

# The Meenoplidae (Hemiptera, Fulgoromorpha) of New Caledonia, with a revision of the genus *Eponisia* Matsumura, 1914, and new morphological data on forewing venation and wax plate areas

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## RÉSUMÉ

Dans une première partie, on propose une nouvelle interprétation de la nervation des tegmina des Meenoplidae-Kinnaridae (Hemiptera, Fulgoromorpha). On s'attache en particulier à la reconnaissance (homologie primaire) des branches postnodales des nervures M et Cu en invoquant le principe de parcimonie dans le nombre d'événements évolutifs et leurs hiérarchisation pour rendre compte des patterns observés. On préférera ainsi un simple déplacement avec coalescence entre deux nervures à la disparition et l'apparition d'une nouvelle branche. Des arguments morphologiques (observation des trachées) viennent appuyer cette nouvelle interprétation. Plusieurs nouvelles synapomorphies sont suggérées pour le taxon monophylétique des Meenoplidae-Kinnaridae.

Dans une seconde partie, on livre les principaux résultats d'un travail encore non publié sur les plaques cilières des Meenoplidae-Kinnaridae afin de définir de nouveaux caractères d'importance tant taxinomique que phylogénétique et qui seront utilisés dans la partie systématique de ce travail. Trois types de plaques cilières sont décrits : centrotypique, paratypique et eurytypique.

Dans la dernière partie de cette étude, on entreprend la révision des Meenoplidae de Nouvelle-Calédonie. On donne une clé des genres qui inclut également ceux du groupe *Eponisia* et *Suva*. Vingt-six espèces sont recensées pour neuf auparavant. Le genre *Eponisia* Matsumura, 1914, est redéfini et toutes les espèces néo-calédoniennes précédemment rangées dans celui-ci sont transférées dans de nouveaux genres avec de nouvelles espèces : *Caledonisia* gen. nov. [espèce-type : *C. theophane* (Fennah, 1969), n. comb. ; *C. bolanus* (Fennah, 1969), n. comb. ; *C. crypta* n. sp. ; *C. guilberti* n. sp. ; *C. monsmollis* n. sp. ; *C. xli* n. sp.], *Kaghisia* gen. nov. [espèce-type : *K. lysis* (Fennah, 1969), n. comb. ; *K. anosphosa* n. sp.], *Fennahisia* gen. nov. [espèce-type : *F. matuta* (Fennah, 1969), n. comb. ; *F. hypogaea* (Hoch, in press), n. comb. ; *F. periofata* n. sp. ; *F. cafana* n. sp.], *Glyptodonisia* gen. nov. [espèce-type : *G. fugax* (Fennah, 1969), n. comb. ; *G. tomyris* (Fennah, 1969), n. comb.], *Nisia albonotata* Distant, 1920, déplacée par FENNAH dans le genre *Suva* Kirkaldy, 1906, est proposée comme espèce-type pour un nouveau genre, *Suvenisia* gen. nov., où l'on décrit également quatre nouvelles espèces [espèce-type : *S. albonotata* (Distant, 1920), n. comb. ; *S. tillerorani* n. sp. ; *S. caudifurcata* n. sp. ; *S. robusta* n. sp. ; *S. hwanoa* n. sp.]. Deux autres nouveaux genres

BOURGOIN, TH., 1997. — The Meenoplidae (Hemiptera, Fulgoromorpha) of New Caledonia, with a revision of the genus *Eponisia* Matsumura, 1914, and new morphological data on forewing venation and wax plate areas. In : NATH, J. & MATHIE, L. (eds), *Zoologia Neocaledonica*, Volume 4. *Mém. Mus. natn. Hist. nat.*, 171 : 197-249. Paris, ISBN 2-85653-505-4.

Publié le 20 juin 1997

sont décrits : *Anorhinosis* gen. nov. [espèce-type : *A. anomala* n. sp. ; *A. spatulalba* n. sp.] et *Mutirisia* gen. nov. [espèce-type : *M. desutterae* n. sp.]. Enfin, un huitième nouveau genre, *Distantiana* gen. nov. [espèce-type : *D. stylirecta* n. sp.], est proposé pour la première espèce néo-calédonienne des Meenopliidae Meenopliinae, qui étend ainsi de manière remarquable l'aire de répartition de cette sous-famille.

Enfin, la nouvelle interprétation du genre *Eponisia* conduit également à déplacer *Eponisia woodwardi* Tsaour, Yang et Wilson, 1986, dans un nouveau genre, *Tyweponisia* gen. nov. [espèce type : *T. woodwardi* (Tsaour, Yang et Wilson, 1986), n. comb.].

## ABSTRACT

In the first part of this paper, a new interpretation of the venation of the forewings in the Meenopliidae-Kinnaridae group (Hemiptera, Fulgoromorpha) is provided. Special attention is paid to the homologies of M and Cu postnodal branches, calling upon the parsimonious principle in the number of evolutionary events and their intercalibration to explain the observed vein pattern. Thus, displacement with coalescence will be tested before vanishing and apparition of a new branch. Morphological evidences (tracheal pattern) support this new interpretation, and several new synapomorphies are suggested for the monophyletic taxon Meenopliidae-Kinnaridae.

In a second part, preliminary results of a still unpublished study of wax plate areas in females are given in order to establish several new characters of taxonomic and phylogenetic importance used in the third part of this study. Three types of wax plates are described in the Meenopliidae-Kinnaridae, according to the arrangement of the glands: the centropotic type, the paratopic type and the eurytopic type.

In the third part the Meenopliidae of New Caledonia are revised. A key to genera, including other meenopliids genera related to the *Eponisia* and *Suva* groups, is given. Twenty-six species are recognized instead of nine previously. The genus *Eponisia* Matsumura, 1914, is redefined. All the New Caledonian species previously described in this genus are transferred with several other new species to four new genera: *Caledonisia* gen. nov. [type species: *C. theophane* (Fennah, 1969), n. comb.; *C. bolanus* (Fennah, 1969), n. comb.; *C. crypta* n. sp.; *C. guilberti* n. sp.; *C. monsmollis* n. sp.; *C. xli* n. sp.], *Koghisia* gen. nov. [type species: *K. lysis* (Fennah, 1969), n. comb.; *K. anospinosa* n. sp.], *Fennahisia* gen. nov. [type species: *F. matuta* (Fennah, 1969), n. comb.; *F. hypogaea* (Hoch, in press), n. comb.; *F. perfoliata* n. sp.; *F. cafania* n. sp.], *Glyptodonisia* gen. nov. [type species: *G. fuxag* (Fennah, 1969), n. comb.; *G. tomyris* (Fennah, 1969), n. comb.]. *Nisia albonotata* Distant, 1920, transferred by Fennah in the genus *Suva* Kirkaldy, 1906, is proposed as type species for a new genus *Suvanisia* gen. nov. in which four new species are described [type species: *S. albonotata* (Distant, 1920), n. comb.; *S. tillierorum* n. sp.; *S. caudifurcata* n. sp.; *S. robusta* n. sp.; *S. huanua* n. sp.]. Two other new genera are also described: *Anorhinosis* gen. nov. [type species: *A. anomala* n. sp.; *A. spatulalba* n. sp.] and *Mutirisia* gen. nov. [type species: *M. desutterae* n. sp.]. An eighth new genus, *Distantiana* gen. nov. [type species: *D. stylirecta* n. sp.] is also described and represents the first Meenopliidae Meenopliinae species from New Caledonia, which extends the distribution of this subfamily notably far south east.

Finally, the new interpretation of the genus *Eponisia* leads to the placement of *Eponisia woodwardi* Tsaour, Yang & Wilson, 1986 in another new genus, *Tyweponisia* gen. nov. [type species: *T. woodwardi* (Tsaour, Yang & Wilson, 1986), n. comb.].

A recent preliminary study (BOURGOIN, 1993a), with a phylogenetic analysis of the Meenopliidae and Kinnaridae genera has given evidence that these two families form a monophyletic group within the Fulgoromorpha, as was suggested by several authors previously (EMELJANOV 1984, 1990; REMANE, 1985; ASCHE, 1988). Within this group, the monophyly of Meenopliidae is fully supported. However, Kinnaridae appeared as paraphyletic and it was suggested, for nomenclatural reasons (BOURGOIN, 1993a), that Meenopliidae should be re-evaluated to a larger group comprising all kinnarid genera. This will be formally established in a paper in preparation, dealing with the phylogeny of the Meenopliidae-Kinnaridae genera.

But even independently from this, it is clear that the generic criteria used in the Meenopliidae are currently inadequate [and since a long time! see MUIR, 1927a: 197] and require a fundamental revision as was already written by EMELJANOV (1984) or WILSON (1984). Currently, this small family comprises twelve genera distributed into two subfamilies: the Meenopliinae Fieber, 1872, and the Kermesinae Kirkaldy, 1906. The first groups *Anigrus* Stål, 1866, *Meenophus* Fieber, 1866 and *Metanigrus* Tsaour et al., 1986; the second groups *Afronisia* Wilson, 1988, *Eponisia* Matsumura, 1914, *Eponisiella* Emeljanov, 1984, *Kermesia* Melichar, 1903, *Nisania* Emeljanov, 1984, *Nisia* Melichar, 1903, *Phaconeura* Kirkaldy, 1906, *Robigalia* Distant, 1916 and *Suva* Kirkaldy, 1906. Most of these old genera need to be reanalysed and this work has already started with EMELJANOV (1984) and WILSON (1988) which have respectively separated new taxa from the old *Nisia* and *Eponisia* genera.

After the initial works of MONTROUZIER (1861), PERROUD & MONTROUZIER (1864), DISTANT (1920), MELICHAR (1898, 1906), MUIR (1925, 1931, 1934) and FENNAH (1964), a revision of the fulgoromorphs from New Caledonia was proposed by FENNAH in 1969. Eight meenopliid species were

recognised: *Nisia neryosa* (Motschulsky, 1863), *Siva albonotata* (Distant, 1920) and six new species described in the genus *Eponisia*: *E. bolanus*, *E. fugax*, *E. lysis*, *E. matuta*, *E. theophane* and *E. tomyris*. From these, males were unknown in *E. bolanus* and *E. theophane*; females were unknown in *E. matuta*, *E. lysis* and *E. tomyris*. A ninth species, already cited by HOCH in 1994, is currently in press (HOCH, *in press*): *E. hypogaea*.

New material from New Caledonia gives us the opportunity to redescribe these taxa where necessary, to revisit the generic status of *Eponisia*, to describe fifteen new species and to erect eight new genera. Also, some morphological characters such as the tegminae venation are reinterpreted: such a work bears directly on recognition of homologies between taxa and then their phylogenetical analysis. New morphological characters of taxonomic and phylogenetic importance based on female wax gland areas have also been studied for the first time. Part of this work clearly involves more than the study of the New Caledonian taxa only.

## MATERIALS AND METHODS

Specimens used for description and illustration were pinned or preserved in 70% isopropyl alcohol. For morphological studies using scanning electron microscopy (SEM), insects were first cleaned using an ultrasonic cleaner by soaking specimens in a chloroform bath (3 min) and then cleaning twice in 70% alcohol or distilled water (2 min). Specimens were then dehydrated through increasing concentrations of alcohol, critical-point dried and coated with a 65-70 µm film of gold-palladium. They were examined using a Jeol JSM 840 scanning electron microscope. For other morphological studies and particularly for genitalic structures, the abdomen was removed and boiled for 2-4 minutes in KOH (15%) containing a few drops of chlorazol black. Gross dissection and cleaning of abdomens were performed in distilled water. Two stains were used: chlorazol black E and Paragon Blue following BOURGOIN (1993b). Drawings were made using a camera lucida with genitalia fixed in glycerine.

Most of the material studied was collected by malaise traps from the Réserve de Rivière Bleue in south of New Caledonia, as part of the program "Evolution et vicariance en Nouvelle-Calédonie" of the Muséum national d'Histoire naturelle, Paris (MNHN). Ecological elements of the Réserve de Rivière Bleue have already been described by BONNET DE LARBOGNE *et al.* (1991). Five stations were studied and have been briefly described by HYNES (1993). To avoid the repetitions of data, only the station numbers (5, 6, 7) or "Forêt transition" and "Maquis" have been indicated with the date of capture. Each specimen label is printed in the following way: Réserv. nat. de la Rivière Bleue, [Forest data and elevation], 166°40'E-22°06'S — [Station number], P. malaise: [date]/Muséum Paris, Nouvelle-Calédonie, [name of collectors]. For each station the data are: Forêt dense humide — 160 m, Parc. 5; Forêt dense humide — 160 m, Parc. 6; forêt dense humide sur pente — 170 m, Parc. 7; Forêt de transition sur pente à Casuarinacées — 250 m; Maquis sur crête — 310 m.

Other material came from recent field studies of the canopy by GUILBERT (1994) in Rivière Bleue (Parc. 6). This material has been collected by fogging. Some material has also been collected by sweeping by the author during a field trip in 1990 (T. BOURGOIN) in different part of New Caledonia and during the "Mission Panié 1990" (M. BAYLAC, T. BOURGOIN, D. BICKEL, L. BONNET DE LARBOGNE, J. CHAZEAU, J. DUGDALE et R. RAVEN).

All these specimens are deposited in the Muséum national d'Histoire naturelle, Paris (MNHN). Additional material (48 specimens) from the Bernice P. Bishop Museum, Honolulu, Hawaii (BPBM) were received on loan for this study. Some specimens from The Natural History Museum, London (BMNH) were also studied.

# MORPHOLOGY

## FOREWING VENATION

Early interpretations of the venation of the forewings in the Meenoplidae-Kinnaridae group have been given by MUIR (Meenoplidae: 1921: 570; Kinnaridae: 1922, Meenoplidae and Kinnaridae: 1925: 158), FENNAH (1944), WOODWARD (*Phaenoneura*, *Nisia*: 1957), SYNAVE (*Nesomicrixia*: 1958), SCHERBAKOV (1981), EMEJANOV (1977, 1984) and more recently for Meenoplidae in general by TSAUR *et al.* (1986). The interpretation of venation patterns proposed here differs a little from the one generally used and particularly in the interpretation of the post nodal median and cubital branches.

In interpreting wing venation characters some principles have been followed: 1) in view to minimise *ad hoc* hypothesis, parsimony has been used in calling upon new evolutive events to explain modified vein patterns and a hierarchy of these events has been admitted: displacement -> vanishing -> apparition. In other terms, venation has been interpreted by slight vein displacements rather than by invoking vanishing or apparition of new vein branches: hypothesis of coalescence of veins is tried before calling upon vanishing, and re-separation after coalescence is tried before calling upon apparition of a new branch; 2) continuity of veins that tend to reach the tegmina margin: partial interruption is not retained, but calls for another interpretation.

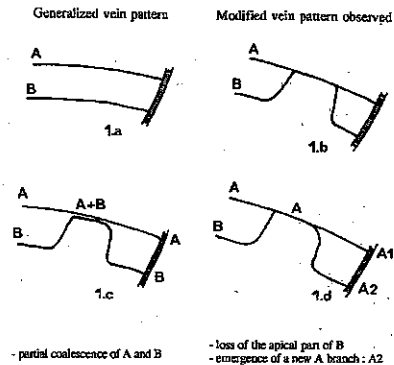


FIG. 1. — Schematic representation in the interpretation of modified pattern (1.b) derived from a generalized one (1.a). Two explanations are advanced: a partial coalescence of vein A and vein B (1.c) which appears more parsimonious than (1.d); loss of the apical part of vein B and emergence of a new branch of vein A: A2.

Figure 1 illustrates such an approach: there is no reason to retain two apomorphic characters in Fig. 1.d: "vanishing of distal sector of B and apparition of a new branch A2" when only one apomorphic character can be retained as in Fig. 1.c: "partial coalescence of A and B". Such interpretation is of course of essential importance in homologizing the apical tegmina venation in Meenoplidae-Kinnaridae.

### Homologies of M and Cu branches in the Meenoplidae-Kinnaridae group

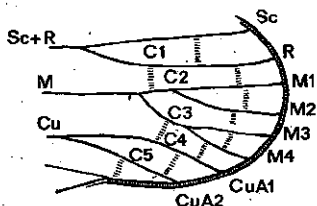
In most fulgoromorphs (Fig. 2.a) five main subapical cells (C1-C5) can be recognized. C1, C2 and C4 are built between Sc-R, R-M and M-CuA1 respectively by nodal and apical transverse veins. C3 and C5 are built between the branches of M and CuA respectively. C5 is connected to the tegmina margin by CuA2 and a transverse vein, C4 by CuA1 and C3 by M3 + 4. In such a pattern, Sc + R and Cu fork first before the nodal line, M at the nodal line. Such a pattern is very close to the one already proposed by FENNAH (1944) and Scherbakov

(1981) but which recognized respectively six and seven main nodal cells. From this generalised scheme, the Meenoplidae-Kinnaridae group is characterised by a general "apicalisation" (MATILE, 1990: 426) of the pattern which generates several possible synapomorphies for this taxa (Fig. 2.b): (1) Sc + R and (2) Cu fork first at the nodal line, (3) M1 + 2 forks late after the apical line, (4) loss of the transverse mt-m2.

However, in interpreting vein pattern in Meenoplidae-Kinnaridae, all authors have admitted that M forks late in the forewing (e.g. *Bashgultala*: EMEJANOV, 1984; Meenoplidae: TSAUR *et al.*,

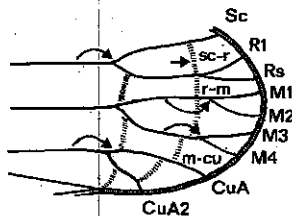
2.a

Fulgoromorpha generalized vein pattern



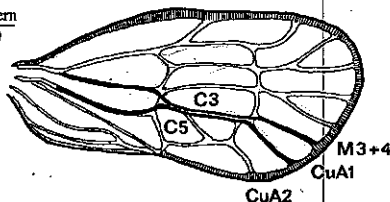
2.b

Meenoptidae-Kinnaridae generalized vein pattern



*Eponisia* vein pattern  
(Tsaar et al., 1986)

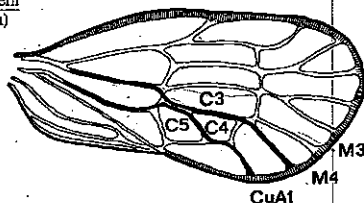
2.c



- long coalescence between M3+4 and CuA1
- M3+4 non forked
- emergence of a new cubital transverse between CUA branches
- loss of the two m-cu transverses

*Eponisia* vein pattern  
(new interpretation)

2.d



- short coalescence between M3+4 and CuA1
- loss of the nodal m-cu transverse only
- CuA2 not reaching the wing margin (loss?)

FIG. 2. — Tegninae vein pattern in the Fulgoromorpha. Diagrammatic representation of a generalized Fulgoromorpha (2.a) vein pattern with five main cells recognized (C1...C5). From this scheme a generalized Meenoptidae-Kinnaridae vein pattern (2.b) is derived showing an apicalisation of several landmarks (arrows) which are proposed as so many probable synapomorphies for the group. From this pattern the *Eponisia* tegmina vein pattern is illustrated with the usual terminology (2.c) as given by TSAAR *et al.* (1986) and the new one proposed in this paper (2.d).

1986; *Afronisia*: WILSON, 1988). Such an interpretation leads to the introduction of several new evolutive events (emergence of new transverse veins) in the cubital trunk (Fig. 2.c). A more parsimonious interpretation is adopted here (Fig. 2.d), considering that this generalised pattern with five subapical cells has been just slightly modified by coalescence between CuA1 and M3+4 on a short distance before or after C4. In this case, the five subapical cells retain a very typical position: C3 and C2 are closed at the same level; C4 is shorter than C3 and C5 than C4. In several cases it is considered that CuA2 had joined CuA1 (or lost its apical connection with the posterior margin) rather than the loss of the CuA2-pcu transverse. This hypothesis is based on the form of C5, posteriorly convex, and by observation of some species where CuA2 is still recognisable as in *Robigalia butleri* Distant, 1916. When less than 5 subapical cells are observed (Kinnaridae: Prosotropinae for instance), the same principle is followed, and the hypothesis of coalescence of CuA1 and M3 + 4 on a longer distance is advanced.

Such an interpretation is supported also by some morphological evidence. Indeed, it is often very easy to follow by transparency the way of the tracheas inside the veins. In all the species and specimens where this could be studied (most of all the Meenoplidae and Kinnaridae taxa) one can observe 1) the separation in two trunks of the median trachea toward M1 + 2 and M3 + 4 at the nodal line and 2) the two tracheas of M3 + 4 and CuA1 side by side at the base of C4 and diverging after.

