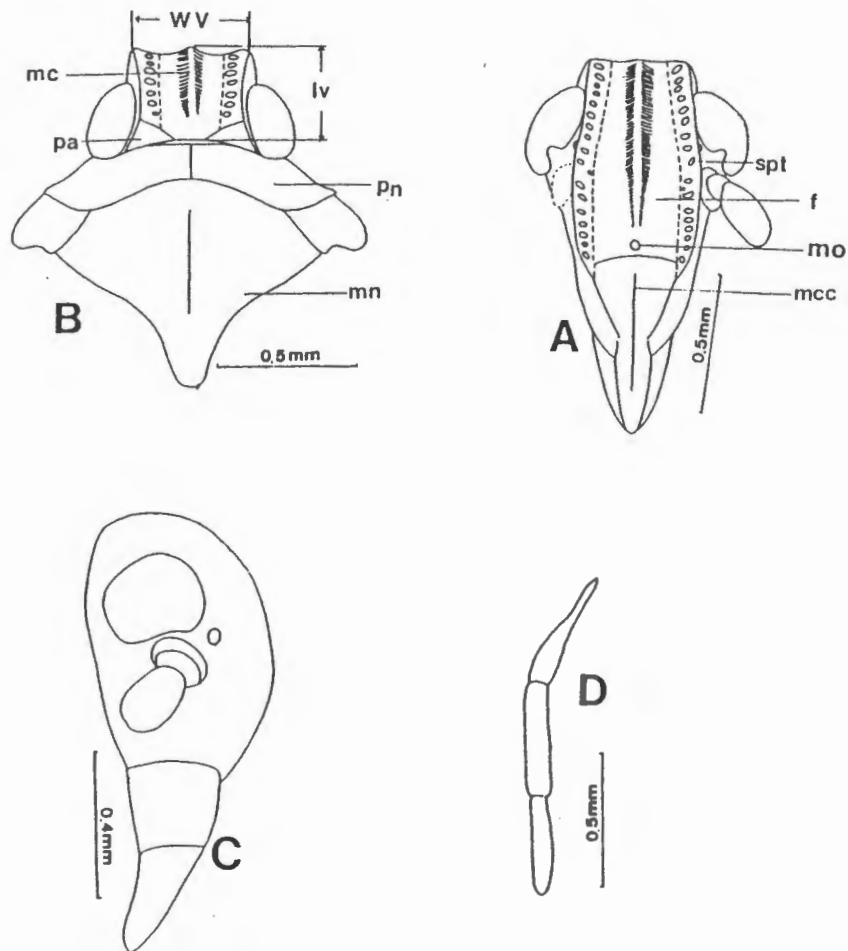


Fig. 1. A. Head of *Anigrus frequens*, dorsal view, lv =length of vertex; wv =width of vertex; pa =posterolateral areolets; mc =median carina; pn =pronotum; mn =mesonotum. B. Head, ventral view; f =frons; mo =median ocellus; mcc =median carina of clypeus. C. Head, lateral view. D. Rostrum.

small, usually forming two posterolateral areolets at base except on part of *Kermesia* and some *Eponisia* the latter having their submedian carinae straight, not touching posterior margin of vertex. In dorsal view, apical margin of vertex again produced forward medially in species with median carina, strongly emarginate in species without. In profile vertex roundly running into frons; frons convexed medially, lateral carina dividing a large area around eye. Frons longer in middle line than wide at widest portion, ranging from 1.3 : 1 to 2.3 : 1. Lateral carinae strongly elevated, along its inner side has 22–34 sensory pits (including several ones on vertex). Median carina present in *Anigrus* and *Phaconeura*, and absent in other genera. In some species, an interruption at frontoclypeal suture between

lateral carina of frons and clypeus. Postclypeus with a distinct median carina except in *Eponisia macula* and *Eponisiella*. Lateral carinae of postclypeus are absent in *Nisia* and *Eponisiella*. Rostrum slender, reaching over hind coxae, 3-segmented, first the longest, second longer than third, third longer than wide. Ocelli present. The antenna 3-segmented, the first segment short and thick, the second long and subcylindrical, the third, the flagellum, very thin.

Thorax: (Fig. 2, A–B)

Pronotum, broader than head, arched, with median carina. Slightly convex on disc of anterolateral area in some species. Mesonotum with median carina, thumb-like, with large

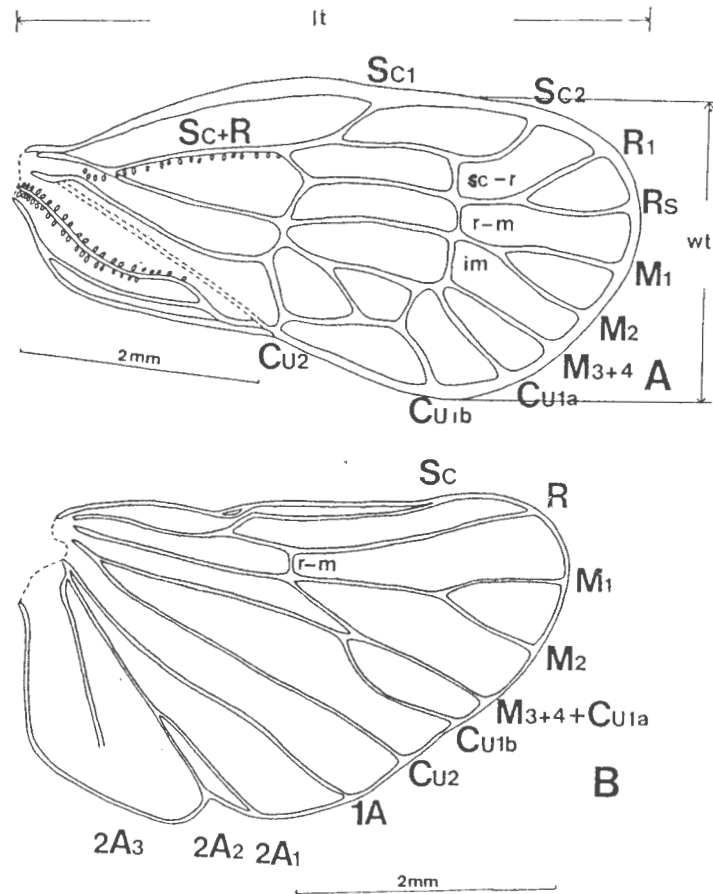


Fig. 2. A. Tegmen of *Eponisia guttula* (Matsumura) lt=length of tegmen; wt=width of tegmen. B. Wing.

tegulae connected with pronotum, and as broad as or slightly broader than pronotum. Metanotum covered by mesonotum. Tegmina always macropterous and normally holding vertically in repose. The venation in general cixiid-like. *Sc+R* and *M* with common petiole at base, and forked before middle or after. A line of sensory pits below *Sc+R* and apical portion of common petiole or on above or not at all. *Sc* and *R* with two branches respectively, M_{1+2} forked or not, M_{3+4} fused with Cu_1a two times. Cu_1b fused or slightly connected with Cu_1a once. Claval veins fused at middle in Meenoplineae, near apex in Kermesiinae, entering the apex of the clavus. First claval vein with single row of sensory pits in Meenoplineae, double in Kermesiinae. Many sensory pits are scattered on the position of second claval vein in Meenoplineae, remainder without. Wings fan-like, hyaline, *Sc+R* forked near middle. *Sc* curved upward, *R* usually forked except in *Nisia* and part of *Eponisia*. *r-m* present. M_{1+2} forked. M_{3+4} and Cu_1a fused throughout. Cu_2 single. $2A$ forked.

Legs: (Fig. 3, D)

Legs simple, the fore and middle legs small. Hind tibia long and slender, without spines laterally, with basal segment of hind tarsus longer than the second and the third together. Spinal formula of hind leg useful for separating genera.

Pregenital segments of the abdomen: (Fig. 3, A–C)

Tergite I visible on the dorsal aspect but very narrow and very weakly sclerotized. Tergite II found modified conically on the dorsal in the male. In both sexes, tergite III widened ventrally. Tergites IV–VIII easily distinguishable. In the female, tergites VI–VIII angulated medially, forming two declivous planes, the backward bearing wax-secretion plates (Fig. 4, A–C). The plates usually wide at middle and narrow laterad. Each plate usually separated into two parts by a line of empty area or the arrangement of marginal pores. Pores of inner plate may be usually darker and larger. The shape and the size of inner plate are useful

characters at least at species level. But in *Nisia* the shape and color of pores are uniform throughout. On the lateral side sternites I and VIII reduced in both sexes. Sternites II and III fused, only distinguishable in male in cleared specimens. Sternites IV–VII are all stout and easily visible. Spiracles I, II and VIII are located dorsally, on the external paratergites. Spiracles III–VII can be found in the lateral membrane, arranged nearly at same level. According to the position of spiracles it is very easy to point out which tergite and sternite belong to. Lateral membranes have depressions anteriorly which outer part with granulates and tiny process, inner impoverished. The cave, maybe some kind of proprioceptor, receive the stout process of hind leg (Fig. 4, A–C).

Male genital segments

These are entirely symmetrical. Segments IX and X fused respectively, forming pygofer and anal segment, all ring-shaped. Pygofer is wider posteriorly than anteriorly, connecting with anal segment tightly. Anal segment sclerotized, anal style arising from dorsomedial portion. The shape of anal segments is diverse in different genera. In dorsal aspect, slender and same width in *Nisia*, widened at middle in *Eponisia*, stout in *Metanigrus*, deflexed obtuse in *Anigrus*.

Phallus simple and located on the central portion of pygofer, usually with a ventral apodeme connecting with base of genital styles and a anterior apodeme lying straightly. Phallobase swollen. Processes of phallobase are with various types. In lateral view, they are sickle-shaped in *Nisia*, irregular in *Eponisia* and *Anigrus*, slightly dilating with reverse teeth in *Anigrus formosanus*, swelling with scale-like processes in *Metanigrus*. Genital styles slender, anterior margin of basal half produced dorsad in a convex lobe which gives off distally a upward spinose process in *Nisia* and *Eponisia*, in other genera curved upward at middle with a process near middle or apex.

Female genital segments (Fig. 3, C)

Ventral valvifer large and quadrate, in Meenoplineae its basocaudal angles turned mesad

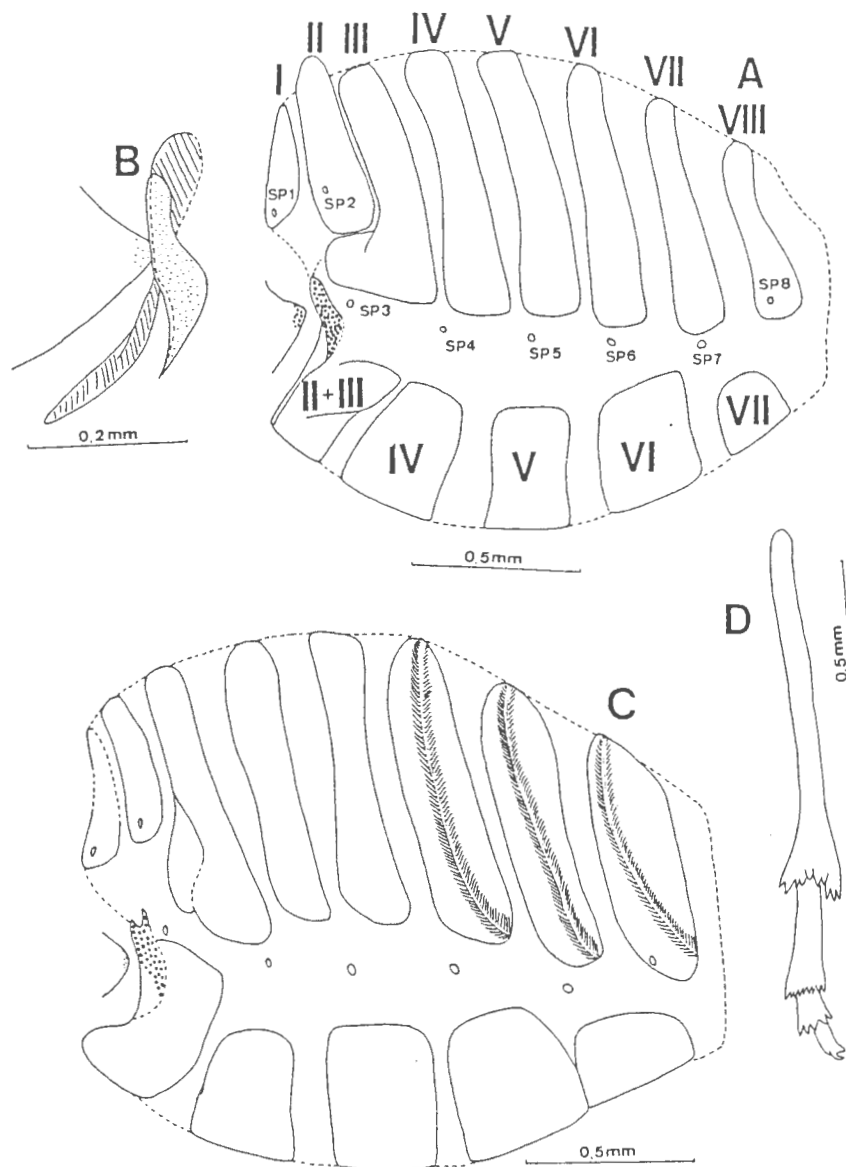


Fig. 3. Abdomen and hind leg of *Nisia carolinensis* Fennah. A. Male abdomen, lateral view; sp=spiracle. B. Proprioceptor. C. Female abdomen, lateral view. D. Hind leg.

and produced into a stout process but reduced in Kermesiinae. Ventral valvula of Meenoplinae except *Metanigrus* also quadrate and large, most portion covered by production of ventral valvifer with a long process slightly curved mesad. Shape of ventral valvula in Kermesiinae and *Metanigrus* bird-head-like with its process beak-shaped, connected with ventral valvifer

by a visible membraneous area.

II. Immature stages

Egg: (Fig. 6, N-I) Only observed in *N. carolinensis*, *N. australiensis* and *Eponisia guttula*.

Egg ellipsoidal, devoid of ornamentation.

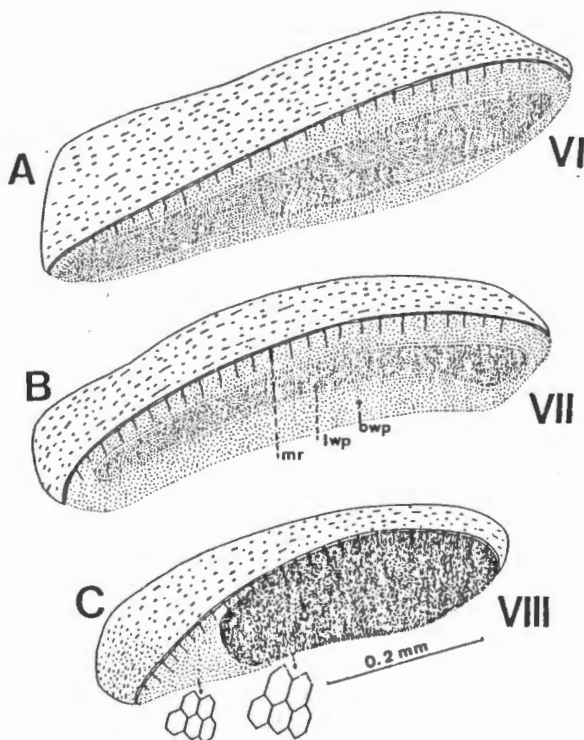


Fig. 4. Abdominal tergites VI–VIII of *Eponisia guttula* (Matsumura). A. Tergite VI, dorsal view. B. Tergite VII, dorsal view; mr=median ridge; iwp=inner wax-secretion plate; owp=outer wax-secretion plate. C. Tergite VIII, dorsal view.

