

XXXV. Fennahius⁺: A new genus of KINNARIDAE (Hemiptera - Fulgoroidea) common to Mauritius and Réunion.

The KINNARIDAE show affinities with the CIXIIDAE not merely in their general overall resemblance, but in a number of morphological points to which attention has already been drawn by Muir and other workers, e.g., Metcalf, Fennah, Synave.

Conventionally separated from one another by wing-venation, the quite dissimilar structure of the male genitalia confirms that the difference is of familial rank.

The presence of wax-producing areas on the sixth, seventh and eighth tergites (vide Plate 18f - top left preparation) of the adult female is a character shared with the MEENOPLIDAE but not the CIXIIDAE.

It is rather unfortunate that the members of the family have never been the subject of a special study. Examination of some of their characters (e.g., ♀ genitalia and text) suggests that in many features they present significant departures from the standard fulgoroid pattern.

The presence of a large bursa-copulatrix and reduced valvulae (vide Plate 18b) in Paramicrixia diaphana makes investigation of the live insect highly desirable. The occurrence of 'blemmata'⁺⁺ minute ocelli-like structures placed close to each ocellus deserves

⁺The author is privileged to dedicate this new genus to Mr. R.G. Fennah (Commonwealth Institute of Entomology) for his important contributions to knowledge of world Fulgoroidea.

⁺⁺Fennah 1963 - Bull. ent. Res. 54, 1:46, coined the term for similar structures occurring in delphacids, cixiids.

KINNARIDAE

TYPE: BM. (N.H.)

LOCALITY:

BENGAL



♀

PAR AMICRIXIA DIAPHANA Distant

further attention to elucidate their function. There seems to be some variation in their number, P. diaphana having 3 blemmata near each ocellus (vide Plate 19b), Fennahius insularis (Synave) only two.

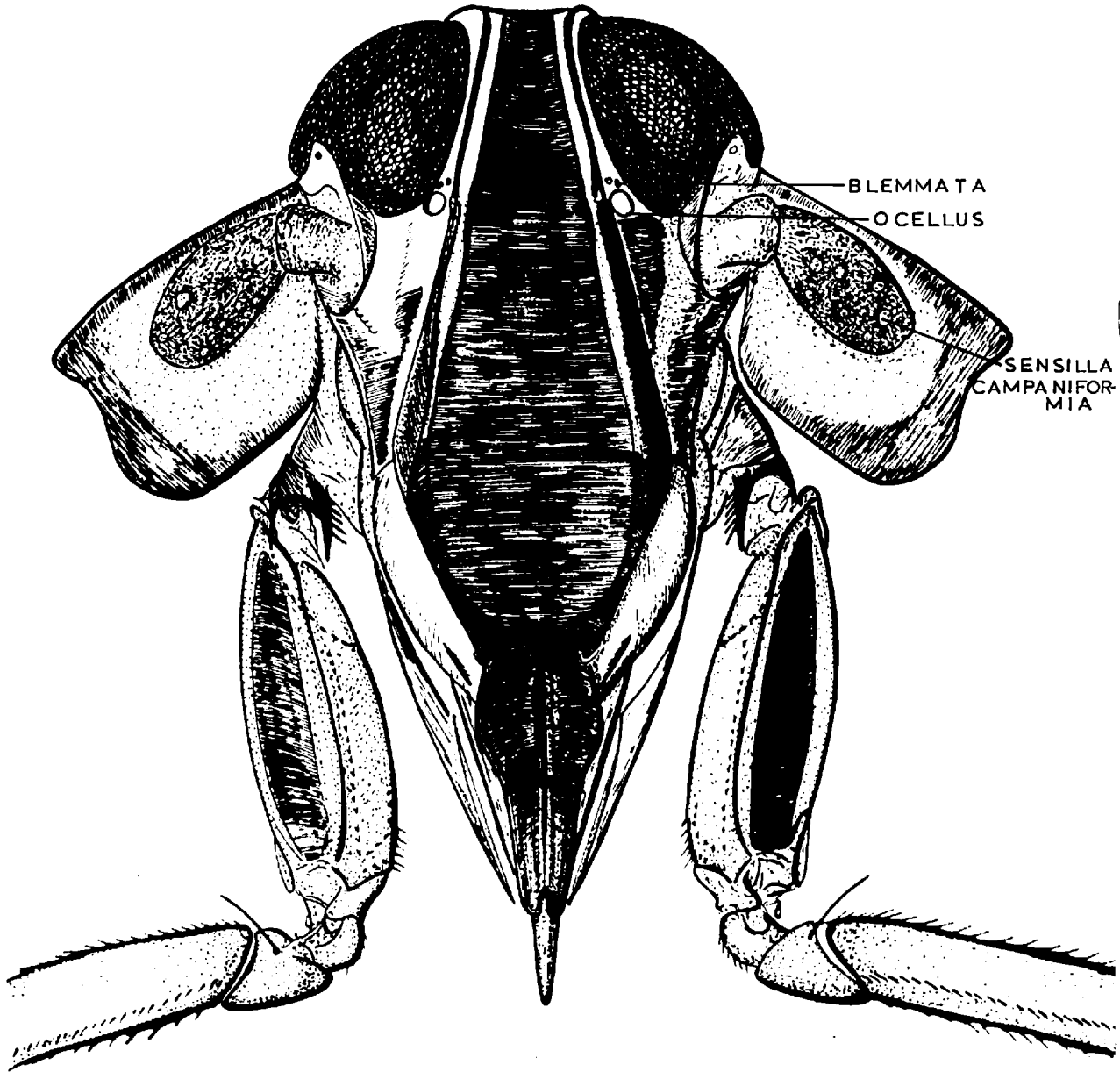
Metcalf [1945 (Gen. Cat. Hem. 4, 17:239)] lists 8 genera and 42 species; 18 species comprising in all 7 of these known genera and one genus not previously established, are to be found in the B.M. collection - viz. Kinnara, Eparmene, Paramicrixia, Quilessa, Prosotropis, Atopocixus, Oeclidius and Fennahius. The family is of both Old World and New World distribution, having been recorded from Malaya, Formosa, the Philippines, India, the Antilles and certain parts of North and South America.

To Henri Synave (Institut Royal des Sciences Naturelles de Belgique) goes the credit of having described the first kinnarid known from the Mascarene Islands, Paramicrixia insularis. (As yet the kinnarids are not recorded from Madagascar but their occurrence there is quite feasible - vide distribution of host plant Scaevola.)

The present author having had the advantage of examining the type species of the genus at the B.M. and numerous specimens of 'insularis', is of the opinion that Synave's species cannot be included in Distant's genus Paramicrixia (type species 'diaphana' Distant Plate 18): a new genus, Fennahius, is therefore proposed. The specimens examined by Synave were collected in Réunion⁺ by Dr. R. Paulian from an unspecified host plant: in Mauritius⁺⁺ the insect is readily collected on Scaevola frutescens Mill - a plant widely

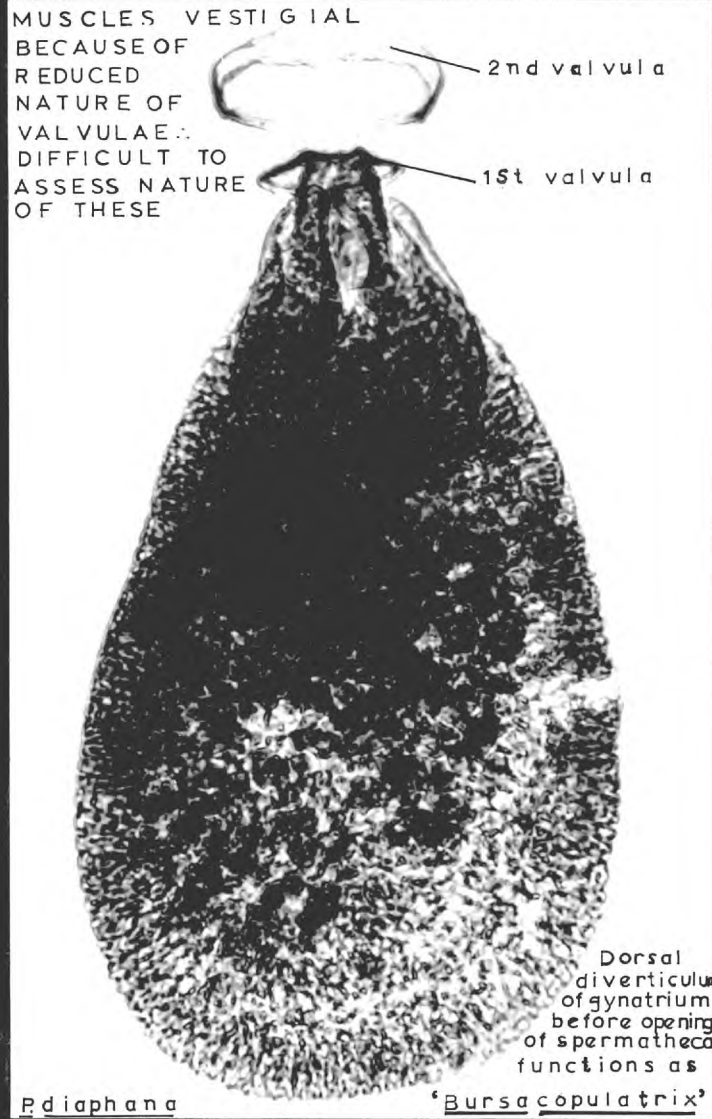
⁺St. Philippe, forêt du Brûlé, Mare Longue (November-December).

⁺⁺Common at Bel Ombre, Trois Mamelles.



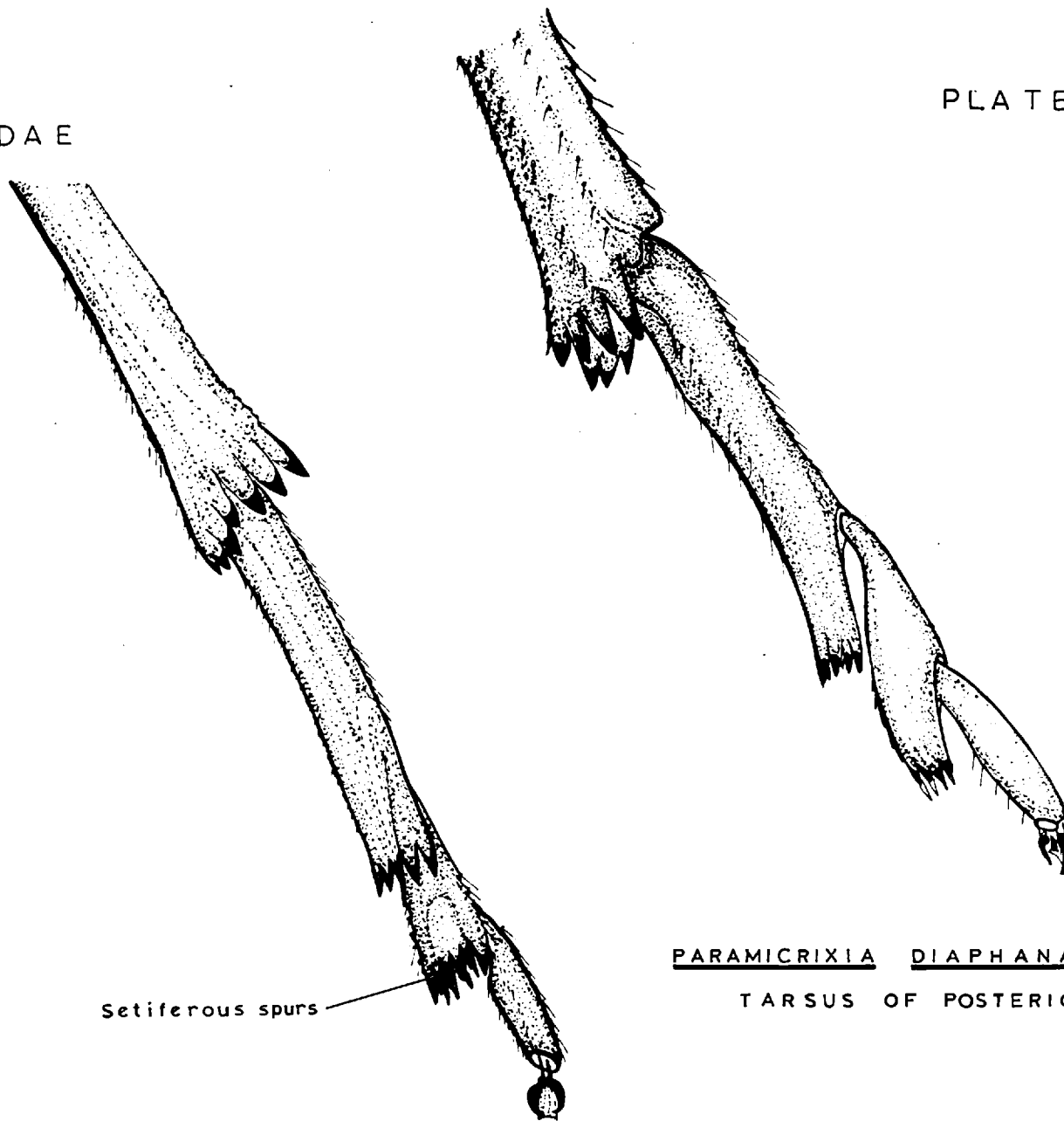
PARAMICRIXIA DIAPHANA DISTANT

♀



KINNARIDAE

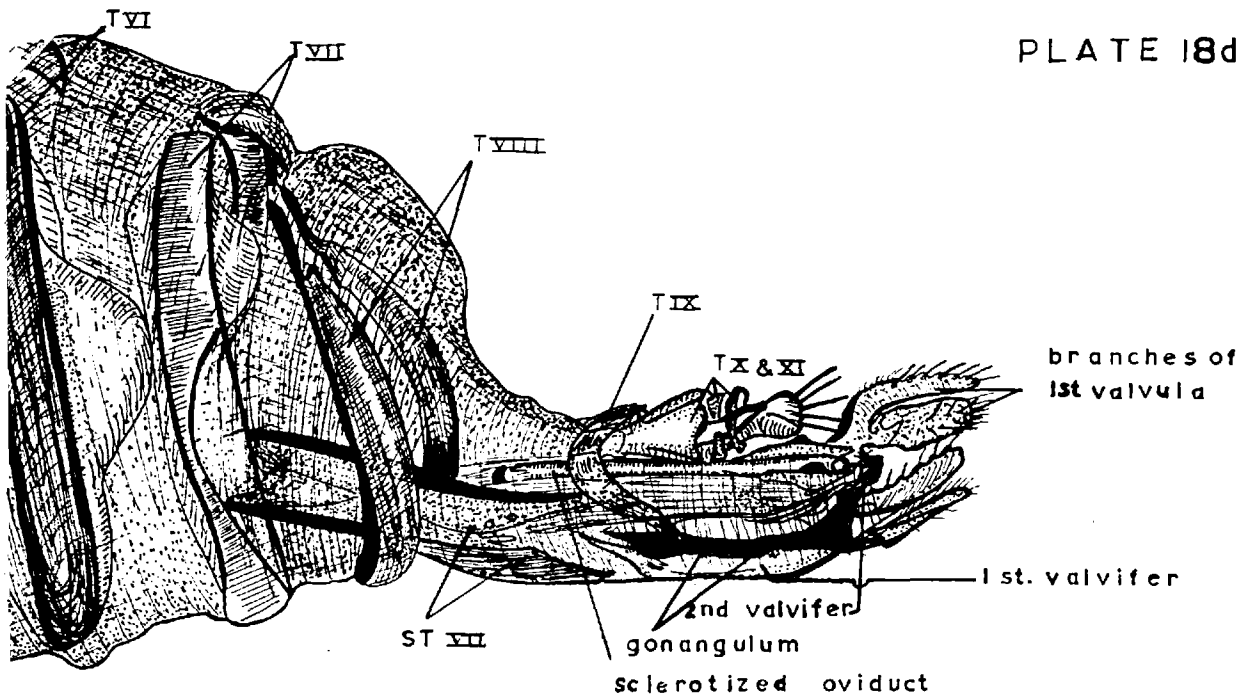
PLATE 18c



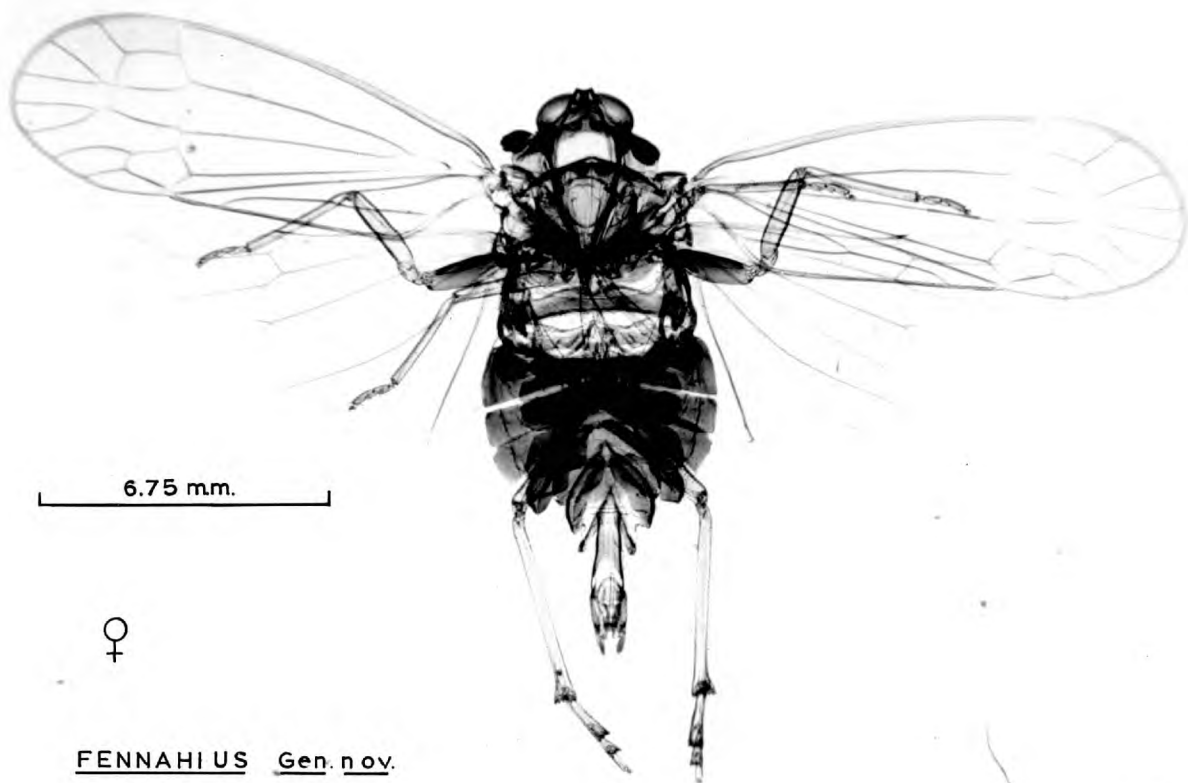
Setiferous spurs

PARAMICRIXIA DIAPHANA

TARSUS OF POSTERIOR LEG

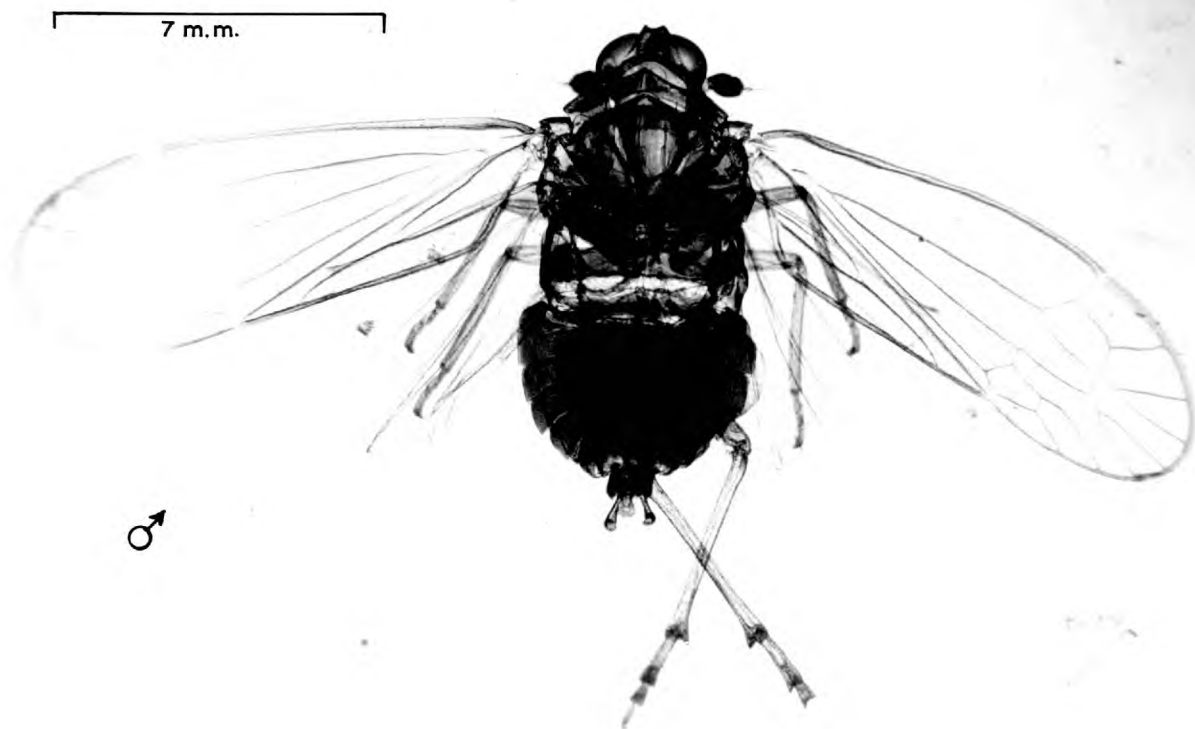


TIP OF ABDOMEN OF FENNAHIUS INSULARIS (SYNAVE) ♀
 from the left (semi diagrammatic)



FENNAHIUS Gen. nov.

F. INSULARIS (Synave)
(cleared specimens)



♂

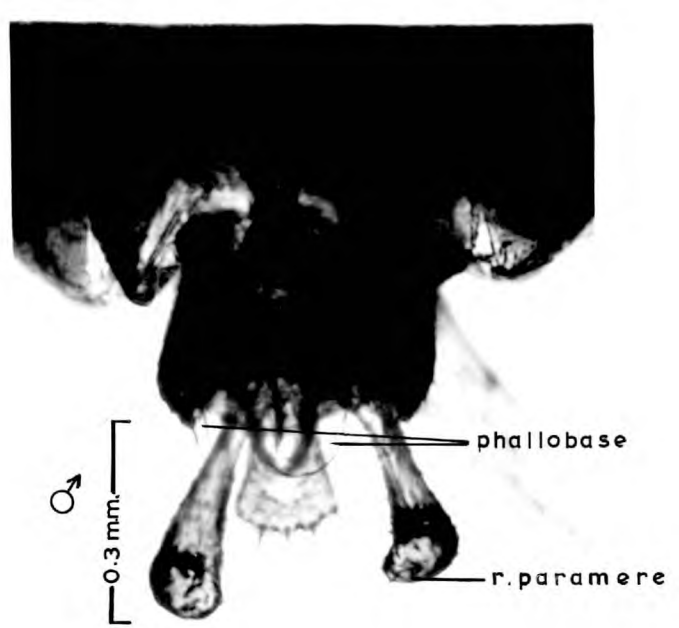
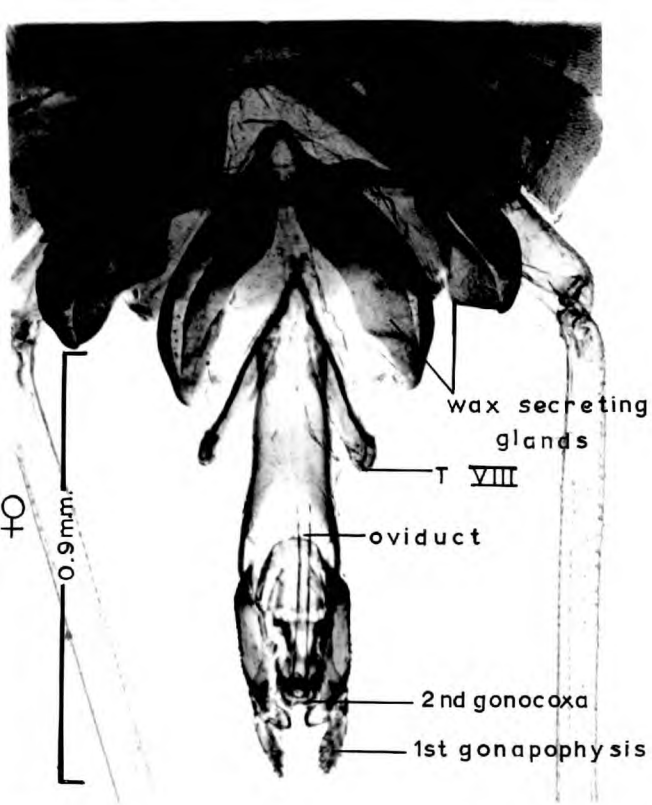
distributed on islands in the Indian Ocean, also in India, Malaya, East Indies, Australia, Hawaii, Formosa, Madagascar, the Seychelles, the Comores and the Mascarene Islands. Although the KINNARIDAE at present are a small family, there is good reason to suspect that closer examination would show that many species now in CIXIIDAE are in fact misplaced. Paramicrixia Distant⁺ was previously one such example.

Fennahius gen.n.

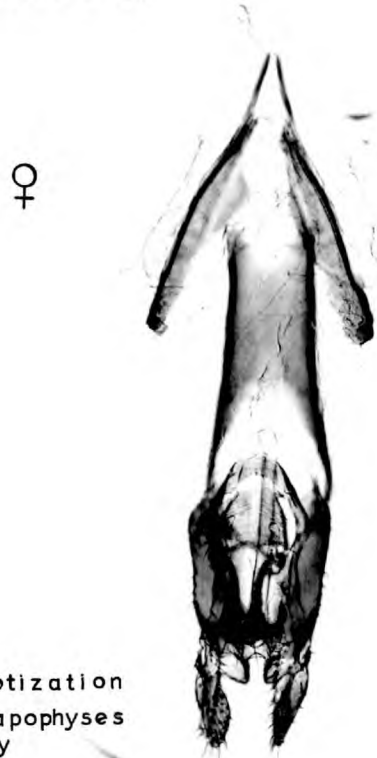
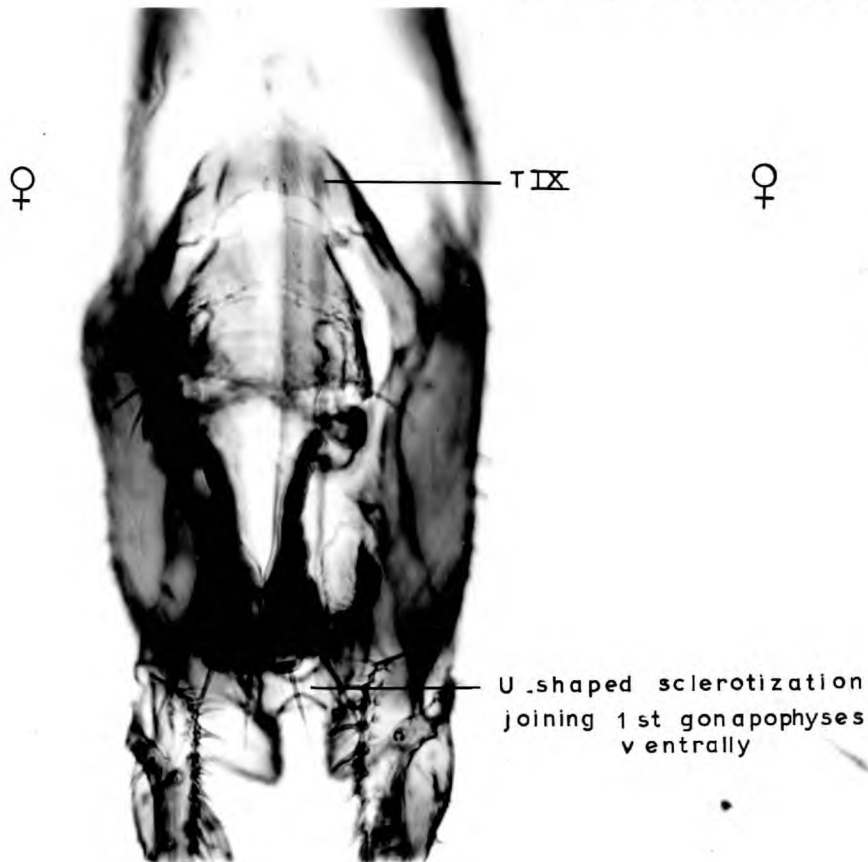
In Fennah's 'Key to the genera of West Indian KINNARIDAE' (1942, Proc. ent. Soc. Wash. 44:99), insularis runs down to Paramicrixia, with which it doubtless has affinity. However, it differs in the following characters which the writer believes to be of generic value: Vertex strongly prominent in front of eyes (cf. only feebly so in diaphana Distant): lateral carina of frons strongly prominent (Plate 19b) - (not weakly developed as in diaphana Distant): posterior margin of head deeply angularly emarginate (only slightly in diaphana): width of pronotum less than twice width across eyes (cf. more than twice head width): tegmen membrane distal to nodal

⁺Distant (1911) erected the genus Paramicrixia (Ann. Mag. nat. Hist. (8)8:742) to contain a single species P. diaphana (vide Pl.18, photograph of type-specimen in B.M.) - the description was based on a single female from Bengal [Note: A search in the accessions of the B.M. has revealed the existence of another ♀ specimen with the following data on the label: Tonkin Hoabinh: August 1918 - coll. R.V. de Salvaza].

In the present study of P. insularis described by Synave (1958, Bull. Ann. Soc. Ent. Belg. 94:118-121), particular attention to ♀ genitalia is therefore drawn. Comparison of ♀ genitalia of 'insularis' with Distant's 'diaphana' show that the two species are not congeneric.



FENNAHIUS INSULARIS
TIP OF ABDOMEN (Cleared)



line, very much shorter than clavus (c f. length subequal in diaphana Dist.)(vide. Pls. 18, 18e, 19, 19a); the nodal line more or less transverse (c f. strongly oblique): membrane with seven apical veins (c f. eight) and three subapical cells (c f. only one): hind wing with 3 apical cells formed by vein bifurcation (c f. only 2 in Paramicrixia). Ovipositor (Pl. 18f & 18g) very long and cylindrical (c f. short). Anal style with 5 setae (c f. 12).

The male genitalia of Paramicrixia are unknown: those of Fennahius are figured by Synave (1958 - loc. cit. p. 120 figs 4, 5, 6.). The characters which Muir has suggested for the KINNARIDAE, viz "the male aedeagus consisting of an outer tube, the perianthium⁺ and an inner tube, the penis, which passes through the perianthium" are probably not general features, (vide Synave's diagrams and Plate 18f top right preparation) since in Fennahius there is no "outer tube".

The major points of interest in the female genitalia illustrated in Plates 18f & 18g are briefly considered as follows:

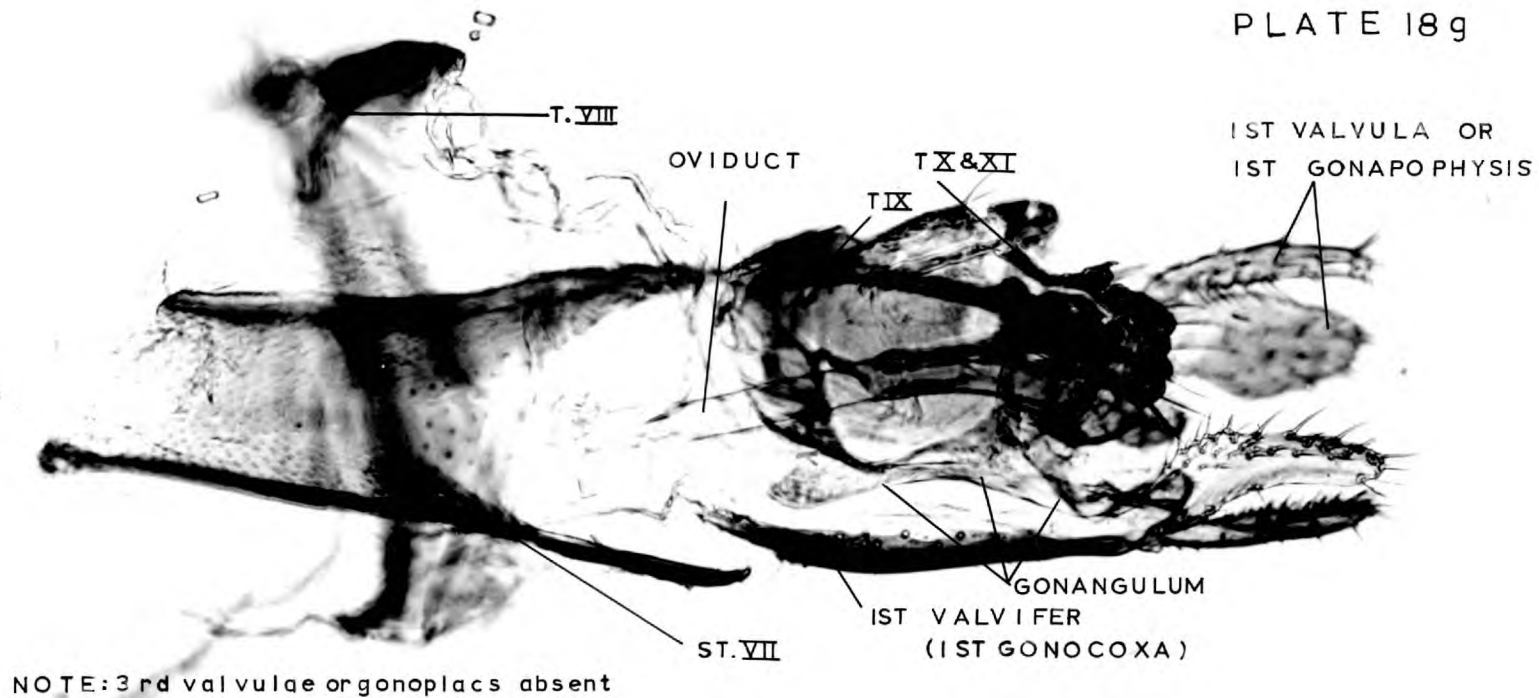
Fennahius - ♀ genitalia.

In having the gonangulum clearly fused to tergum IX⁽¹⁾ & (2) the ♀ genitalia of F. insularis (Plates 18f & g) show similarities with Heteroptera unique amongst Homoptera. Whilst no close relationship to heteropteran families is postulated, the presence of a U-shaped sclerotization joining the 1st gonapophyses ventrally (Plates 18f - bottom

⁺The author is privileged to dedicate this new genus to Mr. R.G. Fennah (Commonwealth Institute of Entomology) for his important contributions to knowledge of world Fulgoroidea.

- (1) Scudder (1957) - 'Reinterpretation of some basal structures in the insect ovipositor', Nature 180:340-341.
- (2) Scudder (1961) - 'The comparative morphology of the insect ovipositor', Trans. R. ent. Soc. Lond. 113:25-40.

PLATE 18g



FENNAHIUS INSULARIS (Synave)

TIP OF ABDOMEN & GENITALIA (FROM THE LEFT)

KINNARIDAE

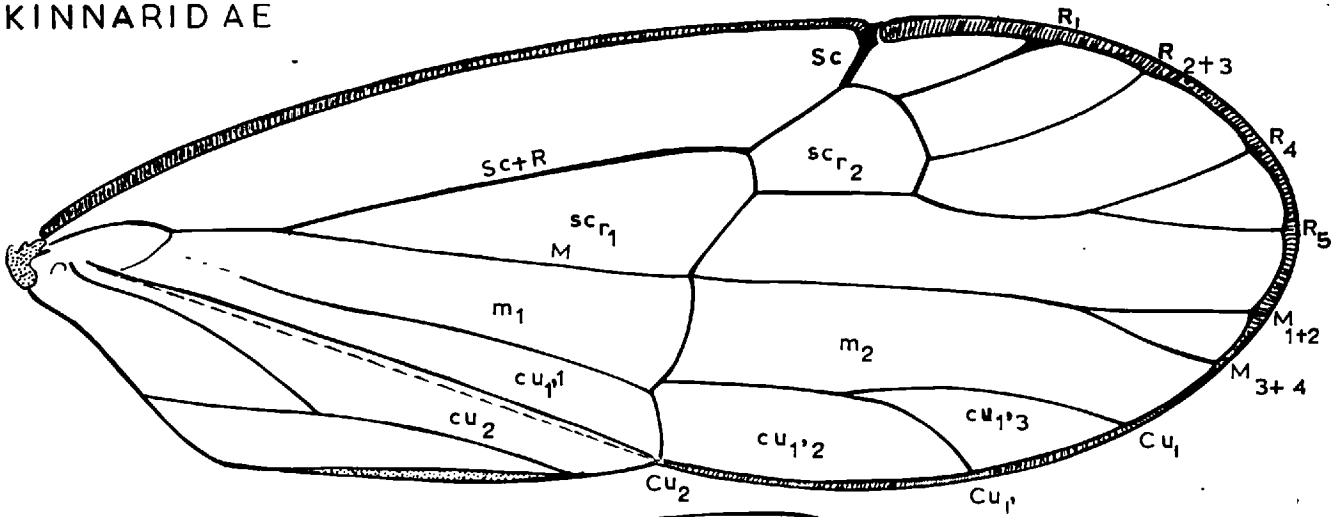


FENNAHIUS GEN. NOV.
LOCALITY: MASCARENES

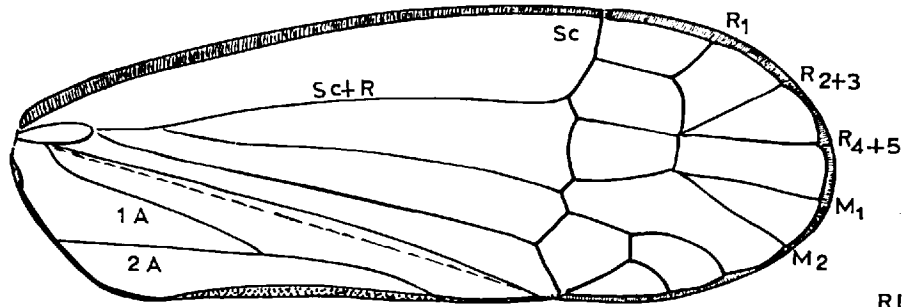
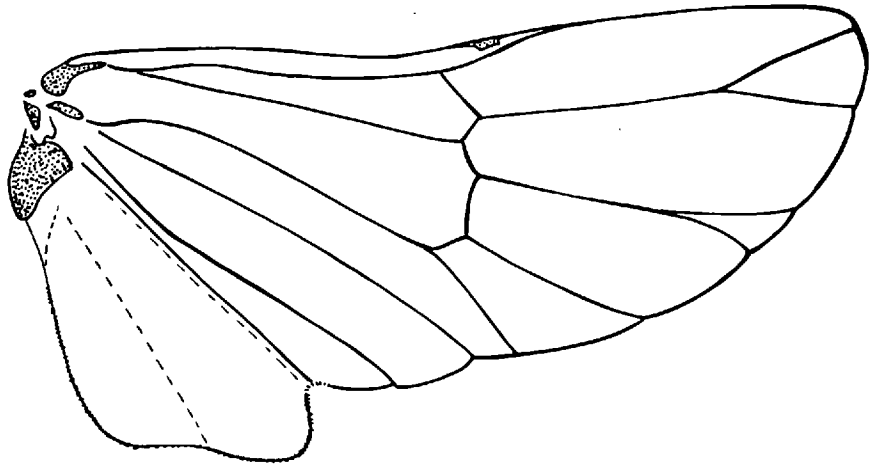
F. INSULARIS (SYNAVE)
comb. n.

♀

KINNARIDAE

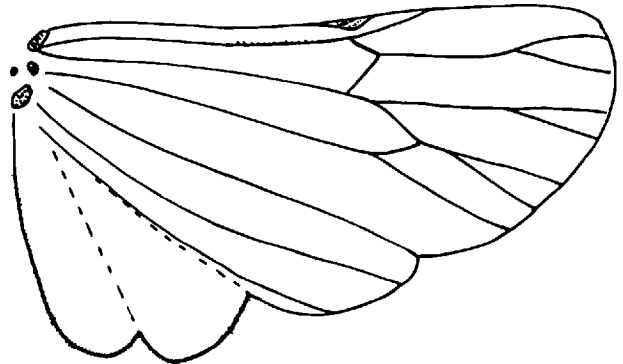


RIGHT TEGMEN & WING OF
P. DIAPHANA DISTANT



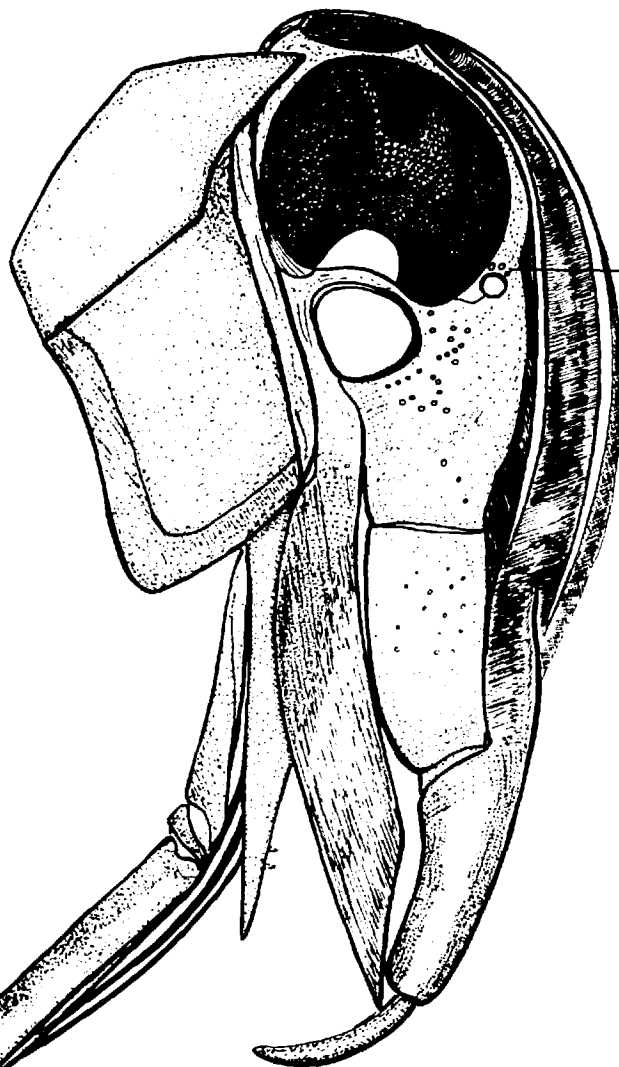
RIGHT TEGMEN & WING OF
FENNAEHUS new genus

TYPE SPECIES:
PARAMICRIXIA *INSULARIS*
SYNAVE

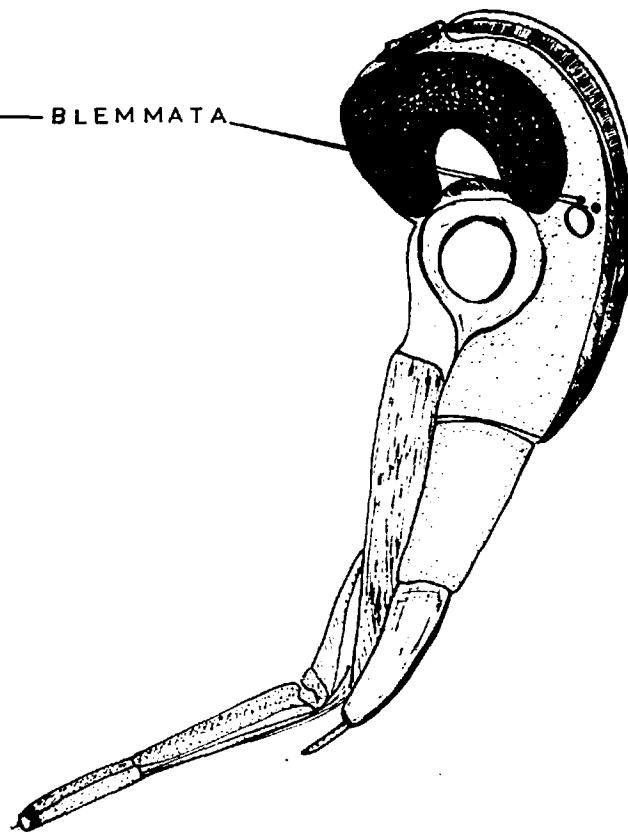


KINNARIDAE

PLATE 19 b



P. DIAPHANA - HEAD LATERAL VIEW



F. INSULARIS

left) occurs also in the RHOPALIDAE.

Furthermore it would appear that the oviduct is sclerotized and opens on the fused gonocoxae; if this is indeed the case it is as far as is known a unique example in the Hemiptera. This would perhaps have been brought about by the complete loss of the 2nd gonapophyses and marked elaboration of the 1st gonapophyses. Gonapophyses in general are used for penetration of plant tissue, their flattened expanded setaceous structure in Fennahius strongly suggests that such is not the function in this case.

Type-species: F. insularis (Synave) comb.n.

An adequate species description has been given by Synave and need not be repeated here.

xxxvi. CIXIIDAE, ACHILIDAE, RICANIIDAE, ISSIDAE, TROPIDUCHIDAE
of the Mascarene Islands.

Until the past few years very little was known of the Fulgoroidea⁺ of the Mascarene Islands. Amyot & Serville, Stål, Melichar, Spinola, recorded a few species. More recently Muir (1925)⁺⁺ studied material from Rodriguez and described 1 new genus and 10 new species. Synave undertook recently to describe the new species from the area. Unfortunately it appears that he has not referred to the type material of all previously recorded species. The present author has reason to suspect that Synave's lists in consequence contains several examples of synonymy. For the purposes of this brief study, however, it is sufficient to draw attention to but one important instance - the erroneous placing of a Mascarene kinnarid under the genus Paramicrinia.

P. insularis Synave is here transferred to a new genus Fennahius. The fulgorid fauna of Mauritius appears to have been modified considerably by two major factors:

- (1) destruction of forests;
- (2) introduction of insectivorous birds.

Lawana escoleta Mel. (FLATIDAE) [Plate 19f] is quite possibly extinct, as is Laberia palliata Stål ~~NOGODINIDAE~~. However many

⁺The delphacid species of the Mascarene Islands have recently been recorded and revised by Fennah [(1964) - Trans. R. ent. Soc. Lond. 116:131-150]. This paper appeared at a date too recent for the writer to analyse it critically.

⁺⁺'On some Fulgorids [Hemiptera-Homoptera] from the island of Rodriguez' - Trans. ent. Soc. London 1925:463-474, 2 pls., 9 figs.

other dendrophilous species can still be collected in what remains of the original tree flora of the island, e.g., in the upper reaches of Tamarind River, R. du Rampart, and in the region round Pétrin, Les Mares, Plaine Champagne and the mountains round Bel Ombre, Chamarel.

Just over a century ago Signoret described Conchyoptera unicolor - a beautiful green⁺ tropiduchid from Réunion and Madagascar. Only recently the species was collected in the 'Macabé Forest' region by Mr. Jacques Monty - the first occasion it has been taken in Mauritius [Plates 19c-d₁]. The present list of fulgorids suggests that only a few are truly endemic to the individual Mascarene islands. Some examples of species occurring in Mauritius and Madagascar and/or the Seychelles are: Brixia stellata Distant, Achaemenes quinquespinosus Synave, Ulandia madagascariensis, Conchyoptera unicolor Signoret.

⁺Melichar in his redescription of this species [1914-
'Monographie der Tropiduchinen' pp.124, 130 & 143] from the old syntype series, has mistakenly concluded that the natural colour is yellowish brown: in fact the species when live is green.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Other localities
CIXIIDAE Spinola 1839						
<u>Ann. Soc. ent. France</u> 8:204.						
Genus <u>Achaemenes</u> Stål 1866						
<u>Hem. Afric.</u> 4:170.						
<u>A. quinquespinosus</u> Synave 1959	+	+				
<u>Nat. malgache</u> 11:133.						
Genus <u>Aselgeoides</u> Distant 1917						
<u>Trans. Linn. Soc. Lond.</u> 17:275.						
<u>A. insularis</u> Distant 1917						+
<u>ibid.</u> p.275.						
Genus <u>Brixia</u> Stål 1856.						
<u>Ofv. K. Vet. Akad. Forh.</u> , p.162.						
<u>B. belouvensis</u> Synave 1959						+
<u>Nat. malgache</u> 11:142.						
<u>B. belouvensis aurata</u> Synave	+	+				
1959						
<u>ibid.</u> p.145.						
<u>B. belouvensis bipunctata</u>						+
Synave 1959						
<u>ibid.</u> p.143.						
<u>B. bohemani</u> Stål 1854	+					East Africa (?)
<u>Ofv. Svenska Vet. Akad.</u> <u>Forh.</u> 11:245.						
<u>B. costalis</u> Synave 1959						+
<u>Nat. malgache</u> 11:142.						

