

# Memoirs of the Queensland Museum | **Nature**

## **56 (2)**

© Queensland Museum 2013

PO Box 3300, South Brisbane 4101, Australia  
Phone 06 7 3840 7555  
Fax 06 7 3846 1226  
Email [qmlib@qm.qld.gov.au](mailto:qmlib@qm.qld.gov.au)  
Website [www.qm.qld.gov.au](http://www.qm.qld.gov.au)

National Library of Australia card number  
ISSN 0079-8835

### NOTE

Papers published in this volume and in all previous volumes of the *Memoirs of the Queensland Museum* may be reproduced for scientific research, individual study or other educational purposes. Properly acknowledged quotations may be made but queries regarding the republication of any papers should be addressed to the Director. Copies of the journal can be purchased from the Queensland Museum Shop.

A Guide to Authors is displayed at the Queensland Museum web site [www.qm.qld.gov.au](http://www.qm.qld.gov.au)

**A Queensland Government Project**  
Typeset at the Queensland Museum

# A revision of *Hypselosoma* Reuter (Insecta: Heteroptera: Schizopteridae) from New Caledonia

Lionel HILL

PO Box 303, Devonport TAS 7310. Email: Lionel.Hill@dpiw.tas.gov.au

Citation: Hill, L., 2013 06 30: A revision of *Hypselosoma* Reuter (Insecta: Heteroptera: Schizopteridae) from New Caledonia. *Memoirs of the Queensland Museum – Nature* 56(2): 407–455. Brisbane. ISSN 0079-8835. Accepted: 30 November 2010.

## ABSTRACT

The identity of *Hypselosoma oculatum* Reuter is clarified and 19 new species are described from New Caledonia. The new species are *H. hypselosomatum*, *H. amieuensis*, *H. bleuensis*, *H. koghiensis*, *H. mandjeliensis*, *H. mouensis*, *H. rhinatum*, *H. elytratum* (the preceding eight forming *H. hypselosomatum* group), *H. chorizobregmatum*, *H. dicroum*, *H. gephyrobregmatum*, *H. haplacanthatum*, *H. ndouaensis*, *H. nordiensis*, *H. onceronotatum*, *H. rembaiensis*, *H. touhoensis*, *H. trachyacanthatum* and *H. triacanthatum*. Lack of sympatry in relation to tentative clades is suggested. Related fossil genera are mentioned and dispersal via oceanic drift briefly discussed. Aspects of subfamily morphology are reviewed and compared with *Cryptostemma* Herrich-Schaeffer (Dipsocoridae). Sympatry of *Hypselosoma* Reuter and *Pateena* Hill in Tasmania is reported. □ *Schizopteridae*, *Hypselosoma*, *Hypselosoma oculatum*, *New Caledonia*, *Pateena*.

The family Schizopteridae has a tropical distribution with distinct genera in the eastern and western hemispheres and few genera in temperate zones (Štys, 1970). *Hypselosoma* Reuter is distributed around the western Pacific rim and Madagascar with many species described by Wygodzinsky (1959). It contains 18 described species from mainland China (2), Honshu, Shikoku, Kyushu and Amami-Oshima Islands in Japan (2), Marinduque Island in Philippines (1), the northern coast of mainland New Guinea (4), Garove Island near New Britain (1), Guadalcanal in the Solomons (1), Grande Terre in New Caledonia (1), Queensland and New South Wales in Australia (4), Tasmania in Australia (1), south island of New Zealand (1) and Madagascar (1) (Fig. 24). Several undescribed species from the Oriental region and Australia await description. *Hypselosoma* has not been found in Fiji or on Norfolk and Lord Howe Islands despite considerable collecting there by the Queensland Museum or Australian Museum. None have been recorded from Vanuatu. Most recently, Ren and Zheng (1992) recorded *H.*

*matsumurae* Horvath 1905, originally described from Japan, in China.

Recent collecting by Queensland Museum revealed 19 new species from New Caledonia and specimens of the type species, *H. oculatum* Reuter, 1891. *Hypselosoma* was erected by Reuter (1891) for *H. oculata* (sic) in a brief Latin description based on a single elytrous female from 'monte Kogui, m. Maji', New Caledonia. Poppius (1909) briefly described a macropterous male from Mt Koghis, New Caledonia as *H. oculata* including a figure of its forewing and said the locality was the same as the type locality of Reuter. Wygodzinsky (1959) described in detail a male from 7 miles southeast of La Foa, New Caledonia (80 km NW from Mt Koghis) as *H. oculatum* and emended the gender of Reuter's specific epithet to be neuter. The 19 new species include eight that can be distinguished only by male genitalia and one of these is from the generic type locality. However, another species best fits the description by Reuter and also matches the description by Wygodzinsky as discussed below.

The genus belongs to the Hypselosomatinae (Esaki and Miyamoto, 1959; Emsley, 1969) whose other extant members are *Glyptocombus saltator* Heidemann, 1905 from the USA including Michigan, Georgia and Arkansas (Heidemann, 1905; Allen & Carlton, 1989), the poorly known *Ommatides insignis* Uhler, 1894 from the Lesser Antilles, the Australian genera *Pateena* Hill, 1980, *Ordirete* Hill, 1984, *Macromannus* Hill, 1984, *Cryptomannus* Hill, 1984, *Lativena* Hill, 1984, *Duonota* Hill, 1984 and *Rectilamina* Hill, 1984, (Hill, 1980, 1984, 1985a, 1985b) and *Williamsocoris ornatus* Carpintero and Dellapé, 2006 from Argentina. Perrichot *et al.* (2007) described two new fossil Hypselosomatinae, *Buzinia* and *Tanaia* from mid-Cretaceous amber (100 Ma) from France and Burma. Azar and Nel (2010) described *Libanohypselosoma* from Lower Cretaceous amber of Lebanon. Some comments on the fossil genera are made in the discussion.

## METHODS

Specimens were obtained in 75% ethanol or glued to cards. Some specimens were cleared in cold sodium hydroxide and divided into several mounts such as a vial of 75% ethanol and several Euparal® slides. Drawings of small slide-mounted structures such as genitalia were done by freehand under a compound microscope while larger structures were drawn using a gradicule eyepiece and squared paper under a stereomicroscope. Montaged photographs of forewings on microscope slides were taken with a stereomicroscope while other photographs are montaged images from a compound microscope.

**Terminology.** The postnotal flange is a lamina projecting posteriorly from the metanotum. It has a continuously curved margin in all pteromorphs of all species described here and is termed arcuate (Fig. 6E) rather than segmental as in Hill (1984, 1987a, 1991). Hill (1987a) used the terms truncate and trapezoidal for some Queensland species in which the margin is briefly straight and (Hill, 1984) used the term rectangular for species of *Rectilamina* Hill in which most of the margin is straight.

Descriptions of the tumidity of the base of the labrum in profile are tentative but may reward further study by scanning electron microscopy. The diagnostic value of male T8 was not investigated but setation of its posterolateral projections may prove useful.

In light of comments by Rédei (2007) the terminology for wing venation is changed from Emsley's system (Emsley, 1969; Hill, 1987a) to that in Figure 6I. The anterior marginal vein is regarded as C, the deflexed margin anterior to C as the hypocostal lamina, the thick submarginal basal vein as Sc+R+M, the posterior membranal vein as 1AN so that Cu runs a direct path and joins M only apically. The identities of the intervening distal veins remain uncertain. The cell on the clavus is termed the anal cell.

**Abbreviations.** In the text a.s.l. is above sea level, S is sternum, T is tergum and LT is laterotergite (appendage articulating with T9). In lists of material female is f, male is m, collectors are C. Burwell, CB; D. Cook, DC; P. Grimbacher, PG; G. B. Monteith, GBM; R. Raven, RR; S. Wright, SW and habitat and methods of collecting are rainforest, R; berlesate, B; pyrethrum knockdown, P and flight intercept trap, FIT. Lists include Queensland Museum sample numbers (QM prefix) for precision given the large number of sympatric species and papers by other authors treating material collected in the numerous samples collected by Queensland Museum.

**Depositories.** All specimens except one of *H. oculatum* were collected by and deposited in the Queensland Museum, Brisbane (QM) other than the holotypes which were deposited in the Muséum national d'Histoire naturelle, Paris (MNHN(EH)). QM registration numbers have a T prefix. One specimen of *H. oculatum* was borrowed from the American Museum of Natural History (AMNH).

SYSTEMATICS

Order HETEROPTERA

Family SCHIZOPTERIDAE Reuter, 1891

Subfamily HYPSELOSOMATINAE Esaki  
and Miyamoto, 1959

*Hypselosoma* Reuter, 1891

**Type Species.** *H. oculata* Reuter, 1891 [emended *oculatum* Wygodzinsky, 1959.]

HOLOTYPE not seen ('D. A. Montadon (Coll. auctoris)' in Reuter, 1891).

Hill (1987) enlarged and qualified the definition of *Hypselosoma* in Wygodzinsky (1959). In brief, *Hypselosoma* has the very large eyes, four-segmented labium and well developed gonapophyses typical of Hypselosomatinae. It is differentiated most notably on the structure of the male genitalia and preceding segments from all other hypselosomatine genera which, as far as documented, share a different and more asymmetric plan. In *Hypselosoma*, T8 has no non articulated laterotergal processes, T9 bears two articulated laterotergites, T10 (anophore) is a simple complete or incomplete ring without processes; the male conjunctival complex is linked to the basal plate by a Y-shaped sclerite; the membranous wall of the conjunctiva bears discrete anterior, right and left sclerites; the last two sclerites often bear prominent processes (see discussion). In the female the anterior gonapophyses bear 5-7 teeth rather than 2-4. In addition, in *Hypselosoma* the labrum bears 1+4 macrosetae but only 4 in males when a male labral organ is present; the male clypeus (or rarely labrum) bears a special organ (rather than pronotal collar or clavus); the labial segments never bear pairs of long, ventrolateral macroseta (equal to or greater than labial diameter); the bucculae do not bear a prominent pair of ventrolateral macrosetae although 0-4 short, procurved macrosetae occur on each side; spiracles are present only on segments 6-8 and a sclerotized spermatheca is absent.

SHARED CHARACTERS OF NEW  
CALEDONIAN HYPSELOSOMA

All the species described below have: five labral macrosetae (Fig. 6B); an unmodified labrum (unlike *H. oncerochilotum* Hill of Queensland, Australia); mesosternum with simple anteroventral face and domed process on posteroventral face (Fig. 6C); metasternum with only a curved, fin-like process; scutellum impunctate; metanotum bearing a large, arcuate postnotal flange (Fig. 6E) (arc not truncated); full hind wings in macropterous males; no medial concavity on posterior margin of T9 for reception of a digit that arises ventrally and at midlength on right LT9 (unlike Queensland species) except *H. touhoensis* in which a medial concavity receives the apex of left LT9.

KEY TO MALES OF NEW  
CALEDONIAN HYPSELOSOMA

(Male of *H. onceronotatum* is unknown)

1. Elytrous ..... 2  
– Macropterous or submacropterous .... 5
2. Clypeal organ absent *H. elytratum* sp. nov.  
– Clypeal organ present ..... 3
3. Clypeal organ recessed between clypeal fused lobes which form a bridge between organ and labrum, without erect setae reaching anterior margin of clypeus ..... *H. gephyrobregmatum* sp. nov.  
– Clypeal organ marginal, erect setae reaching margin (Fig. 4F) ..... 4
4. Elytral apices lobate, highly convex profile *touhoensis* sp. nov.  
– Elytral apices simple, moderately convex profile ..... *rembaiensis* sp. nov.
5. Clavus mostly punctate, anal cell obliterated ..... 6  
– Clavus not or weakly punctate, small anal cell ..... 9
6. Three anterior corial cells between Sc and M mostly punctate ..... 7  
– Three anterior corial cells impunctate

- except vein margins ..... 8
7. Left process T9 has non serrate apex (Fig. 18A) ..... *H. haplacanthatum* sp. nov.  
 – Left process T9 has serrate apex (Fig. 21A) ..... *H. trachyacanthatum* sp. nov.
8. Clypeal organ bilobate (Figs 4B, C), disc impunctate, 1.4 mm labrum to wing apex  
*H. chorizobregmatum* sp. nov.  
 – Clypeal organ weakly elevated hole (Fig. 4E), disc punctate, 1.8 mm labrum to wing apices ..... *H. nordiensis* sp. nov.
9. Habitus highly convex (Figs 1A, 1G), medium-large (1.7-2.4 mm), clypeal organ absent or strongly salient cone, costal cell not concave, margin not explanate, lateral margins of disc smoothly rounded in dorsal view (Figs 1A, 1E) ..... 10  
 – Habitus less convex (Figs 1C, 1E, 1K), small-medium (1.2-1.6 mm), clypeal organ present (flat with erect setae or pit with adpressed setae and pale bridge), costal cell concave, margin explanate, lateral margins of disc sinuate in dorsal view (Figs 3C, 3I) ..... 17  
 – Large (2.4 mm), clypeal organ in salient cone (Fig. 5) ..... *H. oculatum* Reuter  
 – Medium (1.7-2.0 mm), clypeal organ absent (Fig. 4A) ..... 11
10. Macropterous ..... 12
11. Submacropterous ..... 16
12. Vesical process 60% as long as vesica, only one (long) right conjunctival process ..... *H. koghiensis* sp. nov.  
 – Vesical process less than 50% as long as vesica, 2-3 right conjunctival processes... 13
13. Two right conjunctival processes, left process of T9 short ..... 14  
 – Three right conjunctival processes, left process of T9 long ..... 15
14. Vesical process 5% as long as vesica ..... *H. hypselosomatum* sp. nov.  
 – Vesical process 33% as long as vesica ..... *H. bleuensis* sp. nov.
15. Left process of T9 not bifid, vesical process 150% as long as second right conjunctival process, second right conjunctival process 40% as long as first right conjunctival process. .... *H. mandjeliensis* sp. nov.  
 – Left process of T9 bifid, vesical process 100% as long as second right conjunctival process, second right conjunctival process 75% as long as first right conjunctival process ..... *H. mouensis* sp. nov.
16. Length 1.71 mm, vesical process 200% as long as second right conjunctival process, two right conjunctival process. .... *H. rhinatum* sp. nov.  
 – Length 1.90 mm, vesical process 100% as long as second right conjunctival process, three right conjunctival process ..... *H. amieuensis* sp. nov.
17. Small (1.3 mm), strongly flattened (Fig. 1E), submacropterous (Fig. 8E), clypeal organ flat with erect setae . *H. ndouaensis* sp. nov.  
 – Medium (1.5-1.6 mm), less flattened (Figs 1C, 1K), macropterous ..... 19
18. Claval vein 1AN and corial veins R and M bordered by punctuation, clypeal organ with adpressed setae and pale bridge ..... *H. triacanthatum* sp. nov.  
 – Veins not bordered by punctuation, clypeal organ flat with erect setae. . . *H. dicroum* sp. nov.

#### HYPSELOSOMATUM-SPECIES GROUP

The following eight species are similar externally but they can be readily identified by male genitalia (Table 2). These eight species are referred to here as the *H. hypselosomatum* group which is defined in detail under the discussion. Species in this group share similarly small distributions, at a variety of elevations, but as a group are spread the entire length of Grande Terre.

#### *Hypselosoma hypselosomatum* sp. nov. (Figs 4A, 7A, 9F, 10A-B, 22A, Tables 1-2)

**Etymology.** Greek, provided with a high body.

**Material.** HOLOTYPE male: 22°17'0"S x 166°54'46"E, Pic du Grand, Kaori, site 1, 250 m, GBM, 21.xi.2001-

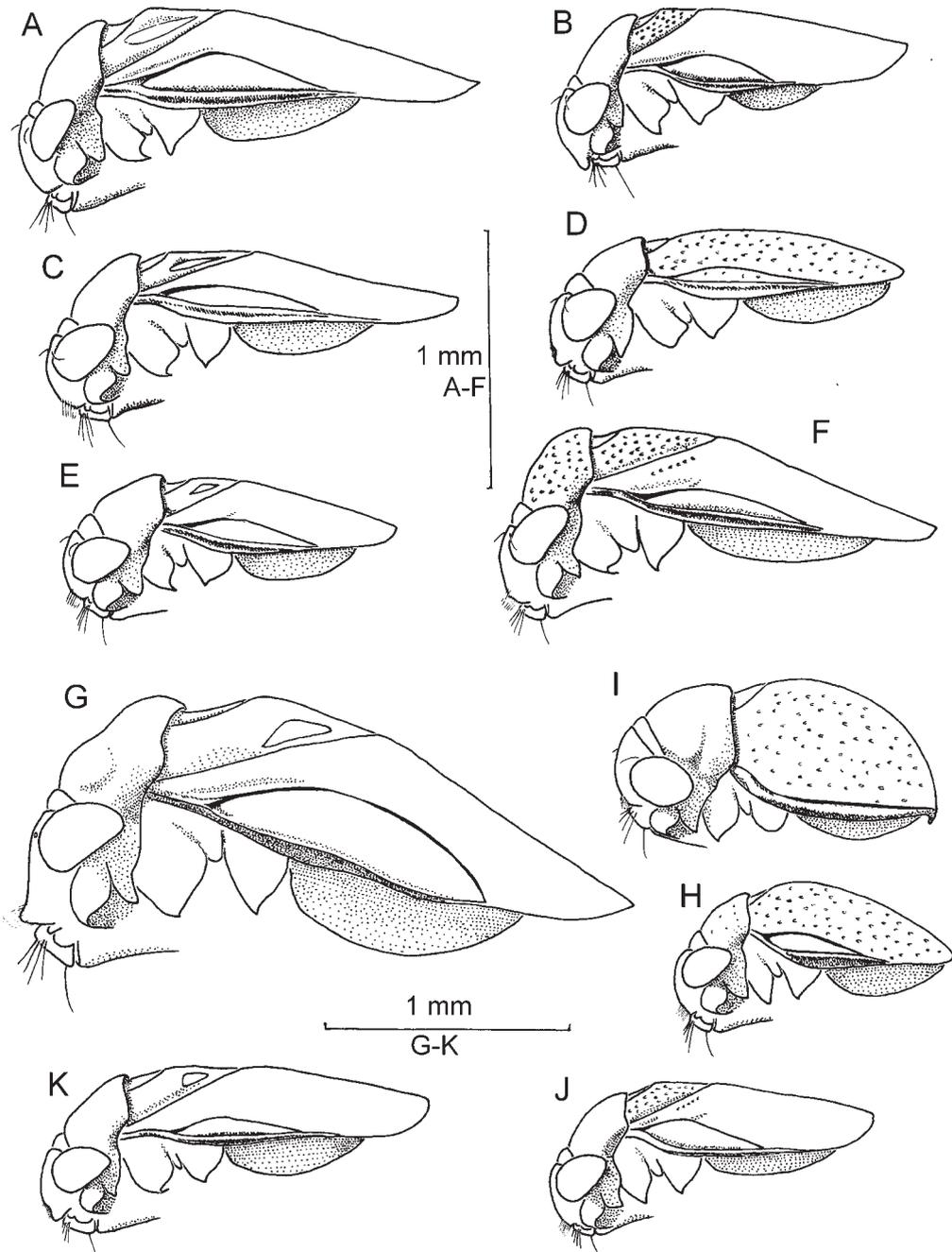


FIG. 1. Left lateral view of 11 New Caledonian male *Hypselosoma*. A, *H. bleuensis* sp. nov.; B, *H. chorizobregmatum* sp. nov.; C, *H. dicroum* sp. nov.; D, *H. gephyrobregmatum* sp. nov.; E, *H. ndouaensis* sp. nov.; F, *H. nordiensis* sp. nov.; G, *H. oculatum* Reuter; H, *H. rembaiensis* sp. nov.; I, *H. touhoensis* sp. nov.; J, *H. trachyacanthatum* sp. nov.; K, *H. triacanthatum* sp. nov.

