# The Cixiidae (Fulgoroidea: Homoptera) of Mauritius 

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## Introduction

Two species of Cixiidae were described from Mauritius in the 19th century, namely Brixia lunulata (Amyot \& Serville, 1843) and Brixia bohemani (Stal, 1854). No further species were recorded until Synave (1958, 1960, 1961, 1965), reporting on collections made largely by J. R. Mamet, C. M. Courtois, and the author, recorded 15 more. This paper, which is based on collections made by the author during the years 1971-1973, raises the number of known species from 17 to 32 . Descriptions of previously known species are amplified as necessary, 16 new species and 2 new subspecies are described, and observations on habits and distributions are given.

Mauritian Cixiidae are largely endemic and closely associated with the island's native trees and shrubs. The genera represented are Brixia, which occurs throughout the Ethiopian and Oriental Regions, and in New Guinea, the Ethiopian Achaemenes and the cosmopolitan Oliarus. The first of these has undergone prolific speciation in the island and the majority of its known species, which number about 100, are from Madagascar (with 39 species) and the Mascarenes (with 33 species-Mauritius 26, Réunion 4, Rodriguez 3). It is to be remarked that Aselgeoides and Eumyndus, both present in Réunion, appear to be absent from Mauritius.

The types and paratypes of all species and subspecies described hereunder as new have been deposited in the British Museum (Natural History).

## Environment and habitats

Mauritius is an isolated oceanic island situated in the tropics about 550 miles east of Madagascar and about 1250 miles from the African coast. The other Mascarene islands of Réunion and Rodriguez are 130 miles to the south-west and 350 miles to the east, respectively. All are of volcanic origin. Mauritius is a compact land mass of 720 square miles and has a central undulating tableland, where elevations are roughly between $1000-2000 \mathrm{ft}$, more or less separated from a coastal plain of varying width by escarpments and sharp mountain peaks. The highest point is 2711 ft . Vulcanicity probably ceased over 100000 years ago in the Pliestocene and little physiographical development has since occurred, topography being much as it was then. Simpson (1950) may be consulted for an account of the origins and geology of the island.

When discovered by Europeans in 1505, Mauritius was uninhabited and covered with dense forests and scrubs that contained many endemic species forming unique plant communities. The fauna was likewise distinctive. Today the island is very densely populated and little is evident of its original flora and fauna following exploitation of the land for the needs of its inhabitants, the indiscriminate and thoughtless destruction of natural forests, and the introduction of exotic plants and animals that displaced native species. Even
a century ago Baker (1877) could say " the indigenous flora of the island, as we have it now, is a mere wreck of what it was a hundred years ago . . . the aboriginal forests linger only in the recesses of the hills . . . and the interesting endemic trees and shrubs . . . have either been exterminated or become very rare". The present situation is, of course, far worse than in Baker's time. Vaughan \& Wiehe (1937-1947) should be referred to for details of the island's topography, climates and plant communities.

The association of Cixiidae with native plants is so close that none have been encountered in habitats where such plants are absent. While some species were collected in inhabited areas where a few scattered native trees occur, others have been found only where some semblance of native plant communities remain. Such habitats are often difficult of access and all are of very limited extent and invaded to a greater or lesser degree by exotics. It is very probable that some Mauritian Cixiids have become extinct in recent times and others are rare consequent to loss, modification or severe restriction of their habitats.

The principal collecting sites, the names of which recur in the following pages, are given below. Grid references, relate to the map of the Director of Military Survey, London (Series Y682, Ed. 2-GSGS).

Macabé (or Macchabées) an upland climax forest, altitude 1800 ft , rainfall 125 in p.a. (EC 465445 )
Plaine Champagne-an area of the central plateau, with marshes, thickets and low forests, altitude $2000-2400 \mathrm{ft}$, rainfall $100-175$ in p.a.
Le Petrin---a few acres of heath and marshy land on the above-mentioned plateau, altitude 2100 ft , rainfall 125 in p.a.
Mi. Cocotte-the forested slopes and vicinities of the mountain of that name, altitude $2000-2300 \mathrm{ft}$, rainfall 175 in p.a. (EC 480402 )
Perrier-a reserve of about 3 acres devoted to the preservation of native plants, altitude 1800 ft , rainfall 125 in p.a. (EC 504498 )
Vacoas-a township with some scattered native trees, altitude 1500 ft , rainfall 100 in p.a.
Le Pouce-the inclined plateau of the mountain of that name, altitude $2000-2400 \mathrm{ft}$, rainfall over 100 in p.a.
Trois Mamelles - the southern slopes and foothills of the mountain of that name, with dry forest, altitude $400-1000 \mathrm{ft}$, rainfall $50-75$ in p.a.
Case Noyale-the escarpment slopes above the village of that name, altitude $500-1000 \mathrm{ft}$, rainfall about 50 in p.a. (EC 394 428)

## Family CIXIIDAE Spinola

Key to the Mauritian genera of Cixiidae
1 Tegmina with Sc, R, and M united at base in a common stem .
Brixia Stal

- Tegmina with Sc and R, but not M, united at base in a common stem

Achaemenes Stal
2 Mesonotum with 3 carinae
Oliarus Stal

## Genus BRIXIA Stal

Brixia Stal, 1856, Ofv. Svenska Vet. Akad. Forh. 13: 162. Haplotype, Derbe natalicola Stal, 1855, Ofv. Svenska Vet. Akad. Forh. 12 : 93.

The salient characters for species recognition in this genus are size, pigmentation, particularly pigmentation of the tegmina, and the form of the male genitalia. Other important features are the number of branches of $R$ on the tegmina and the configuration of the dise of the frons; the latter, an excellent character, does not, however, lend itself to clear and succinct description or to facile illustration. Most of the Mauritian species are recognizable by tegminal
pigmentation without reference to other characters. Sexual dimorphism is limited to a tendency for males to be a little smaller and to have a less definitive pattern of tegminal pigmentation than females.

Adult Brixia in Mauritius become scarce, particularly in the uplands, during the cool, dry season (May-October) and reappear with the onset of the hot, wet season (November-April). They frequent the leaves of dicotyledonous trees and shrubs and are never accompanied by their immature stages, which presumably feed below ground on roots as reported for other Cixiidae (Fennah, 1969; Imms, 1970). The adults of some species were found to occur regularly on certain native plants, often in numbers, but could also on occasion be collected on other plants. Apart from the evident influence of plant attractiveness on distribution in a habitat, there appears also to be a tendency for the adults to occur in groups, or loose associations, for many individuals may be collected on one plant but not on others of the same kind nearby and a group may sometimes be encountered on a plant belonging to a species that is not normally frequented. The impression gained from exhaustive search for these insects is of discrete groups of adults that are often, but not always, located on particular plant species.

Key to the Mauritian species and subspecies of Brixia Stål
13 R veins at apex tegmen ..... 2

- 4 or 5 R veins at apex tegmen ..... 12
2 Common claval vein of tegmina meeting or nearly meeting $\mathrm{Cu}_{2}$ before joining com-missural margin . . . . . . . . B. wagneri Synave- Common claval vein of tegmina joining commissural margin directly3
3 Tegmina almost entirely hyaline, veins dark (B. unistriata) ..... 4
- Tegmina patterned, coloured or infuscate ..... 6
4 Anal segment of male bilaterally symmetrical B.u. unistriata Synave- Anal segment of male bilaterally asymmetrical5
5 Aedeagus subcylindrical B.u. atronervosa subsp. nov.- Aedeagus expanded ventrolaterally on right . . . B.u. courtoisi subsp. nov.
6 Tegmina with broad dark streak along entire length B. tricolor Synave. .
7 Tegmina with broad transverse fuscous band before midway and infuscate apically
B. bohemani (Stal)8
- Tegmina lightly or heavily patterned with fuscous.
8 Tegmina with conspicuous $V$-shaped dark band B. lalouettei sp. nov.- Tegminal pattern without V-shaped band9
9 Dise of frons dark fuscous at least medially ..... 10
- Disc of frons not darkly pigmented ..... 11
10 Dise of frons, excluding lateral elevations, and clypeus entirely dark fuscous
B. williamsi Synave- Disc of frons and clypeus with median dark fuscous band.B. uvidensis sp. nov.
11 Mesonotum with two parallel dark bandsB. virgulata sp. nov.
- Mesonotum without dark bands
B. mameti Synave
12 Tegmina conspicuously maculate along veins, at least in females13
- Tegmina not conspicuously maculate ..... 15
13 Maculation consisting of dark spots ..... 14
- Maculation consisting of pale spots B. pilosa sp. nov.
14 Tegmina with only a few scattered dark patches . . . B. vacoasensis Synave- Tegmina with broad dark arc from stigma to apex clavus and thence around apicalmargin
B. broussei sp. nov.
15 Tegmina with 2-4 white spots in dark area after apex clavus ..... 16
- Tegmina without white spots ..... 17
16 Tegmina with 4 white spots B. sundara sp. n.
- Tegmina with 2 white spots B. belouvensis bipunctata Synave*
17 Tegmina with broad transverse brown band before middle, otherwise infuscate
B. nigripennis sp. nov.
- Tegmina not as above ..... 18
18 Tegmina without variegated pattem ..... 19
- Tegmina with variegated pattern, at least in distal half ..... 23
19 Tegmina, except margin, entirely hyaline tinted ochraceous . B. macabeensis Synave
- Tegmina with fuscous pigmentation ..... 20
20 Tegmina with transverse veins dark fuscous, otherwise entirely hyaline tinted ochrace- ous, or almost so B. flavida sp. nov. ..... 21
21 Tegmina with broad dark border along commissural and apical margins
B. fuscomarginata sp. nov.22
22 Tegmina with longitudinal veins darkly pigmented beyond level of stigmaB. yenulosa sp. nov.- Tegmina with distal half infuscate except large hyaline patch at leading edge.B. lunulata (Amyot \& Serville)*
23 Tegmina basally (to almost midway) uniformly ochraceous to dark fuscous
B. perruchensis Synave- Tegmina not uniformly pigmented basally24
24 Clavus with a dark stripe along each side of $\mathrm{Cl}_{2}$ B. vaughani sp. nov.- Clavus without such stripes25
25 Profemurs banded fuscous ..... 26
- Profemurs not banded fuscous B. mauritii Synave26 First antennal segment entirely dark, or nearly so . . B. variolata sp. nov.First antennal segment pale with discrete dark band on anterior face27
27 Clavus with $\mathrm{Cl}_{1}$ and $\mathrm{Cl}_{2}$ pallid white . . . . . B. discolor sp. nov.
- Clavus with veins concolorous with membrane B. nigrifrons Synave
*Not seen by author.