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Other localities
<u>B. insularis</u> Synave 1959 <u>ibid.</u> p.139.		+				
<u>B. lunulata</u> Amyot & Serville 1843 + <u>Hist. Nat. Ins. Hemip.</u> p.515.						
<u>B. macabeensis</u> Synave 1960 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 36:2.		+				
<u>B. mauritii</u> Synave 1960 <u>ibid.</u> p.4.		+				
<u>B. nigrifrons</u> Synave 1960 <u>ibid.</u> p.6.		+				
<u>B. perruchensis</u> Synave 1960 <u>ibid.</u> p.4.		+				
<u>B. pullus</u> Muir 1925 <u>Trans. ent. soc. Lond.</u> 1924: 465.					+	
<u>B. rodriguezii</u> Muir 1925 <u>ibid.</u> pp.464-465.					+	
<u>B. stellata</u> Distant 1914 <u>Trans. Linn. soc. Lond.</u> 17:284.		+		+	+	
<u>B. tricolor</u> Synave 1961 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 37:3.		+				
<u>B. unistriata</u> Synave 1961 <u>ibid.</u>		+				

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Other localities
<u>B. vacoasensis</u> Synave 1958 <u>ibid.</u>	+					
<u>B. viridis</u> Muir 1925 <u>loc. cit.</u> p.465.			+			
<u>B. wagneri</u> Synave 1958 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 34:4.	+					
<u>B. williamsi</u> Synave 1958 <u>ibid.</u> p.2.						
Genus <u>Cubana</u> Uhler 1895 <u>Proc. zool. soc. London</u> 1895:62.						
<u>C. insularis</u> Muir 1925 <u>Trans. ent. soc. Lond.</u> 463-464.	+*		+			
<u>Eumyndus</u> Synave 1956 <u>Mem. Inst. sci. Madag.</u> (E)7:180.						
<u>E. pallidus</u> Synave 1959 <u>Nat. malgache</u> 11:138.			+			
<u>E. bistriatus</u> Synave 1959 <u>Nat. malgache</u> 11:138.			+			
Genus <u>Oliarus</u> Stål 1862 <u>Berl. Ent. Zeit.</u> , 6:306.						
<u>O. mameti</u> Synave 1961 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 37:7-8.	+					

*New record.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Other localities
<u>O. sancti philippi</u> Synave 1959 <u>Nat. malgache</u> 11:135.		+				
ACHILIDAE Stal 1866 <u>Hem. Afr.</u> 4:130.						
Genus <u>Aphypia</u> Melichar 1908 <u>Cas. Ceske Spol. Ent.</u> 5:6.						
<u>Aphypia</u> sp. Synave 1858 <u>Bull. Inst. roy. sci. nat.</u> <u>Belg.</u> 34:7.		+				
<u>Paraphypia</u> Synave 1960 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 36:7.		+				
<u>P. laevifrons</u> Stal 1861 <u>Ent. Zeit.</u> 22:151.		+		+		
<u>P. macabeana</u> Synave 1960 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 36:8-9.						
<u>P. vinsoni</u> Synave 1961 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 37:16.		+				
RICANIIDAE Amyot & Serville 1843 <u>Hist. nat. Ins. Hemip.</u> 1843, 527.						
Genus* <u>Laberia</u> Stal 1866. <u>Hem. Afr.</u> 4:234.						
<u>L. palliata</u> Stal 1866 <u>ibid.</u>		+				
<u>*Vide page following.</u>						

Status of Laberia palliata Stål

Metcalf has transferred Laberia to the family NCGODINIDAE [Gen. cat. etc., (1954) - Fasc. 4 pt. 12 pp. 71-72]. Originally placed by Stål in the RICANIIDAE Melichar (1928 - Gen. Insect. 182:120, 153, 173) thought it should belong in the TROPIDUCHIDAE.

The type is a female with genitalia so different from any known ricanid, nogodinid or tropiduchid that the position must remain uncertain until the ♂ is discovered.

Type-locality: Mauritius.

[V. et. Fennah Ann. Mus. cong. belge (8) Sci. Zool. (1958) 59:142]

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Other localities
<u>Privesa</u> Stål 1862 <u>Rio Jan. Hem.</u> 2:70.						
<u>P. macabeana</u> Synave 1960 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 36:8.	+					
Genus <u>Tarundia</u> Stål 1859 <u>Berl. Ent. Zeit.</u> 3:325.						
<u>T. cinctipennis</u> Stål 1862 <u>ibid.</u> 6:314.	+					Africa, Sierra Leone.
<u>T. clara</u> Synave 1958 <u>Bull. Inst. Sci. Madag.</u> 34:11.	+					
<u>T. mameti</u> Synave 1958 <u>ibid.</u> p.9.	+					
<u>T. marginata</u> Melichar 1898 <u>Ann. K.K. Naturh. Hofmus.</u> <u>13</u> :268.	+	+				
<u>T. servillei</u> Spinola 1839 <u>Ann. Soc. Ent. Fr.</u> 8:404.	+	+				
<u>T. straminea</u> Muir 1934 <u>loc. cit.</u> p.472-473.					+	
ISSIDAE Spinola 1839 <u>Ann. Soc. ent. France</u> 8:158; 163; 204.						
Genus <u>Tylana</u> Stål 1862 <u>Rio Jan. Hem.</u> 2:67.						

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Other localities
<u>T. carinata</u> Fabr. 1803 <u>Syst. Rhyng.</u> p.100.	+		+			
<u>T. conspersa</u> Schmidt 1910 <u>Stett. Ent. Zeit.</u> 1:166.	+					
<u>T. macabeana</u> Synave 1961 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 37:9.	+					
<u>T. mameti</u> Synave 1961 <u>ibid.</u> p.11.	+					
<u>T. similis</u> Synave 1961 <u>Bull. Inst. roy. Sci. nat. Belg.</u> <u>37:13.</u>	+					
TROPIDUCHIDAE Stål 1866 <u>Hem. Afr.</u> 4:186 [Tropiduchida]						
Genus <u>Clardea</u> Signoret 1862 <u>Notes etc. Annex. (J)</u> p.30.						
<u>C. lequati</u> Muir 1925 <u>loc. cit.</u> p.468-469.				+		
<u>C. mauritii</u> * Synave 1960 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belg.</u> 36:10.	+					
<u>C. notatula</u> Stål 1866 <u>Hem. Afr.</u> 4:191.			+			

* Reared on Helichrysum yuccaefolium by the present author.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Other localities
<u>C. nigrostriata</u> Synave 1961 <u>Bull. Inst. roy. Sci. nat.</u> <u>Belge</u> <u>37</u> :18.	+					
<u>C. unicolor</u> Signoret 1862 <u>Notes in Maillard etc.</u> <u>2</u> :30.		+				
Genus <u>Conchyoptera</u> Signoret 1860 <u>Ann. soc. ent. France</u> (3) <u>8</u> :184.						
<u>C. unicolor</u> Signoret 1860 <u>ibid.</u>	+*	+		+		
KINNARIDAE Muir 1925 <u>Pan. Pacific Ent.</u> <u>1</u> :97.						
Genus <u>Paramicrixia</u> Distant 1911 <u>Ann. Mag. nat. Hist.</u> (8) <u>8</u> :142.						
** <u>P. insularis</u> Synave 1958 <u>Bull. Ann. Soc. R. Ent. Belg.</u> <u>94</u> :119.	+	+				
MEENOPLINIDAE Fieber 1872 <u>Katalog europaischen cicaden</u> <u>1872</u> :3.						
Genus <u>Nisia</u> Melichar 1903 <u>Homopteren Fauna von Ceylon</u> , p.53.						
<u>N. atrovenosa</u> (Lethierry 1888) <u>Ann. Mus. Genov.</u> (2) <u>6</u> :466.						+***

*New record - Collector: Jacques Monty.

**Now under Fennahius Orian.

***New Record.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Other localities
DERBIDAE Spinola 1839						
[Derboides - <u>Ann. Soc. ent. France</u> <u>8:204-205; 377-</u>						
Genus <u>Leguatia</u> Muir 1925						
<u>L. fernandezi</u> Muir 1925						+
<u>loc. cit.</u> p.470.						
Genus <u>Phenice</u> Westwood 1845						
<u>Trans. Linn. Soc. Lond.</u> 19:10.						
<u>Phenice</u> sp.						+
Genus <u>Paraphenice</u> Muir 1924						
<u>Proc. ent. Soc. Washington</u> <u>26:18.</u>						
<u>P. insularis</u> Muir 1925						+
<u>loc. cit.</u> p.471.						
* <u>P. lopezi</u> Muir						+
<u>ibid.</u> 471-472.						
						+

*Named after Diego Lopez de Siqueira, who appears to have visited Rodriguez about 1509-1510.

GENUS:
C. G. CHYOPTERA



C. UNICOLOR SIGN.

MAURITIUS
NEW LOCALITY
COLL. J. MONTY



TROPIDUCHIDAE

PLATE 19c



TROPIDUCHIDAE
PLATE 19 c₁

GENUS: CONCHYOPTERA

Signoret

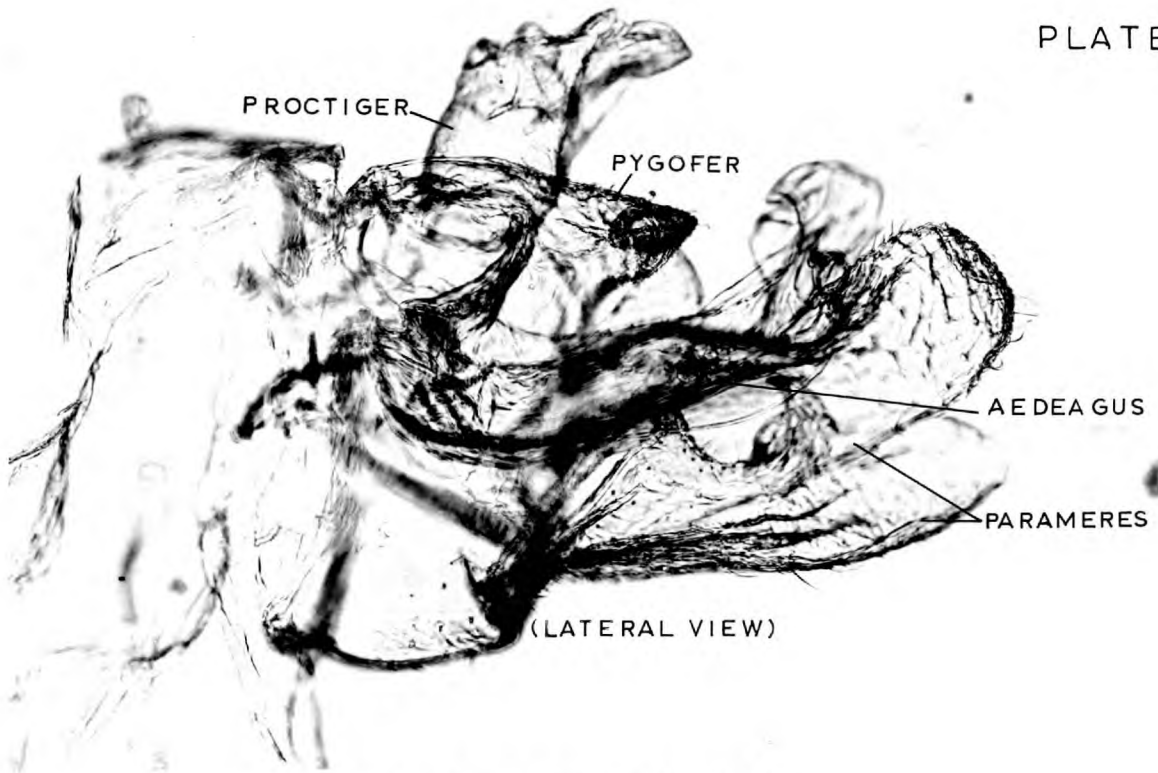




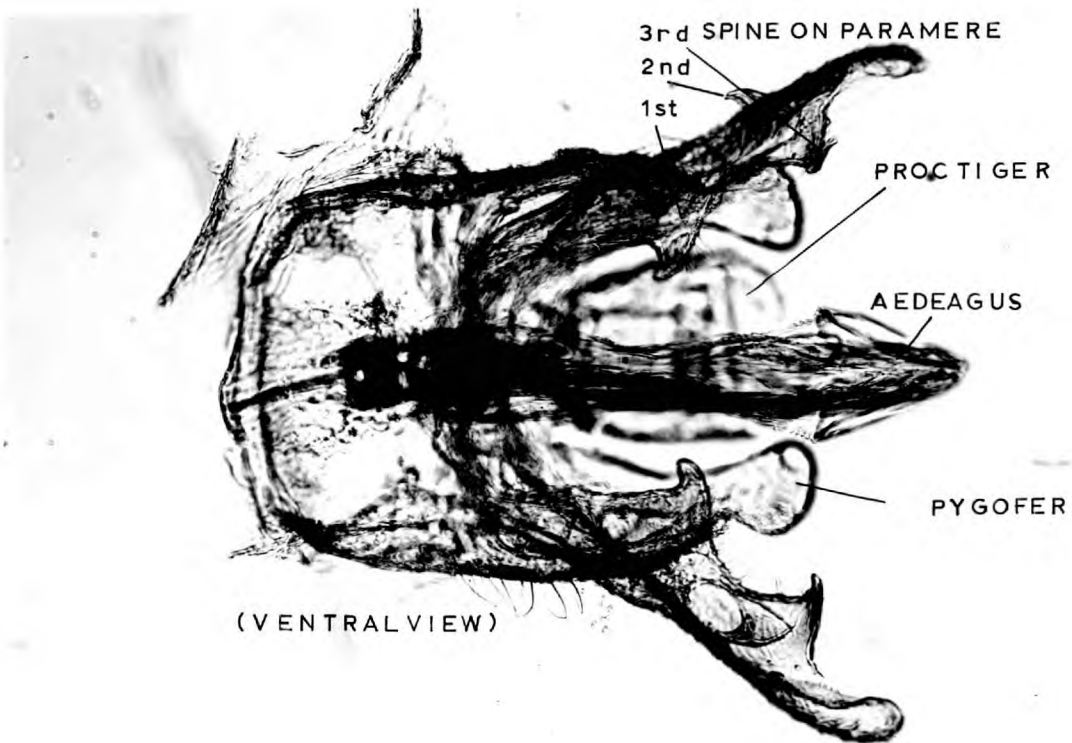
TROPIDUCHIDAE
PLATE 19 2

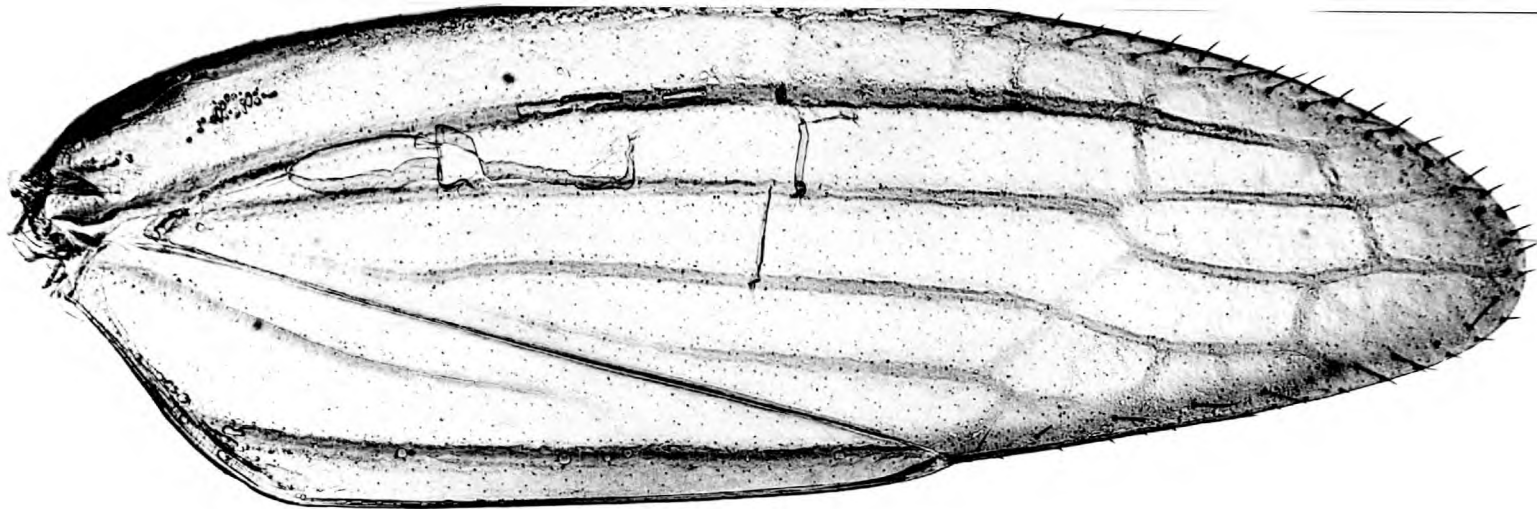
GENUS CONCHYOPTERA SIGNORET

♀



CONCHYOPTERA UNICOLOR
(♂ GENITALIA)





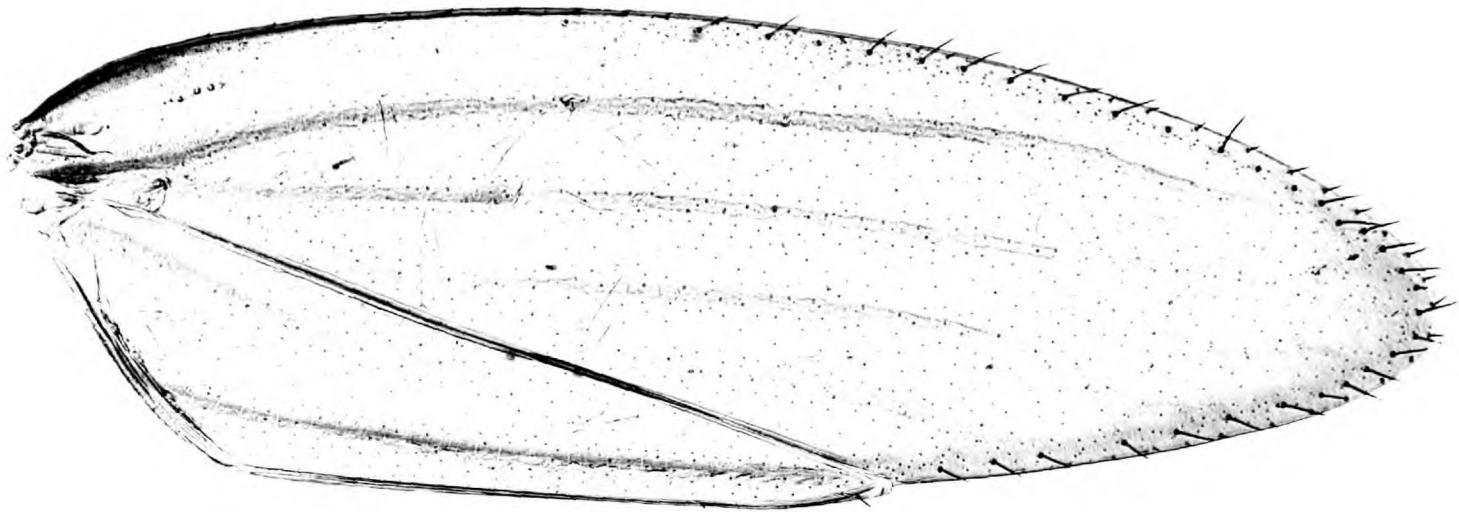
♀



TROPIDUCHIDAE

PLATE 19 d

GENUS: CONCHYOPTERA Signoret 1860
C. UNICOLOR SIGNORET.



♂



TROPIDUCHIDAE
PLATE 19d₁

GENUS: CONCHYOPTERA
Signoret

XXXVII. APHROPHORIDAE recorded in error from Mauritius

APHROPHORIDAE Amyot & Serville 1843

[As Aphrophorides]

Metcalf (1942) in his "Bibliography of the Homoptera" p. 60 under Bennett E.T. [1833 - Proc. zool. Soc. London 1:11-12] notes that Aphrophora goudoti was described from Mauritius. This is an error - the more marked because A. goudoti does not even occur in Mauritius. Yarrell in his reference to the description of this insect states clearly that the type locality is Tamatave on the east coast of Madagascar. Metcalf's mistake probably arose because the first mention of this material was in correspondence between Yarrell and Charles Telfair⁺ discussed at an 1833 meeting of the Zoological Society of London.

On p. 187 of the same "Bibliography" under J.F. Desjardins, Metcalf refers to Aphrophora "porte-écruise". This is a typographical error Aphrophora⁺⁺ "porte écume". The family APHROPHORIDAE is not recorded so far from Mauritius. A. goudoti, now placed under Ptyelus (Le Peletier and Serville) is very variable in coloration. It is interesting to note that neither APHROPHORIDAE nor the CERCOPIDAE⁺⁺⁺ members of which are frequently pests of sugar cane, have been recorded in Mauritius.

⁺"Corr. memb. Z.S., as President of the Mauritius Natural History Society".

⁺⁺the famous "rain -insects" of tropical forests.

⁺⁺⁺CERCOPIDAE - should be attributed to Leach 1815 Brewster Edinburgh Encyclopedia; Entom. 9:125 who first gave a group name Cercopida to the taxon Cercopis F. This has been accepted in the Oshanin Palaeartic Katalog 1912 and the Van Duzee Catalog. America etc. 1917 Metcalf (Gen. cat. HOMOPTERA 7 pt. 2 p. 1. 1961) attributes authorship to Westwood 1838 in error.

xxxviii. The CICADELLIDAE of the Mascarene Region.

Amyot & Serville (1843) were the first authors to describe any cicadellid from the Mascarene region. In their 'Histoire Naturelle des Insectes (Hémiptères)' (p.574) they list Acopsis viridicans from Mauritius.

In Signoret's 'Faune des Hémiptères de Madagascar (1860)',⁺ a few species are mentioned whose range may well extend to the Mascarenes.

Jacobi's treatise (1917) on the group covers only Madagascar and the Comores. Melichar's papers⁺⁺ (1851 - following) have hardly any mention of cicadellids from the Mascarenes. Naudé's (T.J.)⁺⁺⁺ paper (1926) is restricted to S. Africa and many of its generic descriptions are merely translations from Stål's work. Evans's study (1953) is probably the most constructive to date - but like other works it excludes the Mascarenes. Thus the CICADELLIDAE afford yet another example of a family whose representation in the Mascarenes has hardly been considered.

In the author's list (1956) three species are recorded from Mauritius: in the list given hereafter eleven species are named: three of which are identified only to genera.

⁺ Ann. Soc. ent. France (3) 8:177.

⁺⁺ Ann. Hist. nat. Mus. Nat. Hungaria 1:73.

⁺⁺⁺ CICADELLIDAE of South Africa (Ent. Mém. 4, S. Afr. Dept. Agric.)

CICADELLIDAE Latreille 1825

(Fam. nat. Règne Animal, p.427: as Cicadellae)

*Type genus: Cicadella Latreille 1817 (type-species Cicada viridis L. 1758, designated by Van Duzee 1916)Genus Coelidia Germar 1821
Mag. Ent. 4:75Type species C. venosa Germar 1821
Mag. Ent. loc. cit.C. indicus (?) (Walker) 1851. Mauritius (?), India,
Seychelles.Jassus indicus. List. Hom. iii, p.855.(First recorded from Mauritius by Orian 1960 - Ann. Rep. Dept.
Agric.)

The author finds that Mauritian specimens are atypical. The question is under study.

C. determinatus (Distant) 1917. Mauritius, Seychelles.Jassus determinatus Distant. Trans. Linn. Soc. 17:316.First collected in Mauritius by Orian, vide C.I.E. list coll. no. 18194 (Africa No. 6356), 28.6.62 - Dept. Agric. Nos. 987, 988. Often found on Scaevola frutescens (Mill.).Genus Neodartus Melichar 1903Homopt. Faun. Ceylon p.162Type species N. acocephaloides MelicharN. bella (Stål) 1864. Mauritius, Cape Town,
Europa Is., Ethiopian Region generally.
(= Penthimia bella Stål). Hem. Afr. 4:108.)First recorded from Mauritius by Orian, 1961 - Ann. Rep. Dept.

*Vide China - Bull. zool. Nomencl. 18:163-167 (June 1961) - Opinion 647 Bull. zool. Nomencl. 20:35-38.



♀

ACOPSIS VIRICANS A. & S.

Agric. under the name of P. bella Stål.

Evans (Mém. Inst. sci. Madagascar (E), 1953, p.101), places the species under Neodartus.

Genus Acopsis Amyot & Serville 1843

Hist. nat. Inst. Hémipt.:574.

Type species A. viridicans Amyot & Serville

[Plate 19e]

A. viridicans Amyot & Serville. Mauritius, Réunion.
Hist. nat. etc. loc. cit.

This species is apparently endemic to Mauritius and Réunion. It was confused with the Madagascan Ulozena lineaticollis Sign. by Schouteden 1907, p.288. A. viridicans is green with the abdomen red (dorsally). Ulozena is a yellowish species with black markings, a yellow scutellum and reddish elytra. According to Dr. D. Young the type of U. lineaticollis is in Vienna. Signoret's description does not correspond with the type.

[It is interesting to note that the antennae of A. viridicans have disc-like swellings⁺ in the ♂ near the tip (cf. Idiocerus). Nymphal antennae are much longer than those of adults. Common in Mauritius (Macabé Forest) at dusk.]

Genus Igerna Kirkaldy 1903

Wien. ent. Zeit. 22:13 n.n. for Pachynus Stål 1866
(Hem. Afr. 4:127)

Type species Bythoscopus (Oncopsis) bimaculicollis
Stål

⁺The author is grateful to Mr. Peter Broomfield [B.M.(N.H.)] for drawing his attention to this peculiarity.

I. bimaculicollis (Stål) 1855.
Öfv. Vet. Ak. Förh. p.100.

Mauritius, Madagascar,
 S. Africa.

First recorded from Mauritius by Orian 1961 (Ann. Report
Dept. Agric.). Specimens collected by the author in 1962 appear to
 be atypical.

Genus Balclutha⁺ Kirkaldy 1900

Entomologist 33:243

Type species: Cicada punctatus Thunberg

B. rufofasciata (Merino) 1935.
Philippian Journ. Sci. 61:381.

Mauritius, cosmopolitan.

[First recorded from Mauritius by Orian 1961 - Ann. Report Dept. Agric.
 under Nesosteles sanguinescens (Kirkaldy) 1906 - under which the
 insect was identified by C.I.E.]

Swept from grasses.

Genus Exitianus Ball 1929

Trans. Amer. ent. Soc. 55:5

Type: Cicadula exitiosa Uhler

E. (Euscelis) capicola Stål 1855.

Mauritius, S. Africa,
 Rhodesia, cosmopolitan.

Athysanus capicola, Öfv. Vet. Ak. Förh.,
 p.99.

(First recorded from Mauritius by Stål, 1866, Hem. Afr., 4:123).

Common on GRAMINIFAE - often attracted to light.

⁺Information supplied by Dr. H. Derrick Blocker [Dept. Ent.,
 N. Carolina State College, Raleigh] to Dr. Ghauri - in litt.
 25.1.65.

Genus Macropsis Lewis 1834.

Trans. ent. Soc. London 1:49

Type species Cicada virescens Fabricius

Macropsis spp.

Mauritius, Réunion.

The author has in his collection many ♀♀ of a species belonging in this genus.

Genus Empoasca Walsh 1862⁺

Prairie Farmer 10:148, 149

(Vide also Proc. Boston Soc. nat. Hist. 9:315)

Type species Empoasca viridiscens Walsh

E. lybica⁺ (de Bergevin) 1922.

Mauritius, Ethiopian region.

= Chlorita lybica (L'Agricultura Coloniale)
1922 - 16:58-64.

A pest of bean (Phaseolus spp.) and of Solanum melongena.

⁺As pointed out by Pearson, E.O. & Maxwell-Darling, R.C. (1958 - The Insect pests of cotton in tropical Africa - LONDON), this follows the spelling of the species name in the original description, although it has been suggested that this was in error for 'libyca'.

E. benedettoi Paoli is a synonym.

Genus Moonia Distant 1907

Faun. Brit. Ind. Rhyn. 4:197

Type species Moonia sancita Distant

Moonia sp.

Réunion.

⁺Empoasca (subfamily Typhlocybinae Kirschbaum 1868: Jahrb. ver. Nat. Nassau 21-22:1-202) is here recorded for the first time from Mauritius. Specimens in the Division of Entomology. Dept. Agriculture suggest that the insect probably escaped attention of past entomologists for many years.

A few ♀♀ in the author's collection and in the Paris Natural History Collection.

Genus Jassus (as Iassus) Fabricius 1803

Syst. Rhyng. p. 85.

Type species Cicada lanio L. 1761 designated by Fallen 1826 (Hem. Suec. Cicad. p.58).

Synonym Bythoscopus Germar 1833

Type species C. lanio F. 1803 = C. lani L. 1761 designated by Lewis 1835 (Trans. ent. Soc. LOND. 1:48)

Jassus sp.

Mascarene Is.

Many ♀♀ from Mauritius and Réunion are in the author's collection.

FLATIDAE



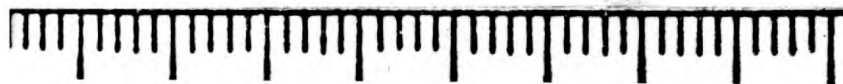
♀

LAWANA EXOLETA MEL.

UNIQUE SPECIMEN FROM MAURITIUS IN PARIS NATURAL
HISTORY MUSEUM



FLATOPSIS NIVEA form basipunctata (MAURITIUS)



XXXIX. Family CICADIDAE Westwood, 1840

Introd. mod. Classif. Insects 2:420

Nomenclature:

Metcalf on the 1st page of his 'General Catalogue of the Homoptera', Fasc. 8 : Part 1, Section 1, accredits authorship to Leach 1815:124 [Entomology. The Edinburgh Encyclopaedia; conducted by David Brewster 9:57-172]. Some authors give Latreille as authority and others still quote Buckton.

According to W.E. China, Bull. zool. Nomencl., 21, 2:155 (1964) (footnote):

"Both Latreille and Buckton used their terms Cicadariae and Cicadae respectively to cover the whole of the Auchenorrhynchous Homoptera. Leach used the group name Tettigonides for the cicadas proper but this is invalid, being based on a homonym of Tettigonia L. 1758 in the Orthoptera"

On the CICADIDAE of Madagascar, Comoro Is., Seychelles & Mascarene Is.

One of the first 'cicadas' recorded from the region is Abricta brunnea Fabricius [vide p.9; Pls.:22 (below), 23♂ & ♀]. Short accounts and descriptions of other 'cicadas' later appeared in Signoret's 'Histoire des Insectes (Hémiptères)' published in 1843, in Brullé's 'Règne Animal' (1835), in Amyot & Serville's 'Histoire des Insectes - Hémiptères' (1843) and in Stål's 'Hemiptera Africana' (4:1866). Signoret also described a few species of CICADIDAE in an article

entitled 'Faune des Hémiptères de Madagascar' (1859) [Part 1].

Between 1882 and 1890 Butler and Karsch described a few more species but it was left to Distant to add significantly to knowledge of the cicadid fauna by working on collections brought back from the area by the Percy Sladen Trust Expedition and by Alfred Grandidier (1903-1935). Altogether during the years 1872-1912 Distant described from the area twenty-four new species under 8 new genera.

Amongst the species which have been described by various authors is Rhinopsalta sicardi Melichar (1902), remarkable for the curious snout-like projection on its head.

Jacobi (1917) in his work entitled 'Die Zikadenfauna Madagascars und der Comoren' listed the Madagascan species describing two as new, namely: Trismarcha voeltzkowi and the tiny Abroma minor. Unfortunately his descriptions, being based to a large extent on unreliable characters such as variation in colour pattern, are not useful for diagnosis of species. Secondly, he seems not to have referred to type-material: On p.525 he places Lemuriana sikorae⁺ Distant under the genus Trismarcha but examination of the type in the B.M. shows this is erroneous.

In 1924, China figured and described in an article: 'Hemiptera - Heteroptera of Rodriguez',⁺⁺ Cicada thomasseti, the only 'cicada' which occurs in that island.

⁺Unfortunately Metcalf in his Gen. Cat. Hom. CICADOIDEA 8, 2:217, has accepted this view.

⁺⁺Now Distantada (ORIAN) 1964.

In the Seychelles there appear to be two species: the indigenous Yanga seychellensis Distant and Chremistica pulverulenta (Distant) formerly placed under 'Cicada'. The Comoro Is. do not differ faunistically from Madagascar.

In Madagascar the genera Yanga, Umjaba, Malagasia and Ligymolpa are all endemic. The Madagascan species of Pycna, and the endemic genera Yanga and Umjaba are connected with each other by structural characters of the forewing. Their nearest relatives on African soil, according to Jacobi, are Ugada Distant but the forewing structures are different in these. Whether Chremistica nigrans (Distant), C. martini (Distant) and C. hova (Distant) represent three distinct species is questionable! Jacobi had reason to believe that they represent different 'degrees of rubbing' of a single species C. nigrans. The present author is investigating this problem.

Jacobi (loc. cit. p.523) makes some significant statements on the distribution of Madagascan cicadas with which the writer is in full agreement:-

"Welche zoogeographische Schlussfolgerung lässt sich aus diesen Feststellungen ziehen? In einer gründlichen Untersuchung, die von den Coleopteren ausging, aber auch die andern Tierklassen berücksichtigte, kam Kolbe 1887¹ zu dem Ergebnis, dass einerseits die Anwesenheit vieler indischen und australischen, ja südamerikanischen Elemente in der madagassischen Region für sie charakteristisch sei, andererseits das Fehlen der typischen Familien und Gattungen des äthiopischen Tiergebiets. Hierzu stehen die Zikaden bei heutiger Kenntnis wenigstens in schroffstem Gegensatz. Alle greifbaren Verwandtschaften engeren

Grades stammen aus Afrika, keine aus Indien oder sonst woher. Wenn man die Leitsätze Kolbe's mit geologischen Vorgängen, mit der wechselnden Verteilung von Land und Meer in Einklang bringen konnte, so muss man aus der Faunistik der Homopteren den Schluss ziehen, dass solche Vorgänge beendet waren, als sich der Homopterenstammherausbildete, und dass ihm dann zur Besiedelung Lemuriens zunächst nur von Afrika her der Weg offenstand. Allerdings deuten die zahlreichen Endemismen darauf hin, dass die insulare Absonderung Zeit genug gehabt hat, um jeue Eigenheiten entstehen zu lassen."

Translation:

What zoogeographical conclusions can be drawn from these established facts? In a thorough investigation based on Coleoptera, but also taking into account other classes of animals, Kolbe (1887¹) came to the result that on the one hand the presence of many Indian and Australian, also South American, elements was characteristic of the Madagascan region, on the other hand the typical families and genera of the Ethiopian region were missing. The Cicadas - at least according to present-day knowledge - stand in the sharpest possible contrast to this. All the tangible relationships of narrower degree are with Africa, none with India or elsewhere. If one is to relate Kolbe's first sentences to geological processes, i.e. the changing distribution of land and sea, then one must draw the conclusion from the faunistics of the Homoptera that such processes had finished when the family tree of the Homoptera started to unfold its branches, and that as far as the colonisation of Madagascar went, the only place from which it could still take place was Africa. At any rate, all the endemic species

indicate that the island has been separated for long enough for its own peculiarities to have arisen. (1) Sitz. Ber. Ges. Nat.-Freunde. Berlin p.166.

More recently Orian (1954) published a synopsis of the CICADIDAE of Mauritius⁺ and described a new autochthonous genus: Mauricia (now Dinarobia) which exhibits an unusual and perhaps primitive type of wing-venation.

In spite of their strong powers of flight the CICADIDAE in the various species are restricted to sharply-defined areas - they keep to boundaries which appear not to set the slightest limitation to their dispersal. Two factors: the subterranean larval life and their unsuitability to be transported, may account for the fact that they keep to an area once they have colonised it.

In the Mascarenes, the four species of CICADIDAE appear to be

⁺The following note which appeared in the Proc. R. Soc. Arts & Sci. Mauritius, 1872, 6:7; concerning an exhibit at a meeting held on Tuesday, 25.iv.1871 is worthy of interest: "Dr. Charles Régnaud exhibited a small green Cicada which he found at Mesnil. He says that one evening, at about 8 o'clock, he was struck with a sweet and pleasant chirping, and on proceeding to the spot from which it emanated, he discovered this cicada. It appears to be a new species at least, is not included among the 66 species described in the 'Encyclopédie Méthodique' by Olivier. If it be really a new species, it might aptly be called, as suggested by Dr. Régnaud, 'Cicada vespertina'. Specimens were forwarded by Col. Pike to the Museum of Comparative Anatomy at Cambridge (U.S.) to be determined."

It has not been possible to the author so far to decide whether the name is a senior synonym of Dinarobia claudeae Orian 1954 or of Stagira darwini Distant 1905 [Pls.20d, 21, 21a & 22]. Both these species are green CICADIDAE which stridulate during the day as well as in the evening. Régnaud's description is inadequate, also his specimens have not been traced. 'C. vespertina' is to be treated as a 'nomen dubium'.

indigenous: Rodriguez has a single autochthonous species - Distantada thomasseti (China) - the genitalia of which resemble that of the species of Cosmopsaltria Stål. At present Réunion appears to be without a representative.

In the Glorioso Islands Martin L. Linell (Proc. U.S. Nat. Mus. 19:695-706 (1877) writing on the insect fauna mentions 'a large Cicada allied to the S. African Platycleura limbata' but this is probably a species of Yanga.

XI. A NEW GENUS OF CICADIDAE (HOMOPTERA) FROM THE ISLAND OF RODRIGUEZ
WITH NOTES ON NOMENCLATURE OF THE FAMILY.

[Plates 20-20a-20c]

In 1924, W.E. China published a paper on the Hemiptera of Rodriguez in which he described a species of CICADIDAE under the name of Cicada thomasseti after H.P. Thomasset, the collector (Ann. & Mag. nat. Hist. (9) 14, 452-453).

The present author, having examined the material in the British Museum collection, has found that it is not congeneric with Cicada.

It has been thought advisable here to indicate briefly the sequence of events which led to the continued and erroneous use of the name Cicada. In the 10th edition of Linnaeus' Systema Naturae, published in 1758, forty-two species of "Cicada" are described but no type is indicated. Lamarck, 1801 (Syst. des Anim. sans vertèb.) cited Cicada orni as a unique species of the genus Cicada Linnaeus, but this was merely an example, since Art. 67C of the International Code of Zoological Nomenclature insists that "the designation of a type-species must be rigidly construed" and that "mention of a species as an example of a genus does not constitute a type designation" (Art. 67C(i)). Lamarck's "examples" were, in addition, rejected by the International Commission of Zoological Nomenclature in Opinion, 79, 1924.

Latreille, 1802 (Hist. nat. Crust. Ins., 3, 257) also gave C. orni L. as an example of "Cicada". Latreille later indicated C. haematodes as

CICADIDAE
DISTANTADINI trib. nov.



GENUS DISTANTADA
ORIAN 1964

HOLOTYPE ♂
BRITISH MUSEUM (N.H.)

DISTANTADA THOMASSETI
(CHINA)

LOCALITY:
RODRIGUEZ

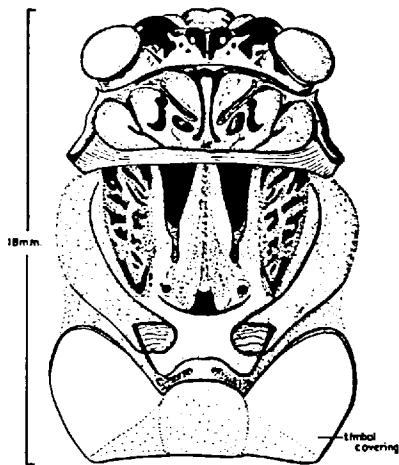
type-species of Cicada (1807) (Genera Crust. Ins. 3, 153) but this work has been ruled out by the International Commission so far as fixation of types is concerned and in addition C. haematodes Scopoli was not an originally included species. Latreille In 1810 (Consid. génér. p. 434) further designated Tettigonia plebeia as the type species of "Cigale", i.e. Cicada. But this is not "an originally included species" although Latreille's 1810 work has been accepted by the International Commission of Zoological Nomenclature in Opinions 11 (1938) and 136 (1939) as a source of type-species designations.

No valid type-species designation for the genus Cicada L., 1758, was made until 1916 when Van Duzee (Check List Hemipt. Amer. N. of Mexico, p. 56) cited Cicada orni L., 1758.

In 1926 Horváth in his classical paper "Les noms génériques de nos trois grandes cigales indigènes" correctly followed Van Duzee in accepting C. orni L., 1758, as the type-species of Cicada L., but he wrongly designated Cicada haematodes Scopoli, 1763, as the type-species of Tibicen Latreille. Since Tibicen Latreille, 1827, was monotypic, the single species Cicada plebeia Scopoli must be the type-species.

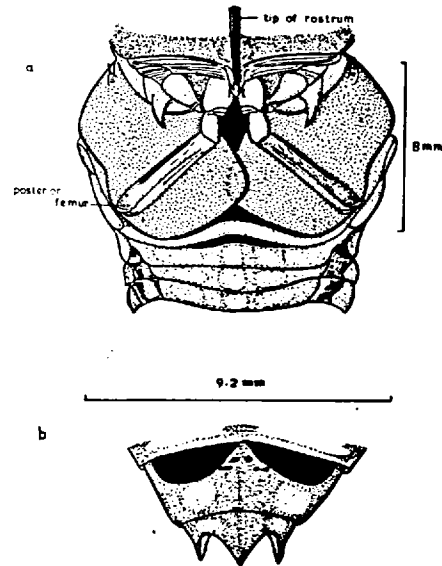
Horváth, however, designated Cicada plebeia Scopoli as the type-species of his new genus Lyristes (which he called a nom. nov.). Lyristes falls as an objective synonym of Tibicen Latreille.

Horváth also designated Cicada haematodes Scopoli as type-species of Tibicen Latreille but as shown above this species was not an originally included species. In fact Kolenati, 1857, was the first to give a valid name to the generic concept including Cicada haematodes Scopoli. This was Tibicina Kolenati, 1857 (Melet. Ent. 7, 414).



DISTANTADA THOMASSETI (CHINA)
 Head, notum & limbal coverings (from above)

FIG. 1



(a) Ventral view of opercula & posterior legs (b) Sixth & seventh apparent tergites

FIG. 2

The synonymy of these genera is therefore as follows:

- (1) Cicada Linnaeus, 1758: type-species C. orni L., 1758.
Syn. Tettigia Kolenati, 1857: type-species C. orni L., 1758.
- (2)⁺ Tibicen Latreille in Berthold, 1827 (Natürliche Familien des Thierreiches. Aus dem Französischen. Mit Anmerkungen und Zusätzen) which is a German translation of Latreille's 1825 work (Familles Naturelles) and in which the names are latinized - has as type-species by monotypy C. plebeia Scopoli, 1763.
Syn. Lyristes Horváth 1926 Cicada Dist. nec L.
- (3) Tibicina Kolenati, 1857: type-species Cicada haematodes Scopoli, 1763.
Syn. Tibicen Horváth nec Latreille.

It is worth using this opportunity to point out that Metcalf in his invaluable catalogue published recently, Metcalf Z.P., 1963, Gen. cat. Homoptera, Fasc. 8: Part 1, Baltimore, has made several serious errors which add to the confusion in cicadid nomenclature.

The difficulty which arises in the major classification of CICADIDAE has been brought about largely by the switch of the type-species of Tibicen Latreille from Cicada haematodes Scop. - as wrongly recognised by Distant who renamed the genus Tibicina (Amyot 1847) Kolenati 1857 - to the correct Cicada plebeia Scop. type-species of Tibicen by monotypy. Thus Distant's subfamily CICADINAE, which has been in use for many years, became

⁺It should be noted that Scopoli's original spelling "plebeja" (1763, Entomologia Carniolica, 36, 117) was also used by Horváth. Latreille, 1810, corrected it to "plebeia". The author follows Latreille - there is no letter "j" in Latin (China & Fennah, 1945, Ann. Mag. nat. Hist. (11) 12, 712). The gender of Tibicen is masculine so that the correct name of the species is Tibicen plebius.

TIBICENINAE. At this point Metcalf is in error in crediting authorship of TIBICENINAE to Atkinson (Metcalf loc. cit. p.11), since Atkinson did not use a group name and placed in his "Tibicen group" two genera Tibicen and Melampsalta belonging to two different subfamilies. The first valid usage of TIBICENINAE was by Van Duzee in 1916. Furthermore, in his bibliography of "Tibiceninae Atkinson" Metcalf gives Tibiceninae Distant 1889: but this name is based on Distant's taxon with type-species Cicada haematodes Scop., a taxon properly belonging to TIBICININAE Distant with type-genus Tibicina (Amyot): Kolenati. It is not the same as Tibicen Latreille.

Thus Metcalf is wrong in placing this group name under TIBICENINAE (Atkinson!!): Van Duzee, type-genus Tibicen Latreille, type-species plebeia Scop. This particular mistake has been made earlier by authors quoted by Metcalf viz. Kato, Moulton. TIBICENINAE Moulton 1919 (Jour. Fed. Malay States Museum 8, 3:61-66) quoted by Metcalf is also misplaced. Reference to the content of Moulton's taxon clearly shows that this must be a misspelling of TIBICININAE Distant.

These repeated mistakes demonstrate how very confusing it is to have two subfamilies of CICADIDAE with such similar names, viz. TIBICENINAE Van Duzee and TIBICININAE Distant. In the author's opinion it would be far better to request that the International Commission use plenary powers to preserve the name CICADINAE, which has been in use for many years; to reject TIBICENINAE and to place TIBICININAE (or TIBICINIDAE, as Metcalf has elevated it) on the official list.

However, the above discussion does not clear up the position of the Rodriguan "Cicada". Dr. China agrees with me that Cicada thomasseti is not a true Cicada; neither can it be placed under Tibicina Kolenati nor

Tibicen Latreille.

A new genus, Distantada, is now proposed for the reception of Cicada thomasseti China, 1924, which is designated as its type-species.

The genus is dedicated to W.L. Distant who made such a notable contribution to the taxonomic knowledge of the CICADIDAE of the world.

Subfamily CICADINAE

Distant, 1889 (Mon. Orient Cicad., p.3)

Tribe: Distantadini trib. nov.

Distantada gen. nov.

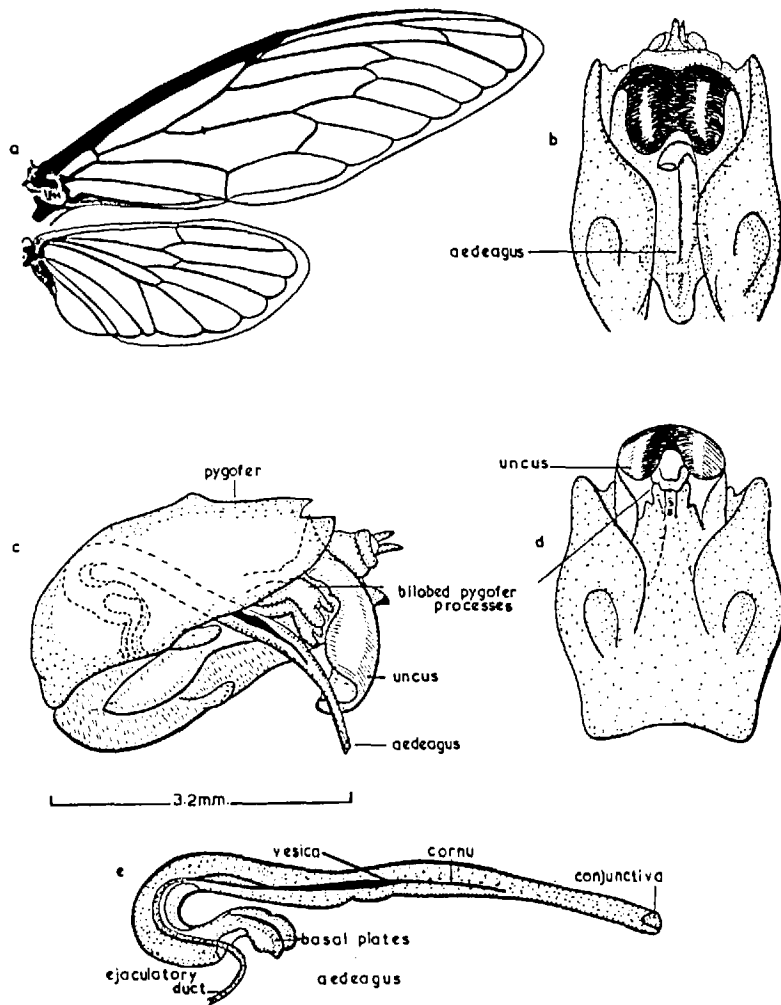
(Plate 20. & 20a, fig. 1)

This genus belongs to Distant's subfamily CICADINAE, in which the "tympanal coverings"[†], which are always present, conceal the "tympanal orifices". It comes closest to the Dundubiararia^{††} (Distant, 1805, Ann. & Mag. nat. Hist. (15) 85, 58) sharing most of the characters of that division but the lateral pronotal tooth typical of Dundubiararia is replaced by a small spine-like tooth at each anterior lateral angle of the pronotum. It seems likely that Distantada represents a new tribe of CICADINAE to be called DISTANTADINI.