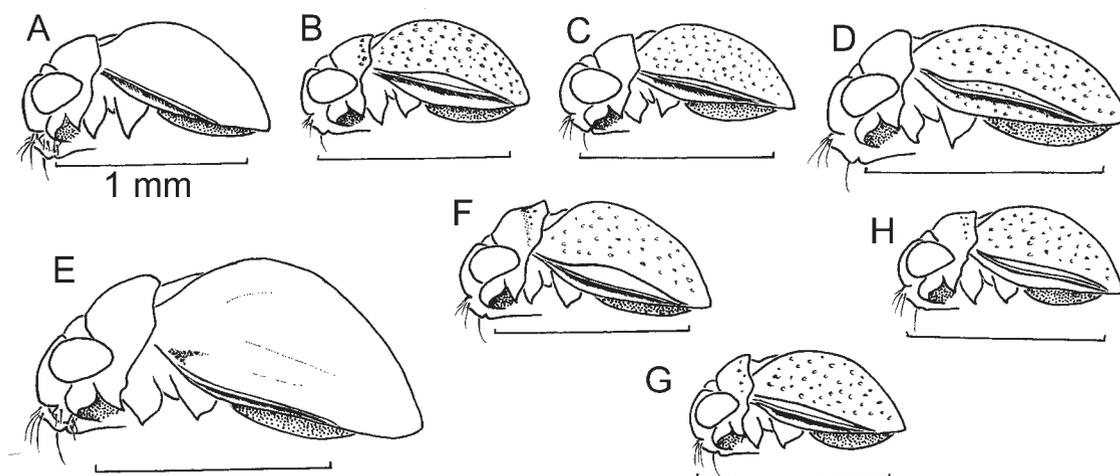


FIG. 2. Left lateral view of 8 New Caledonian female *Hypselosoma*. A, *H. bleuensis* sp. nov.; B, *H. dicroum* sp. nov.; C, *H. ndouaensis* sp. nov.; D, *H. nordiensis* sp. nov.; E, *H. oculatum* Reuter; F, *H. onceronotatum* sp. nov.; G, *H. trachyacanthatum* sp. nov.; H, *H. triacanthatum* sp. nov.

29.i.2002, RFIT, QM8919, 3 slides and vial, 16353 (MNHN(EH)). Paratypes: 2 m as for holotype, T165619-20. Other material: 1 m T165726, 4 f, T165727-30, same site, GBM & PG, 22.xi.2004, RB, QM11767; 2 f, T165731-2, same site, GBM, 22.xii.2004, RB, QM12021; 3 m, 1 f, T165733-6, same site, GBM & PG, 22.xii.2004-12.i.2005, RFIT, QM11847; 1 f, T165737, same site, GBM & PG, 22.xii.2004-12.i.2005, R pitfall trap, QM11848; 1 f, T165738, same site, CB & SW, 22-23.xi.2004, R yellow pans, QM11760; 1 m, T165739, 2 f, T165740-1, 22°17'7"S x 166°54'54"E, Pic du Grand, Kaori site 2, 250 m, QM party, 22.xi.2004, R mercury vapour light, QM11774; 1 m, T165742, vial & 3 slides, same site, GBM & PG, 22.xi.2004, RB, QM11777; 1 m, T165743, 22°19'23"S x 166°54'55"E, Foret Nord, site 2, 200 m, GBM & PG, 22.xii.2004-9.i.2005 FIT, QM11889 (QM).

**Diagnosis.** Colour, high convexity and absence of male clypeal organ as for all members of *H. hypselosomatum* group. See Table 2 for diagnostic characters.

**Description.** *Macropterous male.* Black except frons sometimes uniformly a little paler than clypeus (but without pair of red patches), antennae, labrum, maxillary plates, labium and legs mostly dark brown but tibial apices light brown, forewing membrane black-brown proximally becoming brown distally, costal cell black. Profile convex like Fig. 1A.

Base of labrum tumid in profile, salient above plane of clypeus; maxillary plates tumid rather than gently convex, with two short, erect macrosetae aligned with the basal macrosetae of labrum; bucculae with very short macroseta mounted below a tubercle bearing two minor setae like Fig. 6B; clypeal organ absent.

Disc finely punctate (indistinct at 80x magnification); lateral margins convexly convergent (not sinuous, disc not weakly constricted anteriorly), calli not tumid; posterior margin convex; medial ends of mesosternal transverse carinae taper rather than end abruptly (squarely or acutely).

Forewing (Fig. 7A) not explanate; costal cell sclerotized, not depressed or concave (hence margin not explanate), impunctate but coarsely granulate ventrally; hypocostal lamina narrow, about as wide as hind femoral width; a glabrous furrow along posterior margin of costal cell; corium mostly membranous, darker around anterior margin of trapezoidal cell perhaps from incipient sclerotization; anal cell twice or more as large as trapezoidal cell, bases of 1AN and 2AN sclerotized and finely granulate ventrally.

New Caledonian *Hypselosoma*

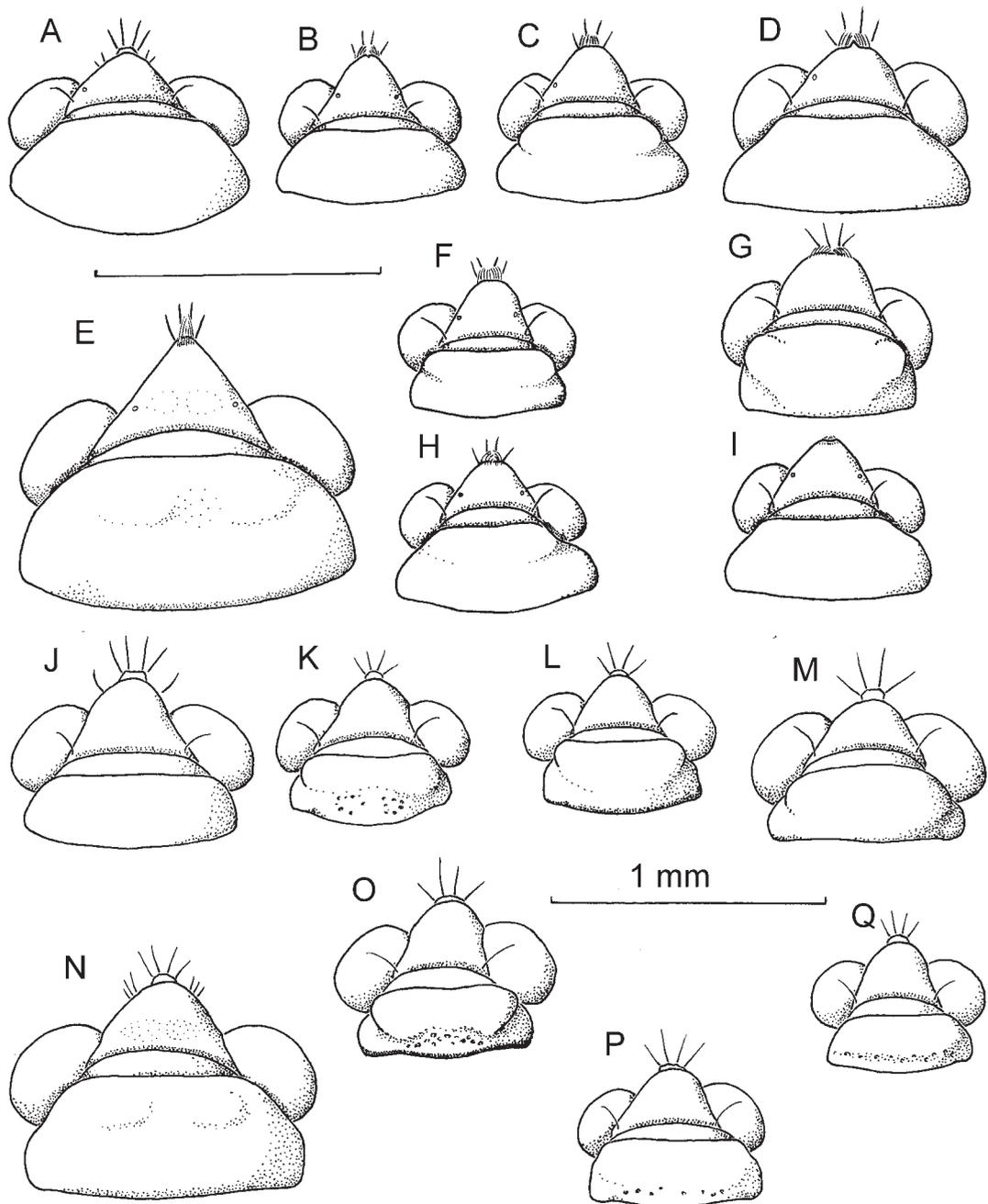


FIG. 3. Dorsal view of head and pronotum, A-I male ; J-Q female *Hypselosoma*. A, *H. bleuensis* sp. nov.; B, *H. chorizobregmatum* sp. nov.; C, *H. ndouaensis* sp. nov.; D, *H. nordiensis* sp. nov.; E, *H. oculatum* Reuter; F, *H. rembaiensis* sp. nov.; G, *H. touhoensis* sp. nov.; H, *H. trachyacanthatum* sp. nov.; I, *H. triacanthatum* sp. nov. J, *H. bleuensis* sp. nov.; K, *H. dicroum* sp. nov.; L, *H. ndouaensis* sp. nov.; M, *H. nordiensis* sp. nov.; N, *H. oculatum* Reuter; O, *H. onceronotatum* sp. nov.; P, *H. trachyacanthatum* sp. nov.; Q, *H. triacanthatum* sp. nov.

TABLE 1. Dimensions of New Caledonian *Hypselosoma* in millimetres. The first eight species form a group and are arranged alphabetically after *H. hypselosomatum* sp. nov. except for the elytrous *H. elytratum* sp. nov. Remaining species are arranged alphabetically. LHT length hind tibia; WP width pronotum; LP length pronotum; DAE distance across eyes; LAH, length from labrum to apex of hemelytra; N, number of specimens measured.

Species	Males						Females					
	LHT	WP	LP	DAE	LAH	N	LHT	WP	LP	DAE	LAH	N
<i>Hypselosoma</i>												
<i>hypselosomatum</i>	0.74	0.87	0.48	0.88	1.77	9	0.72	0.76	0.38	0.89	1.47	10
<i>amiueusis</i>	0.82	0.99	0.53	0.97	1.90	2	0.80	0.86	0.41	1.02	1.66	7
<i>bleuensis</i>	0.84	0.87	0.50	0.88	1.89	2	0.82	0.77	0.36	0.93	1.48	4
<i>koghiensis</i>	0.88		0.54		2.00	2	0.84	0.89	0.42	1.02	1.70	3
<i>mandjeliensis</i>	0.67	0.81		0.83	1.89	2	0.74	0.80	0.39	0.94	1.60	2
<i>mouensis</i>	0.76		0.53		1.96	1						
<i>rhinatum</i>	0.81	0.83		0.87	1.71	1	0.72	0.77	0.36	0.89	1.57	6
<i>elytratum</i>	0.66	0.78	0.41	0.88	1.51	1	0.74	0.83	0.38	0.98	1.68	1
<i>chorizobregmatum</i>	0.56	0.70	0.36	0.69	1.37	1						
<i>dicroum</i>	0.62	0.75	0.41	0.75	1.57	2	0.56	0.60	0.29	0.72	1.19	10
<i>gephyrobregmatum</i>	0.60	0.69	0.34	0.70	1.33	1						
<i>halploacanthatum</i>	0.56	0.71	0.35	0.67	1.40	1	0.55	0.60	0.27	0.70	1.19	1
<i>ndouaensis</i>	0.55	0.67	0.36	0.70	1.26	1	0.53	0.63	0.28	0.73	1.25	1
<i>nordiensis</i>	0.79	0.85	0.46	0.91	1.84	7	0.82	0.76	0.37	0.92	1.58	16
<i>oculatum</i> Reuter	1.27	1.20	0.69	1.20	2.38	9	1.21	1.09	0.55	1.20	2.08	5
<i>onceronotatum</i>						0	0.73	0.68	0.34	0.84	1.38	3
<i>rembaiensis</i>	0.54	0.59	0.29	0.67	1.14	9						
<i>touhoensis</i>	0.59	0.68	0.39	0.77	1.26	3						
<i>trachyacanthatum</i>	0.56	0.74	0.37	0.71	1.42	4	0.55	0.64	0.28	0.74	1.16	2
<i>triacanthatum</i>	0.59	0.77	0.39	0.71	1.61	1	0.56	0.61	0.29	0.71	1.18	1

S3 organ (Fig. 10A) granulate oval with single, peripheral row of long setae anteriorly and a cluster of long setae posteriorly on a tumid area of S3, no setae within oval area (like Fig. 10E).

*Genitalia.* left process of T9 short, decurved spine projecting laterally over base of left LT9 (possibly sharing common base with blunter, shorter medially directed process); left LT9 a medially procurved arm (Fig. 12A); right LT9 gently curved with hyaline, digitate apex and triangular rather than digitate subapical process on ventral margin (Fig. 12C); distal lobe of right paramere barely longer than colinear proximal lobe; left paramere curved, spine-like with broader, lamellate base bearing short spinous process (Fig. 12D); left conjunctival process spatulate, apically serrate and proximally tuberculate (Figs 10B, 12D, 12E); right

conjunctival sclerite with two long, curved processes, one 80% as long as other, lacking third very short, spinous process basally; base of vesica has very short, thick, acute process barely 5% as long as vesica; vesical process 20% as long as second right conjunctival process (see Table 2 for *H. hypselosomatum* group comparison).

*Elytrous female.* Colour like male, elytra black.

Base of labrum tumid in profile, more salient than clypeal apex; maxillary plates tumid rather than gently convex, with 1-3 short, erect macrosetae; bucculae with a very short macroseta mounted below a tubercle bearing two minor setae.

Disc finely punctate (indistinct at 80x magnification), lateral margins of disc parallel in posterior half, roundly converging anteriorly; posterior margin straight, posterior angles not tumid (not projecting posteriorly and not

## New Caledonian *Hypselosoma*

TABLE 2. Diagnostic characters for males of *H. hypselosomatum* group which are defined in the discussion. LT: laterotergite; RCjPr1 and 2: major and secondary processes of right conjunctival sclerite; T: tergum.

Species	Left T9	Right LT9 apex	Vesical process of vesica	Vesical process of R Cj Pr2	Right conjunctival processes	R CjPr 2 of 1
<i>hypselosomatum</i>	Short spine	digit	5%	20%	2	80%
<i>mandjeliensis</i>	Long spine	digit	33%	150%	3	40%
<i>amieuensis</i>	Short spine	digit	25%	100%	3	50%
<i>mouensis</i>	Long bifid spine	Spinous	25%	100%	3	75%
<i>koghiensis</i>	Short spine	digit and lobe	60%	Na	1 (long)	0%
<i>bleuensis</i>	Short apically serrate	digit	33%	400%	2	25%
<i>rhinatum</i>	Possibly very short apically serrate	digit	33%	200%	2 (striate)	40%
<i>elytratum</i>	Short spine	digit	10%	25%	3	75%

causing lateral margins to become tumid posteriorly); medial ends of transverse, mesosternal carinae taper rather than end acutely or squarely.

Elytra highly convex in profile and in section (vertical sides), surface appearing irregular at 80x magnification but finely punctate in cleared material (Fig. 9F); no glabrous furrow marking path of vein Sc; costal cell not abruptly changing plane from remainder of elytra; vein C present as a sharp carina, as high as its width, extending only 75% to apices; hypocostal lamina finely punctate, barely wider than hind femoral width; most venation weakly evident as several raised lines (and in cleared material); elytra overlap in distal half, variably right on left and vice versa.

Gonapophyses with six teeth. Spermatheca absent.

**Distribution.** Known from two localities at 200-250 m a.s.l. at the southern tip of Grande Terre (Fig. 22A).

**Notes.** A male from nearby at Forêt Nord, 200 m a.s.l. has the abdomen missing. It may be conspecific but its hind tibiae are shorter (0.63 mm). It is lodged in QM.

***Hypselosoma amieuensis* sp. nov.**  
(Figs 6F-G, 7B, 11A, 13A-C, 22A,  
Tables 1-2)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 21°35'33"S x 165°48'19"E, Col d'Amieu, sawmill, 350-400 m, GBM & CB, 14.xi.2002, RP, trees & logs, QM11183, 7 slides, 16354 (MNHN(EH)). Paratypes: 4 f as for holotype, 3 slides T165624; 3 points T165621-3. Other material: 1 m, T165703, 7f, same site T165705-165711, GBM, 25.xi.2003-27.i.2004, RFIT, QM11476; 1 m, T165712, 21°33'15"S x 165°46'21"E, Table Unio summit, 1000 m, GBM & DC, 10.v.1984, QM7197 (male transposed by author with male of *H. oculatum* from Forêt de la Thi Reserve in labeled vials but probable error rectified) (QM).

**Diagnosis.** Colour, high convexity and absence of male clypeal organ as for all members of *H. hypselosomatum* group but submacropterous like *H. rhinatum*. See Table 2 for diagnostic characters.

**Description.** *Submacropterous male.* Like *H. hypselosomatum* (no setae within oval of S3 organ) except head dark brown; fore tibiae, apical quarter to whole of mid tibiae and sometimes apical quarter of hind tibiae brown. Fore wing (Fig. 10B) membrane reduced to width equal to that between Cu and 1AN; forewing otherwise like *H. hypselosomatum*; male genitalia (Figs 13A-C) like *H. hypselosomatum* except vesical process is 25% (not 5%) as long as vesica, vesical process 100% (not 20%) as long as second right conjunctival process; three (not two) processes present on right conjunctival sclerite; second right conjunctival process is 50% (not 80%) as long as first.