#### WAX GLAND AREA

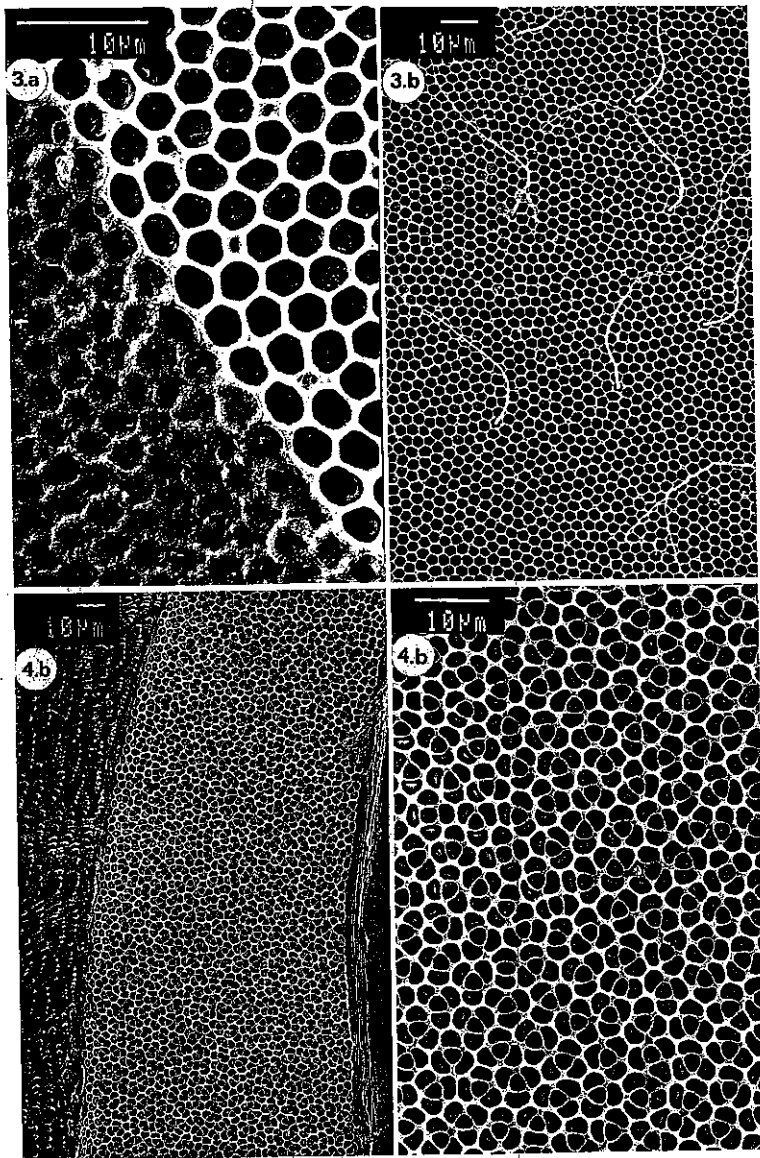
With the exception of Sternorrhyncha Coccoidea, wax glands have been poorly studied within the Hemiptera although they are present in several other main groups (FOLDI, 1991). Within the Fulgoromorpha, wax gland areas are known in several families (Fulgoridae: MASON *et al.*, 1989, Eurybrachidae, Lophopidae... and many larvae) but mainly in Cixiidae tenth abdominal segment (POPE, 1985) and in Meenoplidae-Kinnaridae. They have been very poorly studied although they can give some interesting characters of taxonomic or phylogenetic interest. These wax plates have been studied by SEM in almost all currently known Meenoplidae-Kinnaridae genera and the results will be published later. However, as the characteristics of these structures have been used throughout in this paper, a short description is given here in order to introduce the terminology used.

In the females of Meenoplidae-Kinnaridae, tegumentary glands areas are present in great number on abdominal tergites three to eight, and several types can easily be recognized by their external pore pattern. Wax tegumentary glands are localised in the posterior part of tergites sixth to eighth and they are closely associated in paired wax plates (Fig. 5f). In meenopids, the external pore pattern studied by SEM allows the separation of, at least, two different types of wax glands (we do not consider here several other types of glands which can be observed anteriorly to the wax plate). They are arranged as a bee-nest model following an external area of "covered pores" surrounding an internal area of "open pores" (Figs 3a, 3b, 5f).

At a smaller magnification with a stereomicroscope, three main types of wax plates are observed in the Meenoplidae-Kinnaridae, according to the arrangement of the glandular areas (Fig. 5):

- In the **centrotropic type** (Fig. 5a), the internal area is completely surrounded by the external one;
- In the **paratropic type** (Fig. 5d), the internal area has shifted in a more median position and joins the sagittal line;
- The **eurytopic type** (Figs 4a, 4b, 5c) is generally present in the Prosotropinae: several different glands (detected by their external pore pattern with SEM studies) are distributed on the whole surface of the plate in a more or less regular repetitive pattern.

From these general schemes, several features have been noted. For instance, in *Paramicrixia diaphana* Distant, 1911 (Kinnaridae), the internal area is divided in two smaller ones (Fig. 5e) and in *Kermesia* in several smaller ones (Fig. 5b). In most Kinnaridae Prosotropinae (but not all), the eighth wax plate is absent and in *Oreöpenes luteifacies* Ramos, 1957, all wax plates are absent.



FIGS 3-4. — *Caledonia theophane* (Fennah): wax plate of the Vth tergite; centrotopic type, external view 3.a ( $\times 2700$ ): an external area of "covered pores" (left side) surrounds an internal area of "open pores" (right side). Some smaller pores are scattered between the "open pores"; 3.b ( $\times 700$ ); wax plate of the VIIth tergite, paratopic type, external view of the internal area. — *Kinnacana clara* Remane: wax plate of the VIIth tergite, eurytopic type, external view (4.a:  $\times 600$ ; 4.b:  $\times 1500$ ).

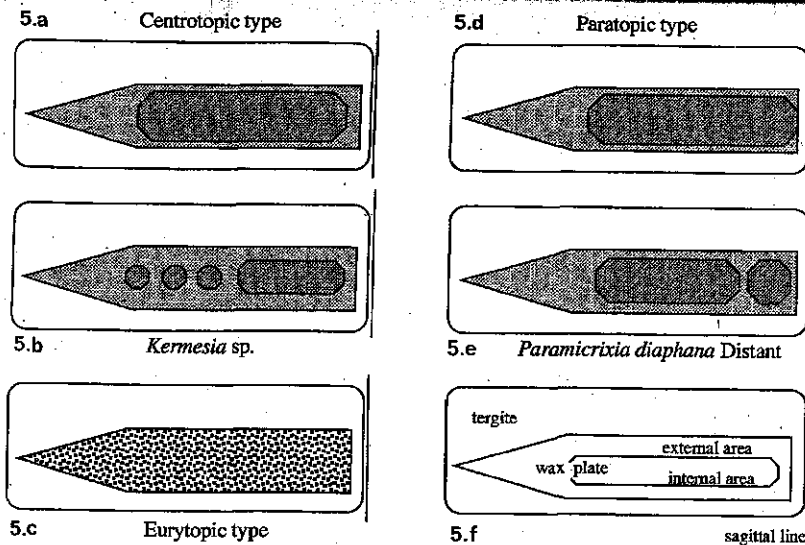


FIG. 5. — Diagrammatic representations of the different wax plate types in the Meenoplidae-Kinnaridae. 5.a: centrotopic type; 5.b: *Kermesia* sp.; 5.c: eurytopic type; 5.d: paratopic type; 5.e: *Paramicrixia diaphana* Distant; 5.f: general terminology.

## TAXONOMY

### CHECK LIST OF THE MEENOPLIDAE SPECIES FROM NEW CALEDONIA

#### KERMESINAE

|     |   |     |
|-----|---|-----|
| 1.  | <i>Anorhinosia</i> gen. nov.                  | 208 |
| 2.  | <i>A. anomala</i> n. sp.                      | 209 |
| 3.  | <i>A. spathulalba</i> n. sp.                  | 212 |
| 4.  | <i>Caledonisia</i> gen. nov.                  | 213 |
| 5.  | <i>C. bolanus</i> (Fennah, 1969), n. comb.    | 216 |
| 6.  | <i>C. crypta</i> n. sp.                       | 216 |
| 7.  | <i>C. guilberti</i> n. sp.                    | 216 |
| 8.  | <i>C. monsmollis</i> n. sp.                   | 219 |
| 9.  | <i>C. theophane</i> (Fennah, 1969), n. comb.  | 219 |
| 10. | <i>C. xli</i> n. sp.                          | 219 |
| 11. | <i>Fennahsia</i> gen. nov.                    | 222 |
| 12. | <i>F. matuta</i> (Fennah, 1969), n. comb.     | 223 |
| 13. | <i>F. hypogaea</i> (Hoch, in press), n. comb. | 223 |
| 14. | <i>F. perioflata</i> n. sp.                   | 226 |
| 15. | <i>F. cafana</i> n. sp.                       | 223 |

|     |  |     |
|-----|--|-----|
| 16. | <i>Glyptodonisia</i> gen. nov.                 | 226 |
| 17. | <i>G. fugax</i> (Fennah, 1969), n. comb.       | 226 |
| 18. | <i>G. tomyris</i> (Fennah, 1969), n. comb.     | 227 |
| 19. | <i>Koghisia</i> gen. nov.                      | 228 |
| 20. | <i>K. lysis</i> (Fennah, 1969), n. comb.       | 230 |
| 21. | <i>K. anospinosa</i> n. sp.                    | 230 |
| 22. | <i>Nisia</i> Melichar, 1903.                   | 235 |
| 23. | <i>N. nervosa</i> (Motschulsky, 1863)          | 235 |
| 24. | <i>Muirisinia</i> gen. nov.                    | 232 |
| 25. | <i>M. desutterae</i> n. sp.                    | 233 |
| 26. | <i>Savanisia</i> gen. nov.                     | 235 |
| 27. | <i>S. albonotata</i> (Distant, 1920), n. comb. | 237 |
| 28. | <i>S. tillierorum</i> n. sp.                   | 242 |
| 29. | <i>S. caudafurcata</i> n. sp.                  | 237 |
| 30. | <i>S. robusta</i> n. sp.                       | 239 |
| 31. | <i>S. hwanoa</i> n. sp.                        | 239 |
| 32. | <i>S. sp. 1</i> , Col d'Amieu                  | 242 |
| 33. | <i>S. sp. 2</i> , Amoa.                        | 242 |
| 34. | MEENOPLINAE                                    | 206 |
| 35. | <i>Distantiana</i> gen. nov.                   | 206 |
| 36. | <i>D. stylirecta</i> n. sp.                    | 207 |
| 37. | Other genera also concerned with this study    |     |
| 38. | <i>Afronisia</i> Wilson, 1988                  | 207 |
| 39. | <i>Eponisia</i> Matsumura, 1914                | 221 |
| 40. | <i>Suva</i> Kirkaldy, 1906                     | 244 |
| 41. | <i>Tyweponisia</i> gen. nov.                   | 246 |

### KEY TO THE MEENOPLIDAE (MALES) OF NEW CALEDONIA AND OF DIFFERENT MEENOPLID GENERA RELATED TO THE EPONISIA AND SUVA GROUPS

1. Tegmen with second claval vein covered with many sensory pits arranged irregularly ..... Meenoplinae: *Distantiana* gen. nov.
- Tegmen with second claval vein not covered with sensory pit ..... Kermesinae: 2
2. Tegmen with M1 + 2 unforked; postclypeus laterally ecarinate ..... *Nisia* Melichar
- Tegmen with M1 and M2 separated; postclypeus laterally carinate ..... 3
3. R of hindwing unbranched; gonostyli shorter than the aedeagus ..... *Tyweponisia* gen. nov.
- R of hindwing bifurcated; gonostyli longer than the aedeagus ..... 4
4. Male gonostyli without a median dorsal process ..... 5
- Male gonostyli with a median dorsal process ..... 8
5. Male gonostyli apically slender and bent at 90°, several pairs of appendages flanking ventrally the aedeagus; distributed in the Afrotropical region ..... *Afronisia* Wilson



- Male gonostyli subapically wider, no appendages flanking ventrally the aedeagus; distributed in the Australasian region ..... 6
- 6. C5 more than two third C1 length, C4 placed in parallel with C5 ..... *Glyptodonisia* gen. nov.
- C5 almost triangular, notably shorter than C1: less than two third length of C1. C4 placed in series behind C5 (Figs 35, 47) ..... 7
- 7. Laterofrontal areolets widely spaced. External side of C5 slightly convex in joining C4 (Fig. 35) ..... *Fennahisia* gen. nov.
- Laterofrontal areolets medially confluent. External sides of C5 and C4 in direct prolongation (Fig. 47) ..... *Koghisia* gen. nov.
- 8. Species more than 7 mm in length. At least ten apical cells. C5 long and quadrate (Fig. 29) ..... 9
- Species less than 7 mm in length. No more than 9 apical cells (Fig. 9) ..... 10
- 9. Laterofrontal carinae extending elevated up to the anteclypeus. A pair of hook-like processes dorsally flanking the aedeagus ..... *Caledonisia* gen. nov.
- Laterofrontal carinae extending elevated up to the dorsal part of the postclypeus only ..... *Muirisia* gen. nov.
- 10. In lateral view: anal tube shorter than the laterodorsal part of the pygofer and bearing a pair of lanceolate processes developed ventrally (Figs 8, 17) ..... *Anorhinosisia* gen. nov.
- Anal tube without a pair of ventral lanceolate processes ..... 11
- 11. C4 and C5 placed in series: external sides of C5 and C4 in direct prolongation ..... *Eponisia* Matsumura
- External side of C5 convex in joining C4 (Fig. 63) not in direct prolongation ..... 12
- 12. Urite X ring like dorsally, very short, forming ventrally a strong unpaired beak-like process; gonostyli with a strong mediodorsal projection ..... *Suvanisia* gen. nov.
- Urite X normally developed, strongly projected lateroventrally; gonostyli with a wide mediodorsal projection weakly elevated ..... *Sava* Kirkaldy

### Subfamily MEENOPLINAE

Genus *Distantiana* gen. nov.

Type species: *Distantiana stylirecta* n. sp.  
Distribution: New Caledonia: Pouebo (Fig. 40).

Included species: currently monospecific.

**Description:** vertex with areolets not meeting medially but the anterior carina complete and straight. Frons without median carina but a short fold dorsally just after the vertex. Laterofrontal carinae strongly elevated, not interrupted at the frontoclypeal suture but abruptly reduced at mid length of the postclypeus, then reaching the anteclypeus. Pronotum posteriorly concave, mediocarinated; laterodorsal carinae

almost vanishing in the mediodorsal part but meeting in the median carina and not reaching the anterior margin of the pronotum. Mesonotum mediocarinated. Metatibiotarsal formula: (3 + 5)/6/5. Tegmina almost as wide in the post nodal part than in the prenodal one; with four closed subapical cells; transverse sc-r absent and C1 closed distally by Sc and R joining together a second time after the nodal line.

Male genitalia: in lateral view dorsal half of the pygofer strongly developed, with a posterodorsal projection developed in the intersegmental membrane IX-X. Aedeagus glob-

ulous and membranous. Gonostyli straight, with a subdistal upcurved process. Anal tube in posterior position to the pygofer, in lateral view almost straight. Female unknown.

**Taxonomic note.** This genus is easily identified from the other meenopline genera by the tegmina venation, the absence of the mediofrontal carina present in *Anigrus*, the anal tube and the gonostyli conformation which differentiates *Distantiana* from *Anigrus*, *Meenoplus* and *Metanigrus*. It seems, however, closer to the genus *Meenoplus* by the form of the pronotum and of the aedeagus. Monophyly of the genus is attested by several autapomorphies: the latero-dorsal prolongation of the pygofer, the gonostyli conformation, the tegmina venation (C1).

The subfamily Meenoplinae is mentioned here for the first time from New Caledonia and *Distantiana* extends far south east the distribution of this taxa which now consists of four genera. The geographically closest meenopline species to *D. stylirecta* is *A. nitidus* (Bierman, 1910), described from Java and transferred from *Nisia* to *Anigrus* by FENNAH (1963). *Anigrus* is mainly an African genus but some species have been described from the oriental region: Sri-Lanka, Taiwan, Vietnam. These species probably need to be re-examined. *Meenoplus* is mainly an African and circum-Mediterranean genus. *Metanigrus* is a recently described genus (TSAUR *et al.*, 1986), monospecific from Taiwan.

*Distantiana stylirecta* n. sp.

(Figs 6, 7)

**Type material:** holotype ♂, (BPBM) New Caledonia: Pouebo, N.E. Coast, 10 m, 11.I.1964 (R. STRAATMAN, light trap), Bishop.

**Description:** general colour whitish with the mesonotum brown. Pedicel and basal swelling of the flagellum, anteclypeus and gena, tip of labium, laterofrontal carina in front of the eye and ocellus and mesonotum brown; median carina of mesonotum whitish, ventral parts of the body and legs pale yellow. Median ocellus present. Labium short but surpassing metaoae; subapical segment of labium almost two times as long as the third. Tegmina white with several brown spots (Fig. 7). As in all meenoplines, R of hind wing simple, not branched; sensory pits on Sc + R and on the first anal vein in one row, second claval vein with some (17) sensory pits arranged irregularly. In lateral view, length of dorsal margin of metatarsomere III > II = I.

Male genitalia (Fig. 6): pygofer completely developed, in lateral view ventrally straight, the postero-dorsal projection tooth-like, directed posterior. Aedeagus ending in a globulous and membranous endosoma, without minute sclerotized production. Tectiform structure strongly developed; in lateral view surpassing the anterior margin of the pygofer on more of its half length; roof like ventrally. Gonostyli notably straight, with a distal recurved process. Anal tube in lateral view feebly concave ventrally, shortly produced posteriorly but without lateroventral process; posterior margin in dorsal view transverse, feebly concave.

Female: unknown.

Total length ♂: 4.1 mm, tegmen: 3.5 mm.

**Type locality:** Pouebo, 10 m.

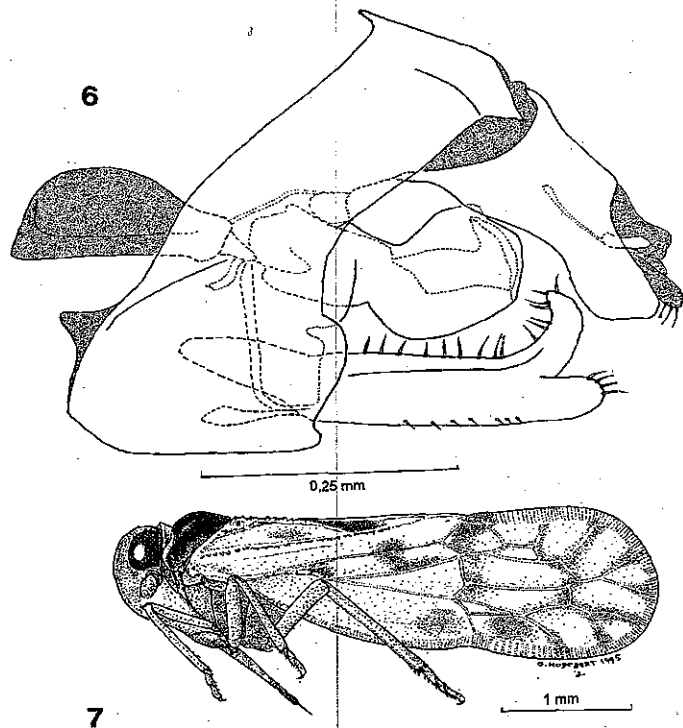
### Subfamily KERMESINAE

Genus *Afronisia* Wilson, 1988

Type species: *Eponisia albivittata* Fennah, 1955 [WILSON, 1988: 325]

Distribution: Africa, south of Sahara

Included species: *A. albivittata* (Fennah, 1955); *A. bredoi* Wilson, 1988; *A. brunescens* (Synave, 1957); *A. flavescens* (Synave, 1971); *A. gembuensis* Wilson, 1988; *A. muiri* (Metcalf, 1945); *A. pallida* (Linnavuori, 1973).



Figs 6-7. — *Distantaina stylirecta* n. sp., holotype. 6: male genitalia, left side. 7: habitus, left side.

**Note.** This genus, recently revised by WILSON (1988), is recognisable by the fusiform gonostyli, with their apical portion upcurved at 90°. As mentioned by WILSON (1988: 325) the monophyly of the genus is attested by the characteristic appendages of the aedeagus, not present in other meenoplid genera. From undescribed material, out of the frame of this study, several new related genera from the Afrotropical region are awaiting description. The form of the gonostyli seems to give good diagnostic characters to separate the different taxa, at least at the generic level. *Afronia* is apparently absent from Madagascar.

Genus *ANORRHINOSIA* gen. nov.

Type species: *Anorhinosia anomala* n. sp.

Distribution: New Caledonia (Fig. 18).

Included species: *A. anomala* n. sp.; *A. spathulalba* n. sp.

**Description:** vertex with transverse anterior carina straight, sometimes interrupted medially; the two occipital arcoleites (FENNAH, 1969: 45) almost quadrate, broadly confluent medially, without median carina. Mediofrontal carina absent; laterofrontal carinae strongly elevated; median ocellus present. Postclypeus basally mediocarinated; anteclypeus mediocarinated. Latero-postclypeal carinae not elevated, extending from lateral carinae of frons. Labium long: second segment reaching the metacoxae; twice as long as the apical segment. Pronotum without a distinct median carina; lateral carinae not meeting medially but joining the anterior margin. Mesonotum with a median carina. Tegminae not very broader in the postnodal part than in the prenodal part; 9 apical cells; C5 not specially short, C4 a little shorter than C5; ratio C3/C5: 1.3; sensory pits on A1 and Sc + R. Radial vein of hind wing bifurcated at apex. Metatibiotarsal formula (3 + 4.5)/7/6. In lateral view, length of dorsal margin of metatarsomere III > I > II; metatarsomere I short, a little longer than metatarsomere II. In female, wax plate area VI and VII of centrotropic type; wax plate area VIII paratopic.

In male, urite X in dorsal view almost as wide as the pygofer, in lateral view shorter than the dorsal part of pygofer and produced twice: 1) laterally in a sclerotized plate more or less quadrate flanking; 2) a pair of longer lanceolate processes developed ventrally. Pygofer without apodemate lamina on its anterior margin, strongly convex ventrally but not deeply knocked posteroventrally, thus gonostyli direct dorsad. Aedeagus in lateral view broad, not filiform. Tectiform structure not surpassing the anterior margin of the pygofer in lateral view; corpus connectivi very thin. Gonostyli with a mediobasal process, ventrally strongly produced.

In female, ductus bursa not very long, basally directed dorsal, progressively dilating to form the bursa. Spermatheca not entering the aliferum *nom. nov.*, but opening in the posterodorsal part of the vagina; the pars intermedialis double walled looking. Anterior vagina long, common oviduct long and apically dilated. Gonapophysis VIII longer than gonocoxae VIII. Lateral arms of sternite VII reaching the gonocoxae VIII laterodorsally.

**Derivatio nominis:** allusion to the conformation of the horn-bearing anogenital complex.

**Note.** The monophyly of the genus is attested by several autapomorphies: a wide urite X, the pair of strong tooth-like anal processes, the wide medioventral process of gonostyli and the strong ventral convexity of the pygofer.

*Anorhinosia anomala* n. sp.

(Figs 8-10, 13, 16)

**Type material:** holotype ♂ (MNHN). Nouvelle-Calédonie, Chaîne centrale: Massif de l'Aoupinié, versant est au-dessus de Ponérihouen, 410 m - Forêt dense humide/Muséum Paris, x.1992 (P. BOUCHET). Paratype: 1 ♀ (MNHN), same data as holotype.