Uniformly translucent in *Nisia carolinensis*, *Nisia australiensis* and yellowish white in *Eponisia guttula* immediately after laying. Because the female ovipositor is reduced or absent, the eggs are laid on the undersurface of a leaf or in a depression on the stem and covered with a thin layer of wax threads, which are excreted from abdominal wax-secretion pores and applied to the egg mass by using the hind tibiae. In *Nisia carolinensis* about 0.4 mm in length and 0.3 mm in width. The arrangement of eggs in *Nisia* as Fig. 6I, irregular in *Eponisia*. Numbers are from 10 to 25, average 18 in *Nisia*, about 27 in *Eponisia*. Duration of egg-laying is about half an hour, of the egg stage to hatching is about 10 days in summer 20 days in winter.

First instar nymph (Fig. 6, A, E, J)

This and following instar nymphs base on *N. carolinensis* only.

Body length 0.45–0.53 mm, width 0.28–0.30 mm.

Grayish, with abdomen grayish white to yellowish white. Body robust in outline, with thorax and abdomen prominent. Compound eye small and reddish.

Head:

In dorsal view vertex small, with lateral carinae and elevated median carinae fused medially at anterior margin, in lateral view strongly rounding into frons. The frons with two median carinae, convex medially, so that the space between them—the interfrons—is considerably broader than the lateral areas—laterofrontes medially. The interfrons is broadest in the middle and become narrower upwards and downwards. Laterofrontes same width throughout, each side with 13–14 sensory pits arranged in two rows. Ocelli absent. Frontoclypeal suture is slightly convex

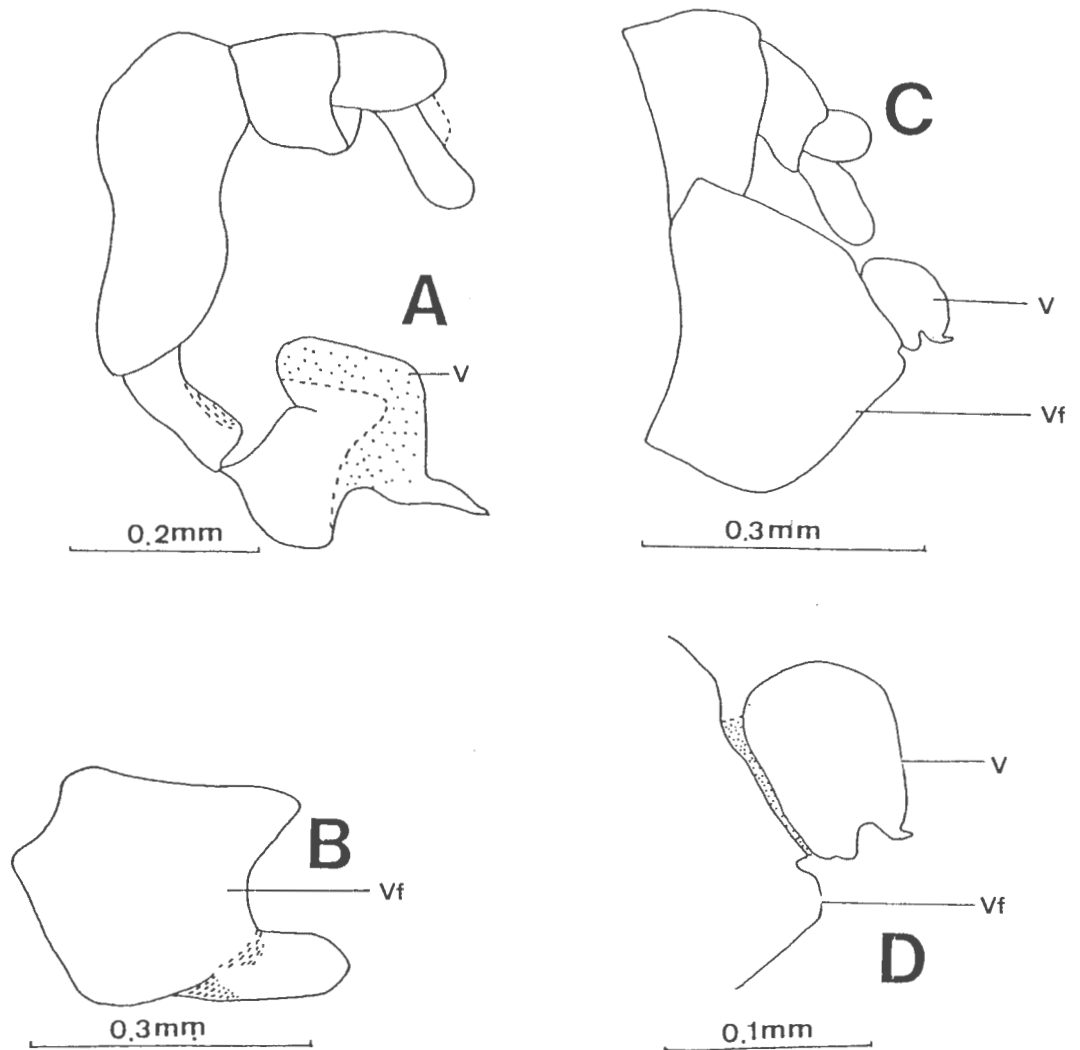


Fig. 5. Female genitalia. A–B. Meenopliinae; C–D. Kermesiinae. v=Ventral valvula; vf=Ventral valvifer.

upward. Clypeus triangular, with steep sides, reaching up to convex portion. Postclypeus without carinal margins, with disc flat in ventral view but evenly curved in lateral view. Rostrum slender, 3-segmented, reaching slightly over hind coxae. Antennae 3-segmented, basal segment wider than long, the second longer than the first, with many sensory organs company with long setae and tiny processes, flagellum thin and short, 11-segmented, with the first segment dilate ball-like and the last flame-shaped, wider than long.

Thorax:

Pronotum with prominent anterolateral margin angulating towards side of body. Lateral carinae obscure, wide in dorsal view, running laterad as lateral margins, each side with 11 sensory pits. Each inner side with 1 sensory pit slightly below anterior margin, 5 medial along posterior margin. Outer 1 at middle, 1 sets at anterolateral angle, 3 at posterolateral angle, hind margin of pronotum straight. Lateral margins reaching ventrally nearly to base of

fore coxae. Coxae of fore legs widely separated. Fore tarsus 2-segmented, each bearing 2 simple claws and a arolium.

Mesonotum small, without lateral carina, hind margin straight, without visible wing-pad, each side bears 4 sensory pits, 1 near midway, 2 lateral. Mid-legs similar to fore legs except larger.

Metanotum similar to mesonotum, including number and arrangement of sensory pits, except narrower. Hind legs with coxae approxi-

mately each other, without meracanthae. Inner side of trochanter with about 7 keels. Hind femur curved dorsally from trochanter, angulate. Hind tibia slender, with hind tarsus 2-segmented, the second longer than the first, with two claws and a arolium. Spinal formula of hind leg 4-3-1.

Abdomen:

Abdomen consists of 9 visible segments, without wax-secretion opening. Segments

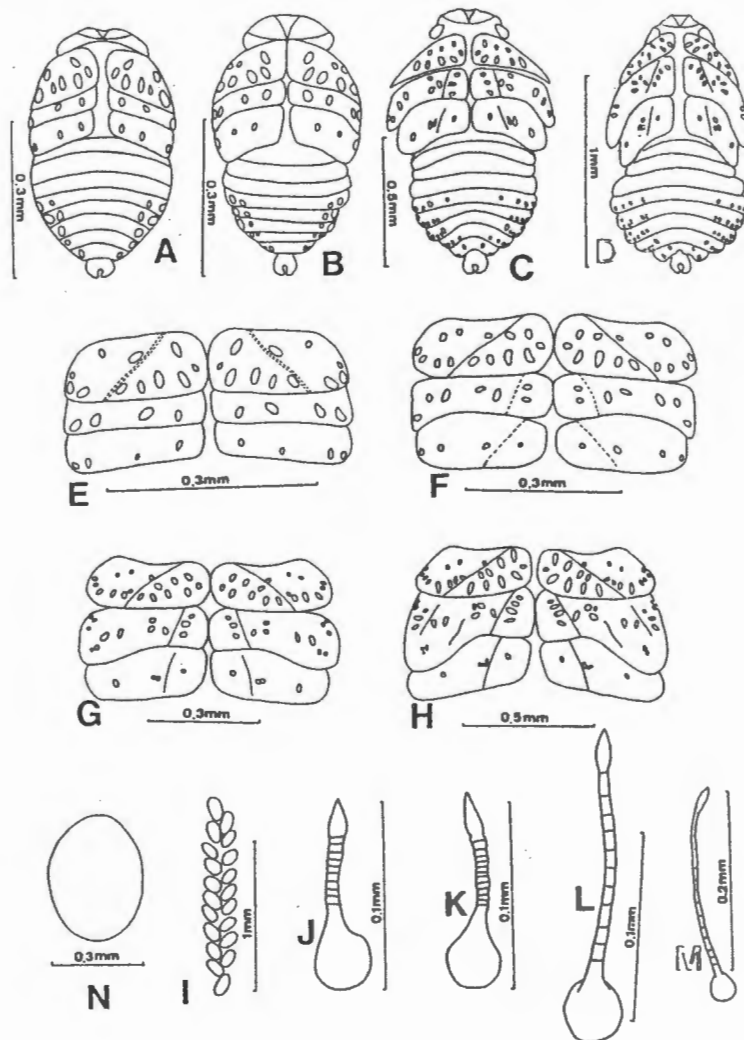


Fig. 6. Nymphs of *Nisia carolinensis* Fennah. A. First instar, dorsal view; B. Second instar, dorsal view; C. Third instar, dorsal view; D. Fourth instar, dorsal view; E-H. Thorax, flat surface. E. First instar; F. Second instar; G. Third instar; H. Fourth instar; I. Arrangement of eggs. J-M. Antenna; J. First instar; K. Second instar; L. Third instar; M. Fourth instar; N. Egg.

broadest on tergite IV, gradually reducing to both ends. Tergites I–III without sensory pits. Tergites IV–VIII each side with 2 sensory pits. Tergite IX without sensory pit.

Second instar nymph (Fig. 6, B, F, K)

Body length 0.56–0.75 mm, width 0.45–0.50 mm.

Differs from the first instar nymph as follows:

Laterofrons with about 16 sensory pits. Rostrum reaching to sternite VI. Flagellum of Antenna 13-segmented, slightly longer than in first instar. Each side of tergal pit configuration of thoracic segments 14–7–4. Pronotum with lateral carinae distinct, fine. Lateral carinae of meso- and metanotum present. Fore tarsus 2-segmented. Trochanter of hind leg with 9 or 10 keels. Spinal formula of hind leg 5–4–2. Tergites IV–VII each side with 3 sensory pits laterally.

Third instar nymph (Fig. 6, C, G, L)

Body length 0.95–1.03 mm, width 0.60–0.63 mm.

Differs from the second instar nymph as follows:

Laterofrons with about 18 sensory pits. Rostrum reaching to sternite IV. Flagellum of antenna 12-segmented, width of each segment about 2–3 times as long as wide. Each side of tergal pit configuration of thoracic segments 17–13–4. Fore wing-pad slightly developed, not reaching half length of metanotum. Hind wing-pad also slightly developed.

Tergites IV, VII each side with 1 medial, 3 posterolateral sensory pits. Tergite V–VI each side with 1 anterior, 4 posterolateral sensory pits. Tergite VIII each side with 1 near middle, 2 ventral sensory pits. Trochanter of hind leg with 11 keels. Spinal formula of hind leg 6–5–3.

Fourth instar nymph (Fig. 6, D, H, M)

Body length 1.02–1.47 mm, width 0.64–0.97 mm.

Differs from the third instar nymph as follows:

Laterofrons with about 19 sensory pits. Flagellum of antenna with its each segment thin and slender, longer than in third instar nymph. Each side of tergal pit configuration of thoracic segments 20–17–5. Two keels present on each side of mesonotum, 1 lies at middle sinuate, another slightly below ending of lateral carina of pronotum. Fore wing-pad developed, covering half length of lateral margin of hind wing-pad. Hind wing-pad reaching to abdominal tergite II. Hind coxae each with a meracanthus. Trochanter of hind leg with about 12 keels. Hind tarsus 3-segmented. Spinal formula of hind leg 8–7–5. Tergite IV each side with 4 sensory pits posteriorly. Tergites V–VI each side with 2 anterior, 5 posterior. Tergite VII each side with 1 anteriorly, 5 posterior. Tergite VIII each side with 1 near middle, 3 ventral.

Fifth instar nymph (Fig. 7)

Body length 1.55–2.03 mm, width 1.03–1.48 mm.

Body white to grayish white, stout, very broad across developing wing-pads.

Head:

In dorsal view vertex small, with lateral carinae and elevated median carinae fused medially at anterior margin. In lateral view vertex rounding into frons. Frons longer in middle line than wide at widest portion, about 1.3 : 1, widest at level of lower margin of eyes. Interfrons wider than laterofrontes in middle, narrower at base and apex. Laterofrons nearly same width throughout, each with about 20 sensory pits arranged in two rows. Numbers of sensory pits of outer row about two times as inner one. Lateral ocelli absent. Median ocellus present. Frontoclypeal suture almost straight. Clypeus triangular, with steep sides reaching up to convex central portion. Postclypeus without carinal margins, with disc flat in ventral view but evenly covered in lateral view. Rostrum slender, 3-segmented, reaching over hind coxae, relative length of each segment about 1.1 : 1.0 : 1.2. Antenna 3-segmented, basal segment wider than long, the second longer than the first about 2.2 : 1, with about 13 sensory organs

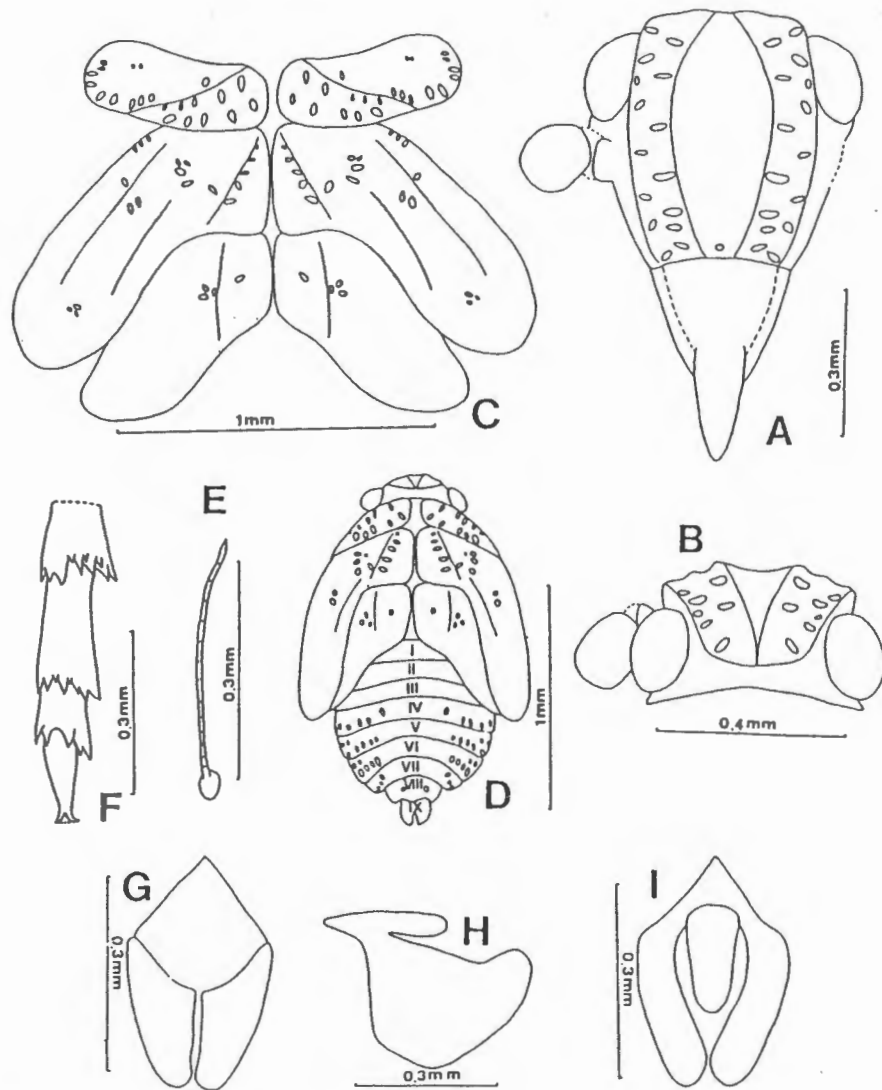


Fig. 7. Fifth instar nymph of *Nisia carolinensis* Fennah. A. Frons and clypeus, ventral view; B. Vertex, dorsal view; C. Thorax, flat surface; D. The same, dorsal view; E. Antennae; F. Hind leg; G-I. Genitalia. G. Dorsal view; H. Lateral view; I. Ventral view.

company with long setae and tiny processes, flagellum very thin, long, 14-segmented. Compound eye large and purplish black.