*Elytrous female.* Like *H. hypselosomatum* (including finely punctate disc and elytra which may not appear distinctly punctate at 80x magnification), except head dark brown; fore tibiae, apical quarter to all of mid tibiae and sometimes apical quarter of hind tibiae brown.

**Distribution.** Known from two adjacent localities at 400-1000 m a.s.l. At Table Unio it is sympatric with *H. rembaiensis*. At Col d'Amieu it is sympatric with *H. gephyrobregmatum* (Fig. 22A).

**Notes.** Reduction of the forewing membrane is marginally less than in *H. rhinatum* (compare Figs 6B, 6E).

*Hypselosoma bleuensis* sp. nov.

(Figs 1A, 2A, 3A, 6C, 7B, 13D, 14A-G, 22A, Tables 1-2)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 22°4'33"S x 166°37'12"E, Rivière Bleue, Kauri Track, 250 m, SW, 21.xi.2002, RP, trees, QM11206, 4 slides, 16255 (MNHN(EH)). Paratypes: 1 m, 4 f, as for holotype, T165625-9 (QM).

**Diagnosis.** Colour, high convexity and absence of male clypeal organ as for all members of *H. hypselosomatum* group. See Table 2 for diagnostic characters.

**Description.** *Macropterous male.* Fig. 1A. Like *H. hypselosomatum* except male genitalia (Fig. 13D, 14A-C) as follows: left process of T9 short and apically serrate; vesical process 33% (not 5%) as long as vesica; vesical process 400% (not 20%) as long as second conjunctival process and second right conjunctival process 25% (not 80%) as long as first. Fore wing membrane fully developed.

*Elytrous female.* Fig. 2A. Like *H. hypselosomatum* except head black brown, elytra smoother at 80x magnification.

**Distribution.** Known from one locality at 250 m a.s.l. at Rivière Bleu (Fig. 22A).

**Notes.** The granulation of the ventral surface of male costal cell is apparently finer than in *H. hypselosomatum*. Pale dots (possibly micro-

tubercles) of similar size to those at the bases of setae on veins occur along the margins of fore wing veins in this species, *H. mouensis*, *H. rhinatum* and possibly in all species of *H. hypselosomatum* group but not so conspicuously.

*Hypselosoma koghiensis* sp. nov.

(Figs 7C, 10C, 14D-F, 22A, Tables 1-2)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 22°10'39" x 166°30'32"E, Mt Koghis track entrance, 500 m, RR & N. Platnik, 23-30.v.1987, R pitfall, QM7135, 3 slides and 1 vial, 16356 (MNHN(EH)). Paratypes: 1 m, 2 f, as for holotype, T165630-2. Other material: 1 f, same site, GBM, 5.ii.2004, RB, QM11533, T165633 (QM).

**Diagnosis.** Colour, high convexity and absence of male clypeal organ as for all members of *H. hypselosomatum* group. See Table 2 for diagnostic characters.

**Description.** *Macropterous male.* Like *H. hypselosomatum* (including bare S3 organ) except head dark brown; male genitalia as for *H. hypselosomatum* except apex right LT9 provided with short hyaline digit and broad, well-defined subapical lobe (Fig. 14D); vesical process 60% (not 5%) as long as vesica; one (not two) process present on right conjunctival sclerite (Fig. 14F). Fore wing membrane fully developed (Fig. 7C).

*Elytrous female.* Like *H. hypselosomatum* except head brown, legs with same pattern but overall paler; elytra smoother, venation less discernable and most conspicuous as two parallel lines in proximal half in dorsal view.

**Distribution.** Known from one locality at 500 m a.s.l. at Mt Koghis (Fig. 22A).

**Notes.** The pattern of the vestigial venation of female elytra is one character excluding this species from consideration as *H. oculatum*.

*Hypselosoma mandjeliensis* sp. nov.

(Figs 6B, 15A-C, 22C, Tables 1-2)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 20°24'15"S x 164°31'13"E, Mandjélia sawmill, 700 m, GBM & DC, 12.v.1984, RB, QM4263, 4 slides, 16357

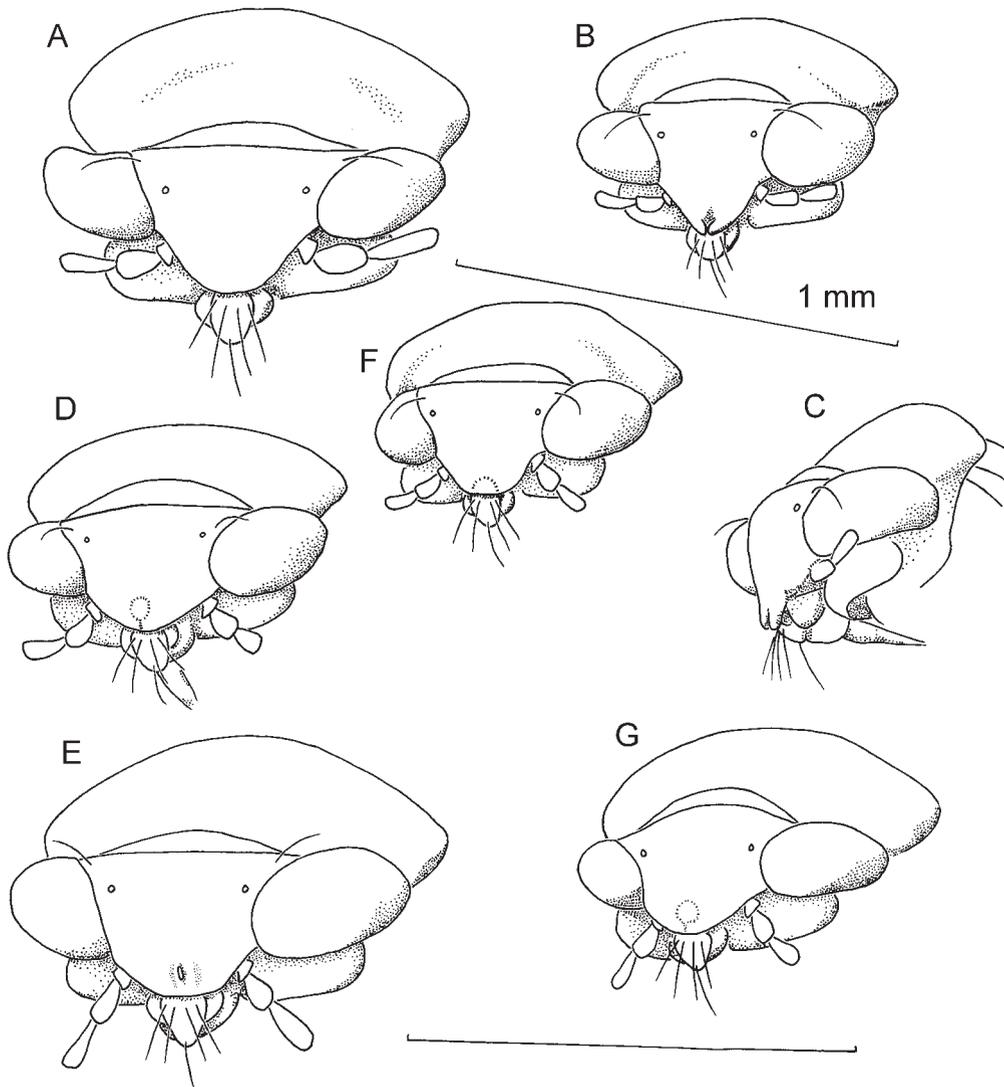


FIG. 4. Left anterolateral view of head and pronotum of 6 male *Hypselosoma*. A, *H. hypselosomatum* sp. nov.; B-C, *H. chorizobregmatum* sp. nov.; D, *H. gephyrobregmatum* sp. nov.; E, *H. nordiensis* sp. nov.; F, *H. trachyacanthatum* sp. nov.; G, *H. triacanthatum* sp. nov.

(MNHN(EH)). Other material: 1 m, same site, GBM & DC, 12.v.1984, RB, QM4265, T165693 (QM).

**Diagnosis.** Colour, high convexity and absence of male clypeal organ as for all members of *H. hypselosomatum* group. See Table 2 for diagnostic characters.

**Description.** *Macropterous male.* Like *H. hypselosomatum* except male genitalia as follows: left process of T9 present as long not short spine (Fig. 15B), vesical process 33% (not 5%) as long as vesica; vesical process 150% (not 20%) as long as second right conjunctival process; three (not two) processes present on right conjunctival sclerite (Fig. 15A); second right conjunctival

process 40% (not 80%) as long as first (Fig. 15C). Fore wing membrane fully developed.

*Elytrous female.* Not described but two specimens from Mt Panié may fit here.

**Distribution.** Known from two localities at 700-900 m a.s.l. at the northwestern end of Grande Terre (Fig. 22C).

***Hypselosoma mouensis* sp. nov.**  
(Figs 6A, 6E, 6I, 15D-H, 22A,  
Tables 1-2)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 22°4'31"S x 166°19'52"E, Mt Mou base, 200 m, GBM, 7.xii.2003-2.ii.2004, RFIT, QM11468, 6 slides, 16358 (MNHN(EH)).

**Diagnosis.** Colour, high convexity and absence of male clypeal organ as for all members of *H. hypselosomatum* group. See Table 2 for diagnostic characters.

**Description.** *Macropterous male.* External morphology as for *H. hypselosomatum* except setae present within oval of S3 organ (like Fig. 11H), maxillary plates with 1 macroseta (Fig. 6A). Male genitalia as for *H. hypselosomatum* except left process of T9 present as long bifid spine (Fig. 15D-E); apex of right LT9 spinous (not digitate); vesical process 25% (not 5%) as long as vesica, vesical process 100% (not 20%) as long as second right conjunctival process; three (not two) processes present on right conjunctival sclerite; second right conjunctival process 75% (not 80%) as long as first (Fig. 15F). Fore wing membrane fully developed.

*Elytrous female.* Unknown.

**Distribution.** Known from one rainforest locality at 200 m a.s.l. at Mt Mou (Fig. 22A).

***Hypselosoma rhinatum* sp. nov.**  
(Figs 7E, 16A-B, 16D, 16E, 22A, Tables 1-2)

**Etymology.** Greek, provided with a rasp (on the left conjunctival sclerite).

**Material.** HOLOTYPE male: 21°34'47"S x 165°49'0"E, 4km N Col d'Amieu, 300 m, GBM & DC, 8.v.1984, RB, QM4257, 4 slides, 16359 (MNHN(EH)). Paratypes: 5 f as for holotype, 1 vial T165635-8, pin T165634. Other material: 1 f, 21°34'22"S x 166°6'42"E, Col de

Petchecara, 350 m, GBM, 28.i.2004, RB, QM11541, T165694 (QM).

**Diagnosis.** Colour, high convexity and absence of male clypeal organ as for all members of *H. hypselosomatum* group but submacropterous like. See Table 2 for diagnostic characters.

**Description.** *Submacropterous male.* As for *H. hypselosomatum* (no setae within oval of S3 organ) except male genitalia as follows: left process of T9 possibly very short and apically serrate; vesical process 33% (not 5%) as long as vesica; vesical process 200% (not 20%) as long as second right conjunctival process; first right conjunctival process broad and striate not spinous; second right conjunctival sclerite 40% (not 80%) as long as first (Fig. 16A). Fore wing membrane is reduced to a thin band half as wide as distance between Cu and 1AN (Fig. 7E).

*Elytrous female.* Like *H. hypselosomatum* except head dark brown.

**Distribution.** Known from two rainforest localities at 300-350 m a.s.l. and 30 km apart (Fig. 22A). At Col d'Amieu it is sympatric with *H. haplacanthatum*.

**Notes.** The degree of reduction of the fore wing membrane is a little greater than in *H. amieuensis* (compare Figs 6B, 6E).

***Hypselosoma elytratum* sp. nov.**  
(Figs 7F, 16C, 22A, Tables 1-2)

**Etymology.** Greek, provided with elytra.

**Material.** HOLOTYPE male: 22°3'44"S x 166°20'41"E, Mt Mou summit, 1150 m, GBM & DC, 24.v.1984, RB, QM4276, 3 slides and 1 vial, 16360 (MNHN(EH)). Paratype: 1 f, as for holotype, 1 vial, T165639 (QM).

**Diagnosis.** The highly convex elytrous form and absence of male clypeal organ distinguish this species.

**Description.** *Elytrous male.* Mostly black; antennae, labrum, maxillary plates, labium and legs mostly dark brown but tibial apices paler.

Profile moderately convex.

Base of labrum tumid in profile, salient above plane of clypeus; maxillary plates tumid, with 2

short, erect macrosetae aligned with four basal macrosetae of labrum; bucculae with 1 short macroseta below tubercle bearing two minor setae; clypeal organ absent.

Disc of pronotum impunctate; lateral margins convexly convergent (not sinuous, disc not weakly constricted anteriorly); calli not tumid; posterior margin straight, posterior angles not tumid; medial ends of mesosternal transverse carinae rounded (not ending acutely).

Elytra moderately convex, weakly overlapping distally; costal margin not explanate; costal cell sclerotized, flat, appearing impunctate at 80x magnification but see Fig. 7F; hypocostal lamina little wider than depth of hind femora, extending 75% to apices; glabrous furrow along posterior margin of costal cell; venation faint.

S3 organ as in *H. hypselosomatum*.

**Genitalia.** As in *H. hypselosomatum* except: right LT9 has clearly digitate process subapically on ventral margin; vesical process 10% (not 5%) as long as vesica; vesical process 40% (not 20%) as long as second conjunctival sclerite (Fig. 16C).

**Elytrous female.** Colour like male.

Base of labrum tumid in profile, more salient than clypeal apex; maxillary plates with 2 short, erect macrosetae, bucculae with tubercle and 1 short, erect macroseta.

Disc appears impunctate at 80x magnification; lateral margins of disc roundly converging anteriorly, parallel posteriorly; posterior margin straight, posterior angles not tumid.

Elytra highly convex in profile, finely punctate; no glabrous furrow marking path of vein Sc and costal cell not abruptly changing plane from remainder of elytra; vein C present as sharp carina, high as wide, extending 75% to apices; hypocostal lamina barely wider than hind femoral depth; venation faint; elytra barely overlapping in distal half.

**Distribution.** Known from one locality at 1200 m a.s.l. on Mt Mou which is the highest involved in this paper (Fig. 22A).

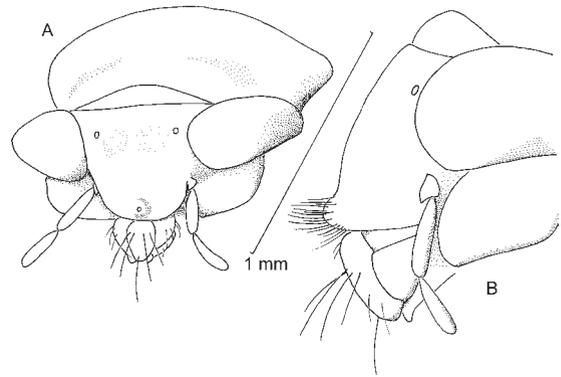


FIG. 5. Left anterolateral and lateral views of head and pronotum of male *Hypselosoma oculatum* Reuter.

**Notes.** This species belongs to *H. hypselosomatum* group but differs in having an elytrous male (minor submacroptery occurs in *H. amieuiensis* and *H. rhinatum*). The genitalia are most similar to *H. hypselosomatum* (compare values in Table 2).

***Hypselosoma chorizobregmatum* sp. nov.**

(Figs 1B, 3B, 4B-C, 8A, 10D, 11B, 17A-B, 22B, Table 1)

**Etymology.** Greek, provided with a split front part of the head.

**Material.** HOLOTYPE male: 22°4'31"S x 166°19'52"E, Mt Mou base, 200 m, GBM, 7.xii.2003-2.ii.2004, RFIT, QM11468, 3 slides and 1 vial, 16362 (MNHN(EH)).

**Diagnosis.** The convex rather than flattened form and pair of clypeal lobes obscuring the labral base (Fig. 4C) distinguish males of this species.

**Description.** *Macropterous male.* Black except antennae, labrum, maxillary plates, labium and legs mostly dark brown but tibial apices light brown, forewing membrane black-brown proximally becoming brown distally, costal cell black.

Profile convex but less than macropterous males of *H. hypselosomatum* group (compare Figs 1A-B).