**Description:** general colour pale brown. Head capsule with lateral carinae, basal part of frons around the median ocella, post clypeus and ventral part of the genae brown. Temporal area, antennae, dorsal part of the gena and anteclypeus white (pale brown in the male specimen). Tegminae whitish with several dark areas (Fig. 9): a characteristic oval macula around Sc + R, a central area on C2 and C3, a wide band on Rs, M1 and M2, shorter maculae on other veins as illustrated. Hind wing feebly smoked behind Cu and a smoked band on R and M. Females larger than males.

Male genitalia as in Fig. 8. Pygofer mediotransversally folded, looking fused laterodorsally with the lateral plate of urite X. Aedeagus wider apically than basally; in lateral view notched apically to form two tooth-like little membranous process; a third one ventrally. Tectiform structure very short.

Gonostyli strongly developed, bearing a strong mediobasal process, rounded and wider dorsally, widely developed ventrally as a triangular basis, ending in a long and acute process.

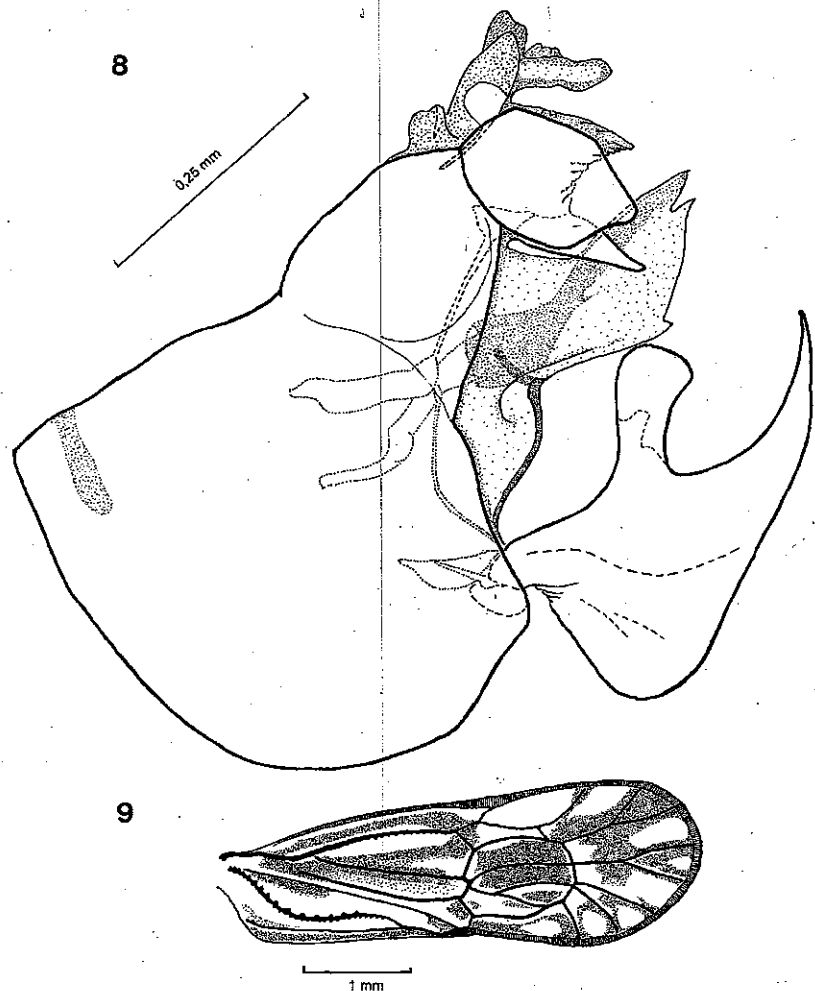
Female genitalia (Figs 10, 13, 16). Bursa covered with large rounded sclerotized ornamentations. Aliferum (Fig. 10) with the lateral wing-like laminae pointing anteriorly, short, the ventral lamina upcurved apically; aliferum widening ventrally, forming a cornice below the ventral lamina before joining ventrally the anterior vagina. Lateral arms of sternite VII strong, reaching the gonocoxae VIII laterodorsally. Gonocoxae VIII reaching half length of gonapophysis VIII (Fig. 13).

Total length ♂: 5.3 mm; tegmen: 4.5 mm; total length ♀: 7.4 mm, tegmen: 6.2 mm.

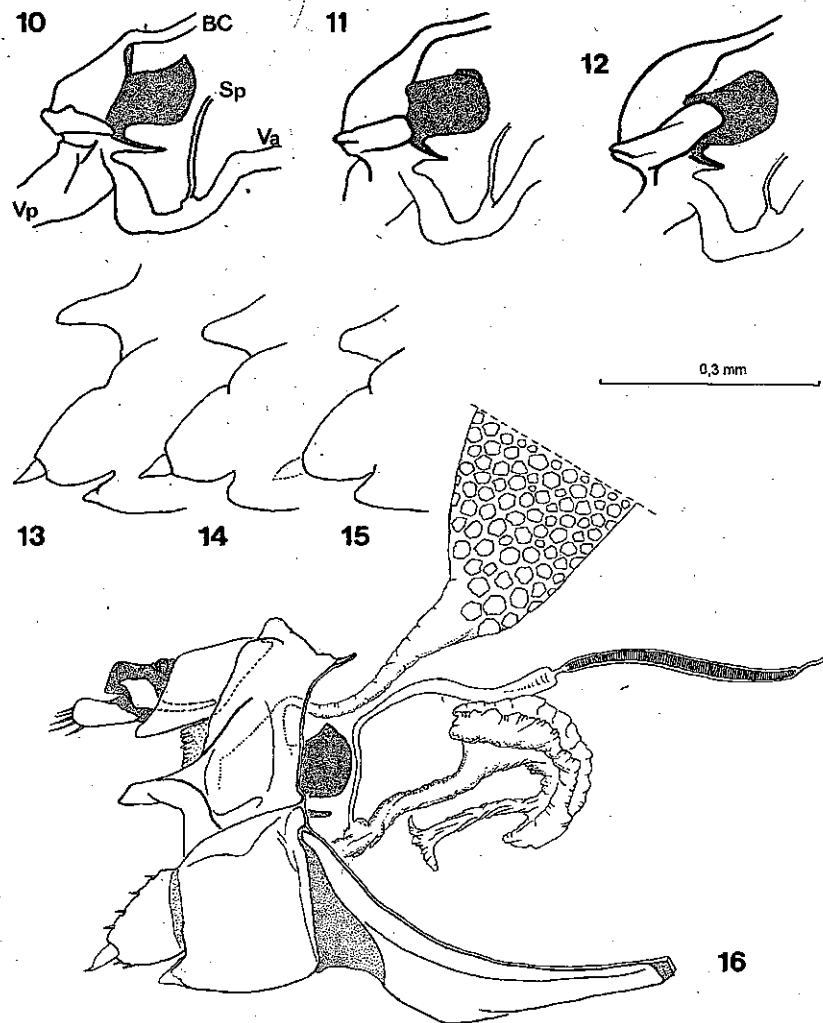
**Type locality:** Chaîne centrale, Massif de l'Aoupinié, versant est au-dessus de Ponérihouen, 410 m.

**Note.** The very short tectiform structure of the connective (Fig. 8) is very probably aborted and the normal conformation should be closer to the one illustrated for *A. spathulalba* n. sp. (Fig. 17).

1. Aliferum (Figs 10, 11, 12): a particular and undescribed sclerite of the Meenoplidae female genitalia which can receive the ducts of the bursa copulatrix and of the spermatheca. In its more complex form this structure bears four processes: a pair of lateral wing-like laminae, a sagittal medioventral lamina (just below this last lamina and inside the aliferum the spermatheca often joins the bursa ductus) and an impair dorsal lamina. Between those four laminae runs the ductus of the bursa copulatrix.



FIGS 8-9. — *Anorhinosia anomala* n. sp., holotype. 8: male genitalia, left side. 9: left tegmen.



FIGS 10-16. — Aliferum, right side. BC: bursa copulatrix; Sp: spermatheca; Va, Vp: anterior, posterior vagina. 10: *Anorhinosia anomala* n. sp., paratype; 11: *Anorhinosia spathulalba* n. sp., specimen of the BMNH from Col d'Amieu; 12: *Anorhinosia spathulalba* n. sp., paratype. 13-16: Female genitalia, right side. 13, 16: *Anorhinosia anomala* n. sp., paratype; 14: *Anorhinosia spathulalba* n. sp., specimen of the BMNH from Col d'Amieu; 15: *Anorhinosia spathulalba* n. sp., paratype.

*Anorkinosia spathulalba* n. sp.

(Figs 12, 15, 17)

**Type material:** holotype ♂, BPBM. New Caledonia, Paita, Mou 300, 8.iii.1972 (J. L. GRESSIT), Bishop Museum. Paratypes: 2 ♀♀, same data as holotype; deposited in BPBM.

**Other material:** 1 ♀ from BPBM is tentatively assigned to this species even if some differences with the paratypes can be observed in the female genitalia (Figs 11, 14). New Caledonia, Col d'Amieu, 650 m, 31.iii.1968 (J. L. GRESSIT & T. C. MAA), Bishop Museum.

**Description:** general colour: orange-brown, strongly contrasted. Posterodorsal part of frontolateral carinae, dorsal part of frons, areolet, antennae, median area of pronotum, tegulae and legs whitish. Frontolateral carinae in front of eyes and antennae, basal part of frons, post clypeus and ventral part of the genae, lateral areas of pronotum and mesonotum orange-brown. Median part of mesonotum dark brown with median carina paler. Tegminae brown castaneous; Sc + R before the nodal line and the sensory pits, the ambient vein from its base up to the pterostigma, annals veins except the dark brown sensory pits, whitish. Other veins orange.

**Male genitalia** (Fig. 17). Pygofer mediotransversally folded, not fused laterodorsally with the lateral plate of urite X. Aedeagus wider apically than basally; in lateral view knocked apically to form two tooth like little membranous process. Tectiform structure short and relatively thin, not surpassing

the anterior margin of the pygofer in lateral view. Gonostyli strongly developed, bearing a strong mediodorsal process, rounded dorsally, strongly developed ventrally as a triangular basis; a medioventral bulbous process bearing long setae; ending in a strong and acute process.

**Female genitalia.** Bursa covered with large rounded sclerotized ornamentations. Aliferum (Fig. 12) with the lateral wing-like laminae long, pointing anteriorly, the ventral lamina rounded apically; aliferum widening ventrally in a cornice-like process below the ventral lamina before joining ventrally the anterior vagina. Lateral arms of sternite VII strong, reaching the gonocoxae VIII laterodorsally. Gonocoxae VIII short, not reaching half length of gonapophysis VIII (Fig. 15).

Total length ♂: 5.3 mm, tegmen: 4.7 mm; total length ♀: 6 mm, tegmen: 5 mm.

**Type locality:** Paita, Mou 300.

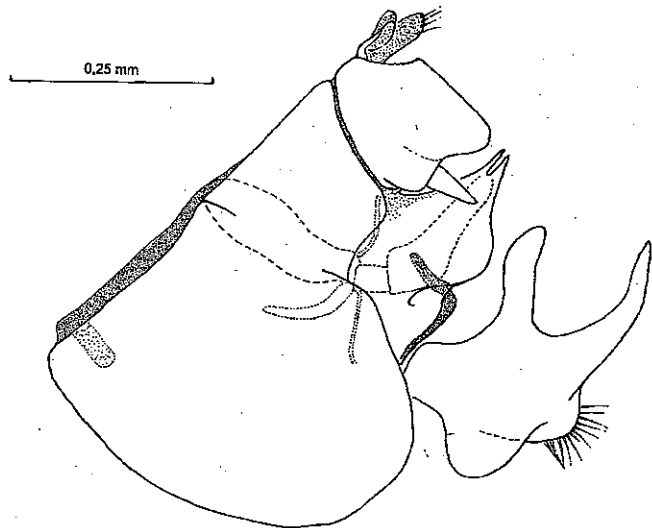


FIG. 17. — *Anorkinosia spathulalba* n. sp., holotype, male genitalia, left side.

Genus *CALEDONISIA* gen. nov.

**Type species:** *Eponisia theophane* Fennah, 1969.

**Distribution:** New Caledonia (Fig. 32).

**Included species:** *C. bolanus* (Fennah, 1969), n. comb.; *C. crypta* n. sp.; *C. guilberti* n. sp.; *C. monsmollis* n. sp.; *C. theophane* (Fennah, 1969), n. comb.; *C. xli* n. sp.

**Description:** vertex with anterior transverse carina oblique interrupted medially or at least reaching posterior margin, occipital areolet triangular, just meeting medially or more generally separated. Frontal medio-carina absent; lateral frontal carinae foliated all along; median ocellus present; sensory frontal pits present. Post-clypeal medio-carina absent; lateral carinae without interruption at the frontoclypeal suture, foliated dorsally and diminishing progressively. Antoclypeal medio-carina present. Labium 3 segmented, long; subapical segment (L2) surpassing metacoxae, larger than the apical one (L3) (ratio L2/L3: 1.75-1.95). In lateral view head

capsule anteriorly straight. Pronotum with median carina; lateral ones meeting mediodorsally just behind the anterior margin or nearly so. Median carina of mesonotum feebly marked. Tegminae broader in the postnodal part than in the prenodal part; 10-11 apical cells; all subapical cells closed; C4 as long as C5; C5 quadrate; sensory pits on A1 and Sc + R. Hind wings with R forked at apex. Metathoracic formula (3 + 5)/7/7. In lateral view, metatarsomere I short, length of dorsal margin of metatarsomere III > I > II. Females wax plate area VI and VII of centropic type; VIII of paratopic type (Figs 21, 22).

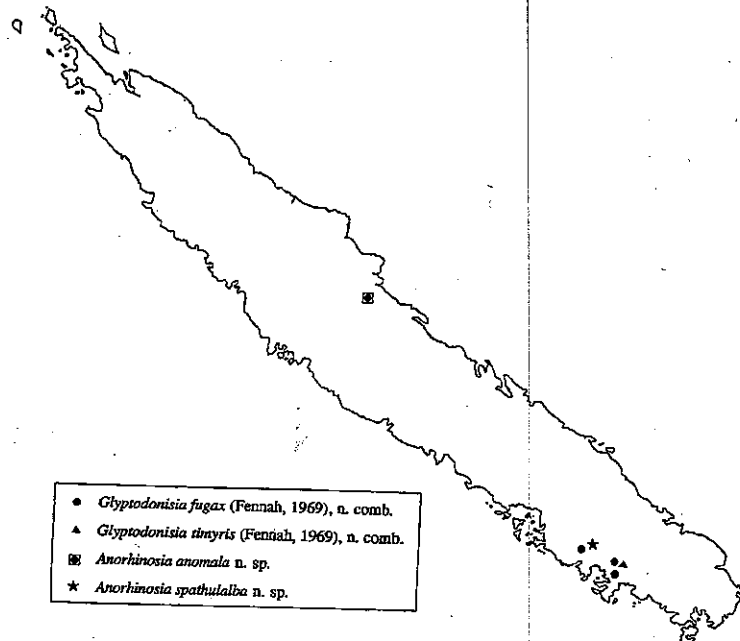
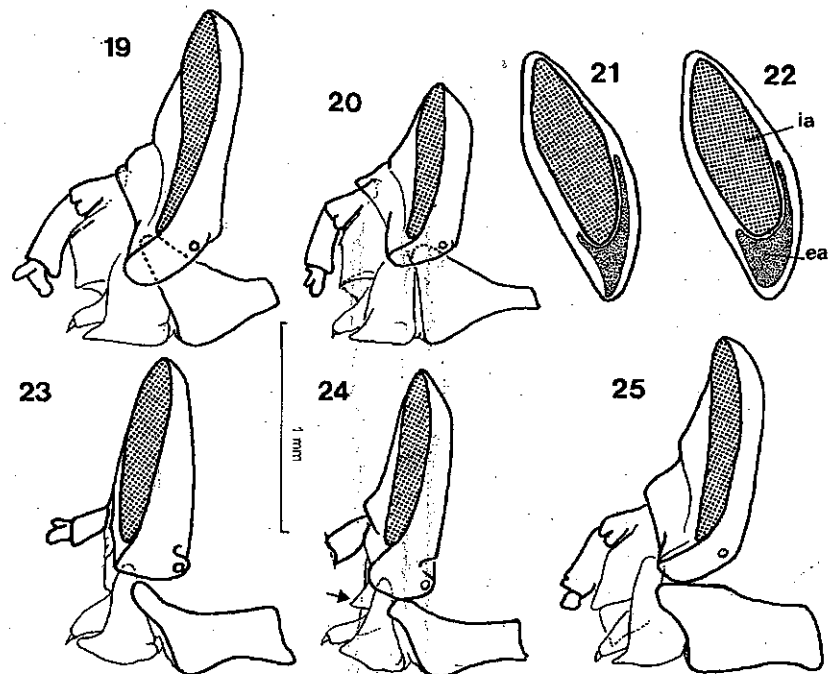


FIG. 18. — Distribution of the genera *Anorkinosia* gen. nov. and *Glyptodonista* gen. nov. in New Caledonia.



FIGS 19-25. — 19-20, 23-25: Female genitalia, right side; same scale and semidiagrammatic. 19: *Caledonisia xli* n. sp.; 20: *Caledonisia theophane* (Fennah, 1969); 23: *Caledonisia bolanus* (Fennah, 1969); 24: *Caledonisia crypta* n. sp.; 25: *Caledonisia gaulti* n. sp. 21-22: Eighth wax plate area; ia: internal area, ea: external area. 21: *Caledonisia theophane* (Fennah, 1969); 22: *Caledonisia bolanus* (Fennah, 1969).

In male, anal tube very short, feebly sclerotized. Pygofer membranous dorsally, in lateral view formed by two sclerotized plates. A pair of long integrated spine like sclerite flanking dorsally a filiform aedeagus. Gonostyli strongly developed, mediodorsally projecting dorsad, developed twice ventrally.

In female, ductus bursa very short, basally directed

cephalad, dilating immediately to form the bursa. Spermatheca branched on the aliferum; the pars intermedialis long, not double walled looking. Anterior vagina long, common oviduct long, not apically dilated. Gonapophysis VIII longer than gonocoxae VIII. Lateral arms of sternite VII reaching the gonocoxae VIII lateromedially or dorsally.

**Derivatio nominis:** from New Caledonia.

**Taxonomic note.** The monophyly of this taxa is attested by the wing venation with C5 quadrate and a supplementary cell, not closed, between C5 and the apical cells; by the pygofer sclerotisation, the very reduced anal tube and the paired spine like sclerites overhanging the filiform male genitalia. It is very interesting to note that this last character which occurs also in several species of the — probably paraphyletic — Australian genus *Phaconeura* Kirkaldy, 1906. It could represent a

synapomorphy to link *Caledonisia* gen. nov. and the *Phaconeura* species bearing this character (e.g. at least the three recent cavernicolous species described by HOCH (1990): *P. crevicola*, *P. mopomea* and *P. mimyanea*).

The coloration of all these species is polymorphic and cannot be used to recognize the species. Within the females, two groups of species can be observed:

— the “*bolanus* group” with a short anal tube, a short (not produced) eighth tergite - not the seventh as mentioned by FENNAH, 1969: 48 —, a ventrally rounded external glandular area on the eighth tergite and a posteriorly produced sixth central glandular area close to the sagittal line: *C. bolanus* and *C. crypta* n. sp.; *C. monsmollis* is also referred to this group;

— the “*theophane* group” with a long anal tube and an apomorphic lateroventrally produced eighth tergite, a ventrally acute external glandular area on the eighth tergite and a typical centrotropic sixth wax plate: *C. theophane*, *C. xli* n. sp. and *C. gaulti* n. sp.

Such a separation is also possible with the males. *C. xli* n. sp. and *C. gaulti* n. sp. are much closer to each other than with *C. monsmollis* n. sp. When more specimens will be available in the future, it is probable that *C. bolanus*, *C. crypta* n. sp. and *C. monsmollis* n. sp. will have be included in a new genus.

#### KEY TO THE SPECIES OF *CALEDONISIA* GEN. NOV.

- |   |                             |
|---|-----------------------------|
| 1. Females .....  | 2                           |
| — Males .....   | 6                           |
| 2. Eighth tergite strongly produced laterally, anal tube long, born by a fully developed laterotergite IX (Fig. 18). External area of the eighth wax plate area ventrally acute (Fig. 21) .....       | 4                           |
| — Eighth tergite not produced laterally, anal tube short, laterotergite IX not developed behind the anal tube (Fig. 22). External area of the eighth wax plate area ventrally rounded (Fig. 22) ..... | 3                           |
| 3. Laterotergite IX over the gonapophysis VIII not produced posteriorly (Fig. 23) .....   | <i>C. bolanus</i> Fennah    |
| — Laterotergite IX over the gonapophysis VIII produced acute posteriorly (Fig. 24) .....  | <i>C. crypta</i> n. sp.     |
| 4. Stigmate VIII reaching or below the level of the eighth sternite (Figs 19, 20) .....   | 5                           |
| — Stigmate VIII not reaching the level of the eighth sternite (Fig. 25) .....   | <i>C. gaulti</i> n. sp.     |
| 5. Large species, more than 8 mm in total length, eighth tergite strongly produced .....  | <i>C. xli</i> n. sp.        |
| — Small species, less than 7 mm in total length. ....   | <i>C. theophane</i> Fennah  |
| 6. Posterior arm of gonostyli wide, covered with minute spines .....  | 7                           |
| — Posterior arm of gonostyli acute, without minute spine .....  | <i>C. monsmollis</i> n. sp. |
| 7. Dorsal process of gonostyli wide, anteriorly quadrate, produced posteriorly .....  | <i>C. xli</i> n. sp.        |
| — Dorsal process of gonostyli with anterior margin rounded .....  | <i>C. gaulti</i> n. sp.     |

*Caledonia bolanus* (Fennah, 1969), n. comb.

(Figs 22-23)

*Eponisia bolanus* Fennah, 1969: 48.

**Description:** general colour pale brown. Occipital areolet, line of laterofrontal carinae brown, head capsule in front of eye, ocella and antenna orange-brown; frons and postclypeus medially yellow, laterally castaneous. Pronotum medially whitish with lateral parts; lateral fields of mesonotum and tegulae except at margins brown-castaneous. Tegminae yellowish-brown, Sc + R area and pterostigma whitish, veins paler than ground. Female wax plate areas VI, VII of centropic type, however the sixth with the posterior angle of central glandular area almost reaching the sagittal line.