Thorax:

Pronotum with prominent anterolateral margin angulating towards side of body. At inner side of lateral carinae each with 10 sensory pits. At outer side, each with 9 sensory pits arranged in semicircle, with another 1 separate,

along lateral carina. Two very small ones anterior. Hind margin of pronotum is excavated reverse V-shaped. Lateral margins reaching ventrally to base of fore coxae. Coxae of fore legs widely separated. Fore tarsus 2-segmented, distal segment longer than proximal and bears two claws apparently attached to long arolium.

Mesonotum very broad, with lateral carinae elevated. Fore wing-pads strongly produced caudad, cover lateral margins of hind wing-pads,

but not reaching its posterior margin. Four or five sensory pits present along each inner side of lateral carina, 5 between each lateral carina and submarginal keel, above median keel. Two pits between median keel and submarginal keel, 7 between submarginal keel and lateral margin. Mid-leg similar to fore leg, except longer.

Metanotum broad, with anterior margin straight hind margin excavate reverse V-shaped, lateral margins hidden by fore wing-pads laterally. Lateral carinae elevated, nearly parallel, inner side with 1 sensory pit medially, outer with 3. Hind legs with coxae approximate each other. Inner side of hind trochanter with about 14 keels. Hind femur curved dorsally from trochanter. Hind tibiae slender. Hind tarsus 3-segmented, the first segment longer than the second, the third with claws apparently attached to large arolium. Spinal formula of hind leg 10-9(8)-5.

Abdomen:

Abdomen consists of 9 visible segments, without wax-secretion opening. Segments broadest on tergite IV, gradually reducing to both ends. Tergites I-III without sensory pit. Tergite IV each side with 4-5 sensory pits; tergites V-VI with 4 anterior, 6 posterior; tergite VII with 1 lateral, 6 posterior; tergite VIII with 1 medial, 4 caudad; absent on tergite IX.

Nymphal specimens examined:

- 1st instar nymph: 5
- 2nd instar nymph: 5
- 3rd instar nymph: 5
- 4th instar nymph: 23
- 5th instar nymph: 33

NCHU Campus 6-V-1985.

Note: All 71 individuals were carefully examined by the senior author.

**Key to nymphal stages of
*Nisia carolinensis***

- 1. Hind tarsus 2-segmented; body less than 0.85 mm long; wing-pads not developed 2
- Hind tarsus 3-segmented; body more than

0.90 mm long; wing-pads slightly or well developed 3

- 2. Spinal formula of hind leg 4-3-1; laterofrons with 13-14 sensory pits; each side of tergal pit configuration of thoracic segments 11-4-4 . . . First instar nymph
- Spinal formula of hind leg 5-4-2; laterofrons with 16 sensory pits; each side of tergal pit configuration of thoracic segments 14-7-4 . . Second instar nymph
- 3. Second segment of hind tarsus with 3 teeth apically; each side of tergal pit configuration of thoracic segments 17-13-4 Third instar nymph
- Second segment of hind leg with 5 teeth apically 4
- 4. Spinal formula of hind leg 8-7-5; middle ocellus absent; each side of tergal pit configuration of thoracic segments 20-17-5 Fourth instar nymph
- Spinal formula of hind leg 10-9(8)-5; middle ocellus present; each side of tergal pit configuration of thoracic segments 22-19(18)-4 Fifth instar nymph

SECOND PART: SYSTEMATICS

Family Meenoplidae Fieber, 1872

Type genus: *Meenoplus* Fieber, 1872

- Meenoplidae* Fieber, 1872, Katalog europaischen Cicadinen: I-IV p. 3.
- Kermesiinae* Kirdaldy, 1906, Bull Hawaiian Sugar Pl. Assoc. Div. Ent. 1(9):425.
- Nisiinae* Kirkaldy, 1907, Bull. Hawaiian Sugar Pl. Assoc. Div. Ent. 3:163.
- Meenoplidae* Muir, 1925, Pan-Pacific Ent. 1:97.

All the species, compared with other fulgoroids, moderately small insects, with body strongly compressed and tegmina tectiform. Head usually small with vertex and frons usually broad and lateral carinae strongly elevated. Antenna general short and simple with many sensory organs around second segment. Last segment of the rostrum elongate. Median ocellus usually present. Thorax usually large with carinae generally distinct. Tegulae large. Pronotum short and arched, broader than head.

Mesonotum as broad as or slightly broader than pronotum. Tegmen usually macropterous, normally held vertically in repose. Venation in general cixiid-like, with basal costal area more or less expanded. Radius usually simple, but cubitus complex, general with supernumerary veins. One or both claval veins typically granulate. Abdomen compressed, female with sixth, seventh, eighth tergites bearing three areas of wax-secretion pores on each side respectively. Male genitalia superficially resembles the genitalia in many derbids, achilids and achilixiids, with genital styles large and complex. Female genitalia incomplete, ovipositor absent or greatly reduced. Ventral valvula of female with process at apex, slightly curved mesad.

Key to the subfamilies of Meenoplidae

1. Claval veins fused near apex, first claval vein with two rows of sensory pits, second slightly curved, without sensory pits; tegmen with *Sc+R* and *M* forked near base *Kermesiinae*
- Claval veins fused near middle, first claval vein with one row of sensory pits, second strongly curved with many sensory pits arranged irregularly; tegmen with *Sc+R* and *M* forked near apex *Meenopliinae*

Subfamily *Kermesiinae* Kirkaldy (Fig. 5, C–D)

Kermesiinae Kirkaldy, 1906 Bull. Hawaiian Sugar Pl. Assoc. Div. Ent. 1(9):425.

Tegmen with *Sc+R* and *M* forked near base. *Sc* with a row of sensory pits. Claval vein fused near apex, first claval vein with two rows of sensory pits, second without. *M*₁₊₂ single or forked. *R* of wing simple or forked. Shape of ventral valvula like a bird head which with its process beak-shaped, connected with ventral valvifer by a visible membranous area.

Key to genera of *Kermesiinae* in Taiwan

1. Tegmen with *M*₁₊₂ forked; vertex with submedian carinae and basal margin sepa-

- rated medially; spinal formula of hind leg 8–7–6 *Eponisia* Matsumura
- Tegmen with *M*₁₊₂ simple; vertex with submedian carinae and basal margin fused medially 2
2. Spinal formula of hind leg 10–9(8)5; lateral carinae of postclypeus absent *Nisia* Melichar
 - Spinal formula of hind leg 8–7–5; lateral carina of postclypeus present *Eponisiella* n. gen.

Genus *Nisia* Melichar, 1903

Nisia Melichar, 1903, Homopteren-Fauna von Ceylon 1903:53.

Body small to medium, covered with thick powdery wax. Vertex narrowed medially, with two posterolateral areolets at base. Lateral carinae of frons ending at frontoclypeal suture, absent at postclypeus. Clypeus with median carina. Rostrum reaching over hind coxae. Pronotum with anterolateral disc convex, with distinct median carina. Mesonotum with distinct median carina. Tegmen elongate, scarcely dilating towards apex, with cross veins obscure, *M*₁₊₂ simple. Below *Sc+R* with single row of sensory pits. Wing with *R* branched. Spinal formula of hind leg 10–9(8)–5 (except *N. grandiceps* Kirkaldy with 14–11–6). Male genitalia in dorsal view, anal segment elongate, lateral margins nearly parallel, lateroapical angles obtusely rounded at apex. In lateral view, phallus slender, slightly curved downward, covered by glove-like process of phallobase. Genital styles elongate, in profile, strongly curved at middle, obtusely rounded at apex, posterior margin convex near base, its anterior margin of basal half produced in a convex lobe (except *N. grandiceps* Kirkaldy and *N. langleyi* Muir). Female genitalia in lateral view, ventral valvifer large, caudoventral angle without process. Ventral valvula small, dorsal and caudal margins evenly curved, ventral margin distinctly incised medially, in caudal view with a small process. Shape of wax-secretion pores on tergites VI–VII all small hexagonum, on tergite VIII large, long hexagonum, all arranged

tightly. Color uniform, not forming inner and outer plates.

Type species: *Livilla nervosa* Motschulsky
(=*Meenoplus atrovenosus* Lethierry,
1888) 1863 (original designation)

Key to the species of *Nisia* in Taiwan

- In lateral view, genital style at basal half with lobe-like process which gives off distally a stout process caudally, margin of lobe sinuate; in caudal view, inner margin of style with dorsad trifurcate
. *australiensis* Woodward
- In lateral view, genital style with lobe-like process at basal half which gives off distally a stout process dorsally, margin of lobe slightly concave; in caudal view, inner margin of style with dorsad bifurcate
. *carolinensis* Fennah

Nisia carolinensis Fennah n. status (Fig. 8)

Nisia atronervosa carolinensis Fennah, 1971,
Insects Micronesia 6(8):584–585.

General color white. Vertex, frons, antennae and pronotum pale yellow. Mesonotum dark brown. Ocelli light yellow. Legs yellowish. Tegmen white with veins fuscous brown. Abdomen brown.

In ventral view, frons longer in middle line than wide at widest portion about 1.3 : 1. Lateral carinae with about 27 sensory pits along each inner side (including several ones on vertex). Postclypeus longer in middle line than wide at base, median carina obsolete at basal third. Rostrum with relative length of each segment about 1 : 1 : 1. Antenna with basal segment wider than long, second segment longer than first about 2.5 : 1. Tegmina about 2.5 times as long as wide. Below *Sc+R* with about 20 sensory pits. First claval vein with about 14 sensory pits on each side.

Male genitalia: In dorsal view, anal segment with lateral margins nearly parallel, each

lateroapical angle obtusely rounded at apex. Phallus with both sides sclerotized. In lateral view, reaching about as far as anal segment, apex curved downward, appearing acuminate. Apex of phallus at same level of ventral margin of phallobase. Anterior apodeme of aedeagus almost in same level as aedeagus in side view. Process of phallobase bilobed, membranous, slightly longer than phallus. In lateral view, convex lobe of genital style (Fig. 8E) gives off distally a stout process dorsally, margin of lobe smooth. In caudal view, divergent, inner margin of styles strongly produced mesad near base, which with basal half convex, with two processes apically. Outer one slender, needle-like, distinctly longer than inner, inner one stout, thumb-like, obtuse at apex.

Female genitalia: Anal segment quadrate, anal style elongate, longer than anal segment, the two combined longer than ventral valvifer. Ventral valvifer in caudal view with wart-like ventral valvula at inner side.

Length of body (includ. teg.): Male 2.90–3.10 mm; Female 3.20–3.70 mm.

Length of tegmen: Male 2.40–2.80 mm; Female 2.40–3.30 mm.

Width of head (across eyes): Male 0.53–0.57 mm; Female 0.53–0.60 mm.

Width of mesonotum: Male 0.70–0.73 mm; Female 0.77–0.87 mm.

Specimens examined: 11 ♂♂ 2 ♀♀ NCHU campus, Taichung 17–IX–1984; 1 ♂ 1 ♀ NCHU campus, Taichung 18–III–1985; 3 ♂♂ 3 ♀♀ NCHU campus, Taichung 7–IV–1985; 12 ♂♂ 8 ♀♀ NCHU campus, Taichung 12–IV–1985; 4 ♂♂ 4 ♀♀ NCHU campus, Taichung 16–IV–1985; 1 ♂ NCHU campus, Taichung 3–V–1985; Many specimens Lanshu, Taitung Hsien 9–VII–1985; 1 ♂ 1 ♀ Lanshu, Taitung Hsien 12–VII–1985 L. C. Tang 1 ♂ 4 ♀♀ Lanshu, Taitung Hsien 12–VII–1985 C. T. Yang.

Host plant: *Cyperus rotundus* Linn. (Cyperaceae), *Oryza sativa* L. (rice)

Distribution: Micronesia, Philippines, Taiwan.

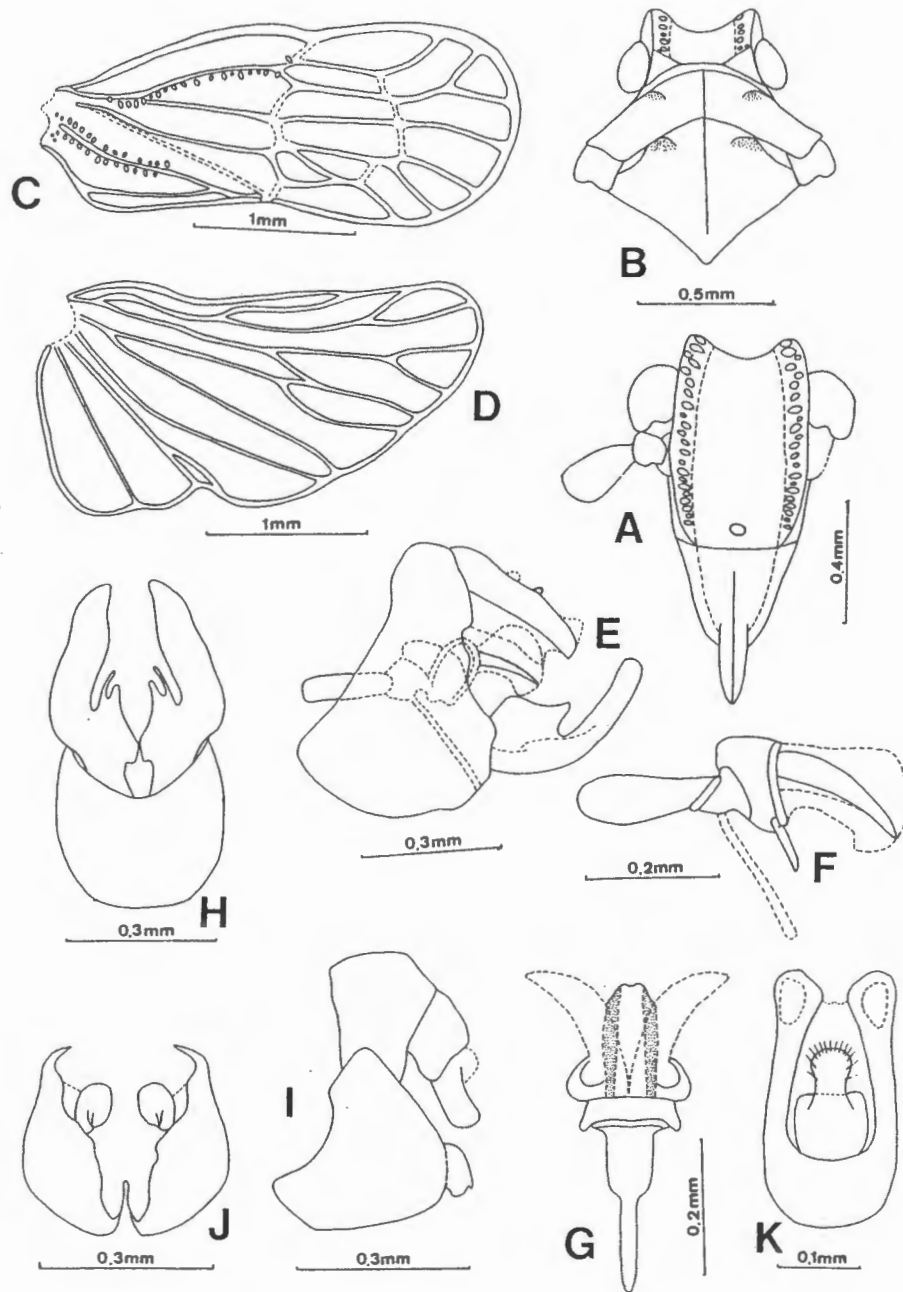


Fig. 8. *Nisia carolinensis* Fennah. A. Frons and vertex, ventral view; B. Vertex, pronotum and mesonotum, dorsal view; C. Tegmen; D. Wing; E. Male genitalia, lateral view; F. Aedeagus, lateral view; G. The same, dorsal view; H. Male genitalia, caudal view; I. Female genitalia, lateral view; J. The same, ventrocaudal view; K. Male anal segment, dorsal view.