## 1. Brixia wagneri Synave (fig. 1, $(a)-(b)$ )

Brixia wagneri Synave, 1958, Bull. Inst. r. Sci. nat. Belg. 34 (3) : 4, figs. 3-6.
(Type locality; Vacoas, Mauricius. Type repository; Museum National d'Histoire Naturelle, Paris)

Tegmina with $\mathrm{Cl}_{1}+\mathrm{Cl}_{2}$ meeting or nearly meeting $\mathrm{Cu}_{2}$, then continuing to commissural margin; R with 3 apical veins.

Anal segment of male slightly asymmetrical, left ventroapical margin lower than right; with a posterior face bearing a pair of setal tufts. Aedeagus with a short basal spine below on right directed caudad, a large bifid spine below near apex directed cephalad, a long spine on right near apex directed cephalad and bearing a spur at its base directed caudad; flagellum with a short outer spine and a large inner bifid spine, both basal.

Mauritius: Vacoas, at light, 19, 14.iii.54, 1 ${ }^{\text {T, }}$, iv. 54 (J.R.W.); Le Pouce,

 (J.R.W.).

The course of the combined claval vein is a distinctive character of this species: Synave's diagram of the tegmen wrongly shows it ending in $\mathrm{Cu}_{2}$.

The species is known only from Mauritius.

## 2. Brixia mameti Synave (fig. 1, (c))

Brixia mameti Synave, 1958, Bull. Inst. r. Sci. nat. Belg. 34 (3) : 6, figs. 7-10.
(Type locality; Vacoas, Mauritius. Type repository; Museum National d'Histoire Naturelle, Paris)

Tegmina with 3 R veins at apex.
Anal segment of male bilaterally symmetrical, with a posterior face bearing a pair of setal tufts. Aedeagus with a short basal spine below on right directed

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caudad and two spines below near apex directed cephalad, one short, the other large and bifid; flagellum with a short outer spine and a large inner bifid spine, both basal.

Mauritius: Magenta, $1 \widehat{\delta}, 1$, 9. ii. 63 (C. M. Courtois); Bambous Mts.,


This species is obviously close to $B$. wagneri. Synave's diagram of the aedeagus does not show the small basal spine on the flagellum.

The species is known only from Mauritius.

## 3. Brixia virgulata sp. nov. (fig. 2, (a)-(g))

Overall length $6 \cdot 0-6.5 \mathrm{~mm}$. Vertex in midline distinctly longer than wide at base, lateral margins feebly convex or straight and converging distally. Frons with dise narrow, lateral margins of dise almost parallel distally and sharply and greatly elevated. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork and $\mathrm{Cu}_{1}$ fork at about same level and before that of junction of claval veins; $R$ with 3 apical veins.

General body colour pale green; dark fuscous band from lateral ocellus to frons, from front of eye to frons, over head medially across disc of vertex and along narrow platform of fused lateral elevations of frons, and around anterior and ventral margin of extremity first antennal segment; pronotal disc and vicinity diffusely fuscous; mesonotum with two parallel, sharply demarcated dark fuscous bands along whole length, one on each side of median line. Tegmina with two dark fuscous, more or less triangular, patches in costal cell; two fuscous, opposed arcs near apex, the proximal following transverse veins, the distal more pronounced and extending to, or nearly to, a conspicuous fuscous spot in eighth apical cell, proximal to which is a diffuse fuliginous area; otherwise flavotestaceous and whitish-hyaline. Wings hyaline, powdered white.

Anal segment of male slightly asymmetrical, left ventroapical margin a little lower than the right; with a posterior face bearing a pair of setal tufts. Aedeagus with a short basal spine below on left, a long spine below near apex directed cephalad; flagellum with two adjacent basal spines, the larger bifid.

Holotype $\begin{gathered}\text { § } \\ \text {, Mauritius: }\end{gathered}$ Magenta, 13.ii. 63 (C. M. Courtois), genitalia on slide Cx 20.

Paratypes, Mauritius: Trois Mamelles, 1ố, 19.iv.72, 1ô, 1q, l.v. 72 (J.R.W.).

Other specimens, Mauritius: Trois Mamelles, 1q, 14.xi.72, 1q, 25.xi.72,


This species resembles $B$. wagner $i$ and $B$. mameti in tegminal pigmentation and venation, and in features of the male genitalia. It is readily distinguished by the conspicuous dark bands on the mesonotum and by the armature of the aedeagus. It appears to frequent only dry lowland forest.

## 4a. Brixia unistriata Synave (fig. 3, (a)-(b))

Brixia unistriata Synave, 1961, Bull. Inst. r. Sci. nat. Belg. 37 (21) : 3, figs. 1-4.
(Type locality; Le Pouce, Mauritius. Type repository; Institut royal des Sciences naturelles de Belgique, Bruxelles)

Overall length 7.5 mm . Vertex in midline as long as wide at base, small, dise pit-like, lateral margins subparallel. Frons with lateral margins of dise greatly elevated. Second antennal segment subcylindrical. Tegmina with


Fig. 2. Brixia virgulata sp. nov.: (a) head, face view; (b) head, profile; (c) tegmen; (d) head and thorax, from above; (e) posterolateral margin of pygofer, anal segment and genital style, from the right; $(f)$ aedeagus, from the right; $(g)$ aedeagus, from above.
$\mathrm{Sc}+\mathrm{R}$ fork and $\mathrm{Cu}_{1}$ fork at same level and slightly before that of junction of claval veins; $R$ with 3 apical veins.

Ochraceous suffused fuscous. Frons with lateral margins dark fuscous or castaneous, dise with median fuscous band which continues on clypeus. Genae with fuscous band from base antenna to frons distally. First antennal segment, and second basally, fuscous. Pro- and mesofemurs, and pro and mesotibiae, with more or less distinct longitudinal fuscous stripes. Tegmina hyaline with fuscous patches forming a transverse band at level of $\mathrm{Sc}+\mathrm{R}$ fork; all veins, stigma and entire margin dark fuscous. Wings hyaline, veins dark.

Anal segment of male symmetrical, with well developed, pointed, lateroapical angles; a pair of small setal tufts behind anal foramen. Aedeagus with a small spine at base below on left; flagellum with a long spine at base on right, a spine at base on left which bifurcates at its extreme base into two long, equalsized prongs, and a large spine near midway.


Fig. 3. Brixia unistriata Synave: (a) aedeagus, from the left; (b) anal segment of male, from the right.

The above redescription was made from the unique type specimen kindly loaned to the author by the Institut royal des Sciences naturelles de Belgique.

4b. Brixia unistriata atronervosa subsp. nov. (fig. 4, (a)-(c))
Overall length $8.5-10.0 \mathrm{~mm}$.
Anal segment of male asymmetrical, left lateroventral margin much lower than right and with a small teat-like point; a pair of small setal tufts behind anal foramen. Aedeagus subcylindrical, with a small spine near base below on left; flagellum with a long spine at base on right, a spine at base on left which bifurcates after midway into two short, equal-sized prongs, and a large spine near midway.

Holotype ô, Mauritius: Trois Mamelles, 15.vi.72 (J.R.W.), genitalia on slide Cx $23 \cdot 1$.

Paratypes, Mauritius: $1 \hat{\sigma}$, same data as holotype but 3.ii.73, genitalia on slide Cx $23 \cdot 2 ; 1$, same data but 22.ii.73.

This subspecies differs from the typical subspecies by the form of the anal segment of the male and by the form of the bifid spine at the base of the aedeagal flagellum.