Female eighth tergite lateroventrally not produced caudad, not surpassing ventrally the seventh sternite (Fig. 22). Eighth wax plate of paratopic type, the external glandular area widely rounded ventrally (Fig. 21).

Female genitalia. Anal tube short: less than two times as long as wide in lateral view. Laterotergite IX not projected posteroventrally, in lateral view apically wide.

Male unknown.

Total length ♀: 8.2 mm, tegmen: 7.2 mm.

**Note.** The female holotype (BPBM) is from the Thi River Valley, close to Nouméa.

*Caledonia crypta* n. sp.

(Fig. 24)

**Material studied:** holotype ♀ (BPBM); New Caledonia: Ciu, 9.I.1969, N. L. H. KRAUSS.

**Description:** very similar to *C. bolanus* but darker. Head capsule on laterofrontal carinae in front of eye and ocella, laterodorsal parts of pronotum, lateral fields of mesonotum and on each side of the white median band dark brown. Tegminae brown, with a wide area on the costal cell; veins pale brown. Female wax plate areas VI, VII of centropic type, however the sixth with the posterior angle of central glandular area almost reaching the sagittal line. Female eighth tergite lateroventrally not produced caudad, not

surpassing ventrally the seventh sternite (Fig. 24). The external glandular area of eighth wax plate widely rounded.

Female genitalia (Fig. 24). Anal tube short: less than two times as long as wide in lateral view. Laterotergite IX posteroventrally projected tooth like, in lateral view apically acute, produced caudad.

Male unknown.

Total length ♀: 8.1 mm, tegmen: 7.1 mm.

**Type locality:** Ciu.

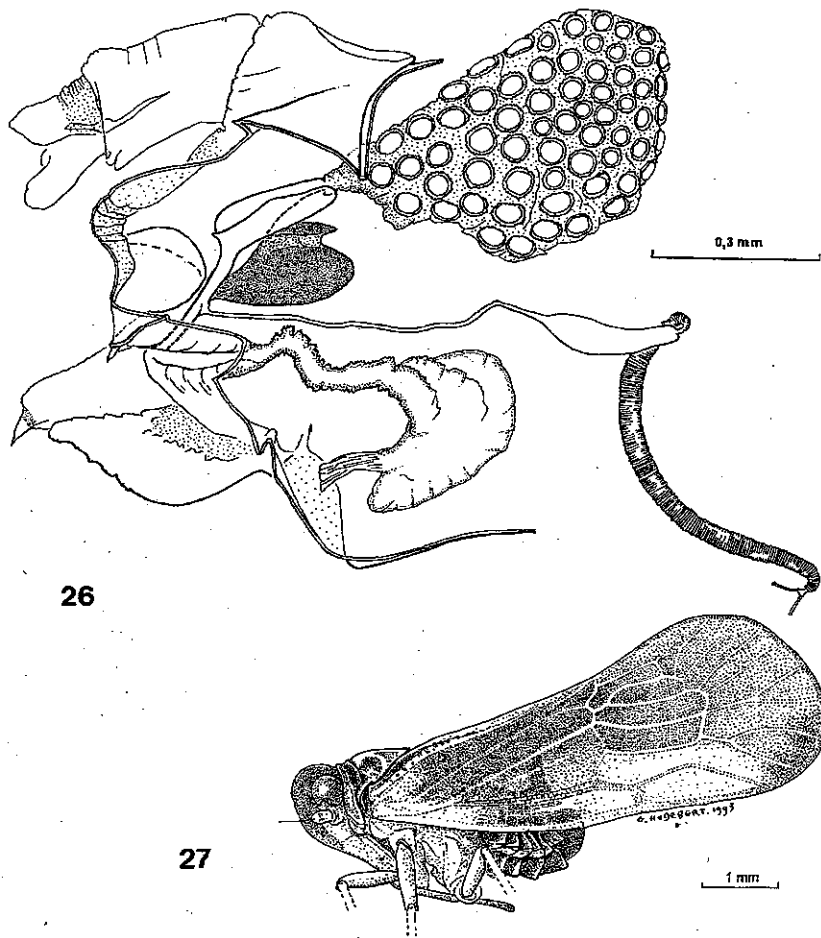
**Note.** The darker coloration and the conformation of the laterotergite IX (arrow, Fig. 24) allow to range this specimen without hesitation in a new species different from *C. bolanus*.

*Caledonia guilberti* n. sp.

(Figs 25-29)

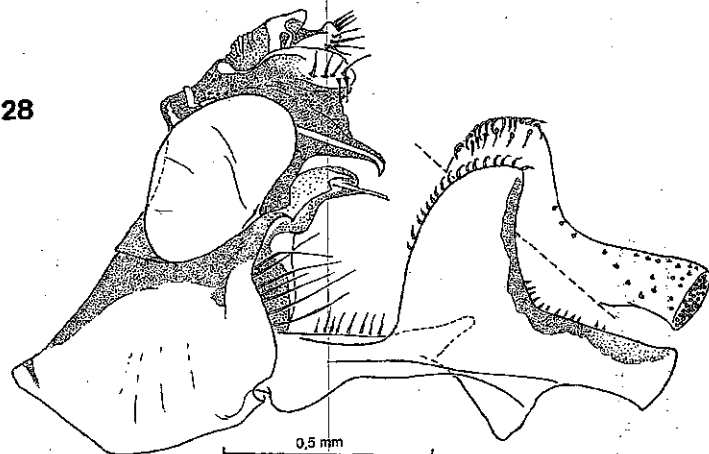
**Type material:** holotype ♂ (MNHN), Nouvelle-Calédonie. Rivière Bleue — P. 6, forêt dense, fogging 21.x.1992. 16 paratypes (5 ♂♂, 11 ♀♀). Two specimens deposited BPBM: 1 ♂, same data as holotype, 1 ♀, New Caledonia, Yaté, 6-10 km, 25.III.1968/ex. plum fork (J. L. GRESSITT & T. C. MAA), Bishop Museum. Fourteen specimens deposited MNHN: 2 ♂♂, 5 ♀♀: same data as holotype and 2 ♀♀, 20.I.1993; Rivière Bleue, forêt dense humide sempervirente non inondable, test d'homogénéité, piège malaise 1: 29.VII-7.VIII.1987, 1 ♂; piège malaise 3: 29.VII-7.VIII.1987, 1 ♂; Rivière Bleue, Parc. 7: 24.VIII-7.IX.1989, 1 ♀; 25.XII.1986-5.I.1987, 1 ♂; Rivière Bleue, Parc. 5: 23.IV.1986-9.V.1986, 1 ♀; 25.XI.1986-8.XII.1986, 1 ♀; Rivière Bleue, forêt dense humide sempervirens inondable, test d'homogénéité, piège malaise 1: 13-20.VIII.1987, 1 ♀ [abdomen dissected] and 1 ♀ same data, without date.

**Other material:** 1 ♀ from BMNH is tentatively assigned to this species, New Caledonia, Kouakoué (P. D. MONTAGUE).

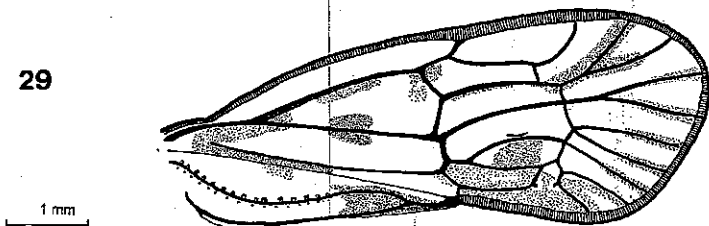


Figs 26-27. — *Caledonia guilberti* n. sp. 26: female genitalia, right side; 27: habitus.

28



29



Figs 28-29. — *Caledonia guilberti* n. sp. 28: male genitalia, left side; 29: right tegmina.

**Description:** general colour whitish or pale yellow, variable, with several brown maculae. Occipital areolets and line of latero-frontal carinae brown; frons and postclypeus medially white or yellowish, lateromedially brown. Pronotum clear with laterodorsal part brown; mesonotum orange-brown with three parallel white bands often bordered brown and often two others white short bands lateral and oblique. Tegminae translucent whitish to yellowish, pterostigma white-yellowish, veins whitish; typically several brown maculae (Fig. 29): basally on Sc + R, medially on M, on the distal part of A1 and A2 and the area between them. Often a brown area between Cu and the claval fold. In the nodal part a brown band on M1 and M2 and several other little brown maculae. Hind wing translucent.

In female, wax plate of sixth and seventh tergite of centropotic type. Eighth tergite lateroventrally strongly bend and produced caudad, not surpassing ventrally the seventh sternite (Fig. 25). Eighth wax plate of paratopic type, long: ratio internal glandular area length/length of anal tube: 3.15; external glandular area acute ventrally.

**Male genitalia** (Fig. 28): pygofer mediotransversally membranous and separated in two lateral sclerotized plates; the dorsal one rounded posterodorsally. Anal tube in dorsal position to the pygofer, very feebly sclerotized; in dorsal view very shortly lobed. A pair of long integrated spine-like sclerites down curved apically and flanking dorsally the aedeagus. Aedeagus filiform, short, wider basally; tectiform structure surpassing the anterior margin of the pygofer in lateral view. Gonostyli strongly developed: almost twice as long as pygofer wide; bearing a strong mediodorsal process, rounded dorsally; developed twice ventrally: at its base and medially forming a short triangular ventral projection, ending in a long and strong rectangular process bearing minute spines apically; a short inner projection at the base of the mediodorsal process.

**Female genitalia** as in Fig. 26. Anal tube long: nearly two times as long as wide in lateral view (Fig. 24).

Total length ♂: 6.6-6.75 mm, tegmen: 5.8 mm; total length ♀: 7.9 mm tegmen: 6.6-6.75 mm.

**Type locality:** Rivère Bleue; forêt dense.

**Taxonomic note.** This species seems restricted to the south of New Caledonia and apparently is the most common of the genus. It is named after its collector, Eric GUILBERT.

*Caledonia monsmollis* n. sp.

(Fig. 30)

**Type material:** holotype ♂ (MNHN), Nouvelle-Calédonie, Mont Mou, piège malaise, 13.II.1977 (DELOBEL & J. CHAZEAU).

**Description:** general colour pale brown. Occipital areolets, line of latero-frontal carinae brown; frons and postclypeus medially yellow, laterally brown. Pronotum medially whitish with lateral parts brown; mesonotum medially yellow with a pair of lateral brown bands. Tegminae yellowish-brown, pterostigma pale yellow, veins concolor; sensory pits brown. Male genitalia (Fig. 30). Pygofer mediotransversally membranous and separated in two lateral sclerotized plates; the dorsal one short, rounded posterodorsally. Anal tube in dorsal position to the pygofer, feebly sclerotized, reduced to a pair of lateral acute processes, one on each side of the

eleventh write. A pair of long integrated spine-like sclerites down curved apically and flanking dorsally the aedeagus. Aedeagus filiform, long, wider basally; tectiform structure long, surpassing the anterior margin of the pygofer in lateral view. Gonostyli strongly developed: a little longer than pygofer wide; bearing a strong triangular mediodorsal process, rounded dorsally; developed twice ventrally: at its base and medially, ending in a strong acute process.

Female unknown.

Total length ♂: 5.9 mm, tegmen: 5 mm.

**Type locality:** Mont Mou.

**Taxonomic note.** It has been impossible to match the male of *C. monsmollis* n. sp. with one of the females of *C. bolanus* n. sp. or *C. crypta* n. sp. However, in the future, when more material will be available or when specimens will be collected in copula, it may fall into synonymy with one of these species.

*Caledonia theophane* (Fennah, 1969), n. comb.

(Figs 20-21)

*Eponisia theophane* Fennah, 1969: 49.

**Material studied:** holotype ♀ (deposited in BPBM), from Yahoué. The 2 ♀♀ paratypes, from St Louis Valley, have not been examined.

**Description:** general colour yellowish brown. Latero-frontal carinae in front of the eyes and tegminae sensory brown. Tegminae yellowish-brown, pterostigma pale yellow, veins orange-yellow. Females: wax plate area VI and VII of centropotic type. Female eighth tergite lateroventrally produced caudad, surpassing ventrally the seventh sternite (Fig. 20). Eighth wax plate of paratopic type, short: ratio central

glandular area length/length of anal tube: 2.7; external glandular area acute ventrally (Fig. 21).

**Female genitalia.** Anal tube long: two times as long as wide in lateral view. Laterotergite IX posteroventrally projected on each side of the anal tube.

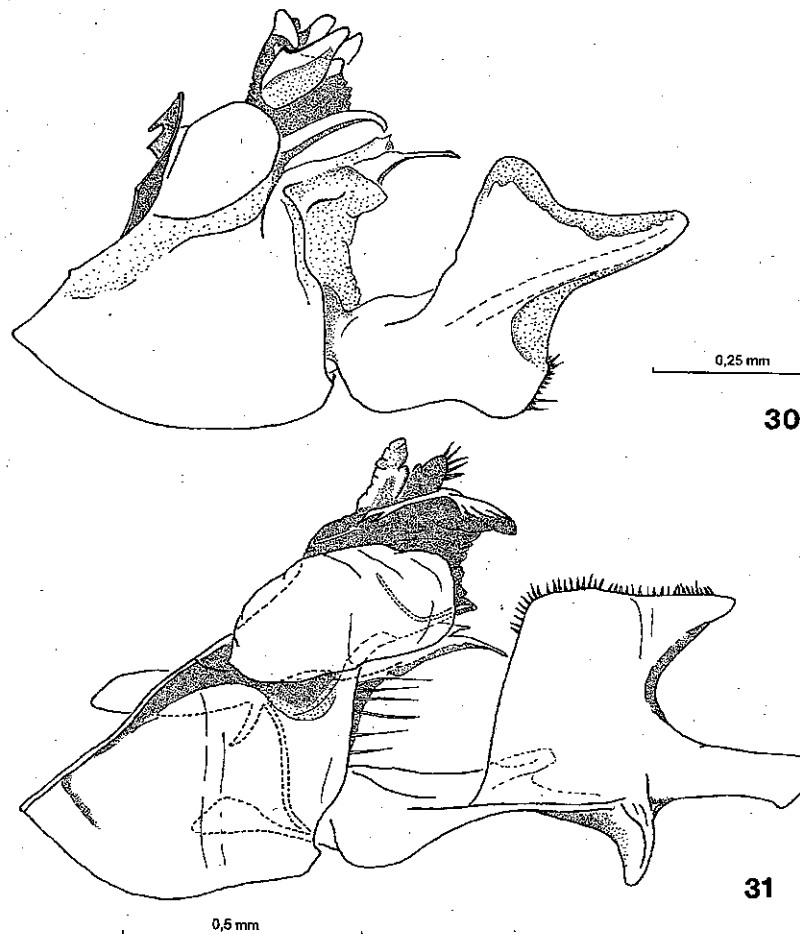
Male unknown.

Total length ♀: 6.5 mm, tegmen: 5 mm.

*Caledonia xli* n. sp.

(Figs 19, 31)

**Type material:** holotype ♂ (MNHN), Nouvelle-Calédonie, Monts Koghis, Chemin de la Cascade, 17.X.1990 (Th. BOURGOIN), sur *Burretokiensia viellardi* (Palmacée). Three paratypes: 2 ♂♂, 1 ♀, deposited in BPBM, New Caledonia, Yahoué, 100-200 m, XII.1983 (N. L. H. KRAUSS), Coll. Bishop Museum, Acc# 1984.168, ♂; New Caledonia: Mts des Koghis, 400-600 m, I.1969 (N. L. H. KRAUSS), Coll. Bishop Museum, ♂; New Caledonia: Mt Koghi, 400-600 m, II.1973 (N. L. H. KRAUSS), Coll. Bishop Museum, ♀.



FIGS 30-31. — 30 : *Caledonia monanellii* n. sp., male genitalia, left side. 31 : *Caledonia xli* n. sp., male genitalia, left side.

**Description:** close to *C. guberti* n. sp., but with stronger proportions. General colour orange brown. Occipital areolet, line of laterofrontal carinae and external laterodorsal part of laterofrontal carinae from the lateral ocella to the occipital margin dark brown; frons pale yellow. Pronotum medially white, laterodorsal part dark brown, lateroventral part surrounded with a dark brown band; mesonotum orange brown with three parallel white thin bands. Tegminae yellowish pale brown, pterostigma covered by a whitish suffusion, veins Sc+R whitish, others yellowish; a smoked band on M1 and M2. Hind wing smoked behind Cu. Females wax plates VI and VII of centropic type. Female eighth tergite lateroventrally strongly produced caudad, surpassing ventrally the seventh sternite (Fig. 18). Eighth wax plate of paratopic type, long; ratio central glandular area length / length of anal tube: 3.7; external glandular area acute ventrally.

**Female genitalia.** Anal tube long: almost three times as long as wide in lateral view (Fig. 19).

**Type locality :** Monts Koghis, Chemin de la Cascade.

**Genus** *EPONISIA* Matsumura, 1914: 285

[MATSUMURA, 1914: 285, FENNAH, 1956: 475; 1969: 45; EMELIANOV, 1984: 481; TSAUR, YANG & WILSON, 1986: 101; WILSON, 1988: 324; TSAUR, 1989: 27]

**Type species:** *E. guttula* Matsumura, 1914: 286, by original designation.

**Distribution:** Taiwan, China: Mokansan, Che-Kiang Province (FENNAH, 1956).

**Included species:** *E. guttula* Matsumura, 1914; *E. macula* Tsauro, Yang et Wilson, 1986; *E. splendida* Tsauro, 1989.

**Description:** vertex with transverse anterior carina straight very shortly acute angled medially; occipital areolet triangular, broadly confluent medially, without median carina. Mediofrontal carina absent; laterofrontal carinae strongly elevated; median ocellus present. Postclypeus without median carina, sometimes feebly marked basally; anteclypeus feebly medio-carinated. Latero-postclypeal carinae extending from lateral carinae of frons without knock at the frontoclypeal suture level. Pronotum with a distinct median carina; lateral carinae not meeting mediadorsally but joining the anterior margin. Mesonotum without median carina (*E. macula*) or very feebly marked (*E. guttula*). Tegminae broader in the postnodal part than in the prenodal part. C4 and C5 short, of equal length; ratio C3/C5: 1.6-1.7. Radial vein of hind wing bifurcated at apex. Metastibiotal formula (3+5)/7-6/6-5 (in *E. splendida*: 8/6/5, Tsauro, 1989: 29). In lateral view, length of dorsal margin of metatarsomere I > III > II; metatarsomere I long, two times as long as metatarsomere II.

In female, wax plates VI, VII and VIII of paratopic type.

In male, anal segment stout, strongly produced laterally, at least two times as long as broad. Pygofer complete dorsally, in lateral view prolonged and narrow. Aedeagus in lateral view broad. Gonostyli laterally passing beyond the anal tube, basally projecting dorsad and bearing a posterior process, distally bending dorsad.

In female, ductus bursa long, bursa covered with minute rounded sclerotized ornamentations. Spermatheca not entering the aliferum but opening in the very posterodorsal part of the vagina; spermatheca with the pars intermedia long, not double walled looking; aliferum with lateral wing-like process pointing dorsally, the ventral lamina strongly developed. Anterior vagina wide, common oviduct not dilated apically. Gonapophysis VIII (without the apical tooth) as long as gonocoxae VIII. Lateral acrus of sternite VII strong, reaching the gonocoxae VIII latero-medially.

**Taxonomic notes.** The genus is easily recognisable by a combination of following characters: shape of the pygofer narrowly elongated dorsally in lateral view and gonostyli conformation with the posterior process of their mediadorsal projection which attest the monophyly of this genus (apomorphy). By this new interpretation, the genus is currently absent from New Caledonia.

The five African species previously placed in *Eponisia* were recently transferred by Wilson (1988) to a new genus: *Afronisia*. The six New Caledonian species currently placed in *Eponisia* by FENNAH (1969) are transferred to new genera (this study). *Eponisia woodwardi* Tsauro, Yang & Wilson, 1986, is transferred to a new genus, *Tyweponisia* gen. nov. (this study).



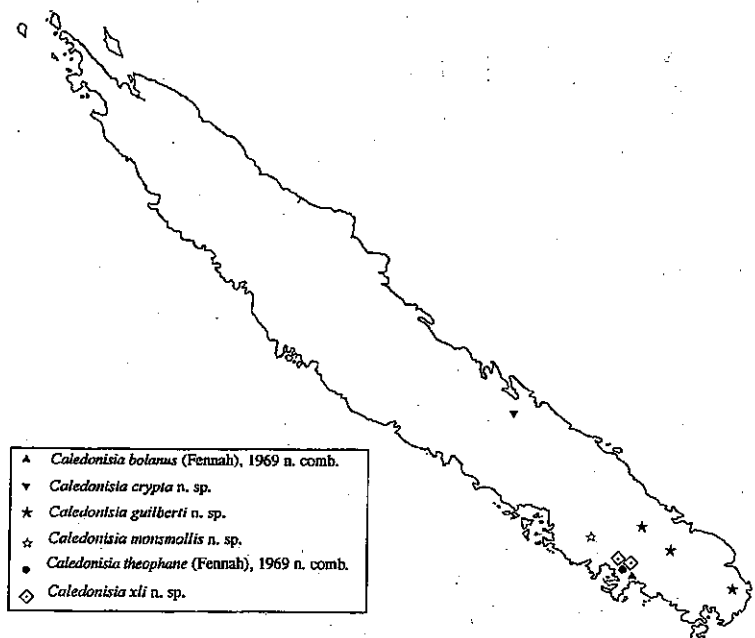


FIG. 32. — Distribution of the genus *Caledonisia* gen. nov. in New Caledonia.

Genus *FENNAHSIA* gen. nov.

Type species: *Eponisia matuta* Fennah, 1969, by original designation.

Distribution: New Caledonia (Fig. 40).

Included species: *F. matuta* (Fennah, 1969); *F. hypogaea* (Hoch, in press), comb. nov. [see HOCH, 1994]; *F. perioflata* n. sp.; *F. cafana* n. sp.