Nisia australiensis Woodward n. status
(Fig. 9)

Nisia atrovenosa australiensis Woodward, 1957,

Univ. Queensland Pap. (Dept. Ent.) 1(4):
67.

General color brown. Mesonotum dark

brown. Ocelli light yellow. Legs pale yellowish brown to brown. Tegmina yellowish white with veins fuscous brown.

In ventral view, frons longer in middle line than wide at widest portion about 1.4:1. Lateral carinae with 26–29 sensory pits along each inner side (including several ones on vertex). Postclypeus longer in middle line than wide at base. Rostrum with relative length of each segment about 1.1 : 1 : 1.1. Antenna with basal segment wider than long, second segment longer than first about 2.2 : 1. Tegmen about 2.0 times as long as wide. Below *Sc+R* with about 21 sensory pits. First claval vein with about 17, 14 sensory pits at above and below respectively.

Male genitalia: Pygofer with dorsolateral angles not produced. In dorsal view anal segment with lateral margins parallel, each lateroapical angle obtusely rounded at apex. Phallus with both sides sclerotized. In lateral view, reaching about as far as anal segment, apex curved downward, appearing acuminate. Apex of phallus at same level of ventral margin of phallobase. Anterior apodeme of aedeagus almost in same level as aedeagus in side view. Process of phallobase bilobed, membraneous, slightly longer than phallus. Genital styles nearly same width, nearly straight. In lateral view, convex lobe of genital style gives off distally a stout process caudally, margin of lobe sinuate, anterior nearly at right angle. In caudal view, divergent, inner margin of styles strongly produced mesad near base, which with dorsal margin trifurcate. Outer one slender, acuminate at apex, curved at basal half, almost reaching at same level of middle one. Middle one stout, acute at apex. Inner one straight, directed medially. Inner margin of genital styles with apical two-thirds concave.

Female genitalia: Anal segment quadrate, anal styles elongate, longer than anal segment, the two combined longer than ventral valvifer. Ventral valvifer in caudal view with wart-like ventral valvula at inner side.

Length of body (includ. teg.): Male 2.70–3.60 mm; Female 3.60–4.70 mm.

Length of tegmen: Male 2.30–3.00 mm;

Female 3.30–4.10 mm.

Width of head (across eyes): Male 0.57–0.60 mm; Female 0.63–0.67 mm.

Width of mesonotum: Male 0.90–1.20 mm; Female 0.80–1.30 mm.

Specimens examined: 1 ♀ Songho, Taichung Hsien 2–VII–1984; 1 ♂ Puli, Nantou Hsien 10–VIII–1984; 25 ♂♂ 12 ♀♀ Pingtung, 25–X–1984; 5 ♂ NCHU campus, Taichung 17–IX–1984; 3 ♂♂ 2 ♀♀ Yuching, Tainan Hsien, 22–I–1985 C. T. Yang. 1 ♀ Toubienkeng, 21–VI–1985; 7 ♂♂ 7 ♀♀ Peipu, Hualien Hsien 12–VII–1985; 37 ♂♂ 45 ♀♀ Fuyuan, Hualien Hsien 13–VII–1985; 5 ♂♂ 3 ♀♀ Kaochung, Kaohsiung Hsien 22–VII–1985; Many specimens Fuyuan, Hualien Hsien 10–VIII–1985; 7 ♂♂ 8 ♀♀ Chushan, Nantou Hsien 26–X–1985 C. T. Yang.

Host plant: *Cyperus rotundus* Linn. (Cyperaceae) *Commelina diffusa* Burm. f. (Commelinaceae).

Distribution: Australia, Philippines, Taiwan.

Notes: This and former species, up to now, were considered as two subspecies. Wilson (1981) had mentioned that “Two forms are found together in samples from the Philippines, with little evidence of intermediates.” We have carefully examined specimens that were captured from NCHU campus and found also that there were two forms without intermediates. We therefore consider they are sympatric species. Thirty-three individuals collected from a square meter were examined. They were all *N. carolinensis* without any another individual mixed. At Fuyuan, Hualien Hsien, a field left uncultivated where it was difficult to find any sedge, *Cyperus rotundus* (L.), more than 500 individuals were found on a square meter (rough estimate). Ten male specimens were examined which were uniformly *with N. australiensis*. We therefore have decided to raise them to full species rank. Nymphs of those two species are so much alike and cannot be separated by us.

Yang has found *N. australiensis* Woodward

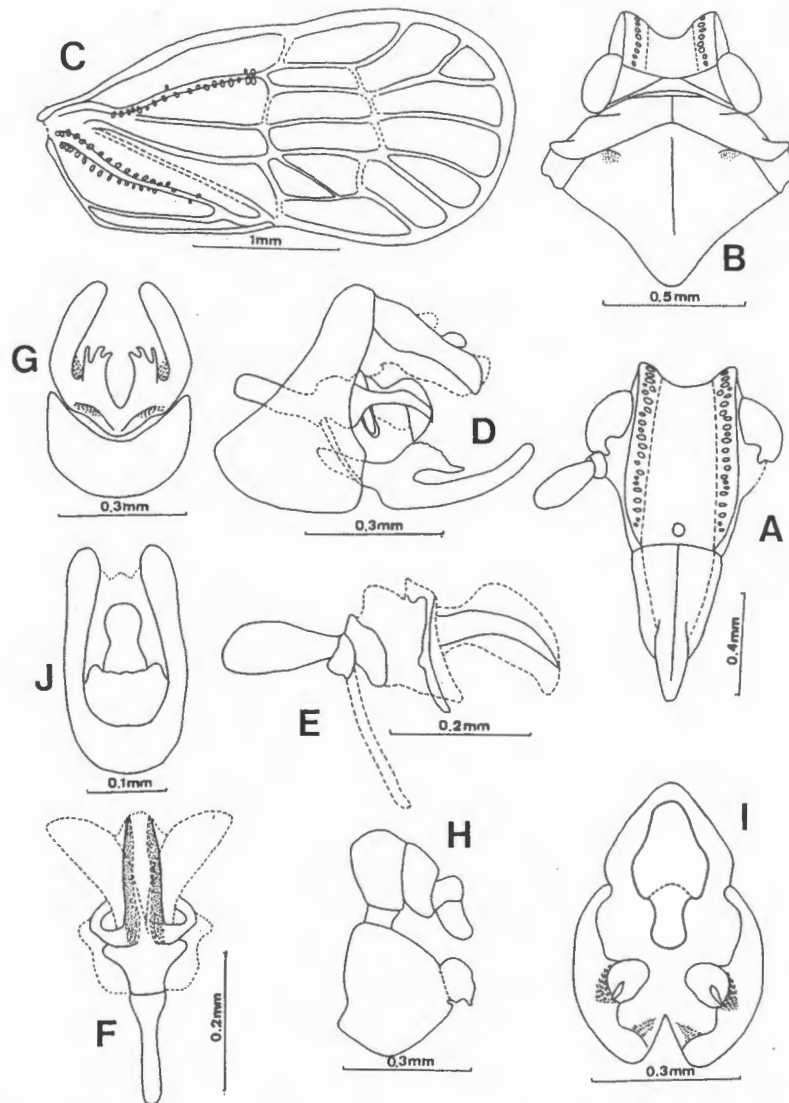


Fig. 9. *Nisia australiensis* Woodward. A. Frons and clypeus, ventral view; B. Vertex, pronotum and mesonotum; C. Tegmen; D. Male genitalia, lateral view; E. Aedeagus, lateral view; F. The same, dorsal view; G–H. Genitalia. G. Male, ventrocaudal view; H. Female, lateral view; I. The same, caudal view; J. Male anal segment, dorsal view.

of Chiasien, Kaohsiung Hsien was feeding on *Commelina diffusa* Burm. f. (Commelinaceae) on 24th, July 1986. They were living beside a stream and about 200 individuals were found in a square meter (rough estimate). We believe that this plant must be one of its host plant.

Genus *Eponisiella* Emeljanov, 1984

Body very small, not covered with pow-

dery wax. Head concave apically with a black stripe medially. Vertex with two posterolateral areolets at base. Lateral carinae of frons ending at frontoclypeal suture strongly convergent apically. Lateral carinae of postclypeus absent. Pronotum without, mesonotum with a weak median carina. Tegmina broadened apically with M_{1+2} not branched. Wing with *R* not forked. Spinal formula of hind leg 8–7–5.

Male genitalia in lateral view pygofer with dorso-caudal angle strongly produced. Female genitalia with ventral valvifer elongate, seemly forming by produced, directly downward, caudoventral angle nearly without process. Ventral valvula bird-head shaped, apex with a process directed ventrocaudad.

Type species: *E. guttulinervis* (Matsumura) 1914, comb. n.
Nisia paludicola Vilbaste, 1968, syn. n. (original designated)

This species is not found in Taiwan but the opportunity is taken here to include the synonymy and designating the lectotype. Figures of *guttulinervis* may be found under *paludicola* Vilbaste (1968:39).

Distribution: Japan, Korea, Soviet Maritime Territory.

Material examined:

Loctotype: (here designated), 1 ♂ (dissected) mounted on left of two specimens on balsa wood block (1 damaged 0 remains undissected), Japan, Tawada, vii. 1905 (sapporo) (examined by Wilson).

Paralectotypes: 2 ♂♂ (1 mounted on block with lectotype). Japan, (Sapporo).

Other material: series of *Paludicola* from Soviet Maritime Territory.

Comments: Matsumura (1914) stated that 3 ♂♂ were examined. These specimens were present in the Matsumura collection in Sapporo and have been examined by Wilson. The synonymy has been made by direct comparison with *guttulinervis* type material and *Paludicola* specimens identified by Vilbaste.

Notes: This genus from the absence of lateral carina of the postclypeus can be approximated with *Nisia*. But differs from other members of Kermesiinae in combination characters as follows: Ventral valvifer elongate, seemly forming by produced directly downward; spinal formula of hind leg; rostrum reaching hind femora. Differs from *Eponisiella*

Emeljanov, 1984 in frons longer in middle line than wide at widest portion about 1.3 : 1 (about two times in Emeljanov's description which was not agree with Vilbaste's material) also in shape of ventral valvifer.

*Eponisiella matsumurai** n. sp.

(Fig. 10)

General color white. Body not covered with powdery wax. Vertex, frons, antenna, mesonotum pale yellow. Pronotum with three longitudinal blackish lines crossing over, one medial, two lateral, down posteriorly to mesonotum. Legs yellowish. Abdomen black, with lateral sides yellow. Tegmina with black markings as figured.

Frons widely expended, slightly longer in middle line than wide at widest portion. Lateral carinae with about 30 sensory pits along each inner side (including several ones on vertex). Clypeus without median carina. Postclypeus like a homebase plate, longer in middle line than wide at base about 1.3 : 1. Anteclypeus elongate. Rostrum reaching to half length of hind femora, relative length of each segment about 1.1 : 1.4 : 1.0. Antenna with basal segment wider than long, second segment longer than first about 2.7 : 1. Central portion of mesonotum with a weak median carina. Spinal formula of hind leg 9(8)–7–5. Tegmen about 2.0 times as long as wide. Below *Sc+R* with about 21 sensory pits. First claval vein with 19–20 sensory pits along each side. Wing with *R* not branched. Shape of wax-secretion pores all hexagonum, on tergites VI–VII smaller, outer plate the smallest, on tergite VIII outer plate large, all arranged tightly.

Male genitalia: In caudoventral view pygofer strongly concave medially, each side with a thumb-like, long process lateroapically. In lateral view anal segment stout, nearly same width, slightly angulate at middle, with stout anal style adherent to anal opening. In dorsal view subquadrate, trifurcate apically. In lateral view phallus bifurcate, lower one longer than upper, reaching over anal segment, apex curved

* Named in honor of S. Matsumura, a Japanese entomologist.

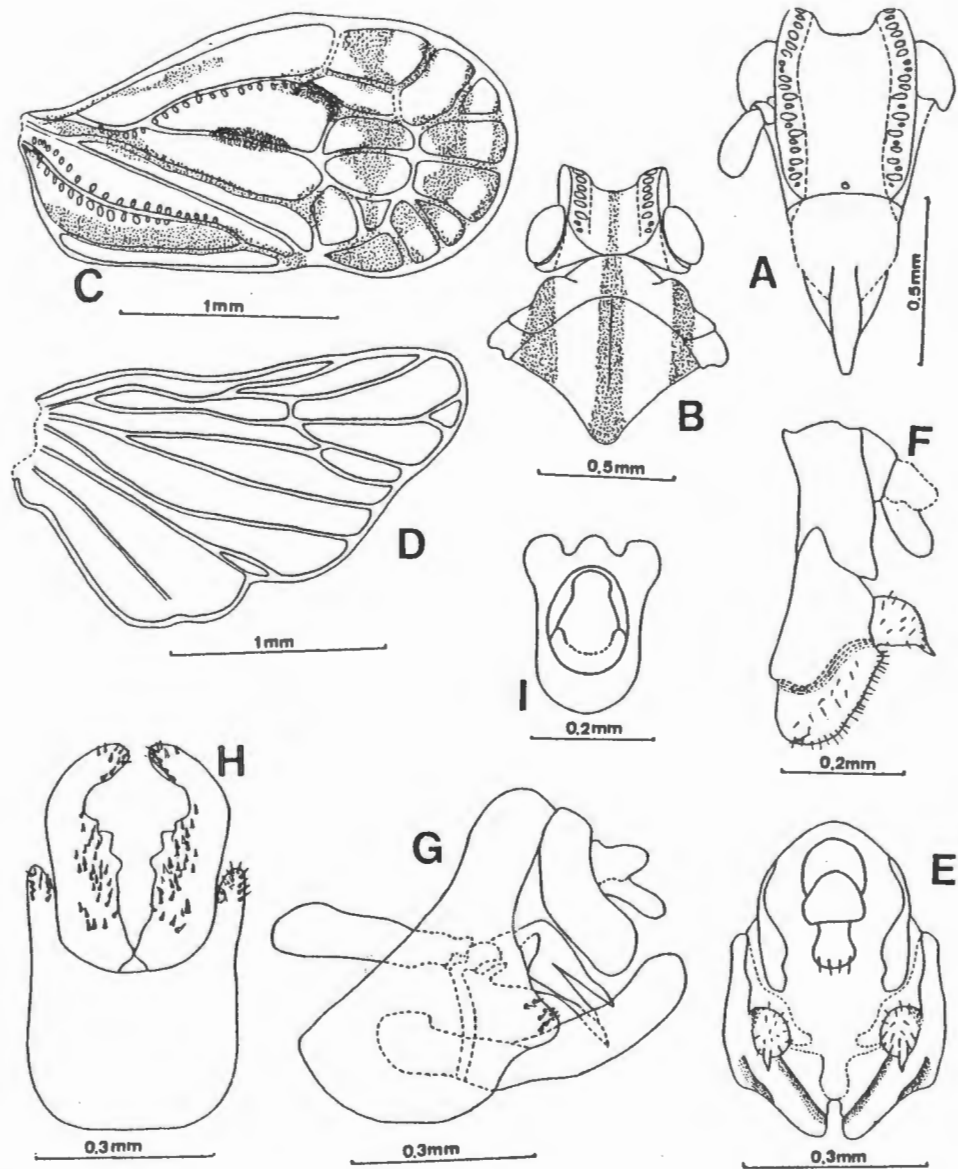


Fig. 10. *Eponisiella matsumurai* n. sp. A. Frons and clypeus, ventral view; B. Vertex, pronotum and mesonotum, dorsal view; C. Tegmina; D. Wing; E-F. Female genitalia. E. Caudal view; F. Lateral view. G-I. Male genitalia. G. Lateral view; H. Caudoventral view; I. Anal segment, dorsal view.

downward, appearing acuminate. Genital style stout, same width throughout, evenly curved upward. In caudoventral view apical third much narrower than the other part, with three productions near middle.