## 4c. Brixia unistriata courtoisi subsp. nov. (fig. 4, (d)-(e))

Overall length 9.0 mm .
Anal segment of male asymmetrical, left lateroventral margin much lower than right and with a small teat-like point; a pair of small setal tufts behind anal foramen. Aedeagus in basal half expanded ventrolaterally on right, with a stout thorn-like spine near base below; flagellum with a long spine at base on right, a spine at base on left bearing a spur at its base, and a large spine near midway.

Holotype $\boldsymbol{o}^{\text {or }}$ Mauritius: Macchabées Forest, 30.iv. 62 (C. M. Courtois), genitalia on slide Cx 23.3 .

This subspecies is distinguished by the form of the aedeagus, the comparatively large basal spine of the aedeagus, and by the form of the left basal spine on the aedeagal flagellum. The anal segment is similar to that of $B$. $u$. atronervosa.

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 left; (e) aedeagus, from the right.
5. Brixia lalouettei sp . nov. (fig. 5, (a)-(d))

Brixia stellata Synave (nec Distant, 1917), 1956, Mem. Inst. sci. Madag. (E) 7 : 194, fig. 2.4
Overall length $5 \cdot 5-6.5 \mathrm{~mm}$. Vertex in midline longer than wide at base; lateral margins almost straight, converging rapidly distad, discal cavity distinctly triangular with the apical angle acute. Frons with lateral margins of dise sharply and greatly elevated and strongly convex in face view. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork and junction of claval veins at about same level and well behind level of $\mathrm{Cu}_{1}$ fork; R with 3 apical veins.

Ochraceous. Disc of frons, but not lateral elevations, and clypeus fuscous or dark fuscous with a pale band along median line; dark fuscous stripe from front of eye to frons and from lateral ocellus to frons, broad fuscous band from below lateral ocellus to frons; pronotum and mesonotum mostly fuscous but whitish or pale ochraceous in lateral angles. Tegmina whitish-hyaline; a broad $V$-shaped fuscous band with its apex near junction of claval veins and its arms extending to basal cell and $M$ fork, respectively; fuscous spot at costal margin before level of $\mathrm{Sc}+\mathrm{R}$ fork, fuscous band across apical cells ending near a fuscous spot in hind angle, transverse veins fuscous, other fuscous markings as illustrated. Wings hyaline, powdered white.

Anal segment of male bilaterally symmetrical; with a posterior face bearing a pair of large setal tufts. Aedeagus with a 3 -pronged process below in basal half, two straight spines below near apex directed ventrocephalad, a large sinuous spine on left near apex directed cephalad.

Holotype $\begin{gathered}\text { ó, Mauritius: Vacoas, at light, 29.i.73 (J. A. Lalouette), }\end{gathered}$ genitalia on slide Cx 7 .

Paratypes, Mauritius: 29 , same data as holotype; 19 , same data but 12.i.73.


Fig. 5. Brixia lalouettei sp. nov.: (a) aedeagus, from the right; (b) aedeagus, from the left; (c) posterolateral margin of pygofer, anal segment and genital style, from the right; (d) tegmen.

Other specimens, Mauritius: 4, Vacoas, at light, iii. 54 (J.R.W.); 1 ㅇ, Rose Hill, at light, iii. 54 (R. Mamet); 2中, same data as holotype but 12.i.73 and 30.iii. 73.

This species closely resembles $B$. stellata Distant, the type locality of which is the Seychelles, but it is distinguished by the genitalic structures of the male. No adequate description of the male genitalia of $B$. stellata has been published; that of Singh-Pruthi (1925) is misleading and his illustration diagrammatic. The most evident distinguishing feature of $B$. lalouettei is the 3 -pronged ventral process of the aedeagus, whereas $B$. stellata has a median basal ridge on the under side of the aedeagus ending distally in a single, rather large spine directed caudad. The form of the anal segment and of the genital styles of the two species also differ*.

Synave (1956) confused this species with B. stellata as shown by his diagram of the aedeagus. His records of $B$. stellata from Madagascar (1956) and Mauritius (1958) thus refer to $B$. lalouette $i$ and the same probably applies to his record of B. stellata from Réunion Island (1959).

## 6. Brixia tricolor Synave

Brixia tricolor Synave, 1961, Bull. Inst. r. Sci. nat. Belg. 37 (21) : 3, figs. 5-8.
(Type locality; Le Pouce, Mauritius. Type repository; Museum National d'Histoire Naturelle, Paris)

Tegmina with 3 R veins at apex.
Anal segment of male very slightly asymmetrical, the left lateroapical margin a little lower than the right; with an inclined posterior face bearing a pair of small setal tufts. Aedeagus with a spine near midway below directed cephalad, a spine at apex below on right directed cephalad, and a spine at apex above on left directed cephalad.


 1 $\widehat{\delta}$, 24.iii.73, 1 $\widehat{\text { 人 }}$, 6.v. 73 (J.R.W.).

This species is known only from Mauritius.

## 7. Brixia williamsi Synave (fig. 6, (a)-(f))

Brixia williamsi Synave, 1958, Bull. Inst. r. Sci. nat. Belg. 34 (3) : 2, fig. 1.
(Type locality; Vacoas, Mauritius. Type repository; Museum National d'Histoire Naturelle, Paris)

Tegmina with $3 R$ veins at apex.
Anal segment of male bilaterally symmetrical, ventrolateral margins with sharp points near apex. Aedeagus generally with two basal spines below directed caudad, one on the left and one, which is sometimes missing, on the right, and a spine below on left near apex directed cephalad; flagellum with two spines at base, the left longer than the right, and a curved spine near apex.



 20.x. 73 (J.R.W.).

[^0]The disc of the frons, except its lateral elevations, and the clypeus are entirely dark, virtually black, while the tegmen has fan-like rays of pigment at its apex. The male genitalia are here described for the first time; the specimens from Mt. Cocotte lack the right basal spine of the aedeagus.

The species is known only from Mauritius and is not uncommon in the wet uplands.


Fig. 6. Brixia williamsi Synave: (a) head, face view; (b) head, profile; (c) anal segment of male, from the left; ( $d$ ) right genital style, from the right; (e) aedeagus, from the left; ( $f$ ) aedeagus, from below.
8. Brixia uvidensis sp. nov. (fig. 7, (a)-(f))

Overall length $5 \cdot 5-6.5 \mathrm{~mm}$. Vertex in midline slightly longer than wide at base, narrow, lateral margins subparallel. Frons with dise narrow, lateral margins of dise greatly elevated and feebly convex in face view. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork, $\mathrm{Cu}_{1}$ fork, and junction of claval veins at about same level; $R$ with 3 apical veins.

Body ochraceous with fuscous markings. Frons with lateral margins entirely edged dark fuscous, dise with broad dark fuscous median band, which continues on clypeus, and pale ochraceous between band and dark lateral margins. Sides of head ochraceous except fuscous under antennae and to a variable extent at margin eyes. Pro- and mesonotum fuscous, dises darker. Tegmina hyaline or hyaline tinted ochraceous with variegated pattern of dark fuscous and, apically, yellowish-orange. Wings fuliginous.

Anal segment of male bilaterally symmetrical, ventrolateral margins in profile angulate near apex. Aedeagus symmetrically expanded in lateral plane with dorsal surface depressed to form a shallow, spoon-like concavity; a slender spine below near base directed ventrocephalad, a spine on left near apex directed cephalad, a spine on right near apex directed cephalad; flagellum with a curved spine towards apex.


Fig. 7. Brixia widensis sp. nov.: (a) head, face view; (b) tegmen; (c) anal segment of male, from the right; ( $d$ ) right genital style, from the right; (e) aedeagus, from the left; ( $f$ ) aedeagus, from below.

Holotype ${ }^{\text {of }}$ Mauritius: Mt. Cocotte, 27.v. 73 (J.R.W.), genitalia on slide Cx 19.

Paratypes, Mauritius: lô, $\mathbf{3}$ ㅇ, same data as holotype, genitalia of male on slide Cx 19.1; $\mathbf{1}_{\circlearrowleft} \mathrm{C}, 1$ ㅇ, same data but 23.vi.73.

Other specimens, Mauritius: $2 \widehat{\delta}, 2$, same data but $16 . i x .73 ; 1{ }^{*}$, same data but 23.ix. 73.

This species resembles $B$. williamsi, differing from it by the less extensive dark pigmentation on the disc of the frons, on the clypeus, and on the sides of the head, by having a slightly different pattern on the tegmina, and by the form of the male genitalia.

## 9. Brixia variolata sp. nov. (fig. 8, (a)-(e))

Overall length $5 \cdot 0-5 \cdot 5 \mathrm{~mm}$. Vertex in midline longer than wide at base, lateral margins feebly convex and converging distad. Frons with dise wide and flat, lateral margins of dise greatly elevated proximally but less so distally and strongly convex in face view. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork slightly, and $\mathrm{Cu}_{1}$ fork considerably, before level of junction of claval veins; $R$ with 4 apical veins.