Base of labrum not tumid, obscured by lobes of clypeal organ; maxillary plates without macrosetae; bucculae with tubercle, without macroseta;

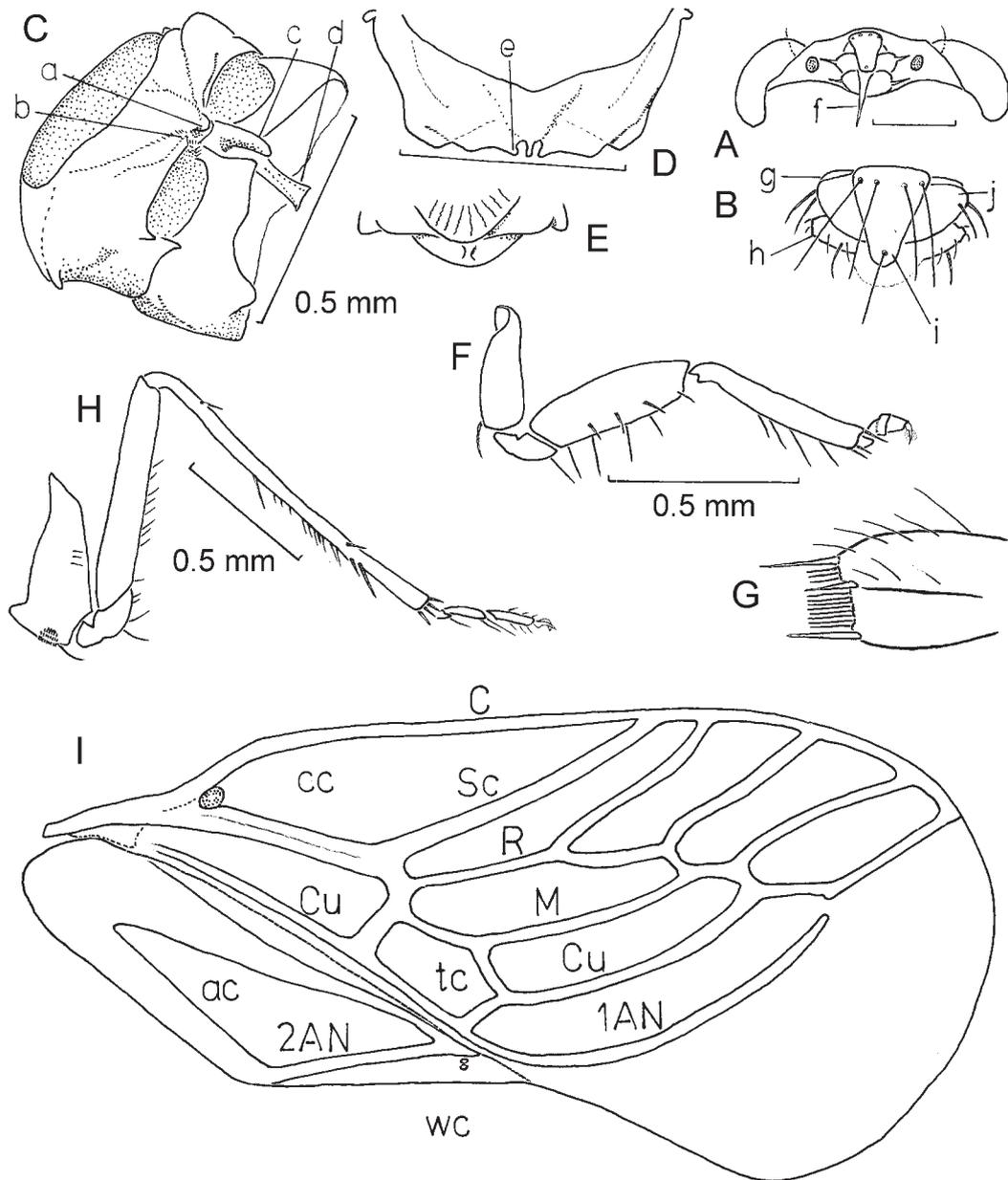


FIG. 6. *Hypselosoma* species. A, head on slide, labium removed, anterior, *H. mouensis* sp. nov.; B, labrum, bucculae, mandibular and maxillary plates on slide, dorsal, *H. mandjeliensis* sp. nov.; C, male pterothorax, ventrolateral, *H. bleuensis* sp. nov.; D, mesosternal carinae, anterior, *H. trachyacanthatum* sp. nov.; E, arcuate postnotal flange, dorsal, *H. mouensis* sp. nov.; F-G, *H. amieuensis* sp. nov. F, male left fore leg, anterior; G, apex fore tibia, ventrolateal; H, left hind leg, anterior, *H. oculatum* Reuter; I, fore wing terminology, *H. mouensis* sp. nov. a, mesosternal process; b, medial end of mesosternal carina; c, metasternal process; d, metendosternite; e, medial end of mesosternal carina; f, epipharyngeal projection; g, mandibular plate; h, bucculae; i, labrum; j, maxillary plate; ac, anal cell; cc, costal cell; tc, trapezoidal cell; wc, wing coupling.

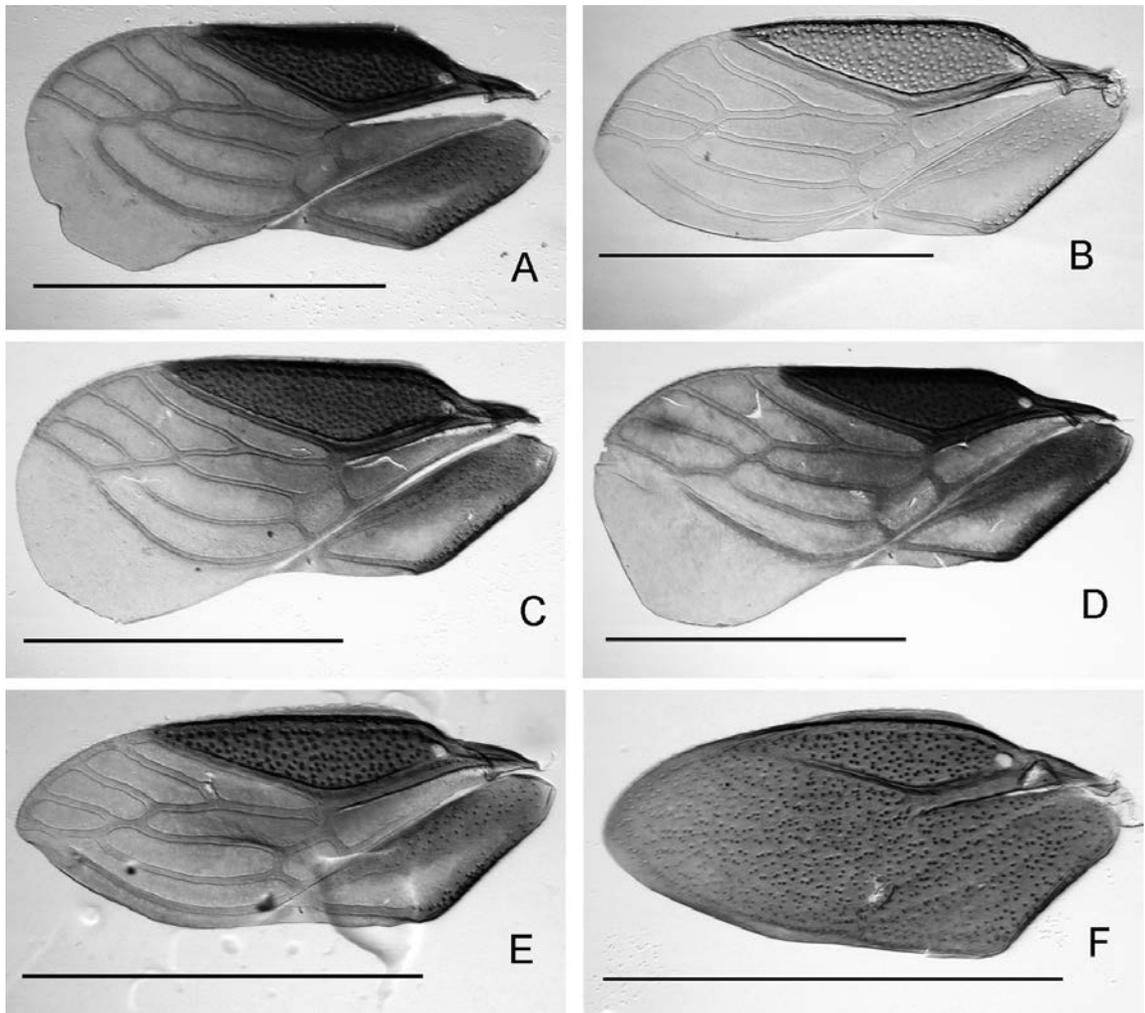


FIG. 7. Male fore wings, dorsal, *H. hypselosomatum* species group. A, *H. hypselosomatum* sp. nov.; B, *H. amieuensis* sp. nov.; C, *H. koghiensis* sp. nov.; D, *H. mouensis* sp. nov.; E, *H. rhinatum* sp. nov.; F, *H. elytratum* sp. nov. Scale lines 1 mm.

apex of clypeus with pair of prominent lobes embracing a setigerous organ (Figs 4B-C).

Disc of pronotum impunctate, weakly constricted anteriorly, lateral margins sinuously convergent (indistinct in view used in Fig. 3B), calli not tumid, posterior margin sinuously convex; medial ends of mesosternal transverse carinae acute.

Forewing (Fig. 8A) distinctly explanate; costal cell sclerotized, impunctate or ventrally

granulate, flat but depressed between vein Sc and inclined, explanate costal margin which is 3-4 membranal-vein widths in dorsal view; hypocostal lamina 1.5 hind femoral widths; glabrous furrow along posterior margin of costal cell; five corial cells including trapezoidal cell wholly sclerotized (in addition to costal cell) except base of cell Sc+R+M, impunctate except posterodistal margin of cell Sc+R+M; clavus sclerotized and coarsely punctate, cell obscure but venation discernible.

S3 organ semicircular, with straight, sclerotized posterior margin extending beyond lateral angles, right projection wide basally and longer than left, semicircular anterior margin without peripheral long setae, many long setae posteriorly on tumidity of S3 and medially on S4 (setae omitted in Fig. 10D).

**Genitalia.** left process of T9 blunt, triangular, projecting over base of left LT9; left LT9 present as a medially procurved arm; right LT9 provided with a short, hyaline, apical lobe (not digitate), short, dorsal, subapical spine and a large, broad ventral process near midlength (Fig. 17B); left paramere curved, tapering spine-like, with bulbous base lacking subbasal lamella and spine; right paramere with spinous, distal lobe twice as long as broad basal lobe; left conjunctival sclerite with two short spines (fractured in slide preparation, Fig 17A); right conjunctival sclerite with (probably) one short spine; vesica with one short, basal, spinous process a little longer than conjunctival spines; vesica abruptly bent near midlength into loop, widening at bend and near three-quarters from base (Fig. 17A).

*Elytrous female.* Unknown

**Distribution.** Known from one locality at 200 m a.s.l. on Mt Mou where it is sympatric with *H. mouensis*, whereas *H. elytratum* is known only from the summit (Fig. 22B).

**Notes.** *H. triacanthatum* and *H. gephyrobregmatum* have the clypeal organ recessed between what are possibly fused lobes of the clypeus but *H. chorizobregmatum* is the only species in which the lobes are salient, obscure the base of the labrum and are clearly discrete although contiguous (Figs 4B-D, 4G).

***Hypselosoma dicroum* sp. nov.**

(Figs 1C, 2B, 3K, 8B, 11C, 17C-D, 23A, Table 1)

**Etymology.** Greek, forked (apex of right conjunctival process).

**Material.** HOLOTYPE male: 22°5'49"S x 166°40'40"E, Rivière Bleue main forest, Kaori Track, 120 m, RR., 21.v.1987, RB, QM4352, 3 slides, 16362 (MNHN(EH)). Paratypes: 11 f, same as holotype,

T165640-50. Other material: 1f, same site, GBM & DC, 25.v.1984, RB, QM4278, T165725; 1f, same site, 120 m, GBM, 12.xi.2000, forest B, QM4447, T165723; 5f, same site, 160 m, GBM, 17.xi.2001, RB, QM8969, T165718-22; 1 m, 22°14'52"S x 166°49'51"E, Pic du Pin, East base site 1, 280 m, GBM & PG, 25.xi.2004-12.i.2005, RFIT, QM11859, T165724 (QM).

**Diagnosis.** The convex rather than flattened form, flat, setigerous clypeal organ, lack of corial sclerotization and punctation, lack of claval punctation and presence of an anal cell distinguish males of this species.

**Description.** *Macropterous male.* Black except antennae, labrum, maxillary plates, labium and legs mostly dark brown, forewing membrane black-brown proximally becoming brown distally (anal cell brown, costal cell black).

Profile convex but less than *H. hypselosomatum* group (compare Figs 1A, 1C).

Base of labrum not tumid in profile, more salient than flat clypeal apex, less salient than setae of clypeal organ; maxillary plates without erect macrosetae; bucculae without macroseta, with tubercle; clypeal organ present in flat, semicircular area on anterior margin bearing many erect, incurved setae.

Disc of pronotum finely punctate (indistinct at 80x magnification); disc weakly constricted anteriorly, lateral margins of disc sinuously convergent, calli not tumid, posterior margin sinuously convex; medial ends of mesosternal transverse carinae acute.

Forewing strongly explanate; costal cell sclerotized, impunctate, concave, merging with wide, inclined, explanate, subcostal margin creating a broad furrow one third from costal edge; hypocostal lamina subequal to width of hind femora; glabrous furrow present along posterior margin of costal cell; clavus sclerotized in proximal half, impunctate, anal cell present, 1AN and 2AN clearly evident in distal half. Vein Cu absent on left forewing of holotype (Fig. 8B).

S3 organ (Fig. 11C) semicircular to oval, possibly without sclerotized posterior rim, with short sclerotized projections from lateral angles, right larger than left, without peripheral row

of long setae, with many long setae adjacently posteriorly on tumidity of S3 and on S4.

**Genitalia.** left process of T9 short, broad, with rounded apex; left LT9 present as a medially procurved arm; right LT9 with broadly bilobate apex (Fig. 17D); distal lobe of right paramere slender, spinous, more than twice as long as proximal lobe; left paramere long, with bulbous base lacking any spine or lamella; left conjunctival sclerite without process (perhaps with a very short spine only); right conjunctival sclerite with curved, apically bifid spine longer than left paramere; vesical base with recurved, slender spine one third length of right conjunctival spine (Fig. 17C); vesica with slight rounded expansion near midlength.

**Elytrous female.** Head dark brown, elytra black, legs dark brown with femoral apices, tibiae and tarsi light brown.

Profile highly convex (Fig. 2B).

Base of labrum not tumid in profile, salient above clypeal plane; maxillary plates without erect macrosetae; bucculae with tubercle, without macroseta.

Disc punctate along faint, transverse impression posterior to calli; lateral margins of disc roundly converging anteriorly, tumid in posterior half; posterior margin straight except angles tumid and projecting a little posteriorly (Fig. 3K).

Elytra highly convex in profile, punctate (including clavus), venation faint, no overlap; glabrous furrow along vein Sc extending roughly 90% to elytral apices demarcating costal cell which is inclined at roughly 30° below horizontal to form a sloping, tapering shelf a little wider than depth of hind femora; hypocostal lamina at least 1.5 times width of hind femora and inclined at roughly 45°, extending 90% to elytral apices.

Gonapophyses provided with 5 teeth.

**Distribution.** Known from two localities about 25km apart and at 120-280 m a.s.l. near the southern end of Grande Terre (Fig. 23A).

**Notes.** The colour of the legs of the female is unlike that of the male. Male S3 organ is like in *H. nordiensis* in apparently lacking a sclerotized posterior rim and possessing a tiny fragmentary sclerite on left side. The holotype has the vein Cu missing on remigium of the left wing (Fig. 8B). The hind tibiae have five not four non-apical macrosetae (3-4 distally and 1-2 near midlength).

***Hypselosoma gephyrobregmatum* sp. nov.**

(Figs 1D, 4D, 8C, 11D, 17E-G, 22B, Table 1)

**Etymology.** Greek, provided with a bridge on front part of head.

**Material.** HOLOTYPE male: 21°35'33"S x 165°48'19"E, Col d'Amieu, sawmill, 400 m, GBM, 25.xi.2003-27.i.2004, RFIT, QM11476, 3 slides and 1 vial, 16363 (MNHN(EH)).

**Diagnosis.** The flat, elytrous form and recessed clypeal organ lacking erect setae (Fig. 4D) distinguish males of this species.

**Description.** *Elytrous male.* Head, pronotum and elytra black; antennae, labrum, maxillary plates, labium and legs dark brown except apices of fore and mid femora and tibiae lighter, hind tibiae lighter except basally; tarsi not lighter.

Overall profile very flat with distinctly explanate costal margins (Fig. 1D).

Base of labrum not tumid in profile, less salient than bridging lobes of clypeal organ; maxillary plates smoothly convex, without erect macrosetae; bucculae without erect macroseta, with tubercle; clypeal organ present, separated from anterior margin by a pair of partly fused lobes forming a bridge (not pale) anterior to circular pit surrounded by many short, incurved, adpressed setae (Fig. 4D).

Disc of pronotum impunctate, gradually constricted anteriorly, lateral margins sinuously convergent, calli not tumid, posterior margin straight, angles weakly tumid; medial ends of transverse mesosternal carinae acute.

Forewing (Fig. 8C), elytrous, punctate, strongly explanate, venation not evident,

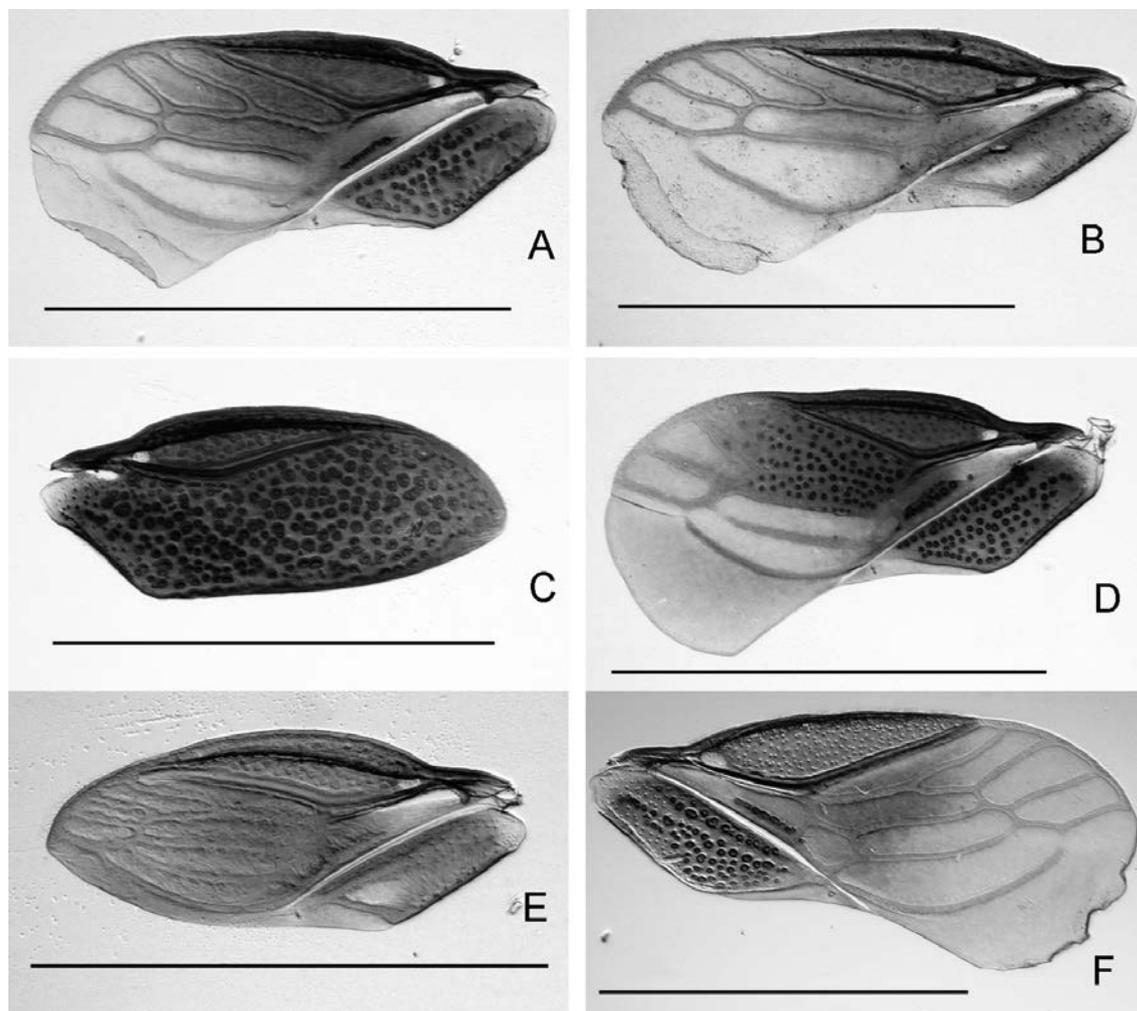


FIG. 8. Male fore wings, dorsal, *Hypselosoma* species. A, *H. chorizobregmatum* sp. nov.; B, *H. dicroum* sp. nov. (aberrant, Cu missing); C, *H. gephyrobregmatum* sp. nov.; D, *H. haplacanthatum* sp. nov.; E, *H. ndouaensis* sp. nov.; F, *H. nordiensis* sp. nov. Scale lines 1 mm.

elytra weakly overlap in distal half; costal cell less punctate, weakly concave, merging with upturned costal vein; glabrous furrow along posterior margin of costal cell extending 75–80% to apex; hypocostal lamina twice width of hind femora, extending 90% to apex.