Female genitalia: In lateral view, anal style stout, anal segment small, both curved down-

ward. In caudoventral view, Ventral valvifer strongly curved upward near base, widely divergent. Ventral valvula ellipse-shaped, at middle of inner margin of ventral valvifer, with blade-like process at ellipsoidal top. Distance between ventral valvulae much wider than width of anal segment.

Length of body (includ. teg.): Male 2.93–3.27 mm; Female 2.93–3.17 mm.

Length of tegmen: Male 2.43–2.73 mm; Female 2.93–3.17 mm.

Width of head (across eyes): Male 0.60–0.63 mm; Female 0.63 mm.

Width of mesonotum: Male 0.97–1.00 mm; 0.93–1.03 mm.

Holotype: Male, Chintuan, Ilan Hsien 1–VIII–1985.

Paratypes: 1 ♂ Chishingshan, Taipei Hsien 7–IX–1985; 3 ♂♂ 3 ♀♀, Chihtuan, Ilan Hsien 1–VIII–1986. (deposited 1 ♂ 1 ♀ in BMNH).

Host plant: unknown.

Distribution: Taiwan.

Key to *matsumurai* and *guttulinervis*

1. In caudoventral view, genital style with three productions near middle; in lateral view ventral valvifer longest against widest portion about 1.9:1 . . . *matsumurai* n. sp.
- . In caudoventral view, genital style only with one production near middle; in lateral view ventral valvifer longest against widest portion about 1.2:1 *guttulinervis* (Matsumura)

Genus *Eponisia* Matsumura

Eponisia Matsumura, 1914, Ann. Mus. Nat. Hungarici 12:285.

Body median size, covered with or without powdery wax. Vertex without median carina, with areolets confluent medially, straight anteriorly and shallowly concave posteriorly. Median carina of frons absent. An interruption at frontoclypeal suture between lateral carinae of frons and postclypeus. Clypeus with median carina. Pro- and mesonotum with distinct median carina. Tegmina broad, markedly divergent towards apex. Spinal formula of hind leg 8–7–6. Male genitalia in dorsal view, anal segment stout, gradually expending to apex, shallowly emarginate at apex. Phallus in lateral

view, covered by membraneous sheath, process of phallobase auricle-like. Genital style slightly bent angularly at middle. Anterior margin of basal half produced dorsad in a convex lobe, another process hiding after it. Female genitalia in lateral view, ventral valvula beak-shaped at apex, slightly longer than process of ventral valvifer. Lower margin of ventral valvifer produced caudoventrad forming a thumb-like process.

Type species: *Eponisia guttula* Matsumura, 1914. (original designation)

Key to the species of *Eponisia* in Taiwan

1. Length of body including tegmen 5.67–6.50 mm; genital style as long as anal segment, equally divided into three rival productions apically . . . *woodwardi* n. sp.
- . Length of body including tegmen less than 5 mm; genital style long, distinctly longer than anal segment, unequally divided into three rival productions apically, ventral one extremely long 2
2. Tegmina with veins white and other portion pale black; female genitalia with process of ventral valvifer covered by ventral valvula partially, nearly same length *macula* n. sp.
- . Tegmina pure white, opaque to somewhat dark, subhyaline; female genitalia with process of ventral valvifer reaching two-thirds of ventral valvula, a deep gap between them *guttula* (Matsumura)

*Eponisia woodwardi** n. sp.

(Fig. 11)

General color grayish yellow. Body more or less covered with powdery wax. Vertex, frons and antenna yellow. Mesonotum yellowish brown. Ocelli light yellow. Legs yellowish. Tegmen dirty yellow. Abdomen dark brown to black, with lateral side orange.

Frons longer in middle than wide at widest portion about 1.5 : 1. Lateral carinae with 32–34 sensory pits along each inner side (in-

* Named in honor of Dr. T. E. Woodward, the Australian Hemipterist.

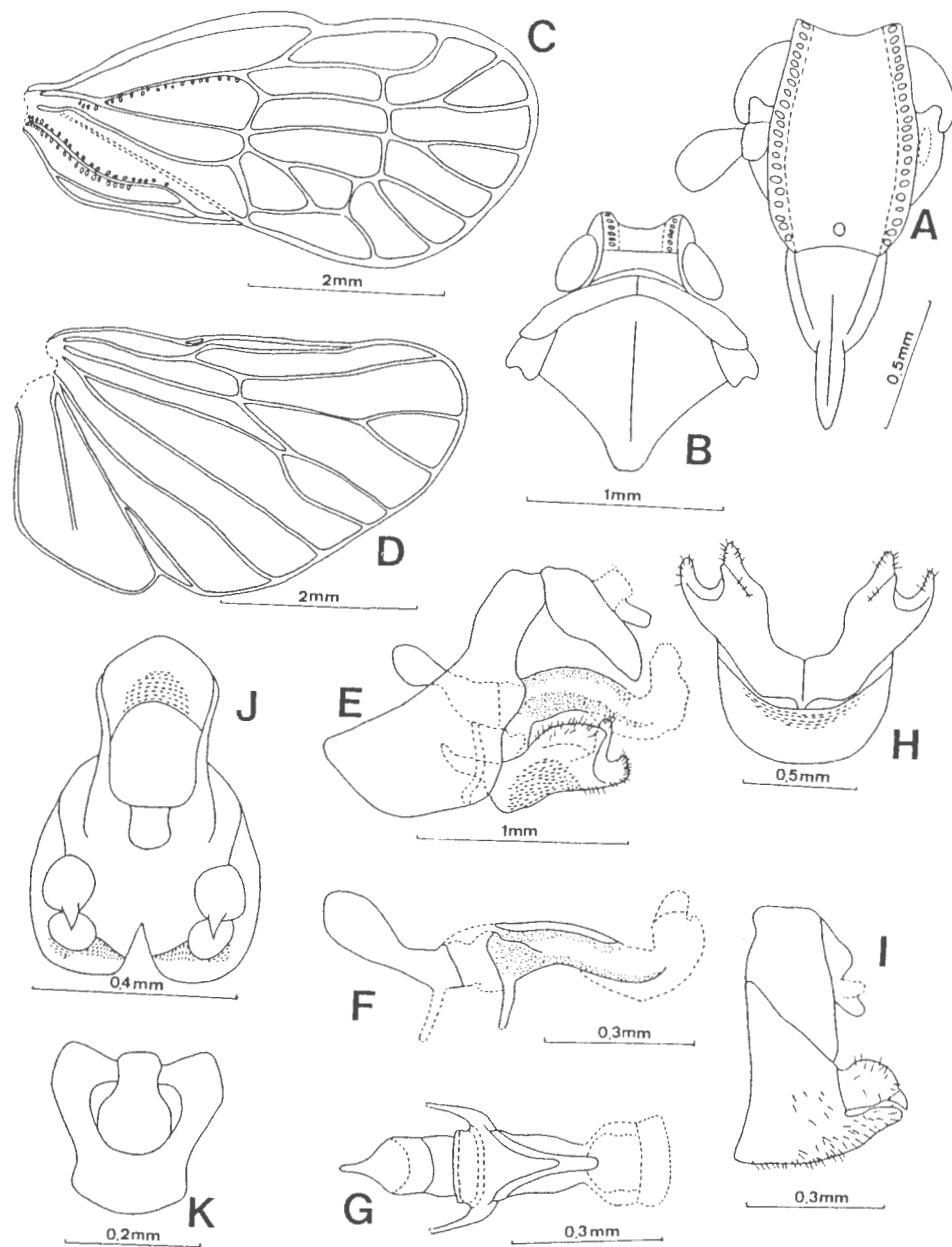


Fig. 11. *Eponisia woodwardi* n. sp. A. Frons and clypeus, ventral view; B. Vertex, pronotum and mesonotum, dorsal view; C. Tegmen; D. Wing; E. Male genitalia, lateral view; F. Aedeagus, lateral view; G. The same, ventral view; H. Male genitalia, caudoventral view; I. Female genitalia, lateral view; J. The same, caudal view; K. Male anal segment, dorsal view.

cluding several ones on vertex). Postclypeus longer in middle line than wide at base. Rostrum with relative length of each segment about 1.1 : 1.3 : 1. Antenna with basal segment wider than long, second segment longer than

first about 2.8 : 1. Tegmen about 2.1 times as long as wide. Below *Sc+R* with about 20 sensory pits. First claval vein with 20, 21 sensory pits on upper and lower sides respectively. *R* of wing not branched. Inner wax-

secretion plate of tergite VII with lateral half nearly as wide as median.

Male genitalia: Pygofer with dorsolateral angle not produced. In dorsal view, anal segment elongate, slightly expanding at apex, lateroapical angles each produced roundly. Phallus with both sides sclerotized, in lateral view much longer than anal segment, apex membranous, curved upward, at same level of anterior apodeme of aedeagus. In lateral view, process of phallobase cylindrically curved downward. Genital styles short and stout, posterior margin curved near base, anterior margin slightly produced medially, dorsal aspect of convex lobe with many setae along margin, in caudal view divergent, inner margin of styles slightly produced subapically, divided into three rival productions apically. Inner one higher than the other two.

Female genitalia: Anal segment quadrate. Anal style elongate. Ventral valvifer distinctly produced caudoventrally, just reaching to base of beak, forming a gap between ventral valvifer and ventral valvula. Ventral valvula like head of bird, as wide as long, beak curved downward at apex. Ventral valvifer and valvula both with many setae.

Length of body (includ. teg.): Male 5.67–5.87 mm; Female 5.70–6.50 mm.

Length of tegmen: Male 5.03–5.27 mm; Female 5.00–5.67 mm.

Width of head (across eyes): Male 0.57–0.73 mm; Female 0.77–0.87 mm.

Width of mesonotum: Male 1.40–1.43 mm; Female 1.37–1.53 mm.

Holotype: Male, Fuhsing, Taoyuan Hsien 28–IV–1985. (deposited in NCHU)

Paratypes: 1 ♀ Wuchieh, Nantou Hsien 26–VII–1984; 13 ♂♂ 12 ♀♀ Fuhsing, Taoyuan Hsien 28–IV–1985; 1 ♂ 4 ♀♀ Fuhsing, Taoyuan Hsien 12–V–1985; 7 ♂♂ 8 ♀♀ North Tungyoanshan, Nantou Hsien 20–VII–1985 S. J. Fang; 6 ♂♂ 8 ♀♀ North Tungyoanshan, Nantou Hsien 23–VII–1985 C. T. Yang. (deposited 3 ♂♂ 3 ♀♀ in BMNH)

Host: plant: unknown.

Distribution: Taiwan.

Eponisia guttula Matsumura, 1914

(Fig. 12)

Eponisia guttula Matsumura, 1914 Ann. Mus. Nat. Hungarici 12:285.

General color white. Body covered with powdery wax. Vertex, frons and antenna yellow. Mesonotum brown with three yellowish longitudinal stripes from anterior to posterior. Ocelli light yellow. Legs yellowish. Tegmen in color from white, opaque to somewhat dark, subhyaline. Abdomen brown with lateral sides fresh yellow.

Frons longer in middle line than wide at widest portion about 1.7 : 1. Lateral carinae with 25–30 sensory pits along each inner side (including several ones on vertex). Postclypeus longer in middle line than wide at base. Rostrum with relative length of each segment about 1.3 : 1.3 : 1. Antenna with basal segment wider than long, second segment longer than first about 2 : 1. Tegmen about 2.2 times as long as wide. Below *Sc+R* with about 16 sensory pits. First claval vein with 22 sensory pits on each side. *R* of wing branched. Inner wax-secretion plate of tergite VII with lateral half distinctly narrower than median.

Male genitalia: Pygofer with dorsolateral angles not produced. In dorsal view, anal segment strongly expanding to apex, anterolateral angle narrowly produced, in lateral view anal segment long and slender, wide across base of end of anal style, shorter than greatest length about 1 : 4.1, apex narrowly protruding, ventral margin evenly produced downward. Phallus with both sides sclerotized, in lateral view reaching about as far as anal segment, in dorsal view with two auricle-like processes at basal sixth, apex reflected cephalad ventrally. Apex of phallus at same level of ventral margin of phallobase. In dorsal view, process of phallobase acuminate curved downward. Genital styles nearly same width, slightly bent angularly at middle, obtusely rounded at apex, anterior margin of