The classification of the tribes (Distant's so-called divisions) of the CICADINAE appears to be in need of revision, but it would be inappropriate here to attempt such a task.

[†]The use of the words "tymbal coverings" as used by Pringle, 1955 (Spolia Zeylanica, 27, 2:235) is preferred to Distant's "tympanal coverings" (cf. Pringle, 1957, Proc. Linn. Soc. Lond. 167 (2):151). However, Pringle (in litt.) now suggest that this is more correctly spelt "timbal coverings".

^{††}Distant's divisions are really tribes; the ending therefore should be "ini" instead of "aria".



(a) RIGHT TEGMEN & WING of DISTANTADA (b) PYGOFER: aedeagus in situ (c) PYGOFER: side view (d) aedeagus removed (e) aedeagus side view.

Distantada differs from Cicada L., Tibicina Kolenati and Tibicen Latreille in the structure of the aedeagus, shape of pygofer and conformation of pygofer processes [Plates 20, 20a, figs. 2(a, b)].

The most conspicuous difference, however, is the possession of greatly enlarged "timbale coverings" which are proportionally greater than those of the above genera and also of all the other CICADINAE in the British Museum collection.

These strongly developed timbale coverings constitute a most striking feature (Plates 20 and 20a, fig. 1).

Head including eyes, only slightly narrower than base of the mesonotum (Plate 20a, fig. 1).

Pronotum armed at anterior angles behind the eyes with a small tooth which is not really homologous with the lateral tooth in Dundubiaria; posterior margin of pronotum transversely wrinkled.

Wing-venation similar to Cicada, Tibicina and Tibicen (Plates 20, 20e & 20f).

Abdomen: seventh apparent tergite deeply cut, three-pronged (Plate 20a, fig. 2b).

Type-species: Distantada thomasseti (China) comb. n.

(Plates 20, 20a, figs. 1, 2; 20b, (a) - (e)).

Distantada thomasseti (China) - redescription.

♂ Head, pronotum, mesonotum, abdomen and veins of tegmina and wings ochraceous generally; claval membrane of tegmen and anal lobe of hind wing pale ochraceous or greyish; antennae black; head and notum sparsely pallidly pilose. Tegmina and wings hyaline, vitreous and immaculate; posterior tibiae with a few short dark spines; middle tibiae dark brown externally.

Colour markings. Generally as described below but sometimes less distinct: head with a black transverse band between the eyes extending at the middle almost to posterior margin; three black spots on each side between the ocelli and the base of the eye. Pronotum with two sub-parallel black stripes down the middle and two black areas, almost crescent-shaped, on each side; oblique sulci dark.

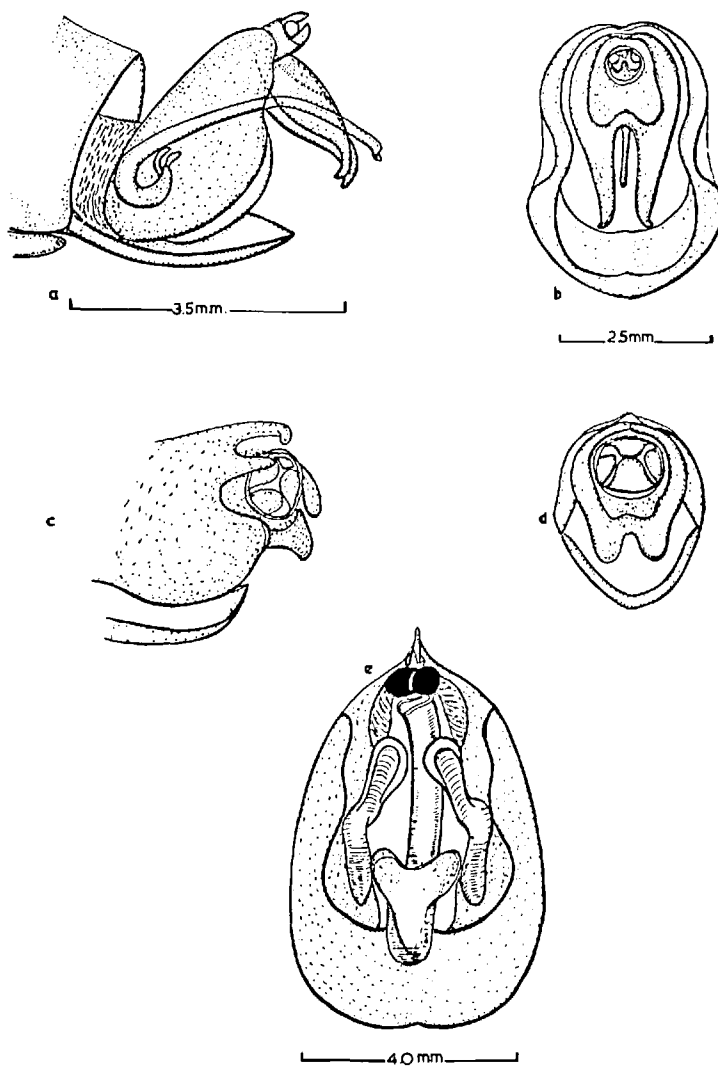
Mesonotum with four obconical dark brown areas along anterior margin, outer pair reticulate with darker ochraceous markings. Abdominal tergites darkish brown laterally, otherwise sparsely covered with pale shining hairs (Plate 20a). Sixth apparent tergite with black patches (Plate 20a, fig. 2b).

Structure. Ocelli conspicuous, red; rostrum extending to posterior coxae, pale ochraceous with black apex; postclypeus with twelve pairs of transverse ridges; lateral margins of pronotum strongly carinae; opercula not extending beyond metasternum, short, rounded, overlapping along mid-ventral line, lateral border slightly concave, sinuate (Plate 20a). Tibial coverings pale ochraceous, enlarged, shiny and wide apart.

Genitalia. In the shape of the uncus, conformation and position of pygofer processes, aedeagus and other parts of the genitalia (Plates 20b & 20c) Distantada thomasseti differs from all CICADINAE so far described.

Aedeagus. Long (3.25mm.), proximal part strongly recurved, conjunctiva small, projecting at tip; cornu long; vesica chitinous. (Orlan, in press).

Pygofer. On each side a chitinous tooth; uncus single, black, broad, strongly inwardly curved; bilobed pygofer processes projecting just behind uncus and lying on each side of aedeagus.



PYGOFER & TIPS OF ABDOMEN OF (a) CICADA ORNI (b) do
(c), (d) PURANA PRYERI (e) TIBICEN PLEBEIUS (Scopoli)

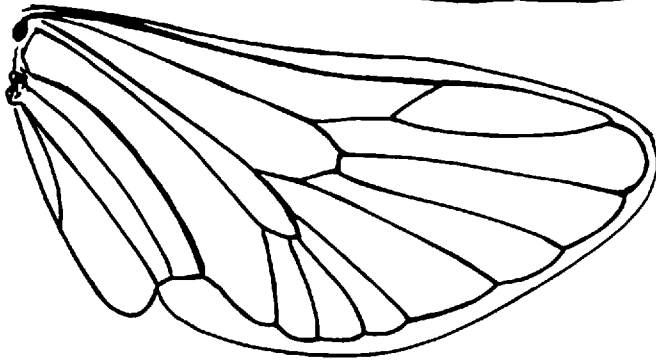
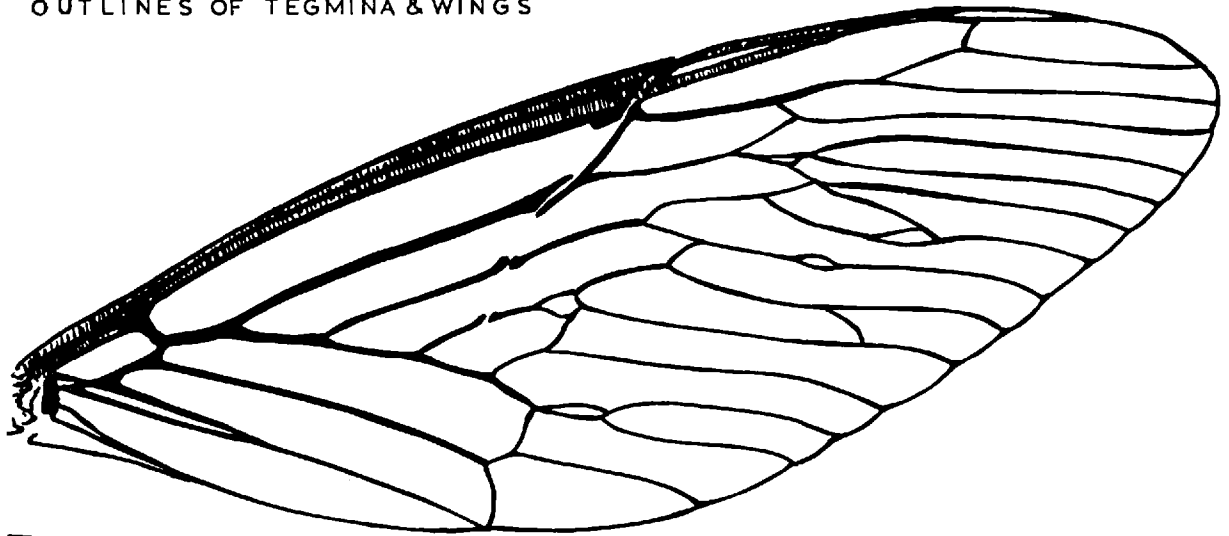
Measurements in millimetres.

Male. Width of head including eyes 10, length of head from middle of posterior margin to dorsal apex of frons 3.0; pronotum length in midline 4, width anteriorly 8.5, posteriorly 11.5; width of mesonotum anteriorly 10. Total length of body 26.5, width across timbal coverings 13.2; expanse of tegmina 86, length of tegmen 40, greatest width 12; length of wing (posterior) 22, width 11; length of operculum 8, width 5; length of timbal coverings 5.

Paratype female (smaller than male). Length of tegmen 37, width 12; length of wing 21, width 10; length of body 23.

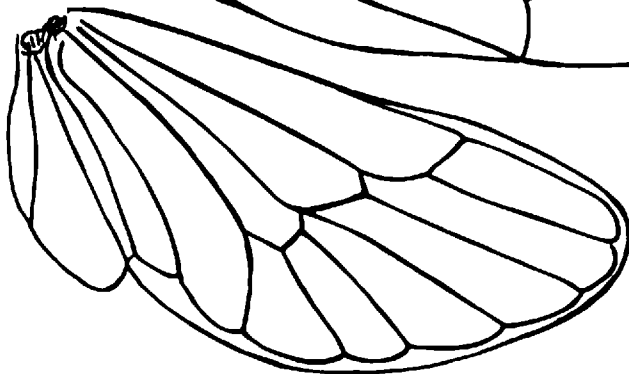
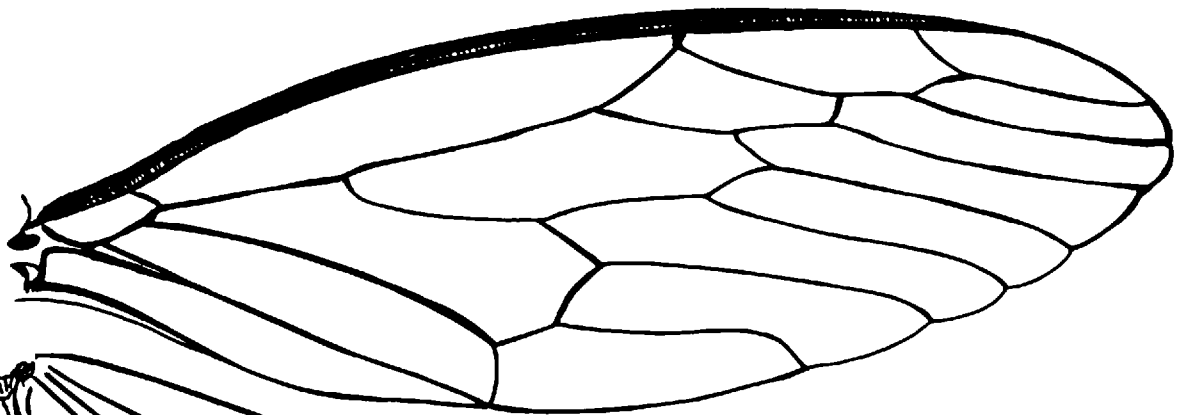
Holotype male (8.ix.1918, B.M. 1924-215-H.J. Snell and H.P. Thomasset); three male paratypes (B.M. 1924-65-G.C. Addison-Williamson); and one female paratype (B.M. 1924-215-Dr. H. Scott). All from Rodriguez (types in British Museum collection).

OUTLINES OF TEGMINA & WINGS



GENUS: MAURICIA ORIAN 1954

M. CLAUDEAE ORIAN



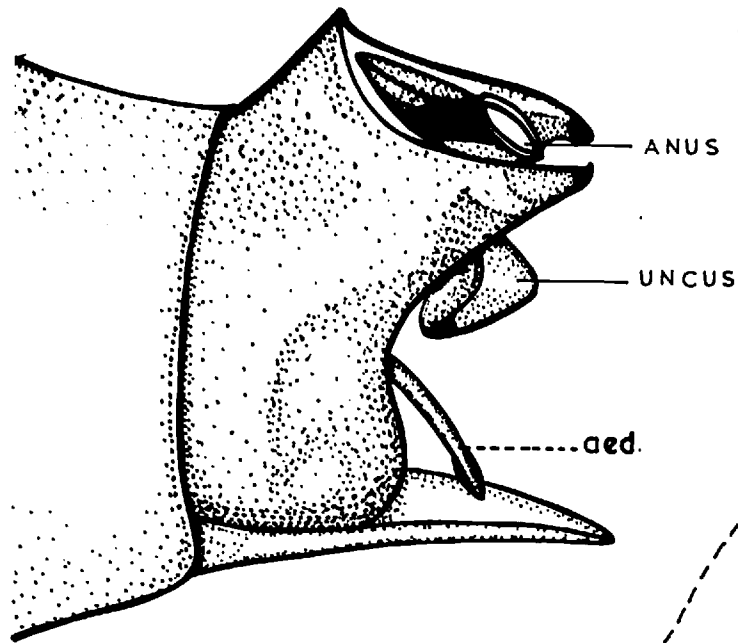
STAGIRA DARWINI DISTANT



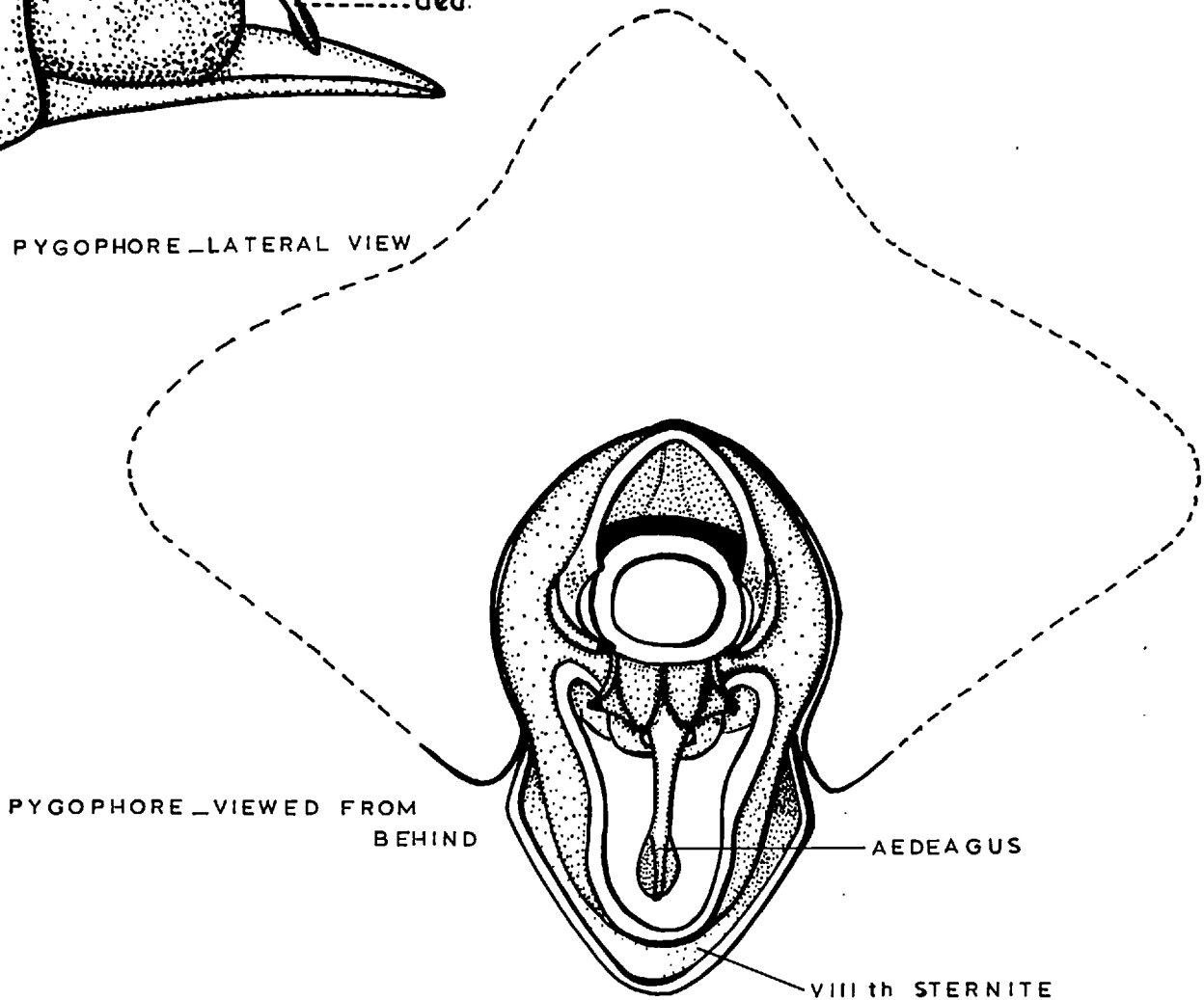
GENUS: MAURICIA ORIAN 1954

M. CLAUDEA EORIAN

HOLOTYPE ♂



PYGOPHORE_LATERAL VIEW



PYGOPHORE_VIEWED FROM
BEHIND

AEDEAGUS

VIIIth STERNITE

28 mm.

♂

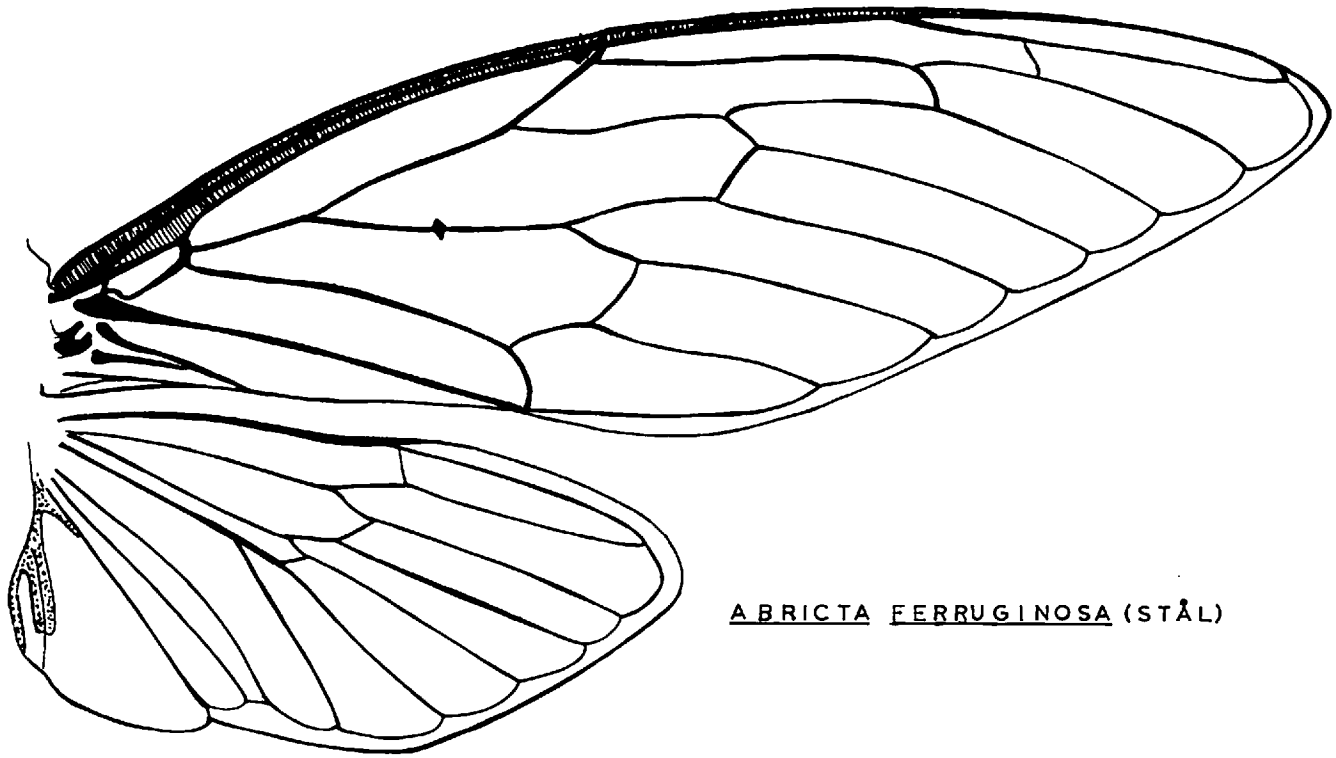
DINAROBIA CLAUDEAE (ORIAN)



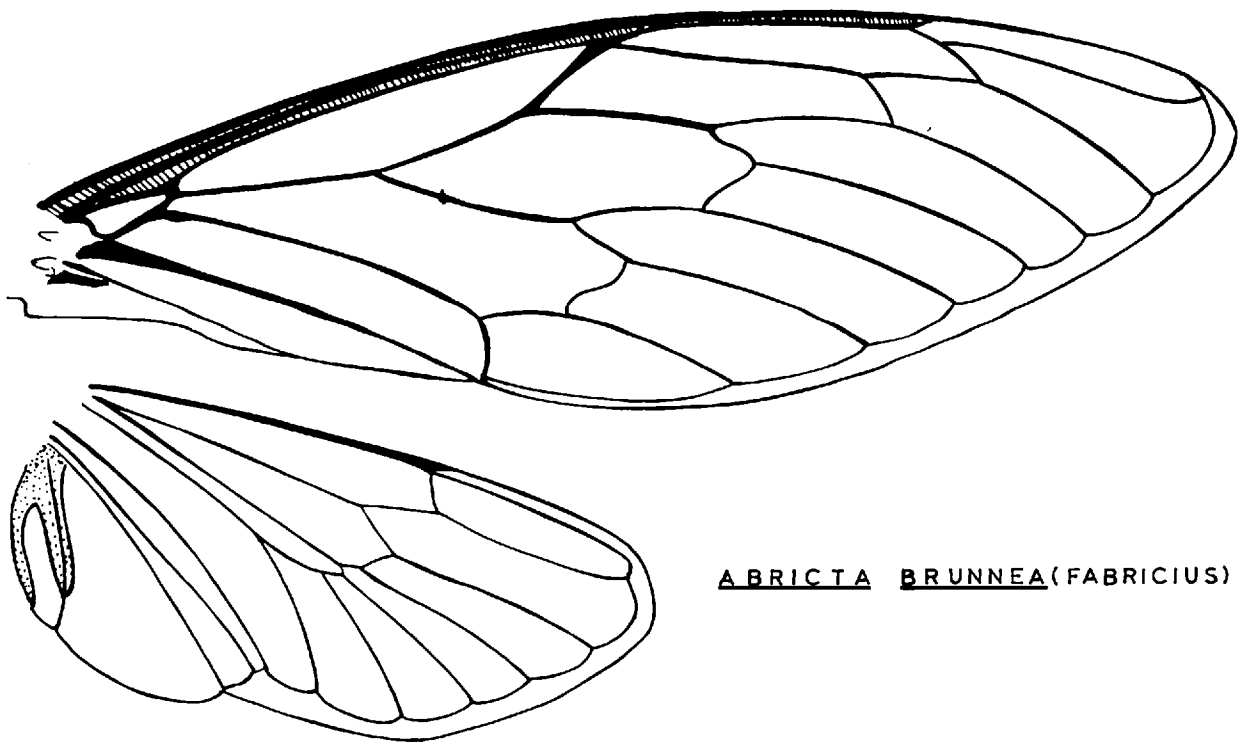
HOLOTYPE ♂ B.M.(N.H.)

STAGIRA DARWINI
DISTANT

LOCALITY
MAURITIUS



ABRICTA FERRUGINOSA (STÅL)



ABRICTA BRUNNEA (FABRICIUS)



♀

ABRICTA BRUNNEA
(FABR.)



♂

XLII. Recorded distribution of the CICADIDAE of the
Madagascar - Mascarene - Seychelles Area.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
Family CICADIDAE Westwood 1840							
Subfamily PLATYPLEURINAE Schmidt 1918							
<u>Stettin. Ent. Ztg.</u> 79:378.							
Tribe Platipleurini Schmidt <u>ibid.</u>							
Genus <u>Platycleura</u> Amyot & Serville 1843							
<u>Hist. Hem.</u> p.465.							
Subgenus <u>Oxypleura</u> Amyot & Serville <u>loc. cit.</u> p.469.							
Type-species <u>O. clara</u> A. & S. 1843							
* <u>P. (Oxypleura) spicata</u> Distant 1905							+
<u>Trans. ent. Soc. Lond.</u> p.192.							
Tribe <u>Chremisticini trib. nom.</u> <u>nov.</u> (= Tibicenini ⁺ Distant 1889).							
Genus <u>Chremistica</u> Stål 1870 <u>Ofv. Sv. Vet. Akad. Forh.</u> 27:714.							
Type-species [<u>Cicada</u>] (<u>Chremistica</u>) <u>viridis</u> Distant 1904							

* Indigenous.

⁺In the light of recent nomenclatural work by China, Orian (1964) this has to be altered to Chremisticini trib. nom. nov. (Rihana Distant being equivalent to Tibicen Latreille).

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
* <u>C. hova</u> (Distant) 1905 <u>Trans. ent. Soc. Lond.</u> p.198.				+			Described under <u>Rihana</u> .
* <u>C. martini</u> (Distant) 1905 <u>ibid.</u>				+			" " S.W. Madagascar, Tuléar, Maha- faly, Andra- momana.
* <u>C. nigrans</u> (Distant) 1904 <u>ibid.</u> p.673.				+			S.E. Madagascar, Fort Dauphin.
<u>C. pulverulenta</u> (Distant) 1905 <u>Trans. ent. Soc. Lond.</u> p.199.				+	+	+	Aldabra, N.W. & S.W. Madagas- car, Tuléar, Praslin Is., Mahé.

Genus Yanga⁺ Distant 1904
Ann. Mag. nat. Hist. (7) 14.

Type-species Y. hova (vide infra)

^mIndigenous.

⁺Metcalf [Gen. cat. etc. 1, Pt. I, Sect. I, p.211 (1963)] following Distant (1906:17) lists a 'cicada' described from Pemba in this genus. Prior to this: Jacobi had noted (loc. cit. p.521 - translation) that "this was to be treated with caution since of the 11 species of this genus only one is described from Pemba." In this context Paulian's remarks concerning the Zanzibar - Madagascar Element of Dipterous fauna is relevant (1961:272-273) 'Oldroyd (The horse-flies of the Ethiopian region 1-111 London. B.M. 1952-1957) signale que certains Tabanides occupent Madagascar, Zanzibar et la côte africaine voisine: il paraît considérer cette répartition comme traduisant d'anciennes liaisons terrestres. En réalité on connaît l'ampleur du trafic maritime, au temps de la navigation indo-arabe et des Etats d'Afrique Orientale, et encore maintenant par des boutres comoriens, entre Diego-Suarez et Nosy Bé, les Comores, les villes disparues de Vohémar, Mailaka, etc., Zanzibar et la côte d'Afrique L'exemple type d'Oldroyd est le genre Aegophagomyia Austen.'

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
* <u>Y. andriana</u> (Distant) 1904 <u>Trans. ent. Soc. Lond.</u> p.476.				+			S.W. Madagascar, <u>vide Y. seychellensis.</u>
* <u>Y. antiopa</u> (Karsch) 1890 <u>Berl. ent. Zeitschr.</u> 35:88.				+			Described under <u>Platypleura.</u>
* <u>Y. bouvieri</u> Distant 1905 <u>Trans. ent. Soc. Lond.</u> p.194.				+			Dedicated to Prof. A. Bouvier, Fondateur et Conservateur du Muséum, Paris. Baie d'Antongil, E. Madagascar.
* <u>Y. brancsiki</u> Distant 1893 <u>Ann. Mag. nat. Hist.</u> (6) 11:52.				+			Nosy Bé, N.W. Madagascar.
* <u>Y. grandidieri</u> Distant 1905 <u>Trans. ent. Soc. Lond.</u> p.195.					+		S.E. Madagascar, Ambolo Valley, Sakalavana Forest. Type in Paris Museum.
* <u>Y. guttulata</u> (Signoret) 1860 <u>Ann. Soc. ent. Fr.</u> (3) 8:178				+	+(?)		S.E. Madagascar, Nosy Be.
* <u>Y. handlirschi</u> (Distant) 1897 <u>Ann. Mag. nat. Hist.</u> (6) 19:282.				+			Described under <u>Poecilopsaltria.</u> Type in Vienna.
* <u>Y. heathi</u> (Distant) 1899 <u>Trans. ent. Soc. Lond.</u> p.475.				+			Described under <u>Platypleura.</u> Type in B.M.

* Indigenous.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
* <u>Y. hova</u> (Distant) 1901 <u>ibid.</u> p.475.				+			Type in B.M.
* <u>Y. pulverea</u> (Distant) 1882 <u>ibid.</u> p.335.				+			Nosy Bé (?).
* <u>Y. seychellensis</u> ⁺⁺ Distant 1912 <u>Gen. Ins.</u> 142:13.					+		Mahé, ⁺⁺⁺ Silhouette, Praslin Is.
Genus <u>Umjaba</u> Distant 1904 <u>Ann. Mag. nat. Hist.</u> (7) 14:298.							
* <u>U. alluaudi</u> Distant 1905 <u>Trans. ent. Soc. Lond.</u> p.196.				+			Type in B.M.
* <u>U. lvanescens</u> (Butler) 1882 <u>Ann. Mag. nat. Hist.</u> (5) 9:389.				+			Described under <u>Platypleura</u> . Type in B.M.

* Indigenous.

⁺⁺Distant originally recorded this species as Y. andriana from the examination of three discoloured specimens [1909 - Trans. Linn. Soc. (2) Zool. 13:29-47]. Subsequently [Gen. Insect. Fasc. 142, 13 (1912)] he showed that the species was distinct. Metcalf's list of localities given under Y. andriana is erroneous.

⁺⁺⁺Specimens collected by M. Guy Lionnet at La Misère on Neowormia ferruginea (Bois Rouge) have been seen by the author.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
+ <u>Pycna</u> Amyot & Serville 1843 <u>Hist. Nat. Ins.</u> p.463.							
* <u>P. gigas</u> (Distant) 1881 <u>Trans. ont. Soc. Lond.</u> p.107.				+			Type in B.M.
<u>P. madagascariensis</u> (Distant) <u>ibid.</u> p.217. 1879.		+		+			C. & E. Madagascar. Acc. to Jacobi there is a specimen from Réunion in the Dresden Museum. The present author is of the opinion that this requires confirmation.
* <u>P. strix</u> Amyot & Serville 1843 <u>Hist. Nat. Ins.</u> p.463. (Jacobi gives Brullé as authority in error).				+			= <u>Cicada stryx</u> Brullé, Règne Animal 1836(?) <u>nom. nud.</u>

+ Note from Jacobi - p.524 - Translation:

Pycna.

'The character which Distant and others use to separate this species from Yanga guttulata (Sign.), i.e. that the operculum is not supposed to touch the inner angles, is not always in my experience, reliable. The tone of the coloration varies within fairly wide limits. There are bright specimens, in which the vertex, pronotum, mesonotum and the basal halves of the fore- and hind-wings are bright grass-green, then exactly in the middle of the mesonotum is a pair of black spots close together and another large egg-shaped one on each side at the same level; the tip of the wing is made brighter by large, longitudinal spots inside the apical cells. The extreme phase of this is dark brown-yellow; the flecks on the mesonotum are much smaller; the covering wings have at most an olive-green ground colour, while the wings are rust-brown with almost black tips. By the degree of density of the hair covering, I would say the latter specimens are fresh, the others rubbed.'

* Indigenous.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
Genus <u>Antankaria</u> Distant 1904 <u>Ann. Mag. nat. Hist.</u> (7) 14:429.							
* <u>A. madagascariensis</u> (Distant) <u>ibid.</u> (6) 10:57. 1892 (Type-species)				+			Described under <u>Cicada</u> ; N. Madagascar. Type in B.M.
CICADINAE Westwood 1840							
Type-genus <u>Cicada</u> L.							
Type-species <u>C. orni</u> L.							
Tribe Cicadini Westwood 1840							
+ <u>Cicada</u> L. 1758 <u>Syst. Nat.</u> 1:434.							
* <u>C. signoreti</u> ⁺⁺ Metcalf 1955 <u>Wash. Acad. Sci. Jour.</u> 45:267. [nom. nov. pro <u>Cicada punctipes</u> Signoret (1860) nec <u>C. punctipes</u> Zetterstedt 1828.]				+		+	S.W. Madagascar; Tuléar.

* Indigenous.

+ Cicada maculigena Signoret [Ann. Soc. ent. Fr. (3) 8:181 (1860)] = C. stigmosa Stål, is presumably lost. Handlirsch reported to Distant that he could not find it in the Vienna Museum where Signoret's collection is housed.

⁺⁺The following note from Jacobi (loc. cit. p.525 - Translation) is worthy of interest: "As Karsch (1890 - Contribution to the knowledge of the Song Cicadas of Africa and Madagascar) has already pointed out, Stål included this species in the genus Tettigia Kol. on the basis of the female only, while the characters of the male completely contradict the generic diagnosis (Stål 1866, p.24) and (p.7). Distant did indeed quote Karsch's reference, but left it unused. In reality the species is a genuine Cicada, being a miniature version of Distant's C. pulverulenta from which it differs in having evenly broad opercula, which are also distinctly separated from each other on the inner side."

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
Tribe Distantadini Orian 1964 <u>Ann. Mag. nat. Hist.</u> (13) 6:321-328.							
Genus <u>Distantada</u> Orian 1964 <u>ibid.</u> (monotypic)							
* <u>D. thomasseti</u> (China) 1924 <u>ibid.</u> (9) 14:324-328.			+				Illtr. details of genitalia [described under <u>Cicada</u> . Type in B.M.
TIBICINIDAE Distant 1905							
Subfamily Tibicininae Dist. 1905 <u>Ann. Mag. nat. Hist.</u> (7) 15, p.304.							
Type-genus <u>Tibicina</u> Kolenati 1857							
Type-species <u>C. haematodes</u> Scopoli							
Tribe Parnisini Distant 1905 <u>Ann. Mag. nat. Hist.</u> (7) 16:203.							
Genus <u>Rhinopsalta</u> Melichar 1908 (monotypic) <u>Ceskoslov. Spolec. Ent. Casopis</u> 5:58.							
* <u>R. sicardi</u> Melichar 1908 <u>ibid.</u> p.59.			+				
Genus <u>Jafuna</u> Distant 1912 (monotypic) <u>Ann. Mag. nat. Hist.</u> (8) 9:647.							
* <u>J. melichari</u> Distant 1912 <u>ibid.</u> (8) 9:648.			+				

* Indigenous.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
Tribe Taphurini Distant 1905 <u>Ann. Mag. nat. Hist.</u> (7) <u>16</u> :25.							
Genus <u>Abricta</u> Stål 1866 <u>Hem. Afr.</u> <u>4</u> :26.							
Type-species <u>A. brunnea</u> (Fabr.)							
* <u>A. brunnea</u> (Fabricius) 1798 <u>Ent. Syst. Suppl.</u> 517.	+						+ - <u>vide</u> footnote.
* <u>A. ferruginosa</u> (Stål) 1866 <u>Hem. Afric.</u> <u>4</u> :27.	+						
Genus <u>Trismarcha</u> Karsch 1891 <u>Ent. Nachr.</u> <u>17</u> :348.							
Type-species <u>T. umbrosa</u> Distant 1905							
* <u>T. voeltzkowi</u> Jacobi 1917 <u>Wiss. Ergeb. System. Arb.</u> 3:525.				+			
Genus <u>Abroma</u> Stål 1866 <u>Hem. Afr.</u> <u>4</u> :27.							
Type-species <u>Cicada guerinii</u> Signoret							
* <u>A. guerinii</u> Signoret 1860 <u>Ann. Soc. ent. Fr.</u> (3) <u>8</u> :180.				+			Mauritius (in error).

* Indigenous.

+ The record of A. brunnea from Bengal by Stål 1866 and by Melichar 1904 from Ethiopia appears to be erroneous.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
* <u>A. minor</u> Jacobi 1917 <u>Wiss. Ergeb. System. Arb.</u> 3:525.				+			
<u>Malagasia</u> Distant 1882 <u>Trans. ent. Soc. Lond.</u> p.336.							
Type-species <u>M. inflata</u> Distant							
* <u>M. aperta</u> (Signoret) 1860 <u>Ann. Soc. ent. Fr.</u> (3) 8:179.				+			West & North Madagascar.
* <u>M. distanti</u> Karsch 1890 <u>Berl. ent. Ztschr.</u> 35:123.				+			West & East Madagascar.
* <u>M. inflata</u> Distant 1882 <u>Trans. ent. Soc.</u> p.337.				+			Central Madagas- car.
* <u>M. virescens</u> Distant 1905 <u>Ann. Mag. nat. Hist.</u> (7) 16:32.				+			W. Madagascar.
Genus <u>Ligymolpa</u> Karsch 1890 <u>Ent. Ztschr.</u> 35:122.							
Type-species: <u>L. madegassa</u> .							
* <u>L. madegassa</u> Karsch 1890 <u>ibid.</u>				+			
Genus <u>Lemuriana</u> Distant 1905 <u>Ann. Mag. nat. Hist.</u> (7) 16:32.							
Type-species <u>L. apicalis</u> Distant							
* <u>L. sikorae</u> Distant				+			Transferred under <u>Trismarcha</u> Karsch by Jacobi & Metcalf in error.

* Indigenous.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
Genus <u>Nelcyndana</u> Distant 1906 CICADIDAE Part 1, p.139.							
Type-species <u>N. tener</u> Distant.							
* <u>N. madagascariensis</u> Distant 1905 <u>Ann. Mag. nat. Hist.</u> (7) 16:35.						+	Fénérive.
Tribe Chlorocystini Distant 1905 <u>Ann. Mag. nat. Hist.</u> (7) 16:212. [Correction of Chlorocystaria Distant]							
Genus <u>Dinarobia</u> Mamet 1957 <u>Maur. Inst. Bull.</u> : 5:74. <u>nom. nov. pro Mauricia</u> Orian 1954 <u>nec Harris</u> [Mollusca] (monotypic)							
* <u>D. claudeae</u> (Orian) 1954 <u>Ann. Mag. nat. Hist.</u> (7) 16: 213.						+	
Genus <u>Stagira</u> Stål 1861 <u>Ann. Soc. ent. Fr.</u> (4) 1:621.							
Type-species <u>S. simplex</u> Germar 1834.							
* <u>S. darwini</u> Distant 1905 <u>Ann. Mag. nat. Hist.</u> (7) 16: 213.						+	
Tribe Hemidictyini Distant 1905 <u>ibid.</u> p.275. [Correction of Hemidictyaria Distant 1905]							

* Indigenous.

	Mauritius	Réunion	Rodriguez	Madagascar	Seychelles	Comoro Is.	Remarks
Genus <u>Hovana</u> Distant 1905 (monotypic) <u>Ann. Mag. nat. Hist.</u> (7) <u>16</u> :279.							
* <u>H. distanti</u> (Brancsik) 1893 <u>Jahresh. Naturw. Ver.</u> <u>Tremsener</u> 1892, <u>10</u> :1:253. [Described under <u>Hemidictya</u> Burmeister]						+	Nosy Bé Is.

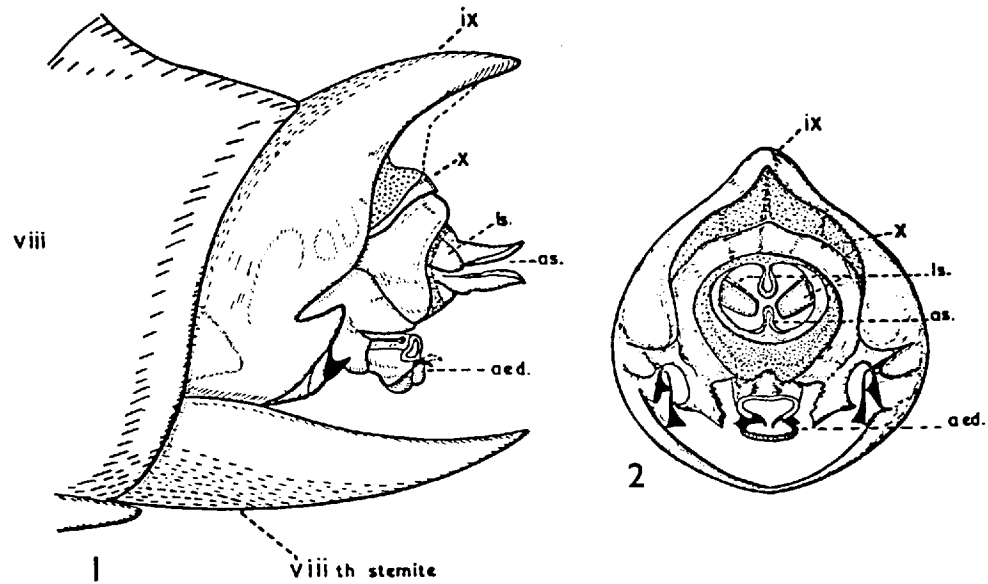
* Indigenous.

The morphology of the male genitalia of Abricta ferruginosa (Stål)
(Homoptera:Cicadidae)

Synopsis

The genitalia of the male of Abricta ferruginosa are described and an interpretation is given of the structures involved.

The detailed morphology of the genitalia of CICADIDAE, in spite of their size, has never been worked out and, to date, the different structures have remained almost unknown or misunderstood. This is very surprising indeed, as these insects have attracted the attention of philosophers and scientists since the very early days of biology. Copulation of cicadas was described by Aristotle, and both Malpighi (in 1687) and Réaumur (in 1740) investigated the morphology of the copulatory organs to some extent. It seems that the first real attempt to describe the genitalia was made by Ellis A. Apgar (1887). He figured the aedeagus of Cicada septendecim Linn. (= Magiccicada septendecim (Linn.)) in both the contracted and the extended condition but his interpretation of the various parts is inadequate, and unfortunately later hemipterists did not study cicadid genitalia to a degree comparable to this. Thus Kershaw and Muir (1922) simply emphasised that the male genitalia "were very distinct" from those of other Homoptera and pointed out that "in some CICADIDAE the aedeagus was complex and trilobed". Similarly Pruthi (1925) examined the aedeagus of Abricta curvicosta Germ. and concluded that the "Aedeagus was short, wide, slightly lobed at its distal end; with a short endosomic region as well; the latter with minute spines and tubercles". He did not figure the extended



PYGOPHORE OF ABRICTA FERRUGINOSA (STÅL) (1) Lateral view (2) viewed from behind
 aed. aedeagus; as. = anal style; ls. = lateral sclerite.

aedeagus with its remarkable membranous vesica, and his diagram is far too sketchy. Davis published a number of articles on North American cicadas in the Journal of the New York Entomological Society (1915-43) but, although he sometimes gives diagrams of terminal body segments and shows the tip of the aedeagus, he does not seem to have studied the genitalia in detail.

Evans (1940) figured the male genitalia of Tettigarcta tomentosa White, and Torres (1948) represented those of Carineta in his description of species of that genus. China (1954) re-examined the genitalia of three species of Carineta and in addition figured the remarkable apically dilated apex of the "endosoma". Mauricia claudae was described by Orian (1954), who dissected the genitalia and figured the aedeagus. More recently, Dlabola (1958) published some descriptions and figures of the genital organs of some species of CICADIDAE from the Belgian Congo, and figures of the external characters of the aedeagus in the different species he examined and described. None of these authors, however, examined in detail the aedeagus itself. In a series of papers Torres (1960, Proc. XIth Int. Congr. Ent. (Vienna) 1:1-6, 48-57) discussed the genitalia of different species of CICADIDAE, mostly in situ, and gave excellent figures of the "phallosoma" but he did not dissect out the aedeagus to show its complete structure.

The author has examined the male genitalia of Abricta ferruginosa (Stål) from material collected at Curepipe (Mauritius), in the expanded state, after manipulation in 2 per cent KOH.