S3 organ (Fig. 11D) semicircular, with straight, sclerotized posterior margin extending beyond lateral angles, right projection widening basally and longer than left, semicircular anterior margin without peripheral row of long setae,

many long setae posteriorly on tumidity of S3 and medially on S4.

*Genitalia.* left process of T9 short tapering process; left LT9 present as a medially procurved arm; right LT9 with spherical lobate apex, with subapical spine and with a spine on ventral margin at midlength (Fig. 17E); distal lobe of right paramere slender, spinous, twice as long as proximal lobe; left paramere curved, spine-like, with bulbous base lacking lamella or spine (Fig. 17F); left conjunctival sclerite with two

short, curved spines; right conjunctival sclerite with one long curved spine subequal to left paramere; base of vesica provided with one curved spine adjacent to and shorter than those of left conjunctival sclerite (this spine possibly originates from left conjunctival sclerite) (Fig. 17G); vesica abruptly bent near midlength into loop, with short expansion at bend and second abrupt widening near three-quarters from base.

*Female.* Unknown.

**Distribution.** This species is known from one locality at 400 m a.s.l. at Col d'Amieu where it is sympatric with *H. amieuiensis* (Fig. 22B).

**Notes.** The right LT9 is like in *H. triacanthatum*. The short, trispinous configuration (Fig. 17G) of the left conjunctival sclerite and vesical base is shared with *H. triacanthatum* (Fig. 21D), *H. nordiensis* (Fig. 19C) and perhaps *H. chorizobregmatum*.

*Hypselosoma haplacanthatum* sp. nov.

(Figs 8D, 11E, 18A-C,  
22B, Table 1)

**Etymology.** Greek, provided with a single spine (left conjunctival process).

**Material.** HOLOTYPE male: 21°34'47"S x 165°49'0"E, 4km N Col d'Amieu, 300 m, GBM & DC, 8.v.1984, RB, QM4257, 2 slides and 1 vial, 16364 (MNHN(EH)). Paratype: 1 f, as for holotype, 1 vial, T165651 (QM).

**Diagnosis.** The convex form, flat, setigerous clypeal organ, sclerotized and punctate corium and clavus and absence of anal cell distinguish males of this species.

**Description.** *Macropterous male.* Black to dark brown; antennae, labrum, maxillary plates, labium dark brown; coxae and femora dark brown, femoral apices, tibiae and tarsi light brown; forewing membrane black to dark brown proximally becoming brown distally (costal cell black).

Profile convex but less than in members of *H. hypselosomatum* group.

Base of labrum not tumid in profile but salient above plane of flat clypeal apex and less salient than setae of clypeal organ; maxillary plates without erect macrosetae; bucculae

without erect macroseta, with tubercle; clypeal organ present in flat, semicircular area on anterior margin and bearing many (12-20) erect, incurved setae.

Disc of pronotum punctate (not as clearly as forewings), weakly constricted anteriorly, lateral margins sinuously convergent, calli not tumid, posterior margin sinuously convex; medial ends of mesosternal transverse carinae acute.

Forewing (Fig. 8D) moderately explanate, costal cell sclerotized, weakly punctate (in slide mounted material), flat but depressed between vein Sc and inclined, explanate costal margin which is 2-3 membranous-vein widths in dorsal view; hypocostal lamina about 1.5 hind femoral widths; glabrous furrow along posterior margin of costal cell; four corial cells (additional to costal cell) wholly or partly sclerotized and punctate; trapezoidal cell with one puncture in posterobasal angle; clavus sclerotized and punctate, cell obscured, 1AN and 2AN barely discernible.

S3 (Fig. 11E) organ subcircular, with curved, sclerotized posterior margin lacking lateral projections, with peripheral row of long setae anteriorly and cluster of long setae posteriorly on S3 as well as long setae medially on S4.

**Genitalia.** left process of T9 short, broad, with non serrate, rounded apex; left LT9 present as a medially procurved arm; right LT9 possibly without an apical hyaline digit, provided with two spinous processes subapically (Fig. 18A); distal lobe of right paramere almost twice as long as broad, bilobate proximal lobe (Fig. 18B); left paramere curved, tapering spine-like, with bulbous base bearing spine but no lamella; left conjunctival sclerite with short straight spine; right conjunctival sclerite with one short and one long, curved spines; base of vesica with a short spinous process (unless a second spine of left conjunctival process has been confused); vesica bent abruptly at midlength to form incomplete loop, with short digit at bend (Fig. 18C).

*Elytrous female.* Colour like male, elytra black.

Base of labrum not tumid in profile but salient above apex of clypeus; maxillary plates without erect macrosetae or tubercle; bucculae with tubercle, without macroseta.

Disc of pronotum punctate, lateral margins of disc roundly convergent anteriorly, tumid posteriorly; posterior margin mostly straight but tumid at angles.

Elytra highly convex in profile, punctate (including clavus), venation indistinct except faint 1AN, no overlap; a glabrous furrow along path of vein Sc extending roughly 90% to elytral apices demarcating the costal cell which is inclined at roughly 30° below horizontal to form a sloping, tapering shelf a little wider than depth of hind femora; hypocostal lamina at least 1.5 times width of hind femora and inclined at roughly 45°, extending 90% to elytral apices.

Gonapophyses provided with with five teeth.

**Distribution.** Known from a single locality at 300 m a.s.l. near Col d'Amieu where it is sympatric with *H. rhinatum* (Fig. 22B).

**Notes.** The S3 organ seems subcircular but may have a sclerotized posterior rim. It may be intermediate between the subcircular or oval form lacking a sclerotized posterior rim but possessing anterior peripheral setae (*H. hypselosomatum* group) and the semicircular form with a sclerotized posterior margin and lateral projections of most other species. The presence of a spine but no lamella at the base of left paramere is also intermediate.

***Hypselosoma ndouaensis* sp. nov.**

(Figs 1E, 2C, 3C, 3L, 8E, 11F, 18D-G, 22B Table 1)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 22°23'11"S x 166°55'3"E, Cape Ndoua, site 2, 50 m, GBM & PG, 28.xi.2004-8.i.2005, RFIT, QM11877, 2 slides and 1 vial, 16365 (MNHN(EH)). Paratype: 1 f, as for holotype, T165652 (QM).

**Diagnosis.** The small size, flat submacropterous form, flat, setigerous clypeal organ, remigial punctuation limited to margins of veins and

presence of an anal cell distinguish males of this species.

**Description.** *Submacropterous male.* Head dark brown, pronotal collar brown, disc dark brown, clavus and costal cell brown, remainder of fore wing black-brown becoming paler apically; antennae, labrum, maxillary plates, labium and legs dark brown except tarsi and apices of femora and tibiae lighter.

Overall profile flat with distinctly explanate costal margins (Fig. 1E).

Base of labrum not tumid in profile, equal to clypeal plane, less salient than setae of clypeal organ; maxillary plates without erect macrosetae; bucculae without erect macroseta, with tubercle; clypeal organ present, pit near anterior margin in flat area bearing many erect, incurved setae, flat area not coplanar with labrum in profile because clypeus protrudes gently at posterior margin of clypeal organ.

Disc of pronotum finely punctate (indistinct at 80x magnification), gradually constricted anteriorly, lateral margins sinuously convergent, calli not tumid, posterior margin straight, angles not tumid (Fig. 3C); medial ends of transverse mesosternal carinae acute.

Forewing (Fig. 8E) strongly explanate; costal cell sclerotized, impunctate, flat but merging with wide, inclined, explanate, subcostal margin creating a broad furrow midway between vein Sc and costal edge; hypocostal lamina 1.5 times depth of hind femora; glabrous furrow along posterior margin of costal cell extending 80% to apex; fine punctation along remigial veins; membrane reduced to width equal to that between 1AN and Cu; clavus sclerotized in proximal half, impunctate, anal cell present, 1AN and 2AN clearly evident in distal half. Hindwing reduced, reaching T9.

S3 organ (Fig. 11F) semicircular, with sclerotized posterior margin, with short sclerotized projections from lateral angles, right larger than left, without anterior peripheral row of long setae, with many long setae adjacently posteriorly on tumidity of S3 and on S4.

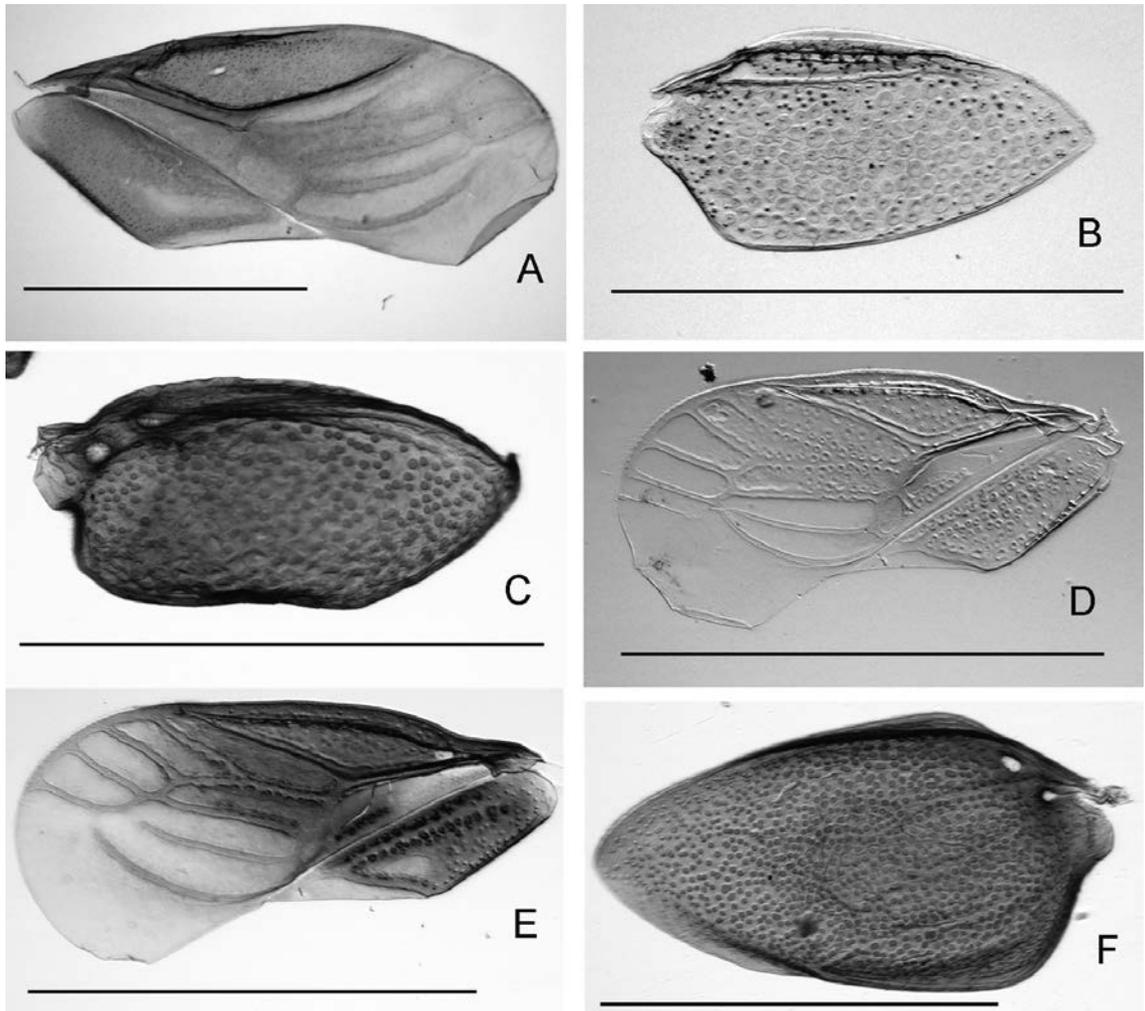


FIG. 9. Fore wings, dorsal, *Hypselosoma* species, A-E, male, F, female. A, *H. oculatum* Reuter; B, *H. rembaiensis* sp. nov.; C, *H. touhoensis* sp. nov.; D, *H. trachyacanthatum*, sp. nov.; E, *H. triacanthatum* sp. nov.; F, *H. hypselosomatium* sp. nov. Scale lines 1 mm.

*Genitalia.* left process of T9 short, tapering to round apex; left LT9 present as a medially procurved arm with expanded apex; right LT9 with blunt apex lacking hyaline digit, with blunt subapical lobe (Fig. 18D); distal lobe of right paramere slender, spinous, twice as long as proximal lobe (Fig. 18E); left paramere very long (twice as long as spinous lobe of right paramere), spine-like, with bulbous base lacking both lamella and spine (Fig. 18F); left conjunctival sclerite with minute spine; right conjunctival sclerite with very long, thick,

spinous process bearing four serrations sub-apically; base of vesica with short spinous process (one third left paramere); vesica sinuous, with rounded expansion before midlength (Fig. 18G).

*Elytrous female.* Colour black except head uni formly dark brown, antennae, labrum, maxillary plates, labium and legs dark brown but tarsi and apices of femora lighter.

Moderately convex in profile (Fig. 2C).

Base of labrum not tumid in profile, equal to clypeus; maxillary plates without erect macrosetae; bucculae with tubercle, without erect macroseta.

Disc of pronotum impunctate, constricted at midlength, lateral margins roundly converging anteriorly in association with tumid calli, straight and parallel in posterior half (not roundly tumid); posterior margin straight (Fig. 3L), not tumid except angles projecting a little posteriorly.

Elytra moderately convex in profile, punctate (including clavus), venation not evident, no overlap; glabrous furrow along path of vein Sc extending 90% to elytral apices demarcating costal cell as an almost horizontal, concave, tapering shelf subequal to hind femoral depth; hypocostal lamina 1.5-2 times depth of hind femora, inclined at roughly 45°, extending 90% to elytral apices.

**Distribution.** Known from one locality at 40 m a.s.l. at the southern tip of Grande Terre (Fig. 22B).

*Hypselosoma nordiensis* sp. nov.

(Figs 1F, 2D, 3D, 3M, 4E, 8F,  
11G, 19A-C, 23B, Table 1)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 22°19'23"S x 166°54'55"E, Forêt Nord, site 2, 200 m, GBM & CB, 2.xii.2004, RP, QM11832, 4 slides 16366 (MNHN(EH)). Paratype: 5 m, T165660-4 and 7f, T165653-9, as for holotype. Other material: 1 m, 22°5'49"S x 166°40'40"E, Rivière Bleue, main forest Kaori track, 160 m, GBM, 17.xi.2001, RP, trees & logs, QM8731, T165747; 3f, same site, GBM, 11.xi.2000, RP, QM9954, T165744-6; 5f, same site, GBM, 19.xi.2002, RP, trees and logs, QM11202, T165756-60; 3 m, 5f, 22°14'52"S x 166°49'51"E, Pic du Pin, site 1, 280 m, GBM & CB, 26.xi.2004, RP, QM11782, T165748-55 (QM).

**Diagnosis.** The convex form, weakly elevated, setigerous clypeal organ, sclerotized and punctate clavus without an anal cell, mostly unsclerotized and non punctate corium and two pale sections on all legs distinguish males of this species.

**Description.** *Macropterous male.* Black to dark brown, apex of scutellum sometimes pale; antennae, labrum, maxillary plates and labium dark brown; legs dark brown except apices

of tibiae and basal tarsomeres light brown; forewing membrane black to dark brown proximally becoming brown distally (costal cell dark) as well as pale triangular area at base of remigium between costal cell and clavus.

Profile convex but less than in members of the *H. hypselosomatum* group (Fig. 1F).

Base of labrum not tumid in profile but salient above plane of (unflattened) clypeal apex and less salient than setae of clypeal organ; maxillary plates without erect macrosetae; bucculae without macroseta, with tubercle; clypeal organ small, weakly elevated, submarginal hole surrounded by many erect, incurved setae (Fig. 4E).

Disc of pronotum coarsely and finely punctate, weakly constricted anteriorly, lateral margins sinuously convergent, calli not tumid, posterior margin sinuously convex (Fig. 3D); medial ends of mesosternal transverse carinae acute.

Forewing (Fig. 8F) moderately explanate, costal cell sclerotized, impunctate (ventrally granulate in slide mounts), flat but depressed between vein Sc and inclined, explanate subcostal margin which is 2 membranal-vein widths in dorsal view; hypocostal lamina about 1.5 hind femoral depths; glabrous furrow along posterior margin of costal cell; corial cells (other than costal cell) not sclerotized except cell Sc+R+M posterodistally (with about six punctures), trapezoidal cell not sclerotized but with one puncture posterobasally; clavus sclerotized and punctate, cell obscured, 1AN and 2AN barely discernible.

S3 organ (Fig. 11G) oval, with (probably) sclerotized posterior margin projecting briefly from lateral angles, right projection T-shaped and larger than left, without peripheral row of long setae anteriorly, with many long setae posteriorly on tumidity of S3 and on S4.