Head ochraceous or pallid with cavity of vertex, median band along ridge formed by apposition of lateral margins of frons, much of disc of frons, patches above eyes, band from front of eye to frons, from lateral ocellus to frons, from base antenna to frons, part of clypeus and sides of head behind clypeus, fuscous to dark fuscous. Thorax ochraceous lightly to heavily suffused fuscous. Legs pallid or ochraceous with fuscous markings. Tegmina hyaline powdered white and intricately patterned dark fuscous as illustrated; stigma ochraceous. Wings hyaline powdered white, veins mostly dark.


Fig. 8. Brixia variolata sp. nov.: ( $a$ ) head, face view; (b) head, profile; (c) tegmen of male; (d) posterolateral margin of pygofer, anal segment, aedeagus and genital style, from the right; (e) aedeagus, from the left.

Anal segment of male slightly asymmetrical, the left lateroapical margin lower than the right. Aedeagus with a small spine near base below on left directed caudad, a small longitudinal fin-like expansion near base below on right, a small hook-like spine near apex on left, and a long spine near apex above directed cephalad; flagellum with a spine near midway on left.

Holotype ô, Mauritius: Macabé, 4.xi. 73 (J.R.W.), genitalia on slide Cx 30 .

Paratypes, Mauritius: 1 , same data as holotype; $2 \hat{\sigma}$ (genitalia of one on slide Cx 30.1), 1 , same data but ll.xi.73.

Other specimens, Mauritius: 5 万人, 4 , same data but $22 . x i .73$.
This species is primarily distinguished by the pattern on the tegmina and the form of the male genitalia. The tegminal pigmentation is more intense and extensive in the females than in the males.

## 10. Brixia nigrifrons Synave (fig. 9, (a))

Brixia nigrifrons Synave, 1960, Bull. Inst. r. Sci. nat. Belg. 36 (36) : 6, figs. 4-6.
(Type locality; Macabé, Mauritius. Type repository; Museum National d'Histoire Naturelle Paris)

Tegmina with 4 R veins at apex.
Anal segment of male bilaterally symmetrical or almost so. Aedeagus with a longitudinal fin-like expansion with a serrated edge below on right, a stout thorn-like spine at extreme base below on left directed ventrocaudad, a small spine near base above directed cephalad, a spine near apex below directed cephalad, a spine near apex above directed cephalad; flagellum with a spine near middle.

Mauritius: 25ô, 12 우, Le Petrin, 27.xi.71 (J.R.W.); 12才, 6ㅇ, Perrier,
 29.iv. 72 (J.R.W.). All on Coffea macrocarpa A. Rich.

The intensity of pigmentation varies greatly in this species with females almost always more heavily pigmented than males so that the sexes are usually seperable on sight.
$B$. nigrifrons is a very common species in upland forests. The adults are often numerous on the leaves of the endemic Coffea macrocarpa: they have also been found aggregating on the endemic Pleurostylia leucocarpa Baker (Celastraceae).

The species is known only from Mauritius.


Fig. 9. (a) Brixia nigrifrons Synave, aedeagus, from the right; (b)-(c) Brixia perruchensis Synave: (b) anal segment and aedeagus, from the right; (c) right genital style, from the right.

## 11. Brixia perruchensis Synave (fig. 9, (b)-(c))

Brixia perruchensis Synave, 1960, Bull. Inst. r. Sci. nat. Belg. 36 (36) : 4, figs. 7-9.
(Type locality; Mt. Perruche, Mauritius. Type repository; Museum National d'Histoire Naturelle, Paris)

Tegmina with $4 R$ veins at apex.
Anal segment of male bilaterally symmetrical, lateroapical angles with small points. Aedeagus with a longitudinal fin-like expansion with a serrated edge near base below on right, a large spine at extreme base below on left directed caudad, a spine near apex below on right directed cephalad, a spine near apex above on right directed cephalad; flagellum with a spine near middle.

Mauritius: Perrier, 2ô, xii. 72 (J.R.W.); Macabé, 1ㅇ, 14.xii.71, 1 ㅇ,


As with $B$. nigrifrons, the intensity of pigmentation varies greatly, with females usually more heavily pigmented than males; the proximal third or so of the tegmina, which is uniformly pigmented, varies from ochraceous to dark fuscous. The aedeagus has a basic similarity to that of B. nigrifrons. In Synave's figure of the aedeagus the basal spine is not shown, while the
view given is inverted and from the right，not lateroventral from the left as stated．

The species is known only from Mauritius where it seems confined to wet upland forests．

## 12．Brixia macabeensis Synave

Brixia macabeensis Synave，1960，Bull．Inst．r．Sci．nat．Belg． 36 （36）：2，figs．1－3．
（Type locality；Macabé，Maurimus．Type repository；Museum National d＇Histoire Naturelle， Paris）

Tegmina with 4 R veins at apex．
Anal segment of male bilaterally symmetrical．Aedeagus with a large， longitudinal，fin－like expansion in basal half below on right and a smaller similar expansion above on left，a spine at base below on left directed caudad， a large curved spine above at apex；flagellum with a spine near middle．

Mauritius：Macabé，2ず，29．iv．72，1ぶ，19，22．x．72，19，9．xii． 72 （J．R．W．）． This species is known only from Mauritius．

13．Brixia flavida sp．nov．（fig． $10,(a)-(d))$
Overall length 6.0 mm ．Vertex in midline about as long as wide at base； lateral margins feebly convex，converging slightly or considerably distad． Frons with disc wide and flat，lateral margins of disc greatly elevated．Tegmina


Fig．10．Brixia flavida sp．nov．：（a）head，face，view；（b）posterolateral margin of pygofer，anal segment，aedeagus and genital style，from the right；（c）aedeagus，from the left；（d）tegmen of male．
with junction of claval veins distinctly beyond level of $\mathrm{Cu}_{1}$ fork； R with 4 or 5 apical veins．

Head，except eyes and lateral ocelli，thorax，legs and abdomen，more or less uniformly yellowish－ochraceous．Tegmina yellowish－ochraceous with transverse veins dark fuscous，other fuscous markings distinct in female but absent or very faint in male as follows：apical margin interruptedly fuscous， small spot at margin in second apical cell and another at margin in ninth or tenth apical cell，small transverse markings in vicinity junction claval veins．

Anal segment of male bilaterally symmetrical，lateroapical angles pointed． Aedeagus with a spine at extreme base below directed caudad，a longitudinal fin－like expansion with a finely serrated edge near base below，two spines near apex on right directed cephalad，a spine near apex below on left directed cephalad；flagellum with a spine near middle．

Holotype ô，Mauritius：Macabé，4．xi． 73 （J．R．W．），genitalia on slide Cx 31 ．

Paratype 9, Mauritius：same data as holotype but 22．xi．73．
This species resembles B．macabeensis but is distinguished by the darkly pigmented transverse veins．The male genitalia of the two species are distinct although there are similar features．The holotype male has 5 R veins on both tegmina and the paratype female 4.

## 14．Brixia mauritii Synave（fig．11，（a）－（b））

Brixia mauritio Synave，1960，Bull．Inst．r．Sci．nat．Belg． 36 （36）：4，figs．10－12．
（Type locality；Macabé，Mauritius．Type repository；Museum National d＇Histoire Naturelle， Paris）

Tegmina with 4 R veins at apex．
Anal segment of male asymmetrical，the left lateroapical angle drawn out to a point．Aedeagus with a long basal spine on right directed dorsad before curving caudad，a spine at apex below directed cephalad，a spine at apex above directed laterocephalad on the right；flagellum with a strong spine near midway．

Mauritius：Perrier，29，4．xii．71，2q，6．xii．71，1ơ，1 ㅇ，14．xii． 71 （J．R．W．）； 2才̂，19，same data but 23．xii．71，on Coffea macrocarpa A．Rich．；Plaine Cham－ pagne，on Myonima multiflora A．Rich．，18§̂，109，22．xii． 71 （J．R．W．）；Macabé， 2ベ，29．iv．72，1ぶ，11．xi． 72 （J．R．W．）．

The intensity of pigmentation varies greatly in this species with females usually more heavily pigmented than males．The general pattern on the tegmina，as described by Synave，remains recognizable even in lightly pigmented individuals．

Large aggregations have been encountered on the foliage of the endemic shrub Myonima multiflora A．Rich．（Rubiaceae）．

The species is known only from Mauritius．

b


Fig．11．Brixia mauritii Synave：（a）anal segment of male，from the right；（b）aedeagus，from the right．
15. Brixia discolor sp. nov. (fig. 12, (a)-(f))

Overall length about 6.0 mm . Vertex a little longer in midline than wide at base, lateral margins incurving distad. Frons with lateral margins of disc greatly elevated proximally, less so distally, tending to be angulate rather than convex in face view. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork, $\mathrm{Cu}_{1}$ fork, and junction of claval veins at about same level; $R$ with 4 apical veins.


Fig. 12, Brixia discolor sp. nov.; (a) head, face view; (b) head, profile; (c) aedeagus, from the left; ( $d$ ) aedeagus, from above; (e) posterolateral margin of pygofer, anal segment and genital style, from the right; $(f)$ tegmen.