Description: vertex with transverse anterior carina medially interrupted; occipital areolet triangular, not confluent medially but widely separated on more or less the length of one areolet; no median carina. Mediofrontal carina absent; laterofrontal carinae strongly elevated until the anteclypeus; median ocellus absent. Postclypeus relatively narrow, with median carina absent or just marked very basally in *F. matuta*; anteclypeus medio-carinated. Latero-postclypeal carinae extending from lateral carinae of frons without knock at the frontoclypeal suture level; this one deeply sunk between the frons and the post clypeus. Labium long; second segment surpassing the metacoxae; two times longer than the apical segment. Pronotum with a distinct median carina; lateral

carinae not meeting mediodorsally but joining the anterior margin. Mesonotum with a well marked but thin medio-carina. Tegminae slightly broader in the postnodal part than in the prenodal part. Metatibiotarsal formula. (3+4)/5/5. In lateral view, length of dorsal margin of metatarsomere I > III > II; metatarsomere I long, two times as long as metatarsomere II.

In male, anal segment stout, strongly produced, distally deeply bilobed. Pygofer complete dorsally, in lateral view prolonged and narrow. Aedeagus in lateral view short, beak like; surmounted by a compressed spatulate process. Gonostyli in lateral view shortly passing beyond the anal tube, distally wider than basally.

**Derivatio nominis** : dedicated to the memory of Dr R. FENNAH.

**Taxonomic note.** Only one female specimen is known in this genus (*F. cafana* n. sp.), thus no generic character has been given in the genus diagnose for the female genitalia. The monophyly of this new genus is assured by the laterofrontal carinae strongly elevated up to the anteclypeus and surrounding a sunk frontoclypeal suture, the general form of the elongated pygofer and by the development of the spatulate process dorsally to the aedeagus (autapomorphy). The troglobitic species *F. hypogaea*, described by HOCH (currently in press and already cited in 1994 in the genus *Eponisia*) is placed in this new genus.

*Fennahsia cafana* n. sp.

(Figs 33-34)

**Type material:** holotype ♀ (BPBM), New Caledonia. Mt Koghi, 400-500 m, 11.II.1976 (N. L. H. KRAUSS).

**Description:** general colour pale stramineous powdered white. Antenna, laterofrontal carinae in front of the antenna, and mesonotum yellowish. Tegminae (Fig. 34) hyaline powdered white; a dilute fuscous area on the anterior margin of pterostigma and on R at the base of C1. Veins concolor. Wings whitish. In female, wax plates of paratopic type, the sixth and seventh wax plate internal areas are strongly developed to almost the whole plate.

Female genitalia (Fig. 33). Anal tube short. Gonapophysis VIII strongly developed: widely rounded dorsally. Sperma-

theca entering the aliferum with a long and thin ductus oecoptaculi; diverticulum ductus double walled, as long as pars intermediis single walled. Bursa ductus long and thin; bursa covered with rounded sclerotized ornamentations. Aliferum strongly developed dorsally with lateral wings diverging laterally; anterior lamina unpair dorsally and widening ventrally in two lateral plates. Sternite VIII reaching gonocoxae VIII mediolaterally.

Male unknown.

Total length ♀: 5 mm, tegmæ: 4.3 mm.

**Type locality** : Mont Koghi, 400-500 m.

**Taxonomic note.** *F. cafana* n. sp. appears close to *F. matuta* and I cannot exclude the fact that the two species might be synonymized in the future when the male of the first or the female of the second will be collected. However, the pattern of the tegminae coloration is rather different, especially the darker spot on R at the base of C1 which should be distinctive.

*Fennahsia hypogaea* (Hoch, in press), n. comb.

*Eponisia hypogaea* Hoch, in press. [already cited in HOCH, 1994: 319].

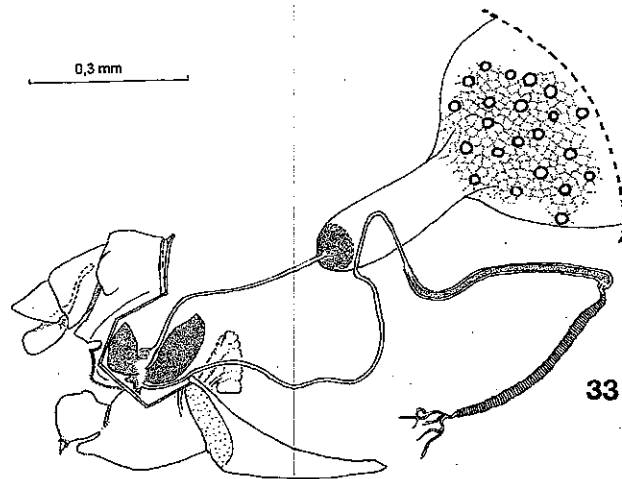
The description of this species is currently in press but it has been already mentioned by HOCH in 1994. It is the first troglobitic meenoplid from New Caledonia and the eleventh for the Meenoplidae. As mentioned by HOCH, this species is very close to the epigeal species *E. matuta* Fennah.

*Fennahsia matuta* (Fennah, 1969), n. comb.

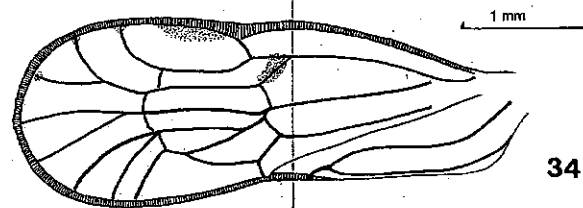
(Figs 38-39)

*Eponisia matuta* Fennah, 1969: 45.

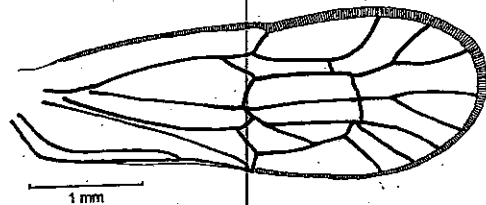
**Note.** This species is still currently only known from the ♂ holotype collected from Col des Roussettes. The brown spot on the laterofrontal carinae surrounding the ocella seems distinctive in this species. The male genitalia drawing of FENNAH (1969: 46, fig. 229) is rather imprecise and has been redrawn in Figure 38 from the holotype deposited in BPBM.



33

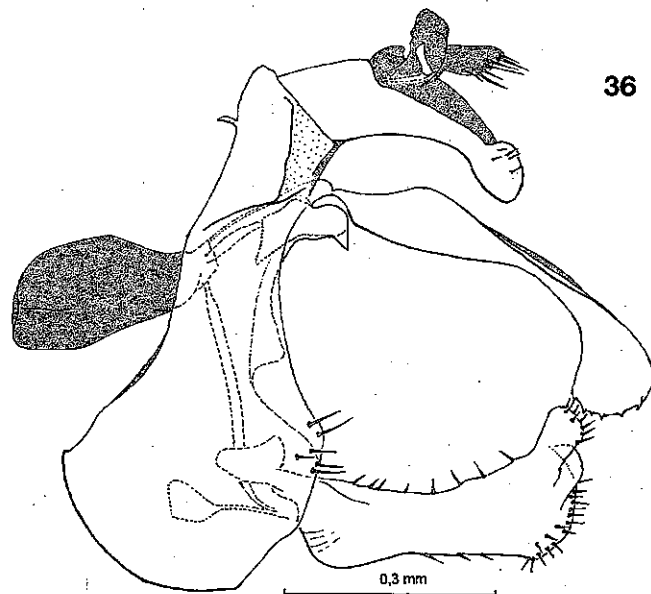


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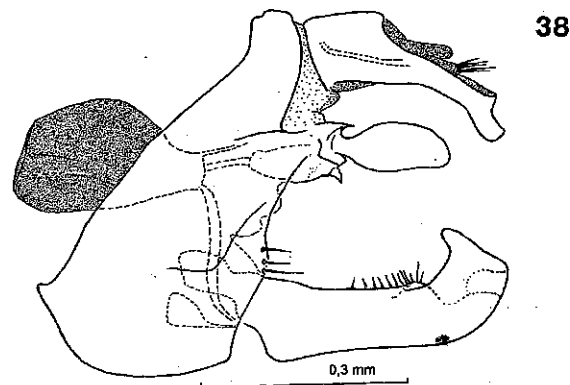
FIGS 33-35. — 33-34: *Fennahsia cafana* n. sp. 33: female genitalia, right side; 34: left tegmina. 35: *Fennahsia perioflata* n. sp., right tegmina.



36



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38



39

FIGS 36-39. — 36-37: *Fennahsia perioflata* n. sp. 36: male genitalia, left side; 37: right gonostylus, posterior view. 38-39: *Fennahsia matuta* (Fennah, 1969). 38: male genitalia, left side; 39: right gonostylus, posterior view.

*Fennahsia perioflata* n. sp.

(Figs 35-37)

**Type material:** holotype ♂ (BPBM), New Caledonia, Plateau de Dogny, 29.II.1968 (T. C. MAA), Coll. Bishop. Paratypes: 2 ♂♂, same data, deposited BPBM and MNHN.

**Description:** general colour stramineous, feebly darker on the laterofrontal carinae in front of the ocella and on the mesonotum. Mesonotum yellow. Tegminae hyaline (Fig. 35) with five closed cells and nine apical cells, hind wings whitish. Male genitalia (Figs 36, 37) with anal tube distally bilobed. Tectiform structure strongly developed in lateral view, surpassing the anterior margin of the pygofer on more of its

three fourth of its length. Spatulate process dorsal to the aedeagus strongly developed, longer than the gonostyli; distally bearing short spines. Aedeagus short, beak like. Gonostyli apically bearing a short dorsal process. Female unknown.

Total length ♂: 4.5-5 mm, tegmen: 4.1 mm.

**Type locality:** Plateau de Dogny.

Genus *GLYPTODONISIA* gen. nov.

**Type species:** *Eponisia fugax* Fennah, 1969.

**Distribution:** New Caledonia (Fig. 18).

**Included species:** *G. fugax* (Fennah, 1969), n. comb.; *G. tomyris* (Fennah, 1969), n. comb.

**Description:** vertex with transverse anterior carina almost straight; occipital areolae confluent medially; no median carina. Mediofrontal carina absent; laterofrontal carinae strongly elevated until the anteclypeus; median ocellus represented by a scar. Postclypeus wide and convex, with median carina basally well marked; anteclypeus mediocarinated. Latero-postclypeal carinae extending from lateral carinae of frons, without knock at the frontoclypeal suture level. Labium short; second segment not surpassing the metacoxae; ratio L2/L1: 1.33-1.5. Pronotum with a distinct median carina; lateral carinae not meeting mediocorsally but joining the anterior margin. Mesonotum with a well marked but thin mediocarina. Tegminae slightly broader in the postnodal part

than in the prenodal part. C5 large, triangular, longer than C4. Metabiotarsal formula (3+4-5)/5-6/5. In lateral view, length of dorsal margin of metatarsomere I > III > II; metatarsomere I slightly longer than metatarsomere II.

In male, anal segment stout, with a tooth like process on each side more or less developed, distally rounded. Pygofer complete dorsally, in lateral view prolonged and narrow, laterally produced on each side of the aedeagus. Aedeagus in lateral view well developed, apically strongly concave as in a bispinous conformation, the ventral one longer than the dorsal one; surmounted by a strong spine like process. Gonostyli laterally passing beyond the anal tube, distally wider than basally.

**Derivatio nominis:** allusion to the Glyptodon (Glyptodontidae) test-like wax area structure.

**Note.** The monophyly of this new genus is assured by the general form of the elongated pygofer, posterodorsally produced on each side of the aedeagus and by the lateroventral tooth-like projection on each side of the anal tube. The strong apical concavity of the aedeagus in lateral view is probably also characteristic of the genus.

*Glyptodonisia fugax* (Fennah, 1969), n. comb.

(Figs 41-42)

*Eponisia fugax* Fennah, 1969: 45

**Other material:** 1 ♂, 1 ♀, New Caledonia, Mts des Koghi, 400-600 m, I.1969 (N. L. H. KRAUSS), Bishop Museum; 1 ♂, same data but n.1973; New Caledonia: Yahoué, 60-100 m, n.1980 (N. L. H. KRAUSS), Bishop Museum, Acc. #1980.128.

This species is easily recognizable by the dark dorsal band along the dorsal margin of the tegminae. Male genitalia figured in Figure 42. Further characters than those given by FENNAH (1969) are provided below.

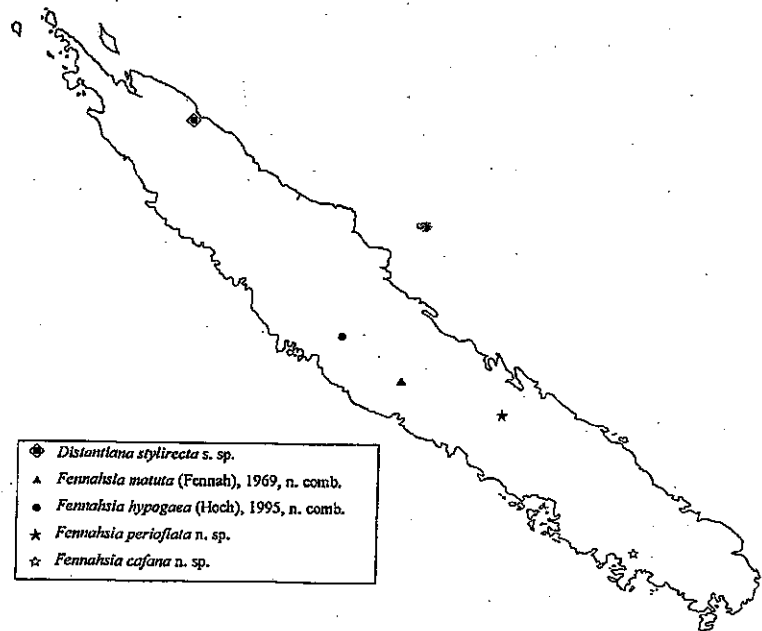


FIG. 40. — Distribution of the genera *Distantlana* gen. nov. and *Caledonisia* gen. nov. in New Caledonia.

**Description:** wax plates of paratopic type, the sixth and seventh wax plate internal areas are strongly developed to almost the whole plate.

**Female genitalia** (Fig. 41). Anal tube short. Gonapophysis VIII strongly developed; widely rounded dorsally. Spermatheca entering the aliferum with a long and thin ductus

receptaculi; diverticulum ductus as long as pars intermedialis. Bursa ductus long and thin; bursa covered with rounded sclerotized ornamentations. Aliferum strongly developed dorsally with lateral wings diverging laterally; anterior lamina unpaired dorsally and widening ventrally in two lateral plates. Sternite VIII reaching gonocoxae VIII mediolaterally.

This species is known from Mt Koghi (at 500 m alt.) by the holotype and 21 paratypes, all from the Col de la Pirogue.

*Glyptodonisia tomyris* (Fennah, 1969), n. comb.

(Fig. 43)

*Eponisia tomyris* Fennah, 1969: 49.

This species is close to *G. fugax* n. comb. as mentioned by FENNAH. Until now, the holotype male is still the only specimen collected. The type locality is Mt. Koghi (600 m). The gonostyli are distinctly apically broken (Fig. 43) and FENNAH's drawing is inexact. Before another male is collected and the gonostyli figured complete, the anal tube appears to be the most distinctive character to separate the two species. The male genitalia of *G. tomyris* and *G. fugax* can be compared in Figures 42 and 43.

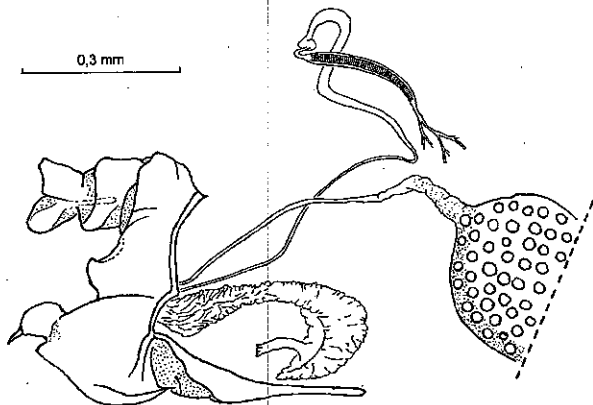


FIG. 41. — *Glyptodonisia fugax* (Fennah, 1969), n. comb., female genitalia, right side.

Genus *KOGHISIA* gen. nov.

Type species: *Eponisia lysis* Fennah, 1969: 47.

Distribution: New Caledonia (Fig. 49).

Included species: *K. lysis* (Fennah, 1969), n. comb.; *K. anospinosa* sp. nov.

**Description:** vertex with occipital areolet more or less confluent medially. Frontal medio-carina absent; lateral frontal carinae foliated all along; median ocellus present. Post-clypeal medio-carina feebly marked basally; lateral carinae without interruption at the frontoclypeal suture, dorsally foliated and diminishing progressively up to the middle of the postclypeus. Anteclypeal medio-carina present. Labium 3 segmented, long; subapical segment surpassing metacoxae, two times larger than the apical one. Pronotum with median carina; lateral ones meeting mediadorsally just behind the anterior margin or nearly so. Mesonotum medio-carinated. Tegminae broader in the postnodal part than in the prenodal part; 9 apical cells; all subapical cells closed; C4 placed directly after C5; C5 short and triangular, shorter than C4. Hind wings with R forked at apex. Metatibiotarsal

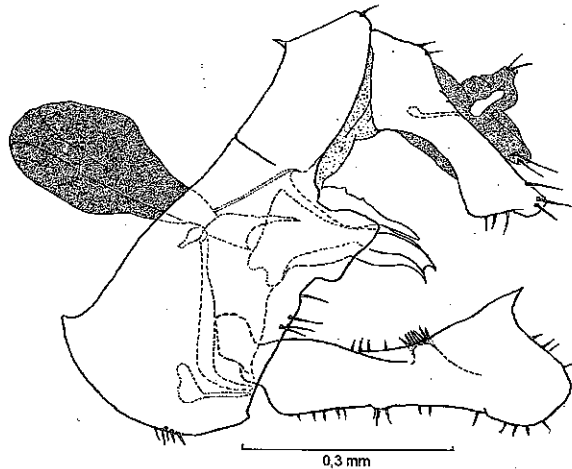
formula (3 + 5)/7/6. In lateral view, metatarsomeres short, length of dorsal margin of metatarsomere III  $\geq$  I > II. Wax plates VI, VII and VIII of centropetal type, the eighth central glandular area strongly concave on its posterior margin (*K. lysis* n. comb.).

In male, urite X quadrate, ventral margin strongly convex in lateral view by a posterodorsal projection. Pygofer feebly sclerotized dorsally, in lateral view more or less quadrate; produced in a short posterodorsal acute angle. Aedeagus filiform. Gonostyli without a mediadorsal projection, subapically wider than basally.

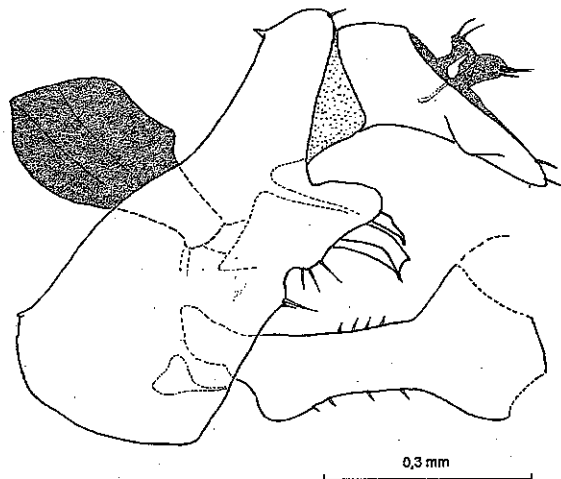
Female with ductus bursae long, bursa covered with rounded sclerotized ornamentations. Spermatheca entering the aliferum below the anterior lamina. Anal tube short.

**Derivatio nominis:** from Mounts Koghis.

**Taxonomic note.** The monophyly of this genus is attested by the shape of urite X, the pygofer and genitalia conformation. The pattern venation which shows C4 placed completely in series behind C5 and not in parallel with C5 is very distinctive and may represent an autapomorphy for this genus.



42



43

FIGS 42-43. — 42: *Glyptodonisia fugax* (Fennah, 1969), n. comb., male genitalia, left side. 43: *Glyptodonisia tomyris* (Fennah, 1969), n. comb., male genitalia, left side.

*Koghisia lysis* (Fennah, 1969) n. comb.  
(Figs 44, 46-48)

*Eponisia lysis* Fennah, 1969: 47.

**Material examined:** in MNHN, 3 ♂♂, Rivière Bleue, Parc 6, fogging: 21.x.1992 (CHAZEAU, GUILBERT & BONNET DE LARBOGNE). 1 ♀: MNHN, Nouvelle-Calédonie, Monts Koghis, Chemin de la cascade, 17.xi.1990, (Th. BOURGOIN). In BPBM: 1 ♀, New Caledonia, Mt Koghi, iii. 1978 (N. L. H. KRAUSS), Bishop Museum, Acc. #1978.114.

**Description:** general colour stramineous. Lateral sides of laterofrontal carinae in front of the eyes and lateral parts of pronotum brown. Mesonotum orange brown, darker laterally. Tegminae hyaline with a feebly darker suffusion bordering veins in its postnodal part; a small macula on mid point of M in the corium and basally on R and in the median cell (Fig. 47); C5 short, ratio C3/C5: 1.6; C4 longer than C5. Hind wing translucent. In female wax plate area VIII concave posteroventrally.

Male genitalia (Figs 44, 46) with write X strongly knocked in lateral view by a strong posterodorsal projection, wide, and bearing an impar posterocapital tooth. Pygofer with a short laterodorsal membranous process covered with minute spines. Tectiform structure strongly developed in lateral view, surpassing the anterior margin of the pygofer on more of its half length. Gonostyli apically ended in an oval lobe, acute

anteriorly and bearing basally two short processes on its internal side.

Female genitalia (Fig. 48). Anal tube short, Gonapophysis VIII feebly developed. Gonocoxae VIII almost as long posteriorly as gonapophysis VIII, triangular. Spermatheca entering the aliferum, with a short ductus receptaculi; diverticulum ductus double walled looking in its anterior part which is wider, longer than pars intermedia. Bursa ductus relatively long, longer than pars intermedia. Bursa ductus ornamentations but not closely arranged. Abiferum with lateral wings pointing dorsad; anterior lamina unpair, feebly upcurved anterodorsally. Sternite VIII reaching gonocoxae VIII mediolaterally.