**Genitalia.** left process of T9 short, tapering, with rounded apex; left LT9 present as a medially procurved arm; right LT9 with lobate apex lacking hyaline digit, provided with a triangular process on ventral margin at two thirds from base (Fig. 19B); spinous distal lobe

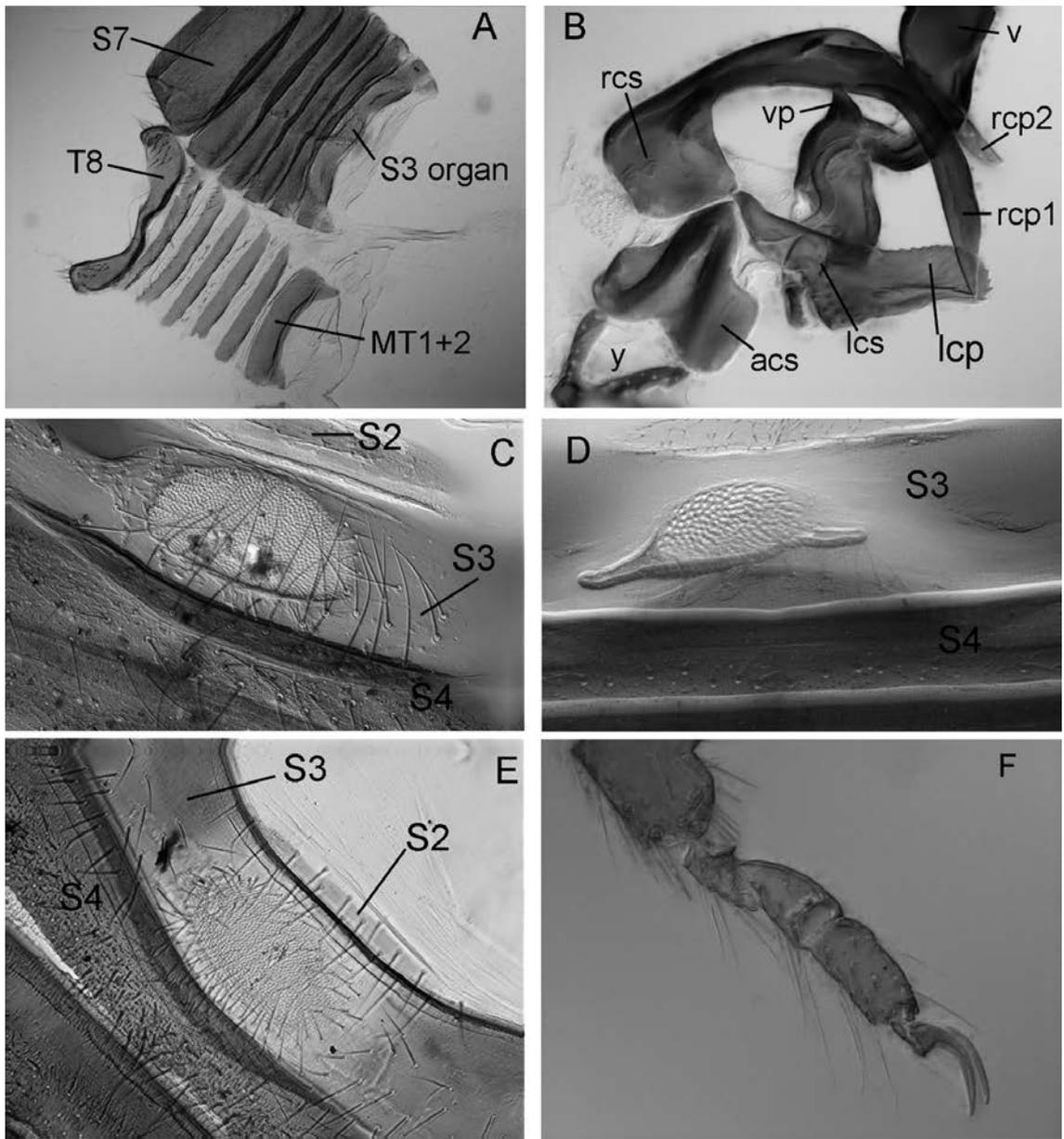


FIG. 10. Males. A-B, *H. hypselosomatum* sp. nov.; A, dissected pregenital abdomen on slide, B, conjunctival sclerites; C, organ on third abdominal sternum, *H. koghiensis* sp. nov.; D, *H. chorizobregmatum* sp. nov., same; E, *H. oculatum* Reuter, same; F, unswollen midtarsus, *H. touhoensis* sp. nov. acs, anterior conjunctival sclerite, lcp, left conjunctival process; lcs, left conjunctival sclerite, rcp, right conjunctival processes; rcs, right conjunctival sclerite, v, vesica, vp, vesical process; y, y sclerite.

of right paramere twice as long as proximal lobe; left paramere curved, tapering, spine-like, with bulbous base bearing a spine but no lamella (Fig. 19A); left conjunctival sclerite with two short processes, longer process spinous and proximally curved, shorter process half as long, spinous, bearing a biserrate basal flange (Fig. 19C); right conjunctival sclerite provided with one process, subequal in length to left paramere, stout and spiculate proximally, abruptly constricted at midlength into broadly tapering spine; vesical base with spinous process subequal to longer process of left conjunctival sclerite (Fig. 19C); vesica bent abruptly near midlength into loop, with short widening or projection at bend.

*Elytrous female.* Mostly black; labrum, maxillary plates and labium dark brown; legs dark brown except apices of tibiae and basal tarsomeres light brown. Moderately convex in profile (Fig. 2D).

Base of labrum tumid in profile and salient above apex of clypeus; maxillary plates without erect macrosetae; bucculae with tubercle, without macroseta.

Disc of pronotum punctate, lateral margins roundly convergent anteriorly, tumid posteriorly; posterior margin mostly straight, not tumid except at angles (Fig. 3M).

Elytra moderately convex in profile, coarsely punctate (including clavus), venation faint, no overlap; glabrous furrow along path of vein Sc extending roughly 90% to elytral apices demarking costal cell which is inclined at roughly 30° below horizontal to form a sloping, tapering shelf a little wider than width of hind femora; hypocostal lamina at least 1.5 times depth of hind femora and inclined at roughly 45°, extending 90% to elytral apices.

Gonapophyses provided with 5 teeth.

**Distribution.** Known from three localities (four sites) about 35km apart and at 120-210 m a.s.l. near the southern end of Grande Terre. It is sympatric with *H. bleuensis*, *H. dicroum*, *H. oculatum*, *H. onceronotatum* and possibly *H. hypselosomatum* at various localities (Fig. 23B).

**Notes.** The colour of the male legs is distinctive in that the pale femoral apices and basal (but not apical) tarsomeres form two pale spots on each leg. The vesica, vesical process, left conjunctival sclerite and right paramere are similar to those of *H. triacanthatum*. The clypeal organ hole is submarginal but not embraced by salient lobes nor in a flat area. In this, it is similar but less elevated than the clypeal organ of *H. oculatum*. The male S3 organ may not be strictly semicircular and may share a fragmentary sclerite (perhaps an artifact) on left side with *H. dicroum*. The presence of a basal spine but no lamella of the left paramere also occurs in *H. haplacanthatum* and may be intermediate between *H. hypselosomatum* group and other species.

#### *Hypselosoma oculatum* Reuter, 1891

(Figs 1G, 2E, 3E, 5, 6H, 9A, 10E, 11H, 19D-G, 23C, Table 1)

**Material.** HOLOTYPE not seen. 1 m on slide, 5 miles (sic) SE La Foa, C.L. Remington, 9 April 1945 (AMNH). 1 m, 22°5'15"S x 166°26'41"E, Dzumac Road, GBM, 5.xii.2003-26.i.2004, RFIT, QM11467, T165678; 1 m, 1 nymph, T65714-5, 22°11'3"S x 166°31'59"E, Forêt de la Thy Reserve, M&C, 21.v.1984; 5 m, 5 f, T165668-0, T165672-6, T165716, 22°19'23"S x 166°54'55"E, Forêt Nord site 2, QM party, 200 m, 3.xii.2004, R handpicking, QM11829; 1 m T165677, 20°57'22"S x 165°17'27"E, Pic d'Amoa, N slopes, 500 m, GBM, 27.xi.2003-30.i.2004, RFIT, QM11482, T165677 (QM).

**Diagnosis.** The large size, convex profile, strongly elevated setigerous clypeal organ and reddish spots on the frons distinguish males of this species.

**Redescription.** *Macropterous male.* Mostly black; head black except for pair of reddish spots which sometimes merge to form a band across frons; antennae, labrum, maxillary plates, labium and legs mostly dark brown but tibiae and tarsi paler (fore tibiae wholly pale, mid tibiae mostly pale and hind tibiae distally pale), forewing membrane black proximally becoming black-brown distally (costal cell black). Profile highly convex (Fig. 1G).

Base of labrum not tumid in profile, equal to clypeal apex but less salient than setae of clypeal organ; maxillary plates with 2-3 macro-

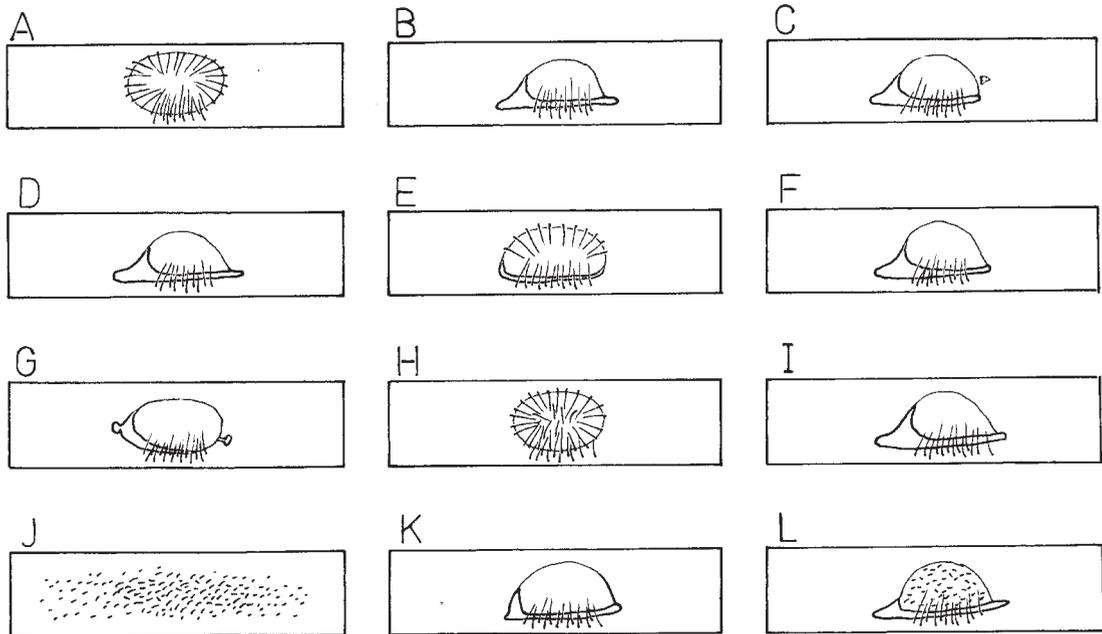


FIG. 11. Male third abdominal sternum with medial organ, schematic, anterior margin upper, *Hypselosoma* species. A, *H. amieuensis* sp. nov.; B, *H. chorizobregmatum* sp. nov.; C, *H. dicroum* sp. nov.; D, *H. gephyrobregmatum* sp. nov.; E, *H. haplacanthatum* sp. nov.; F, *H. ndouaensis* sp. nov.; G, *H. nordiensis* sp. nov.; H, *H. oculatum* Reuter; I, *H. rembaiensis* sp. nov.; J, *H. touhoensis* sp. nov.; K, *H. trachyacanthatum* sp. nov.; L, *H. triacanthatum* sp. nov.

setae setae aligned with basal macrosetae of labrum; bucculae with 2-3 macroseta and rugose tubercle; clypeal organ present as small submarginal hole elevated on a conical prominence surrounded by many erect incurved setae (Fig. 5); ocular setae absent.

Disc of pronotum finely punctate (not easily observed); lateral margins convexly and smoothly convergent (not sinuous), calli tumid, posterior margin convex (Fig. 3E); medial ends of mesosternal, transverse carinae square (perhaps acute but not tapering).

Forewing (Figs 9A, 10E, 11H) not explanate; costal cell sclerotized, not concave (hence margin not explanate), impunctate but finely granulate ventrally; hypocostal lamina as wide as hind femoral width; glabrous furrow along posterior margin of costal cell; corium mostly membranous, with some dark areas perhaps indicating incipient sclerotization associated with fine punctation on margins of

veins immediately distal to trapezoidal cell; membrane fully developed; anal cell reduced to area of trapezoidal cell, remainder sclerotized and finely granulate ventrally.

Hind tibiae with anterodorsal macroseta at 10% from base and posteroventral macroseta at 40% from base in addition to 2-3 distal non-apical macrosetae (Fig. 6H).

S3 organ is oval granulate area with a single peripheral row of long setae plus shorter seta within oval area; with cluster of long setae adjacently on posterior tumidity of S3.

*Genitalia.* left process of T9 absent; left LT9 is present as a medially bent arm; right LT9 with round non-hyaline apex, with pair of lobate processes subapically, lacking spinous process at midlength (Fig. 19F); distal lobe of right paramere digitate (not spinous), longer than proximal lobe (Fig. 19D); left paramere stout, tapering (but not spinous) arm with bifid apex, without subbasal spine and lamella (Fig. 19G);

left conjunctival sclerite without process; right conjunctival sclerite with very long, sinuously recurved, spinous process; vesica recurved, without basal process, with short branch distally (Fig. 19E).

*Elytrous female.* Mostly black; head black except for pair of reddish spots which sometimes merge to form a band across frons; antennae, labrum, maxillary plates, labium and legs mostly dark brown but tibiae and tarsi paler (fore tibiae wholly pale, mid tibiae mostly pale and hind tibiae distally pale); elytra black. Profile highly convex (Fig. 2E).

Base of labrum not tumid in profile, barely more salient than clypeus; maxillary plates with 2-3 short, erect macrosetae; bucculae with tubercle bearing 1-2 erect macrosetae; ocular setae absent.

Disc of pronotum impunctate, lateral margins of disc linearly converging anteriorly (truncate not rounded), parallel posteriorly; posterior margin straight, posterior angles not tumid.

Elytra highly convex in profile and in section (with vertical sides), impunctate; no glabrous furrow marking path of vein Sc and costal cell not abruptly changing plane from remainder of elytra; costal margin (vein C) with low (as high as wide), rounded carina extending 60% to apices; hypocoastal lamina a little wider than width of hind femora, extending 60% to apices; venation weakly evident distally as several raised parallel lines in dorsal view; elytra overlap in distal half, variably right on left and vice versa.

**Distribution.** This species is known from five, disjunct localities at 150-700 m a.s.l. mostly in the southern half of Grande Terre. It is sympatric with *H. nordiensis*, *H. rembaiensis*, *H. hypselosomatum* (or a close relative at Forêt Nord) and perhaps *H. koghiensis* (Mt Koghis) (Fig. 23C).

**Notes.** It is believed that the male from Forêt de la Thy listed above was transposed with a male of *H. amieuensis* from Table Unio in labeled vials during observations for this paper but this error was rectified.

The absence of ocular setae (arising on the frons and overlying the eyes) is very unusual in Hypselosomatinae and was observed in several specimens.

The holotype of *H. oculatum* was listed as 'D.A. Montadon (Coll. auctoris)' in Reuter (1891) and as 'Holotype brachypterous female [Reuter], Mt Kogui, New Caledonia (D.A. Fennel)' in Emsley 1969. It was not found through enquiries at Hensinki and London Museums. The author does not know whether Wygodzinsky saw the type of Reuter or the macropterous male described by Poppius. Of the latter, Emsley (1969) wrote 'Macropterous male, Mt Kogui (probably lost)'. The holotype may be with other material of Montadon in Bucharest Museum (Rédei, pers. comm.). Wygodzinsky's (1959) material was listed as '7 miles southeast of Foa, New Caledonia, under a stone, 22.iv.1945, collector C.L. Remington' which is not precisely the same as the material from AMNH examined here.

The Queensland Museum specimens listed above match the slide of a dissected male used by Wygodzinsky in his description, including dimensions of appendages. They also match the description by Wygodzinsky (1959), particularly the diagnostic male genitalia and red frons but dimensions are smaller. Wygodzinsky gave the length of his male as 3.2 mm, which is 35% larger than the males studied here (2.38 mm, range 2.17-2.51, n = 9), larger than the 19 species newly described here or any previously described species although Wygodzinsky said the elytrous female of *H. pauliana* Wygodzinsky is 2 mm suggesting the male, if macropterous, is 2.4 mm. However, in the same paper Wygodzinsky made an error when describing *H. hickmani* Wygodzinsky, 1959, the only species in Tasmania, as explained by Hill (1980). In essence, Wygodzinsky gave a length of 2.45 mm for *H. hickmani* when the true length is closer to 1.8 mm, an overestimate of 36%. Measurement of the holotype in the British Museum confirmed the error. Hence it is concluded that some of the dimensions in Wygodzinsky (1959) are erroneous and that the specimen described by him is conspecific with the Queensland Museum material listed above.

Reuter said the head of *H. oculatum* has a 'ferrugineis' band between the eyes, rostrum and antennae. In the other 19 species described here the head is concolourous (black, black-brown or brown) or the frons and vertex are slightly paler than the clypeus. However, this difference in colour is slight and variable whereas in the material examined above two well-defined reddish patches (sometimes coalescing) consistently occur on the otherwise black head. In *H. koghiensis*, from the generic type locality of Mt Koghis, the head is entirely and uniformly brown in contrast to the remainder of the body being black. The only other species known to have a red frons is *H. hirashimai* Esaki and Miyamoto, 1959. Esaki and Miyamoto (1959) described a red area on the frons of the female and paler area in males.

On locality, size, convexity and lack of elytral punctation, two species among the 20 studied here were strong contenders to be *H. oculatum*, namely that described above and *H. koghiensis*. The latter occurs at Mt Koghis while the former occurs nearby at Forêt de la Thy Reserve. However, seven other species occur in a 20km radius, namely *H. bleuensis*, *H. chorizobregmatum*, *H. dicroum*, *H. elytratum*, *H. mouensis*, *H. nordiensis* and *H. rembaiensis*.

Reuter's figure 16A, a dorsal view of his elytrous female, indicates three parallel longitudinal lines distally on each elytra (traces of veins M, Cu and 1AN), linearly rather than roundly truncated anterior angles on the pronotal disc, straight parallel lateral margins of the posterior half of the disc and a relatively acute, prominent rather than bluntly rounded clypeus. These four characters best match the specimens described above among the 20 species studied here. *H. koghiensis* has two parallel lines proximally on the relatively shiny elytra not three distally, roundly truncated anterior angles on the disc, convex lateral margins on the disc posteriorly and a less prominent clypeus.

Reuter gave the overall length of his elytrous female as 1.8 mm compared with 2.08 mm observed here for the specimens described above (12% longer or a possible error by Reuter of -7.8%). All the other species described

here have shorter elytrous females with the closest being *H. amieuensis*, *H. elytratum* and *H. koghiensis* at 1.7 mm and *H. nordiensis* at 1.6 mm. The convexity in lateral profile of *H. nordiensis* is much less than Reuter's figure 16B and it has inflated posterior angles on the disc and more rounded anterior angles in dorsal view. Although *H. elytratum* and *H. amieuensis* have strong convexity in profile they lack the four characters mentioned in the preceding paragraph and have concolourous heads.

It is concluded that the specimens described above and that described by Wygodzinsky belong to *H. oculatum* while *H. koghiensis* from Mt Koghis, the generic type locality, is a sympatric species. Many examples of sympatry in New Caledonia *Hypselosoma* species are listed below.