Disc of frons proximally, stripe from eye to frons and from lateral ocellus to frons, band on anterior face lst antennal segment, dark fuscous; broad area from antennal base to frons, part of pronotal disc, lateral angles pronotum and sometimes lateral angles mesonotum, pale ochraceous to whitish. Legs pale ochraceous or whitish, pro-, meso-, and metafemurs banded fuscous. Tegmina dark fuscous as follows: between bases $\mathrm{Cu}_{1}$ and $\mathrm{Cu}_{2}$, irregular and often broken transverse arc crossing $\mathrm{Sc}+\mathrm{R}$ and both claval veins, patch at costal margin near level $\mathrm{Sc}+\mathrm{R}$ fork, regular are across middle, transverse veins at M fork, transverse are from Sc beyond level of stigma to $\mathrm{Cu}_{1 \mathrm{~b}}$ fork, patch in ninth apical cell at margin; otherwise whitish before level of $M$ fork, except basal area, including most of clavus, and irregular patches between transverse arcs, which are ochraceous to fuscous, while beyond level of M fork largely ochraceous suffused fuscous with irregular areas around and below stigma and are across apex, whitish; veins $\mathrm{Cl}_{1}$ and $\mathrm{Cl}_{2}$ whitish. Wings hyaline, powdered white, veins dark.

Anal segment of male bilaterally symmetrical. Aedeagus in basal half expanded ventrolaterally on right, with small lobe on left near base bearing a short spine, a sinuous spine below on left near apex directed cephalad; flagellum with two strong curved spines at base.

Holotype ô, Mauritius: Trois Mamelles, on Coffea vaughani J.F. Ler., 13.1 .72 (J.R.W.), genitalia on slide Cx 15.

Paratypes, Mauritius: $2 \widehat{\delta}, 3$, same data as holotype; $4 \widehat{\delta} \hat{\gamma}, 3$, same data but 11.i.72.

Other specimens, Mauritius: same locality as holotype, 1 , , 19.iv.72,

 Murraya paniculata (Rutaceae), 4ठ̊, 4 ¢ , 22.vi. 73 (J.R.W.).

This species resembles B. mauritii and is easily confused with it, particularly as the intensity of pigmentation and the consequent distinctness of the tegminal pattern is variable in both. The most useful tegminal characters for separating the two species are (1) the central, transverse, fuscous arc: regular and complete in B. discolor, never smoothly arcuate and irregular or absent between R and M in $B$. mauritii, (2) the claval veins: both whitish in $B$. discolor, neither, or at most $\mathrm{Cl}_{2}$ and a short length of $\mathrm{Cl}_{1}$ basally, white in $B$. mauritii. The male genitalia of the two species are quite distinct and the species also frequent different habitats, B. discolor dry lowland forests and scrubs, B. mauritii the wet uplands.

## 16. Brixia vaughani sp. nov. (fig. 13, (a)-(h))

Overall length $5 \cdot 5-6 \cdot 0 \mathrm{~mm}$. Vertex in midline usually longer than wide at base, lateral margins straight or feebly convex and usually converging


Fic. 13. Brixia vaughani sp. nov.: (a) head, face view; (b) head, profile; (c) thorax and claval areas of tegmina, from above; (d) tegmen; (e) aedeagus, from the left; $(f)$ aedeagus, from below; (g) anal segment of male, right ventrolateral view; ( $h$ ) right genital style, right ventrolateral view.
distad. Frons with disc narrow, lateral margins of disc greatly elevated. Tegmina with $\mathrm{Cu}_{1}$ fork and junction of claval veins at about same level and slightly behind that of $\mathrm{Sc}+\mathrm{R}$ fork; R with 4 apical veins.

Head and thorax ochraceous, with lateral angles of pronotum whitish, and patterned dark fuscous as follows: median stripe on disc of frons, band from eye to frons, from lateral ocellus to frons and from base antenna to frons, diffuse band from postclypeus to below eyes narrowing and continuing over shoulder of pronotum and often faintly on mesonotum, two stripes, one on each side of median line, from dise of pronotum to posterior margin mesonotum. Legs interruptedly fuscous. Tegmina variegated whitish-hyaline and ochraceous with dark fuscous markings as follows: 4 patches in costal cell, the first in basal angle and diffuse, the second level with $\mathrm{Sc}+\mathrm{R}+\mathrm{M}$ fork, the third small and sometimes absent, the fourth narrow, oblique, often crossing Sc to near R, stripe along M near base, elongate patches in second and third apical cells, the latter patch sometimes extending faintly across apex, diffuse patch, which is sometimes absent, in fourth apical cell, broad arc across sixth and seventh apical cells, an irregular area in hind angle, short arc from commissural margin at apex clavus, stripes between $\mathrm{Cl}_{1}$ and $\mathrm{Cl}_{2}$ and between $\mathrm{Cl}_{2}$ and commissural margin meeting at junction Cl veins, band from junction Cl veins dividing after meeting $\mathrm{Cu}_{2}$, one branch extending over $\mathrm{Cu}_{1 \mathrm{a}}$ and $\mathrm{Cu}_{1 \mathrm{~b}}$ the other to commissural margin. Wings hyaline, powdered white.

Anal segment of male asymmetrical, the left lateroapical margin drawn out to a point. Aedeagus with a spine below at base directed caudad, a spine at middle on right curving cephalad, a spine below at apex directed cephalad; flagellum with a long sinuous spine at base on right and a long curved spine near middle.

Holotype ${ }^{\star}$, Mauritius: Trois Mamelles, on Coffea vaughani J.F. Ler., 13.i. 72 (J.R.W.), genitalia on slide Cx 16.

Paratypes, Mauritius: 19, same data as holotype; 1q, same data but 11.i.72; $1_{\widehat{\delta}}$, same data but l.iii.73; $1^{\star}$, Macabé, 22.x. 72 (J.R.W.).

Other specimens, Mauritius: Trois Mamelles, 1ơ, 11.i.72, 2q, 1.iii.73,
 2.ix. 73 (J.R.W.); Macabé, 1 ¢, $9 . x$ xii. 72 (J.R.W.).

The dark stripes on the thorax and claval areas of the tegmina are a very distinctive feature of this species.

## 17. Brixia sundara sp. nov. (fig. 14, (a)-(g))

Overall length $5 \cdot 5-6.5 \mathrm{~mm}$. Vertex in midline about twice as long as wide at base, lateral margins subparallel or parallel proximally before converging slightly distad. Frons with dise narrow, lateral margins of dise greatly elevated. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork and $\mathrm{Cu}_{1}$ fork at about same level and before that of junction of claval veins; $R$ with 4 apical veins.

Head and thorax ochraceous often suffused fuscous; carinae on head fuscous; legs ochraceous interruptedly fuscous. Tegmina elaborately patterned and coloured; hyaline basally to near level of stigma with two brown or goldenbrown areas, the proximal over basal cell and extending obliquely to middle of clavus, the distal a broad transverse band edged fuscous and narrowing to commissural margin; middle region whitish-opaque bounded distally by a brown transverse band, veins and cells patterned dark fuscous, an extensive


Fig. 14. Brixia sundara sp. nov.: (a) head, face view; (b) head, profile; (c) tegmen; (d) anal segment of male, right posterolateral view; (e) aedeagus, from the right; $(f)$ aedeagus, from above; $(g)$ right genital style, from the right.
jet-black area at commissural margin from apex clavus to near eighth apical cell enclosing 4 (sometimes 3) pure white spots; apical region with transverse hyaline band across apical cells $3-7$, otherwise brownish with ochraceous area across apical cells 4-6 and in distal half apical cell 8.

Anal segment of male bilaterally symmetrical. Aedeagus with a bifid spine below at apex directed ventrocephalad, a spine on right at apex directed laterad, a spine on left at apex directed cephalad.

Holotype ơ, Mauritius: Perrier, 4.xii. 71 (J.R.W.), genitalia on slide Cx 3.
Paratypes, Mauritius: Macabé, 1 ${ }_{0}$, 5.iv. 69 (C. M. Courtois); same locality, 1才, 22.x.72, 19, 14.xi. 71 (J.R.W.).

Other specimens, Mauritius: Macabé, lô, 22.x.72, 1ठ, 24.ii.73 (J.R.W.).
This species is distinguished by the pigmentation of the tegmina and the genitalia of the male.

## 18. Brixia belouvensis bipunctata Synave

Brixia belouvensis bipunctata Synave, 1959, Naturaliste malgache 11 : 143, figs. 21-22.
(Type locality; Pic Bébour, Réunion Island. Type repository; Museum National d'Histoire Naturelle, Paris)

Synave recognised three subspecies of $B$. belouvensis in Réunion Island and recorded (Synave, 1961) a single specimen of B. b. bipunctata collected by C. M. Courtois at Mt. Cocotte, Mauritius.
B. b. aurata Synave was erroneously listed with Mauritian Fulgoroidea by Synave (1961).

 segment and genital style, from the right; (e) aedeagus, from the left; $(f)$ aedeagus, from below.
19. Brixia pilosa sp. nov. (fig. $15,(a)-(f))$

Overall length 5.0 mm . Vertex in midline longer than wide at base, lateral margins straight or feebly convex and converging distinctly distad. Frons with dise wide and flat, lateral margins of disc greatly elevated proximally but not distally. Tegmina with $\mathrm{Se}+\mathrm{R}$ fork and junction of claval veins at about same level and well behind that of $\mathrm{Cu}_{1}$ fork; $R$ with 4 apical veins.