Total length ♂: 5.55 mm, tegmen: 4.75 mm; total length ♀: 6 mm, tegmen: 5.1 mm.

**Taxonomic note.** This species was already known from the ♂ holotype from Mts Koghis (at 600 m). Unfortunately, FENNAH's drawing of the holotype is very difficult to understand and is imprecise; it has been redrawn here. FENNAH has mentioned a tumescence on each side of the anal tube, which does not appear to be present. The female triangular gonocoxa should be characteristic for the genus but it is still unknown in *K. anospinosa* n. sp.

*Koghisia anospinosa* n. sp.  
(Fig. 45)

**Type material:** holotype ♂ (BPBM), New Caledonia, Col de Ho, 11.ii.1963 (C. YOSHIMOTO & N. KRAUSS), Malaise trap.

**Description:** general colour pale brown. Lateral areas of mesonotum and laterodorsal parts of pronotum brown. Tegminae hyaline, veins yellowish. C5 short, ratio C3/C5: 1.7; C5 longer than C4. Hind wing whitish. Male genitalia (Fig. 45). Male genitalia with write X strongly knocked in lateral view by a strong laterodorsal spine like process; a median posterocapital tooth. Pygofer with a long dorsal fold producing a strong laterodorsal

membranous process covered with minute spines. Tectiform structure strongly developed in lateral view, surpassing the anterior margin of the pygofer on more of its half length. Gonostyli apically ending in an oval lobe not produced anteriorly and bearing basally two short processes on its internal side.

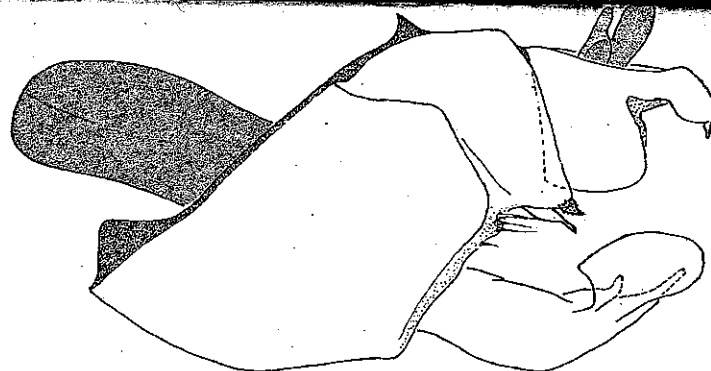
Female unknown.

Total length ♂: 5.1 mm; tegmen: 4.4 mm.

**Type locality:** Col de Ho.

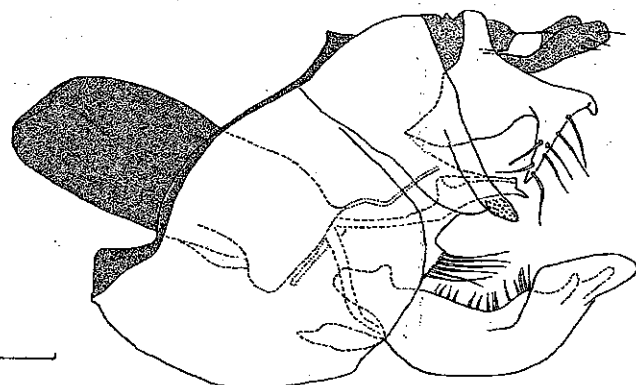
**Taxonomic note.** This specimen was previously referred as *Suva albonotata* by FENNAH (1969: 45).

44



0.25 mm

45

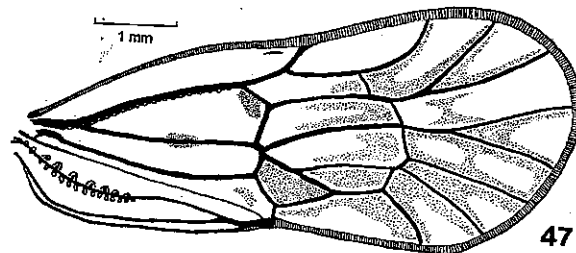


0.5 mm

46

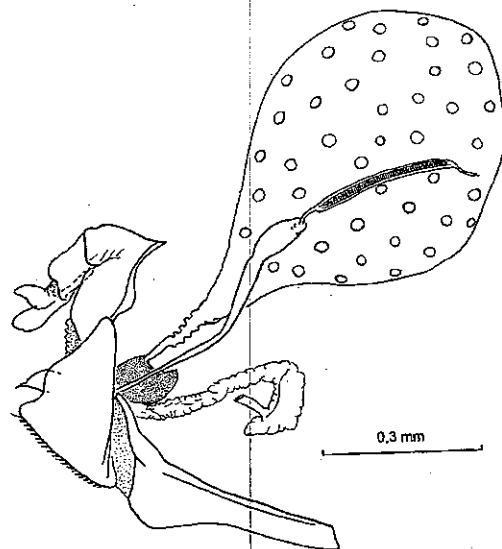


1 mm



47

FIGS 44-47. — 44: *Koghisia lysis* (Fennah, 1969), n. comb., male genitalia, left side. 45: *Koghisia anospinosa* n. sp., male genitalia, left side. 46-47: *Koghisia lysis* (Fennah, 1969), n. comb. 46: gonostylus posteroventral view; 47: right tegmina.

FIG. 48. — *Koghisia lysis* (Fennah, 1969), female genitalia, right side.Genus *Muirisinia* gen. nov.Type species: *Muirisinia desutterae* n. sp.

Distribution: New Caledonia (Fig. 49).

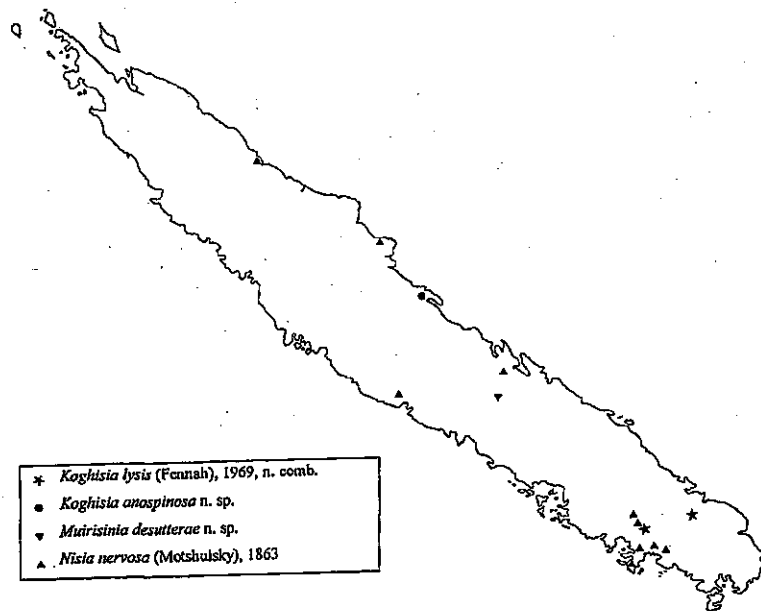
Included species: monospecific.

**Description:** vertex with occipital areolets meeting medially. Frons feebly mediocarinated (fold) in its mediodorsal third; lateral frontal carinae foliated all along; median ocellus present. Postclypeal lateral carinae present but abruptly unfoliated just after the frontoclypeal suture level. Antoclypeal medio-carina present. Labium 3-segmented, short. In lateral view head capsule anteriorly straight. Pronotum with median carina; lateral ones meeting mediodorsally just behind the anterior margin or nearly so. Median carina of mesonotum feebly marked. Tegminae broader in the postnodal part than in the prenodal part; 11-12 apical cells; all subapical cells closed; C4 as long as C5; C5 almost quadrate. Hind wings with R forked at apex. Metatibiotarsal formula

(3 + 5)/7/7. In lateral view, metatarsomere I short, length of dorsal margin of metatarsomere III = I > II. Females wax plate areas VI and VII of centropitic type; VIII of paratopic type.

In female, lateral sclerotized arms of sternite VII reaching gonocoxae VIII medially. Laterotergite IX projected posterodorsally on each side of the anal tube. Bursa copulatrix with rounded sclerotized ornamentations; ductus bursae short. Spermatheca joining the aliferum, with ductus receptaculi relatively long, pars intermedialis looking double walled. Anterior vagina long, common oviduct long, not apically dilated.

Derivatio nominis : dedicated to the memory of F. MUR.

FIG. 49. — Distribution of the genera *Koghisia* gen. nov., *Muirisinia* gen. nov. and *Nisia* in New Caledonia.*Muirisinia desutterae* n. sp.

(Figs 50-52)

**Type material:** holotype ♀ (MNHN), Nouvelle-Calédonie, 8 km N.W. Col d'Amieu, N. La Foa, abattage, Pied Table Unio, 22.II.1994 (L. DESUTTER-GRANDCOLAS). Paratype: 1 ♀ (MNHN), Nouvelle-Calédonie, Monts Koghis, Chemin de la Cascade, 17.XI.1990 (Th. BOURGOIN), sur *Burretokiensia viellardi* (Palmacée).

**Description:** general colour pale stramineous, powdered white with mesonotum orange-brown. Prothoracic legs, frons, labium and pedicel of antenna brown. Postclypeus paler. Lateral frontal carinae whitish, darker in front the eyes. Post clypeus mediocarinated basally. Vertex whitish, occipital areolets brown, meeting medially. Labium short: L2 not reaching mesocoxae, L3 just surpassing them (ratio L2/L3: 1.3). Pronotum whitish, brown on its lateral parts. Tegulae brown, more or less whitish rounded. Mesonotum with two longitudinal thin whitish bands; median carina white well marked. Metatibiotarsal formula: (3 + 5)/7/7. Tegmina hyaline (Fig. 52): C4 almost as long as C5, C5 little shorter than C1; ratio C3/C5 = 1.4; several brown areas: at the base of Cu, at the base of R, at the base and

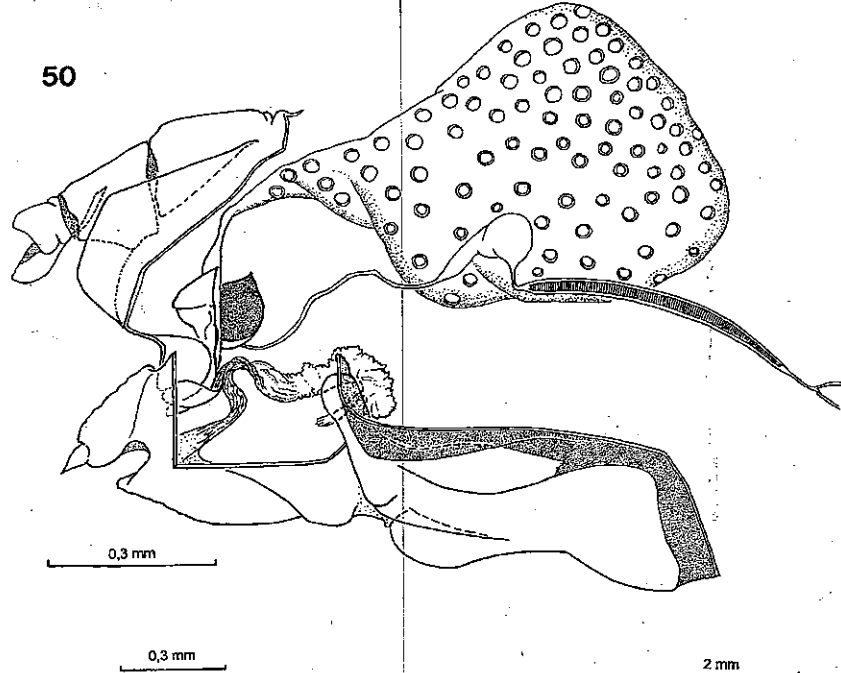
medially on M in corium and between the anal veins; Sc + R whitish; a dilute pale brown suffusion in distal part of the tegmen bordering the veins; veins whitish; sensory pits whitish, their dorsal part dark. Wax plates VI and VII of centropitic type, the eighth of paratopic type.

In females, gonapophysis VIII longer than gonocoxae VIII, a relatively wide gap between them posteriorly (Fig. 51). Urine X a little longer than high. Aliferum with lateral laminae directed anterodorsally, the ventral lamina pointing dorsal apically. Ductus bursae short, basally directed; dorsal (Fig. 50).

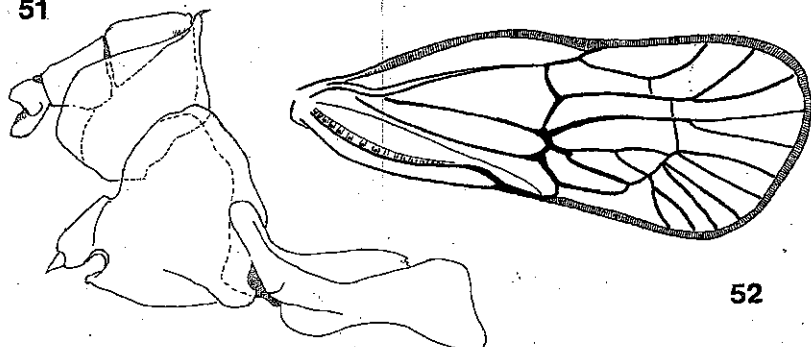
Male unknown.

Total length ♀: 6.6-6.75 mm, tegmen: 6.1-6.2 mm.

50



51



52

FIGS 50-52. — *Muirisinia desutterae* n. sp., holotype. 50-51: female genitalia, right side. 52: n. sp., holotype, right tegmina.

Type locality : 8 km N.W. of Col d'Amieu, N. La Foa, Pied Table Unio.

Derivatio nominis : the species is named after its collector, Laure DESUTTER-GRANDCOLAS.

**Taxonomic note.** This species is closely related to *G. fugax* by the tegmina venation with a long C5, but it is much larger and M3 + 4 carries three branches (at least in these two specimens). The significant gap between gonocoxae and gonapophysis is very distinctive and allows a quick recognition of this species from all species of the genus *Caledonisia*. The female genitalia are very interesting as they still show a clear orthopteroid type disposition of the different structures as it was illustrated and discussed by BOURGON (1993 b) (Fig. 1). Indeed, from posteriorly to anteriorly one can observe: a wide intergonocoxal plate followed by a short but very distinct post-gonapophysian IX fold, the paired sclerotized plate of gonapophyses IX and the exterior opening of the vagina. This species will be very helpful in understanding homologies in the meenoplid female genitalia.

Genus *Nisia* Melichar, 1903

*Nisia nervosa* (Motschulsky), 1863

Cosmopolitan = *Nisia atrovenosa* (Lethierry), 1888: 466.  
[FENNAH, 1969; WILSON, 1981; TSAUR *et al.*, 1986]

FENNAH (1969) has reported this species from Poindimié, Boulari River, Dumbea River, Anse Vata, St Louis, Tao, La Crouen, Mt Koghi, Bourail (Fig. 49). In the New Caledonian females examined here, wax plates are of paratopic type, the sixth and seventh wax plate central areas are strongly developed to almost the whole plate. Several types of wax plate can be observed among *Nisia* species, and the genus is obviously paraphyletic (*Nisia grandiceps* Kirkaldy, 1906, for instance belong to new genus which needs to be described). Considerable geographical variation is known to occur in this species (WILSON, 1981) and, according to FENNAH (1969), the gonostyli of the males from the New Caledonian populations and of the Australian populations of *N. australiensis* Woodward, 1957, are very close. As only 3 females have been studied here, it cannot be excluded that these should belong to this species or even *N. carolinensis* Fennah, 1971.

**Material examined :** in MNHN: 2 ♀♀, Mission Panié, Massif du Panié, Tao (Th. BOURGON), 12.XII.90 and 13.XII.90. In BPBM: 1 ♀, New Caledonia, Yahoué, 100-200 m, XII.1983 (N. L. H. KRAUSS), Bishop Museum, Acc. #1984.168.

Genus *SUVANISIA* gen. nov.

Type species: *Nisia albonotata* Distant, 1920.

Distribution: New Caledonia (Fig. 68).

Included species: *S. albonotata* (Distant, 1920), n. comb.; *S. tillierorum* n. sp.; *S. caudafurcata* n. sp.; *S. robusta* n. sp.; *S. hwanoa* n. sp.

**Description:** vertex with occipital areoles broadly meeting in the middle line; the anterior margin straight. Laterofrontal carinae strongly elevated; median ocellus present. Frons often with a short median fold looking as mediocarinated in its median third. Postclypeus without median carina; anteclypeus mediocarinated. Lateral carinae of the postclypeus present but not elevated. Labium with second segment

reaching the metacoxae, longer than the apical segment. Pronotum with median carina; lateral carinae not meeting medially but joining the anterior margin. Median carina of mesonotum present. Tegmen broader in the postnodal part than in the prenodal part; 9 apical cells; C5 not specially short, C4 a little shorter than C5. Radial vein of hind wing bifurcated at apex. Metatibiotarsal formula: (5 + 3)/6-7/6. In

lateral view, length of dorsal margin of metatarsomere III > I > II. Wax plate area of sternite VI centrotropic (*S. tillierorum* n. sp., Fig. 59) or paratopic (all other species, Fig. 60).

Male genitalia. Urite X dorsally ring like, ventrally developed in a strong beak-like process. At its base a pair of short rounded processes. Pygofer with a short posterior transverse fold at the level of the rounded processes of urite X; a thin lamelliform apodeme on its anterior margin. Aedeagus long and thin in *S. albonotata* (Distant) and *S. hwanoa* n. sp., stronger and basally wider in *S. caudafurcata* n. sp. and *S. robusta* n. sp. Tectiform structure shortly surpassing the

anterior margin of the pygofer. Gonostyli strongly developed with a mediadorsal process strongly diverging laterally.

Female genitalia. Urite X projected ventrally. Bursa copulatrix ductus long, basally directed anterodorsally; no sclerotized rings in the bursa wall. Spermatheca short, joining the genital tractus at the aliferum level, diverticulum ductus conic, pars intermediae long, appearing double walled. Common oviduct short, apically not dilated. Gonapophysis VIII longer than gonocoxae VIII; these two structures not joined side by side but separated by a relatively wide gap. (Figs 56, 58, 60, 62). Sternite VII strongly laterally prolonged in two lateral arms reaching the gonocoxae VIII latero-medially.

#### Derivatio nominis: from the genera *Suva* and *Nisia*.

**Taxonomic notes.** *S. albonotata* was transferred from the genus *Nisia* Melichar, 1903 to *Suva* Kirkaldy, 1906, by FENNAH (1969: 44). However, the male genitalia conformation of *S. albonotata* appears very different from the one of the type species: *Suva koebelei* Kirkaldy, 1906, and figured by FENNAH (1950: 46) (see below notes about the genus *Suva*). This species is thus removed from *Suva* and designated as the type species of this new genus.

The monophyly of this genus is assured by several autapomorphic male genitalia characters as the beak-like process of the urite X and its basal rounded lobe, the mediadorsal process of gonostyli strongly diverging laterally. So far, *Suvanisia* gen. nov. is the only NEW CALEDONIAN genus without ring-like formations in the bursa copulatrix wall.

All the species are very similar and cannot be separated without the help of genitalic characters. The smoky grey cells adjoining R in the membrane is noted more or less strongly in all the species and the golden yellow coloration of base of the tegminae is also not specific (versus FENNAH, 1969: 45). Curiously, the development of the subanal process from the tenth urite in males recalls that of the Hildinae tettigometrids and the distal part of the gonostyli recalls that of the Tettigometrinae tettigometrids.

#### KEY TO THE SPECIES OF *SUVANISIA*

1. Females ..... 2
- Males ..... 7
2. Ventral margins of gonostylus VIII and its apical tooth in prolongation in the same line (Fig. 61). Wax plate area of the sixth tergite of centrotropic type (Fig. 59) ..... *S. tillierorum* n. sp.
- Ventral margins of gonostylus VIII and its apical tooth not aligned on the same line (Figs 56, 58). Wax plate area of the sixth tergite of paratopic type (Fig. 60) ..... 3
3. A membranous finger-like lobe (gonostylus IX) on each inner side of the gonostyli VIII (Fig. 62) ..... *S. hwanoa* n. sp.
- No membranous finger-like lobe ..... 4
4. A sclerotized transverse plate medially cleft between the gonostyli (Figs 53, 54) ..... 5
- Sclerotized plate without cleft if present (Figs 55, 57) ..... 6
5. Sides of the transverse plate cleft strongly produced posteriorly (Fig. 53) ..... *S. caudafurcata* n. sp.
- Sides of the transverse plate cleft not produced posteriorly (Fig. 54) ..... *S. sp. 1*, Col d'Amieu

6. Gonocoxa VIII rounded produced above the gonostylus VIII (Fig. 58) ..... *S. robusta* n. sp.
- Gonocoxa VIII not produced above the gonostylus VIII (Fig. 56) ..... *S. sp. 2*, Amoa
7. In lateral view, aedeagus almost as wide as the subanal process ..... 8
- In lateral view, aedeagus less than two times subanal process width ..... 9
8. Aedeagus almost as long as the subanal process; mediadorsal process of gonostyli with a basal posterior projection (Fig. 66) ..... *S. caudafurcata* n. sp.
- Aedeagus shorter than the subanal process; mediadorsal process of gonostyli with a wide dorsal posterior projection (Fig. 65) ..... *S. robusta* n. sp.
9. Mediadorsal process of gonostyli wider apically than basally (Fig. 67) ..... *S. albonotata* Distant
- Mediadorsal process of gonostyli as wide apically as basally (Fig. 64) ..... *S. hwanoa* n. sp.

#### *Suvanisia albonotata* (Distant, 1920), n. comb.

(Fig. 67)

*Nisia albonotata* Distant, 1920: 463.

*Suva albonotata* (Distant, 1920) [FENNAH, 1969: 44]

**Material examined:** holotype ♂, described by DISTANT and deposited in BMNH, Rhoo, Houadou R., New Caledonia, 7.XI.1914 (P. D. MONTAGUE), 1914-87. BPBM: 1 ♂, 1 ♀, New Caledonia, Col des Roussettes, 550 m, 4-6.II.63. Other specimens from BPBM determined as *S. albonotata* by FENNAH (1969: 45) and collected in other localities belong to other species.