A description of the terminal body segments and of the various parts of the genitalia is given below:

Eighth tergite (Plate 23a, fig. 1) large, curved down laterally so

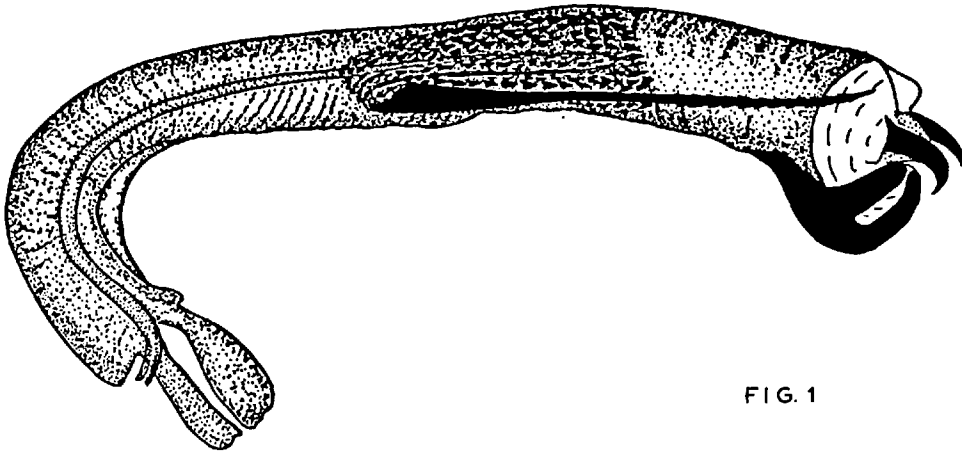


FIG. 1

ABRICTA FERRUGINOSA (aedeagus retracted)

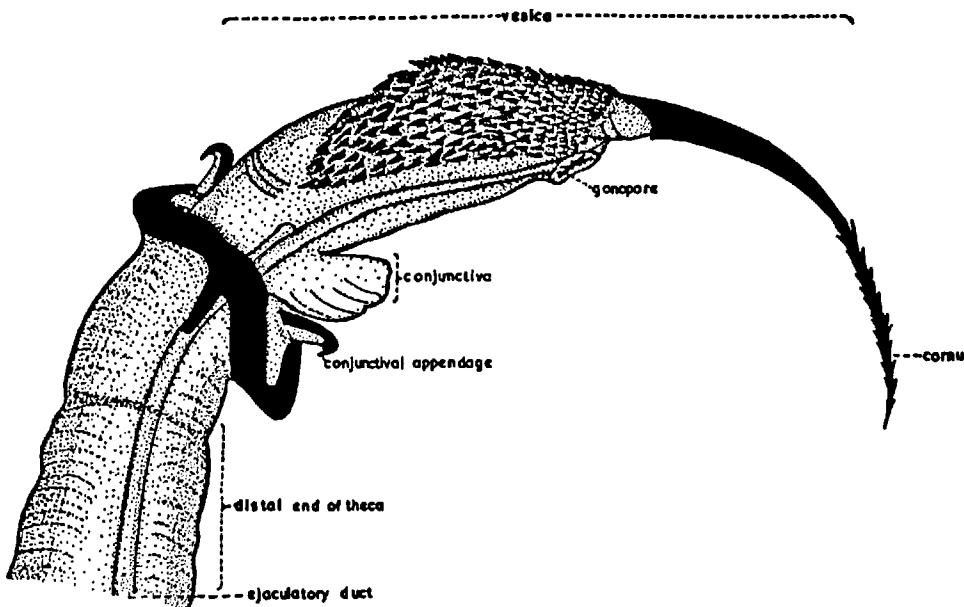


FIG. 2

TIP OF THECA (with vesica extended)

as to form a complete ring; ninth tergite strongly sclerotised and covered with long hairs, bearing a large ventrolateral spine (? gonocoxite) and a smaller sclerotised projection and forming the pygofer. This lies in the boat-shaped "hypandrium" or eighth sternite, which is produced posteriorly and protects the genitalia from below (a condition which, according to Myers (1928), is peculiar to the cicadas). Distally, pygofer bears the largely membranous anal segments, which have islands of sclerotised tissue and support two large conical sclerites or anal styles (epiproct and hypoproct) (considered by some authors to be the vestigial segment XI) and a pair of lateral sclerites (Plate 23, figs. 1 & 2:1s). These are referred to as 'cerci' by some authors. The true aedeagus arises from the ninth segment. In Abricta, this is highly specialised, consisting of a stout structure thickened and bilobed at base near point of entry of ejaculatory duct - the basal plates, and a long, tubular sclerotised "theca" (Kullenberg and others) (Plate 23b, figs. 1 & 2), or "phallosoma" (Pruthi); the theca surrounds the thin elastic ejaculatory duct, the small ill-defined conjunctiva and the vesica; ventral and lateral margins of opening of theca heavily sclerotised; conjunctiva like a small lobe, with two heavily sclerotised conjunctival appendages; vesica a complicated membranous structure bearing several rows of minute spines and terminated by a long horn-like process for which the name "cornu" is here proposed (Plate 23b, fig. 2). (Comparable but smaller structures called cornuti are present in the male genitalia of Lepidoptera (Klots, 1956).) Vesical cornu of Abricta grooved ventrally along distal half, where it also bears a double row of large spines with smaller ones in between. Ejaculatory duct opening or gonopore lies ventrally at distal end of membranous vesica.

In life, whole aedeagus exposed, lodged in a groove on ventral surface of tenth sternite and held in position by a pair of ventrolateral toothed sclerotised lobes.

It will be seen from the above that the male genitalia of the CICADIDAE have not been described in sufficient detail by workers like Crampton (1920, 1922), Pruthi (1925), Myers (1928), Kershaw and Muir (1922) and by recent authors. Although Apgar (1887) included drawings of both the extended and retracted aedeagus, he failed to interpret correctly the various parts.

In view of this the present author has given his interpretation of the structures shown in his figures and summarises his conclusions as follows:-

(1) The male genitalia of Abricta ferruginosa consist of (a) a well-developed sclerotised theca, which encloses a small ill-defined conjunctiva, (b) a long retractile vesica covered with minute spines, which functions as the intromittent organ and (c) a long saw-like process at the tip of the vesica.

(2) The eighth sternite protects the aedeagus from below.

(3) It is suggested that the genitalia of the CICADIDAE, although superficially simple, present a somewhat complicated structure quite unlike that of most of the other Homoptera, e.g. MEMBRACIDAE and CICADELLIDAE, differing from them in the composition of the aedeagus. It is not possible to draw further conclusions from the above structures without a considerable amount of work on the genitalia of other members of the CICADIDAE.

Sub-order HOMOPTERA

Series Sternorrhyncha Amyot & Serville, 1843⁺Key to the Superfamilies

1. Adults always with well-developed legs which bear tarsi of two segments of about equal length. Antennae 7 - 10 segmented. Adults always alate. Males and females often present in about equal proportions. Sexes generally similar to one another structurally, although possibly differing somewhat in size and pigmentation. Mostly living on the foliage of trees and shrubs 2
- Legs sometimes absent or much reduced in size. Tarsi at most consisting of an elongate segment which bears the claws and a much smaller, usually triangular basal segment. Antennae 1 - 13 segmented. Adults often apterous. Females often much more common than males. Adult males may lack wings and/or mouthparts. Colonies sometimes conspicuous; on foliage of trees, shrubs and in many cases on herbaceous plants 3
2. Forewings of rather harder consistency than the hindwings and with prominent veins; both media and cubitus forked; clavus present (Plate 35). Antennae usually 10 - segmented (Plate 36). Body length 1 - 6mm. PSYLLOIDEA
- Forewings membranous (Plate 29a) with obscure reduced venation; without clavus. Antennae 7 - segmented. Body small, 1 - 5mm., wax-dusted insects ALEYRODOIDEA
3. Tarsi when present bearing only a single claw and usually of only one segment. Antennae 1 - 13 segmented. Females always neotenic; apterous or alate - when alate dipterous. Scale insects and mealy bugs COCCOIDEA
- Two-segmented tarsi bearing a pair of claws usually present; sometimes with only one segment very rarely atrophied. Number of antennal segments ranging from 1 - 6 but most commonly 5 or 6, the last segment often with an elongate processus terminalis (Plates 24 - 27). Alatae with a characteristic wing venation (Plates 24 - 28). Both males and females may be either apterous or alate. In alatae hind wing present, although small and usually with two oblique veins. The abdomen of many genera bears a pair of siphunculi (cornicles) which vary in structure from mere pores (Plate 29) to black cylinders (Plates 24 - 26) which may be nearly as long as the body APHIDOIDEA

⁺Adapted from C.S.I.R.O.- sponsored 'Insects of Australia'.

XLV- The APHIDIDAE⁺ of the Mascarene Islands,
with additional notes on some Madagascan forms.

The annual reports of the Department of Agriculture, Mauritius (from 1913 onwards) contain isolated records of the species of aphids occurring in Mauritius and Rodriguez, but no really comprehensive lists appeared until those of Mamet (1939; 1943). Much earlier Dr. Charles Coquerel (1859) had described and figured Pentalonia nigronervosa, a remarkable species collected at St. Denis (Réunion Is.) on Musa paradisiaca L.: Signoret, a year later, gave an illustrated account of another interesting species⁺⁺ Schizoneura rotundiventris, also from Réunion. Again from this island Williams and Courtois (1951) recorded Dactynotus compositae (Theobald), Lulacorthum solani (Kltb.)⁺⁺⁺ Myzus persicae (Sulzer), Macrosiphum euphorbiae (Thos.) and Aphis craccivora Koch.

From Mauritius, Orian (1959, 1960, 1962) reported severe attacks of various aphids on tea, on Litchi sinensis Sonn. and on Fragaria sp.

A few species of economic importance in Madagascar were recorded by Paulian (1960), viz.: Toxoptera aurantii (B. de Fonsc.), Aphis maidis (Fitch)

⁺In Opinion 677 Bull. zool. Nomen. 20:336 Oct. 1963 the International Commission on Zoological Nomenclature ruled that the family group name of the aphids was to be APHIDIDAE, not APHIDAE, the latter name being placed on the official index of rejected and invalid family group names in zoology.

⁺⁺Two spellings, viz. Schyzoneura and Schizoneura, are given by Signoret.

⁺⁺⁺Dr. Hille Ris Lambers, who identified these specimens of aphids from Réunion, found that the material of Myzus persicae from there differs from the European forms.

A. laburni Koch, Rhopalosiphum nymphæae (L.)^φ, R. pseudobrassicae Davis, Macrosiphum rosae (L.), M. compositae (Theobald), Brevicoryne brassicae (L.), Doralis^{φφ} fabae Scop., D. durantae Theobald and the curious aleurodiform Cerataphis lataniae (Signoret). Earlier Claudius Frappa recorded Eriosoma lanigerum (Hausman) but this does not seem to have been collected by later workers.

In 1953, Paulian published a second list of Madagascan aphids which increased the number of species known from this island to fifteen: a little later (1956) he recorded yet another species, viz.: Cerosipha nerii B. de Fonsc.

From Réunion R. Luziau (1953) recorded the following aphids: A. maydis,⁺ Cerataphis lataniae, Ailacorthum solani, Myzus persicae, Macrosiphum euphorbiae, Dactynotus compositae, Macrosiphum sp., Ramularia cynarae and two unidentified aphids on lentils and cress. A year later G. Renaudière⁺⁺ described and figured a new species of Sitobion from Madagascar, naming it after Paulian who had collected it many years earlier (1949) on Pennisetum setosum Rich.

^φPaulian's spelling 'nymphæae' is erroneous.

^{φφ}Doralis Leach 1927 was suppressed under Opinion 646 under the Plenary powers (vide Bull. zool. Nomencl. 20, 1963:31 & 18, 1961:143-145). The species here referred to is Aphis fabae.

⁺The correct spelling should be A. maidis.

⁺⁺of the Plant Pathology Section, 'Institut Pasteur', Paris.

Professor E.O. Essig⁺, also in 1957, gave illustrated descriptions of two very remarkable aphids, Eonaphis pauliani reported as causing galls on leaves of an indigenous member of the APOCYNACEAE, and Paulianaphis madagascariensis on Euphorbia stenoclada Baillon (another native Madagascan plant exhibiting curious coralliform growth).⁺⁺

Essig unfortunately neglected to describe the genera in which he placed his species: or perhaps he intentionally considered his descriptions to be composite generic and specific designations.⁺⁺⁺

Mention must also be made of 2 recent works; Paulian's third list of APHIDIDAE from Madagascar (1957) in which thirty-five species are recorded; Louis Caresche and Jean Brénière's 'Liste des insectes nuisibles' ... etc. (1961) which is a compilation based on Frappa's and Paulian's previous records. Many of the names used in these papers are no longer valid and emendations to these are given later in the text.

⁺University of California, Berkeley, U.S.A.

⁺⁺For a description of this plant vide Baillon H.M.: 'Liste des plantes de Madagascar (suite)' - Bull. Soc. Linn. Paris 1887, p. 671.

⁺⁺⁺According to Art. 16(a) (V) of the International Code of Zoological Nomenclature (1951) the citation in combination with a new genus name (in the present case Eonaphis and Paulianaphis) of one or more available specific names (viz. pauliani and madagascariensis) constitutes an indication sufficient to validate the genera.

The classification adopted is based on the system developed by Mordwilko, Börner and Hille Ris Lambers. The keys are adaptations of those given for the African fauna by V. Eastop (1958, 1961), the few changes having been made in deference to recent work.

The present revision also brings the total number of verified species occurring in Madagascar and the Mascarenes to ~~41~~....

Special attention is drawn to the following points:-

- (1) A very striking feature of the Madagascan-Mascarene aphid fauna is that it resembles that of Africa in having a relatively large number of Sitobion species.
- (2) It appears that, to date, two species of Sitobion, viz. S. phyllanthi Takahashi and S. wikstroemiae (Mamet) are known only from Mauritius. Whether or not they are indigenous is hard to say as the host plants Phyllanthus sp. and Wikstroemia viridifolia are not native to Mauritius. Furthermore, alatae apparently of S. wikstroemiae have been trapped in Southern Rhodesia and Orian (1959) collected the species on tea in Mauritius.
- (3) The occurrence of ⁺Neophyllaphis araucariae Takahashi in Mauritius is highly interesting. The genus Neophyllaphis Tak. is otherwise known from Australia, islands off the Queensland coast, New Zealand, China,

⁺Another species, Neophyllaphis michelbacheri (Essig 1953) occurring on Pilgerodendron uviferum in Chile, was described as a new genus Chileaphis.

Formosa and Japan feeding on Podocarpus spp. (PODOCARPACEAE), a conifer related to the ARAUCARIACEAE.

Discovery of the genus in Africa again on Podocarpus spp. (Eastop 1955) suggests that aphids must have been present in Africa for a considerable period.

It is not known with certainty when the vast forests of conifers in Africa started to dwindle, but most probably aphids associated with Podocarpus reached there in pretertiary times, as to-day they can be found in all remaining pockets of Podocarpus on widely scattered mountain tops. Neophyllaphis may have gained entry to Mauritius quite recently as it occurs on Araucaria cunninghami Sweet, a species recently introduced. It was recorded by Zimmerman (1948c) from Hawaii on A. excelsa - again an introduced conifer.

- (4) Paulianaphis and Eonaphis⁺ were described as unique to Madagascar but the affinities of these genera lie with the subfamily Greenideinae, a group best developed in South-east Asia and including the well-known genus Schoutedenia Rubszaamen 1905.
- (5) On the whole, one can say that the majority of the species known from the Malagasy and Mascarene subregion are subtropical pests with a wide distribution, and for the most part have been introduced with their host plants. The occurrence of Eriosoma lanigerum (Hausman) in Madagascar is an exception. This species is generally a pest of temperate countries, although now naturalised in the more elevated

⁺Quednau (1962) has recently described E. crotonis from South Africa.

parts of Kenya.

- (6) Schizoneura rotundiventris was described from Réunion by Signoret (1860). The identity of this insect is not certain since the type is lost. However, the description fits that of Schizaphis cyperi van der Goot) 1917 described from Java (host: Cyperus rotundus Linn.) but also known from Kenya, Nigeria, S. Rhodesia, Sierra Leone, Ghana, Sudan, Egypt, Pakistan, N. Borneo, Philippine Is., Queensland, Victoria (Australia). If this is so, the species is not autochthonous to Réunion and Signoret's name has priority over van der Goot's.
- (7) Much work remains to be done on the Madagascan-Mascarene aphid fauna: collections on native plants are likely to yield the more interesting results. The aphid fauna of Rodriguez is very poorly known. Even the British Museum (N.H.) collection contains only one specimen of Sitobion of the 'africanum' group. (Collectors: Thomasset and Snell, 7.xi.1918).
- (8) Endemic aphids are few, their ecological niche being filled by the ALEYRODIDAE and perhaps the PSYLLIDAE. In these families the Madagascan and Mascarene fauna seems to be unique. The fact that endemic species are scarce does not necessarily imply that the native flora is immune to infestation.
- (9) Doubtful records:-
- (a) Mamet's lists.
- The sole record of Anuraphis sorbi (Kalb) from Mauritius is doubtful as Mamet has named Carum petroselinum Benth and Hooker as host. In Africa the aphid associated with this plant is Dysaphis apiifolia (Theobald).

It must also be emphasised that true 'sorbi' is Dysaphis (Pomaphis) sorbi: apparently confined to Europe, this species alternates between Sorbus aucuparia and members of the CAMPANULACEAE.

Similarly, Mamet's records of Aphis laburni Koch in fact refer to A. craccivora Koch.

Also his Aphis craccivora on Eriobotrya japonica Lindl. deserves checking since A. spiraeicola Patch occurs on this host elsewhere.

Mamet's restriction of 'wikstraemiae' as a subspecies of Macrosiphum phyllanthi is not supported here. The present author has examined material at the British Museum (Natural History) which strongly suggests that the insect is a distinct species. The name Sitobion wikstraemiae Mamet is proposed for it.

Mamet's record of Toxoptera citricida (Kirkaldy) on Pyrus communis must be questioned as this is a most unlikely host.

Inevitably the passage of time has seen many of his listed species undergo nomenclatural change. These, together with various other minor errors, are corrected as follows:-

Amphorophora carduellinum - now in Hyperomyzus.

A. phyllanthi - now in Macrosiphum.

A. phyllanthi subspecies wikstraemiae now in Macrosiphum (Sitobion) and considered to be a good species Macrosiphum (Sitobion) wikstraemiae stat. nov.

Aphis citricidus - now in Toxoptera.

A. laburni - Mauritian records apply to A. craccivora Koch.

A. maidis - now in Rhopalosiphum.

A. sorghi = Longiunguis sacchari Zehntner.

Aulacorthum rosaefolium = Rhodobium porosum (Sand.).

Cerataphis lataniae - in part at least C. variabilis.

Fullawayella kirkaldyi = Idiopterus nephrolepidis Davis.

Macrosiphum compositae - now in Dactynotus (Uromelan)⁺

M. granarium = M. (Sitobion) avenae, but Mauritian specimens are probably a different species.

Rhopalosiphum pseudobrassicae = Lipaphis erysimi (Kltb.).

Tetraneura hirsuta probably = T. nigriabdominalis Sasaki.

Doralis sp. collected by Mamet on Cuscuta sp. is an Aphis related related to "gossypii" (Mamet's specimen-slides in B.M. Collection have been examined by the author).

(b) Paulian's lists.

A. eriobothryae Schouteden as listed by Paulian (1957) is probably a synonym of A. spiraeicola.

Doralis fabae is in Aphis, the name Doralis having been suppressed.

Aphis laburni Koch - non-European laburni = Aphis (Pergandeida) craccivora Koch.

⁺Vide footnote to genus Dactynotus Raffinesque.

Rhopalosiphum pseudobrassicae Davis = Lipaphis erysimi Klth.

Anuraphis helichrysi (Kalt) = Brachycaudus helichrysi (Klth.)

Macrosiphum granarium (Kirby) = Macrosiphum (Sitobion) avenae
(Fabr.)

M. solanifolii (Ashmead) = M. euphorbiae Thomas.

Sitobion gathaca Eastop = M. (Sitobion) graminis Tak.

(c) Frappa's records.

A. laburni Kalt recorded by Frappa (1936) on lima beans refers to
A. craccivora Koch [vide Distrib. Maps Insect pests
No. 99 (1959)].

E. lanigerum (Hausman) is also a doubtful record as it was not
recovered by later collectors. Its introduction may have
been accidental and the insect may not have survived
for more than a few generations.

- (10) Concerning the incidence of aphids: it seems there is no knowledge of
the seasonal periodicity of aphid flight in Madagascar and the
Mascarenes. The following aphids are most commonly encountered as their
hosts include many plants of economic importance (e.g. families
CRUCIFERAE, GRAMINAE): Lipaphis erysimi (Klth.), Aphis craccivora Koch,
A. gossypii Glover, Rhopalosiphum maidis Fitch, Toxoptera aurantii
(Boyer de Fonscolombe), T. citricida (Kirkaldy).[†]

Towards the end of the winter (late August and early September) there
is generally a very great increase in the Lipaphis erysimi (Klth.)
population. In the driest months of the year (September-November),

[†]Moericke yellow-traps operated by the author in Mauritius confirm this
sequence.

Toxoptera aurantii and T. citricida are very common indeed. However, the present author has never come across population build-ups as large as those reported for T. aurantii (= T. coffeae) by C.B. Williams (1922) in Africa when he states that the scraping movements of the aphids acting in unison produced distinctly audible sounds.

- (11) The absence from Mauritius of sugar cane mosaic - a disease well known in all other cane-growing countries - is very remarkable.

Tests have shown that at least a dozen aphids can transmit the virus (Kennedy et al 1962). In all probability the disease must have been introduced into Mauritius from time to time before the enforcement of the strict quarantine measures now in operation. Nevertheless, although a number of the vectors occur locally, the island remains free from mosaic. Perhaps the virus does exist in Mauritius but due to prevailing climatic conditions the symptoms are not apparent. Similar climatic repressions of a virus manifestation are known in daffodils, in tulips (McKenny Hughes (1930, 1931, 1934), McWhorter, 1922) and in other plants, e.g., sweet potato (Shieffield, 1955).

- (12) One of the most interesting species of Mascarene aphids is Cerataphis lataniae (Boisduval)[†] which is probably indigenous to the area although originally described from material found in the greenhouses

[†]Essai sur l'entomologie horticole comprenant l'histoire des insectes nuisibles à l'horticulture avec l'indication des moyens propres à les éloigner ou à les détruire et l'histoire des insectes et autres animaux utiles aux cultures. E. Donnaud - Paris 1867. 648 pp., 125 wood-engravings.

of Montpellier (France).

This insect has a dimorphic female, the apterous form being common and the winged form extremely rare. Boisduval 1867, first recorded the apterous form under the name Coccus lataniae. A year earlier Signoret, noting the pentamerous antennae (vide Boisduval loc. cit. p. 357) had thought that the insect was a tiny pentatomid - an error which Signoret himself corrected the following year when he transferred it to Boisduvalia lataniae. Unfortunately he omitted to give any diagnostic characters; furthermore, Signoret's generic name Boisduvalia was already preoccupied, having been used by him for a coccid. Finally in 1882 Lichtenstein renamed the insect Cerataphis lataniae. He was the first person to study the winged form which revealed that the insect was neither coccid nor aleurodid, but a true aphid. The generic name 'Cerataphis' refers to the two sharp, conical, horn-like structures between the antennae. The cubitus of the forewing is forked and the winged individuals resemble Phylloxera in holding their wings flat over the abdomen when at rest. As mentioned earlier, the antennae are 5-segmented; the eyes, at first brownish, turn black after 3-4 days. Lichtenstein's description of this curious species was later confirmed by Buckton's work on [†]Kew material.

[†]The insect developed as a pest in the Botanical Gardens of Montpellier and Kew on Latania borbonica (= L. commersonii) - a palm native to the Mascarenes.

The record of C. lataniae on vanilla from Réunion (Bordage 1913) probably refers to another species, C. orchidearum (Westwood) which occurs extensively on cultivated orchids. If this assumption is correct then C. orchidearum made its first appearance as a pest in Réunion in 1906.

Mamet's record of C. lataniae on coconut is also very dubious: specimens collected in Mauritius on this plant by the present writer have always proved to be C. variabilis H.R.L. Similarly it is reasonable to assume that his record of C. lataniae on various orchids refers to C. orchidearum.

Keys to all three species are given further on in the text.

- (13) In an attempt to avoid errors due to misidentifications in the early literature the distributions given here are based only on specimens in the collections of the British Museum (Natural History).

XLVI Classification of the APHIDIDAE known from the Mascarene Islands

Key to the subfamilies of Mascarene APHIDIDAE

1. Subterranean, globular, white, yellow or pink aphids with short appendages. Media of forewings simple, on roots of grasses ERIOSOMATINAE p. 217
- . Mostly on the aerial parts of plants, if not then with longer appendages. Media of forewings once or twice branched 2
2. Last antennal segment with only a short processus terminalis. Head of apterae fused with prothorax. Eyes of apterae having only 3 facets. Alatae with normal compound eyes but antennae 5-segmented and bearing annular rhinaria. Media of forewing only once branched; Cubitus and anal vein usually joined at the base. Head of apterae usually with a pair of horns. On palms, orchids and GRAMINEAE. Either flattened and black with a fringe of wax or densely covered with wax wool THELAXINAE p. 218
- . Last antennal segment with an elongate processus terminalis. Head of apterae 'free'. Eyes of all forms large and compound. Antennae usually 6-segmented, sometimes 5-segmented. Alatae with circular secondary rhinaria. Media of forewing usually twice branched (sometimes only once branched and cubitus and anal vein not touching. Body with more or less elongate siphunculi (= cornicles) and usually with an elongate cauda; ordinary aphids APHIDINAE p. 221

Subfamily BRIOSOMATINAE Baker 1920

Gen. class. hem. families p.62

Key to the Mascarene genera.

1. Siphunculi absent. Tarsi of apterae 2-segmented, wax plates very small or absent Geoica Hart
- Siphunculi present as small truncated cones. Tarsi of apterae only one-segmented. Wax plates consisting of a ring or mass of cells surrounding an open space Tetraneura Hartig

Genus Geoica HartRep. I. 11 Ent - 18;101Type species: G. squamosa Hart (which is in fact a synonym of G. utricularia (Passerini))G. lucifuga (Zehnt.)

(Tetraneura lucifuga Zehnt., 1897
Arch. Java Suiker - Industr., 5:555)

Generally distributed in the Old World tropics

Host plants: Saccharum officinarum L.
Setaria barbata Lam.,
S. pallide-fusca Schum.
Stenotaphrum dimidiatum Brongn.

Mauritius, Egypt,
 Abyssinia, Ghana, Kenya,
 Nigeria, S. Leone,
 S. Africa, S. Rhodesia,
 Ceylon, India, Pakistan,
 Philippine Is.,
 N.S. Wales, N. Zealand.

Genus Tetraneura Hartig, 1841Germar. Z. Ent. 3:366Type species: Aphis ulmi L.T. nigriabdominalis (Sasaki) 1899.

Manual of insect pests of crops in Japan, p.435
 (= T. hirsuta (Baker) 1921).

Dryopeia hirsuta Baker. Dept. Agr. Calif.
 16th Bull. 10:159.

Generally distributed in the Old World tropics

Host plants: Chloris pycnothrix Trin.
Cynodon dactylon L.
Digitaria didactyla Willd.
Eleusine indica L.
Paspalum conjugatum Berg.
P. dilatatum Poir
P. paniculatum L.
Phlaris arundinacea L.
Setaria pallide-fusca Skun
Sida acuta Burm.

Mauritius, Egypt,
 Japan, Ghana, Guinea,
 Kenya, Nigeria,
 N. Rhodesia, Nyasaland,
 S. Leone, S. Africa,
 S. Cameroons, Tanganyika,
 Uganda, Ceylon, India,
 Pakistan, Malaya,
 N. Guinea, N. Borneo,
 Philippine Is.,
 N.S. Wales, Queensland,
 Victoria, Fiji,
 Honduras, Jamaica.

Subfamily THELAXINAE Baker 1920

Key to the Mascarene genera.

1. Apteræ black and flattened, more or less circular and surrounded with a ring of wax. On palms and orchids Cerataphis Lich.
- . Aphids with a more elongate and conventional appearance, densely covered with wax wool. On grasses Oregma Buckton (p.17)

Genus Cerataphis Lichtenstein, 1882

Bull. Soc. ent. Fr.(6)2:74

Type species: Coccus lataniae Boisduval 1867

(Essai Ent. horticole, Paris (Hémiptères p.355)

Key to the common species of Cerataphis

Apteræ

1. Cauda bearing 5-7 hairs. Underside of head with at least one pair of thick dagger-shaped hairs. Ultimate rostral segment (i.e. 4th & 5th) about 3/4 as long as hind tarsus 2. On various palms C. variabilis H.R.L.
- . Cauda bearing 10-16 hairs. Underside of head with only fine hairs 2

2. Ultimate rostral segment only $2/3 - 3/4$ as long as hind tarsus 2. On palms C. lataniae⁺
(Boisd.)
- . Ultimate rostral segment equal in length to hind tarsus 2.
On orchids C. orchidearum (Westwood)

C. lataniae (Boisduval) 1867.

Mauritius, Réunion,
cosmopolitan
immigrant elsewhere:
France, England,
Java, Malaya,
N.S. Wales.

Ent. horticole etc.

This species was originally described from palms growing in the hothouses at Montpellier. It is probably indigenous to the Mascarenes as its hosts - various species of Latania - are palms native to the area.

By 1910 it had reached the Hawaiian Islands and was recorded there for the first time by Fullaway from specimens taken at Honolulu by Kirkaldy and Van Dine (Zimmerman 1948:126-127).

⁺Mamet throughout his publications on the APHIDIDAE of Mauritius and as late as 1955 in his food plant catalogue of economic pests has assumed that C. lataniae (Boisd.) is a polyphagous species. According to D. Hille Ris Lambers, an authority on the aphids who amassed a large quantity of Cerataphis from many countries for over 25 years, the orchid inhabiting species are not found on other plants, nor species from palms on anything but palms (Hille Ris Lambers 1953). However, another 'form' frequently identified as 'lataniae' occurs on Pandanus vandermeerschii Balfour (PANDANACEAE) in Mauritius. In the light of Hille Ris Lambers' work, the present author believes that this may well prove to be another species. A further indication of this possibility is given by the occurrence of another species in Java: C. freycinetiae v.d.G. on PANDANACEAE.

Host plants: Latania commersonii J.F. Gmel.

L. loddigesii Mart., L. verschaffeltii Lemaire

Liviston~~ya~~ chinensis R. Br. and another fan palm

Pritchardia sp. (in Hawaii).

C. orchidearum (Westwood) 1879.

Mauritius, S. Africa,
Kenya, S. Rhodesia,
Java, Solomon Is.,
N.S. Wales, Fiji,
B. Guiana, Jamaica,
England.

First described as the 'frimbriated scale' or

the 'fringed scale insect' under the name Astero-

lecanium orchidearum Westwood. (Gdners' Chron. p.796)

Cosmopolitan immigrant.

Host plants: Bulbophyllum sp., Calanthe sylvatica Lindl.

Cymbidium aloeifolium S.W., Dendrobium nobile Lindl.,

Oncidium sp., Scelenepedium sp.

C. variabilis H.R.L. (1953) 1954

Mauritius, Seychelles,
India, Siam, Malaya,
New Britain, N. Borneo,
Papua, Philippine Is.,
Sarawak, Solomon Is.,
Fiji, N. Hebrides,
B. Guiana, Columbia,
Dominica, Jamaica,
Trinidad.

Agric. J. Fiji 24:95.

Cosmopolitan immigrant.

Host plants: Cocos nucifera L.⁺

Dictyosperma album Wendl and its

three varieties D. album rubrum H. Wendl & Drude,

D.a. aureum, D.a. furfaraceum H. Wendl & Drude,

Liviston~~ya~~ chinensis R. Br.,

Roystonea regia C. F. Cooke

⁺(sometimes occurs in such considerable numbers as to weaken the plant severely).

Genus Oregma Buckton 1896

Ind. Mus. Notes 3:87

Type species: O. bambusae Buckton

C. panicola Takahashi 1921.

APHIDIDAE of Formosa I:90-91.

Host plants: Thysanolena maxima Roseb.

Takahashi first recorded the species on

Panicum patens (L.) from Formosa. More recently

Eastop recorded it from East Africa on Pseudechinolaena polystachyon (L.)

Mauritius, East and West Africa (on mountains), Congo, Ghana, S. Cameroons, Tanganyika, Australia, (N.S. Wales) N. Zealand, Formosa, Cuba.

Subfamily APHIDINAE Latreille

Key to the tribes of Mascarene APHIDINAE

1. Spiracles of abdominal segments 1 & 2 widely spaced, with the lateral abdominal tubercle of segment 1 between them. 7th abdominal segment also with a lateral tubercle. Hairs pointed. Antennal tubercles little developed. Apterae without secondary rhinaria on antennae APHIDINI (Mordwilko) (see below)
- . Spiracles of abdominal segments 1 & 2 adjacent, sometimes with their bases fused. Abdominal segments 1 & 7 mostly without lateral abdominal tubercles, but if present then no larger than those found on segments 2 - 5 or 2 - 6. Hairs often blunt or weakly capitate. Antennal tubercles variably developed. Apterae often with secondary rhinaria MACROSIPHINI (Mordwilko) p.231

Tribe APHIDINI

Key to the subtribes of Mascarene Aphidini

1. Lateral abdominal tubercles placed more ventrally. Mostly on dicotyledons, very rarely on grasses and sedges Aphidina Mordwilko p.222.

- Lateral abdominal tubercles placed more dorsally relative to the spiracles. In temperate regions generations alternate between ROSACEAE, GRAMINEAE, CYPERACEAE and more rarely aquatic monocotyledons Rhopalosiphina⁺ Mordwilko

Subtribe APHIDINA Mordwilko 1908, p.378

Key to the Mascarene genera

1. Stridulating mechanism present: On shrubs Toxoptera Koch
 -. Stridulating mechanism absent: Many plants Aphis L. (p.224)

Genus Toxoptera Koch

Key to the species of Toxoptera occurring in the Mascarenes

Apterae

1. Siphunculi $9/10 - 1.1/4$ x cauda which bears 9 - 17 hairs. Longest hairs on antennal III $12 - 25\mu$, $2/3 - 4/5$ of basal diameter of III, $1/20 - 1/15$ of III. Siphunculi with normal imbrication aurantii B.d.F.
 -. Siphunculi $1.1/10 - 1.1/2$ x cauda which bears 22 - 36 hairs. Longest hairs on antennal III about 50μ , about twice the basal diameter of III and about $1/10 - 1/7$ of its length. Siphunculi strongly imbricated citricidus Kirkaldy

Alatae

1. Media of forewing normally once branched. Antennal III pale except for the very apex, bearing 2 - 8 rhinaria, IV without rhinaria. Cauda 8 - 15 hairs. Siphunculi with normal imbrication, $1 - 1.2/3$ as long as the cauda. Longest hairs on antennal III shorter than the basal diameter of III aurantii B.d.F.
 -. Media of forewing normally twice branched. Antennal III dark except for the very base, bearing 7 - 20 rhinaria, IV with 0 - 4 rhinaria. Siphunculi strongly imbricated, $1.1/4 - 1.3/4$ x cauda which bears 21 - 39 hairs. Longest hairs on antennal III longer than basal diameter of III citricidus Kirk.

⁺Mordwilko 1916 p.61 actually used Rhopalosiphini.

Genus Toxoptera Koch 1856Die Pflanzenl. Aphiden p.253Type species T. aurantiae Coq. (which is a synonym
of 'aurantii' Boyer de Fonscolombe)⁺T. aurantii (Boyer de Fonscolombe 1841)(Aphis aurantii B.d.F. Ann. Soc. ent. Fr. 10:178)Distribution of this pest may be described as warm
cosmopolitan.Host plants: Anona muricata L., Aralia sp.,
Bignonia unguis-cati L.,
Camellia thea Link.,
Cereus triangularis Mill.,
Ipomoea sp., Litchi sinensis Sonn.,
Mangifera indica L., Sida acuta Burn.,
Ficus sp.Mamet has recorded Dracaena reflexa Lam.
as host. This is unusual for that species.Plénet A. (1960) recorded the insect from Réunion (Rev. agric.
Réunion (N.S.) 60, p.167).T. citricidus (Kirkaldy 1907)(Myzus citricidus Kirk. Proc. Hawaii. ent. Soc.
1:99-102)Reported in some countries as a vector of Tristesia
(S. America), stem pitting disease (S. Africa)
lime die-back (Ghana), citrus yellows (Australia).Mauritius, Réunion,
Madagascar. S. Africa,
St. Helena, S. Cameroons,
French Cameroons,
Gaboon, Kenya, Uganda,
F.W. Africa, Nyasaland,
Principe Is., S. Leone,
Europe: Wales, Turkey,
U.S.S.R., N., S. &
Central America, Sao
Thomé, Australasia,
W. Indies. Malaya,
N. Britain, N. Borneo,
Philippine Is.,
Sarawak, Salomon Is.,
Queensland, N. Hebrides,
N. Zealand, Samoa Is.,
Brazil, Brit. Guiana,
Br. Honduras, Colombia,
Costa Rica, Jamaica,
Surinam, St. Vincent,
Venezuela, California.Mauritius, S. Africa,
Kenya, Tanganyika,
Nigeria, Nyasaland,
S. Cameroons, Ghana,
Katanga, S. Rhodesia,
Sudan, St. Helena,
India, Ceylon, Nepal,
Siam, Taiwan, Malaya,
N. Borneo, N. Guinea,
Philippine Is.,⁺vide Distr. Maps Pests No. 132, Dec. 1961.

In Mauritius, although die-back seems to result from attacks of this pest, yellowing of Citrus leaves seems to be seasonal.

Host plants: Citrus sinensis Asbeck,

C. aurantiifolia bigaradia Loisel,

C. maxima Merr., C. medica L.,

C. nobilis Lour.

Solomon Is., Sarawak,
N.S. Wales, Queensland,
S. & W. Australia,
Victoria, Fiji Is.,
Hawaii, N. Zealand,
Brazil, British Guiana.

Mamet lists this species on Pyrus communis but this is an unlikely record as Pyrus is not a normal host.

GENUS APHIS Linnaeus
Key to Mascarene species of Aphis

Apterae⁺⁺

1. 1st segment of hind tarsus bearing 3 hairs. Siphunculi black, $1/5 - 2/7$ of body length, $1.3/5$ (usually $1.4/5 - 2.1/5$ as long as the black cauda which bears 1 - 22 hairs. Processus terminalis $3.1/2 - 4.3/4$ x base VI. Ultimate rostral segment $1.1/3 - 1.3/5$ x hind tarsus 2 nerii B.d.F. p.226
- 1st segment of hind tarsus bearing 1 - 2 hairs. Siphunculi $1/7 - 1/4$ of body length. Cauda 4 - 7 hairs. Processus terminalis $1.4/5 - 3.1/10$ x hind tarsus 2 2 p.225
2. Dorsum black. Ultimate rostral segment $17/20 - 1.1/10$ x hind tarsus 2. Cauda black and rather pointed cracivora Koch "
- Dorsum pale. Ultimate rostral segment longer, $19/20 - 1.2/5$ the hind tarsus 2. Cauda pale or dusky and more rounded apically gossypii Glover p.226

⁺⁺Keys for the alatae are not given here as they can only be separated on more elaborate characters.

Genus Aphis⁺ Linnaeus, 1758

Syst. Nat. X,1 : 451

Type species: A. sambuci L. 1758

(Opinion 677 - Bull. zool. Nomencl. 20,5:336)

A. craccivora Koch 1854.

Die Pflanzenläuse Aphiden p.124.

Distribution: (warm) cosmopolitan

Mauritian records of A. laburni Kalt. (Mamet

1939) refer in fact to A. craccivora,

a polyphagous and polymorphic species which

is a serious pest of Leguminous plants

especially.

Host plants: Arachis hypogea Koch,

Caesalpinia bonducella Flem.,

Cajanus cajan Millsfs., Cineraria sp.

Gliricidia maculata H.B.K.,

Hiptage madablota Gaertn, Phaseolus spp.,

Portulaca oleracea L., Vicia sp.,

Vigna unguiculata L.

Predators: The coccinellid beetles Cheilomenes sulphurea Olivier,

Dysis bisquatuorguttata Muls. and the syrphid flies Xanthogramma pfeifferi

Big and Melanostomma annulipes mauritianum Big. prey on this aphid.

Mauritius, Madagascar, Uganda,
Gambia, Ghana, Eritrea,
St. Helena, S. Africa, Sudan,
Nigeria, Nyasaland,
Tanganyika, Yugoslavia,
Austria, Cyprus, Elba,
Morocco, Egypt, Palestine,
Turkestan, Nepal, Ceylon,
Pakistan, Iran, Iraq, India,
U.S.S.R., Austria, France,
England, Netherlands,
Madeira, Japan, China, Borneo,
Java, Malaya, N. Britain,
N. Guinea, Philippine Is.,
Sarawak, Solomon Is.,
Montebello Is., N.S. Wales,
N. Territory, Queensland,
S. Australia, Tasmania,
W. Australia, N. Zealand,
Samoa, Tahiti, Fiji, Hawaii,
Arizona, Colorado, Idaho,
Chile. N. Mexico, N. York,
Quebec, Utah, Washington,
Argentina, British Guiana,
Venezuela, Wyoming,
Montserrat, St. Vincent,
Surinam, Trinidad, Colombia,
Jamaica.

⁺Doralis Leach, 1837, is now a synonym of Aphis (Ref.: Bull. zool.

Nomencl. 18,2:143-145).

A. gossypii Glover 1877.

Rept. com. Agr. Operations Rept. for 1876 p.36.

Some authors have placed gossypii in the
(sub-) genus ⁺⁺Cerosipha del Guercio 1900.

Type species: C. passeriniana del Guer.)

Host plants: Alocasia macrorhiza Schott.

Cordia macrostachya Jacq., Crinum carlyanum Herb., Cucumis sativus L.,

Cucurbita maximum Duchenne, C. pepo L., Dahlia sp., Dianthus caryophyllus L.,

Eupatorium pallescens Dc., Euphorbia peplus L., Gossypium barbadense L.,

Hibiscus esculentus L., H. rosa-sinensis L., Machnera rosae Rebb.,

Mammea americana L., Nicotiana tabacum L., Portulaca oleracea L.,

Psidium guajava L., Salvia coccinea Jus., Scaevola frutescens Krause

Solanum nigrescens L., S. torvum Sv., S. tuberosum L., S. wendlandii Hook,

Tragopogon porrifolius L., Zinnia elegans L.

Predators: In addition to the coccinellids and syrphids already listed
as predators for A. craccivora, the following insects are recorded as
attacking A. gossypii: Platynaspis kollari capicola Crotch (COCCINELLIDAE);
? Aphidius sp. (HYMENOPTERA).

A. nerii Boyer de Fonscolombe, 1841.

Ann. Soc. ent. Fr. 10:179.

As the distribution shows, this species
is now a cosmopolitan tropical and subtropical
pest. The first specimens from Mauritius
were collected in 1933.

Mauritius, Nyasaland,
Nigeria, Kenya, Ghana,
Eritrea, Aden, Sudan,
Rhodesia, Cameroons,
Abyssinia, Uganda, Zanzibar,
S. Africa, Siam, Pakistan,
Nepal, India, China, Malaya,
Sierra Leone, Utah,
California, Bermuda,
Paraguay, Jamaica, British
Guiana, N. Zealand,

⁺⁺Nuove Rel. R. staz. Ent. Agr. Firenze 1900, p.114.

Food plants: Asclepias sp.,

Hoya carnosa R. Bri.

N. Hebrides, Victoria
(Australia), Tasmania,
Queensland, Northern
Territory, N.S. Wales,
Solomon Is., N. Borneo.

Aphis sp.

Recorded by Mamet on Cuscuta sp., refers probably to A. gossypii.

Only one American species of APHIDIDAE confined to this plant has been described so far.

Subtribe RHOPALOSIPHINA Mordwilko 1914

Key to the Mascarene genera.

1. Apterae with dorsum characteristically ornamented with spinules. Media of forewings usually twice branched. Cauda bearing 4 or 5 hairs. Abdomen of alatae pale dorsally Rhopalosiphum Koch
- . Dorsum of apterae smooth, without polygonal ornamentation. Abdomen of alatae pale dorsally, cauda bearing 4 or 5 hairs 2
2. Media of forewing only once branched Schizaphis Börner p.229.
- . Media of forewing twice branched. Cauda bearing about 10 hairs. Alatae without dorsal abdominal segmentation ..
..... Longiunguis van der Goot p.229.

Genus Rhopalosiphum Koch, 1854

Die Pflanzenl Aphiden, p.23

Key to the Mascarene species

Apterae

1. Processus terminalis only 1.3/4 - 2.1/2 x base of segment VI. Antennae less than half as long as the body. Siphunculi barrel-shaped, 1/4 - 1/9 as long as the body. Ultimate rostral segment shorter than hind tarsus 2 maidis (Fitch)

- Processus terminalis $3 - 4.1/2$ x base VI. Antennae $3/5 - 4/5$ of body length. Siphunculi elongate and clavate, $2/11 - 2/9$ body length. Ultimate rostral segment $1.1/10 - 1.1/3$ hind tarsus 2 nymphaeae L. 1761 p. 229.

Alatae

1. Processus terminalis $1.4/5 - 2.1/3$ base VI. Siphunculi $1/15 - 1/9$ body length. Ultimate rostral segment shorter than hind tarsus 2. Secondary rhinaria distributed: III, 6 - 30; IV, 0 - 12; V, 0 - 4 (usually 0) maidis (Fitch)
(See below)
- Processus terminalis $3.1/4 - 4.1/4$ base VI. Siphunculi distinctly clavate, $1/7 - 1/5$ as long as the body. Rhinaria III, 17 - 27; IV, 0 - 8; V, 0 nymphaeae L. p. 29.

Genus Rhopalosiphum Koch, 1854

Die Pflanz. Aphiden pp. 23 - 24

Type species: Aphis nymphaeae L.

R. maidis (Fitch)

(Aphis maidis Fitch: 1st & 2nd report on noxious, beneficial and other insects of the state of New York, pp. 318-320).

A cosmopolitan species reported as a vector of a number of virus diseases (vide Kennedy et al 1962).

Host plants: Coix lacryma L.

Eleusine sp. on lower leaf surface,

Pennisetum purpureum Schum,

Saccharum officinarum L.,

Sorghum roxburghii Staph.

Zea mays L.

Mauritius, Mozambique, N. Rhodesia, Nigeria, Nyasaland, St. Helena, Sierra Leone, S. Africa, S. Cameroons, S. Rhodesia, Aden, Kenya, Sudan, Tanganyika, Uganda, Bonin Is., Ceylon, India, Nepal, Pakistan, Quelpart Is., Tokake Is., Malaya, New Britain, N. Guinea, N. Borneo, Philippine Is., Papua, Sarawak, Solomon Is., Australia, Fiji, N. Zealand, Trinidad, Bermuda, America.

R. nymphaeae (L.)

(Aphis nymphaeae L. Faun. Suec. ed. 2:260).

Now cosmopolitan, probably originally
palaeartic.

Mauritius, Nepal,
India, China, Pakistan,
W. Bengal, Australia,
Bermuda, Fiji,
New Zealand, Brazil,
U.S.A., Canada.

Host plants: Hydrilla verticillata Casp.,

Nelumbium speciosum Willd.

Victoria regia Lindl.

Genus: Schizaphis Börner

Type species: Aphis graminum Rondani 1847

Anz. schädlingok. Ø:10

Vide p.6: remarks under (6).

Genus Longiunguis van der Goot 1917

Contr. Fauna Ind. Neerl., 1(3) 112⁺

Type species: Aphis sacchari Zehntner

L. sacchari (Zehnt.) 1897⁺⁺

Die plantenluizen van het suikerrett,

Arch. Suikerind. Ned. - Ind., 5:551.

Generally distributed throughout the Old

Mauritius, Aden,
Gambia, Kenya,
Nigeria, Sierra Leone,
S. Africa,
S. Rhodesia, Sudan,
Tanganyika, Zanzibar,
Ceylon, China, India.

World Tropics. Originally described from Java.

⁺Mamet (1939) p. 53 gives the page reference as 116 in error.

⁺⁺So far the author has not been able to obtain a copy of this article.

Mamet (l.c.) gives the following pagination and date Arch. Java Suiker

Industrie 9:674 (1901): the above is taken from F.S. Bodenheimer &

E. Swirski's 'APHIDOIDEA of the Middle East' 1957:310 (Jerusalem -

Weizmann Sci. Press Israel).

Host plants: Panicum maximum Jacq.

Saccharum officinarum L.

Sorghum verticilliflorum Staud.

Zea mays L.

On the sugar cane the aphid is commonly found on the lower leaf surface. Attacks are sporadic. Predators and parasites include:-

Aphidius sp. (BRACONIDAE)

+++Cephalosporidium aphidicola Patch (an entomogenous fungus)

Cheilomenes sulphurea Oliver (COCCINELLIDAE)

Melanostoma annulipes mauritianum Bigot (SYRPHIDAE)

Platynaspis kollari capicola Crotch (COCCINELLIDAE)

Scymnus constrictus Mulsant (COCCINELLIDAE)

Xanthogramma pfeifferi Bigot (SYRPHIDAE)

+++Patch, T., 1941 - The entomogenous fungi of Mauritius, Bull. Maur.

Inst. 2:14-20.

Tribe Macrosiphini Mordwilko 1914

Key to the subtribes of MACROSIPHINI

1. Antennal hairs about as long as or longer than the diameter of the segment, body hairs usually conspicuous. Apterae with rhinaria on the base of antennal III at least. Alatae usually with rhinaria only on III, rarely also with a few on IV. Cauda elongate, tongue-like, bearing 6-20 hairs, usually 8-17 hairs. Alatae without or with only scattered, broken, dorsal abdominal pigmentation
 Macrosiphina Mordwilko 1914
2. Antennal hairs inconspicuous, often only $1/4$ - $1/5$ as long as the diameter of the segment, body hairs usually short also. Apterae without secondary rhinaria on antennal IV & V in addition to III. Cauda short, triangular or pentagonal, mostly bearing only about 4-7 hairs. Alatae sometimes with a dorsal abdominal black patch Myzina

Subtribe Macrosiphina Mordwilko 1914

Aphidoidea I in Faune des pays limitrophes (Insecta Hemiptera) I : 61.