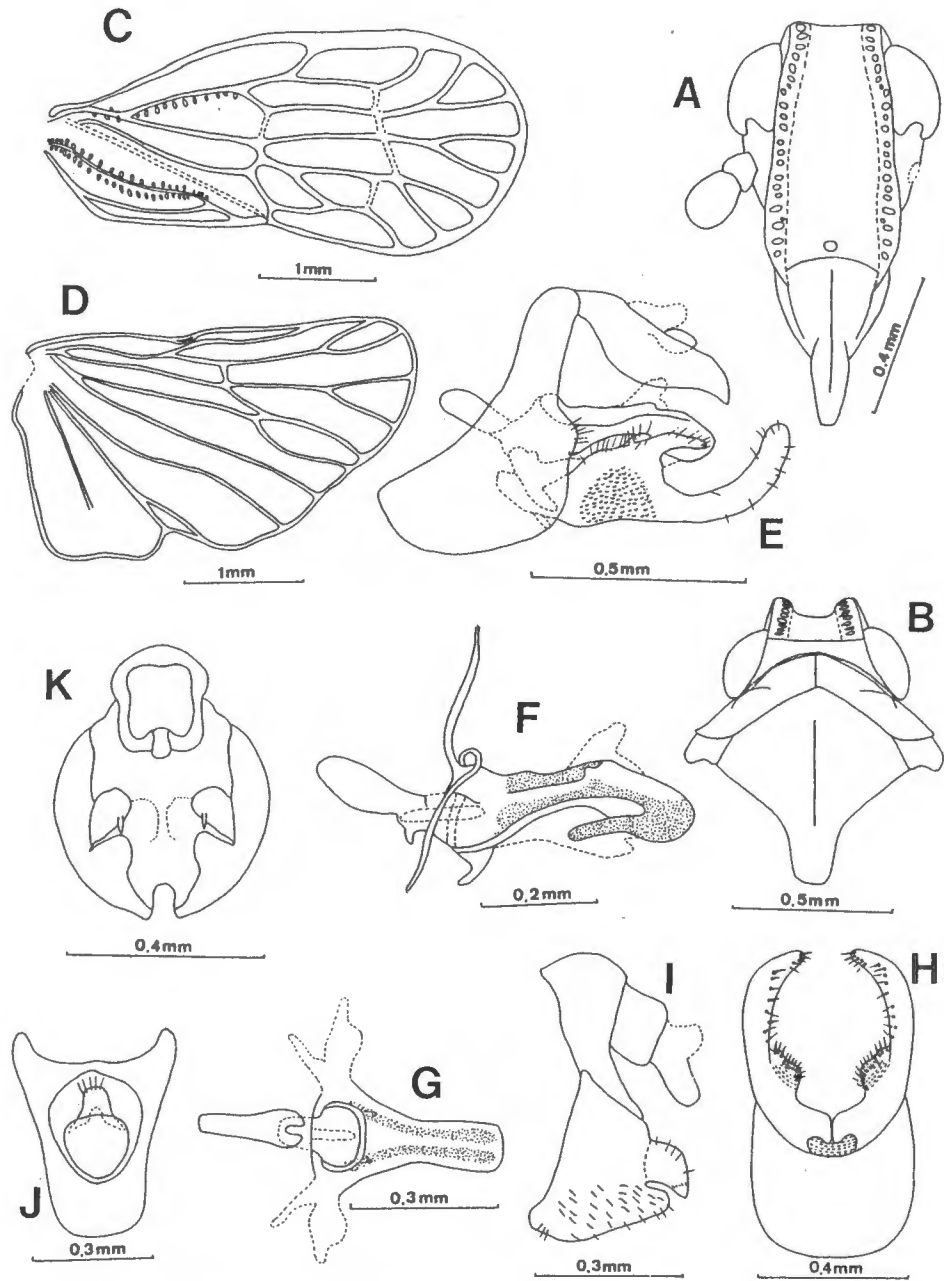


Fig. 12. *Eponisia guttula* Matsumura. A. Frons and clypeus, ventral view; B. Vertex, pronotum and mesonotum; C. Tegmen; D. Wing; E. Male genitalia, lateral view; F. Aedeagus, lateral view; G. The same, dorsal view; H. Male genitalia, caudoventral view; I. Female genitalia, lateral view; J. Male anal segment, dorsal view; K. Female genitalia, ventrocaudal view.

basal half produced dorsad in a convex lobe which gives off distally a stout process, posterior margin at basal third with a scaled area, anterior margin near base of process, strongly

produced mesad. In caudal view, genital styles divergent, converging only apically, inner margin of styles strongly produced mesad medially.

Female genitalia: Anal segment quadrate. In profile, ventral valvifer distinctly produced caudoventrally, nearly reaching apex of beak, forming a deep gap between ventral valvifer and valvula. Ventral valvula with apex produced into unequilateral triangle beak dorsocaudal side the longest, slightly arched, rounded at apical angle.

Length of body (includ. teg.): Male 4.54–4.77 mm; Female 4.30–4.83 mm.

Length of tegment: Male 3.50–4.07 mm; Female 3.83–4.23 mm.

Width of head (across eyes): Male 0.57–0.61 mm; Female 0.57–0.62 mm.

Width of mesonotum: Male 1.10–1.17 mm; Female 1.10–1.17 mm.

First instar nymph (Fig. 13)

Body length 0.50–0.60 mm, width 0.32–0.37 mm.

This species is similar to *Nisia* species but differs from latter as follows:

General color yellowish, abdomen pale yellowish. Laterofrontes each with 13 sensory pits. Each side of tergal pit configuration of thoracic segments 10–4–3. Inner side of trochanter each with 8 keels. Spinal formula of hind leg 5–4–1. Tergites I–III without sensory pit. Tergites IV–VII each with 2 sensory pits. Tergite VIII with 1.

Material examined:

Lectotype: Male (here designated). Taiwan, labelled; Formosa, Matsumura (printed), 30.iv.07, Horisha (in Japanese, handwritten on reverse), *Eponisia guttula* det. Matsumura. (examined by Wilson).

Paralectotypes: Taiwan, 2 ♂ 3 ♀ 16.viii. 1906, Taikokan (1 ♂ mouted separated-

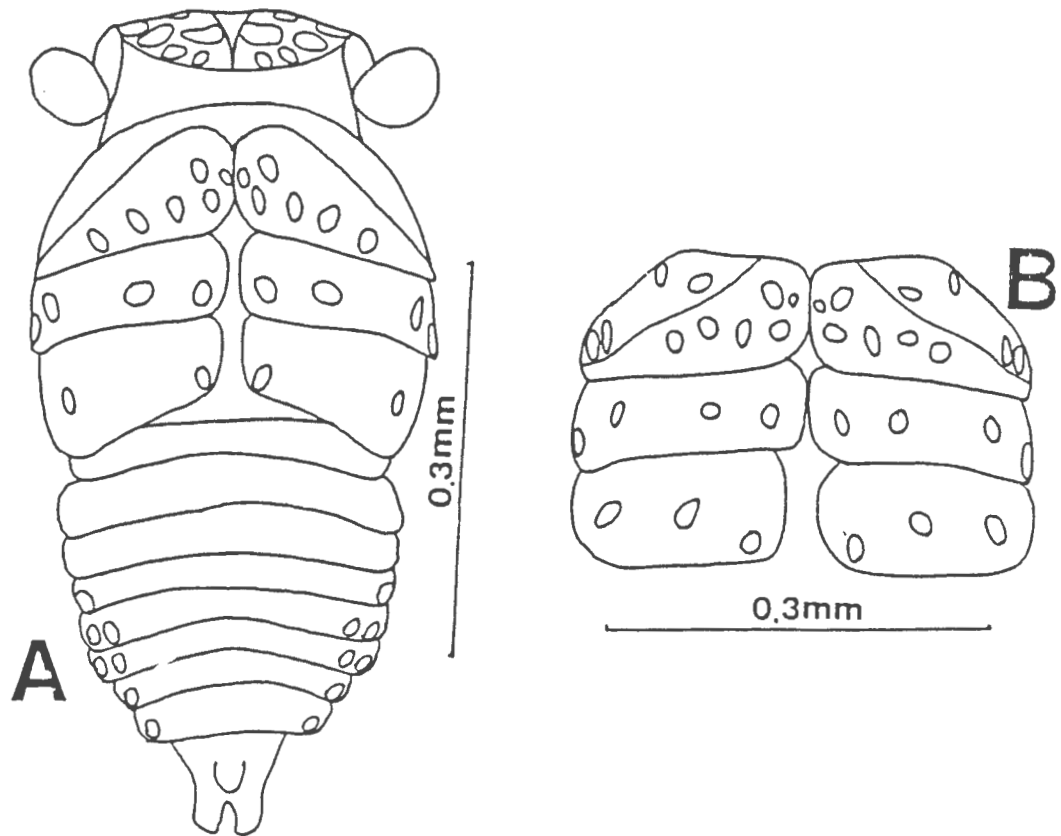


Fig. 13. First instar nymph of *Eponisia guttula* Matsumura. A. Dorsal view; B. Thorax, flat surface.

ly); 1 ♂ 12.vii.1906, Ako; 1 ♂ 7.viii.1906, Hoppo.

Notes: Four localities (Taikokan, Hoppo, Horisha, Ako) were mentioned in the original description but the number of specimens was not stated. Specimens from all these localities were present in the syntypes appear to be specimen figured by Matsumura. The wings were possibly removed for drawing (figured by Matsumura) and then reattached.

Additional Specimens examined: 4 ♂♂ 2 ♀♀ Takeng, Taichung 21-VI-1985; 1 ♂ 1 ♀ Hsenping, Kaohsiung Hsien 12-VII-1984; 2 ♂♂ 4 ♀♀ Wuchieh, Nantou Hsien 26-VII-1984; 1 ♀ Wuchieh, Nantou Hsien 27-VII-1984; 2 ♂♂ 6 ♀♀ Kuanzuling, Tainan Hsien 31-VII-1984; 1 ♂ 2 ♀♀ Puli, Nantou Hsien 14-IX-1984; 1 ♂ Puli, Nantou Hsien 10-VIII-1984; 1 ♀ Takeng, Taichung 19-IV-1985 M. M. Yang; 7 ♂♂ 7 ♀♀ 21-IV-1985; Many specimens Fushing, Taoyuan Hsien 28-IV-1985; Many specimens Shiayunping, 28-IV-1985; 7 ♂♂ 7 ♀♀ Takeng, 2-V-1985; Many specimens Fushing, 11-V-1985; 3 ♂♂ 2 ♀♀ Jihyuehtan, Nantou Hsien 25-V-1985; 2 ♂♂ Takeng, 5-VI-1985; 1 ♂ Kuantzuling, Tainan Hsien 18-VI-1985; 2 ♂♂ 2 ♀♀ Peipu, Hsinchu Hsien 22-VI-1985; 5 ♂♂ 18 ♀♀, Wufeng, Hsinchu Hsien 24-VI-1985; 1 ♀ Tsaoling, Yunlin Hsien 6-VII-1985 C. T. Yang; 2 ♂♂ 1 ♀ Puli, Nantou Hsien 18-VII-1985; 1 ♀ Liyan, Taichung Hsien 19-VII-1985; 1 ♂ 2 ♀♀ Baolai, Kaohsiung Hsien 21-VII-1985; 1 ♂ Kaochung, Kaohsiung Hsien 20 ♂♂ 22 ♀♀ Chiasien, Kaohsiung Hsien 23-VII-1985; 2 ♂♂ Kuangyinshan, Taipei Hsien 6-IX-1985; 3 ♂♂ 6 ♀♀, Wulai, Taipei Hsien 9-IX-1985; 3 ♀♀ Chiasien, Kaohsiung Hsien 11-IX-1985; 9 ♂♂ 6 ♀♀ Nanhua, Tainan Hsien 4-IV-1986 C. T. Yang; 7 ♂♂ 23 ♀♀, Chiasien Kaohsiung Hsien 5-IV-1986 C. T.

Yang. 1 ♀ Takeng, Taichung Hsien 28-IV-1986 M. L. Chan.

Nymphal specimens examined:

1st instar nymph: 7 Takeng, Taichung 5-VI-1986.

Host plant: unknown.

Distribution: Taiwan.

***Eponisia macula** n. sp.**
(Fig. 14)

General color brownish black. Body not covered with powdery wax. Vertex, frons yellowish brown. Mesonotum with three yellowish longitudinal stripes from anterior to posterior. Ocelli white. Legs yellowish brown. Tegmina pale black with distinct white veins. Abdomen dark brown with lateral sides brown.

Frons longer in middle line than wide at widest portion about 1.6 : 1. Lateral carinae strongly extended and elevated, with 31-33 sensory pits along each inner side (including several ones on vertex). Postclypeus slightly wider at base than long in middle line. Rostrum with relative length of each segment about 1.2 : 1.3 : 1. Antenna with basal segment wider than long, second segment long than first about 2.4 : 1. Tegmina about 2.3 times as long as wide. Sc+R with about 22 sensory pits, 2 above, another below. First claval vein with 18-19 sensory pits along each side. R of wing branched. Shape of wax-secretion pores as figured, inner plate of tergite VII with lateral half distinctly narrower than median.

Male genitalia: Pygofer with dorsolateral angles slightly produced. In dorsal view, anal segment elongate, strongly expending to apex, anterolateral angle widely produced, in lateral view anal segment short and stout, wide across base of end of anal style shorter than greatest length about 1 : 3.0, apex obtusely protruding ventral margin downward medially. Phallus straight, membraneous, central portion with membraneous production anteriorly. In dorsal view with two auricle-like process. Anterior

* *L. macula*-spot, indicated the black spots of tegmen.

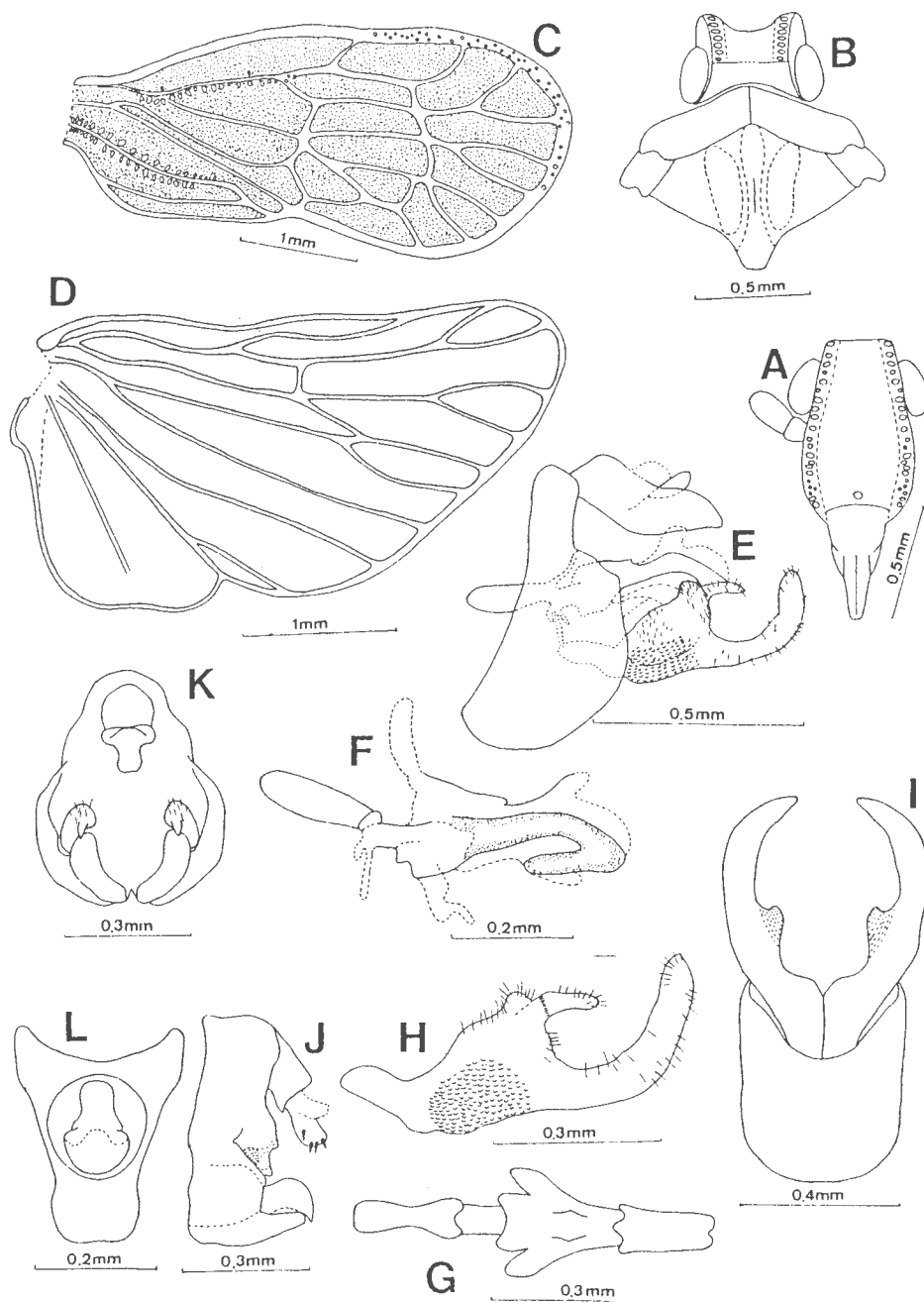


Fig. 14. *Eponisia macula* n. sp. A. Frons and clypeus, ventral view; B. Vertex, pronotum and mesonotum; C. Tegmen; D. Wing; E. Male genitalia, lateral view; F. Aedeagus, lateral view; G. The same, dorsal view; H. Male genitalia, lateral view; I. The same, caudoventral view; J. Female genitalia, lateral view; K. The same, ventrocaudal view; L. Male anal segment, dorsal view.

apodeme of aedeagus rounded, at same plane with phallus and phallobase. Processes of phallobase decline foliaceous. Genital style

elongate, curved at apical half, obtusely rounded at apex, anterior margin of basal half produced dorsad in a convex lobe which gives

Type species: *Metanigrus yami* n. sp. (here designation)

Diagnosis: This genus has the characters, first claval vein with a row of sensory pits, second strongly curved with many sensory pits arranged irregularly; common petiole of claval veins fused near middle; *Sc+R* and *M* forked near middle are Meenoplineae's. But the ventral valvula of female genitalia connecting with caudoventral angle of ventral valvifer are similar to those in Kermesiinae. The process of phallobase this genus resembles *Anigrus* but differs in having ventral valvula not covered by ventral valvifer; vertex and frons without median carina absolutely; anal segment of male with basoventral process.