**Description:** general colour stramineous powdered white. Mesonotum yellow ochre. Base of tegminae yellow. In females, wax plate area of the sixth tergite of paratopic type. Male genitalia (Fig. 67). Aedeagus tubular and slender, shorter than the subanal process. Gonostyli strongly developed,

bearing a strong process on their mediadorsal side wider dorsally than basally; in lateral view distal part of the gonostyli hook-like. Total length ♂: 4.6 mm, tegmen: 4 mm.

**Note.** The only female specimen (noted as female) has its abdomen lost, thus no description can be given for the female genitalia. However the species listed below as *S. sp. 2*, Amoa, may be conspecific with *S. albonotata*.

#### *Suvanisia caudafurcata* n. sp.

(Figs 53, 66)

**Type material:** holotype ♂ (BPBM), New Caledonia, Pouebo, 200 m, 18.I.1964 (R. STRAATMAN), Bishop Museum. Paratypes: 2 ♀♀, same data but 19.I.1964 and 23.I.1964.

**Description:** general colour pale stramineous. Mesonotum pale orange. Tegminae with veins pale yellow or concolor, whitish on its costal margin, distal part of Sc and R smoked. In females, wax plate area of the sixth tergite of paratopic type.

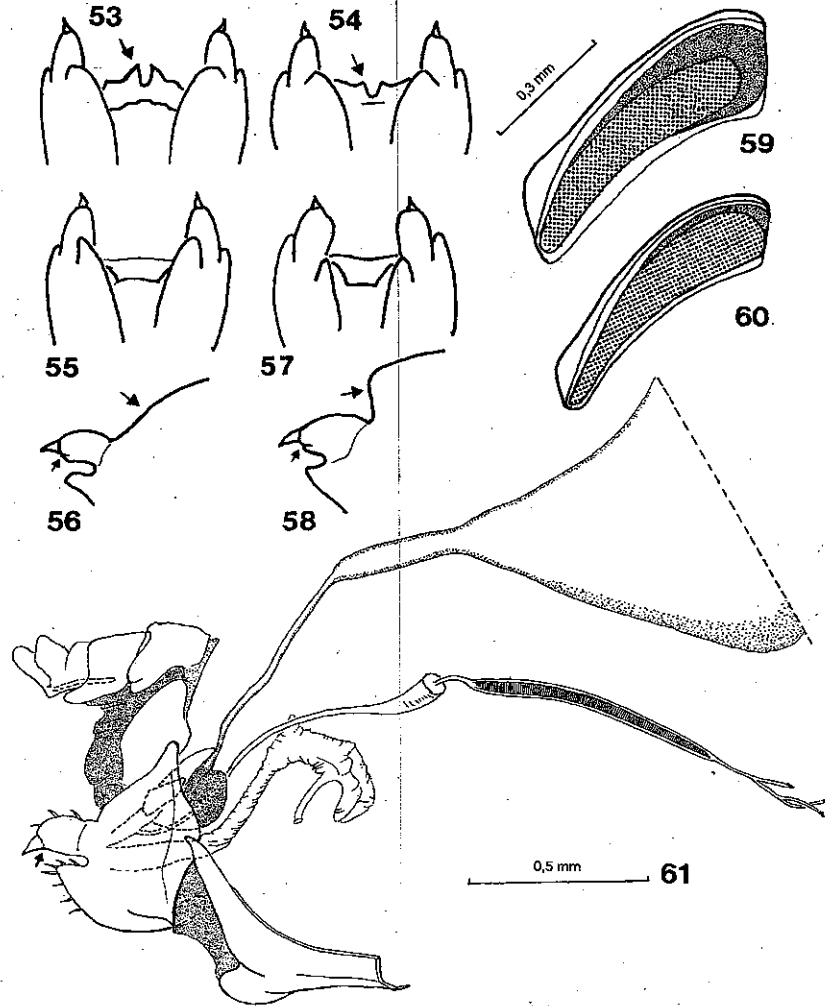
Male genitalia. Aedeagus wide basally, distally slender, almost as long as the subanal process (Fig. 66). Gonostyli strongly developed, slightly concave on their ventral margins,

bearing a strong rounded mediadorsal process; at its base and pointing posteriorly a short rounded process; distal process long and slender.

In females, posterior view with a sclerotized transverse plate between the gonostyli. This plate medially cleft and sides of the cleft produced posteriorly (Fig. 53).

Total length ♂: 4.2 mm, tegmen: 3.6 mm. ♀: 5.1 mm, tegmen: 4.2 mm.





FIGS 53-61. — *S. caudafurcata* n. sp., female genitalia, posteroventral view. — 54. *Suvanisia* sp. 1, Col d'Amieu, female genitalia, posteroventral view. — 55. *Suvanisia* sp. 2, Amoa, female genitalia, posteroventral view. — 56. *Suvanisia* sp. 2, Amoa, gonocoxa VIII and gonapophysis VIII, lateral view. — 57. *Suvanisia robusta* n. sp., female genitalia, posteroventral view. — 58. *Suvanisia robusta* n. sp., gonocoxa VIII and gonapophysis VIII, lateral view. — 59. *Suvanisia robusta* n. sp., left wax plate VI. — 60. *Suvanisia robusta* n. sp., left wax plate VI. — 61. *Suvanisia robusta* n. sp., female genitalia, right side.

Type locality : Pouebo, 200 m.

Note. This species is currently the smallest of the genus and the less coloured. Female specimens can also be separated from *S. robusta* n. sp. by the coloration being more uniform in *S. caudafurcata* n. sp.

*Suvanisia hwanoo* n. sp.

(Figs 60, 62, 64).

Type material: holotype ♂ (MNHN), côte Ouest, Vallée de la Hwa No (affluent de la Tontouta), 250 m, forêt de pente sur péridotites (P. BOUCHET), x.1992. Paratypes: 10 specimens. In MNHN, 2 ♀♀: 1 ♀, same data as holotype; 1 ♀, Mont Mou, Piège malaise, 13.II.1977 (DELOBEL & CHAZEAU). In BPBM: 1 ♂, 7 ♀♀: 1 ♂: New Caledonia, Mt Koghi, 500-550 m, XII.1983 (N. L. H. KRAUSS), Bishop Museum, Acc. #1984.168; 3 ♀♀: New Caledonia, Plateau des Dogny, 29.III.1968 (T. C. MAA), Bishop Museum; 2 ♀♀: New Caledonia, Plateau des Dogny, 29.III.1968 (J. L. GRESSIT & T. C. MAA), Bishop Museum; 1 ♀: New Caledonia, 7 km S. of Koh, 31.I.1963 (C. M. YOSHIMOTO) [this specimen was previously cited as *Suva albonotata* by FENNAH (1969: 45)]; 1 ♀: New Caledonia, Ciu, 9.I.1969 (N. L. H. KRAUSS).

Description: general colour beige stramineous. Mesonotum stramineous to orange brown, often with a darker median band. Tegmina pale stramineous with veins orange yellow excepted Sc + R and Sc proximal part whitish. Subapical segment of the labium longer than the apical segment; ratio L2/L3 = 1.45. Median carina of mesonotum feebly but distinctly marked. In females, wax plate area of the sixth tergite of paratopic type (Fig. 60).

Male genitalia (Fig. 64). Aedeagus tubular and slender, shorter than the subanal process. Gonostyli strongly developed, broadly concave on their inner side, bearing a strong

more or less rectangular process on their mediadorsal side; each dorsal corner of this process ending in a short little acute process; distal process almost of equal width on its whole length, apically pointing dorsad.

In females, alitrifurum (Fig. 62) with lateral laminae strongly developed, directed dorsally, the ventral lamina upcurved apically. A membranous finger-like lobe (gonostylus IX) on each inner side of the gonostyli VIII (Fig. 62: dotted arrow).

Total length ♂: 4.7 mm, tegmen: 4 mm. ♀: 6.1-6.7 mm, tegmen: 5.1-5.7 mm.

Type locality : côte Ouest, Vallée de la Hwa No.

Note. This species and *S. robusta* n. sp. are currently the largest of the genus. In *S. hwanoo*, C5 is generally longer than C1 and not especially wide basally, its sides are almost parallel in its median part; in all other species, sides of C5 are most often convergent (Fig. 63).

*Suvanisia robusta* n. sp.

(Figs 57-58, 63, 65)

Type material: holotype ♂ (BPBM), New Caledonia, Road to Mt des Koghis, 100-400 m, II.1980 (N. L. H. KRAUSS), Bishop Museum, Acc. #1980.128. Paratypes, 10 specimens (1 ♂, 9 ♀♀) deposited in BPBM: 1 ♂, New Caledonia, Mts des Koghis, 400-600 m, I.1969. 1 ♀, New Caledonia, Paita-Mou 300 m, 8.III.1972/8383 (J. L. GRESSIT), Bishop Museum; 1 ♀, New Caledonia, Mt Koghi, 500-550 m, XII.1983 (N. L. H. KRAUSS), Bishop Museum, Acc. #1984.168; 7 other ♀♀ same localities but: 600-900 m, 19.III.1968; 400-600 m, I.1969; 400-600 m, II.1980; 400-500 m, 11.II.1976; 400-600 m, II.1973; and 2 ♀♀: 400-600 m, I.1969.

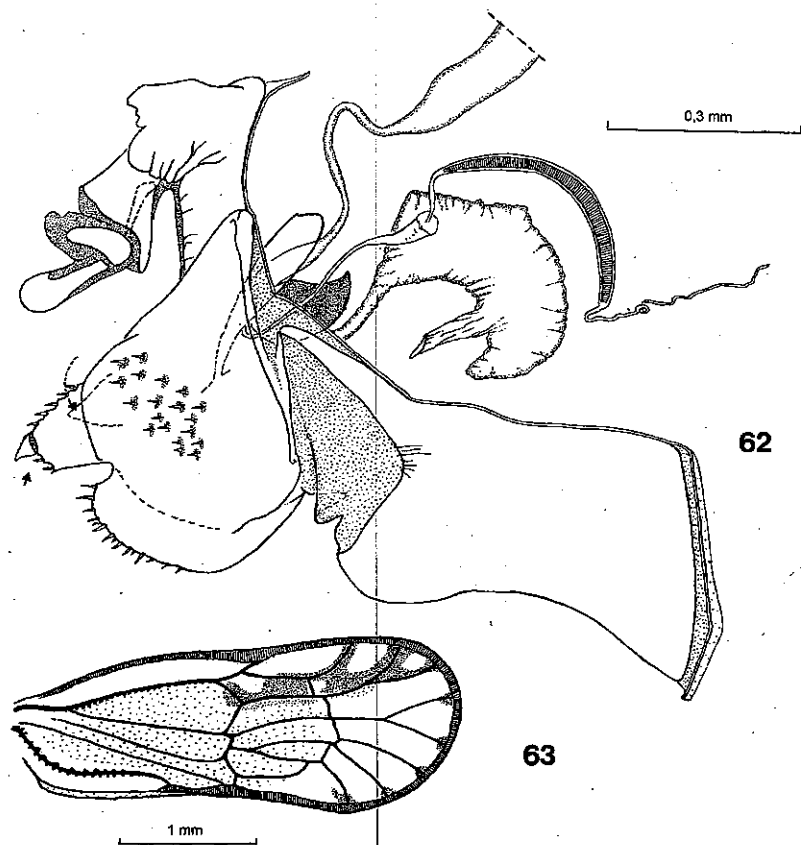
Description: general colour stramineous. Mesonotum stramineous to orange brown, often with a darker median band. Tegmina in males pale stramineous with veins orange yellow excepted Sc + R and Sc proximal part whitish. In female, pattern more strongly marked with a whitish costal margin, a brown band on R adjoining cells from the nodal line to the margin (Fig. 63). In females, wax plate area of the sixth tergite of paratopic type.

Male genitalia. Aedeagus short and wide; shorter than the subanal process (Fig. 65). Gonostyli strongly developed, with

a strong process on their mediadorsal side bearing a wide and short posterodorsal rounded and setiferous process; distal process short.

Female genitalia without membranous finger-like lobe on each inner side of the gonostyli VIII. In posterior view, the sclerotized transverse plate between the gonostyli not clefted. Gonocoxae VIII rounded produced above the gonostyli VIII (Fig. 57, 58).

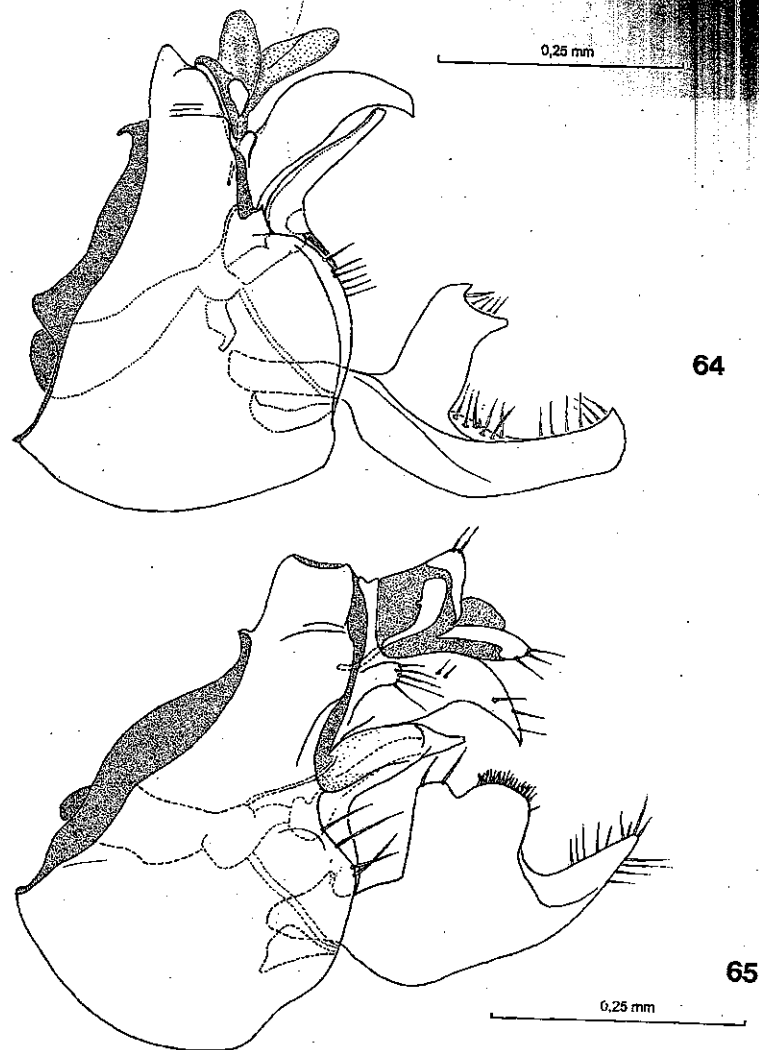
Total length ♂: 4.6-5 mm, tegmen: 4.4-5 mm. ♀: 6.5 mm, tegmen: 5.5 mm.



FIGS 62-63. — 62: *Suvanisia hwanooa* n. sp., female genitalia, right side. 63: *Suvanisia robusta* n. sp., right tegmina.

Type locality : : Road to Mt des Koghis, 100-400 m.

**Taxonomic notes.** In well coloured specimens, the tegminae coloration seems rather distinctive. However, this pattern is not specific and some specimens have a more uniform coloration. All the species of *Suvanisia* seem to have a separate distributions but *S. hwanooa* n. sp. apparently occurs (at least from one male specimen) in the same region than *S. robusta* n. sp. The presence of the membranous finger-like lobe on each inner side the gonostyli VIII in female and the characteristic male genitalia help to separate surely the two species.



FIGS 64-65. — 64: *Suvanisia hwanooa* n. sp., male genitalia, holotype, left side. 65: *Suvanisia robusta* n. sp., male genitalia, holotype, left side.

*Suvanisia tillierorum* n. sp. (Figs 59, 61)

**Type material:** holotype ♀ (MNHN), Rivière Bleue, Parc 5, 8.I.1986-23.I.1986. Paratypes: 2 ♀♀ (MNHN), Rivière Bleue, Parc 5, 20.XII.1985-8.I.1986 and 9.IV.1987-22.IV.1987.

**Description:** general colour pale brown. Lateral parts of frons and postclypeus, and area around lateral ocella brown. Frons medicarinated in its median third, whitish medially. Vertex whitish, occipital areoles not individualised but broadly fused medially; the anterior margin transverse, not reaching the posterior margin medially. Labium surpassing metacoxae (ratio L2/L3: 1.2-1.3). Pronotum whitish, brown on its lateral parts. Tegulae bicolor, anteriorly brown, posteriorly whitish. Mesonotum brown with two longitudinal thin whitish bands; median carina well marked. Tegmen pale yellow; C4 a little shorter than C5, C5 as long as C1; ratio

C3/C5 = 1.3; several brown areas: at the base of Sc + R + M, at apex of Sc + R, medially on M in corium; Sc + R whitish; a dilute brown suffusion in distal part of the tegmen; veins whitish but R reddish brown; sensory pits whitish, their very upper part dark. In females, wax plate area of the sixth tergite of centrotropic type (Fig. 59).

**Female genitalia.** Abdomen with lateral laminae directed dorsally, shorter than the posterior lamina, the ventral lamina rounded apically (Fig. 61).

Total length ♀: 6.2 mm; tegmen: 5.4 mm.

**Type locality:** Rivière Bleue, Parc 5.

**Derivatio nominis:** this species is dedicated to its collectors, Annie and Simon TILLIER.

**Note.** The tegmina pattern of coloration is really different from the other species of the genus and allows to describe this new species without hesitation. In particular, the bicolor tegula seem really distinctive to separate *S. tillierorum* n. sp. from all other species of the genus. As moreover, this species is the only one of the genus with a sixth tergite wax plate area of centrotropic type, it is possible that it could be placed in another genus when a male is found.

Notes on some other *SUVANISIA* female specimens

Two other probably new species can be separated by female genitalia characters from the others already described (see key). However, as only few specimens are available, which make it difficult to correctly appreciate the infraspecific polymorphism and also because males are still unknown I just list them below. They are categorized by their localities and without formal description.

*Suvanisia* sp. 1, Col d'Amieu, 2 ♀♀

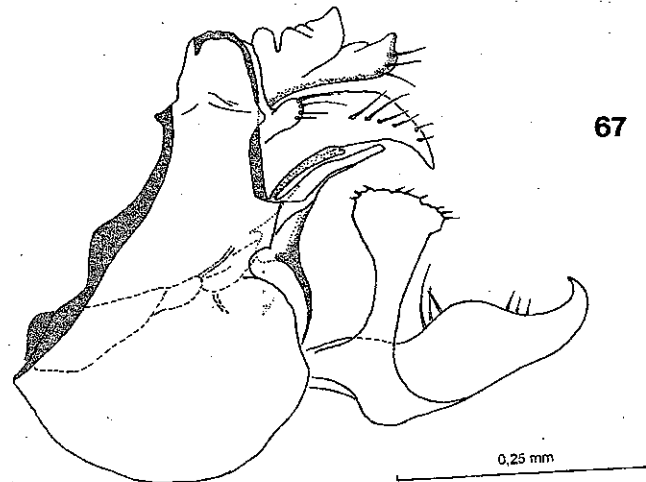
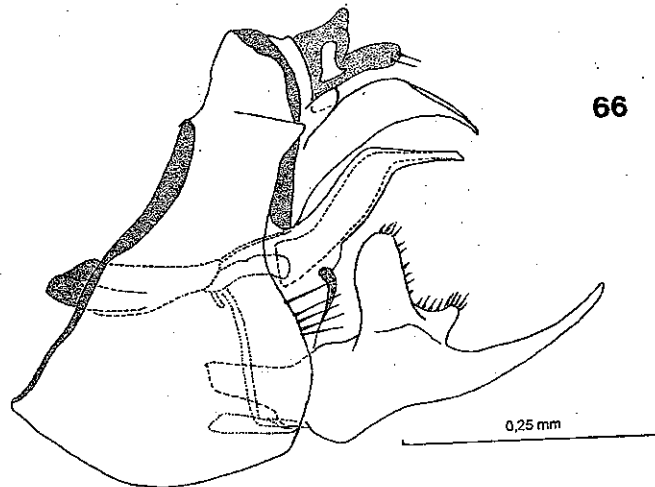
New Caledonia, Col d'Amieu, 27.XII.1976/9218 (J. L. GRESSIT), Bishop Museum/Bishop Museum accession: 1977-54; New Caledonia, Col d'Amieu, 650 m, 31.III.1968/sweeping (J. L. GRESSIT), Bishop Museum.

This species is close to *S. robusta* n. sp. and *S. hwanoa* n. sp. From the former it differs by the clefted sclerotized transverse plate between the gonostyli and the not produced gonocoxae VIII above the gonostyli VIII and from the latter by the absence of the membranous finger-like lobe on each inner side the gonostyli VIII (Fig. 54). Wax plate area of the sixth tergite of paratopic type.

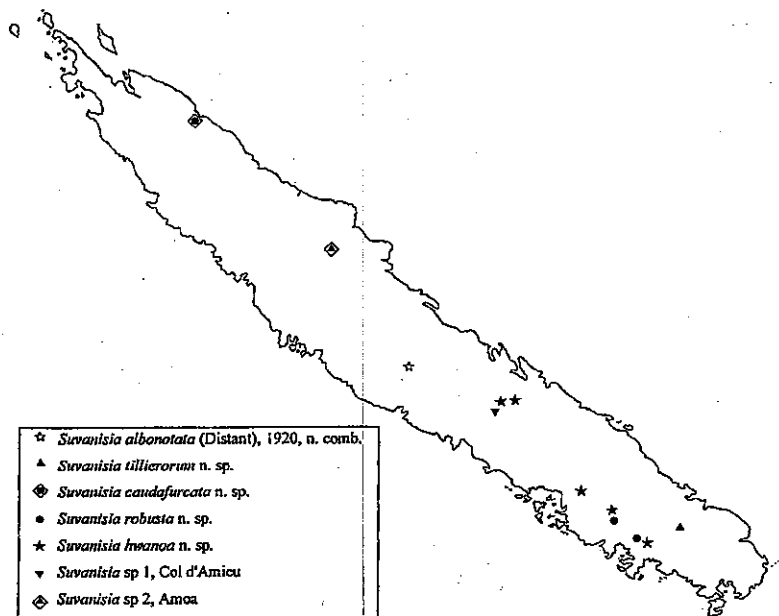
*Suvanisia* sp. 2, Amoa, 1 ♀

New Caledonia, Vallée d'Amoa, 7.II.1963 (C. M. YOSHIMOTO). This specimen was previously cited as *S. albonotata* by FENNAH (1969: 45).