*H. oculatum* differs from *H. hypselosomatum* group in the following characters: presence of clypeal organ; linear not round truncation of anterior disc angles; greater male claval sclerotization (small anal cell); left paramere is apically bifid and lacks a lamella and associated spine basally; distal lobe of right paramere is much longer than proximal lobe; left conjunctival sclerite lacks a spatulate process; vesica branches distally and lacks a subbasal process; left process of T9 is absent (although it is small in some members of *H. hypselosomatum* group); and apex of right LT9 is not hyaline and digitate.

The left paramere was observed acting as a wing clip restraining the left wing in one male. The vesical branch may act as a scribe against the margin of genital capsule.

***Hypselosoma onceronotatum* sp. nov.**  
(Figs 2F, 23D, Table 1)

**Etymology.** Greek, provided with a swollen back (pronotum).

**Material.** HOLOTYPE female: 22°5'49"S x 166°40'40"E, Rivière Bleue, main forest, Kaori track, 120 m, RR, 21.v.1987, QM4352, carded, 16367 (MNHN(EH)). Other material: 1f, same site, GBM & DC, 25.v.1984, RB, QM4278, T165761; 1f, 22°17'0"S x 166°53'46"E, Pic du Grand, Kaori W base, site 1, 250 m, GBM & PG, 23.xi.2004, RB, QM11767, T165762 (QM).

**Diagnosis.** The pronotal disc has distinctively complex topography derived from a faint transverse depression and tumid muscles scars (calli), posterior angles and margin.

**Description.** *Male.* Unknown

*Elytrous female.* Colour black except head uniformly dark brown, antennae, labrum, maxillary plates, labium and legs mostly dark brown but tarsi and apices of femora and tibiae lighter.

Overall profile is moderately convex (Fig 2F).

Base of labrum not tumid in profile, salient above clypeal plane; maxillary plates without erect macrosetae; bucculae with tubercle, without erect macroseta; clypeal organ absent as in all female *Hypselosoma*.

Disc of pronotum impunctate except in faint, transverse impression posterior to calli; constricted anteriorly; lateral margins of disc roundly convergent anteriorly, straight and parallel posteriorly; calli tumid; posterior margin straight and thick (abruptly rather than roundly deflexed), posterior angles tumid and squarely deflexed.

Elytra highly convex in profile, punctate (excluding base of clavus), venation not evident, no overlap; glabrous furrow along path of vein Sc demarcating costal cell which is inclined at roughly 45° below horizontal to form a sloping, tapering shelf a little wider than depth of hind femora and extending roughly 90% to elytral apices; hypocostal lamina at least 1.5 times depth of hind femora and inclined at roughly 45°.

**Distribution.** Known from two localities about 30 km apart and at 120-250 m a.s.l. near the south end of Grande Terre. It is sympatric with *H. nordiensis* and *H. dicroum* at Rivière Bleu and with *H. hypselosomatum* at Pic du Grand (Fig. 23D).

*Hypselosoma rembaiensis* sp. nov.  
(Figs 1H, 9B, 11I, 20A-F, 23E, Table 1)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 21°34'46"S x 165°50'34"E, Mt Rembai, 750 m, GBM & DC,

9.v.1984, RB, QM4259, 4 slides, 16368 (MNHN(EH)). Other material: 1 m, 21°36'36"S x 165°48'37"E, Col d'Amieu west slope, 470 m, GBM, 25.xi.2003-27.1.2004, RFIT, QM11475, T16571, 3 slides and vial; 1 m, 21°24'59"S x 165°28'11"E, Col de Roussettes, forestry track, 490 m, RR, 29.v.1987, RB, QM4353, T165692; 4 m, 22°1'54"S x 166°27'59"E, Dzumac Rd junction, 950 m, GBM, 5.xii.2003-26.i.2004, RFIT, QM11465, T165685-8; 1 m, same site, GBM, 26.i.2004, RB, QM11534, T 165691; 2 m, Forêt Nord summit, site 1, 480 or 600 m, GBM & PG, 1.xii.2004-9.i.2005, RFIT, QM11883, T 16589-90; 1 m, 21°33'15"S x 165°46'21"E, Table Unio summit, 1000 m, GBM & DC, 10.v.1984, RB (moss), QM4261, T165717 (QM).

**Diagnosis.** The convex, elytrous form and flat setigerous clypeal organ distinguish males of this species.

**Description.** *Elytrous male.* Black except antennae, labrum, maxillary plates, labium and legs dark brown; tarsi and apices of femora marginally paler in some individuals.

Overall profile is moderately convex (Fig. 1H).

Base of labrum not tumid in profile, more salient than flat clypeal apex, less salient than setae of clypeal organ; maxillary plates smoothly convex, without erect macrosetae; bucculae without erect macroseta, with tubercle (rugose apically); clypeal organ present in flat, subcircular area on anterior margin bearing many erect, incurved setae. Ocelli present.

Disc of pronotum punctate (indistinct at 80x magnification), abruptly constricted anteriorly, anterior halves of lateral margins roundly convergent, calli not tumid, posterior halves tumid; posterior margin straight, posterior angles tumid.

Medial ends of mesosternal transverse carinae acute.

Elytra (Fig. 9B) moderately convex in profile, punctate (including costal cell and hypocostal lamina), venation not evident, no overlap; glabrous furrow along path of vein R extending almost 90% to elytral apices demarcating costal cell which is inclined at roughly 45° below horizontal to form a sloping, tapering shelf a little wider than depth of hind femora; hypocostal lamina at least 1.5 times width of hind femora and inclined at roughly 45°, extending 90% to elytral apices.

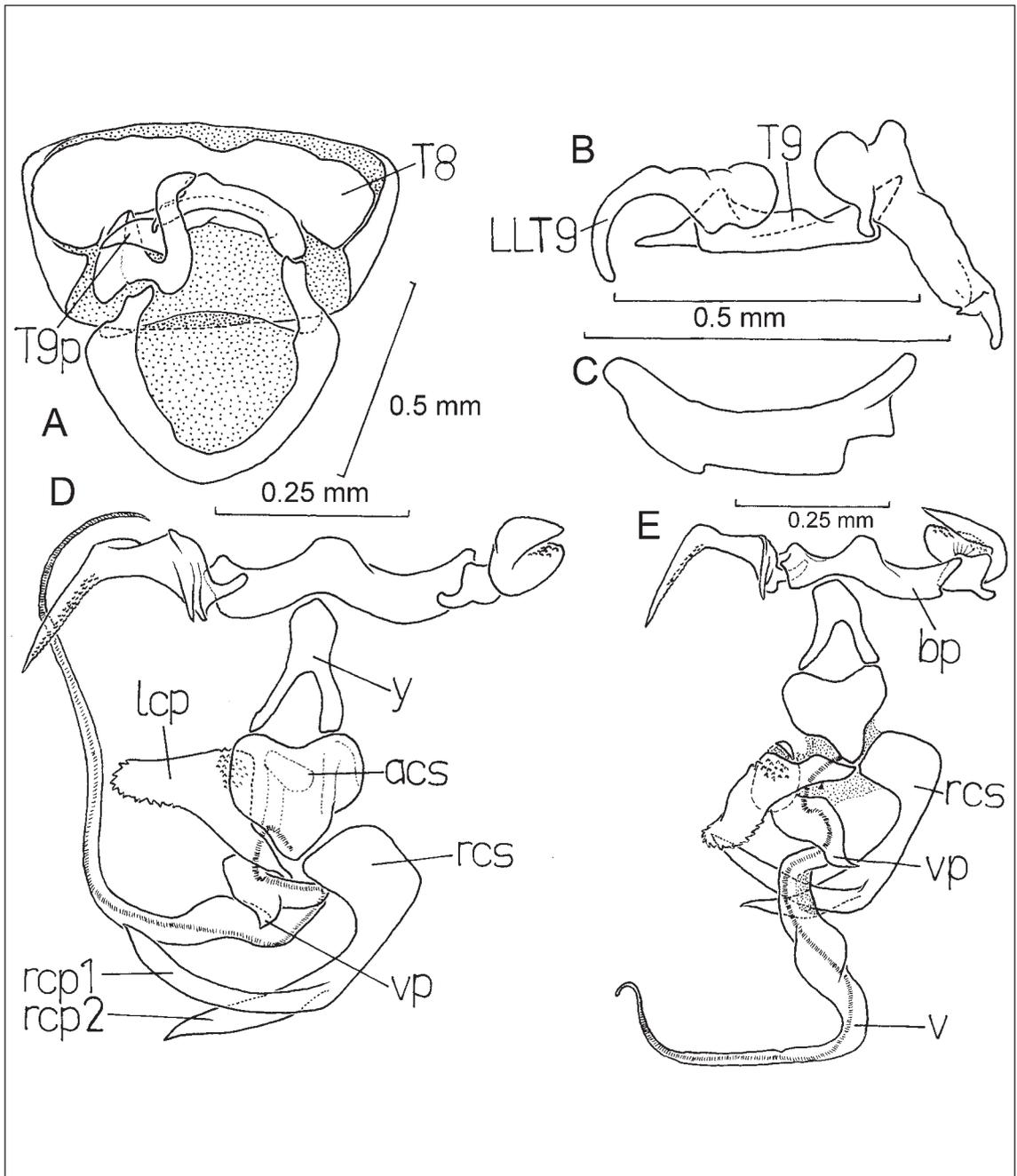


FIG. 12. Male genitalia *Hypselosoma hypselosomatum* sp. nov. A, caudum with aedeagus removed; B, T9 and laterotergites; C, right ninth laterotergite; D, aedeagus, basal plate and parameres (Pic du Grand Kaori site); E, same, another male. acs, anterior conjunctival sclerite; bp, basal plate; lcp left conjunctival process; LLT9, left ninth laterotergite; rcp, right conjunctival process; rcs, right conjunctival sclerite; T8, eighth tergum; T9, ninth tergum; T9p, left process of ninth tergum; v, vesica; vp, vesical process; y, y-sclerite.

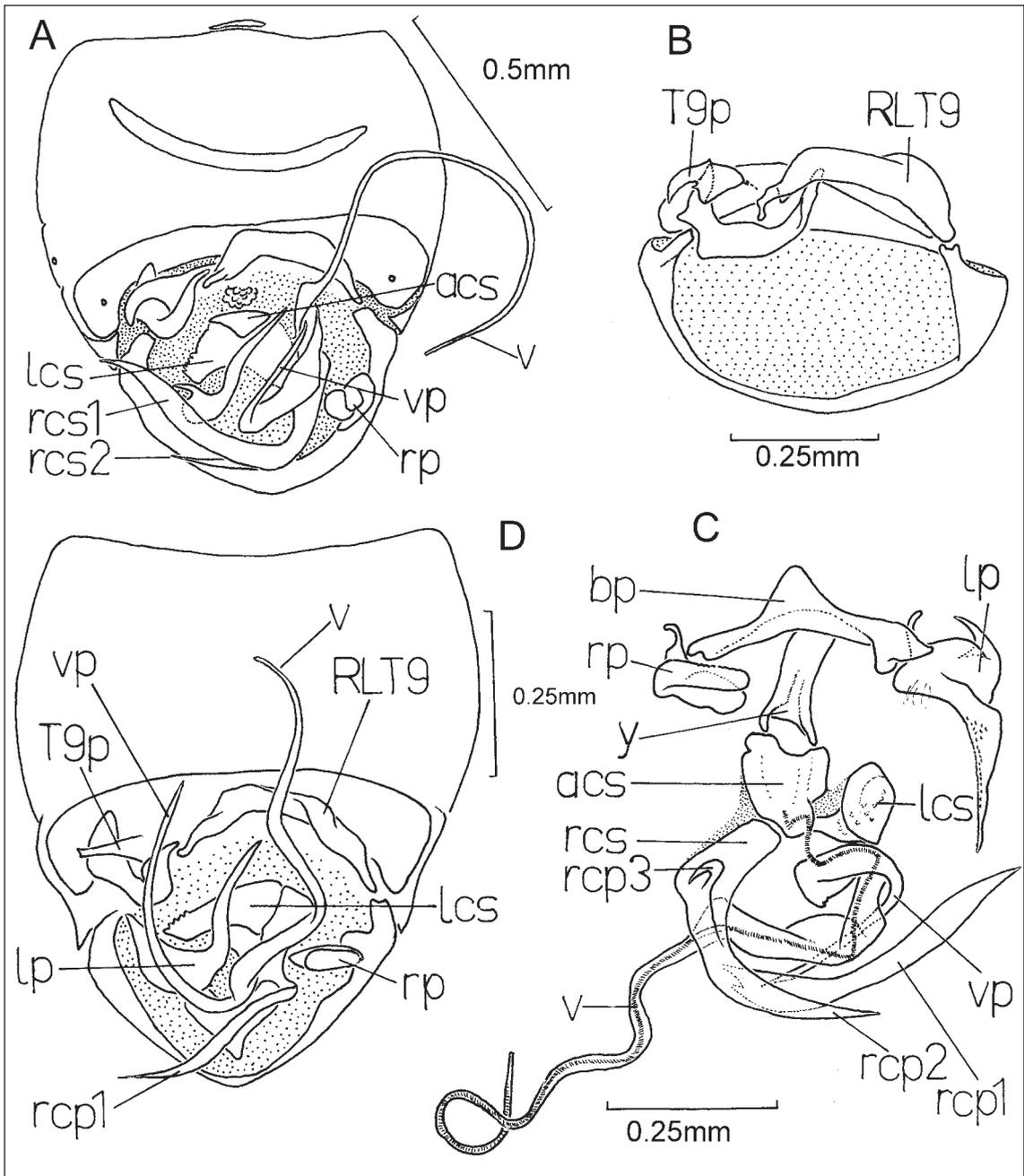


FIG. 13. Male genitalia, A-C, *Hypselosoma amieuensis* sp. nov. A, abdomen, dorsal; B, genital capsule and T9, dorsal; C, aedeagus, basal plate and parameres; D, *H. bleuensis* sp. nov., abdomen, dorsal. acs, anterior conjunctival sclerite; bp, basal plate; lcs, left conjunctival sclerite; lp, left paramere; RLT9, right ninth laterotergite; rcp, right conjunctival process; rcs, right conjunctival sclerite; rp, right paramere; T8, eighth tergum; T9, ninth tergum; T9p, left process of ninth tergum; v, vesica; vp, vesical process; y, y-sclerite.

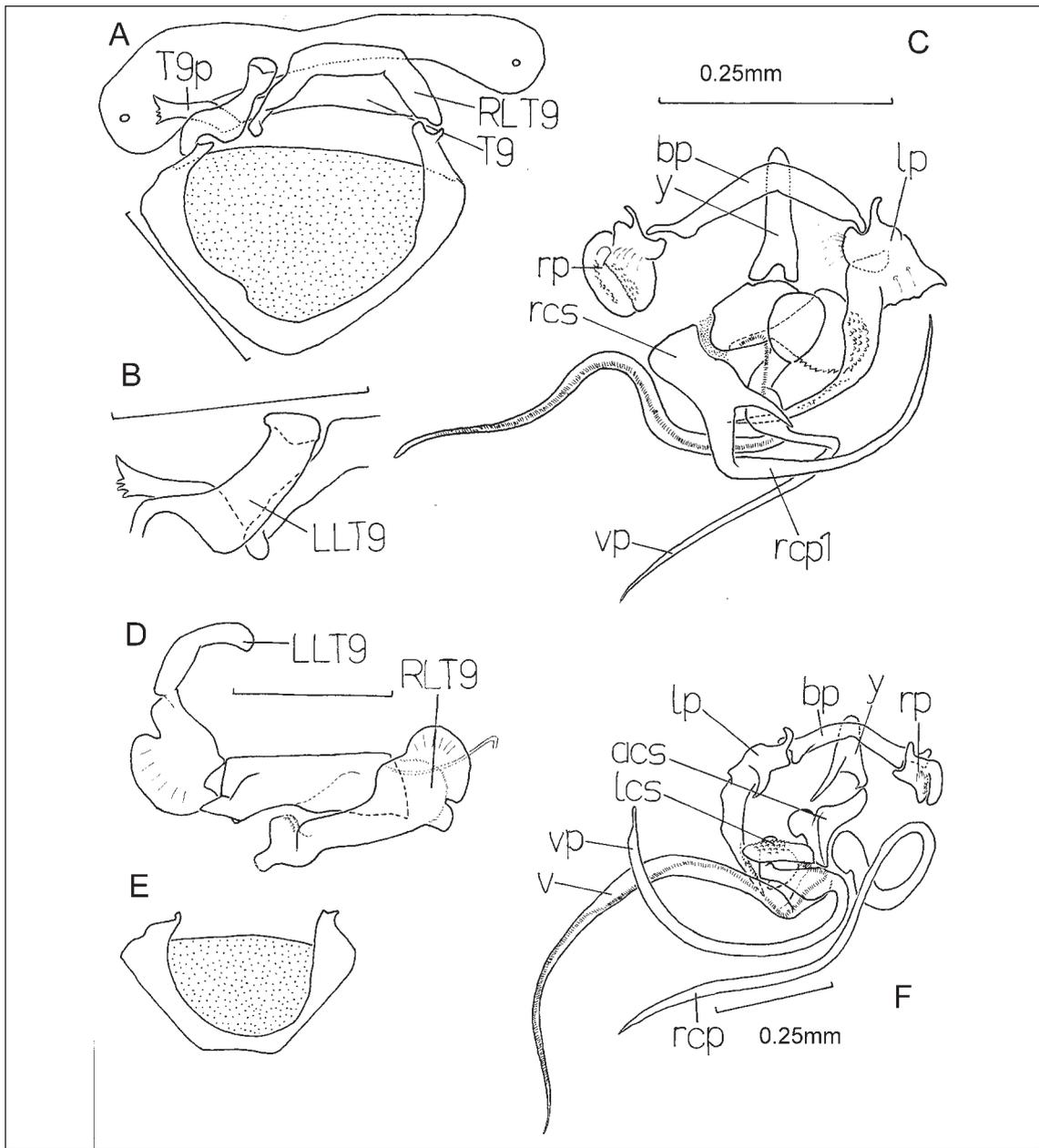


FIG. 14. Male genitalia. A-C, *Hypselosoma bleuensis* sp. nov.; A, T8-9 and genital capsule with aedeagus removed, dorsal; B, left ninth laterotergite and left process of T9; dorsal; C, aedeagus, basal plate and parameres. D-F, *H. koghiensis* sp. nov. D, T9 and laterotergites; E, genital capsule, aedeagus removed, dorsal; F, aedeagus, basal plate and parameres. acs, anterior conjunctival sclerite; bp, basal plate; lcs, left conjunctival sclerite; lp, left paramere; LLT9, left ninth laterotergite; RLT9, right ninth laterotergite; rcp, right conjunctival process; rcs, right conjunctival sclerite; rp, right paramere; T9, ninth tergum; T9p, left process of ninth tergum; v, vesica; vp, vesical process; y, y-sclerite. All scale lines 0.25 mm.