1. Siphunculi cylindrical or tapering and with an apical band of polygonal reticulation 2
- . Siphunculi variously shaped, without apical polygonal reticulation 4
2. Dorsal body hairs arising from dark scleroites, very dark red superficially appearing black: on COMPOSITAE. Antennal III of apterae with rhinaria over at least half its length 3
- . Dorsal body hairs without dark bases. Apterae with 1 - 10 rhinaria near base of antennal III. Green or otherwise coloured aphids on many plants Macrosiphum Passerini 1860
3. First tarsal segments bearing only 5 hairs. Siphunculi much longer ($1\frac{1}{2}$ - 2) than cauda Dactynotus Raffinesque 1818

- . First tarsal segments bearing only 3 hairs. Siphunculi a little shorter (9/10) than cauda Macrosiphoniella Del Guercio 1911 p.237
- 4. Siphunculi cylindrical; black on basal half, white on distal half. Radius of forewing touching or almost touching upper branch of media. Wing veins shaded. On Ferns Idiopterus Davis 1909 p.237
- . Siphunculi variously shaped but unicolorous or darker at apex than at base. Wing venation normal 5
- 5. Siphunculi cylindrical, spiracles normal, reniform. On Rose Rhodobium H.R.L. 1947 p.238
- . Siphunculi clavate. On Sonchus. Spiracles more open than usual. Alatae with a dorsal abdominal black patch Hyperomyzus Börner 1933 p.238

Genus Macrosiphum Passerini, 1860.

Gli. Afidi ... p.27 (footnote)

Key to the Mascarene species of Macrosiphum⁺

Apterae viviparae

- 1. Antennal hairs as long as the diameter of segment III of antenna at its base. 1st instar larvae with 4 caudal hairs, and 1st tarsal segments bearing 3 hairs. Adults with 8-17 caudal hairs. Usually on dicotyledons and monocotyledons, rarely on GRAMINEAE (Macrosiphum) 2
s.str.
- . Antennal hairs rarely more than half the diameter of III at base. 1st instar larvae with 2 caudal hairs and 1st tarsal segments with 2 hairs. Usually on GRAMINEAE, a few species on dicotyledons (Sitobion) 3

⁺ Although Macrosiphum fragariae Wlk. has been recorded from Mauritius (Host plant: Sorghum verticilliflorum), the present author believes this to be a misidentification: 'fragariae' is much like M. (Sitobion) africanum and may well have been confused with it. M. fragariae is not therefore keyed here.

2. Antennal III with 1 - 7 rhinaria in a row on basal half. Siphunculi usually pale with only the base pale. Ante - siphuncular sclerite not evident. Ultimate rostral segment shorter than hind tarsus 2. Cauda bearing 8 - 12 hairs. Polyphagous M. euphorbiae (Thomas)
- . Antennal III with 5 - 30 rhinaria in a group, not in a single row on the basal half of the segment. Siphunculi usually black, sometimes paler at the very base. Ante - siphuncular sclerite dark and conspicuous. Ultimate rostral segment about equal in length to hind tarsus 2. Cauda bearing 8 - 17 (usually 11 - 14) hairs. On roses . M. rosae (L.)
3. Siphunculi $1/9 - 2/11$ as long as the body, $9/10 - 1.1/4$ as long as the pale cauda. Dorsum black and more or less uniformly pigmented. Processus terminalis $3 - 4.1/4$ x base of VI. Ultimate rostral segment $9/10$ to equal hind tarsus 2. Antennal hairs 10 - 17u, posterior dorsal cephalic hairs 12 - 23u, hairs on 8th tergite 20 - 45u. Cauda bearing 6 pointed hairs. On GRAMINEAE
M. (S.) pauliani (Remaudière)
- . Siphunculi $2/11 - 2/5$ as long as the body, if less than $2/9$ then processus terminalis more than $4.1/4$ x base VI and dorsum of abdomen with small well-defined segmentally arranged dark bars 4
4. Siphunculi constricted at the apex. Apical caudal hairs short and straight, some of them distinctly capitate. Antennal hairs and posterior dorsal cephalic hairs 7 or 8u, hairs on 8th tergite about 10u. Caudal hairs often capitate 5
- . Siphunculi not constricted at the apex, parallel-sided or expanded at the apex 7
5. Ultimate rostral segment $1.1/8 - 1.1/3$ x hind tarsus 2, $1 - 1.1/10$ x base of antennal VI. Processus terminalis $6.1/2 - 7.1/2$ x base VI. Siphunculi $2/7 - 1/3$ of the body length, pale at the base, $1.3/4$ to twice as long as the cauda which bears 7 - 9 hairs, only the two basal pairs usually being long and pointed. A medium to dark green aphid living in colonies at the growing point of Vernonia (COMPOSITAE)
..... M. (S.) congolensis Doncaster & H.R.L.
- . Ultimate rostral segment shorter than hind tarsus 2. Processus terminalis $3.1/2 - 6$ x base VI. Not on COMPOSITAE 6

6. Processus terminalis $4\frac{1}{2}$ - $5\frac{1}{2}$ x base VI. Apical caudal hairs pointed. Eighth tergite normally bearing 4 hairs (rarely 3). Ultimate rostral segment $\frac{7}{10}$ - $\frac{4}{5}$ of hind tarsus 2, about $\frac{4}{5}$ to equal base VI. Siphunculi black. On Wikstroemia M. (S.) wikstroemiae Mamet stat. nov.
- . Processus terminalis $3\frac{1}{2}$ - $4.1/4$ x base VI. Apical caudal hairs capitate. Eighth tergite with 2 or 3 hairs. Ultimate rostral segment $\frac{2}{3}$ - $\frac{3}{4}$ of hind tarsus 2, $\frac{3}{4}$ - $\frac{4}{5}$ of base VI. On Phyllanthus M. (S.) phyllanthi Takahashi
7. Cauda black, almost as dark as the siphunculi. Ultimate rostral segment distinctly constricted at the base, $\frac{2}{3}$ - $\frac{3}{4}$ as long as hind tarsus 2. Wax covered in life, bluish grey, red in alcohol. On GRAMINEAE . M. (S.) graminis Takahashi
- . Cauda pale or if dusky, much paler than the black siphunculi. Ultimate rostral segment more elongate 8
8. Ultimate rostral segment longer (normally $1.1/10$ - $1.1/5$) x hind tarsus 2. Processus terminalis $5.3/4$ - $7.3/4$ x base VI. Hairs on 8th abdominal tergite 40 - 50u long..... M. (S.) nigrinectria Theobald
- . Ultimate rostral segment shorter than $\frac{4}{5}$ - $\frac{9}{10}$ of hind tarsus 2. Processus terminalis $4.2/5$ - $5.3/4$ x base VI. Hairs on 8th tergite 17 - 23u M. (S.) africanum H.R.L.

Genus Macrosiphum Passerini, 1860

[As pointed out by Passerini, the name Siphonophora Koch is preoccupied (Gli. Afidi. loc. cit.)]

Type species by original designation Aphis rosae L., 1758

M. euphorbiae (Thomas, 1878)

Siphonophora euphorbiae Thomas. Bull. Ill. nat. Hist. Surv. No. 2:6.

Host plants: Alocasia sp., Hibiscus esculentus L.,

Hibiscus spp., Solanum melongena L.,

S. nigrum L., S. tuberosum L.

Mauritius, S. Africa,
Kenya, Katanga,
St. Helena,
Rhodesia, Tanganyika,
Ceylon, Columbia,
Brazil, N. Zealand,
Queensland, Victoria,
Utah, Oregon,
Colorado,
Connecticut, Bermuda,
Jamaica, Hawaii,
Campbell Is.,
England, Norway.

A polyphagous species recorded elsewhere on a variety of plants of the following families: IRIDACEAE, LABIATAE, LILIACEAE, NYCTAGINACEAE, PAPAVERACEAE, RANUNCULACEAE, RUBIACEAE, SAXIFRAGACEAE and even on Filicales, e.g., Osmunda sp.

Probably originally American, now quite cosmopolitan in distribution.

M. rosae (L.)

Mauritius, Madagascar, Kenya, Eritrea, S. Rhodesia, Uganda, Katanga.

Host plants: DIPSACACEAE, ROSACEAE.

Originally palaeartic but now with an increasingly cosmopolitan distribution. The species is recorded as a vector of not less than half a dozen virus diseases.

Macrosiphum (Sitobion) africanum H.R.L., 1954

Boll. Lab. Ent. agr. Filippo Silvestri 33:169-171.

This and the following species are placed in the subgenus Sitobion Mordwilko, 1914: S. congolensis, S. graminis, S. nigrinectria, S. pauliani, S. phyllanthi Takahashi and S. wikstroemiae.

Type of subgenus: Aphis avenae F.

M. (S.) africanum H.R.L.

Mauritius, Rodriguez, Kenya, Tanganyika, Eritrea, Aden, Yemen, Nigeria, Cameroons, China (?).

Host plants: Setaria spp. and many other GRAMINEAE, more rare on CYPERACEAE and

DICOTYLEDONAE. Previous records of this species on tea from Mauritius apply to M. (S.) wikstroemiae (Mamet).

M. (S.) congolensis Doncaster & H.R.L., 1956.

Mauritius (?), Madagascar, Kenya, Nigeria, Ghana, S. Cameroons, Congo (Katanga).

Ent. Ber. Jmst. 16:49-52.

Dark green specimens of a species

identical with or very near this species were once collected at Réduit on Gladiolus sp.. Eastop (1961) finds that specimens from Mauritius have shorter siphunculi, also constricted at the apex.

M. (S.) graminis (Takahashi, 1950) Mauritius, (?)
Madagascar, Kenya,
Ann. ent. Soc. Amer. 43: Malaya.

Greyish brown specimens apparently belonging to this species are said to have been collected from Mauritius, but the present author has seen specimens from Madagascar only.

Host plants: Setaria and other GRAMINEAE.

M. (S.) nigrinectria Theobald, 1915 Mauritius, Madagascar,
Kenya, Uganda,
Bull. ent. Res. 6:107-108 Rhodesia.

A pest of Cajanus cajan Millsp. in many countries.

M. (S.) pauliani Remaudière, 1957 Mauritius, Madagascar,
S. Cameroons,
Nat. malgache 9:281-285 Nigeria.

Described from Madagascar on Pennisetum setosum Rich.. Specimens on Pennisetum spp. from Mauritius may well belong to this species.

M. (S.) wikstroemiae (Mamet) Mauritius, S. Rhodesia
(?)
Bull. Maur. Inst. 1:7

Described from Mauritius.

Host: Wikstromia indica Mey.

Rather short processus terminalis for a Macrosiphum.

Genus Dactynotus⁺ Raffinesque, 1818

Amer. mo. Mag. Crit. Rev. 3:18

Type species subsequently designated: Aphis hieracium-panicum Raff.

⁺There is a suggestion before the International Commission on Zoological Nomenclature that Dactynotus should be made invalid. If that is the case the species will come in Uroleucon (Uromelan) Mordwilko 1914 (type species subsequently designated Aphis sonchi L. Börner & Schilder 1930).

D. compositae (Theobald) 1915

(Macrosiphum compositae Theobald)

Bull. ent. Res. 6:106, fig.

Mauritius, S. Africa,
S. Cameroons,
S. Rhodesia, Tanganyika,
Uganda, Zanzibar, Asia
(India).

First specimens from Mauritius apparently collected by D. d'Emmerez de Charmoy 1921. A seasonal pest of Cynara cardunculus L., C. scolymus L.

Genus Macrosiphoniella Del Guercio, 1911

Redia 7:331

Type species: Siphonophora atra Ferrari

M. (Pyrethromyzus sanborni) (Gillette), 1908

(Macrosiphum sanborni (Gillette 1908))

Can. ent. 40:65, fig.

Some authors recognize the subgenus

Pyrethromyzus Börner.

Host plants: Chrysanthemum sp.

Mauritius, probably
oriental originally,
now cosmopolitan.
Cyprus, Egypt, England,
Japan, Yugoslavia,
Kenya, Nigeria,
S. Rhodesia, Sudan,
India, Nepal, Pakistan,
N. Guinea, N. Borneo,
Philippine Is., Tasmania,
Victoria, Utah,
Colorado, Bermuda,
California, N. Zealand,
Jamaica.

Genus Idiopterus Davis, 1909

Ann. ent. Soc. Amer. 2:198

Type species: I. nephrelepidis Davis, 1909

I. nephrelepidis Davis, 1909

Ann. ent. Soc. Amer. 2:199.

A cosmopolitan pest of Ferns, especially

Adiantum sp. Formerly recorded in Mauritius under

the name of Pullawayella kirzaldii Pullaway 1911.

Mauritius, Belgium,
Channel Is., Egypt,
England, Scotland,
Syria, Wales, Kenya,
S. Africa, S. Rhodesia,
Tasmania, N. Zealand,
Bermuda, California.

Genus Rhodobium Hille Ris Lambers, 1947

Tenninckia 7:300

R. porosum (Sanderson), 1900

Ann. Rept. Del. agric. Exp. Sta. 12:205.

Formerly recorded in Mauritius under the name: Aulacorthum
rosae-folium.

Genus Hyperomyzus Börner, 1933

Kleine Mitteilungen über Blattläuse (private publication), p.2

Type: Aphis lactucae, 1758

H. carduellinus (Theobald)

Bull. ent. Res. 6, Rhopalosiphum, 113; Mason (1925).

Proc. U.S. Nat. Mus., 67, Art. 20, Amphorophora, p.14.

Host: Sonchus oleracea L.

Possibly a high temperature form of H. lactucae (L.).

Subtribe MYZINA

1. Antennatubercles well developed. Siphunculi elongate, weakly clavate, about as long as the head is wide 2
- Antennal tubercles less well developed. Siphunculi shorter than head width 3
2. Radius of forewing fused with upper branch of media. Brown aphids on MUSACEAE, ARACEAE & ZINGIBERACEAE. Cauda short and thick with a lobe at the end Pentalonia Coquerel 1859
- Wing venation normal. Green aphid on many plants. Cauda triangular shaped Myzus Passérini 1860
3. Cauda pentagonal. Wax covered aphids at the base of the stems of UMBELLIFERAE, LILIACEAE and IRIDACEAE. Alatae with a dorsal abdominal black patch Dysaphis Börner 1931

- . Cauda triangular and almost as long as the siphunculi. Variably wax dusted aphids on CRUCIFERAE. Alatae without dorsal abdominal pigmentation Lipaphis Mordwilko 1928

Genus Pentalonia Coquerel 1859

Type species P. nigronervosa Coq. 1859 (monobasic)

Ann. Soc. ent. Fr. (3) 7:259

P. nigronervosa Coquerel

(Ann. Soc. ent. Fr. loc. cit.)

Host plant: Musa sp.

Recorded as a vector of "Bunchy top" and other virus diseases. Apparently the symptoms of so-called

"Bunchy top" disease in Mauritius are not typical of the disease elsewhere.

According to Eastop (personal communication) specimens of P. nigronervosa

Coq. on Colocasia sp. refer to a new species which he is now describing.

In typical nigronervosa the veins are heavily bordered with black

pigmentation whereas in specimens from Colocasia veins are paler (Plate 2).

Mauritius, Réunion,
S. Cameroons,
Nigeria, Gambia,
St. Helena, Kenya,
Tanganyika, Uganda,
Rhodesia, Egypt,
Ceylon, India,
Malaya, New Hebrides,
S. America, W. Indies.

Genus Myzus Passerini 1860

Gli. afidi p.27

Type species by original designation,
Aphis cerasi Fabricius 1775

M. persicae (Sulzer) 1776

Abgek. Gesch. Ins., p.105

Polyphagous, rare on sedges and grasses.

Host plants in Mauritius: Matthiola sp.,

Solanum tuberosum L., Nicotiana tabacum L.,

Impatiens sp., Chrysanthemum sp.

Mauritius,
Madagascar, Seychelles,
Uganda, Tanganyika,
Sudan, S. Cameroons,
S. Africa, St. Helena,
Nyasaland, Rhodesia,
Katanga, Congo, Kenya,
Egypt, Palestine,
Jordan, Ghana, Eritrea,
Morocco, Gibraltar,
Aden, Cyprus,

Portugal, Germany,
 Scotland, Canary Is.,
 England, Wales,
 Sweden, Norway,
 Guernsey, Ireland,
 Denmark, Iceland,
 Czechoslovakia,
 Austria, Iraq, Japan,
 Ceylon, India, China,
 Nepal, Pakistan,
 Malaya, New Britain,
 Victoria, Tasmania,
 S. Australia,
 Queensland, N.S. Wales,
 Philippine Is.,
 N. Borneo, New Guinea,
 W. Australia,
 Campbell Is., Fiji,
 Hawaii, New Zealand,
 Utah, Nevada,
 Manitoba, Idaho,
 California, Bermuda Is.,
 Venezuela, Costa Rica,

Genus Dysaphis Börner 1931

Anz. schadlingskol 7:9

Type species: Aphis angelicae Koch

Anuraphis sorbi Kltb. is recorded from Carum (Mauritius). This is almost certainly a misidentification as sorbi is known only from Europe and does not feed on UMBELLIFERAE. It is likely that the aphid was Dysaphis apiifolia but it could also be D. foeniculus Theob.: both of these live on Umbelliferae and are known from various parts of Africa.

Genus Lipaphis Mordwilko 1928

Keys to the Insects of European Russia p.200, Mordwilko in Philipjew
 J.N.

Type species: Aphis erysimi Kaltenbach 1843

L. erysimi pseudobrassicae (Davis) 1914.

Can. Ent. 46:231.

Mauritius,
 Madagascar,
 S. Cameroons, Sudan,

Tanganyika, Uganda,
S. Africa, Nigeria,
Kenya, Aden, Eritrea,
Morocco, Cyprus,
Egypt, Iraq, Israel,
Pakistan, India,
Ceylon, China, Nepal,
Malaya, New Britain,
N. Borneo, Philippine
Is., Solomon Is.,
N.S. Wales, Queensland,
Australia, Fiji,
Hawaii, N. Zealand,
Br. Guiana, Costa Rica,
Venezuela, Alaska,
Bermuda, California,
Indiana, Maine,
Manitoba, Texas, Utah,
Washington, Germany,
Netherlands, Austria,
Anglesey, Eire,
England, Denmark.

APHIDINAE : Macrosiphini

Above:

Macrosiphum (Sitobion) phyllanthi (Takahashi)

Note the slightly constricted apices of the siphunculi and the comparatively short antennae for Macrosiphum.

Below:

Macrosiphum rosae(Linnaeus)

Note the elongate siphunculi slightly flanged at the apex.

APHIDINAE:
MACROSIPHINI



MACROSIPHUM (SITOBION) PHYLLANTHI Takahashi



MACROSIPHUM ROSAE Linnaeus

APHIDINAE : Macrosiphini

Pentalonia Coquerel 1859

This is one of the few aphid genera with a closed cell in the forewing.

Above :

P. nigronervosa Coquerel 1859

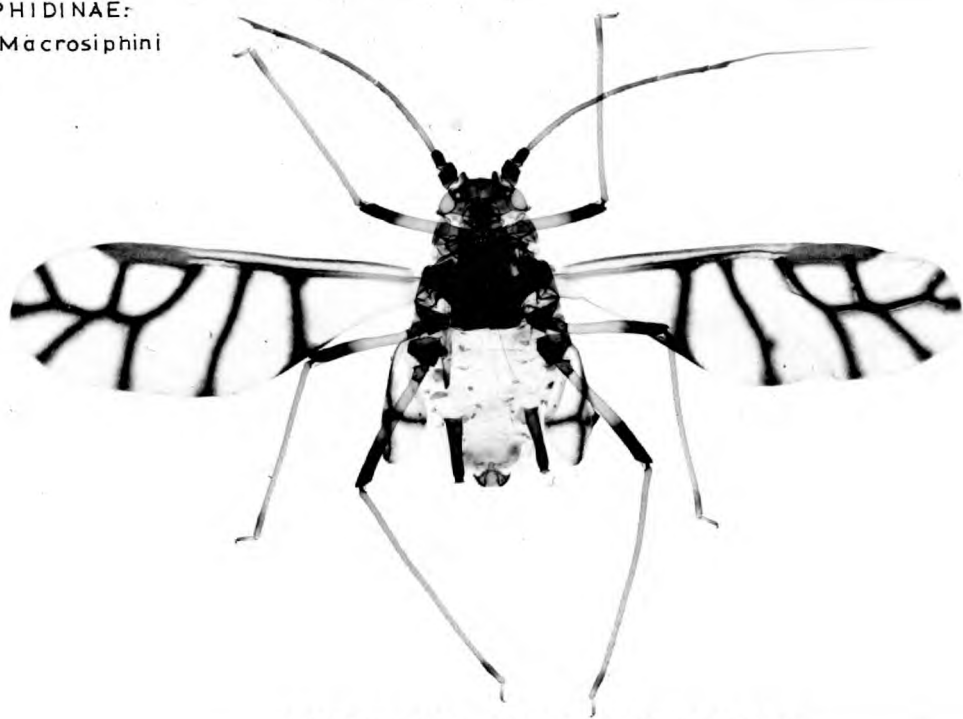
Adult with darker shading of wing veins and thicker siphunculi said to result when nymphal stages feed on Musa sp.

Below :

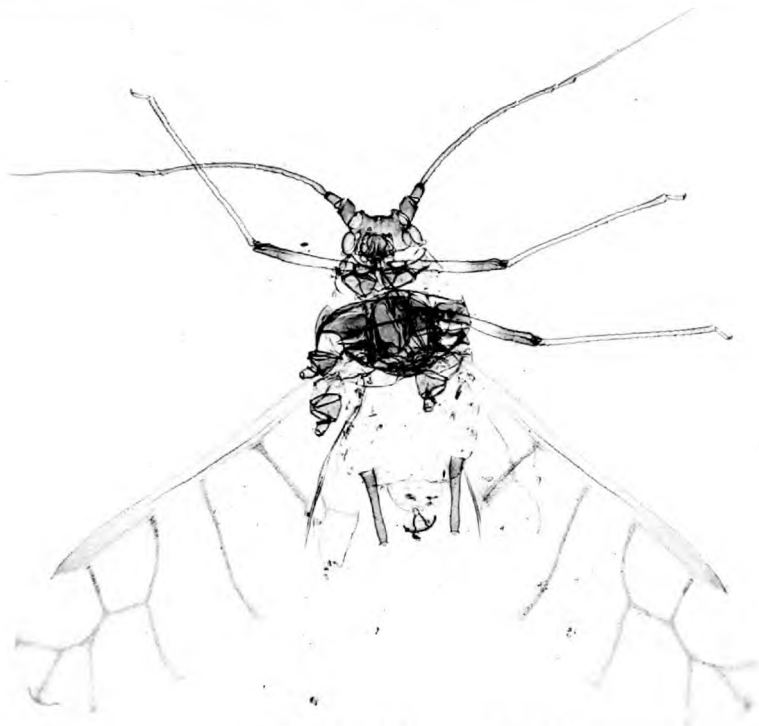
P. nigronervosa Coquerel 1859

Adult with less heavily pigmented wing veins and more slender siphunculi said to result when nymphal stages feed on ARACEAE.

APHIDINAE:
Macrosiphini



PENTALONIA NIGRONERVO SA COQ.



PENTALONIA Sp.nov.(?)

APHIDINAE : Macrosiphina

Idiopterus Davis, 1909

I. nephrolepidis Davis 1909 (left half reversed).

Note the closed cell in the forewing and the pigmented veins.

APHIDINAE
MACROSIPHINI



IDIOPTERUS NEPHRELEPIDIS
Davis

APHIDINAE : Macrosiphini

Above:

Myzus (Nectarosiphon) persicae (Sulzer, 1776)

The photograph shows the dorsal abdominal black patch characteristic of Myzus and its relatives.

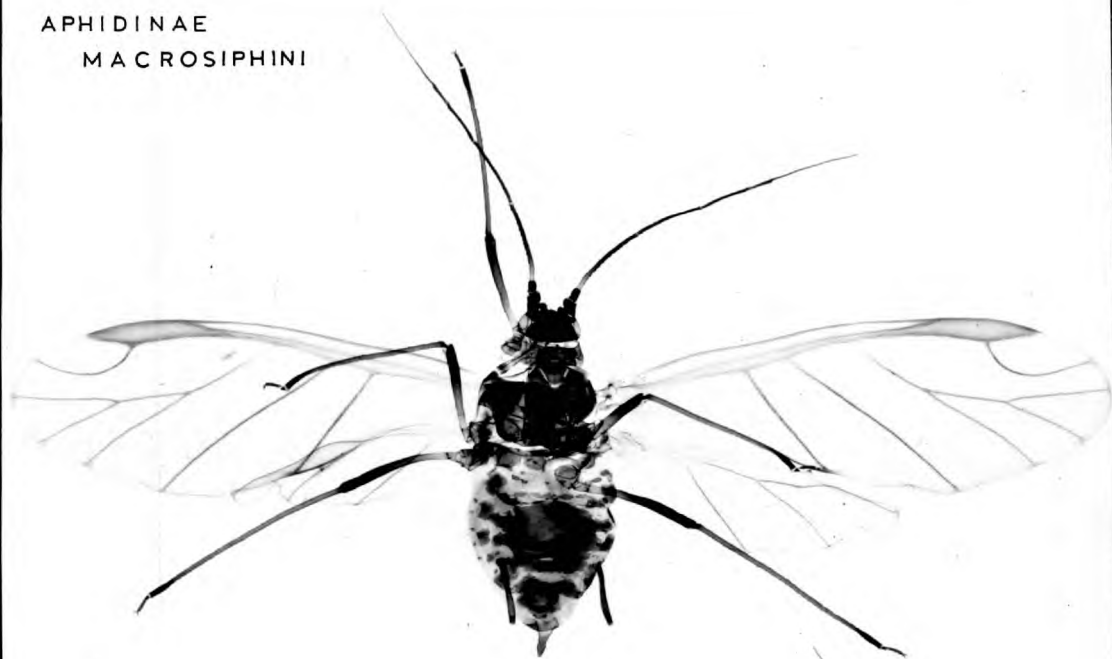
APHIDINAE - Aphidini

Below:

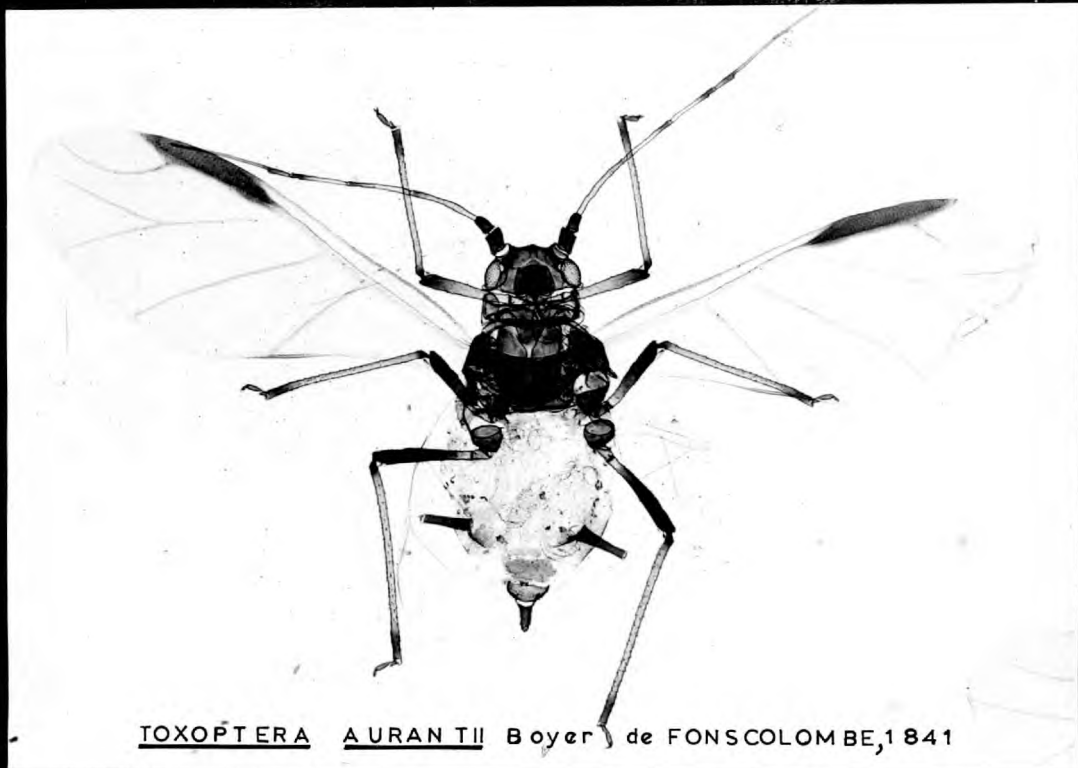
Toxoptera aurantii (Boyer de Fonscolombe, 1841)

Two features of the forewing, the dark stigma and the medius branching only once, are characteristic of this aphid.

APHIDINAE
MACROSIPHINI



MYZUS (NECTAROSIPHON) PERSICAE
Sulzer



TOXOPTERA AURANTII Boyer de FONSCOLOMBE, 1841

APHIDINAE : Aphidini

Above :

Rhopalosiphum maidis (Fitch)

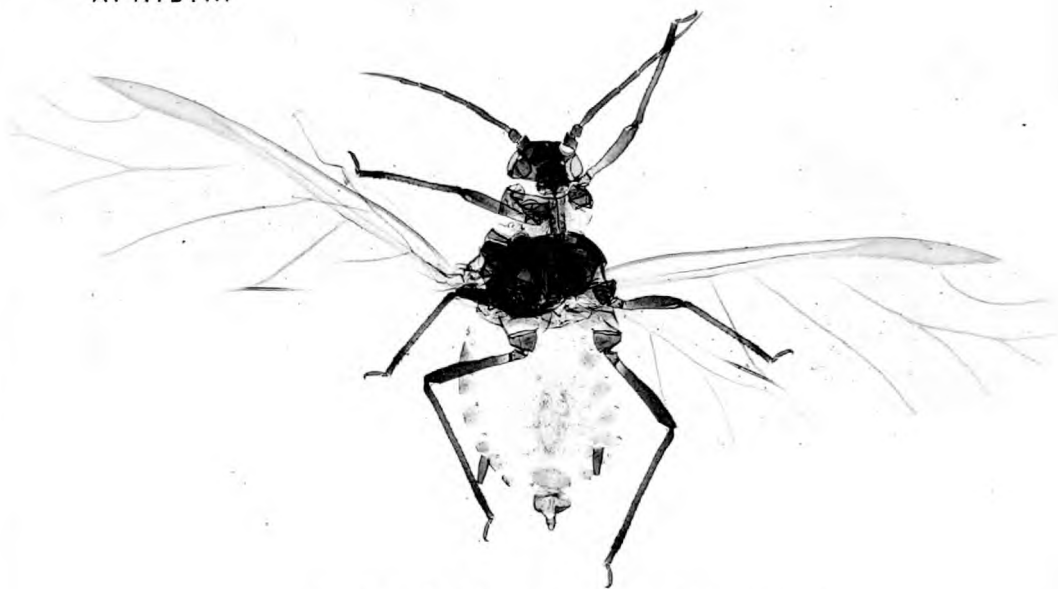
The media of the forewing in Rhopalosiphum may dichotomate once or twice: this specimen shows asymmetry in that the second branch is less well developed in the left wing.

Below :

Longiunguis sacchari Zehntner

Differs from most other Rhopalosiphina in having abdominal pigmentation on tergites 2-5.

APHIDINAE:
APHIDINI



RHOPALOSIPHUM MAIDIS (FITCH)



LONGIUNGUIS SACCHARI Zehntner

Above:

BRIOSOMATINAE : Fordini

Geoica lucifuga (Zehnt.)

The photograph shows clearly the following features characteristic of the tribe Fordini:-

- (1) the short antennae;
- (2) the dorsally-placed sub-anal plate;
- (3) the absence of siphunculi on the abdomen.

In this group the two proximal oblique veins of the forewing often arise from a common base. The very pale wing veins is a feature of this species.

Below:

THELAXINAE : Hormaphidini

Oregma penicola Tokuhashi

(Alata)

Note the five-segmented antennae and the once-branched media of the forewing, characteristic of the Thelaxinae.

The siphunculi here are inconspicuous, being reduced to pale rings.

ERIOSOMATINAE:
FORDINI



ALATA

GEOICA LUCIFUGA (Zehnt)

THELAXINAE : Hormaphidini

Above:

Cerataphis lataniae (Boisduval)

(Aptera)

The margin consists of a ring of wax glands: the aleurodifform appearance has led to species being described as aleurodid 'pupal' cases: they have also been mistaken for scale insects. The cephalic horns characteristic of the apterae of this group of Thelaxinae are much less developed in the alatae (vide Pl. 28 below). Alatae of Cerataphis are very similar to those of Oregma.

Below:

Oregma panicola Takahashi

(Aptera)

The wax glands are arranged into groups of seven facets. The ring-like siphunculi are visible on this preparation.

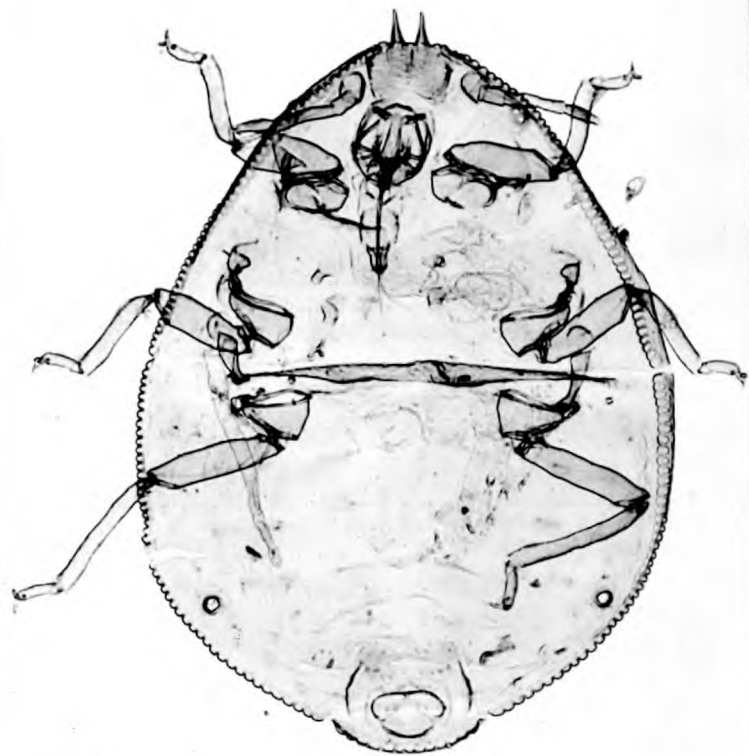
THELAXINAE:



APTERA

OREGMA PANICOLA Takahashi

HORMAPHIDINI



APTERA

CERATAPHIS LATANIAE Boisduval

XLVII THE ALEYRODIDAE OF THE MASCARENE ISLANDS with a list of the species recorded from MADAGASCAR & THE SEYCHELLES.

The earliest record of an aleurodid in the Mascarene Islands is by Signoret (1868), when he described Aleurodes bergii from Mauritius. The species was then a serious pest of sugar-cane on the island. Although he reported having examined numerous specimens, he saw only males of the insect⁺. Quaintance and Baker (Class. Aley. 1914 Pt. II : 104) later transferred the species to the genus Neomaskellia which is quite distinct in that the lingula is broader than long (Plate, 29a).

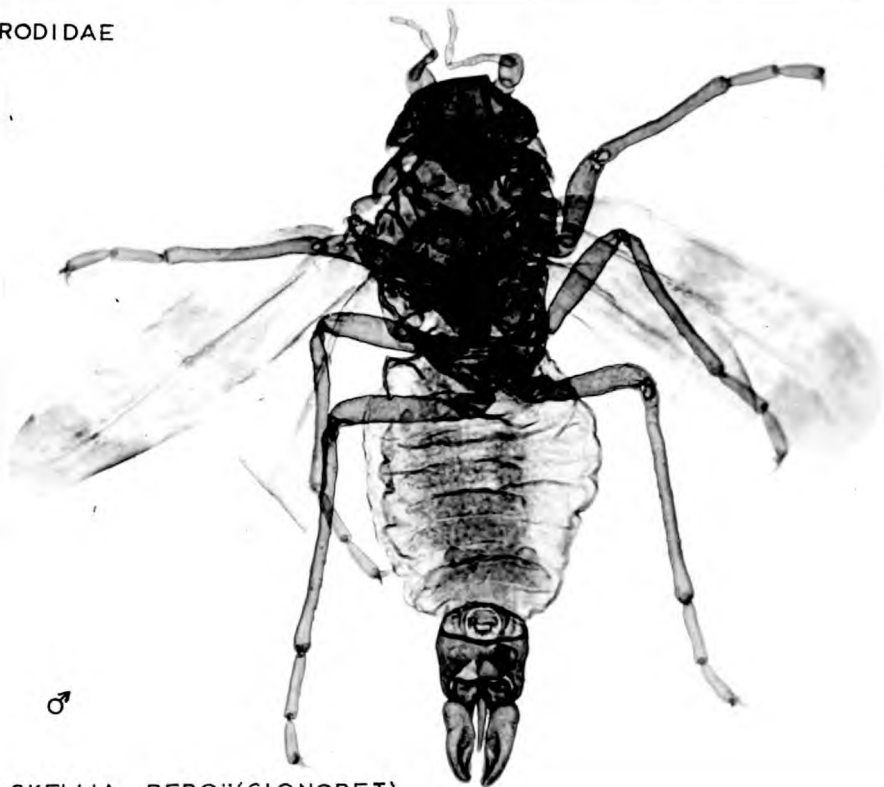
Only about a dozen species of ALEYRODIDAE are known from Mauritius; about the same number has been described from Réunion. Numerous species known from Madagascar are due to the assiduous collecting of Paulian and the taxonomic work of Takahashi. In 1961, Paulian reported that a total of 79 species were known from the area; of these, two reported in 1947 were cosmopolitan species but had assumed pest proportions in Madagascar.

The present study lists over a hundred species from the Madagascar-Mascarene-Seychelles subregion; this is about twice the number already known from Africa - a fact which has some significance since it could indicate that on the African continent the niche is filled differently.

Of the Madagascan forms speciation is very marked in the genus Dialeurolonga Dozier which contains more than thirty species. Paulian (loc. cit.) states that six genera are endemic but Pogonaleyrodes Tak. is now reported to cause severe infestations on coffee in Tanganyika (Mound - personal communication): P. fastuosa appears to be the species involved. The endemic Malagasian genus Marginaleyrodes comprises five

⁺Ann. Soc. ent. France (4) 8:397.

ALEYRODIDAE



♂

NEOMASKELLIA BERGII(SIGNORET)



♀

N. BERGII(SIGNORET)

species.

Few species have been collected from the Seychelles: perhaps a neglected area. In the B.M. collection of this locality the author has seen only two slides of the spiny citrus whitefly: Aleurocanthus woglumi⁺ Ashby 1915 and of the coffee whitefly Africaleurodes coffeacola Dozier (coll. P.N. Dupont, 1916). During 1959, he himself collected specimens of Neomaskellia sp. and saw what appeared to be severe attacks of Bemisia tabaci (Genn.) on experimental plots of Cassava at the Botanic Gardens, Mahé.

The occurrence of Africaleurodes in the Seychelles is worthy of note. The coffee whitefly is widely distributed in tropical Africa: it is all the more strange that it seems not to have been collected from Madagascar.

In Mauritius, during the dry season, N. bergii (Signoret) is a pest of young sugar cane and elephant grass. It is attended by the fire ant: Solenopsis geminata F.

Bemisia tabaci (Genn.) can cause severe damage to tobacco: it also occurs on Blumca lacera Dc., Canavalia ensiformis Dc., Capsicum annum L., Euphorbia peplus L., Lantana aculeata L., Lycopersicum esculentum L.,

⁺The authorship of A. woglumi has been variously attributed to Ashby (1915, in Ann. Rept. Dept. Agr. Jamaica 1914/15 p. 31); Quaintance & Ashby (1915 in Bull. Dept. Agr. Jamaica, n.s. 2:322); according to a note by Quaintance & Baker (1916 J. agric. Res. 6:463-465) the species name was coined by them but the descriptive remarks were supplied originally by Prof. Ashby and this is sufficient to establish him as author (vide Int. Code Zoo. Nomen. 2nd Ed. 1964 p. 50, art. 50)

Mentha peripita L., Parthemium hysterochorus L.

Another tropicopolitan species Aleurocanthus spiniferus Quaint. can cause severe defoliation of Anona muricata L., A. reticulata L. and A. squamosa L. Aleuroplatus subrotundus Tak. occurs on Eugenia sp., A. pileae Tak. is often found on Pilea urticifolia Blume, Aleurotrachelus filamentosus Tak. is a pest of Labourdonnaisia callophyloides Boj. and Aleurotrachelus pandani Tak. is a pest of Pandanus vandermeerschii Balf.

The plates illustrate the general characteristics of the members of the group. Plate 31-33 represent the final instar nymphs of four separate species. The typical T-shaped moulting suture, the rudimentary legs and vasiform orifice can be seen in each case. The vasiform orifice is a characteristic structure of aleurodids. The honeydew accumulates there in globules and is flicked off by the lingula. Thus the lingula of both immature and adult aleurodids seems to have the same function as the cauda of some adult aphids.

Mesad of the mesothoracic legs on plate 31 can be seen the so-called adhesive organs which are present in all species of whiteflies and are reputed to have some function in fixing the sessile nymphs to the leaf surface.

Plate 34 represents the adult male and female of N. bergii which may be taken as fairly typical of members of the family except for the unusually long legs. The wing venation is very reduced and there is a pair of tarsal claws. Two pairs of ventral wax plates which are probably typical of the Aleurodinae can be seen on the photograph of the female.

The female genitalia consists of three valves. The male has a pair

of large claspers surrounding the elongate intromittent organ. The last (9th) abdominal segment bearing the vasiform orifice recalls the appearance of certain psyllids to which family the whiteflies are possibly related.

It has even been suggested that the ALEYRODIDAE are possibly degenerate psyllids - a view suggested by their general morphology and by such behaviour as the side to side copulation, a characteristic of PSYLLIDAE and ALEYRODIDAE which separates them from APHIDIDAE and COCCIDAE.

At the present time the definitions of several genera in the Aleurodinae are far from clear and material for many species is not available for study.

W.W. Sampson and E.A. Drows, however, have produced generic keys based largely on descriptions. Because of the difficulty in correlating captured adults with pupal cases, keys to the Mascarene species are not given here.

From Réunion Luziau 1953 records Aleurodes⁺ trachoides Back on Casuarina, but this species was described from Cuba 1912 (Canad. Ent. 44:151) on a totally different host (Solanum scaphorthianum Andr., an indigenous solanaceous vine).

In Australia, psyllids belonging to the genus Aacanthocnema Tuthill and Taylor 1955 (Austr. J. zoo. 3:252) live on Casuarina and their nymphs resemble the pupal cases of Aleurotrachelus: this matter in particular merits further investigation from the higher systematics standpoint.

⁺Quaintance and Baker (1914: loc. cit. p. 103) placed this species in Aleurotrachelus.

Filicaleyrodes bosseri Tak. 1962, from Madagascar, appears to be closely related to Trialeurodes williamsi Trehan 1938 (Proc. R. ent. Soc. Lond. (B) p. 186).

It appears that Aleuroplatus kewensis Trehan (loc. cit. p. 183) was not included in Takahashi's records of Madagascan aleurodids but a slide of this species⁺ in the B.M. (Buckton Collection, 1911) suggests that it does occur in the region. The host plant on which it was collected is a fern Oleandra articulata Presl. (POLYPODIACEAE). Another species apparently not recorded previously is Bemisia hancocki⁺ Corbett 1936. In Madagascar the host plant is Cassia petersiana Bolle; in the Comoro Islands (Anjouan) this species was collected on Cassia sopheia Linn.

It will be noticed from the list given below that the name Aleurotrachelus pauliani Takahashi 1961 for a species described from Madagascar is preoccupied by 'pauliani' from Réunion, Takahashi 1960. The present author wishes to propose the name Aleurotrachelus moundi for the Madagascan species, dedicating it to L.A. Mound [(British Museum (N.H.) ALEYRODIDAE (Sternorrhyncha Section)].

⁺det. Mound 1964.

ALEYRODOIDEA Handlirsch 1903

ALEYRODIDAE Westwood 1840

Above:

Paratopotype of Aleurotrachelus pandani Takahashi 1951 (dorsal view)

Locality: Baie du Cap (Mauritius).

Empty 4th instar larval case (so-called 'pupal case') with T-suture for emergence of adult, 3 pairs of rudimentary legs clearly visible in transparency. Note the median 'rachis' rather like a windpipe (trachea) in appearance from which the genus derives its name, and the inter-segmental suture lines.

For locality and other data - see below.

Below:

Empty 4th instar larval case (dorsal view) with emergence hole of an unknown parasite

Host plant: Pandanus Vandermeerschii Balf.

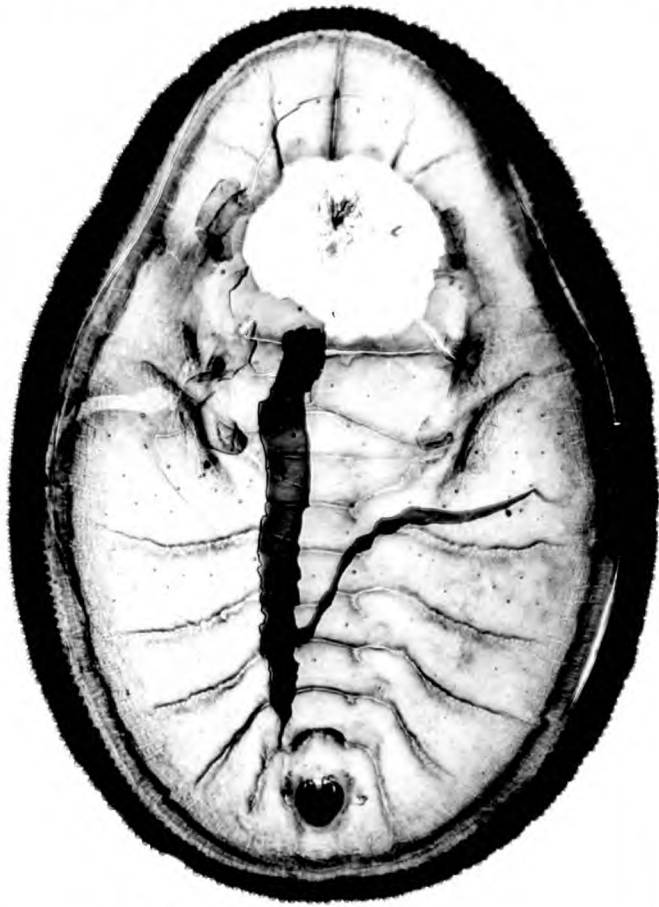
Locality: Baie du Cap.

XI.1949.

B.M. 1962-401.

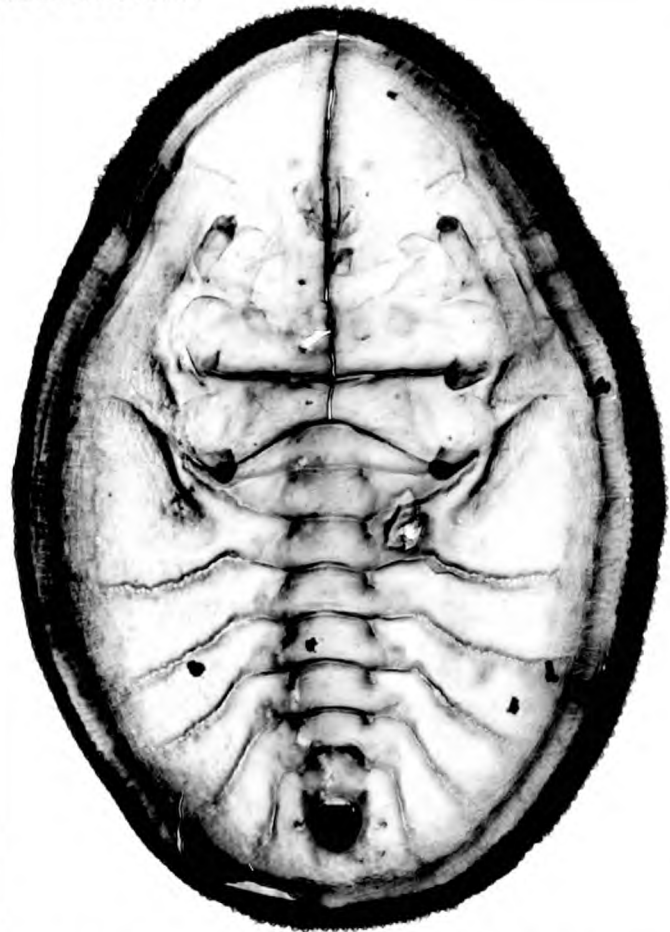
ALEYRODIDAE

'PUPAL CASE'



A. PANDANI (parasitised)

ALEYRODIDAE



A LEUROTRACHELUS PANDANI Tak.

ALEYRODOIDEA Handlirsch 1903

ALEYRODIDAE Westwood 1840

Above:

Aleuroplatus evodiae Takahashi (dorsal view)

Empty 4th instar larval case with polygonal markings on the rachis;
rudimentary legs seen in transparency.