This species is close to *S. robusta* n. sp. from which it differs by the absence of the membranous finger-like lobe on each inner side the gonostyli VIII and its coloration uniformly stramineous. Wax plate area of the sixth tergite of paratopic type. Gonocoxa VIII not produced above the gonostylus VIII (Fig. 56); sclerotized transverse plate between the gonostyli not clefted (Fig. 55).

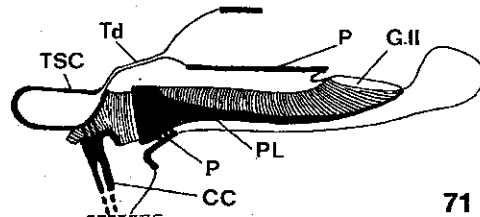
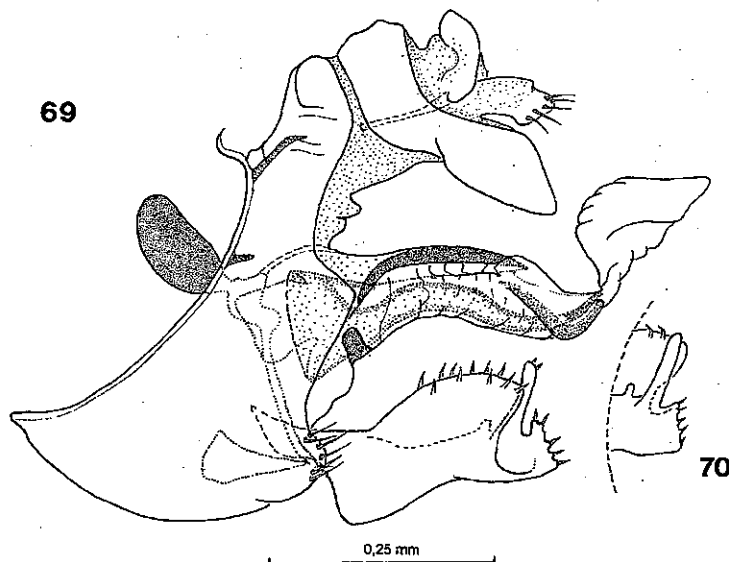


Figs 66-67. — 66: *Suvanisia caudifurcata* n. sp., holotype, male genitalia, left side. 67: *Suvanisia albonotata* (Distant, 1920), male genitalia, left side, specimen from Col des Roussettes.

FIG. 68. — Distribution of *Suvanisia* gen. nov. in New Caledonia.Genus *Suva* Kirkaldy, 1906

**Taxonomic note.** This genus is problematic and currently para- and even polyphyletic. The generic placement of all the species currently included has to be reanalysed. *S. flavimaculata* Yang & Hu, 1985, and *S. longipenna* Yang & Hu, 1985, from China are even not meenoplids but derbids. *S. albiplaga* (Distant), 1906, from Sri Lanka, and first described in the genus *Kinnara* Distant, 1906, probably belongs to another genus. The pygofer, the gonostyli and the aedeagus of *S. cretacea* Fennah, 1950, (from Fiji Islands: Viti Levu) differ strongly from the conformation observed in the type species (also from Viti Levu) *S. koebelei* Kirkaldy, 1906, as figured by FENNAH (1950: 46). *S. metagon* Fennah, 1950 (from Society Islands) also differs from *S. koebelei* in the aedeagus and gonostyli conformation; it is the only species where the four branches of M separate before the transverse postnodal line. *S. fuscomarginata* Fennah, 1950, (from Fiji Islands: Viti Levu) has been described from one mutilated specimen and genitalia are unknown but M1 + 2 is unforked as in *Nisia* or *Eponisiella* Emeljanov, 1984. Females of the genus *Suva* have not been studied but should help to justify and describe the new taxa suggested here.

These remarks would leave only four species as congeneric in the genus *Suva*, all from Samoa or Tonga islands: *S. albipennis* Muir, 1927b, *S. koebelei* Kirkaldy 1906, *S. oloimoa* Hoch et Asche, 1988 and *S. upolensis* Muir, 1927b. The key to genera proposed in this study follows this conclusion.



FIGS 69-71. — *Tyweponosia woodwardi* (Tsaur, Yang et Wilson, 1986). 69: male genitalia, left side; 70: extremity of the gonostylus, internal view; 71: diagrammatic representation of male genitalia. CC: corpus connectivi; G.II: gonoporus II; P: periandrium; PL: ligamentary processes; Td: tectiductus; TSC: tectiform structure of the connective.

Genus *TYWEPONISIA* gen. nov.

Type species: *Eponisia woodwardi* Tsaui, Yang & Wilson, 1986.

Distribution: Taiwan.

Included species: *T. woodwardi* (Tsaui, Yang & Wilson, 1986).

**Description:** vertex with transverse anterior carina interrupted medially; occipital arclets triangular, not meeting medially. Mediofrontal carina absent; laterofrontal carinae elevated; median ocellus present. Postclypeus without median carina, antedypeus feebly mediocarinated. Latero-postclypeal carinae extending from lateral carinae of frons but reduced shortly after the frontoclypeal suture level. Pronotum without a distinct median carina; lateral carinae not meeting mediodorsally but joining the anterior margin. Mesonotum without median carina. Tegmina broader in the postnodal part than in the prenodal part. M four branched; C4 and C5 short, no more than two third length of C1. Radial vein of hind wing not furcated at apex. Metatibiotarsal formula (3 + 5)/6-7/6. In lateral view, length of dorsal margin of metatarsomere I > III > II; metatarsomere I relatively short, not two times as long as metatarsomere II. In females, wax plate VI and VII almost of paratopic type; eighth of paratopic type.

In male (Figs 69-71), anal segment feebly produced laterally, almost as long as broad in dorsal view. Pygofer complete dorsally; in lateral view posterior basal margin strongly concave. Aedeagus in lateral view long with an apical membranous endosoma. Gonostyli short, laterally not passing beyond the anal tube, basally projecting dorsad and abruptly shorter apically, distally produced dorsally on its internal side.

In female, ductus bursa narrow but not very long, bursa covered with minute rounded sclerotized ornamentations. Spermatheca entering the alifurum, with the pars intermedia long, not double walled looking alifurum with lateral wing-like process pointing anteriorly, the ventral lamina strongly developed. Anterior vagina wide, common oviduct not dilated apically. Lateral arms of sternite VII strong, reaching the gonocoxae VIII latero-medially.

**Taxonomic note.** This genus is easily identifiable by the unforked radial vein of the hind wing. Characters such as form of the pygofer (posterior margin) and of the gonostyli are probably autapomorphic for the genus and lead also to separate this new genus from *Eponisia*. The name genus is build from *eponisia* and the first letters of the name of the authors of the type species.

## ACKNOWLEDGEMENTS

I would like to express my thanks to Dr G. NISHIDA, Bishop Museum, Honolulu, and to Mr M. WEBB, The Natural History Museum, London, for the loan of Meenoplidae from New Caledonia and providing type material; to Prof. H. HOCH, Museum für Naturkunde der Humboldt Universität, Berlin, who kindly sent me the paratype of *Fennahsia hypogaea*; to Dr L. DESUTTER-GRANDCOLAS and Dr E. GUILBERT, MNHN, Paris, who collected specimens during their field missions; to Dr J. CHAZEAU, L. BONNET DE LARBOGNE, ORSTOM, Nouméa, and Dr M. BAYLAC, MNHN, Paris, for assistance and good company during the field mission in 1990 and to Dr M. WILSON, National Museum of Wales, Cardiff, for comments on the manuscript.

This work is a contribution to the Programme pluriformation 1992-1995: "Biodiversité terrestre en Nouvelle Calédonie" (DRED-MNHN), and to the Programme PIR-Environnement 1996-1997: "Biodiversité terrestre en Nouvelle Calédonie: Biogéographie historique, Biogéographie actuelle".

## REFERENCES

- ASCHER, M., 1988. — Preliminary thoughts on the phylogeny of Fulgoroidea (Homoptera, Auchenorrhyncha). In: C. VIDANO & A. ARZONE (eds), *6th Auchenorrhyncha Meeting, Turin, Italy, September 7-11, 1987, Proceedings*, 47-53.
- BIERMAN, C. J. H., 1910. — Homopteren aus niederländisch ost-Indien. *Notes from the Leyden Museum*, 33: 1-68.
- BONNET DE LARBOGNE, L., CHAZEAU, J., TILLIER, S., 1991. — Milieux naturels néo-calédoniens : la Réserve de la Rivière Bleue. In: J. CHAZEAU & S. TILLIER (eds), *Zoologia Neocaledonica, 2. Mémoires du Muséum national d'Histoire naturelle, sér. A, Zool.*, 149: 9-17.
- BOURGOIN, Th., 1993a. — Cladistic analysis of the Meenoplidae-Kinnariidae genera: the Kinnariidae, a paraphyletic family (Hemiptera, Fulgoroidea). In: S. Drosopoulos, P. V. Petrakis, M. F. Claridge & P. W. F. de Vries (eds), *Proceedings of the 8th Auchenorrhyncha Congress, Delphi, Greece, 9-13 August 1993*, 22-24.
- BOURGOIN, Th., 1993b. — Female genitalia in Fulgoroidea (Insecta, Hemiptera): morphological and phylogenetical data. *Annales de la Société entomologique de France*, N. S., 29 (3): 225-244.
- DISTANT, W. L., 1906. — Rhynchota. Heteroptera-Homoptera. In: C. T. BINGHAM (ed.), *Fauna of British India, including Ceylon and Burma*, 3: 1-503.
- DISTANT, W. L., 1911. — Descriptions of new genera and species of Oriental Homoptera. *Annals and Magazine of Natural History* (ser. 8), 8: 735-747.
- DISTANT, W. L., 1916. — Rhynchota, Homoptera Appendix. In: A. E. SHIPLEY & A. K. MARSHALL (eds), *Fauna of British India, including Ceylon and Burma*, 6: 1-248.
- DISTANT, W. L., 1920. — Rhynchota from New Caledonia. Part II. Homoptera. *Annals and Magazine of Natural History* (ser. 9), 6: 456-470.
- EMELIANOV, A. F., 1977. — Homology of wing structures in the Auchenorrhyncha and Polyneoptera. *Trudy vsesoyuznogo entomologicheskogo obshchestva*, 58: 3-48 [in Russian].
- EMELIANOV, A. F., 1984. — A contribution to knowledge of the families Kinnariidae and Meenoplidae (Homoptera, Fulgoroidea). *Entomologicheskoe Obozrenie*, 3: 468-483.
- EMELIANOV, A. F., 1990. — An attempt of construction of phylogenetic tree of the planthoppers (Homoptera, Cicadina). *Entomologicheskoe Obozrenie*, 69 (2): 353-356.
- FENNAH, R. G., 1944. — The morphology of the tegmina and wings in Fulgoroidea (Homoptera). *Proceedings of the Entomological Society of Washington*, 46: 185-199.
- FENNAH, R. G., 1950. — Fulgoroidea of Fiji. *Bernice P. Bishop Museum Bulletin*, 202: 1-122.
- FENNAH, R. G., 1955. — Contributions à l'étude de la faune entomologique du Ruanda-Urundi (Mission P. Basilewsky 1953). 78. Homoptera: Fulgoroidea. *Annales du Musée royal du Congo Belge (Zool.)*, 49: 427-447.
- FENNAH, R. G., 1956. — Fulgoroidea from southern China. *Proceedings of the Californian Academy of Sciences*, 28 (13): 441-527.
- FENNAH, R. G., 1957. — Results from the Danish expedition to the French Cameroons 1949-50 XXIV. Fulgoroidea. *Bulletin de l'Institut fondamental de l'Afrique noire, sér. A*, 19 (4): 1274-1311.
- FENNAH, R. G., 1958. — Fulgoroidea from West Africa. *Bulletin de l'Institut fondamental de l'Afrique noire, sér. A*, 20: 460-538.
- FENNAH, R. G., 1963. — A new species of *Phacocera* (Fulgoroidea: Meenoplidae). *Annals and Magazine of Natural History* (ser. 13), 5: 689-700.
- FENNAH, R. G., 1964. — Three new genera of Barybrachidae (Homoptera: Fulgoroidea) from West Africa and Australia. *Proceedings of the Royal Entomological Society of London*, 33: 157-162.
- FENNAH, R. G., 1969. — Fulgoroidea (Homoptera) from New Caledonia and the Loyalty Islands. *Pacific Insects Monographs*, 21: 1-116.
- FENNAH, R. G., 1971. — Homoptera: Fulgoroidea. Supplement. *Insects of Micronesia*, 6 (8): 563-609.
- FIEBER, F. X., 1866. — Neue Gattungen und Arten in Homoptern (Cicadina Bur.). *Verhandlungen des Zoologisch-Botanischen Gesellschaft in Wien*, 16: 497-516.
- FIEBER, F. X., 1872. — *Katalog der europäischen Cicadinen, nach Originalien mit Benützung der neuesten Literatur*. Wien, Druck und Verlag von Carl Gerold's Sohn, 16 pp.
- FOLDI, L., 1991. — The wax glands in scale insects: comparative ultrastructure, secretion, function and evolution (Homoptera, Coccoidea). *Annales de la Société entomologique de France*, 27 (2): 163-188.
- GUILBERT, E., 1994. — Biodiversité des Arthropodes de la canopée dans deux forêts primaires en Nouvelle-Calédonie. Thèse de Doctorat du Muséum national d'Histoire naturelle, vol. 1: 189 pp, vol. 2: 96 pp.
- HOCH, H., 1990. — Cavernicolous Meenoplidae of the Genus *Phacocera* (Homoptera: Fulgoroidea) from Australia. *Occasional Papers of the B. P. Bishop Museum*, 30: 183-203.
- HOCH, H., 1994. — Homoptera (Auchenorrhyncha Fulgoroidea). In: T. I. JUBERTHIE, C. DEBUC, V. (eds), *Encyclopaedia Biospeologica*, Moulis, Burest, Société de Biospéologie, 1994: 313-325.

- HOCH, H., in press. — A new cavernicolous planthopper of the family Meenoplidae from New Caledonia (Hemiptera: Fulgoroidea). *Records of the Western Australian Museum*.
- HOCH, H. & ASCHE, M., 1988. — A new troglitic meenoplid from a lava tube in Western Samoa (Homoptera Fulgoroidea Meenoplidae). *Journal of Natural History*, 22 : 1489-1494.
- HYNES, C. D., 1993. — The crane-flies of New Caledonia (Diptera: Tanyderidae, tipulidae). In: L. MATILE, J. NAIT & S. TILLIER (eds), *Zoologia Neocaledonica*, 3. *Mémoires du Muséum national d'Histoire naturelle*, 157: 73-121.
- KIRKALDY, G. W., 1906. — Leafhoppers and their natural enemies. (Pt. IX Leafhoppers. Hemiptera). *Bulletin. Hawaiian Sugar Planters' Association Experiment Station*, Div. Ent., 1 (9): 271-479.
- KIRKALDY, G. W., 1907. — Leaf-hoppers — Supplement (Hemiptera). *Bulletin. Hawaiian Sugar Planters' Association Experiment Station*, Div. Ent., 3: 1-186.
- LETHÉRY, L. F., 1888. — Liste des Hémiptères recueillis à Sumatra et dans l'île Nias par M. E. Modigliani. *Annali del Museo civico di Storia Naturale di Genova* (2), 6: 460-470.
- LINNAVUORI, R., 1973. — Hemiptera of the Sudan, with remarks on some species of the adjacent countries 2. Homoptera Auchenorrhyncha: Cicadidae, Cercopidae, Machaerotidae, and Fulgoroidea. *Notulae Entomologicae*, 53 (3) : 65-137.
- MASON, R. T., FALES, H. M., JONES, T. H., O'BRIEN, L. B., TAYLOR, T. W., HOGUE, C. L. & BLUM, M. S., 1989. — Characterization of fulgorid waxes (Homoptera: Fulgoridae: Insecta). *Insect Biochemistry*, 19 (8): 737-740.
- MATILE, L., 1990. — Recherches sur la systématique et l'évolution des Keroplatidae (Diptera, Mycetophilidae). *Mémoires du Muséum national d'Histoire naturelle*, (A), 148, 1-682.
- MATSUMURA, S., 1914. — Beitrag zur Kenntnis der Fulgoriden Japans. *Annales Muséi Nationalis Hungarici*, 12: 261-305.
- MELICHAR, L., 1898. — Vorläufige Beschreibungen neuer Ricaniden *Verhandlungen des Zoologisch-Botanischen Gesellschaft in Wien*, 48: 384-400.
- MELICHAR, L., 1903. — *Homopteren-Fauna von Ceylon*. F. L. DAMES (ed.), Berlin, 248 pp.
- MELICHAR, L., 1906. — Monographie der Issiden (Homoptera). *Abhandlungen des Zoologisch-Botanischen Gesellschaft in Wien*, 3: 1-327.
- METCALF, Z. P., 1945. — Meenoplidae. In: *General Catalogue of the Homoptera*. Fasc. IV. Fulgoroidea. Part 6, Smith College, Northampton, Massachusetts, USA, 219-238.
- MONTEUZZER, X., 1861. — Essai sur la faune entomologique de la Nouvelle-Calédonie (Balade) et des îles des Pins, Art, Lifu, etc. Hémiptères. *Annales de la Société entomologique de France* (4), 1: 59-74 (70-74).
- MOISCHULSKY DE, V. I., 1863. — Essai d'un catalogue des insectes de l'île Ceylan. *Bulletin de la Société des Naturalistes de Moscou*, 36: 1-153.
- MUR, F. A. G., 1921. — On some Samoan fulgorids (Homoptera). *Proceedings of the Hawaiian Entomological Society*, 4: 564-584.
- MUR, F. A. G., 1922. — New Malayan Cixiidae (Homoptera). *Philippine Journal of Science*, 20: 111-119.
- MUR, F. A. G., 1925. — On the genera of Cixiidae, Meenoplidae and Kinnaridae. *Pac-Pacific Entomologist*, 1: 156-163.
- MUR, F. A. G., 1927a. — New species of African Meenoplidae (Fulgoroidea, Homoptera). *Annals and Magazine of Natural History* (ser. 9), 19: 197-208.
- MUR, F. A. G., 1927b. — Hemiptera. Fulgoroidea. *Insects of Samoa and other Samoan terrestrial Arthropoda*, 1 (2): 1-27.
- MUR, F. A. G., 1931. — Descriptions and records of Fulgoroidea from Australia and the South Pacific Islands. N° 1. *Records of the Australian Museum*, 18: 63-83.
- MUR, F. A. G., 1934. — New and little-known Fulgoroidea (Homoptera). *Annals and Magazine of Natural History*, ser. 10, 14 (84): 561-586.
- PERRAUD, B. P. & MONTEUZZER, X., 1864. — Essai sur la faune entomologique de Kanala (Nouvelle-Calédonie) et description de quelques espèces nouvelles ou peu connues. *Annales de la Société Linéenne de Lyon* (n. s.), 11: 46-257.
- POPE, R. D., 1985. — Visible insect waxes: form, function and classification. *Antenna*, 9: 4-8.
- RAMOS, J. A., 1957. — Review of Auchenorrhyncha Homoptera of Puerto Rico. *Journal of Agriculture of the University of Puerto Rico*, 41: 38-117.
- REMANE, R., 1985. — Kinnaridae in der SW-Paläarkt: zwei neue Taxa von den Kanaren (Homoptera Fulgoromorpha). *Marburger Entomologische Publikationen*, 1(10): 241-264.
- SCHERBAKOV, D. Y., 1981. — [Diagnosis of the families of the Auchenorrhyncha (Homoptera) on the basis of the wings. I. Forewing]. *Entomologicheskoe Obozrenie*, 60: 828-843 [in Russian].
- STÅL, C., 1866. — Hemiptera Homoptera Latr. *Hemiptera Africana*, 4: 1-276.
- SYNAVE, H., 1957. — *Exploration du Parc National de l'Upemba. Mission G. F. de Witte. 2. Meenoplidae*. Fasc. 43: 79-81.
- SYNAVE, H., 1958. — Une famille nouvelle pour la faune des îles de la Réunion et Maurice : les Kinnaridae (Homoptera-Fulgoroidea). *Bulletin et Annales de la Société Royale Entomologique de Belgique*, 94 (3-4) : 118-121.
- SYNAVE, H., 1971. — Contribution à la connaissance des fulgorides du Nigeria (Homoptera) (récoltes J. T. Medler). *Bulletin de l'Institut royal des Sciences naturelles de Belgique*, 47: 1-34.
- TSURU, S.-C., 1989. — Additions to the fauna of Taiwanese Meenoplidae. *Journal of the Taiwan Museum*, 42 (1): 25-29.
- TSURU, S.-C., YANG, C.-T. & WILSON, M. R., 1986. — Meenoplidae of Taiwan (Homoptera: Fulgoroidea). *Taiwan Museum Special Publications Series*, 6, 81-118.

- WILSON, M. R., 1981. — Geographical variation in *Nisia nervosa* (Motsch.) (Fulgoroidea, Meenoplidae): A preliminary note. In: *Proceedings of the 4th Auchenorrhyncha meeting, Finland, September 1981. Acta Entomologica Fennica*, 38: 53.
- WILSON, M. R., 1984. — Revision of the family Meenoplidae (Fulgoroidea): problems and progress. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 57(4): 449.
- WILSON, M. R., 1988. — *Afronia*, a new African genus of Meenoplidae (Homoptera: Fulgoroidea). *Great Basin Naturalist Memoirs*, 12: 324-334.
- WOODWARD, T. E., 1957. — Studies on Queensland Hemiptera. Part II. Meenoplidae (Fulgoroidea). *University of Queensland Papers (Entomology)*, 1(4): 57-70.
- YANG, L. & HU, C., 1985. — Description of four new species of Meenoplidae (Homoptera, Fulgoroidea). *Nanjing Nongye Daxue Xuebao* [Journal of the Nanjing Agricultural University], 4: 21-27.