Head and thorax ochraceous with pronotum partly, and mesonotum mostly, suffused fuscous; sides of head with dark fuscous patch above eye, dark fuscous band from front of eye to frons, from lateral ocellus to frons, and from base antenna to frons; first antennal segment dark fuscous on anterior face, second segment variegated fuscous. Tegmina hyaline with fuscous suffusions, particularly apically and along veins, forming an irregular pattern and a broad, skeletal, transverse band before the middle; veins conspicuously maculate from absence of pigment at setal bases.

Anal segment of male bilaterally asymmetrical, left lateroapical angle drawn out to a sharp point, right smoothly rounded. Aedeagus with two spines at apex directed cephalad, one below and one on right; flagellum with a spine at midway.

Holotype ${ }^{\text {® }}$, Mauritius: Trois Mamelles, on Quivisia mauritiana Baker, 14.xi. 72 (J.R.W.), genitalia on slide Cx 25.

Paratypes, Mauritius: 4 $\widehat{\delta}, 2$, same data as holotype.
Other specimens, Mauritius: $\mathbf{6}_{6}$, , same data as holotype but 25.xi.72; 2 9 , same data but 5.i.73; 6今, 1 早, same locality as holotype, 1.iii. 73 (J.R.W.).

This species is distinguished by the pigmentation of the tegmina, the pallid spots along the veins, and by the genitalic structures of the male.

The shrub Quivisia mauritiana (Meliaceae) is indigenous in Mauritius and Réunion.
20. Brixia venulosa sp . nov. (fig. 16, $(a)-(g))$

Overall length $5 \cdot 0-5 \cdot 5 \mathrm{~mm}$. Vertex in midline longer than wide at base, lateral margins subparallel. Frons with dise wide and flat, lateral margins of dise not greatly elevated except proximally where diverging. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork and $\mathrm{Cu}_{1}$ fork at about same level and distinctly before that of junction of claval veins; $R$ with 4 apical veins.

Head and thorax castaneous with cavity of vertex, lateral carinae of head, of pronotal disc and mesonotum, dark fuscous. Tegmina hyaline tinted ochraceous basally and whitish apically; longitudinal veins in basal half and all transverse veins concolorous with adjacent membrane, transverse veins very indistinct; longitudinal veins distally from level of stigma, stigma and apical margin, dark fuscous; apical cells variably fuscous at apical margin.

Anal segment of male bilaterally symmetrical, lateroapical angles blunt in profile. Aedeagus considerably and asymmetrically expanded in lateral plane, its upper surface with a fin-like protuberance that has a serrated edge, its lower surface with a similar but small and inconspicuous protuberance; a small spine below at base directed ventrocephalad, a spine on left at apex directed cephalad and with a thorn-like spur at its base, a spine on right at apex directed laterocephalad.


Fig. 16. Brixia venulosa sp. nov.: (a) head, face view; (b) head, profile; (c) tegmen; (d) anal segment of male, from the right; (e) right genital style, ventrolateral view; ( $f$ ) aedeagus, from the left; $(g)$ aedeagus, from below.

Holotype ô, Mauritius: Plaine Champagne, 22.xii. 71 (J.R.W.), genitalia on slide Cx 14.

Paratypes, Mauritius: $3 \hat{o}, 3 \hat{\delta}$, same locality as holotype, on Embelia sp. prob. concinna Baker, 20.xi. 72 (J.R.W.); 1ㅇ, Mt. Cocotte, 23.x. 65 (C. M. Courtois).

Other specimens, Mauritius: 4*̂, 19, Plaine Champagne, on Embelia sp. prob. concinna Baker, 20.xi. 72 (J.R.W.); 2す, same locality, $24.1 i .72$ (J.R.W.); $1_{0}$, Mt. Cocotte, 4.xi. 72 (J.R.W.); 2才, 1q, same data but 8.ix. 73 .

This species is recognisable by the darkly pigmented longitudinal veins on the apical part of the tegmen. It appears to be confined to the high rainfall areas of the uplands.
21. Brixia lunulata (Amyot \& Serville) (fig. 17)

Derbe lunulata Amyot \& Serville, 1843, Hist. Nat. Ins. Hemip. : 515.
(Type locality; Mauritius. Type repository; Naturhistorisches Museum, Vienna)
Overall length 5.0 mm . Vertex in midline longer than wide at base, lateral margins subparallel. Frons with disc wide and flat, lateral marins of disc greatly elevated proximally but not distally. Tegmina with $\mathrm{Se}+\mathrm{R}$ fork and $\mathrm{Cu}_{1}$ fork at about same level and somewhat before that of junction of claval veins; $R$ with 4 apical veins.

Head and thorax castaneous with cavity of vertex, lateral carinae of head, of pronotal disc and mesonotum, dark fuscous. Tegmina hyaline, with fuscous suffusions forming a triangular pattern between base and stigma and continuing in a broad distal arc; longitudinal veins basally ochraceous and distally brownish, otherwise concolorous with membrane; transverse veins indistinct; stigma mostly ochraceous.

This species has not been seen by the author. The original description and that of Stal (1866) are inadequate while the unique type specimen, which is in Signoret's material in the Naturhistorisches Museum, Vienna, is in poor state, the pigmentation having faded to some extent and the abdomen, the metathorax, the wings, the legs except for the right foreleg and the coxae, and part of the left tegmen are missing. The above supplementary description was prepared from the type by Dr. A. Kaltenbach of the Naturhistorisches Museum but in view of the state of the specimen and the fact that it is of unknown sex, it is doubtful if the species can now be recognized with certainty.
B. lunulata was listed from Madagascar as well as Mauritius by Orian (1956), presumably in error: it is evident from the above comments that any record of the species from Madagascar must be regarded as questionable. Synave (1956, 1965) makes no mention of the species in Madagascar.


Fig. 17. Brixia lunulata (Amyot \& Serville), tegmen of type (after a drawing by Dr. A. Kaltenbach, Naturhistorisches Museum, Vienna).
22. Brixia broussei sp. nov. (fig. 18, (a)-(h)))

Overall length $5 \cdot 0-6.5 \mathrm{~mm}$. Vertex in midline as long as, or a little longer than, wide at base; lateral margins subparallel or converging distad. Frons with dise wide, flat and transversely striate; lateral margins of disc not greatly elevated except proximally where diverging. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork and $\mathrm{Cu}_{1}$ fork at about same level and well before that of junction of claval veins; $R$ usually with 4 apical veins, sometimes 3 .

Head and thorax, including legs, castaneous with lateral carinae of head dark fuscous. Tegmina of male hyaline, suffused dark fuscous at base, dark fuscous band from anterior margin crossing $\mathrm{Sc}+\mathrm{R}$ and widening on clavus and giving off a narrow arm directed forwards before meeting posterior margin, broad dark fuscous are from stigma to apex clavus and along apical margin to fourth apical cell; longitudinal veins not conspicuously pigmented. Tegmina of female hyaline but strongly tinted castaneous, fuscous areas basically similar to male but indistinct or fragmented; longitudinal veins more or less conspicuous from fuscous pigment and darkly pigmented setal bases.

Anal segment of male asymmetrical, with left lateroventral margin lower than right distally. Aedeagus with a fin-like longitudinal expansion with a finely serrated edge near base below on left and a long, stout spine directed cephalad on each side at apex; flagellum with a small, strong spine on right at midway.

Holotype ó, Mauritius: Mt. Cocotte, 16.ix. 73 (J.R.W.), genitalia on slide Cx 29.

Paratypes, Mauritius: $1 \hat{\sigma}$, same data as holotype, genitalia on slide Cx 29.1; $\mathbf{l}_{\widehat{O}}^{\hat{\prime}}, 1$ ㅇ, same data as holotype; 1q, same locality, 8.ix. 73 (P. Brousse de Gersigny).


Fig. 18. Brixia broussei sp. nov.: (a) head, face view; (b) head, profile; (c) tegmen of male; (d) tegmen of female; (e) aedeagus, from the right; $(f)$ aedeagus, from below; $(g)$ anal segment of male, from the right; $(h)$ right genital style, from the right.

The distinctive features of this species are the structure of the male genitalia, the wide flat dise of the frons with its distinct, though fine, transverse striae, and the pigmentation of the tegmina. The species is unusual in that the tegminal pattern is more definitive in the male than in the female sex. It may be noted that the two male paratypes have only $3 R$ veins on one tegmen. The pigmentation of the distal part of the tegmina recalls that of $B$. lunulata, but it does not otherwise resemble that species with which it was compared by Dr. A. Kaltenbach in the Naturhistorisches Museum, Vienna (see B. lunulata).
23. Brixia vacoasensis Synave (fig. 19, (a)-(f))

Brixia vacoasensis Synave, 1958, Bull. Inst. r. Sci. nat. Belg. 34 (3) : 3, fig. 2.
('Type locality; Vacoas, Mauritius. Type repository; Museum National d'Histoire Naturelle, Paris)

Tegmina with 4 R veins at apex.
Anal segment of male symmetrical with prominent lateroapical angles or asymmetrical with a left lateroapical angle only. Aedeagus sclerotized to near apex, a long sinuous spine on left at midway directed cephalad and two spines at apex; flagellum with a spine near apex.