Locality: Réunion Is. (Plaine des Aïffouches 1200-1300 m)

Host plant: Evodia sp.

Date collected: V.1957.

J. Bosser Coll.

B.M. 1962-401.

Below:

Aleurotrachelus pandani Takahashi (dorsal view)

3rd instar larva: note absence of T-suture and of pigmentation
at this stage.

N.B. The magnification of this specimen is very much greater than that
in Plate 30.

Host plant: Pandanus sp.

Locality: Baie du Cap (Mauritius).

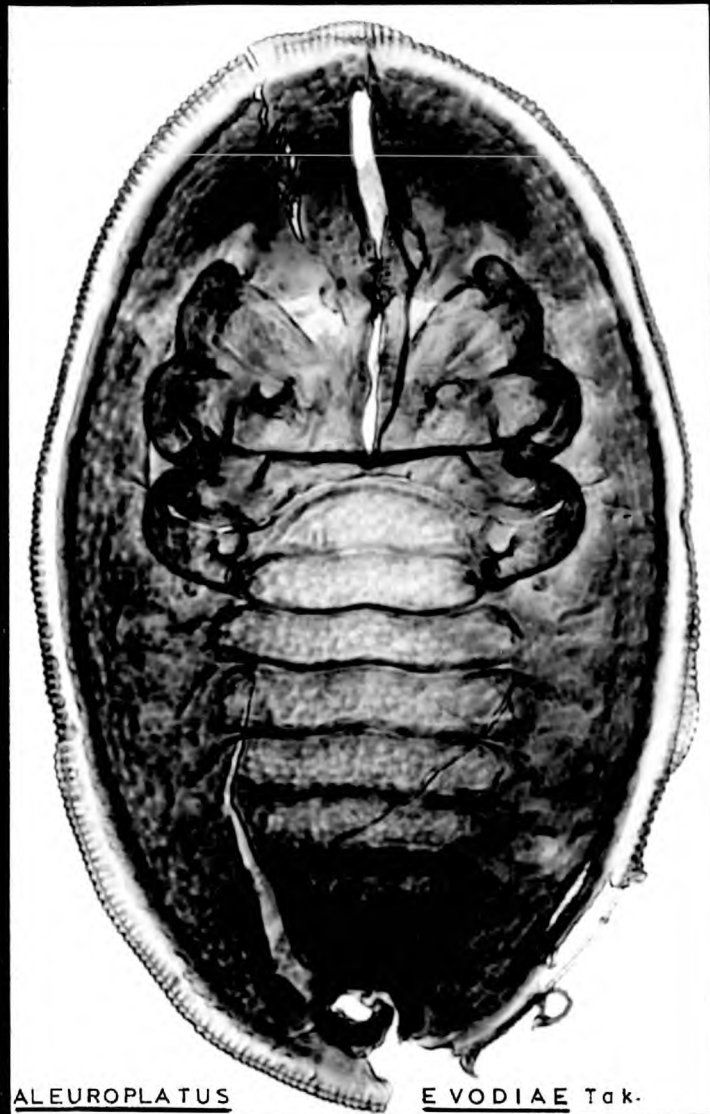
XI.1949.

Coll.: R. Nanet.

B.M. 1962-401.



ALEUROTRACHELUS PANDANI Takahashi



ALEUROPLATUS

EVODIAE Tak.

Pupal cases of Tetraleurodes subrotunda Tak. 1937

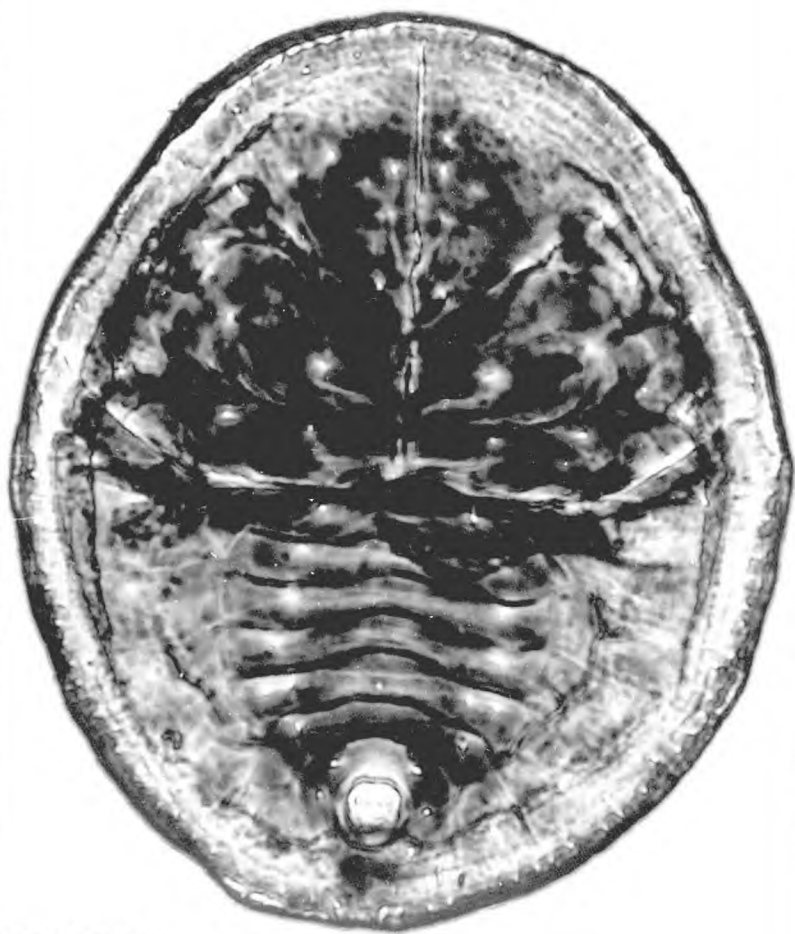
(Cotypes)

Date collected: October 1934.

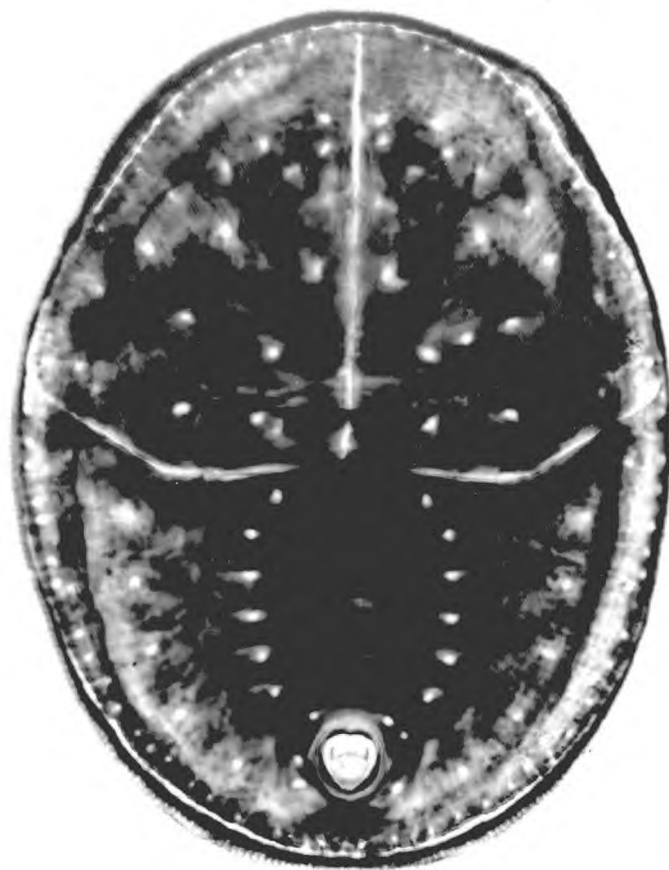
Locality: Kanaka, Mauritius.

Collector: R. Mamet.

The transverse moulting suture nearly reaches the margin of the dorsal disc. In this species the vasiform orifice is rather large. Note also the arrangement of the dorsal pores clearly shewn in the upper photograph.



SYNTYPES



TETRALEURODES
SUBROTUNDA Tak.

Pupal cases of Aleuronolatus nemeti Tak. 1937

(Cotypes)

Date collected: March. 1935.

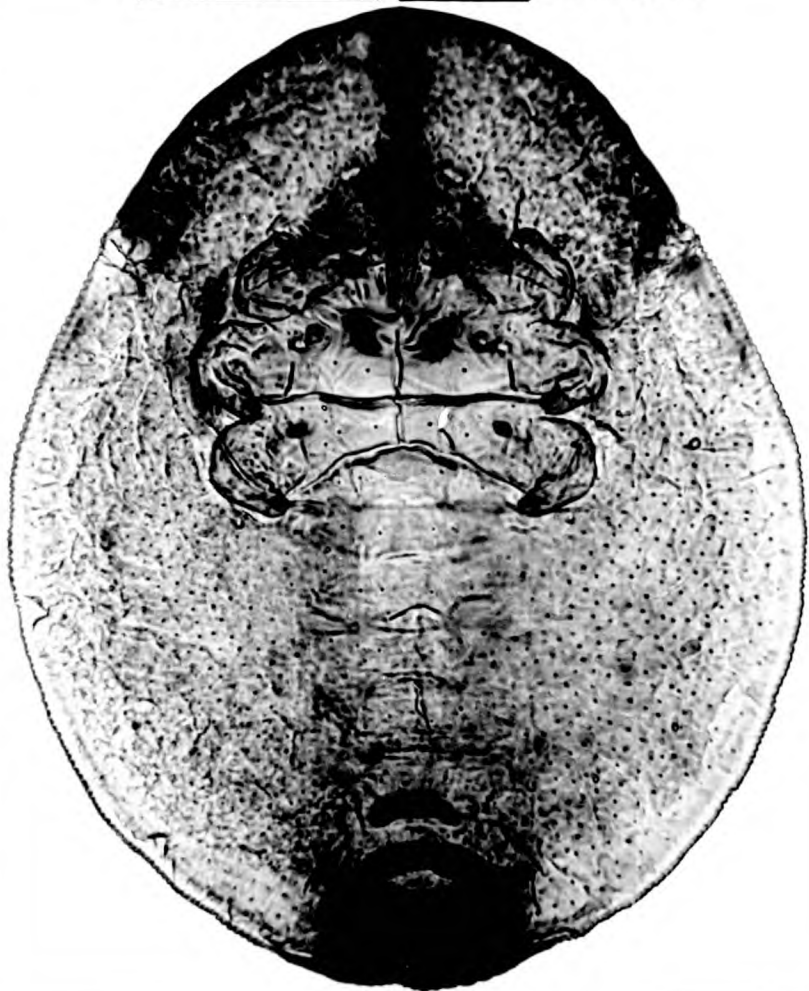
Locality: Forest Side, Mauritius.

Note the numerous minute black spots or dorsal pores and the transverse moulting suture bending sharply forwards. The thoracic tracheal folds and pores are also visible. In this species the vasiform orifice is very close to the posterior margin of the dorsal disc.

SYNTYPES



ALEUROPLATUS MAMETI TAKAHASHI



XIVIII RECORDED DISTRIBUTION OF WHITEFLY SPECIES IN THE
MADAGASCAR - MASCARENE - SEYCHELLES AREA.

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
<u>Acaudaleyrodes</u> gen. nov. Tak. 1951:382					
1. <u>A. pauliani</u> Tak. 1951:382-384, 1955:408					+
<u>Acutaleyrodes</u> gen. nov. Tak. 1960:145 (f. to <u>Stenaleyrodes</u>)					
2. <u>A. palmae</u> Tak. 1960:146					
<u>Africaleurodes</u> gen. nov. Dozier, 1934, <u>Ann. Mag.</u> <u>nat. Hist.</u> (10) 14, 187					
3. <u>A. coffeacola</u> Dozier, <u>Ann. Mag. nat.</u> <u>Hist.</u> (10) 14:187					+
<u>Aleurocanthus</u> gen. nov. Q. & B., 1914. <u>Tech.</u> <u>Ser.</u> 27 pt. 2. <u>Bur.</u> <u>Ent.</u> U.S.D.A. 102					
4. <u>A. spiniferus</u> Quaint. + recorded as <u>Aleurocanthus</u> sp. Tak. 1938, a:28					
5. <u>A. voeltzkowi</u> (Newst.) Tak. 1955:406-408					+

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
6. <u>A. woglumi</u> Ashby <u>Ann. Rpt. Dept.</u> <u>Agr. Jamaica</u> 1914-15, p. 31. (also recorded from Jamaica, Bahamas, Ceylon, Manila, India, Cuba, etc.					+
<u>Aleyrodes</u> Latreille 1795 <u>Magasin Encycl.</u> 2:304					
7. <u>A. ciliata</u> Tak. 1955: 399-400, 401					+
8. <u>A. voeltzkowi</u> Newst. 1908 Q. & B. 1914:102 1917:335, 355-356. Tak. 1951:353 (in <u>Aleurocanthus</u>)					+
<u>Aleuroplatus</u> Q. & B. 1917					
9. <u>A. affinis</u> Tak. 1961:232					+
10. <u>A. agauriae</u> Tak. 1955:425- 426, 427, 432					+
11. <u>A. alpinus</u> Tak. 1955: 426-428					+
12. <u>A. anapatsae</u> Tak. 1951:376- 377, 1955:436					+

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
13. <u>A. dubius</u> Tak. 1955:428-429, 430					+
14. <u>A. evodiae</u> 1938(?) Tak. 1960:142		+			
15. <u>A. incurvatus</u> Tak. 1961:333					+
16. <u>A. kewensis</u> Trehan 1938					+
17. <u>A. latus</u> Tak. 1939:2-3		+			
18. <u>A. madagascariensis</u> Tak. 1951:378-379					+
19. <u>A. mameti</u> Tak. 1937 b. 44 Tak. 1938 a. 260		+			
20. <u>A. manjakaensis</u> Tak. 1955:429-432					+
21. <u>A. neovratus</u> Tak. 1961:334					+
22. <u>A. pauliani</u> Tak. 1955:432-433, 434					+

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
23. <u>A. pileae</u> Tak. 1939:3-5	+				
24. <u>A. polystachyae</u> Tak. 1955:433- 434, 435					+
25. <u>A. robinsoni</u> Tak. 1955:434- 436					+
26. <u>A. serratus</u> Tak. 1955:437, 438					+
27. <u>A. subrotundus</u> Tak. 1938: a. 261; Tak. 1960:142	+		+		
28. <u>A. tsibabenae</u> Tak. 1955:437-440					+
29. <u>A. tsimanensis</u> Tak. 1955:440-441					+
30. <u>A. tuberculatus</u> Tak. 1951:375-376					+
31. <u>A. weinmanniae</u> Tak. 1951:373-375, 1955:426-432					+
<u>Aleurotrachelus</u> Tak. & Mam. 1952:126; Tak. 1951:382, 1955:413					

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
32. <u>A. ambrensis</u>					+
Tak. & Mam. 1952: 128-129; Tak. 1955:411-412					
33. <u>A. filamentosus</u>		+			
Tak. 1938 c. 27, Tak. 1939:2, 27-28					
34. <u>A. hazomiavonae</u>					+
Tak. 1955:408- 409, 410					
35. <u>A. madagascariensis</u>					+
Tak. 1955:409-412					
36. <u>A. orchidicola</u>	.		+		
Tak. 1939:1-2					
37. <u>A. pandani</u>					+
Tak. 1951: 380-382					
38. <u>A. pauliani</u> Tak.					+
(not same as the Mad. 1961) Tak. 1960:151					
39. <u>A. pauliani</u> Tak.					+
1961:336 (nom. <u>praeocc.</u> 1960 - Réunion). New name proposed: <u>A. moundi</u> n. n.					

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
40. <u>A. plectroniae</u> Tak. 1955:412-413					+
41. <u>A. réunionensis</u> Tak. 1960:149		+			
<u>Anomaleyrodes</u> gen. nov. Tak. & Mam. 1952: 129-130					
42. <u>A. palmae</u> Tak. & Mam. 1952: 130-133					+
<u>Bemisia</u> O. & B. 1914 Tak. 1938 b. 269, 1951:372					
43. <u>B. elliptica</u> Tak. 1960:147		+			
44. <u>B. manihotis</u>) Frappa) Tak. 1951:353,) Tak. & Mam.) 1952:125) = <u>tabaci</u> p. 125					+
45. <u>B. vayssierii</u>) Frappa) Tak. 1951:353,) Tak. & Mam.) 1952:125)					+
46. <u>B. porteri</u> Corb. 1935 Tak. 1955:406					+
47. <u>B. psiadiae</u> Tak. 1955: 404-405					+

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
48. <u>B. tabaci</u> (Genn.) 1889 Tak. 1939:5 Tak. & Mam. 1952: 125	+			+	
48a. <u>B. hancocki</u> Corbett 1936 Proc. R. ent. Soc. Lond. (B) 5:20 (new record)				+	
48b. <u>Bemisia</u> sp. <u>Corbettia</u> Doz. 1934			+		+
49. <u>C. tamarindi</u> Tak. 1951:365-366 <u>Dialeurodes</u> Cock., 1902				+	
50. <u>D. mauritiensis</u> Tak. 1938a:260 Tak. 1939:5; 1951:354 (in <u>Dialeurolonga</u>) <u>Dialeurolonga</u> Doz. 1928 Tak. 1951:354, Tak. & Mam. 1952: 118, 119	+				
51. <u>D. agauri</u> Tak. 1951:354-356, 358; 1955:382, 384				+	
52. <u>D. ambilaensis</u> Tak. 1955:375-377				+	

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
53. <u>D. angustata</u> Tak. 1961:325				+	
54. <u>D. aphloiae</u> Tak. 1955:377-378				+	
55. <u>D. bambusae</u> Tak. 1961:325				+	
56. <u>D. brevispina</u> Tak. 1951:356-358, 1955:393				+	
57. <u>D. elliptica</u> Tak. 1955:378-379, 380				+	
58. <u>D. erythroxytonis</u> Tak. 1955:380-382				+	
59. <u>D. eugeniae</u> Tak. 1951:362-364				+	
60. <u>D. lata</u> Tak. 1955:382-383				+	
61. <u>D. maculata</u> Tak. 1951:358-360				+	
62. <u>D. mameti</u> Tak. 1955; 383-384				+	
63. <u>D. milloti</u> Tak. 1951:364-365				+	

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
64. <u>D. multipapilla</u> Tak. 1955:35-387					+
65. <u>D. nigra</u> Tak. & Mam. 1952: 112-113, Tak. 1955:378					+
66. <u>D. paradoxa</u> Tak. 1955:387-389					+
67. <u>D. pauliani</u> Tak. 1951:360-362; 1955:378, 387 Tak. & Mam. 1952:112					+
68. <u>D. perinetensis</u> Tak. & Mam. 1952: 114-116 Tak. 1955:389					+
69. <u>D. phyllanthronis</u> Tak. 1955:389-391					+
70. <u>D. ravensarae</u> Tak. & Mam. 1952: 113-114					+
71. <u>D. rhanmi</u> Tak. 1961:326					+
72. <u>D. robinsoni</u> Tak. & Mam. 1952:118-119; Tak. 1955:391, 392					+

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
73. <u>D. rotunda</u> Tak. 1961:328				+	
74. <u>D. similis</u> Tak. 1955:391-393, 394				+	
75. <u>D. simplex</u> Tak. 1955:393-395				+	
76. <u>D. subrotunda</u> Tak. 1955:395-397				+	
77. <u>D. tamburissae</u> Tak. 1955:397-399				+	
78. <u>D. tenella</u> Tak. 1961:329				+	
79. <u>D. trialeurodes</u> Tak. & Mam. 1952: 116-118				+	
80. <u>D. vendranae</u> Tak. 1961:330				+	
<u>Filicalcyrodes gen. nov.</u> Tak. 1962:100-101					
81. <u>F. bosseri</u> Tak. 1962:101-102				+	
<u>Lipaleyrodes gen. nov.</u> Tak. 1962:100					
82. <u>L. phyllanthi</u> Tak. 1962:100				+	

Genus
and species Mauritius Réunion Comores Madagascar Seychelles

Marginaleyrodes gen.

nov.

Tak. 1961:338

-
83. M. fanalae +
Tak. 1951:379-380,
1955:413
-

84. M. fenestrata +
Tak. 1955:416-418,
424
-

85. M. iscarae +
Tak. 1961:338
-

86. M. madagascariensis +
Tak. 1951:384-385
-

87. M. tsijoarivona +
Tak. 1955:424-425
-

Neoleurotrachelus gen.

nov.

Tak. & Mam. 1952:126

-
88. N. aphloiae +
Tak. & Mam. 1952:126-
128
Tak. 1955:413-414
-

Neomaskellia Q. & B.
1913:91

-
89. N. bergii (Sign.) + +
(as A. bergi Sign.)
Sign. 1868:395-397
Q. & B. 1914:104
(a Neomaskellia)
Q. & B. 1917:436-437
(Neomaskellia)
-

Genus
and species Mauritius Réunion Comores Madagascar Seychelles

90. Neomaekellia sp. +
~~sp.~~

Platyaleyrodes gen.
nov.
Tak. & Mam. 1952:119

91. P. anthocleistae +
Tak. & Mam. 1952:
119, 120-122

Pogonaleyrodes gen.
nov.
Tak. 1955:400-401

92. P. fastuosa +
Tak. 1955:402-404

Stenaleyrodes gen.
nov.
Tak. 1938 a. 269

93. S. vinsoni +
Tak. 1938 a. 269-
271;
Tak. & Mam. 1952:133
Mam. 1952:134

Tetraleurodes Cock.⁺ 1902

94. T. adabicola +
Tak. 1955:414-415

95. T. bararakae +
Tak. 1955:415-416

96. T. hirsuta +
Tak. 1955:419, 420

⁺Cockerell, Proc. Acad. Nat. Sci. Philadelphia 54:283 (as subgenus).
Quaintance & Baker 1914, pp. 107-108 - full genus.

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
97. <u>T. mameti</u> Tak. 1938 a. 262	+				
98. <u>T. mirabilis</u> Tak. 1961:335					+
99. <u>T. pauliani</u> Tak. 1955:420-422					+
100. <u>T. semibarbata</u> Tak. 1955:422-424					+
101. <u>T. subrotunda</u> Tak. 1937 b. 43, Tak. 1938 a. 260, Tak. 1938 a. 262	+				
<u>Trialeurodes</u> Cock., 1902 Tak. 1938:269, 1955:401					
102. <u>T. bambusicola</u> Tak. 1951:367-368, 370 Tak. & Mam. 1952:118					+
103. <u>T. elephoglossi</u> Tak. 1960:139					+
} = <u>Dialeurolonga</u>					
104. <u>T. graminis</u> Tak. 1951:368-370; Tak. & Mam. 1952:118					+
105. <u>T. mameti</u> Tak. 1951:370-372					+
<u>Trichoaleyrodes</u> Tak. & Mam. gen. nov. 1952:122 Tak. 1955:401					

Genus and species	Mauritius	Réunion	Comores	Madagascar	Seychelles
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106. T. carinata

+

Tak. & Mam. 1952:122,
123-125

Xenobemisia Tak. gen.

nov.

1951:372

107. X. coleae

+

Tak. 1951:372-373

XLIX. PSYLLOIDEA Latreille 1807 (as PSYLLIDAE)⁺

So little is known of the Mauritian psyllids that it is difficult to form any real picture of their status in the island's fauna. Only three species have ever been identified, viz. Diaphorina citri Kuw.,⁺⁺ Trioza merwei Petty (= Spanioza erythrae de G.) and Mesohomatoma sp. (?lutheri Enderlein). Another psyllid first found in Mauritius only 2 years ago (ORIAN:May. 1962)⁺⁺⁺ often causes severe leaf distortion in Calophyllum inophyllum (L.) (GUTTIFERAE). This psyllid is known only from nymphs and is apparently a Diaphorina or related genus. In the Pacific Leptynoptera sulfurea Crawford has also been described from C. inophyllum and there are records from Diego Garcia of a psyllid on this plant.

In his 'Psyllidarum catalogus' (Berlin 1913; 82 pp.), Dr. G. Aulman does not record any species from the Mascarenes or the Seychelles and notes only a single species from Madagascar: Psylla lemurica Sulc.⁺⁺⁺⁺

Paulian 1961 (p. 220) records Spanioza erythrae on orange trees. He also states, without giving any scientific name, that the 'Hibiscus' psyllid is known from Madagascar. Moutia (1955) also records the Hibiscus psyllid from Mauritius (Dep. Agric. Bull. 91:40).

In this context the correspondence between Miss Louise Russell and Mr. G. Remaudière is relevant. In letters⁺⁺⁺⁺⁺ dated 24/9/63 and 16/12/63

⁺vide Eastop V.F. 1963. Bull. zool. Nomencl., 20, 2:139-144.

⁺⁺Sapporo Trans. Nat. Hist. Soc. II, 1907, p. 160, fig. 16.

⁺⁺⁺Ann. Rep. Dep. Agric.

⁺⁺⁺⁺Cas. Cesk. Spol. Entom. 1908, p. 77 (fig. p. 79) 1♀ collected in October at Montagne d'Ambre.

⁺⁺⁺⁺⁺Photostats kindly supplied by Dr. V.F. Eastop.

she determines specimens of an Hibiscus psyllid from Réunion and Madagascar as Mesohomatoma lutheri (Enderlein) and adds the following notes: "This name may be a synonym of an older name but there is no way of being sure of this without studying types that are not in the U.S.A.. M. lutheri was described from Ceylon and has been reported from the South Pacific. Five other species of Mesohomatoma have been described from Africa, and one, hibisci (Froggatt), is common on Hibiscus in the South Pacific".

From Réunion again, Bordage⁺ (1914 p.409) had previously mentioned Trioza litseae Gd. as a pest of Litsea (Tetranthera) laurifolia⁺⁺ (now L. glutinosa Robinson). This plant also occurs in Mauritius and a species of Trioza is frequently found in association with it. It is possible that there is an earlier reference to Trioza litseae but Bordage gives no description, no reference to the original description, nor any indication for whom Gd. is an abbreviation. The species is also not listed in the Zoological Record, nor in Aulman's Catalogue (1913 loc. cit.). T. litseae Gd. must therefore be treated as a nomen dubium. T. eastopi is described (p.282) as it causes evident damage to its host plant.

Field observations suggest that numerous psyllid species, particularly those causing gall-formation, occur in the Malagassy-Mascarene-Seychelles area but the present generic classification is very unsatisfactory. It is hoped that Professor Dr. Karel Vondráček's studies of Ethiopian psyllids, when completed, will facilitate work on the Malagassy fauna.

Plate 31c above shows the forewings of ~~and~~ Diaphorina citri Kuw.: both media and cubitus have only a single branch and the membrane of the wing is maculated. In Diaphorina the wings are rather more elongate than

⁺Bordage E. Docteur ès Sciences - Chef de Travaux a la Sorbonne.

⁺⁺This tree, which is Asiatic in origin, is known in Réunion under the vernacular name of 'Avocatier marron' and in Mauritius: Bois d'oiseaux.

in most psyllids. Plate 32 shows a nymph of Diaphorina: various hairs are developed on tarsi: the pigmented sclerotic pattern is typical for Diaphorina. Along the edge of the abdomen are peg-like wax-secreting structures⁺, usually present in those genera grouped under Psyllinae.

Plate 33 Adults: the genitalia in both sexes here are fairly characteristic (cf. plate 29a on ALEURODIDAE - viewed from above); the two segments of the tarsus are approximately equal in length; the head bears a pair of genal cones.

Taken overall, the economic importance of PSYLLIDAE is relatively slight, since psyllids seldom reach pest proportions.

One exception is apparent from a study of ⁺⁺Moore's papers on Australian psyllids: large populations of Glycaspis on Eucalyptus saligna Smith (Sydney Blue Gum) may even bring about the death of the host plant. However, the increasing use of insecticides on crops often results in a selective depletion of the group's natural predators.

In Mauritius, Diaphorina citri appears to be resistant to organo-phosphorous pesticides. In consequence when these are used to control acarina on Citrus the result is an abnormally high incidence of the psyllid with attendant defoliation and crop loss. That the psyllid fauna of the world is hardly known can be gauged from the fact that barely 150 species

⁺These structures may also be found in other subfamilies, e.g., Triozinae.

⁺⁺Moore K.M. 1961 - The significance of Glycaspis spp. (Hemiptera:HOMOPTERA, PSYLLIDAE) Association with their Eucalyptus spp. Host; Erection of a new subgenus and description of thirty new species of Glycaspis (2 plates, 48 figs.). Proc. Linn. Soc. N.S.W. 86, I:128-167.

are recorded from the whole of Australia. Some species of Eucalyptus supply different ecological niches for more than a dozen psyllid species in microhabitats such as underside of leaves, under the bark, etc..

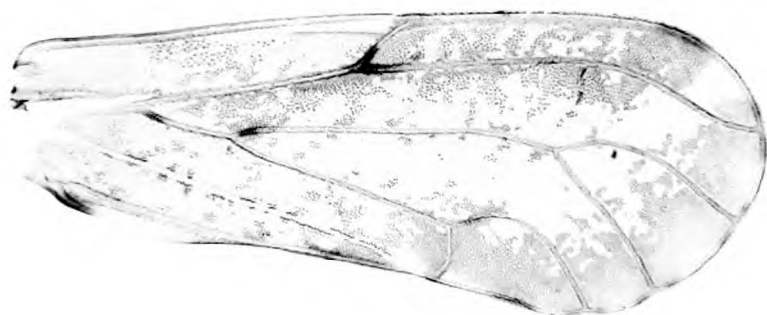
Even if one estimated only two psyllid species per species of Eucalyptus this would infer a total of some 1,200 psyllid species for Australia's 600 known species of Eucalyptus.

There is also a very large Australian psyllid fauna on Acacia, a plant genus which extends through S.E. Asia, India and Africa: according to Dr. Eastop (personal communication) some Australian PSYLLIDAE have gained a foothold in East Africa recently possibly by this means.

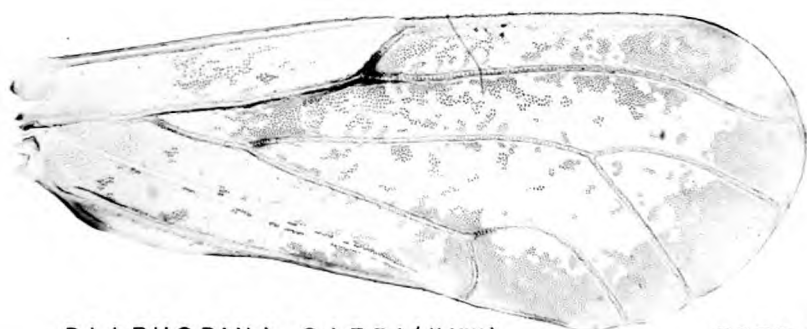
Citrus, coffee, cacao, cotton, apple, pear and many SOLANACEAE including potato are among those plants which may suffer some degree of psyllid attack but for all this it would appear that PSYLLIDAE are primarily important as forestry pests. Damage is caused not only by toxic saliva which distorts growth and by removal of sap, but also indirectly via mould growing on honeydew. This might be taken to infer that all previous records of psyllids as virus vectors are erroneous. However, recent work in Africa and Australia seems to indicate that some psyllids may cause diseases reminiscent of virus diseases in forest trees: as yet there is no really adequate means of studying these diseases, present isolation techniques for viruses affecting trees being unsatisfactory.

A key to the psyllid genera occurring in Mauritius is appended.

♀

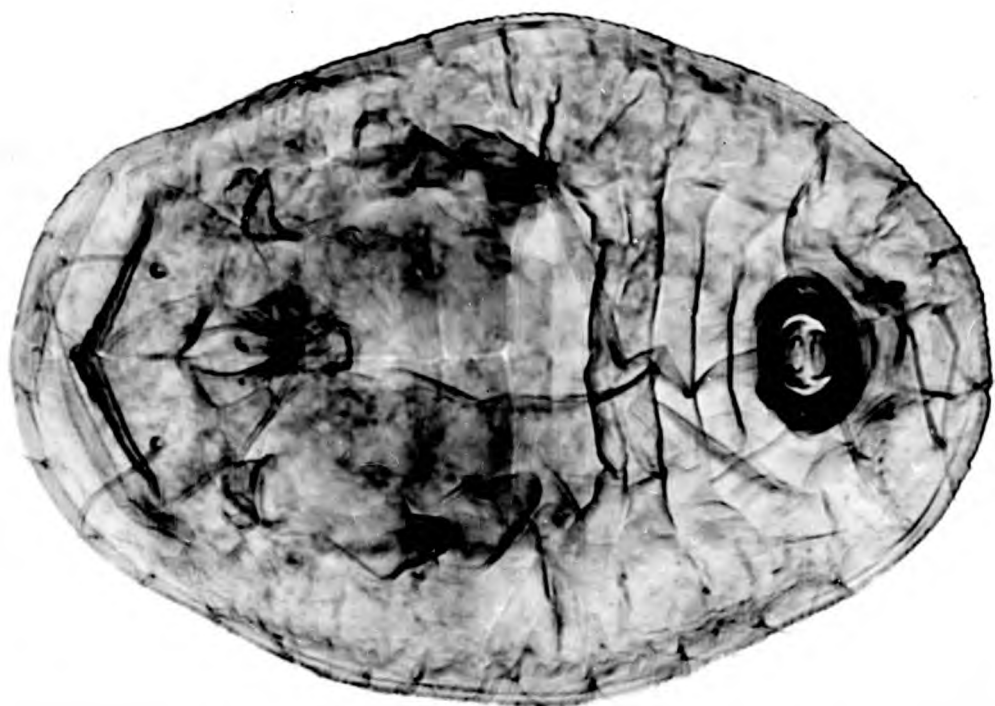


♂



DIAPHORINA CITRI (KUW.)

FORE WINGS



NEOMASKELLIA BERGII - pupal case

Key to the genera of PSYLLIDAE occurring in Mauritius.

VIDE pl. 35

1. R, M & Cu all arising from a common source. Hind tarsus I without black apical teeth TRIOZINAE Puton Trioza Först. 1848
- M & Cu diverging only after separation from R 2
2. Cross vein present between Rs & M. Hind tarsus I bearing a strong black tooth. Front of head appearing divided when viewed from above. Genal cones absent. Wings elongate and often ⁺ pointed CARSIDARINAE⁺ Crawford Mesohomatoma Kuwayana 1907
- Cross vein between Rs & M absent. Hind tarsus I bearing 2 black teeth. Front of head flat but genae produced into genal cones. Wings strongly rounded apically PSYLLINAE Loew .. Diaphorina Loew 1879 [1880]

⁺ Some authors have placed Mesohomatoma under CTRIACREMINAE. Other authors, e.g., Enderlein 1910, Vondráček 1937, Hoslop-Harrison 1958, Vondráček 1963, have raised most of the previously accepted subfamilies to family status. For references vide Vondráček, C. 1963. Jumping plant-lice [PSYLLOIDEA-HOMOPTERA] of Central Africa, Part I (Congo), Acta Ent. Musei Nat. Pragae 35:263-290.

PSYLLIDAE Latreille 1807

Diaphorina citri Kuwayana 1907.

Host: Citrus spp.

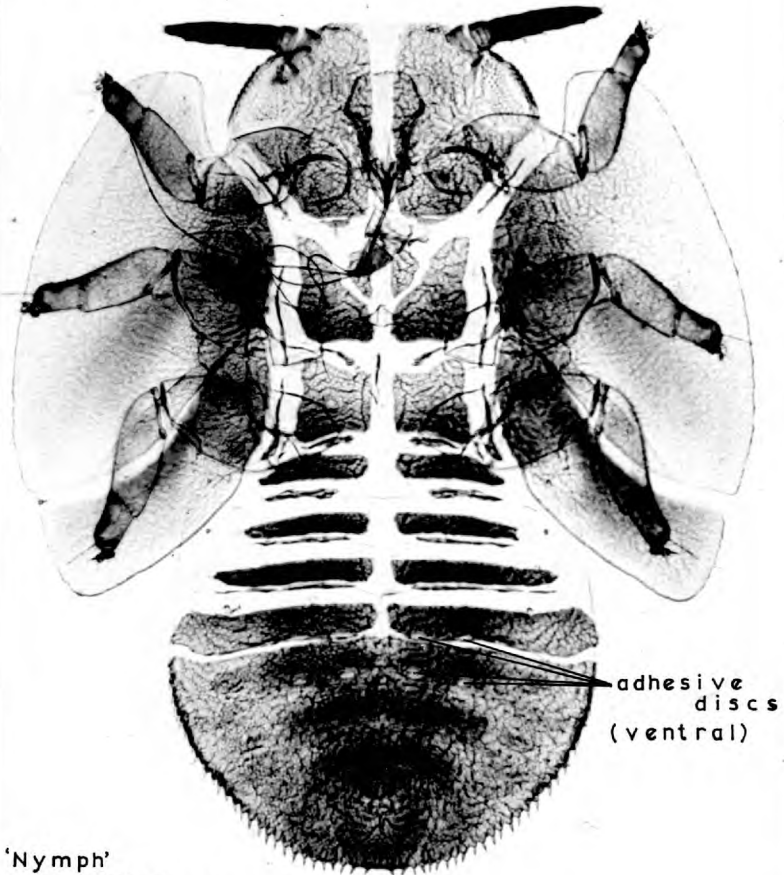
Locality: Pamplemousses.

Date collected: 27.7.62 (A.J.E. ORIAN).

Plate 32: A 5th instar 'nymph': the large wing pads project well outside the contour of the body. Note the longitudinal split and the two transverse rows of pale spots on the ventral surface showing through the dorsal wall of the abdomen. The pores are probably adhesive discs.

Ref.: Slide B.M. No. 33.

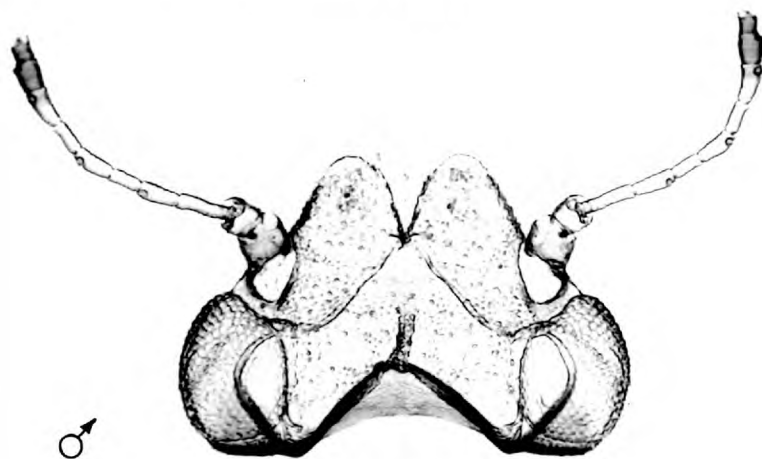
PSYLLIDAE



'Nymph'
Dorsal view

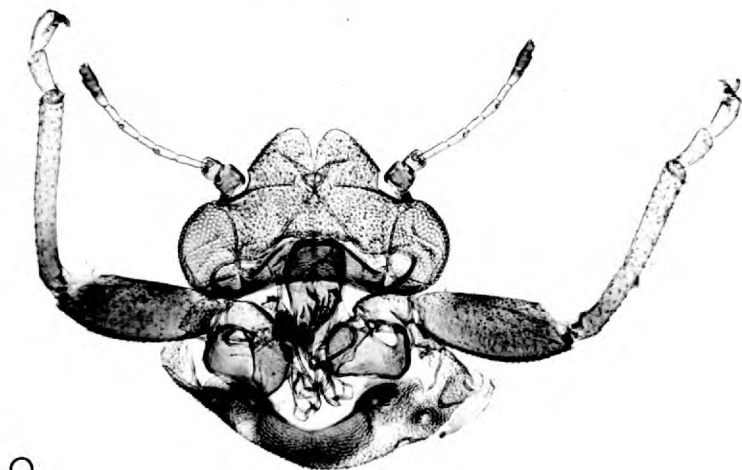
DIAPHORINA CITRI

DIAPHORINA CITRI



♂

HEAD OF MALE



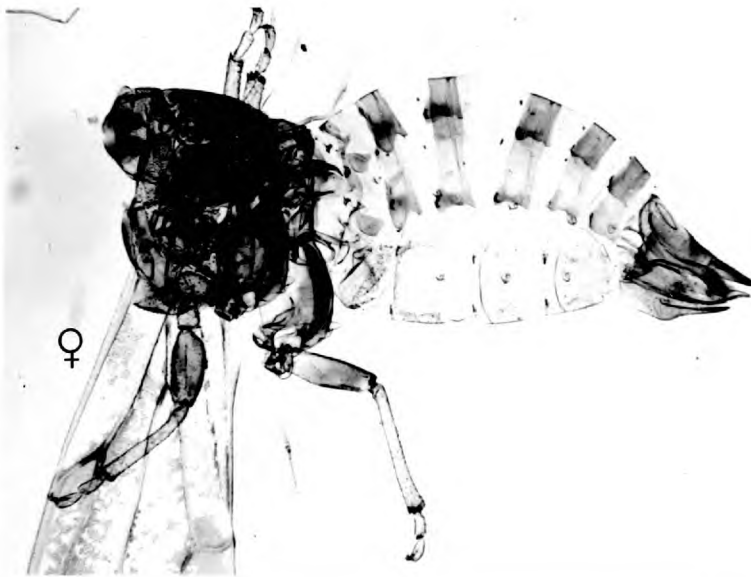
♀

HEAD & FORE LEGS



DIAPHORINA CITRI

(Thorax & abdomen)



PSYLLIDAE



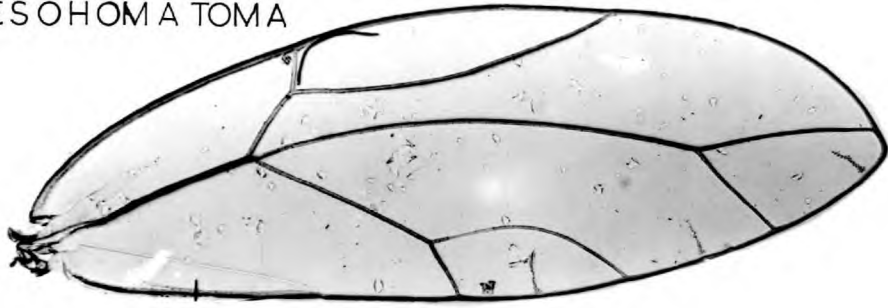
MESOHOMATOMA LUTHERI Enderlein (Left side view)



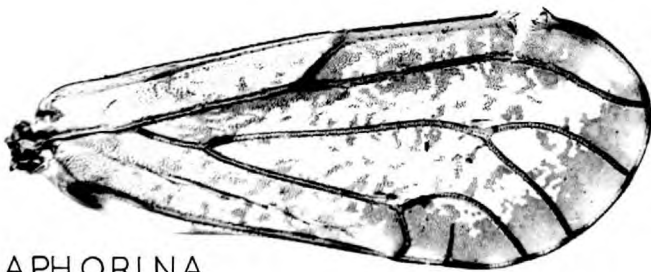
MESOHOMATOMA (Viewed from above : Note the divided head)



MESOHOMA TOMA



TRIOZA



DIAPHORINA

RIGHT FORE WINGS OF CARSIDARINAE, TRIOZINAE & PSYLLINAE.

⁺Trioza eastopi sp. nov.

(The species is dedicated to Dr. V.F. Eastop in recognition of his work on the sternorrhynchous hemiptera of the Ethiopian region)

[Plate 36 a-f; plate 37]

⁺⁺COLOUR: ♂♀ variable. Ground colour in most specimens (probably teneral) yellowish brown. In 'older' specimens, head, genal cones and thorax brown or almost black. Basal antennal segments (1-III) light yellowish brown, other segments dark brown.

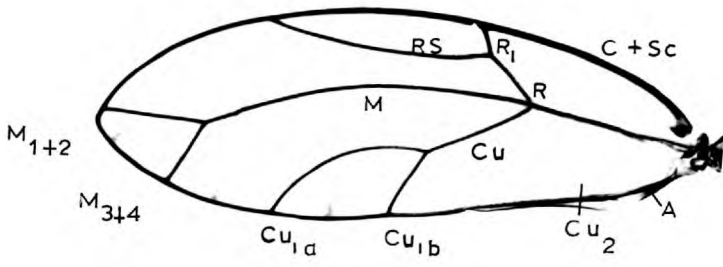
Wings clear in ♀♀, slightly dusky in ♂♂, veins light brown, slightly darker at main furcations. Scutum and metascutum pale yellowish brown or brown with varying shades of dark brown.

STRUCTURE: Head slightly smaller than greatest width of thorax: in pinned (dried) specimens, excavated between the eyes. Between antennal base and genal cone on each side is a long hair or seta (80u in length) resembling a trichobothrium. Genal cones large, divergent, slightly longer than broad.

Forewings: membrane covered all over with fine brown tubercles. Stridulatory radular areas well developed (in cells enclosed by $M_1 + 2$ and $M_3 + 4$; M and Cu and Cu_{1a} and Cu_{1b}). The tubercle

⁺Note: Type of genus - Trioza urticae Linnaeus designated by D.L. Crawford (1914): 'A monograph of the jumping plant-lice or PSYLLIDAE of the New World', p.74.

⁺⁺This is a description of mounted specimens at the B.M. (N.H.) killed in cyanide. Fresh specimens are believed to agree with this description.



a

♀



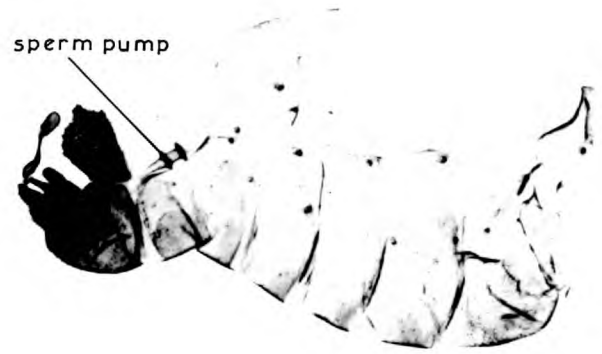
b

♂



c

sperm pump



d



e



f

armament of the female is about the same as that of the male.

Diagnosis: Adult - wings narrow, more so than in other Trioza, radius relatively short. Presence of five tubercles on the extreme base of the posterior tibiae in the ♀♀ and three almost black apico-tibial spurs: one dorsal and two latero-ventral spurs and an apical ring of long hairs on the tibia distally [longest hair 45u, shortest hair 22u long (Plate 37)]. Meracanthi well developed.

Nymph - with numerous, truncate sectisetae, sparse on the dorsal body surface - well developed and numerous along wing-pad margin; in serrated double row on margin of head, thorax and abdomen.

Measurements (in mm.)

(Except where otherwise stated measurements given were made on material fully extended on slide)

<u>Adult</u>	<u>♂</u>	<u>♀</u>
Width of head	0.39	0.42
Length of genal cones	0.12	0.13
" " forewing	1.90	2.20
" " hindwing	1.30	1.40
" " body	-	1.35 (dried pinned specimen)
		2.24 (slide prep.)
" " femur	0.31	0.32
" " tibia	0.44	0.44

Genitalia

Length of aedeagus	0.14
" " claspers	0.13

Nymph (length-slide prep.)

1.34 (vide Plate 36f)

Hamulian formula: The author proposes to use a formula to express the distribution of the hamuli on the metapleuron and along the costal margin of the hindwing. In T. eastopi there are no hamuli on the metapleuron (indicated in the table below by '0'). Along the costal margin there is a proximal group of 2 or 3 hamuli, a median group of 2-4; and distally a unique hamulus.

	<u>Metapleural hamuli</u>	<u>Position I</u>	<u>Position II</u>	<u>Position III</u>
4♀♀	0	3	3	1
	0	2	4	1
	0	3	2	1
	0	3	3	1
♂	0	3	4	1

Holotype: ♂ dissected on slide in the B.M. (N.H.).

Allotype: ♀ " " " " " " "

Paratypes: One ♀ dissected on slide in the B.M. (N.H.).

2♂♂ and 10♀♀ in the author's collection and in B.M. collection.

Host plant: Litsea glutinosa Robinson (LAURACEAE) - vernacular: Bois d'oiseaux.

Explanation of Plates:

Plate 36: (a) Forewing of ♀, (b) of ♂ of T. eastopi sp. nov.

(c) Abdomen of ♀ (cleared); (d) of ♂.