*Metanigrus yami** n. sp.
(Fig. 15)

General color dirty yellow. Mesonotum dark brown. Ocellus light yellow. Legs yellowish brown. Tegmen hyaline. Abdomen brown.

Frons longer in middle line than wide at widest portion about 1.5 : 1. Lateral carinae concave, reaching over median level of anteclypeus, with 22–24 sensory pits along each inner side (including several ones on vertex). Postclypeus as long in middle line as wide at base. Rostrum with relative length of each segment about 1.1 : 1.4 : 1. Antenna with basal segment wider than long, second segment longer than first about 2.4 : 1. Mesonotum with distinct median carina. Tegmen about 2.5 times as long as wide. *Sc+R* with 4–8 sensory pits. *im*, *r-m* and anterior margin at two-thirds with white areas. First claval vein with 9–10 larger sensory pits at basal half and followed with another about 20 small ones pits. $2A_3$ of wing not reaching margin.

Male genitalia: Pygofer with dorsolateral angles not produced. In Lateral view, anal segment trapezoid, basolateral side with a finger-like process, directed downward. Anal style slender, parallel with margin of segment.

Phallus short, acuminate in lateral view, nearly same length as anal segment. Process of phallobase swelling on both sides, surface beset with scale-shaped processes obscure the phallus. Genital style curved apically, tapering into a process, outer side with thumb-like process near apex, directed upward, inner margin with a convex which set with long setae. In caudal view, genital styles divergent, narrowed medially. Apical half with outer margin rounded, inner margin ridged, forming a obtusely rounded triangle. Apex strongly curved outward, forming a hook-like process.

Female genitalia: In lateral view, anal segment stout. Anal style elongate. Ventral valvifer with basocaudal angle turned mesad and produced into a thumb-shaped process. Ventral valvula reduced into a stout process, apex with blade-like process. In caudodorsal view, ventral valvifer approximate each other, separated with ventral valvula, forming a deep gap.

Length of body (includ. teg.): Male 3.00–3.53 mm; Female 3.77–3.97 mm.

Length of tegmen: Male 2.67–3.07 mm; Female 3.20–3.40 mm.

Width of head (across eyes): Male 1.00–1.07 mm; Female 1.13–1.20 mm.

Width of mesonotum: Male 0.53–0.60 mm; Female 0.62–0.65 mm.

Holotype: Male, Lanshu, Taitung Hsien 29–IX–1985. (deposited in NCHU).

Paratypes: 1 ♂ Lanshu, Taitung Hsien 4–VII–1985; 2 ♂♂ 5 ♀♀ Lanshu, Taitung Hsien 5–VII–1985; 1 ♂ Lanshu, Taitung Hsien 8–VII–1985; 3 ♀♀ Lanshu, Taitung Hsien 12–VII–1985 L. C. Tang; 1 ♂ 3 ♀♀ Lanshu, Taitung Hsien 12–VII–1985 J. T. Yang; 1 ♀ Lanshu, Taitung Hsien 12–VII–1985 C. T. Yang; 1 ♀ Lanshu, Taitung Hsien 13–VII–1985 L. C. Tang; 3 ♂♂ 6 ♀♀ Lanshu, Taitung Hsien 29–IX–1985; 1 ♂ 4 ♀♀ Lanshu, Taitung Hsien 30–IX–1985; 1 ♂ Lanshu, Taitung Hsien

* Name of a tribe, indicated collecting from Lanshu.

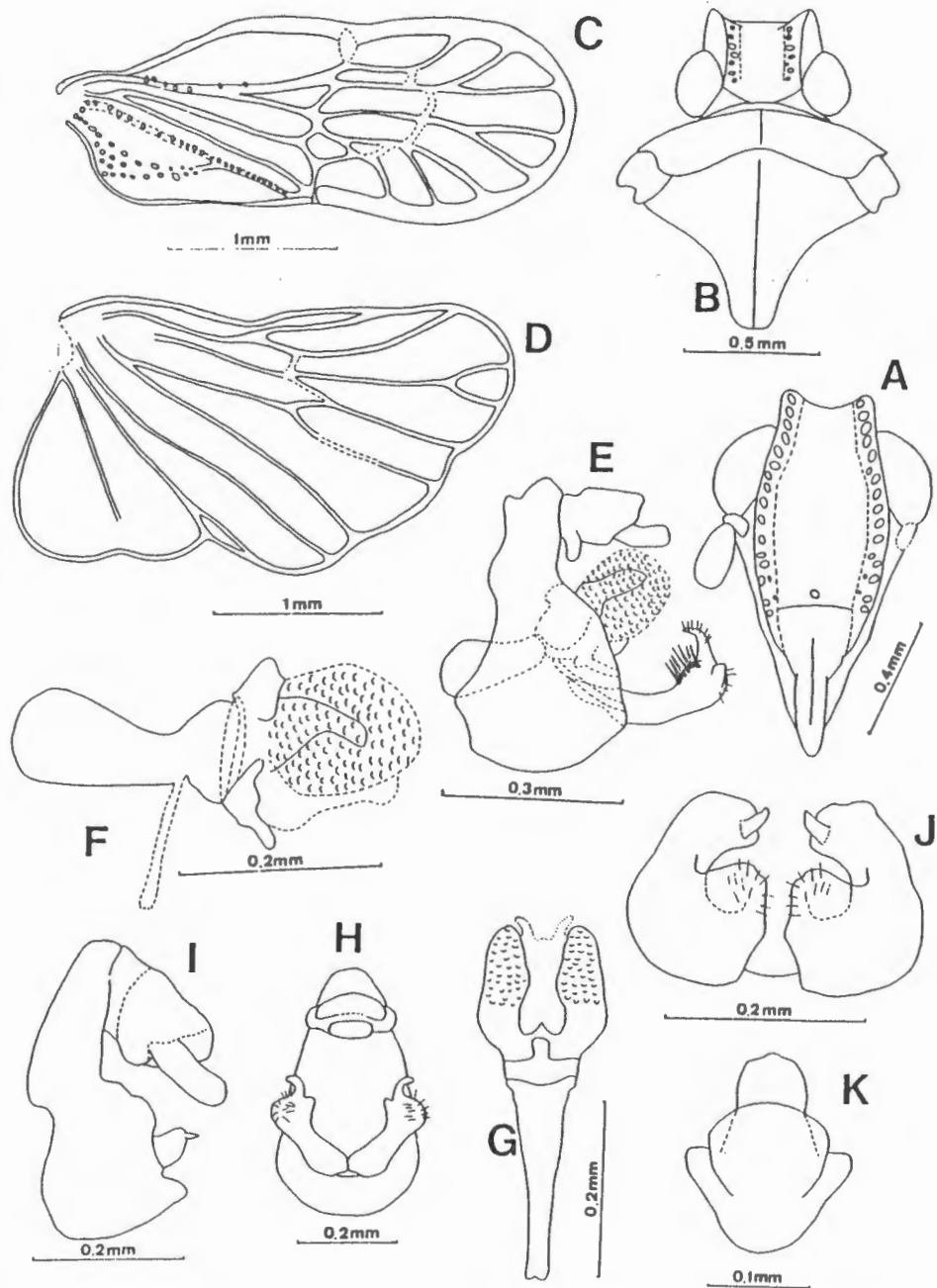


Fig. 15. *Metanigrus yami* n. sp. A. Frons and clypeus, ventral view; B. Vertex, pronotum and mesonotum; C. Tegmen; D. Wing; E. Male genitalia, lateral view; F. Aedeagus, lateral view; G. The same, ventrocaudal view; K. Male anal segment, dorsal view.

1-X-1985. (deposited 2 ♂♂ 3 ♀♀ in BMNH).

Host plant: unknown.
Distribution: Taiwan (Lanshu).

Genus *Anigrus* Stål

Anigrus Stål, 1866, Hemiptera Africana 4:172.

Body small to median, covered with several powdery wax. Vertex with distinct median carina down frons, with two posterolateral areolets at base. Median carina almost reaching median ocellus. An interruption at frontoclypeal suture between lateral carina of frons and clypeus. Clypeus with median carina. Pro- and Mesonotum with median carina. Tegmina slender, nearly same width. *Sc+R* without sensory pit. Claval vein uniting near apex of clavus, first claval vein with sensory pits on it. Wing with *R* not branched, *2A* forked near apex. Spinal formula of hind leg 8–6–5. Male genitalia in lateral view, with anal segment slender, turned downward at apical half, in dorsal view deeply incised at apical margin forming a sharply pointed angle at each side. In lateral view, phallus straight. Genital style nearly same width, strongly angularly bent at middle, at apex obtusely rounded with many setae, inner margin concave beneath rounded portion at apical fourth, a finger-shaped production at apical third, margin with long setae. In caudal view, divergent, inner margin with small production near middle, concave at apical third. Female genitalia in lateral view, anal segment stout, base with a production posteriorly. Ventral valvifer with basocaudal angle turned mesad and produced into a finger-like process. Ventral valvula quadrate, in caudo-dorsal view, ventral valvula quadrate, with two productions, the upper one thumb-like, directed cephalad, the lower one acuminate, directed upward. Ventral valvifer at base produced into a elongate process, approximate each other, with laterodorsal angle angulate.

Type species: *Anigrus sordidus* Stål, 1866 (original designation)

Key to the species of *Anigrus* (males only)

1. Median carina absent; in caudal view, anal segment deeply incised medially (Fig. 16 H) *formosanus* (Matsumura)
- . Median carina present; in caudal view, anal

segment concaved medially (Fig. 17 E)
 *frequens* (Matsumura)

Anigrus formosanus (Matsumura, 1914) (Fig. 16)

Paranisia formosana Matsumura, 1914 Ann. Mag. Nat. Hungarici 12:284.

Anigrus formosanus: Muir, 1930 Ann Mag. Nat. Hist. (10)6:471.

General color brown to whitish gray. Body more or less covered with powdery wax. Vertex, frons, antenna and mesonotum dark brown. A yellowish stripe from vertex to frontoclypeal suture. Eye brownish black. Ocellus white. Leg yellowish. Abdomen black, with lateral side orange red.

Head with lateral carinae concave below eye, nearly parallel before areolets, with about 26 sensory pits along each inner side (including several ones on vertex). Median carina of head replaced by a yellowish vase-shaped marking. Frons longer in middle line than wide at widest portion about 1.4 : 1. Clypeus with median carina. Postclypeus as long in middle line as wide at base. Rostrum with relative length of each segment about 1.1 : 1.2 : 1. Antenna with basal segment wider than long, second segment longer than first about 2 : 1. Mesonotum with two obscure yellowish stripes longitudinally. Spinal formula of hind leg irregular, Post-tibia each with 3+5 teeth apically, basal metatarsial segment with 5 (male) or 6 (female) teeth, second segment with 6 in right, 5 in left. Tegmen about 2.8 times as long as wide. *Sc+R* with 3-5 sensory pits. First claval vein with 9–12 sensory pits, second with 27–32 sensory pits. Shape of wax-secretion pores uniform hexagonum but different in size, on tergites VI and VII smaller, tergite VIII central portion larger, beehive-like all arranged tightly.

Male genitalia: Pygofer with dorsolateral angles not produced. In lateral view, anal segment very large, directed vertically downward at apical half, caudal upper margin curved with central portion strongly elevated, forming a declivous plane. In caudal view, anal segment at upper portion with central part elevated, both sides deeply concave, lower portion

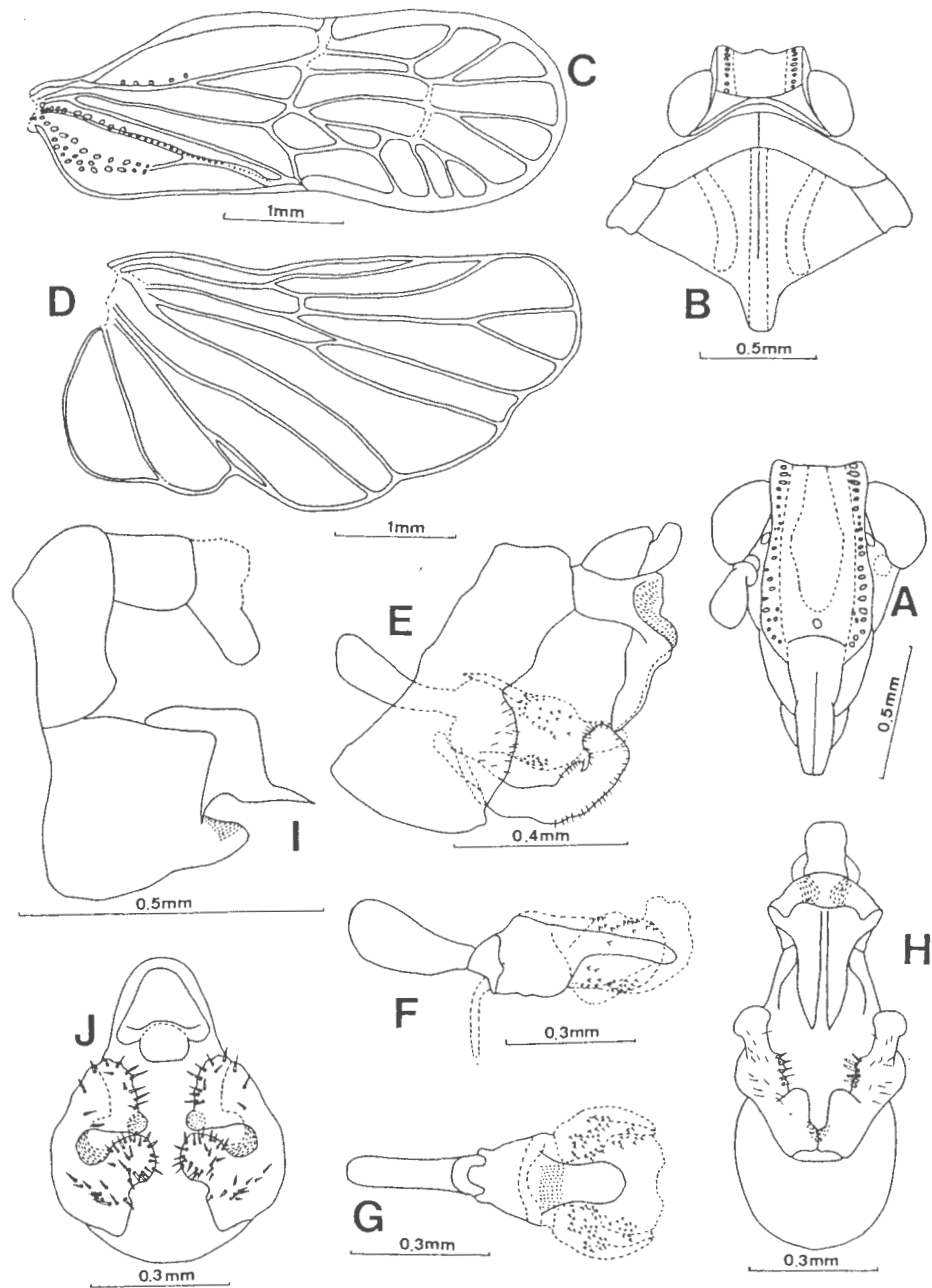


Fig. 16. *Anigrus formosanus* (Matsumura). A. Frons and clypeus, ventral view; B. Vertex, pronotum and mesonotum; C. Tegmen; D. Wing; E. Male genitalia, lateral view; F. Aedeagus, lateral view; G. The same, dorsal view; H. Male genitalia, ventrocaudal view; I. Female genitalia, caudal view; J. The same, caudoventral view.

slender, two lobes. Anal style connect with anal segment tightly, directed upward at apex. Process of phallobase shaped like muffler, with many reverse teeth. Phallus stout, narrowed to

apex, in dorsal view a membraneous area located between processes of phallobase and phallus. In lateral view, genital style stout, strongly bent angularly at middle, with many

setae along outer margin, inner margin concave at apical third. A production near middle, with long setae. In caudal view, divergent, inner margin of styles strongly produced mesad at basal third, with 4–6 thick setae at middle.