Fig. 19. Brixia vacoasensis Synave: ( $a$ ) head, face view; (b) head, profile; (c) anal segment of male, from the right; $(d)$ left genital style, from the left; $(e)$ aedeagus, from the right; $(f)$ aedeagus, from the left.

 72; 1 ${ }^{\text {®. }}$, Le Pouce, 22.vii. 72 (J.R.W.).

The disc of the frons is broad and its margins not greatly elevated except proximally, while the veins of the tegmina are conspicuously maculate from darkly pigmented alveoli. The male genitalia are here described for the first time. Specimens from the type locality have a symmetrical anal segment and hook-like spines at the apex of the aedeagus, as does the specimen from Le Pouce mountain, but males from Le Petrin have an asymmetrical anal segment and the apical aedeagal spines are of different size and shape. Synave's figure of the tegmen shows 5 apical branches of $R$ but all specimens seen by the author have 4.
B. vacoasensis is known only from Mauritius where it occurs in upland regions.

## 24. Brixia fuscomarginata sp. nov. (fig. 20, (a)-(g))

Overall length $5 \cdot 0-6.0 \mathrm{~mm}$. Vertex narrow, twice as long in midline as wide at base, lateral margins subparallel. Frons with disc wide and flat, lateral margins of disc sharply but not greatly elevated. Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork, $\mathrm{Cu}_{1}$ fork, and junction of claval veins at about same level; R with 4 apical veins; $\mathrm{Cu}_{1 \mathrm{~b}}$ without bifurcation.

Head ochraceous variously and often heavily suffused fuscous with clypeus pale distally. Antennae fuscous. Pronotum laterally pallid yellow or whitish,


Fig．20．Brixia fuscomarginata sp．nov．：（a）head，face view；（b）head，profile；（c）tegmen；（d） aedeagus，from the left；（ $e$ ）anal segment of male，left side slightly from above and behind； $(f)$ right genital style，right ventrolaterad view；$(g)$ genital style，from the right．
otherwise fuscous．Mesonotum fuscous，paler in lateral angles．Tegulae pallid yellow or whitish．Legs dark fuscous except band near middle pro－ femurs，protibiae proximally，first and second protarsal segments，mesotibiae， mesotarsi，metatibiae except basally，and metatarsi，pallid yellow．Tegmina mostly hyaline tinged ochraceous，white along proximal two－thirds $\mathrm{Cl}_{1}$ ，dark fuscous patch centred on stigma and a broad dark fuscous border of irregular width along commissural and apical margins．

Anal segment of male bilaterally symmetrical，lateroventral edges almost straight，lateroapical angles rounded．Aedeagus with two spines of same size and shape at apex，on left and right respectively，and directed cephalad，and a longer spine below at apex also directed cephalad．

Holotype ó，Mauritius：Magenta，13．ii． 63 （C．M．Courtois），genitalia on slide Cx 18.

Paratypes，Mauritius：3今，2ㅇ，La Ferme，20．vi．61（C．M．Courtois）； 1q，Trois Mamelles，19．iv． 72 （J．R．W．）．

Other specimens，Maurituus：Trois Mamelles，19，14．xi．72，1才，1q，25．xi．72， 3ô，4q，10．ii．73，1号，1．iii． 73 （J．R．W．）．

This species is easily recognized by the dark border along the apical and hind margins of the tegmina，the dark patch over the stigma，and the white claval vein．It is confined to dry lowland localities．

> 25. Brixia bohemani (Stal) (fig. 21, (a)-(e))

Delphax bohemani Stal，1854，Ofv．Svenska Vet．Akad．Forh． 11 ： 245.
（Type locality；Mauritius．Type repository；Naturhistoriska Riksmuseet，Stockholm）
Overall length 5.0 mm ．Vertex in midine longer than wide at base，lateral margins straight or feebly convex and converging slightly distad．Frons with disc wide and flat，lateral margins of disc greatly elevated proximally where diverging but only slightly elevated distally．Tegmina with $\mathrm{Sc}+\mathrm{R}$ fork and $\mathrm{Cu}_{1}$ fork at same level and well before that of junction of claval veins； R with 3 apical veins．


Fig. 21. Brixia bohemani (Stal): (a) head, face view; (b) aedeagus, from the right; (c) aedeagus, from the left; ( $d$ ) posterolateral margin of pygofer, anal segment and genital style, from the right; (e) tegmen.

More or less uniformly fuscous with first antennal segment, lateral carinae of vertex, of frons, and of clypeus, dark fuscous. Tegmina hyaline to level of stigma except for a broad transverse fuscous band at level of $\mathrm{Sc}+\mathrm{R}$ and $\mathrm{Cu}_{1}$ forks, infuscate after level of stigma; stigma, costal and apical margins fuscous; veins conspicuously maculate from dark pigment at setal bases.

Anal segment of male asymmetrical, with a left lateroapical angle only. Aedeagus with a large spine below near midway directed cephalad; flagellum with a sinuous spine basally on right, two spines near base on left, one straight and slender, the other stout, very long and curving left, and a sinuous spine near midway curving under flagellum.

Mauritius: $1 \widehat{o}^{\wedge}$, Trois Mamelles, $18 . i i .73$ (J.R.W.).
Stal's type has been examined by the author: it is without its abdomen and most of the apical parts of the tegmina but the form of the vertex and frons, the dark maculation along the tegminal veins and the fuscous band across the basal hyaline part of the tegmina are a distinctive combination of characters that enabled confident identification of the specimen described above.
B. bohemani was listed from East Africa by Melichar (1905) and from Madagascar by Orian (1956) but these records need verification.

## 26. Brixia nigripennis sp. nov. (fig. 22, (a)-(c))

Overall length 5.5 mm . Vertex in midline longer than wide at base, lateral margins feebly convex and converging distad. Frons with dise wide and flat, lateral margins of disc greatly elevated proximally but becoming only slightly elevated distally and strongly convex in face view. Tegmina with $\mathrm{Cu}_{1}$ fork before, and junction of claval veins behind, level of $\mathrm{Sc}+\mathrm{R}$ fork; R with 5 apical veins.

Head and thorax more or less uniformly dark fuscous. Second antennal segment less darkly pigmented than first. Legs ochraceous extensively suffused fuscous. Tegmina infuscate with a broad, transverse, golden-brown band erged dark fuscous and situated before the middle; stigma and apical margin dark fuscous.

Holotype ㅇ, Mauritius: Macabé, at light, 5.xii. 72 (J.R.W.).
The dark body and the golden-brown band across the otherwise infuscate tegmen are the distinctive features of this species.
a

b



Fig. 22. Brixia nigripennis sp. nov.: (a) head, face view; (b) head, profile; (c) tegmen.

## Genus ACHAEMENES Stal

Achaemenes Sta1, 1866, Hemip. Africana 4:170. Logotype, Achaemenes notatinervis Stal, 1866, Hemip. Africana 4 : 171 .

## 1. Achaemenes macabeanus Synave

Achaemenes macabeanus Synave, 1965, Bull. Inst. r. Sci. nat. Belg. 41 (27) : 6, figs. 4-8.
(Type locality; Macabé Forest, Mauritius. Type repository; Museum National d'Histoire Naturelle, Paris)

Anal segment of male bilaterally symmetrical, lateroapical angles prominent with blunt extremities. Aedeagus with a small spur below after midway directed cephalad; flagellum with two long, stout, sinuous, inner spines at base which curve across each other, a spur near base on left, a large spine near midway, and a spine at apex.

Mauritius: Macabé, 1ô, 14.xi.71, 1早, 5.viii.72, 2우, 22.x.72, 2才̂, 2 우,

 (J.R.W.).

This species is known only from Mauritius where it is confined to upland forest.

## 2. Achaemenes quinquespinosus Synave

Achaemenes quinquespinosus Synave, 1959, Naturaliste malgache 11 : 133, figs. 1-4.
(Type locality; Plaine des Cafres, Réunion Island. Type repository; Museum National d'Histoire Naturelle, Paris)




 6우, 19.iv.72; Le Pouce, $1_{o}^{*}$, 1 ㅇ, 15.xii.71, 1ㅇ, 22.vii.72; Tamarin Falls, 1 ㅇ,


Described from specimens captured in Réunion Island, this species has been recorded several times from Mauritius (Synave, 1958, 1960, 1961, 1965). It has also been recorded from Madagascar (Synave, 1965). It is common in all parts of Mauritius where native vegetation persists. As remarked by Synave (1959), its pigmentation, always sombre, is very variable and the tegmina range from almost completely hyaline to darkly infuscate, with most specimens having a variegated pattern of fuscous. The male genitalia, which resemble those of A. synavei, also show some variation in the size of the aedeagal spines: on present knowledge the variations must be considered intraspecific.