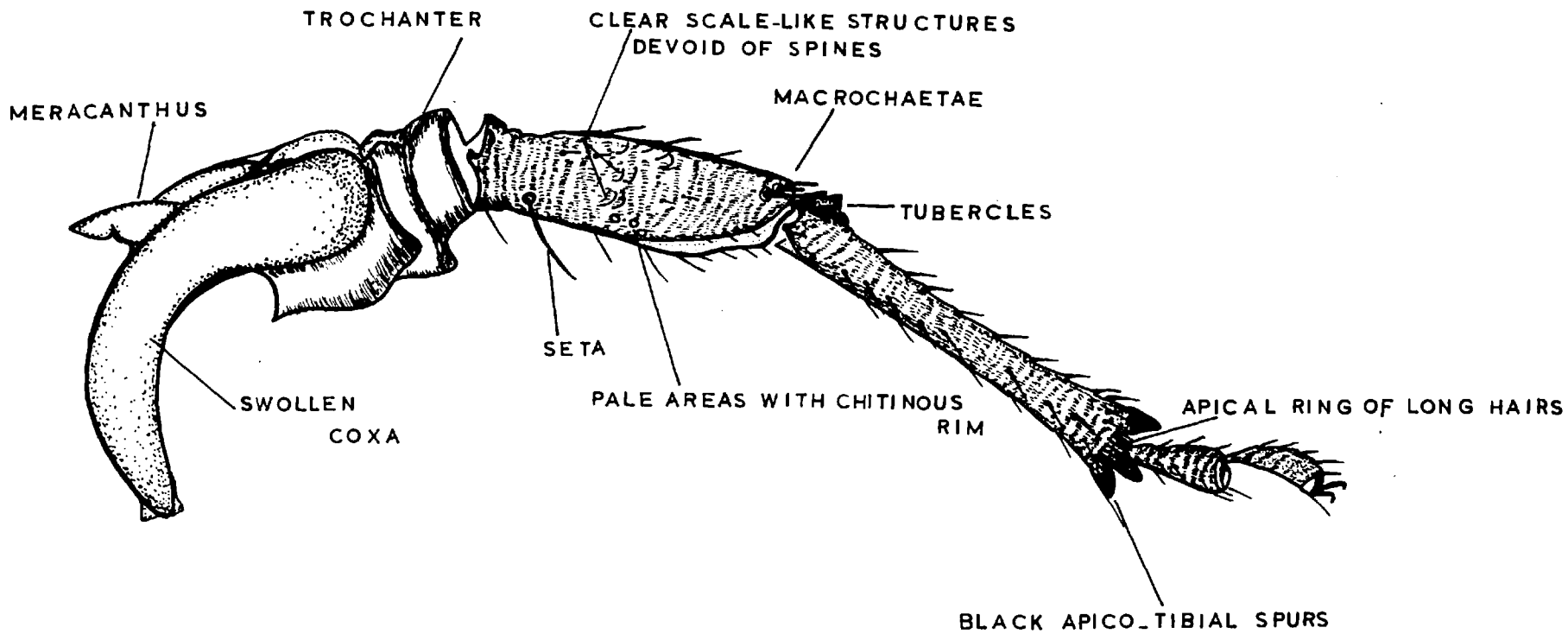
(e) Head of ♀ (tip of antennal segments missing)

(f) Nymph; marginal setisetae on head, thorax and abdomen.

Plate 37: T. eastopi sp. nov.

Posterior leg of ♀ - Note the long seta present on the femur⁺ and the three small pale areas with an evident chitinous rim outside diameter 7u; internal diameter 4-5u.

⁺Also present in T. urticae L. and in T. erythrae (Del Guer.)



♀

TRIOZA EAS TOPI sp. nov. (POSTERIOR LEG)

PLATE 37

LII List of COCCOIDEA recorded from the Mascarenes, the Seychelles,
Aldabra, Agalega, Farquar, Providence, Amirantes.

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
ACLERDIDAE.										
<u>Aclerda</u>										
Signoret 1874										
<u>Ann. Soc. Ent.</u>										
<u>Fr. (5) 4:96</u>										
∅	<u>A. takahashii</u>	+	+							Brazil, Formosa, India.
	Kuw. 1932									
	<u>Philippine J.</u>									
	<u>Sci. 48:62.</u>									
ASTEROLECANIIDAE.										
<u>Asterolecanium</u>										
Targ.-Tozz.										
1869 <u>Intr. 2nd</u>										
<u>Mem. Studi</u>										
<u>Cocc.,</u>										
<u>Catalogue, p.41</u>										
	<u>A. bambusae</u>	+	+							Africa, N. & S. America, Australia, Ceylon, China, Formosa, Guam I., Hawaiian Is., Europe, India, Philippine Is., N. Caledonia, W. Indies, C. America.
	(Bdv.) 1869									
	<u>Insectologie</u>									
	<u>Agric., 3:261-</u>									
	<u>262.</u>									
<hr/> <hr/>										
∅	<u>A. thysanolaenae</u>									Mamet, 1943 <u>Bull. ent. Res. 34</u> (2):125-127 - is a synonym.

ASTEROLECANIIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>A. palmicola</u> Mamet 1957 <u>Mém. Inst.</u> <u>Sci. Madag.</u> (E) 8:382			+							
<u>A. pseudomiliaris</u> Green 1922 <u>Bombay Nat.</u> <u>Hist. Soc. Journ.</u> 28:1036.		+								N. & S. America, Africa, Caroline Is., Ceylon, China, W. Indies, India, Japan, Palau Is., Assam, Formosa.
<u>A. pustulans</u> (Ckll.) 1892 <u>Journ. Inst.</u> <u>Jam.</u> 1:143.			+		+					N. & Central America, Africa, Formosa, Hawaiian Is., Marianna Is., Palestine, W. Indies, S. America, Madagascar, Palestine.
* <u>A. spectabile</u> Newst. 1917 <u>Bull. ent.</u> <u>Res.</u> 8:15.			+							
<u>Cerococcus</u> Comstock 1882 <u>Rep. U.S.</u> <u>Dept. Agric.</u> , p. 213.										

* are probably endemic.

ASTEROLECANIIDAE.
(Cont'd.)

C. pileae Mamet +
1950 Proc. R. ent.
Soc. Lond. (B)
19:35-38.

COCCIDAE.

Akermes Cockerell
1902 Can. Ent.,
34:89, 90.

A. andersoni +
Newstead
1916 Bull. ent.
Res. 7:347.

British E.
Africa, Southern
& Northern
Rhodesia, Belgian
Congo, Nigeria,
S. Africa,
Eritrea.

Ceroplastes Gray
1830 Spicilegia
Zoologica, p.7.

C. denudatus +
Cockerell
1893 Entom.,
26:82.

Antigua, British
Guiana, Cyprus,
Greene, Madeira,
India, Uganda.

C. floridensis + +
Comstock
1881 Rep. U.S.
Dept. Agric.,
1880, p.331.

Australia, N. &
S. America,
Bonin Is.,
Ceylon, Formosa,
Hawaiian Is.,
India, Japan,
Java, Marianna
Is., Palau Is.,
S. Franc, W.
Indies,
Zanzibar, Cyprus,
Turkey, Egypt,
Israel, Madeira,
Malaya, Sarawak,
Madagascar.

Mauritius

Réunion

Rodriguez

Seychelles 284.

Comores

Aldabra

Agalega

Farquar Providence

Amirantes

Other
localities

COCCIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>C. rubens</u> Maskell 1892 <u>N.Z. Trans.</u> <u>25:214</u>				+						Australia, Ceylon, China, Formosa, Hawaiian Is., India, Japan, Marianna Is., Philippines, Zanzibar, New Guinea, Solomon Is., Cook Is., Fiji, New Caledonia, New Hebrides, Samoa.
<u>C. vinsonii</u> Signoret 1872 <u>Ann. Soc.</u> <u>ent. Fr. (5)</u> <u>2:38.</u>	+	+								
<u>Coccus</u> Linnaeus 1758 <u>Syst. Nat.</u> <u>Ed. 10, 1:455.</u>										
<u>C. acutissimus</u> (Green) 1896 <u>Ind. Mus.</u> <u>Notes, 4:10.</u>	+									Ceylon, Formosa, India, Malaya.
<u>C. elongatus</u> (Sign.) 1873 <u>Ann. Soc.</u> <u>ent. Fr. (5)</u> <u>3:404.</u>	+			+						Europe, Ceylon, India, Fiji, Formosa, Hawaiian Is., U.S.A., S. Africa, W. Indies, Philippines, Mexico, Sumatra, China, Egypt, New Zealand.

	286.								
	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence Amirantes	Other localities
COCCIDAE. (Cont'd.)									
<u>C. hesperidum</u> L. 1758 <u>Syst. Nat.</u> <u>Ed. 10, 1:455.</u>	+	+		+		+			N. & S. America, Africa, India, Europe, Eire, Japan, New Zealand, Sumatra, Formosa, Hawaiian Is., W. Indies, Zanzibar.
<u>C. mangiferae</u> (Green) 1889 <u>Ent. mon.</u> <u>Mag., 25:249.</u>	+		+						Ceylon, Formosa, India, Palau Is., Philippines, W. Indies.
<u>C. mauritiensis</u> Mamet 1936 <u>Proc. R. ent.</u> <u>Soc. Lond. (B)</u> <u>5:96.</u>	+		+						
<u>C. oculatus</u> (Brain) 1920 <u>Bull. ent.</u> <u>Res. 11:13.</u>	+	+	+						
<u>C. viridis</u> (Green) 1889 <u>Ent. mon. Mag.</u> , <u>25:248.</u>	+	+	+	+					S. America, Ceylon, Formosa, Hawaiian Is., Marianna Is., Palau Is., Philippines, S. Africa, Sumatra, Zanzibar.

C. dorsociliatus (Green & Mamet) 1938 Proc. R. ent. Soc. Lond. (B)
7:126 - is a synonym.

Note: C. guerinii (Sign.) 1869 Ann. Soc. ent. Fr. (4) 9:96 - indet.,
recorded from Mauritius. Type lost and difficult to say what the
species really is.

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
COCCIDAE. (Cont'd.)										
<u>Eucalymnatus</u> Cockerell 1901 <u>Can. Ent.</u> , 33:57.										
<u>E. tessellatus</u>	+	+		+			+	+		Africa, Australia, British Guiana, Caroline Is., Ceylon, England, Formosa, France, Hawaiian Is., Japan, U.S.A., W. Indies, Samoa, Solomon Is., Egypt, New Britain, Malaya Fiji, Zanzibar, India, Italy, New Caledonia.
<u>Platysaissetia</u> Ckll. 1901 <u>Ent. Student</u> , 2:32.										
<u>P. tsaratananae</u> Namet 1951 <u>Mém. Inst.</u> <u>Sci. Madag. (A)</u> 5:238.			+							Madagascar.
<u>Protopulvinaria</u> Ckll. 1894 <u>Jn. Trin.</u> <u>Nat. Club</u> , 1:309.										
<u>P. longivalvata</u> Green 1909 <u>Coccidae of</u> <u>Ceylon</u> , 4:254.										Ceylon, Sarawak, Dutch Guiana, Venezuela.

COCCIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>P. pyriformis</u> (Ckll.) 1894 Jn. Trin. Nat. Club., 1:309.	+									Trinidad, Jamaica, Grenada, Madeira, British Guiana, Venezuela, S. Africa, Barbados, Canary Is., Dominica.
<u>Pulvinaria</u> Targ.- Tozz. 1869 Catalogue, p.34.										
<u>P. cariei</u> Grandpré & Charm. 1899 Proc. Soc. Amic. Sci. Maur. p.41.	+									
<u>P. floccifera</u> (Westw.) 1870 Gard. Chron. p.308.								+		Argentine, Canada, England, India, S. Africa, U.S.A., W. Indies.
<u>P. grabhami</u> Ckll.+ 1903 Entom., 36:261.					+		+			Madeira, Zanzibar, Ghana, India, Principe, Sao Tomé.
<u>P. iceryi</u> (Signoret) 1869 Ann. Soc. ent. Fr. (4) 9:95.	+	+					+			S. Africa, Southern Rhodesia.

P. lepida Brain, 1920 Bull. ent. Res., 11:20 - is a synonym of
P. iceryi (Signoret).

COCCIDAE.
(Cont'd.)

S. nigra (Nietn.) +
1861 "Enemies
of the Coffee
Tree", p.9.

Mauritius

Réunion

Rodriguez

Seychelles

Comores

Aldabra

Agalega

Farquar Providence

Amirantes

Other
localities

Swains Is., Fiji,
Australia, Africa,
N. & S. America,
W. Indies, New
Hebrides, Solomon
Is., Madagascar,
Samoa, Hawaii,
England, Israel,
New Guinea,
Ceylon, Sarawak,
Malaya, China,
New Zealand,
Formosa, India,
Thailand.

S. oleae (Bern.) +
1782 Mém. d'Hist.
Nat. Acad.
Marseille, p.108.

+

Chagos, Africa,
N. & S. America,
Australia, Ceylon,
China, Corsica,
Formosa, Hawaiian
Is., India,
Japan, Marquesas
Is., W. Indies,
S. Europe,
Philippines, Java,
Sarawak, England,
Malaya, Solomon
Is., Cyprus,
Norfolk Is., New
Zealand, Italy.

Vinsonia
Signoret
1872 Ann. Soc.
Ent. Fr. (5)
2:33.

V. stellifera + + +
(Westw.)
1871 Proc. ent.
Soc. Lond., 3-11.

N., S. & Central
America, Ceylon,
Formosa, Palau
Is., Philippines,
S. India,
Solomon Is., Sao
Tomé, Kenya,
England.

DIASPIDIDAE.	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>Acanthomytilus</u> Borchsenius 1944 Dok. Akad. Nauk CCCP., <u>58:344.</u>										
<u>A. intermittens</u> + (Hall) 1924 Minist. Agr. Egypt Tech. Sci. <u>Serv. Bull. 46:7.</u>										Egypt, Algeria, Palestine, Irak, U.S.S.R., Pakistan, Israel.
<u>Aonidia</u> Targ. 1869 Catalogue, p.42.										
<u>A. obtusa</u> Green & Laing. 1921 Bull. ent. <u>Res. 12:126.</u>										
<u>Aonidiella</u> Berlese & Leonardi 1895 Rev. Pat. <u>Veg., 4:77.</u>										
<u>A. aurantii</u> + + (Mask.) 1878 Trans. N.Z. <u>Inst., 11:199.</u>										N. & S. America, Africa, Bonin Is., Ceylon, China, Europe, India, Japan, Java, New Caledonia, New Zealand, Palau Is., Palestine, Samoa, Syria.

DIASPIDIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>A. destructor</u> Sign. 1869 Ann. Soc. ent. Fr. (4) 9:120.	+	+								Madagascar, Cargados, Australia, N. & S. America, Africa, Caroline Is., Ceylon, China, Fiji, Formosa, Hawaiian Is., India, Laccadive Is., Marianna Is., Marquesas Is., Mexico, Palau Is., W. Indies, Zanzibar.
<u>Aulacaspis</u> Cockerell 1893 Journ. Inst. Jam., 1:180.										
<u>A. tegalensis</u> (Zehnt.) 1898 Mede. Proef. Suik. <u>Java (3) 6:7.</u>	+	+								Formosa, Java, Sumatra, Malaya, Tanganyika.
<u>A. tubercularis</u> Newst.	+	+	+							Africa, Formosa, Java, India, Iraq, China, Malaya, New Hebrides, Venezuela.
<u>Chrysomphalus</u> Ashmead 1880 Amer. Ent. 3:268.										

A. cinnamoni (Newst.), 1908, Journ. Econ. Biol., 3:34 - is a synonym.

DIASPIDIDAE.
(Cont'd.)

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
* <u>C. ansei</u> (Green) 1916 <u>Bull. ent.</u> <u>Res.</u> 7:193.				+						
<u>C. dictyospermi</u> (Morgan) 1889 <u>Ent. mon.</u> <u>Mag.</u> , 25:352.	+	+	+	+						N. & S. America, Africa, Ceylon, China, Eire, Formosa, Europe, Hawaiian Is., Japan, Java, Madeira, Mexico, Palau Is., W. Indies, Zanzibar, Malaya, Sarawak, Fiji.
♂ <u>C. pinnulifer</u> (Mask.) 1890 <u>N.Z. Trans.</u> 23:4.										Fiji, Italy, Algeria, Argentine, B. Guiana, Canary Is., S. Rhodesia, W. Indies, Madeira, Portugal, Turkey, St. Helena, India.
<u>C. ficus</u> Ashmead 1880 <u>Amer. Ent.</u> 3:267.	+	+	+	+						Madagascar, Africa, N. & S. America, Australia, Bonin Is., Europe, Formosa, Hawaiian Is., India, W. Indies, Zanzibar, Japan, Porto Rico, Cuba, Ceylon, Agalega, Diego Garcia.

Clavaspis
MacGillivray
1921 The Coccidae,
p.391.

♂C. diversicolor Green, 1923 Bull. ent. Res., 14:96 - is a synonym.

*Probably endemic.

DIASPIDIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>C. herculeana</u> + (Doane & Hadden) 1909 <u>Can. Ent.</u> , <u>41:298.</u>										Cuba, Peru, Society Is., (Tahiti), U.S.A., Nyasaland, S. Rhodesia, Argentina, Jamaica, Fiji.
<u>Coccomytilus</u> <u>Leonardi</u> 1877 <u>Riv. Pat.</u> <u>Veg.</u> , 6:205, 206.										
<u>C. greeni</u> + + (Grand. & Charm.) 1899 <u>Proc. Soc.</u> <u>Amic. Sci. Maur.</u> p.33.										
<u>Diaspis Costa</u> 1828 <u>Prospetto</u> <u>nuovo Div. Met.</u> <u>Coccus</u> , p.7.										
<u>D. boisduvalii</u> + Sign. 1869 <u>Ann. Soc.</u> <u>ent. Fr.</u> (4) <u>9:432.</u>										Africa, N. & S. America, Ceylon, Europe, Formosa, Hawaiian Is., Mexico, New Zealand, W. Indies, India.
<u>D. bromeliae</u> + (Kern.) 1778 <u>Naturg.</u> <u>Coccus bromeliae</u> , pp.20, 52.										Argentine, Egypt, Europe, Formosa, Mexico, S. Africa, U.S.A., Kenya, Jamaica, Hawaii, Sierra Leone, Azores.

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
DIASPIDIDAE. (Cont'd.)										
<u>D. tessaratus</u> (Grand. & Charm.) 1899 <u>Proc. Soc. Amic. Sci. Maur.</u> p.23.	+									Ceylon, Mexico, Africa, U.S.A., W. Indies, Hawaii.
<u>D. tripartitus</u> (Mamet) 1936 <u>Proc. R. ent. Soc. Lond. (B)</u> 5:91.	+									
<u>Emmereziaspis</u> Mamet 1941 <u>Maur. Inst. Bull. 2:34.</u>										
* <u>E. alluaudi</u> (Grand. & Charm.) 1899 <u>Proc. Soc. Amic. Sci. Maur.</u> , p.35.	+									
* <u>E. galliformens</u> (Grand. & Charm.) 1899 <u>ibid</u> , p.36.	+									
<u>Euvoraspis</u> Mamet 1951 <u>Mem. Inst. sci. Madag. (A) 5:227.</u>										
<u>E. cordiae</u> Mamet + 1936 <u>Proc. R. ent. Soc. Lond. (B)</u> 5:95. (Descr. under <u>Pseudaulacaspis</u>)	+									

* Probably endemic.

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Madagascar	Agalega	Farquar Providence	Amirantes	Other localities
DIASPIDIDAE. (Cont'd.)										
<u>Fiorinia</u> Targioni- Tozzetti 1869 <u>Catalogue</u> , p.42.										
<u>F. fioriniae</u> + (Targ.) 1867 <u>Studdi sul</u> . <u>Cocc.</u> , p.14.										Africa, N. & S. America, Ceylon, China, Australia, Egypt, Eire, Europe, Formosa, Hawaiian Is., India, Japan, Malta, Mexico, W. Indies, Zanzibar, New Caledonia.
<u>F. japonica</u> Kuw. + 1902 <u>Proc. Cal.</u> <u>Acad. Sci.</u> (3) 3:79.										Australia.
<u>Fundaspis</u> MacGillivray 1921 <u>The Coccidae</u> , p.307.										
<u>Galeraspis</u> Mamet 1939 <u>Trans. R.</u> <u>ent. Soc. Lond.</u> 89:588.										
* <u>G. eugeniae</u> + Mamet 1939 <u>ibid</u> :588.										
<u>Hemiberlesia</u> Leonardi 1897 <u>Riv. Pat.</u> <u>Veg.</u> , 6:117.										

*Probably endemic.

DIASPIDIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Amirantes	Other localities
<u>L. beckii</u> (Newn.) 1869 <u>Entom.</u> , 4:217.	+		+	+			+		Madagascar, Africa, Australia, Europe, India, N. & S. & Central America, Japan, New Zealand, Ceylon, Malaya, Borneo, S Solomon Is., Fiji, New Hebrides, Samoa.
<u>L. desmidioides</u> Green 1917 <u>Ent. mon.</u> <u>Mag.</u> (3) 3:267.	+								England.
<u>L. duponti</u> Green ;0;6 <u>Bull. ent.</u> <u>Res.</u> , 7:195.				+					
<u>L. gloverii</u> (Pack.) + 1869 <u>Guide to study</u> <u>of Insects</u> , <u>Ed.1</u> , p.527.									Australia, Caroline Is., Ceylon, China, Corsica. England, Hawaiian Is., Africa, Europe, N. & S. America, W. Indies, Japan, India, Malaya, Fiji, Samoa.
<u>L. hibisci</u> (Grand. + & Charm.) 1899 <u>Proc. Soc.</u> <u>Amic. Scien.</u> <u>Maur.</u> p.32.									
<u>L. ocellata</u> Green 1907 <u>Trans. Linn.</u> <u>Soc. Lond. XII</u> , 2:206.				+					
<u>L. pallida</u> Green + 1896 <u>Ind. Mus.</u> <u>Notes</u> , 4:5.									Bonin Is., Caroline Is., Ceylon, China, Formosa, Hawaiian Is., India, Japan, Northern Australia, Malaya.

DIASPIDIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
♂ <u>L. tokionis</u> (Kuw.) 1902 <u>Proc. Calif.</u> <u>Acad. Sci. (III)</u> <u>3</u> (2) :8.	+	+		+						Hawaii, China, India, Ceylon, England, Malaya, Java, Philippines, Nigeria, Australia, Fiji, Barbados.
<u>L. vinsoni</u> Mamet 1940 <u>Proc. R.</u> <u>ent. Soc. Lond.</u> (B) 9:71.	+									
<u>Lopholeucaspis</u> <u>Actual. scient.</u> <u>ind. 1953,</u> <u>1202:153.</u>										
<u>L. cockerelli</u> (Grand. & Charm.) 1899 <u>Proc. Soc.</u> <u>Amic. Scien.</u> <u>Maur.</u> :38.	+									Brazil, Ceylon, Germany, Panama, Principe, Sierra Leone, France, Sarawak.
<u>Lindingaspis</u> MacGillivray 1921 <u>The Coccidae,</u> p.388.										

♂
L. auriculata Green 1907 - Trans. Linn. Soc. Lond., xii, 2:205 -
is a synonym.

	Mauritins	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
DIASPIDIDAE. (Cont'd.)										
<u>L. rossi</u> (Mask.) 1890 <u>Trans.</u> <u>N.Z. Inst.</u> , <u>23:3.</u>	+	+								Australia, Africa, N. & S. America, China, Formosa, Hawaiian Is., India, Japan, New Zealand, Philippines
<u>Mauritiaspis</u> Mamet 1939 <u>Trans. R.</u> <u>ent. Soc. Lond.</u> , <u>89:583.</u>										
* <u>M. malloti</u> Mamet 1939 <u>Trans. R.</u> <u>ent. Soc. Lond.</u> , <u>89:583.</u>	+									
* <u>M. mimusopis</u> Mamet 1939 <u>ibid:585.</u>	+									
<u>Melanaspis</u> Ckll. 1897 <u>Bull. 6</u> , <u>T.S., Dep. Ag.</u> , <u>p.9.</u>										
<u>M. smilacis</u> (Comstock) 1883 <u>2nd Rep.</u> <u>Dep. Ent.</u> <u>Corn. Univ.:69.</u>				+						Azores Is., England, N. America, Egypt, Jamaica.
<u>Nimusaspis</u> Mamet 1942 <u>Proc. R.</u> <u>ent. Soc. Lond.</u> (B) <u>11:36.</u>										

* Probably endemic.

DIASPIDIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
* <u>M. baldulae</u> Mamet 1943 <u>Bull. ent.</u> <u>Res. 34(2):127-</u> <u>128.</u>	+									
<u>M. mimusopis</u> (Mamet) 1939 <u>Trans. R.</u> <u>ent. Soc. Lond.,</u> <u>89:581.</u>	+	+								
<u>Morganella</u> Cockerell 1897 <u>Bull. U.S.</u> <u>Dept. Agric.</u> <u>Tech. Ser. 6:22.</u>										
<u>M. longispina</u> (Morg.) 1889 <u>Ent. mon.</u> <u>Mag. 25:352.</u>	+			+						Algeria, Brazil, British Guiana, Ceylon, Hawaiian Is., India, W. Indies, San Thomé, S. Africa, Brazil, Cook Is.
<u>Odonaspis</u> Leonardi 1897 <u>Riv. Pat.</u> <u>Veg., 5:284.</u>										
<u>O. ruthae</u> Kotinsky 1915 <u>Proc. Ent.</u> <u>Soc. Wash.,</u> <u>17:101-104.</u>	+	+								Chagos, Argentine, Australia, Ceylon, Egypt, Hawaiian Is., Palestine, Israel, S. Rhodesia, Kenya, Bermuda, S. Africa.
<u>O. saccharicaulis</u> (Zehnt.) 1897 <u>Mede Proef.</u> <u>Suik. Java, n.s.,</u> <u>39:1.</u>	+									Java, Sumatra.

*Probably endemic.

DIASPIDIDAE.
(Cont'd.)Parlatoria

Targioni-Tozzetti

1868 Cat. Cocc.,Soc. Ital. Sci.Nat. 11:735.P. pergandii

Comstock

1881 Rep. U.S.Dep. Ag. 1880,p.327.P. proteus

(Curtis)

1843 Gard.Chron., p.676.P. ziziphus

(Lucas)

1853 Bull. Soc.Ent. Fr. (3)1:28.

Mauritius

Réunion

Rodriguez

Seychelles

Comores

Aldabra

Agalega

Farquar Providence

Amirantes

Other
localities

+

N. & S. America,
W. Indies, Canary
Is., China, Africa,
Europe, Hawaiian
Is., India, Japan,
Java, New Zealand,
Palestine,
Philippines,
Sumatra, Straits
Settlements,
Syria, Thailand.

+

Central, N. & S.
America, Australia,
Europe, Caroline
Is., Ceylon,
China, Cuba,
Egypt, Formosa,
India, Java,
Hawaiian Is.,
Malaya, Palau Is.,
Philippines,
Sumatra, Thailand,
W. Indies, New
Zealand.

+

Central, N. & S.
America,
Australia, Burma,
Europe, China,
Africa, Formosa.
Hawaiian Is.,
Japan, Java,
Philippines,
India, Sumatra,
W. Indies,
India.

DIASPIDIDAE.
(Cont'd.)

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>Phenacaspis</u> Cooley & Cockerell 1899 <u>Check List</u> Coccidae, Supple. p.398.										
<u>P. comorensis</u> Mamet 1961 <u>Nat. malgache</u> <u>12:150.</u>										
♂ <u>P. dilatata</u> (Green) 1899 <u>Coccidae of</u> <u>Ceylon, 2:148.</u>		+	+	+	+					Madagascar, Ceylon, India, China, S. Africa, S. Rhodesia, Zanzibar, Egypt, Java, Solomon Is., Australia, Hawaii.
<u>P. inday</u> (Banks) 1906 <u>Philippine</u> <u>Jn. Sci., 1,</u> <u>7:787.</u>					+	+				Palau Is., Philippines.
<u>P. subcorticalis</u> (Green) 1905 <u>Journ. Bomb.</u> <u>Nat. Hist. Soc.,</u> <u>16:351.</u>		+				+				Ceylon.
<u>Pinnaspis</u> Cockerell 1892 <u>Journ. Inst.</u> <u>Jam., 1:136.</u>										

♂ Apparently a synonym of P. cockerelli (Cooley).

DIASPIDIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>Poliaspoides</u> MacGillivray 1921 <u>The Coccidae</u> , p.309.										
<u>P. formosana</u> (Takahashi) 1930 <u>Rept. Dept.</u> <u>Agric. Formosa</u> , <u>48:29.</u>	+	+								Formosa, S. Africa.
<u>Pseudaonidia</u> Cockerell 1897 <u>Bull. U.S.</u> <u>Dept. Agric.</u> , <u>Tech. Ser. 6:14.</u>										
<u>P. trilobiformis</u> (Green) 1896 <u>Ind. Mus.</u> <u>Notes, 4:4.</u>	+	+	+							Brazil, Ceylon, E. Indies, Formosa, India, Japan, Africa, Zanzibar; Malaya, Barbados, B. Guiana, Dominica, Trinidad, Australia, New Caledonia.
<u>Pseudaulacaspis</u> MacGillivray 1921 <u>The Coccidae</u> , p.305.										
<u>P. major</u> (Ckll.) 1894 <u>Ent. News</u> , <u>5:43.</u>	+			+						Ceylon, Cuba, Formosa, W. Indies, Brazil, Venezuela.

DIASPIDIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>S. articulatus</u> (Morg.) 1889 <u>Ent. mon.</u> <u>Mag.</u> 25:352.	+	+								Australia, S. America, Ceylon, W. Indies, England, Formosa, India, Japan, Mexico, Panama, Africa, Zanzibar, Solomon Is.
<u>S. magnospinosus</u> Newst. 1919 <u>Bull. ent.</u> <u>Res.</u> , 10:197.										Uganda.
<u>Spinaspidiotus</u> MacGillivray 1921 <u>The Coccidae</u> , p.390.										
<u>S. charmoyi</u> (Brain)+ 1918 <u>Bull. ent.</u> <u>Res.</u> , 9:138.										
<u>Tollaspidiotus</u> MacGillivray 1921 <u>The Coccidae</u> ,										
<u>T. mauritianus</u> (Newst.) 1916 <u>Bull. ent.</u> <u>Res.</u> , 7:374.										

S. articulatus simplex (Grand. & Charm.) 1899 Proc. Soc. Amic. Sci.
Maur., p.21 - is a synonym.

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
DIASPIDIDAE. (Cont'd.)										
<u>T. rufus</u> (Lindinger) 1913 <u>Jahr. Hamb.</u> <u>wiss. anst.</u> 30 (3):97.		+								
<u>Triraphaspis</u> Balachowsky 1954 <u>Mém. Sci.</u> <u>Inst. Pasteur,</u> p.139.										
<u>T. desmidioides</u> (Green) 1917 <u>Ent. mon.</u> <u>Mag.</u> 53:267.		+								England.
<u>T. hymenophylli</u> Mamet 1959 <u>Nat. malgache</u> <u>11, (1-2):129.</u>		+								
<u>T. trilobis</u> Mamet 1957 <u>Mém. Inst.</u> <u>sci. Madag.,</u> <u>8:384.</u>		+								
<u>Unaspis</u> MacGillivray 1921 <u>The Coccidae,</u> p.308.										
<u>U. citri</u> (Comst.) + 1883 <u>2nd Rep.</u> <u>Dept. Ent. Corn.</u> <u>Univ., p.100.</u>										Southern U.S., W. Indies, Mexico, Bermuda, Australia, Japan, Samoa, New Zealand.

ERICCOCCIDAE.	Mauritius	Réunion	Rodriguez	Seychelles	Comres	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
<u>Centrocooccus</u> <u>Borchsenius</u> , 1949 <u>Biol. Inst.</u> <u>Acad. Sci. U.S.S.R.</u> <u>N.S. 38:303.</u>										
<u>C. insolitus</u> + (Green) 1908 <u>Mém. Dept.</u> <u>Agric. India 2,</u> <u>2:25.</u>										India, Ceylon, China, Tanganyika, Zanzibar, S. Africa.
<u>Dactylopius</u> Costa 1835 <u>Faun. Regn.</u> <u>Nap., Cocc., p.15.</u>										
<u>D. indicus</u> Green + 1908 <u>Mém. Dept.</u> <u>Agric. India,</u> <u>2:28.</u>										N. & S. America, Ceylon, India, S. Africa, Australia.
<u>D. tomentosus</u> + + (Lam.) 1835 <u>Hist. Nat.</u> <u>Anim. Ed. 2,</u> <u>4:115.</u>										Argentina, Ceylon, England, Mexico, U.S.
<u>Eriococcus</u> Targioni-Tozzetti 1869 <u>Catalogue,</u> p.33.										
<u>E. araucariae</u> + Mask. 1878 <u>Trans. N.Z.</u> <u>Inst. 11:218.</u>										Africa, N. & S. America, Japan, Hawaiian Is., New Zealand, Europe, Ceylon, India, Lord Howe Is.

MARGARODIDAE.

Icerya Signoret1875 Ann. Soc.ent. Fr. (5) 5:357.

I. seychellarum + + + + + + +
 (Westwood)
 1855 Gard. Chron.
 p.830.

Ceylon, China,
 Formosa, India,
 Japan, Madeira,
 New Zealand,
 Palau Is.,
 Philippines, S.
 Africa, Zanzibar,
 Sarawak, Malaya,
 Java, Australia,
 Cook Is., Fiji,
 Ocean Is., Tahiti,
 Andaman Is., Uganda,
 Nyasaland, Kenya,
 Switzerland,
 Canary Is.

ORTHEZIIDAE.

Newsteadia Green1902 Ent. mon.Mag., 38:285.

N. mauritiana +
 Mamet
 1943 Bull. ent.
Res. 34(2):117-
 118.

N. montana Mamet +
 1947 Proc. R. ent.
Soc. Lond. (B)
 16:31.

Orthezia

Bosc d'Antic.

1784 Journ. dePhys., 24:173.

O. insignis Browne + +
 1887 Journ.
Quekett Micro.
Club, Series 2,
 3:169.

N. & S. & Central
 America, Africa,
 Ceylon, China,
 Dutch East Indies,
 Europe, Malaya.

PSEUDCOCCIDAE.	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
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Antonina Signoret
1875 Ann. Soc.
ent. Fr. (5) 5:24.

~~z~~ A. bambusae (Mask.)
1892 Trans. N.Z. +
Inst., 25:237.

Brazil, Ceylon,
Formosa, Hawaiian
Is., Marianna Is.,
S. Africa,
Southern Rhodesia,
Sénégal, Tanganyika,
India, Thailand,
Surinam.

~~ss~~ A. graminis (Mask.)
descr. as +
Sphaerococcus
Entomologist's
mon. Mag. 1897
33:244.

Australia, Ceylon,
E. Africa, Formosa,
Hawaiian Is.,
India, Palau Is.,
Sumatra. See
map C.I.E.

Dysmicoccus Ferris
1950 Atl. Scale
Ins. N. Amer. Ser.
V, p.53.

~~sss~~ D. brevipes + +
(Cockerell)
1893 Entom.,
26:267.

Africa, Formosa,
Hawaiian Is.,
Jamaica, Marianna
Is., Philippines,
Zanzibar,
Madagascar, Fiji,
Gilbert Is., Samoa,
S. America, W.
Indies, Australia,
Azores, Egypt,
Israel, Ceylon,
India, Java, Malaya,
New Guinea, Solomons.

~~φ~~ A. bambusae (Mask.) is a Chaetococcus.

~~φφ~~ A. indica Green, 1908 Ném. Dept. Agric. India, Ent. Series 2:2 - is
a synonym.

~~φφφ~~ D. pseudobrevipes (Mamet), 1941 Bull. Ent. Res., 32:58 - is not a
valid species; D. cannae Green, 1922 Coccidae of Ceylon, 5:381,
is also a synonym.

PSEUDOCOCCIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
				315.						
<u>D. boninsis</u> (Kuwana) 1909 Journ. N.Y. Ent. Soc., 17:161.	+	+								S. America, W. Indies, Bonin Is., Egypt, Formosa, Hawaiian Is., Japan, Louisiana, Panama, Samoa, New Caledonia, New Zealand, Sierra Leone.
<u>Ferrisia Fullaway</u> 1923 Proc. Haw. Ent. Soc., 5:311.										
<u>F. virgata</u> (Ckll.) 1893 Entom. 26:178.	+	+	+	+		+	+	+		Chagos, Africa, N. & S. America, Ceylon, Fiji, Formosa, Hawaiian Is., India, W. Indies, Japan, Java, Solomon Is., Philippines, Sumatra, Zanzibar, England, Burma, Thailand, Malaya, New Britain, New Guinea, N. Borneo, Gilbert Is., New Hebrides, New Caledonia, Australia, Madagascar.
<u>Mascarenococcus</u> Mamet 1940 Proc. R. ent. Soc. Lond. (B) 9:68.										
* <u>M. pandani</u> Mamet 1940 Proc. R. ent. Soc. Lond. (B), 9:68.	+									

*Probably endemic.

PSEUDOCOCCIDAE.
(Cont'd.)

Mauritius

Réunion

Rodriguez

Seychelles

Comores

Aldabra

Agalega

Farquar Providence

Amirantes

Other
localities

Nipaecoccus Sulc
1945 Acta Soc. Sci.
nat. Morav. 17:1-48.

N. cacuminis +
Mamet
1957 Mém. Inst.
sci. Madag. (F)
8:377.

∅ N. vastator (Mask.)+

Saudi Arabia,
Ceylon, India,
Thailand, Egypt,
Africa, Hawaii,
Malaya.

Pedrococcus
Mamet
1942 Proc. R. ent.
Soc. Lond. (B)
11:79.

* P. greeni Mamet +
1937 Proc. R. ent.
Soc. Lond. (B)
6:173.

* P. longipes Mamet +
1942 Proc. R. ent.
Soc. Lond. (B)
11:83.

* P. longisetosus +
Mamet
1942 ibid:84.

∅ N. filamentosus (Ckll.), 1893 Entom., 26:268, is a misidentification.

* Probably endemic.

PSEUDOCOCCIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
* <u>P. mauritanus</u> Mamet 1939 <u>Bull. Soc. Linn. Lyon</u> , 8:215.	+									
* <u>P. simplex</u> Mamet 1943 <u>Bull. ent. Res.</u> 34(2):120- 121.	+									
<u>Phenacoccus</u> Cockerell 1893 <u>Ent. News</u> , 4:318.										
<u>Planococcus</u> Ferris 1950 <u>Atl. Scale Ins. N. Amer.</u> <u>Ser. V</u> :164.										
<u>P. citri</u> (Risso) 1813 <u>Essai, Hist. Nat. des Oranges</u> .	+	+	+	+						Madagascar, Africa, Australia, W. Indies, Europe, Sandwich Is., N. & S. America, Christmas I., Malaya, New Britain, New Guinea, Sarawak, Solomon Is., Borneo, Sumatra, Fiji, Hawaii, Samoa, New Hebrides, Tahiti
<u>P. ficus</u> (Signoret, 1875 <u>Ann. Soc. ent. Fr.</u> (5) 5:315. (? doubtful record)	+									N. & S. America, Europe, Africa, Sudan.

* Probably endemic.

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
PSEUDOCOCCIDAE. (Cont'd.)										
<u>P. lilacinus</u> (Ckll.) 1905 <u>Proc. Dav.</u> <u>Akad. Sci.</u> 10:128.	+		+							Madagascar, Philippines, Ceylon, Java, Guam, U.S.A., Hawaii, India, Tanganyika, Kenya, Uganda, Sarawak.
<u>Pseudococcus</u> Westwood 1839 <u>Synop. Gen.</u> <u>Br. Ins.</u> , p.118.										
♂ <u>P. adonidum</u> (L.) 1766 <u>Syst. Nat.</u> <u>Ed. 12</u> , 1:740.	+	+	+	+						Madagascar, America, Europe, Africa, Asia, India, Ceylon, Malaya, Solomon Is., Sumatra, New Britain, W. Indies, Fiji, Hawaii, New Hebrides, New Zealand, Australia, Norfolk I.
<u>P. citriculus</u> Green 1896 <u>Cocc. of</u> <u>Ceylon</u> I:377.										Ceylon, Zanzibar, Hawaii, Palestine, Sarawak.
<u>P. mascarensis</u> + Mamet 1957 <u>Mém. Inst.</u> <u>sci. Madag.</u> (E) 8:378.										
<u>P. pollicis</u> Mamet + 1940 <u>Proc. R. ent.</u> <u>Soc. Lond.</u> (B) 9:65.										

♂ P. longispinus (Targioni-Tozzetti) 1869 Catalogue, p.32, is a synonym.

	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
PSEUDOCOCCIDAE. (Cont'd.)										
<u>P. portiludovici</u> + Mamet 1943 <u>Bull. ent.</u> <u>Res. 34(2):122-123.</u>										
<u>Ripersia</u> Signoret 1875 <u>Ann. Soc.</u> <u>ent. Fr. (5) 5:335.</u>										
<u>R. pileae</u> Mamet + 1940 <u>Proc. R.</u> <u>ent. Soc. Lond.</u> (B) 9:65.										
<u>Saccharicoccus</u> Ferris 1950 <u>Atl. Scale</u> <u>Ins. N. Amer. Ser.</u> <u>V:216.</u>										
<u>S. sacchari</u> + + + (Ckll.) 1895 <u>Jn. Trin.</u> <u>Nat. Club, 2:195.</u>										Madagascar, Trinidad, Barbados, Mexico, Africa, India, Java, Malaya, Madeira, Marianna Is., Palestine, Samoa, Sarawak, Ceylon, Fiji, Hawaii, W. Indies, S. America.
<u>Spilococcus</u> Ferris 1950 <u>Atl. Scale</u> <u>Ins. N. Amer.</u> <u>Ser. 5:219.</u>										

PSEUDOCOCCIDAE. (Cont'd.)	Mauritius	Réunion	Rodriguez	Seychelles	Comores	Aldabra	Agalega	Farquar Providence	Amirantes	Other localities
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S. bourbonicus +
Mamet
1957 Mém. Inst.
sci. Madag. (E)
8:380.

Trionymus Berg.
1899 Commun. Mus.
Buen. Aires.

T. dactyloctenii +
Mamet
1943 Bull. ent.
Res. 34(2):123-125.

III. Discussion.

It is perhaps unwise to come to a definite conclusion about the origin of the Mascarene fauna by consideration of one Order alone, but having surveyed the hemipterous fauna very carefully it is not out of place here to indicate the zoogeographical conclusions reached by this study. The value of any speculations based on the recorded fauna of a given area naturally depends on the accuracy of identification of the recorded genera and species. In the case of the Hemiptera it is known that errors in Distant's identifications misled Scott in his otherwise remarkable analysis of the Seychelles fauna (1933).

Todd's incorrect identification of Nerthra rugosa [Plates 4a - 4f] which was described from Mauritius, led him to synonymise it with an American species, thus giving a completely false impression of the relationships of the Mauritian fauna.

Many such errors in the various hemipterous families have been indicated in the appropriate preceding chapters.

In the author's opinion there is no doubt that the basic relationships of the Mascarene fauna are with Africa via Madagascar. The old hypothesis that continents formed a single supercontinent 'Pangaea' which in the Devonian and in the remainder of the Palaeozoic split into two supercontinents: 'Laurasia' and 'Gondwanaland', although disputed for over half a century, seems to be finding favour once more⁺.

⁺vide Creer K.M. - 'An Expanding Earth' - Nature 205:539-544 (1965).

If one accepts these views and Wegener's theory of Continental Drift⁺ the relationships of the Mascarene with the Ethiopian fauna are easily explained by the splitting off of the Mascarene islands progressively at a very early date. Rodriguez first, then Mauritius, then Réunion. The original fauna common to the three islands of the group thus would have become modified by the restricted gene flow resulting from isolation.

Rodriguez, as one would expect from this hypothesis, shows the highest proportion of endemic forms.

When Madagascar itself split off from Africa at a much later date the evolution of many endemic forms took place, although often these show relationship with the Mascarene fauna. Some may contend that in the African fauna the progress of evolution has been relatively slower due to the continued facility of gene flow. If this is so, one would expect the African fauna to be more representative of the original 'Gondwanaland' fauna once inhabiting the whole region from West Africa to India at a time before the break-up of the area began.

In studying the Hemiptera of the Mascarene Islands, it is possible to separate these insects into three groups:-

1. Descendants of original land mass (Gondwanaland):-
 e.g., Mecidea, Pseudobathycycoelia, Phricodus, Scotinophara,
Cletus, Leptoglossus, Leptocoris, Daclera, Euthethus,
Dicranocephalus, Neuroctenus, Aneurus, etc.

⁺With regard to the long despised theory of Continental Drift propounded by Wagner, it is interesting to note that work by Blackett on residual magnetism in rocks tends to support the hypothesis.

2. Descendants of Afro-Madagascan land mass fauna (after its separation from the Mascarenes):-

This group includes species introduced naturally many years ago, e.g., Brachyplatys testudonigra, Cydnus pallidipennis and species of many genera, e.g., Macroscytus, Geotomus, Afrius, Antestia, Aspavia, Chinavia, Hydara, Hypselopus, Acanthosoma, Tupalus, Nariscus, Spilostethus, Graptostethus, Nysius, Dieuches, Paromius, Cligenes, Lethaeus, Rhyparochromus, Geocoris, Germalus, Cymodema, Physopelta, Laccotrephes, Ranatra, Arbela, Lasiochilus, Acopsis, Igerna, Flatopsis, Delphacodes.

3. Recent introductions (by man or naturally) [One may suppose that many of the following cosmopolitan and tropicopolitan Hemiptera are reintroduced sporadically]:-

Nezara viridula, Bathycoelia rodhaini, Piezodorus rubrofasciatus, Andrallus spinidens, Liorhyssus hyalinus, Oxycarenus hyalipennis, Coenocoris nerii, Perigrinator biannulipes, Triatoma rubrofasciata, Xylocoris flavipes, Nabis capsiformis, Nesidiocoris volucer, N. tenuis, Exitianus spp., Empoasca lybica, etc.

It is necessary to refer briefly to the conflict between the advocates of 'Continental Drift' (Wegener⁺, Du toit⁺⁺, Jeannel⁺⁺⁺) and those who oppose the theory. Among the most recent 'anti-Gondwanian' opinions it may be noted that Millot (1952), basing his

⁺1924 (Trans. J.G.A. Skerl) 'The origin of continents and oceans. London (Methuen).

⁺⁺1937 'Our Wandering Continents'. London 306pp.

⁺⁺⁺1942 - See Bibliography (also 1946-1969-Coleoptères carabiques de la région malgache I-III, 1, 146pp., 548 figs.)- Paris Larose, Ed.

views on zoogeographic hypotheses, stressed that "'Gondwanaland' is a myth"! His conclusions about the Mascarene fauna (passim) are really undocumented generalisations and are not supported by the evidence collated in the present study.

Zoologists, working on the unique avi- and reptilian faunas, have previously brought forward devastating arguments against Millot's views but these cannot be considered here. According to Millot the notion of 'Gondwanaland' originated 'à une époque où l'on ne craignait pas de jongler les continents avec la plus inconcevable légèreté'. (Millot loc. cit. pp.25-26). His views, however, are of minor relevance to the hemipterous fauna of the area.

On the other hand, Paulian (1952, 1958, 1961) draws attention to the major points 'for and against' the concept of Continental Drift. Attention has briefly been drawn to his views in the section under 'faunistic analysis' (vide p.34).

long ago,
Once, Blyth referred to the Madagascar-Seychelles-Comoro-Mascarene area collectively as 'LEMURIA'. The present author believes that the term is misleading (it is undesirable to link the name of a zoogeographic region to any one animal group, especially a minor one). He has suggested elsewhere the term "Madagasia".

However, such matters of terminology are only of minor importance to a study of the Hemiptera. What must be stressed is a need for precise censuses of the hemipterous species from Africa, Madagascar, etc.. Until these areas are more thoroughly studied there can be no definitive understanding of the origin of the fauna of the Mascarenes.

Fennah's views (1964)⁺ that in the DELPHACIDAE 'some genera, e.g. Nesodryas and Nesosydne are members of the apex of wedges parts of which have been destroyed by glaciation' may apply to other groups of insects.

Absence or presence of a particular species from one or other of the islands of the area may represent actual limits of penetration of taxa.

Another notable feature of the Mascarene fauna is the small number of species - usually one or two - in each genus.

Of the autochthonous species which occur in the Mascarenes, the most remarkable amongst the Heteroptera are: Nerthra rugosa (GELASTOCORIDAE - Pls. 4-4e); Mametocoris furtivus Miller (the extraordinary aedeagus with balloon-like projections are figured on Plate 5d), the tingids described by China from Rodriguez; Ogygotingis insularis (China), Litadea delicatula.