Female genitalia: In lateral view, anal segment stout, anal style elongate. Inner plate of tergites VII–VIII with many long hairs, shape of tergite VIII larger beehive-like. Ventral valvifer at base produced into a elongate process, approximate each other. Ventral valvula quadrate, caudal margin sinuate, ventrocaudal process slightly produced ventrobased. In caudodorsal view, ventral valvula curved toward central portion, inner basal angles roundly produced. Distance between ventral valvulae almost same width of anal style at apex.

Length of body (includ. teg.): Male 4.67–5.20 mm; Female 5.20–5.57 mm.

Length of tegmen: Male 4.00–4.53 mm; Female 4.53–4.90 mm.

Width of head (across eyes): Male 0.67–0.70 mm; Female 0.67–0.70 mm.

Width of mesonotum: Male: 1.13–1.27 mm; Female 1.17–1.30 mm.

Material examined:

Lectotype: Male (here designated). Taiwan, labelled, Formosa, Matsumura (printed), Hokuto, 30.viii.1906 (handwritten, on reverse). (dissected, examined by Wilson).

Paralectotypes: Taiwan, 4 ♂♂ 3 ♀♀ same data as Lectotype but collected 31.viii.1906; 1 ♂ 1 ♀ Tansui, 29.vii.1906; 1 ♂ Shurui, 31.vii.1906, 1 ♀ Ako, 12.vii.1906; 1 ♂ 2 ♀♀ Hoppo, 6.vii.1907.

Notes: Matsumura (1914) in his original description did not give any specific localities in Taiwan. A total of 15 specimens were examined from the syntype series. A female from Hoppo is labelled by Matsumura as *Paranisia formosana* and may have been the specimen figured. However, it agrees well with the females collected from Hokuto from where males were also collected. The single male from Hoppo is lacking wings. Accordingly

a male from Hokuto is selected as lectotype.

Comparison with *nudifrons* Fennah, *Anigrus formosanus* closely resembles *A. nudifrons* Fennah (1978). The male genitalia serve to separate the two species, particularly the form of the anal tube appendages. In *formosanus* they are considerably longer (Fig. 16 H) than in *nudifrons* where they are short and more or less triangular at the tip.

Other specimens examined: 2 ♂♂ 1 ♀ Takeng, Taichung 19–IV–1985 M. M. Yang; 12 ♂♂ 11 ♀♀ 21–IV–1985; 2 ♂♂ 2–V–1985; 1 ♂ Songho, Taichung Hsien 8–V–1985; 2 ♂♂ Takeng, Taichung 5–IV–1985; 1 ♀ Kuantzuling, Tainan Hsien 18–VI–1985; 1 ♀ C. T. Yang; 1 ♀ 19–VII–1985 M. M. Yang; 1 ♀ Baolai, Kaohsiung Hsien 21–VII–1985; 2 ♂♂ 4 ♀♀ Kaochung, 22–VII–1985; 4 ♂♂ 2 ♀♀ Chiasien, 23–VII–1985; 1 ♂ Takeng, Taichung Hsien 12–IX–1985; 1 ♂ 17–X–1985 M. M. Yang; 1 ♂, Shengsing, Miaoli Hsien 13–X–1985 M. L. Chan. 1 ♂ 4 ♀♀ Nanhua, Taiwan Hsien 4–IV–1986 C. T. Yang. 1 ♂ Takeng, Taichung Hsien 28–IV–1986 M. L. Chan.

Host plant: unknown.

Distribution: Taiwan.

Anigrus frequens Matsumura, 1914

(Fig. 17)

Paranisia frequens Matsumura, 1914 Ann. Mus. Nat. Hungarici 12:285.

Paranisia nigricans Matsumura, 1914 Ann. Mus. Nat. Hungarici 12:285. syn. nov.

Anigrus frequens: Muir, 1930, Ann. Mag. Nat. Hist. (10)6:471.

Anigrus metalces Fennah, 1978 Ann. Zool. Warsz. 34(9):237. syn. nov.

General color brown. Vertex and frons yellowish brown, mesonotum dark brown. Ocellus deep yellow. Leg yellowish brown. Tegmen semihyaline. Abdomen black, with lateral side orange red.

Frons longer in middle line than wide at widest portion about 2.3 : 1. Lateral carinae

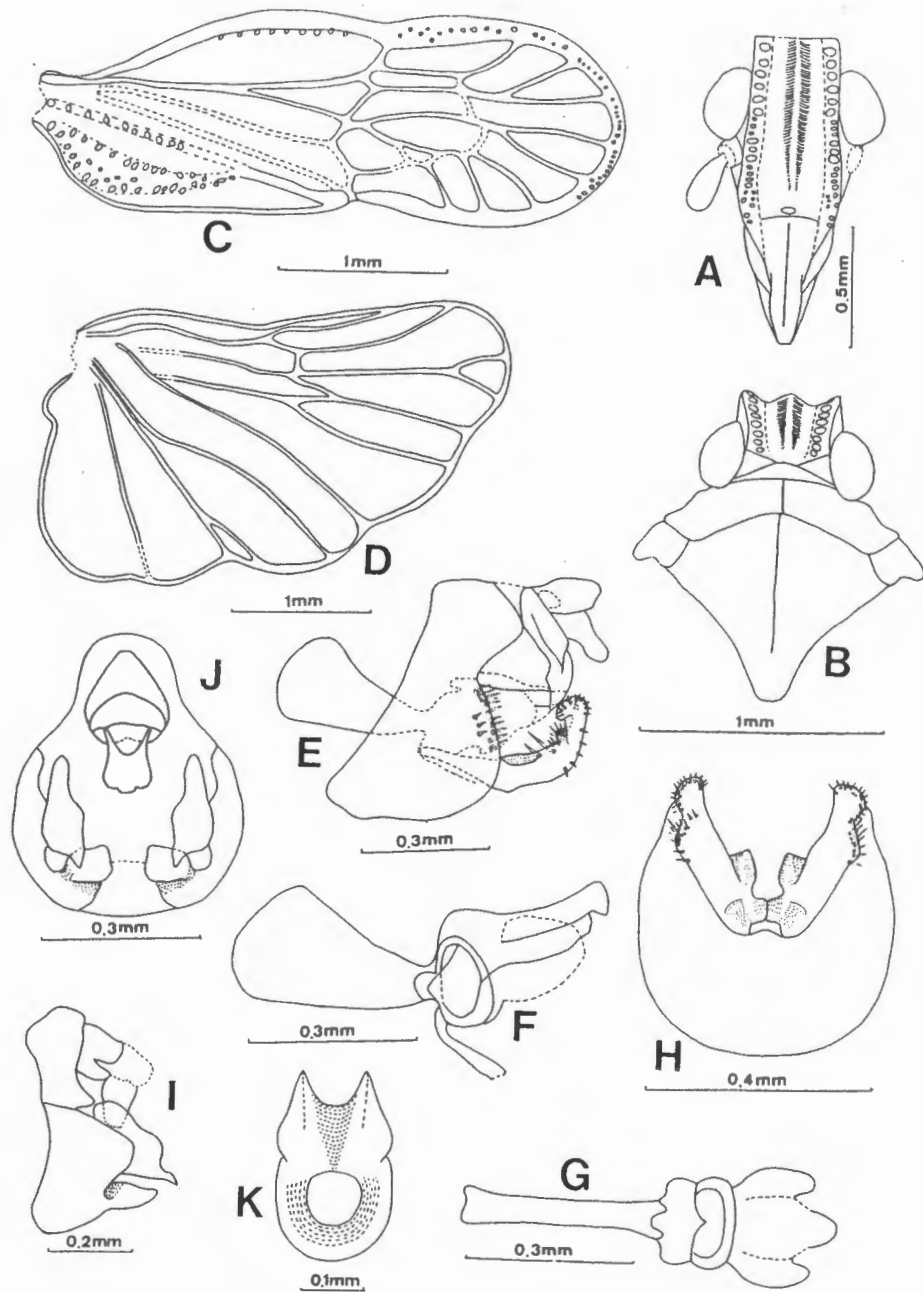


Fig. 17. *Anigrus frequens* (Matsumura). A. Frons and clypeus, ventral view; B. Vertex, pronotum and mesonotum, dorsal view; C. Tegmen; D. Wing; E. Male genitalia, lateral view; F. Aedeagus, lateral view; G. The same, dorsal view; H. Male genitalia, ventrocaudal view; I. Female genitalia, lateral view; J. The same, ventrocaudal view; K. Male anal segment, dorsal view.

concave, with about 26 sensory pits along each inner side (including several ones on vertex). Postclypeus longer in middle line than wide at

base. Rostrum with relative length of each segment about 1.2 : 1.2 : 1. Antenna with basal segment wider than long, second segment

longer than first about 2.3 : 1. Mesonotum with median carina at basal two-thirds. Tegmen about 2.8 times as long as wide. *Sc+R* with 8 sensory pits. First claval vein with about 10 sensory pits, second with about 37 sensory pits. $2A_3$ of wing not reaching apex. Shape of wax-secretion pores uniform hexagonum but different in size, on tergite VI the smallest, tergite VII large, tergite VIII the largest, all arranged tightly.

Male genitalia: Pygofer with dorsolateral angles produced. In lateral view, anal segment slender, turned downward at apical half, anal style large, distinctly rounded at apex. In dorsal aspect, deeply incised at apical margin, forming a sharply pointed angle at each side. Phallus straight, with central portion sclerotized. In lateral view, reaching slightly shorter than genital styles. Process of phallobase bilobed, foliaceous, membraneous, reaching about apical third of phallus. Genital styles, nearly same width, strongly angulately bent at middle, obtusely rounded and covered with many setae at apex, inner margin concave beneath rounded portion at apical third, a thumb-shaped production at curved inner portion, margin with long setae. In caudal view, divergent, inner margin with production near middle, slightly concave at apical fourth.

Female genitalia: In lateral view, anal segment stout. Anal style elongate. Ventral valvifer with basocaudal angle turned mesad and produced into a finger-shaped process. In caudodorsal view, anal style evenly convex at apex, slightly produced medially, deeply concave at basal margin. Distance between two upper productions about 2 times as wide as width of anal style at apex. Distance between processes of ventral valvifer slightly narrower than width of anal style at apex.

Length of body (includ. teg.): Male 3.46–5.10 mm; Female 3.88–4.12 mm.

Length of tegmen: Male 3.00–4.67 mm; Female 3.47–4.93 mm.

Width of head (across eyes): Male 0.57–0.70 mm; Female 0.60–0.73 mm.

Width of mesonotum: Male 0.87–1.27 mm; Female 1.03–1.30 mm.

Lectotype: Male (here designated). Taiwan, labelled Formosa, Matsumura (printed), Shoka, 21.vii.1906. Handwritten label *Paranisia frequens*. (dissected, examined by Wilson).

Paralectotypes: Taiwan, 1 ♂ 1 ♀ Shoka; 1 ♀ 21.vii.1906, Shako; 1 ♂ 1 ♀, 20.vii.1906, Shoka; 3 ♂♂ 5 ♀♀ Kaoshun; 1 ♀ Taikokan, 16.viii.1906; 1 ♂ 3 ♀♀ Hokuto, 31.vii.1906; 1 ♂ 2 ♀♀ Tanshui, 29.vii.1906.

Lectotype: Male of *A. nigricans* (here designated). Taiwan, labelled, Formosa, Matsumura (printed), Hoppo, 8.viii.1906 (handwritten on reverse), labelled *Paranisia nigricans*. (dissected, examined by Wilson).

Paralectotypes: 2 ♂♂ 4 ♀♀ same data as lectotype.

Holotype of *Anigrus metalces* Fennah 1978, Type locality; Vietnam. Type depository; Insitute Zool. Pan, Poland. (examined by Wilson).

Notes: Six localities were mentioned by Matsumura in his original description (Tansui, Hokuto, Shoka, Taikokan, Hoppo, Koshun) but the number of specimens examined was not stated. The synonymy of *nigricans* with *frequens* was made by comparing the male genitalia of each species directly. Although described by Matsumura in the same paper the name *frequens* has chosen for the two species.

The synonymy of *A. metalces* with *frequens* was made on the basis of comparisons of the male genitalia of the holotype with *frequens*.

This species has some kinds of variations distributed in three main populations which collected from Songho, Yushih, and other localities. The altitudes which they inhabit is 500 m, 1,400 m, 300 m respectively. Their body coloration also has various forms: white in Songho population (S. P.); brown in the other 'vo. Body size appears the smallest in S. P. (ranged from 3.47–4.07 mm in male; 3.88–4.12 mm in female), Yushih population (Y. P.), the largest, (ranged from 4.80–5.10 mm in male; 5.00–5.53 mm in female), others

(O. P.) ranged from 3.93–4.63 mm in male; 4.57–5.33 mm in female. The ratio of second against first segment of antennae is 2.8 : 1 in O. P.; 3.0 : 1 in S. P.; 3.3 : 1 in Y. P.. Distance between process of female ventral valvifers and ventral valvulae is widest in P.P. narrowest in S. P. In spite of having so much minor differences in which mentioned above, their male genitalia (so far the most important character we use to separate species) are the same. So we decide to treat them as the same species.

Other specimens examined: 7 ♂♂ 4 ♀♀ Songho, Taichung Hsien 2–VII–1984; 13 ♂♂ 7 ♀♀ Songho, Taichung Hsien 5–VII–1984; 2 ♂♂ 2 ♀♀ Hsenping, Kaohsiung Hsien 10–14–VII–1984; 11 ♂♂ 13 ♀♀ Yushih, Nantou Hsien 14–X–1984; 1 ♂ Nanjenshan, Pingtung Hsien 11–II–1985; 2 ♀ Nanjenshan, Pingtung Hsien 12–II–1985 L. Y. Huang; 1 ♂ 2 ♀♀ 14–II–1985; 3 ♂♂ 4 ♀♀ Takeng, Taichung Hsien 21–IV–1985; 1 ♂ 1 ♀ 19–IV–1985 M. M. Yang; 2 ♀♀ Shiayunping, Taoyuan Hsien 28–IV–1985; 9 ♂♂ 6 ♀♀ Songho, Taichung Hsien 8–V–1985; 16 ♂♂ 6 ♀♀, Shiayunping, Taoyuan Hsien 12–V–1985; 1 ♂ Takeng, Taichung Hsien 5–VI–1985; 4 ♂♂ 7 ♀♀ Songho, Taichung Hsien 1–VII–1985; 1 ♂ Takeng, Taichung Hsien 30–IX–1985; 1 ♂ 7–X–1985; 9 ♂♂ 4 ♀♀ Yushih, Nantou Hsien 1–XI–1985.

Host: unknown.

Distribution: Taiwan.

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