## 3. Achaemenes synavei sp. nov. (fig. 23, (a)-(g))

Overall length $5 \cdot 0-5 \cdot 5 \mathrm{~mm}$. Vertex distinctly wider than long in midline, base usually roundly but sometimes angulately emarginate, anterior margin convex, lateral margins concave, transverse carina curved and dividing vertex into two subequal parts. Frons slightly longer in midline than wide; basal margin concave, lateral margins gently concave basally and diverging to become strongly convex where foliaceously expanded laterad in front of antennae, anterior margin angulately emarginate; median carina strong, continuing over and becoming more prominent on clypeus. Median ocellus absent. Tegmina relatively short and broad, ratio length to width at level stigma $2 \cdot 2: 1 ; \mathrm{Cu}_{1}$


Fig. 23. Achaemenes synavei sp. nov.: (a) head, face view; (b) head, from above; (c) tegmen; (d) aedeagus, from the left; (e) aedeagus, from above; $(f)$ anal segment of male; ( $g$ ) left genital style, from the left.
fork and junction claval veins at about same level and well behind level of $\mathrm{Sc}+\mathrm{R}$ fork. Metatibiae with 6 apical spines. Metatarsi with 7 apical spines on first segment and 5 on second.

Yellowish-ochraceous. Frons mostly, vertex, genae, pronotum and mesonotum suffused fuscous. Tegmina hyaline tinted yellowish-ochraceous, variably suffused fuscous at apex, small fuscous patch at margin after apex clavus, clavus patched dark fuscous, $\mathrm{Cu}_{1}$ entirely white.

Anal segment of male bilaterally symmetrical, lateroapical angles prominent and bluntly pointed. Aedeagus with two short, stout, hook-like spines directed cephalad, the first above near midway, the second below and a little behind the level of the first; flagellum with two long, stout, sinuous, inner spines at base which cross each other when viewed from above or below, a spine after midway, and a spine at apex.

Holotype J̄, Mauritius: Case Noyale, on Dodonaea viscosa Linn., 11.vii. 72 (J.R.W.), genitalia on slide Cx 21.

Paratypes, Mauritius: $6 \delta, 11$, same data as holotype.
Other specimens, Mauritius: Trois Mamelles, 1ठิ, 13.i.72, 1 今, 19, 19.iv.72,
 Noyale, 1

This species is closely related to $A$. quinquespinosus, from which it is distinguished by the colour and proportions of its tegmina. It is confined to dry localities.

## Genus OLIARUS Stal

Oliarus Stal, 1862, Berliner Ent. Zeit. 6:306. Logotype, Cixius walkeri Stal, 1859, Freg. Eugenies Resa: 272.

1. Oliarus mameti Synave (fig. 24, (a)-(b))

Oliarus mameti Synave, 1961, Bull. Inst. r. Sci. nat. Belg. 37 (21) : 7, figs. 9-11.
(Type locality; Trois Mamelles, Mauritius. Type repository; Museum National d'Histoire Naturelle, Paris)

Anal segment of male ovate in dorsal view, distally truncate, median line broadly raised, anal foramen at apex. Pygofer with ventral margin excavate, medioventral process relatively large, not triangular in ventral view. Aedeagus


Fig. 24. Oliarus mameti Synave: ( $\alpha$ ) aedeagus, from the right; (b) medioventral process of pygofer, from below.
with two spines of unequal size near apex, the longer above on right directed cephalad, the shorter above directed laterocephalad to the right; flagellum with 3 large spines, one at base on left, one near midway, and one at apex.

Mauritius: 9 ${ }^{\text {ºn }}, 6$, Trois Mamelles, on stems Erythroxylon sp. near laurifolium Lam., 13.i. 72 (J.R.W.).

Synave describes the metatibiae as having a very small spine near the articulation with the femur and a strong spine near the middle. In all the above specimens the metatibiae have 2 or 3 minute basal spines near the articulation and two prominent lateral spines or spurs, one at $1 / 4-1 / 3$ from the base and one, somewhat larger, near midway. The basal spines are also present in the species described below. The medioventral process of the pygofer is very prominent in this species.

## 2. Oliarus courtoisi sp. nov. (fig. 25, (a)-(h))

Overall length, male $7 \cdot 5-8.0 \mathrm{~mm}$, female $9.5-10.0 \mathrm{~mm}$. Vertex with length in midline often less than twice width at apex of posterior emargination ( $1 \cdot 7-2 \cdot 4: 1$ ), lateral margins strongly elevated, straight or feebly concave and converging slightly distad, median carina prominent at base and absent elsewhere. Frons wider than long in midline ( $1 \cdot 3: 1$ ), width at base about $1 / 4$ that at widest point, lateral margins foliately produced laterad, disc shallowly depressed between median carina and lateral margins, median carina forked in about basal fourth, median ocellus present. Frontoclypeal suture indistinct. Metatibiae with 2 lateral spines and 6 apical spines. Metatarsi with 7 apical spines on first segment and 5 on the second.

Dark fuscous, with lateral elevations of vertex, median carina, margins and lateral angles of frons, genae mostly, pronotum except behind eyes and laterally, ochraceous-castaneous. Legs ochraceous suffused fuscous. Tegmina hyaline, veins interruptedly ochraceous and fuscous; male with small fuscous patches around margins, below stigma, on Rl , in apical cell 5 , on Cu branches and after apex clavus, respectively, and narrow fuscous bands along transverse veins in apex; female marked similarly but fuscous areas more extensive and present also at bifurcations $\mathrm{M}, \mathrm{Sc}+\mathrm{R}$, and Cu .

Anal segment of male ovate in dorsal view, distally truncate, median line broadly raised, anal foramen at apex. Pygofer with ventral margin excavate, medioventral process triangular in ventral view. Aedeagus with a short spine above on right near apex directed laterad, a stout hook-like spine on right at almost same point curving inwards and under, a spinose process below at almost same level curving right; flagellum with a long spinose process at base on left and a large spinose process at about midway.

Holotype ${ }^{\text {on }}$, Mauritius: Mt. Cocotte, $23 . x .65$ (C. M. Courtois), genitalia on slide Cx 2.

Paratypes, Mauritius: 2 , , same data as holotype; ${ }^{1}{ }^{\wedge}$, Le Pouce, 17.ix. 63 (C. M. Courtois), genitalia on slide Cx 2a.

This species is distinguished by the structure of the male genitalia. Its size, the dimensions of the vertex, and the pigmentation of the tegmina are also useful recognition characters.

3. Oliarus mauritiensis sp. nov. (fig. 26, (a)-(e))

Overall length, male $7 \cdot 0-7 \cdot 5 \mathrm{~mm}$, female 7.5 mm . Vertex with length in midline more than twice width at apex of posterior emargination (2.2-2.7:1), lateral margins strongly elevated, straight and converging distad; median carina prominent at base and absent elsewhere. Frons wider than long in midline ( $1 \cdot 4: 1$ ), width at base a little less than $1 / 4$ that at widest point, lateral margins foliately produced laterad, disc depressed between median carina and lateral margins, median carina forked for a little more than the basal $1 / 4$, median ocellus present. Frontoclypeal suture indistinct. Metatibiae with two lateral spines and 6 apical spines. Metatarsi with 7 apical spines on first segment and 5 on the second.


Fig. 26. Oliarus mauritiensis sp. nov.: (a) aedeagus, from the right; (b) aedeagus, from the left; (c) genital style, ventrolateral view; (d) medioventral process of pygofer, from below; (e) anal segment of male, from above.

Dark fuscous, with lateral elevations of vertex, median carina, margins and lateral angles of frons, genae mostly, pronotum except behind eyes and laterally, ochraceous-castaneous. Legs ochraceous suffused fuscous. Tegmina hyaline with brownish tinge, veins and stigma fuscous.

Anal segment of male in dorsal view with lateral margins slightly angulate rather than convex, distally truncate, median line broadly raised, anal foramen at apex. Pygofer with ventral margin excavate, medioventral process triangular in ventral view. Aedeagus with a large spine below directed caudad with its extremity curving dorsad on the right side and a strong spine on right directed caudad with its extremity curving ventrad; flagellum with a long spine at base and a short spine on each side at about midway.

Holotype ô, Mauritius: Macabé Forest, 18.xii. 65 (C. M. Courtois), genitalia on slide Cx 24.

Paratypes, Mauritius: $1 \delta^{*}$, Le Pouce Mt., 8.xii. 65 (C. M. Courtois), genitalia on slide Cx 24a; $\mathbf{1}_{\widehat{O}}^{\wedge}, 1$, same locality, 2.xii. 72 (J.R.W.), genitalia of male on slide Cx 24 b.

The structure of the male genitalia chiefly characterize this species. The lack of tegminal pigmentation and the shape of the vertex are also useful characters.

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[^0]:    *I am indebted to Dr. R. G. Fennah for examining the type material of $B$. stellata in the British Museum.