Equally interesting forms occur amongst the Homoptera, e.g., Fennahius [KINNARIDAE - Pls. 18d-19b], Conchyoptera unicolor Signoret [TROPIDUCHIDAE], Lawana exoleta Melichar [FLATIDAE - Pl. 19f above], Laberia pallida Stål [NOGODINIDAE], Distantada thomasseti (China) [CICADIDAE, Pls. 20-20a], Dinarobia claudeae (Orlan) [CICADIDAE, Pls. 21-21a], Abricta spp. [CICADIDAE, Pls. 22a, 23, 23a, 23b], Cerataphis lataniae Boisduval [APHIDIDAE, Pl. 29].

The aleurodid and psyllid faunas, although small, are worthy of a detailed study [vide pls. 29a-37]. The cicadid fauna of Madagascar-The Seychelles-The Mascarenes has been shown to be made up entirely

⁺'DELPHACIDAE from Madagascar and the Mascarene Islands', Trans. R. ent. Soc. London 116:131-150.

of endemic forms.

The aphid fauna, on the other hand, resembles that of Africa with a large number of species of Sitobion: there are also many pests, of wide distribution in the subtropical regions of the world, which have been inadvertently introduced with their imported host plants.

The occurrence of Neophyllaphis araucariae Tak. in Mauritius has been discussed in detail and that of Paulianaphis and Eonaphis in Madagascar is interesting in that the affinities of these genera lie with the Greenideinae - a group well-developed in South-east Asia.

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-

The strange brevipennate birds and giant tortoises and lizards formerly living in Mauritius have long held the attention of scientists. Though of less general appeal, the present invertebrate fauna is by no means less interesting. The Hemiptera, of which some 300 species are now known, are of particular interest - some of them appear to be related to ancestral groups, while in many cases it is the high degree of endemism (100% in the CICADIDAE) that makes their study highly rewarding.

Prior to the present studies a number of examples of curious zoogeographic distribution had been reported. Thus Todd insisted that the gelastocorid Nerthra rugosa (Desjardins) was common to Mauritius and Florida; Mamet stated that Abricta brunnea (Fabricius) [CICADIDAE] also occurred in Bengal.

Re-examination of these claims has shown them to be wrong: Todd, not having seen the type of N. rugosa which is in Paris, had erroneously synonymised it with Glossoaspis brunnea Blatchley; Mamet's so-called A. brunnea from Bengal turned out to be Abroma bengalensis Distant.

Errors of this nature are commonplace in Mauritian entomology failure to refer to relevant type material, inadequate examination of morphological minutiae and an uncritical approach to previous literature account for many of them. One such example is Westwood's - and Todd's, later - support for Desjardins' assertion, disproved in the present studies, that the hemelytra of N. rugosa are completely fused.

Failure of many authors to check the type-species has sometimes had far-reaching results by artificially linking species not truly congeneric. Acrosternum heegeri Fieber and the species under the present author's new genus *Chinavia* is a case in point (pp.A-J). Misvaluation of sexual dimorphism is another common source of errors (vide Hypselopus villosipes pp.135).

In his now classical 'Principles of Insect Morphology' R.E. Snodgrass pointed out that the aedeagus was almost entirely suppressed in the cicadas; that the structure called the uncus by Van Duzee, Davis et al., was in reality the theca (phallosheca), and the inner tube of the organ was therefore the endotheca; the aedeagus, proper, was reduced to a small apodemal process attached to the inner extremity of the endotheca. Studies of the genitalia of Abricta ferruginosa (Stål⁰) from Mauritius by the present author have shown that in this genus at least Snodgrass's views are untenable - a fact which underlines the danger in dogmatic generalisation even when backed by 3 decades of experience and original work.

The author's notes on the nomenclature of the CICADIDAE have not only drawn attention to the great confusion which still exists in the classification of cicadas, but prompted the Secretary of the International Commission on Zoological Nomenclature to support his criticisms of Z.P. Metcalf's 'General Catalogue of Homoptera' (Fasc. 8) and his proposals for nomenclatural classification by preserving some subfamily names, e.g., Cicadinae, but rejecting others, e.g., Tibiceninae (Bull. zool. Nomencl. 1964, 21, 2:154-160).

A revised list of the Hemiptera (Heteroptera and Homoptera) from Mauritius with nomenclatural and distributional notes is also given: a complete revision of the PENTATOMIDAE, ARADIDAE and APHIDIDAE of the area has been completed as well as descriptions of many new genera and species of PENTATOMIDAE, REDUVIIDAE, ANTHOCORIDAE, PSYLLIDAE, etc..

The author's views on the origin of the hemipterous fauna of the Mascarenes are outlined. Excluding the cosmopolitan species, the inquilines like Clerada apicicornis Signoret probably carried by rodent pests and the household pests like Cimex hemipterus (Fabricius) carried by man himself, the fauna finds its closest relatives in Madagascar, the Seychelles and Africa (Ethiopian region). On the whole the hemipterous faunas of Réunion and Rodriguez (also, of the Mascarene group) are actually impoverished replicas of that of Mauritius.

An important factor affecting the fauna of Mauritius has been the introduction of vertebrate predators over the past 200 years. Because the author feels that the hemipterous fauna of Mauritius is derived from that of Madagascar, he has also appended in this study what is probably the most complete and most up-to-date bibliography of the Hemiptera for the whole area. Also included in this bibliography is a list of papers on genitalia which, in the author's opinion, are vital in the study of the group.

Appendix I.PRESERVING AND MOUNTING APHIDS.

(Technique recommended in F.A.O. Plant Protection Bull. 1961, 9,4:46)

Preserving Fluid.

90% - 95% ethyl alcohol.

Mounting.

The procedure recommended when using KOH maceration is as follows:-

- (i) The sample of aphids is transferred to a 2½ in. x 5/8 in. tube if not already in one of this size. The pickle fluid is then decanted and may be kept for use if not too dirty; it is replaced by a few cc. of 90% alcohol, a burnt match head or fragment of porous pot dropped in and the tube plugged with cotton wool and placed in the water bath for about 10 min. or until the alcohol has boiled for about 5 min.
- (ii) The tube is removed from the bath and the alcohol decanted and replaced with a small quantity of 10% KOH (about 3 or 4 cc.); this is gently boiled over a very small naked flame for 1 to 2 min., depending on the age of the material and the size of the specimens.
- (iii) The decanted 90% alcohol is added to the KOH to dilute it and cool it; this stops the macerating action and causes the aphids to sink to the bottom by reducing the density of the fluid in which they are immersed, so that the supernatant mixture of alcohol and KOH can be decanted carefully.
- (iv) A few cc. of clean 90% alcohol is poured on to rinse the aphids; and when this has been decanted the material is ready for clearing. The clearing process involves the gentle heating of the aphids in a mixture of approximately equal parts by weight of crystalline phenol and chloral hydrate, melted together at fairly low temperature.

Mountant.

Gum arabic	12 gms.
Chloral hydrate	20 gms.
Glacial acetic acid	5 ml.
50% w/w glucose syrup	5 ml.
Distilled water	40 ml.

The gum is dissolved overnight in the distilled water (high quality picked lumps rather than powdered gum should be used to obtain clarity of the solution) and the other ingredients are then added in the order shown while the whole mixture is gently warmed on the water bath till entirely clear and dissolved. The solution is filtered hot through glass wool or colloid filter paper, the latter being better but requiring a suction filter funnel.

APPENDIX IIAleyrodidae: Pupal Cases:

- CLEAR: 1. Soak specimens in 10% KOH until clear. Usually by heat in solid watch glasses on a cooling sand bath for 10 mins. or cold for 24 hours.
2. Place in glacial acetic acid for 5 mins [2^a - decolorise in Diaphanol]
- STAIN: 3. Stain in acid Fuchsin for c. 10 mins.
- DEHYD: 4. Place in glacial acetic acid, CH₃, COOH, mixt. Cellosolve and acetic acid.
5. Clear in carbo-xylol (10 or 15 mins.)
- MOUNT: 6. Mount in Canada/balsam/in Xylene.

Coccidae: Staining:

1. Place the specimens in 10% KOH. Heat for 30 mins. but do not boil.
2. Remove to bath of distilled water and, where necessary, express the body contents by gentle pressure (sometimes, especially in the case of mealy-bugs, hard crystals will have formed in the body; these may be dissolved by first placing the specimens in 95% alcohol for several minutes and then to carbo-xylene for about 10 mins. When the specimens have cleared, place in 95% alcohol again to remove the carbo-xylene).
3. Transfer from the water, or if the latter method has been used, from the alcohol to acid alcohol and leave overnight.
4. Stain for at least an hour in acid Fuchsin.
5. Transfer from stain to 95% alcohol for very few minutes to remove surplus stain.
6. Transfer to absolute alcohol. 3 baths of this are necessary, allowing the specimens to remain for about 10 mins. in each case. This process is very important, as it is essential that the last traces of water are removed before mounting.
7. Transfer to clove oil for 20 mins.
8. Place 2 or 3 specimens on slide and remove surplus clove oil by means of a fine filter paper. Put drop of mountant on the specimens and lower cover slip gently by its own weight.

Ethylene Glycol Monethyl Ether = Cellosolve:

Trade name of E. Gurr.

Dehydration excellent, fast dehydrating agent.

50% Cellosolve)
50% acetic acid (glacial)) used for dehydrating stained aleyrodids.

De-waxing Aleyrodid pupal cases:

Best method is to use hot chloro-phenol. Another method is to chip the wax off carefully with a micro-pin when the specimens have been cleared in KOH. Usually the wax can be removed in flakes without breaking the hairs on the surface of the specimens.

LVIII. APPENDIX III

A new organ on the head of NEPIDAE (Hemiptera-Heteroptera).

Immediately behind the base of the antenna of various species of Laccotrephes [e.g., L. annulipes (Laporte), L. fabricii (Stål)], the gula (in both sexes) bears on each side a small hairy cone-like projection or tubercle of unknown function. The shape and size vary with the different species of Laccotrephes: in other Nepid genera (e.g. Nepa Ranatra) the structures are apparently absent.

The organs were first noticed in preparation of the head of L. annulipes (cleared in 10% caustic potash and stained with acid fuchsin). However, they are visible on the live insect as well as on dried museum specimens.

Preliminary studies on preserved material suggested that these tubercles are innervated and glandular the long hairs on the surface which appear to be in contact with the lower segments of the antenna suggest that the function is probably tactile or olfactory and therefore associated with feeding. Plate 3d shows the head of L. annulipes in ventral view; the gular organs are clearly visible.

It seems probable that these structures are not previously reported since they have not been mentioned by those other authors most concerned with NEPIDAE, e.g. Hamilton, Poisson, Larsen, Hübner).

The presence of organs at the base of antennae of Hemiptera has been described by Pendergrast (1953)⁺, Leston (1954)⁺⁺ et al.

⁺ A projection on the Maxillary Plate in some ACANTHOSOMINAE (Hem., PENTATOMIDAE) - Entomologist's mon. Mag., 89:215-216.

⁺⁺ Brachycoris Stål and Saceseurus Breddin (Hem., PENTATOMIDAE), with the description of an unusual maxillary plate tubercle in the former (O.S.R. Publication No. 39b, pp.9-10).

Following Horváth (1924)⁺ who mentioned their presence in the generic description of Hovania, Scudder (1952)⁺⁺ uses presence or absence of antennal tubercles to separate species of Pylorgus (LYGAEIDAE), [e.g. P. scutellaris (Horváth) has antennal tubercles⁺⁺⁺ with a distinct lateral projection].

It is interesting to note that swollen processes on underside of antenniferous tubercles are also present in the 'hop-damson' aphid Phorodon humuli (Schrank) - these are apparently more developed in the apterae than in the alatae.

There seems to be a need for more detailed investigations on cephalic glands and maxillary plate tubercles. The present author hopes to carry out histological investigations of the nepid 'gular organs' in an attempt to find evidence of their origin and function.

⁺Ann. Mus. Hung. 21:191.

⁺⁺The Ischnorhynchinae of the World (Hemiptera:LYGAEIDAE). Trans. R. ent. soc. Lond. 114:163-194.

⁺⁺⁺Spocner (1938) Illinois biol. Monogr., 16(3):1-102 uses the term 'antennal tubercle' cf. Leston, who prefers 'antenniferous tubercle'.

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A NEW GENUS OF CICADIDAE (HOMOPTERA) FROM
THE ISLAND OF RODRIGUEZ* WITH NOTES ON
NOMENCLATURE OF THE FAMILY.

By ALFRED J. E. ORIAN.

[Plates XII-XIII.]

IN 1924, W. E. China published a paper on the Hemiptera of Rodriguez in which he described a species of Cicadidae under the name of *Cicada thomasseti* after H. P. Thomasset, the collector (*Ann. & Mag. nat. Hist.* (9) 14, 452-453).

The present author, having examined the material in the British Museum collection, has found that it is not congeneric with *Cicada*.

It has been thought advisable here to indicate briefly the sequence of events which led to the continued and erroneous use of the name *Cicada*. In the 10th edition of Linnaeus' *Systema Naturae*, published in 1758, forty-two species of "*Cicada*" are described but no type is indicated. Lamarck, 1801 (*Syst. des Anim. sans vertèb.*) cited *Cicada orni* as a unique species of the genus *Cicada* Linnaeus, but this was merely an example, since Art. 67 C of the International Code of Zoological Nomenclature insists that "the designation of a type-species must be rigidly construed" and that "mention of a species as an example of a genus does not constitute a type designation" (Art. 67 C (i)). Lamarck's "examples" were, in addition, rejected by the International Commission of Zoological Nomenclature in *Opinion*, 79, 1924.

Latreille, 1802 (*Hist. nat. Crust. Ins.*, 3, 257) also gave *C. orni* L. as an example of "*Cicada*". Latreille later indicated *C. haematodes* as type-species of *Cicada* (1807) (*Genera Crust. Ins.* 3, 153) but this work has been ruled out by the International Commission so far as fixation of types is concerned and in addition *C. haematodes* Scopoli was not an originally included ~~included-included~~ species. Latreille in 1810 (*Consid. génér.* p. 434) further designated *Tettigonia plebeia* as the type species of "*Cigale*", i.e. *Cicada*. But this is not "an originally included species" although Latreille's 1810 work has been accepted by the International Commission of Zoological Nomenclature in *Opinions* 11 (1938) and 136 (1939) as a source of type-species designations.

No valid type-species designation for the genus *Cicada* L., 1758, was made until 1916 when Van Duzee (*Check List Hemipt. Amer. N. of Mexico*, p. 56) cited *Cicada orni* L., 1758.

In 1926 Horváth in his classical paper "Les noms génériques de nos trois grandes cigales indigènes" correctly followed Van Duzee in accepting *C. orni* L., 1758, as the type-species of *Cicada* L., but he wrongly designated *Cicada haematodes* Scopoli, 1763, as the type-species of

* Indian Ocean at 19° 41' S. and 62° 23' E. and about 950 miles east of Madagascar.

Tibicen Latreille. Since *Tibicen* Latreille, 1827, was monotypic, the single species *Cicada plebeia* Scopoli must be the type-species.

Horváth, however, designated *Cicada plebeia* Scopoli as the type-species of his new genus *Lyristes* (which he called a nom. nov.). *Lyristes* falls as an objective synonym of *Tibicen* Latreille.

Horváth also designated *Cicada haematodes* Scopoli as type-species of *Tibicen* Latreille but as shown above this species was not an originally included species. In fact Kolenati, 1857, was the first to give a valid name to the generic concept including *Cicada haematodes* Scopoli. This was *Tibicina* Kolenati, 1857 (*Melet. Ent.* 7, 414).

The synonymy of these genera is therefore as follows :

(1) *Cicada* Linnaeus, 1758 : type-species *C. orni* L., 1758.

Syn. *Tettigia* Kolenati, 1857 : type-species *C. orni* L., 1758.

*(2) *Tibicen* Latreille in Berthold, 1827 (*Natürliche Familien des Thierreiches. Aus dem Französischen. Mit Anmerkungen und Zusätzen*) which is a German translation of Latreille's 1825 work (*Familles Naturelles*) and in which the names are latinized—has as type-species by monotypy *C. plebeia* Scopoli, 1763.

Syn. *Lyristes* Horváth 1926 *Cicada* Dist. nec L.

(3) *Tibicina* Kolenati, 1857 : type-species *Cicada haematodes* Scopoli, 1763.

Syn. *Tibicen* Horváth nec Latreille.

It is worth using this opportunity to point out that Metcalf in his invaluable catalogue published recently, Metcalf Z.P., 1963, *Gen. cat. Homoptera*, Fasc. 8 : Part 1, Baltimore, has made several serious errors which add to the confusion in cicadid nomenclature.

The difficulty which arises in the major classification of Cicadidae has been brought about largely by the switch of the type-species of *Tibicen* Latreille from *Cicada haematodes* Scop. — as wrongly recognised by Distant who renamed the genus *Tibicina* (Amyot 1847) *Kolenati* 1857 — to the correct *Cicada plebeia* Scop. type-species of *Tibicen* by monotypy. Thus Distant's subfamily Cicadinae, which has been in use for many years, became Tibiceninae. At this point Metcalf is in error in crediting authorship of Tibiceninae to Atkinson (Metcalf *loc. cit.* p. 11), since Atkinson did not use a group name and placed in his "Tibicen group" two genera *Tibicen* and *Melampsalta* belonging to two different subfamilies. The first valid usage of Tibiceninae was by Van Duzee in 1916. Furthermore, in his bibliography of "Tibiceninae Atkinson" Metcalf gives Tibiceninae Distant 1889 : but this name is based on Distant's taxon with type-species *Cicada haematodes* Scop., a taxon properly belonging to Tibicininae Distant with type-genus *Tibicina* (Amyot) : Kolenati. It is not the same as *Tibicen* Latreille.

* It should be noted that Scopoli's original spelling "plebeja" (1763, *Entomologia Carniolicæ*, 36, 117) was also used by Horváth. Latreille, 1810, corrected it to "plebeia". The author follows Latreille—there is no letter "j" in Latin (China & Fennah, 1945, *Ann. Mag. nat. Hist.* (11) 12, 712). The gender of *Tibicen* is masculine so that the correct name of the species is *Tibicen plebeius*.

Thus Metcalf is wrong in placing this group name under Tibiceninae (Atkinson!!) : Van Duzee, type-genus *Tibicen* Latreille, type-species *plebeia* Scop. This particular mistake has been made earlier by authors quoted by Metcalf viz. Kato, Moulton. Tibiceninae Moulton 1919 (*Jour. Fed. Malay States Museum* 8, 3 : 61—66) quoted by Metcalf is also misplaced. Reference to the content of Moulton's taxon clearly shows that this must be a misspelling of Tibicininae Distant.

These repeated mistakes demonstrate how very confusing it is to have two subfamilies of Cicadidae with such similar names, viz. Tibiceninae Van Duzee and Tibicininae Distant. In the author's opinion it would be far better to request that the International Commission use plenary powers to preserve the name Cicadinae, which has been in use for many years ; to reject Tibiceninae and to place Tibicininae (or Tibicinidae, as Metcalf has elevated it) on the official list.

However, the above discussion does not clear up the position of the Rodriguan "*Cicada*". Dr. China agrees with me that *Cicada thomasseti* is not a true *Cicada* ; neither can it be placed under *Tibicina* Kolenati nor *Tibicen* Latreille.

A new genus, *Distantada* is now proposed for the reception of *Cicada thomasseti* China, 1924, which is designated as its type-species.

The genus is dedicated to W. L. Distant who made such a notable contribution to the taxonomic knowledge of the Cicadidae of the world.

Subfamily *CICADINAE*.

Distant, 1889 (*Mon. Orient. Cicad.*, p. 3).

Tribe : *Distantadini* trib. nov.

DISTANTADA gen. nov.

(Plate XIIIa and fig. 1.)

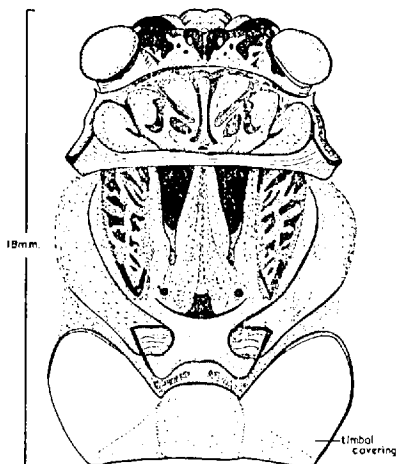
This genus belongs to Distant's subfamily Cicadinae, in which the "tympanal coverings" *, which are always present, conceal the "tympanal orifices". It comes closest to the *Dundubiarina*† (Distant, 1805, *Ann. & Mag. nat. Hist.* (15) 85, 58) sharing most of the characters of that division but the lateral pronotal tooth typical of *Dundubiarina* is replaced by a small spine-like tooth at each anterior lateral angle of the pronotum. It seems likely that *Distantada* represents a new tribe of Cicadinae to be called *Distantadini*.

The classification of the tribes (Distant's so-called divisions) of the Cicadinae appears to be in need of revision, but it would be inappropriate here to attempt such a task.

* The use of the words "tympanal coverings" as used by Pringle, 1955 (*Spolia Zeylanica*, 27 2 : 235) is preferred to Distant's "tympanal coverings" (cf. Pringle, 1957, *Proc. Linn. Soc. Lond.* 167 (2) : 151). However, Pringle (*in litt.*) now suggests that this is more correctly spelt "tinibal coverings".

† Distant's divisions are really tribes ; the ending therefore should be "ini" instead of "aria".

Fig. 1.



Head, notum and timbal coverings of *Distantada thomasseti* (China) from above.

Distantada differs from *Cicada* L., *Tibicina* Kolenati and *Tibicen* Latreille in the structure of the ædeagus, shape of pygofer and conformation of pygofer processes (figs. 3 & 4).

The most conspicuous difference, however, is the possession of greatly enlarged "timbal coverings" which are proportionally greater than those of the above genera and also of all the other Cicadinae in the British Museum collection.

These strongly developed timbal coverings constitute a most striking feature (Plate XII (a) and fig. 1).

Head including eyes, only slightly narrower than the base of the mesonotum (fig. 1).

Pronotum armed at anterior angles behind the eyes with a small tooth which is not really homologous with the lateral tooth in *Dundubiaria*; posterior margin of pronotum transversely wrinkled.

Wing-venation similar to *Cicada*, *Tibicina* and *Tibicen* (Plates XII & XIII).

Abdomen : seventh apparent tergite deeply eut, three-pronged (fig. 2(b)).

Type-species : *Distantada thomasseti* (China) **comb. n.**

(Plate XII (a), figs. 1, 2, 3 (a)-(e).)

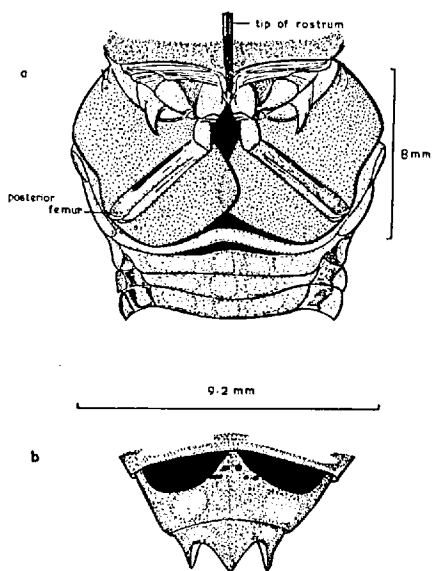
Distantada thomasseti (China)—redescription.

♂ *Head*, pronotum, mesonotum, abdomen and veins of tegmina and wings ochraceous generally; elaval membrane of tegmen and anal lobe of hind wing pale ochraceous or greyish; antennæ black; head and notum sparsely pallidly pilose. Tegmina and wings hyaline, vitreous and

immaculate ; posterior tibiae with a few short dark spines ; middle tibiae dark brown externally.

Colour markings.—Generally as described below but sometimes less distinct : head with a black transverse band between the eyes extending

Fig. 2.



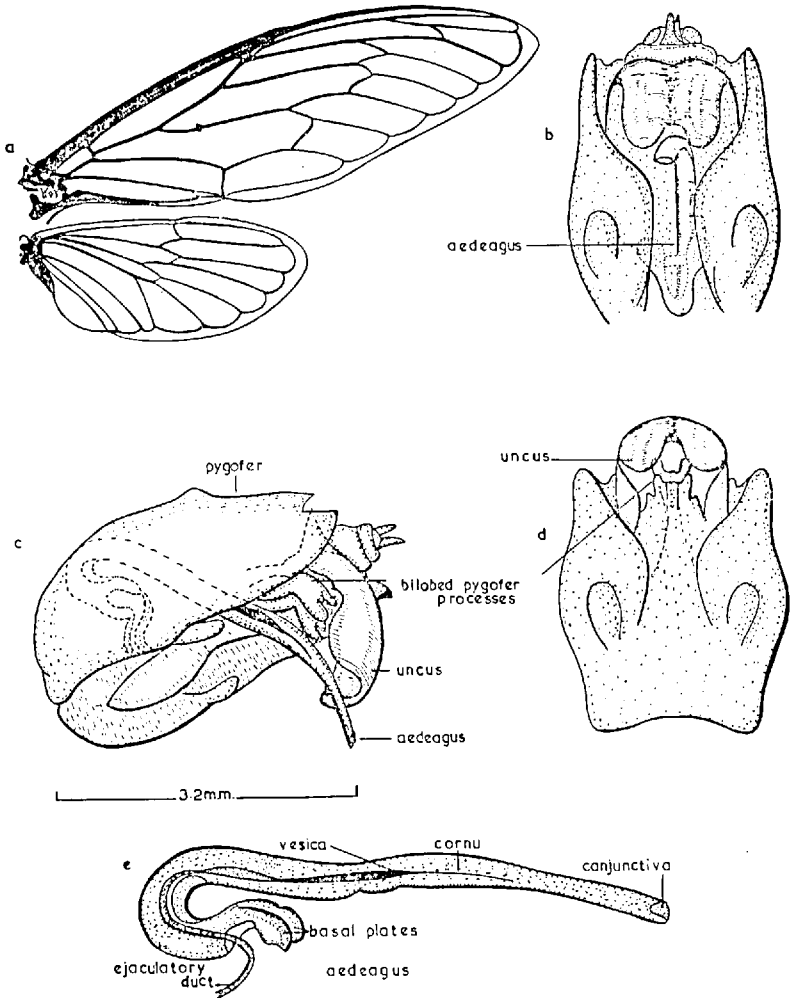
(a) Ventral view of opercula and posterior legs (tibia omitted) of *Distantada* ; note the well-developed coxal spines. (b) Sixth and seventh apparent tergites.

at the middle almost to posterior margin ; three black spots on each side between the ocelli and the base of the eye. Pronotum with two sub-parallel black stripes down the middle and two black areas, almost crescent-shaped, on each side ; oblique sulci dark.

Mesonotum with four obconical dark brown areas along anterior margin, outer pair reticulate with darker ochraceous markings. Abdominal tergites darkish brown laterally, otherwise sparsely covered with pale shining hairs (Plate XII (a)). Sixth apparent tergite with black patches (fig. 2 (b)).

Structure.—Ocelli conspicuous, red ; rostrum extending to posterior coxæ, pale ochraceous with black apex ; postclypeus with twelve pairs of transverse ridges ; lateral margins of pronotum strongly carinate ; opercula not extending beyond metasternum, short, rounded, overlapping along mid-ventral line, lateral border slightly concave, sinuate (fig. 2). Timbal coverings pale ochraceous, enlarged, shiny and wide apart.

Fig. 3.

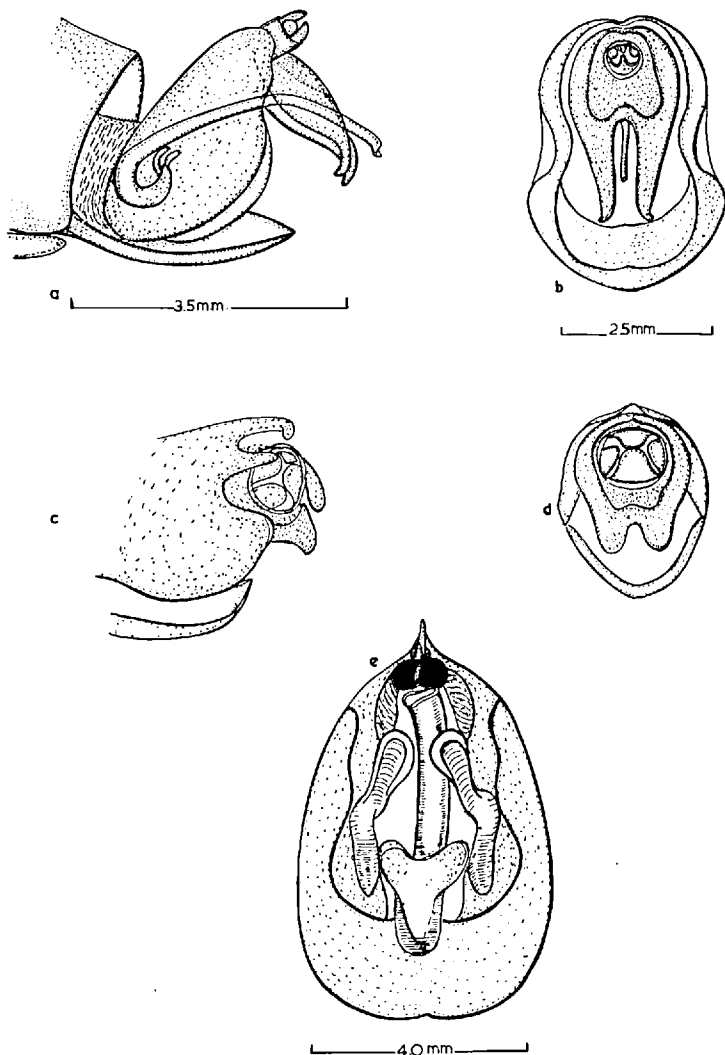


a) Right tegmen and wing of *Distantada*—detail of articular sclerites not shown; (b) pygofer with aedeagus *in situ* (ventral view); (c) pygofer (side view); (d) pygofer—ædeagus removed to show bilobed pygofer processes (ventral view); (e) ædeagus in side view.

Genitalia.—In the shape of the uncus, conformation and position of pygofer processes, aedeagus and other parts of the genitalia (figs. 3 & 4), *Distantada thomasseti* differs from all Cicadinæ so far described.

Ædeagus.—Long (3.25 mm.) proximal part strongly recurved, conjunctiva small projecting at tip; cornu long; vesica chitinous. (Orian, *in press*).

Fig. 4.



(a), (b) Pygofer and tip of abdomen of *Cicada orni* Linn. lateral and end-on view ;
 (c), (d) pygofer and tip of abdomen of *Paruna pryeri* Distant (Dundubiaris) ;
 (e) *Tibicen plebeius* (Scopoli)—ventral view of pygofer and tip of abdomen.

Pygofer.—On each side a chitinous tooth ; uncus single, black, broad, strongly inwardly curved ; bilobed pygofer processes projecting just behind uncus and lying on each side of ædeagus.

Measurements in millimetres.

Male.—Width of head including eyes 10, length of head from middle of posterior margin to dorsal apex of frons 3·0; pronotum length in mid-line 4, width anteriorly 8·5, posteriorly 11·5; width of mesonotum anteriorly 10. Total length of body 26·5, width across timbal coverings 13·2; expanse of tegmina 86, length of tegmen 40, greatest width 12; length of wing (posterior) 22, width 11; length of operculum 8, width 5; length of timbal coverings 5.

Paratype female (smaller than male).—Length of tegmen 37, width 12; length of wing 21, width 10; length of body 23.

Holotype male (S. ix. 1918, B.M. 1924–215—H. J. Snell and H. P. Thomasset); three male paratypes (B.M. 1924–65—G. C. Addison-Williamson); and one female paratype (B.M. 1924–215—Dr. H. Scott). All from Rodriguez (types in British Museum collection).

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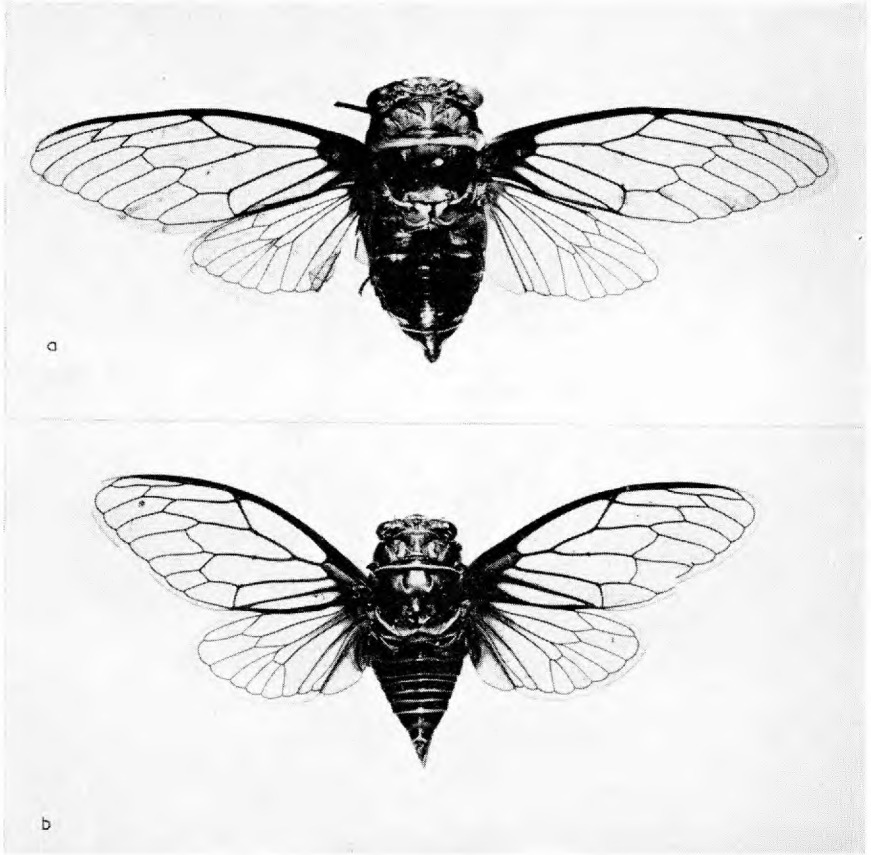
The author is most grateful to Dr. W. E. China, C.B.E., Secretary, The International Commission on Zoological Nomenclature, for many stimulating discussions and generous help. He wishes to tender his thanks to Mr. J. P. Doncaster, Keeper of Entomology in the British Museum (Natural History), who kindly granted permission to work on the Museum collections. He is also indebted to Professor J. W. S. Pringle, F.R.S., of the Department of Zoology, University of Oxford, and to Dr. M. S. K. Ghauri of the Commonwealth Institute of Entomology for advice. Messrs. D. E. Kimmins and R. J. Izzard also helped in various ways. He is also grateful to Mr. J. A. Grant, Miss G. M. Day, and Mr. P. S. Broomfield for providing information on various points.

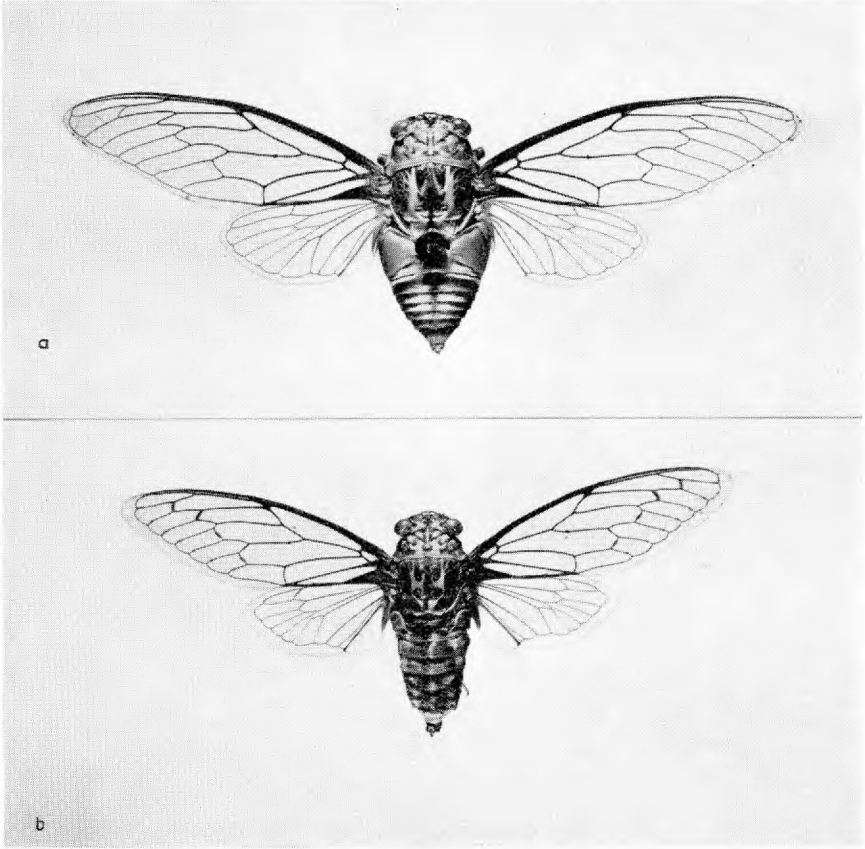
EXPLANATION OF THE PLATES.

Plate XII. (a) *Distantada thomasseti* (China); (b) *Cicada orni* Linn.

Plate XIII. (a) *Tibicen plebeius* Scopoli; (b) *Tibicina haematodes* (Scopoli).

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A. J. E. Orrian. Ph.D.
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The morphology of the male genitalia of
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The Royal Entomological Society of London,
41, Queen's Gate, S.W.7

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*Department of Agriculture, Mauritius**

SYNOPSIS

The genitalia of the male of *Abricta ferruginosa* are described and an interpretation is given of the structures involved.

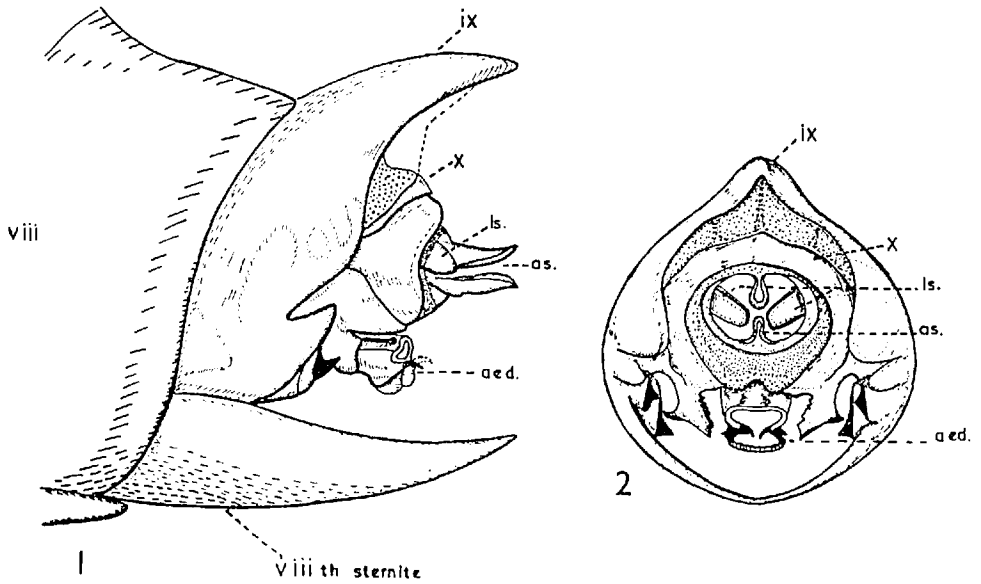
THE detailed morphology of the genitalia of Cicadidae, in spite of their size, has never been worked out and, to date, the different structures have remained almost unknown or misunderstood. This is very surprising indeed, as these insects have attracted the attention of philosophers and scientists since the very early days of biology. Copulation of cicadas was described by Aristotle, and both Malpighi (in 1687) and Réaumur (in 1740) investigated the morphology of the copulatory organs to some extent. It seems that the first real attempt to describe the genitalia was made by Ellis A. Apgar (1887). He figured the aedeagus of *Cicada septendecim* Linn. (= *Magiccicada septendecim* (Linn.)) in both the contracted and the extended condition but his interpretation of the various parts is inadequate, and unfortunately later hemipterists did not study cicadid genitalia to a degree comparable to this. Thus Kershaw and Muir (1922) simply emphasised that the male genitalia "were very distinct" from those of other Homoptera and pointed out that "in some Cicadidae the aedeagus was complex and trilobed". Similarly Pruthi (1925) examined the aedeagus of *Abricta curvicosta* Germ. and concluded that the "Aedeagus was short, wide, slightly lobed at its distal end; with a short endosomic region as well; the latter with minute spines and tubercles". He did not figure the extended aedeagus with its remarkable membranous vesica, and his diagram is far too sketchy. Davis published a number of articles on North American cicadas in the *Journal of the New York Entomological Society* (1915-43) but, although he sometimes gives diagrams of terminal body segments and shows the tip of the aedeagus, he does not seem to have studied the genitalia in detail.

Evans (1940) figured the male genitalia of *Tettigarcta tomentosa* White, and Torres (1948) represented those of *Carineta* in his description of species of that genus. China (1954) re-examined the genitalia of three species of *Carineta* and in addition figured the remarkable apically dilated apex of the "endosoma". *Mauricia claudeae* was described by Orian (1954), who dissected the genitalia and figured the aedeagus. More recently, Dlabola (1958) published some descriptions and figures of the genital organs of some species of Cicadidae from the Belgian Congo, and figures of the external characters of the aedeagus in the different species he examined and described. None of these authors, however, examined in detail the aedeagus itself. In a series of papers Torres (1960, *Proc. XIth Int. Congr. Ent. (Vienna)* 1 : 1-6, 48-57) discussed the genitalia of different species of Cicadidae, mostly *in situ*, and gave excellent figures of the "phallosoma" but he did not dissect out the aedeagus to show its complete structure.

The author has examined the male genitalia of *Abricta ferruginosa* (Stål) from material collected at Curepipe (Mauritius), in the expanded state, after manipulation in 2 per cent. KOH.

A description of the terminal body segments and of the various parts of the genitalia is given below:

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FIGS. 1, 2.—(1) Segments VIII-X of *Abrieta ferruginosa* (Stål), lateral view, with hairs removed. (2) Abdominal segments IX and X, viewed from behind. *aed.*, aedeagus; *as.*, anal style; *ls.*, lateral sclerite.

Eighth tergite (fig. 1) large, curved down laterally so as to form a complete ring; ninth tergite strongly sclerotised and covered with long hairs, bearing a large ventrolateral spine (?gonocoxite) and a smaller sclerotised projection and forming the pygofer. This lies in the boat-shaped "hypandrium" or eighth sternite, which is produced posteriorly and protects the genitalia from below (a condition which, according to Myers (1928), is peculiar to the cicadas). Distally, pygofer bears the largely membranous anal segments, which have islands of sclerotised tissue and support two large conical sclerites or anal styles (considered by some authors to be the vestigial segment XI) and a pair of lateral sclerites (figs. 1 and 2: *ls.*). The true aedeagus arises from the ninth segment. In *Abrieta*, this is highly specialised, consisting of a stout structure thickened and bilobed at base near point of entry of ejaculatory duct—the basal plates, and a long, tubular sclerotised "theca" (Kullenberg and others) (figs. 3 and 4), or "phallosoma" (Pruthi); the theca surrounds the thin elastic ejaculatory duct, the small ill-defined conjunctiva and the vesica; ventral and lateral margins of opening of theca heavily sclerotised; conjunctiva like a small lobe, with two heavily

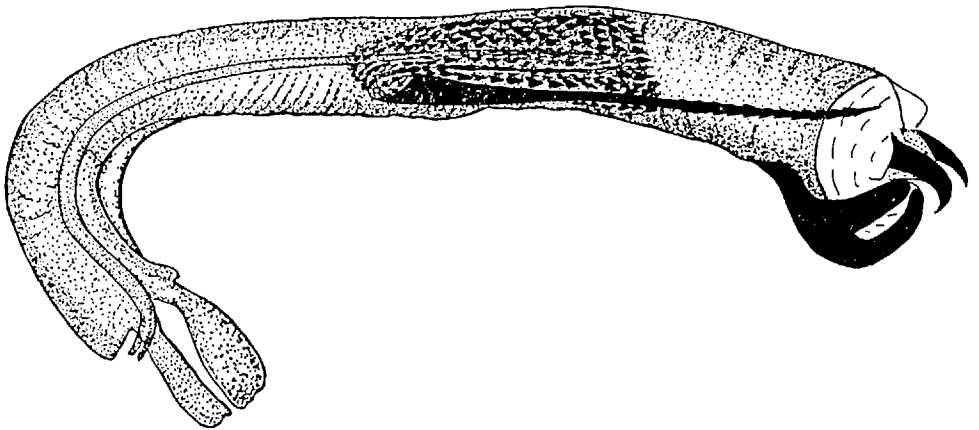


FIG. 3.—Aedeagus (retracted), lateral view.

sclerotised conjunctival appendages; vesica a complicated membranous structure bearing several rows of minute spines and terminated by a long horn-like process for which the name "cornu" is here proposed (fig. 4). (Comparable but smaller structures called cornuti are present in the male genitalia of Lepidoptera (Klots, 1956).) Vesical cornu of *Abricta* grooved ventrally along distal half, where it also bears a double row of large spines with smaller ones in between. Ejaculatory duct opening or gonopore lies ventrally at distal end of membranous vesica. In life, whole aedeagus exposed, lodged in a groove on ventral surface of tenth sternite and held in position by a pair of ventrolateral toothed sclerotised lobes.

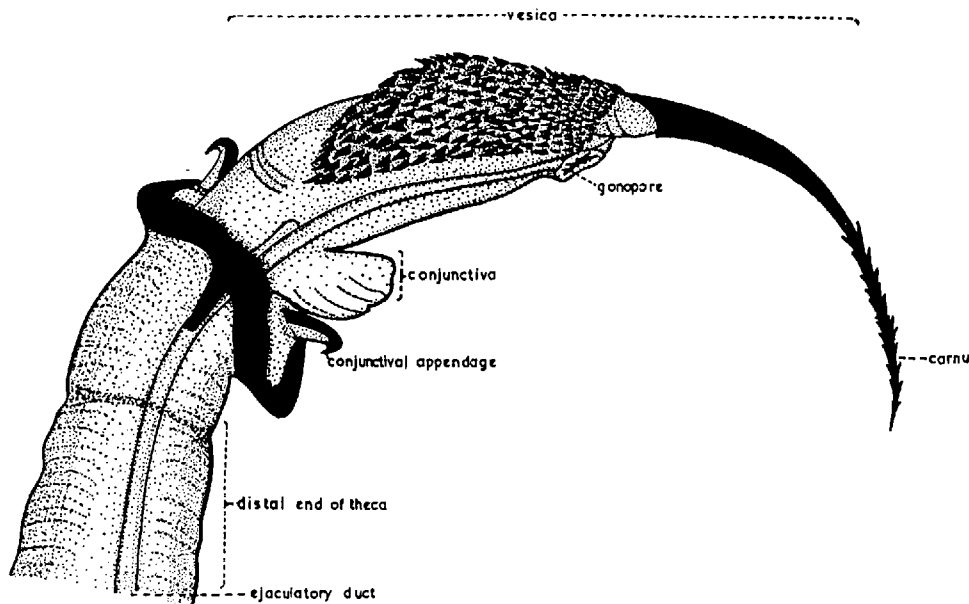


FIG. 4.—Aedeagus showing tip of theca with vesica extended (ventrolateral view). (Length of vesica = 5 mm.) Drawn with camera lucida.

It will be seen from the above that the male genitalia of the Cicadidae have not been described in sufficient detail by workers like Crampton (1920, 1922), Pruthi (1925), Myers (1928), Kershaw and Muir (1922) and by recent authors. Although Apgar (1887) included drawings of both the extended and retracted aedeagus, he failed to interpret correctly the various parts.

In view of this the present author has given his interpretation of the structures shown in his figures and summarises his conclusions as follows:

(1) The male genitalia of *Abricta ferruginosa* consist of (a) a well-developed sclerotised theca, which encloses a small ill-defined conjunctiva, (b) a long retractile vesica covered with minute spines, which functions as the intromittent organ and (c) a long saw-like process at the tip of the vesica.

(2) The eighth sternite protects the aedeagus from below.

(3) It is suggested that the genitalia of the Cicadidae, although superficially simple, present a somewhat complicated structure quite unlike that of most of the other Homoptera, e.g. Membracidae and Cicadellidae, differing from them in the composition of the aedeagus. It is not possible to draw further conclusions from the above structures without a considerable amount of work on the genitalia of other members of the Cicadidae.

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