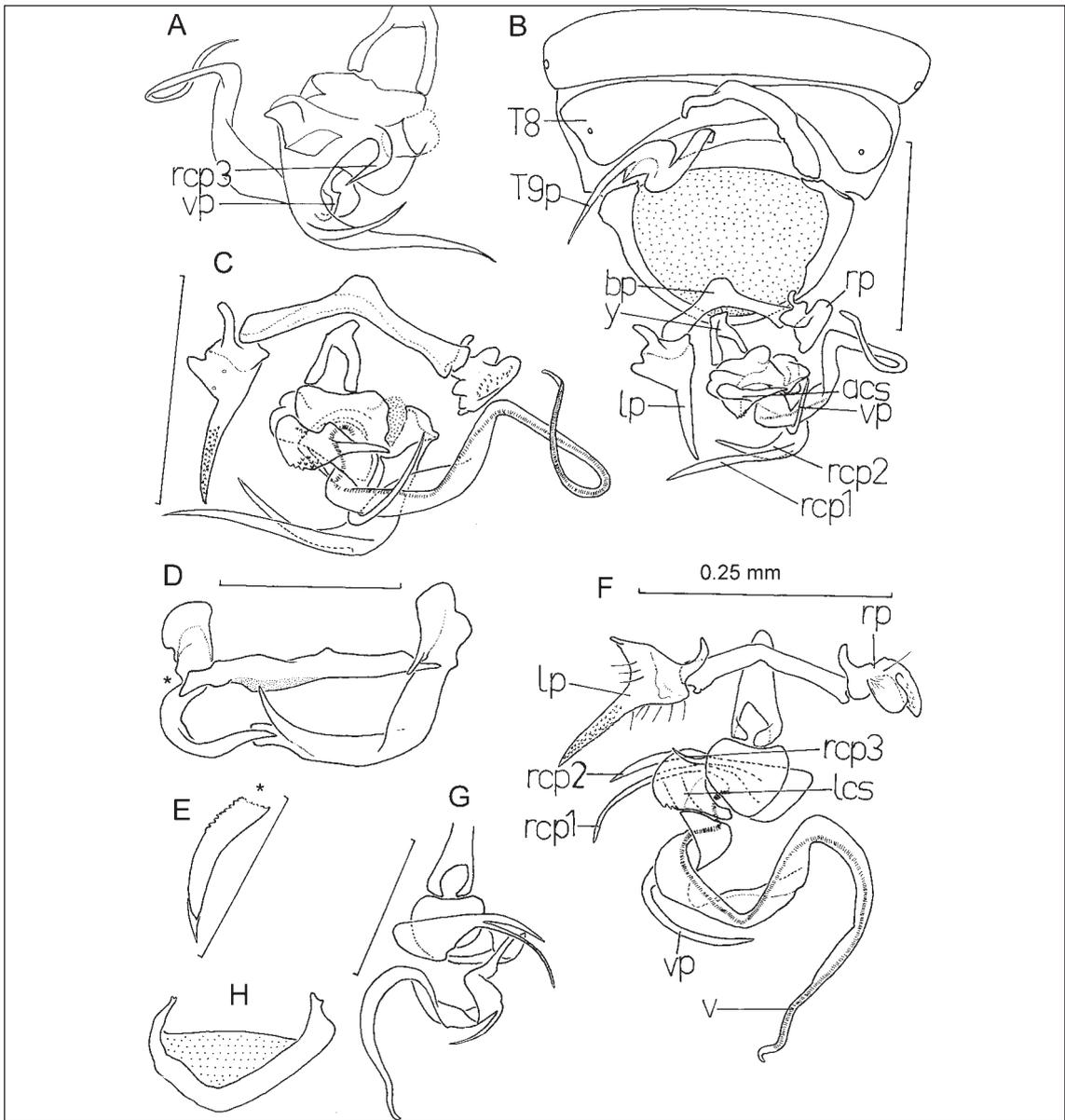


FIG. 15. Male genitalia. A-C, *Hypselosoma mandjeliensis* sp. nov. A, y-sclerite, conjunctiva and vesica with right conjunctival sclerite dorsal; B, caudum, dorsal, aedeagus folded out; C, aedeagus, basal plate and parameres, left conjunctival sclerite dorsal. D-H, *H. mouensis* sp. nov. D, T9 and laterotergites with fracture of left process asterisked; E, fractured apex of left process of T9; F, aedeagus, basal plate and parameres with right conjunctival sclerite ventral; G, aedeagus with right conjunctival sclerite dorsal. acs, anterior conjunctival sclerite; bp, basal plate; lcs, left conjunctival sclerite; lp, left paramere; LLT9, left ninth laterotergite; RLT9, right ninth laterotergite; rcp, right conjunctival process; rcs, right conjunctival sclerite; rp, right paramere; T8, eighth tergum; T9, ninth tergum; T9p, left process of ninth tergum; v, vesica; vp, vesical process; y, y-sclerite. All scale lines 0.25 mm.

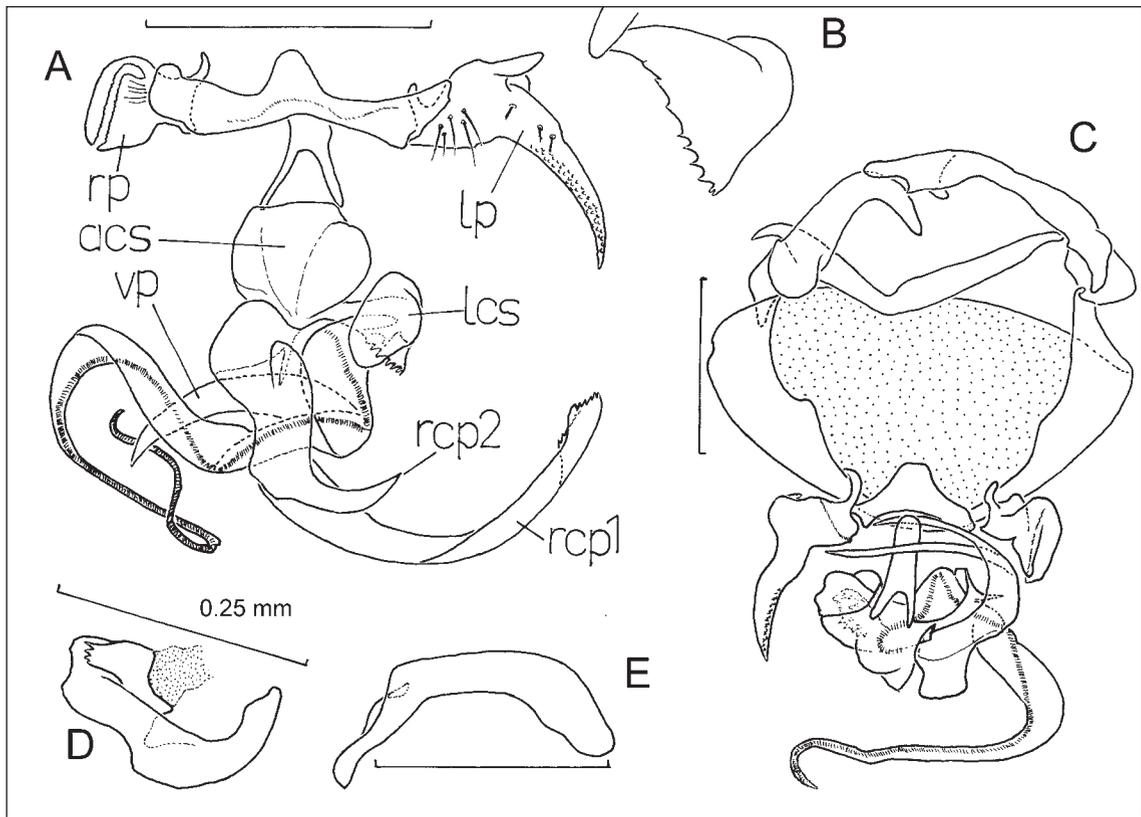


FIG. 16. Male genitalia. A, B, D and E, *Hypselosoma rhinatum* sp. nov. A, aedeagus, basal plate and parameres; B, apex left conjunctival process; D, left process of T9 and laterotergite; E, right ninth laterotergite. C, *H. elytratum* sp. nov., T9 and laterotergites and genital capsule with aedeagus folded out. acs, anterior conjunctival sclerite; lcs, left conjunctival sclerite; lp, left paramere; rcp, right conjunctival process; rp, right paramere; vp, vesical process. Scale lines 0.25 mm.

S3 organ (Fig. 11I) semicircular, with sclerotized posterior margin and projections from lateral angles, right projection widening basally and longer than left, semicircle without anterior peripheral row of long setae, many long setae posteriorly on tumidity of S3 and medially on S4.

*Genitalia.* left process of T9 short and broad with finely serrate apex; left LT9 present as a medially procurved arm; right LT9 with lobate apex (no hyaline digit), with distal, digitate process on ventral margin (Figs 20A, 20E); distal lobe of right paramere slender, spinous, more than twice as long as proximal lobe (Fig. 20D); proximal lobe of right paramere bilobate with short secondary lobe projecting perpendicular

to axis of distal lobe; left paramere long, with bulbous base, lacking spine and lamella (Fig. 20F); left conjunctival sclerite bearing a short, recurved spine; right conjunctival sclerite bearing a curved, spatulate process with spiculate apex (Fig. 20C), process equal in length to left paramere and four times as long as spine on left conjunctival sclerite (Fig. 20A); base of vesica bearing a spine equal in length to left conjunctival spine (Fig. 20B); vesica stout, with short projection (apex of spiral sheath?) at midlength, probably not abruptly bent at midlength (Fig. 20F).

*Female.* Unknown.

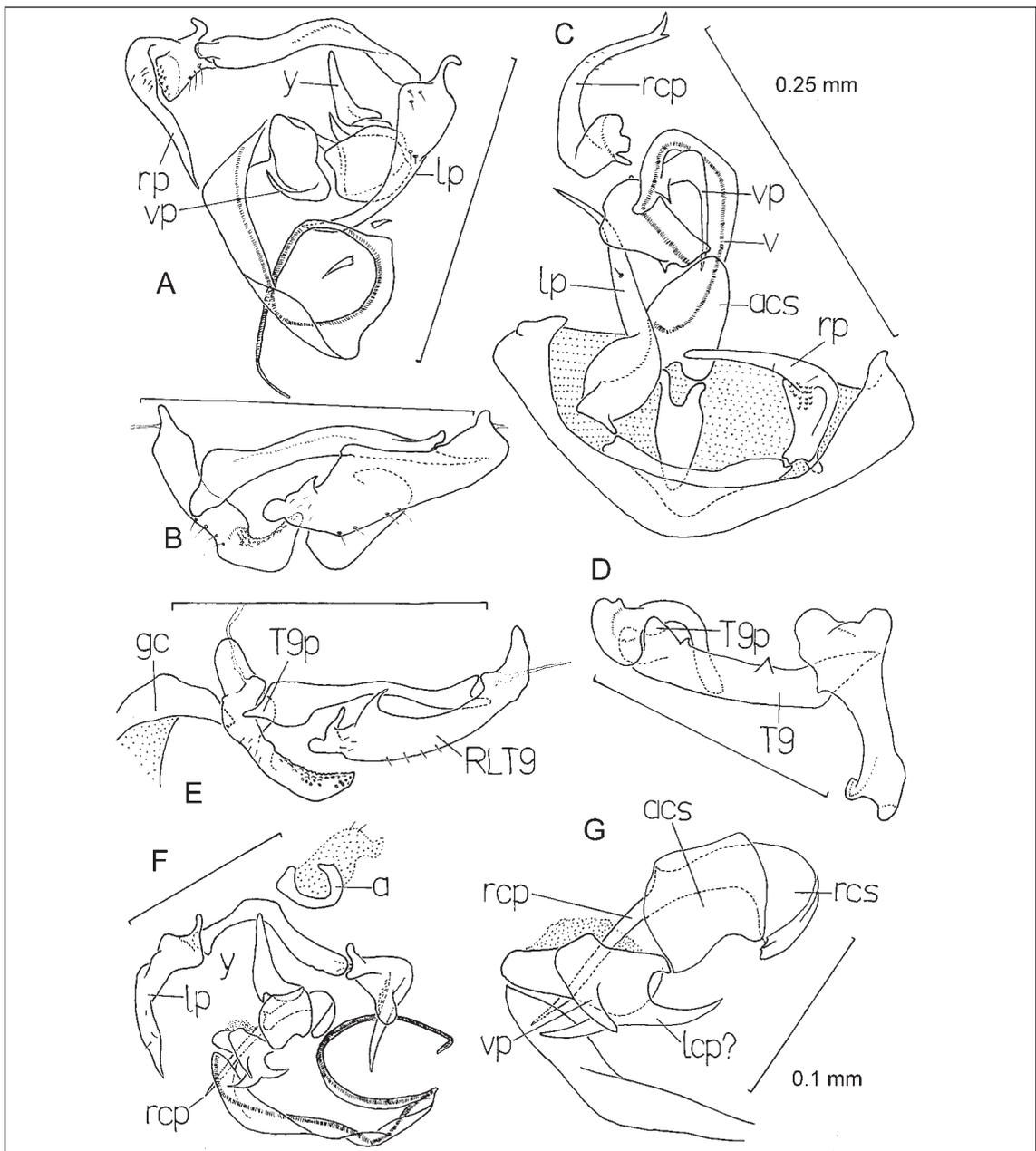


FIG. 17. Male genitalia. A-B, *Hypselosoma chorizobregmatum* sp. nov.; A, aedeagus, basal plate and parameres; B, T9 and laterotergites. C-D, *H. dicroum* sp. nov.; C, genital capsule, aedeagus, basal plate and parameres; D, T9 and laterotergites. E-G, *H. gephyrobregmatum* sp. nov.; E, T9 and laterotergites; F, aedeagus, basal plate and parameres; G, conjunctiva and base of vesica with left conjunctival sclerite dorsal. acs, anterior conjunctival sclerite; lcp, left conjunctival process; lp, left paramere; RLT9, right laterotergite; rcp, right conjunctival process; rcs, right conjunctival sclerite; rp, right paramere; T9, ninth tergum; T9p, left process of ninth tergum; v, vesica; vp, vesical process; y, y-sclerite. Scale lines 0.25 mm except G.

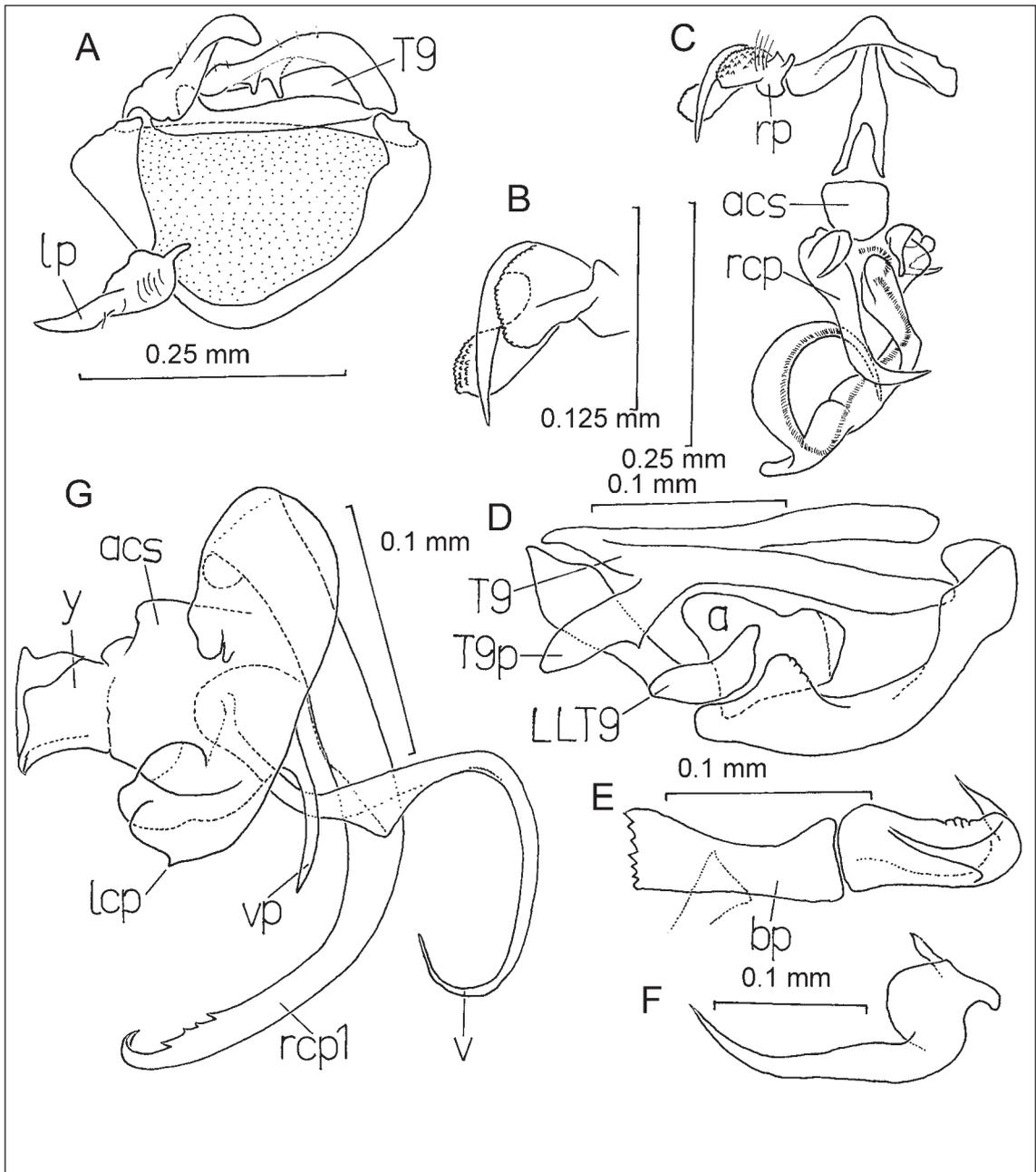


FIG. 18. Male genitalia. A-C, *Hypselosoma haplacanthatum* sp. nov.; A, T9, genital capsule and left paramere, aedeagus removed; B, right paramere; C, aedeagus, basal plate and right paramere. D-G, *H. ndouaensis* sp. nov.; D, T9, laterotergies and anophore, dorsal; E, right paramere and half of basal plate; F, left paramere; G, aedeagus. acs, anterior conjunctival sclerite; bp, basal plate; lcp, left conjunctival process; lp, left paramere; LLT9, left ninth laterotergite; rcp, right conjunctival process; rp, right paramere; T9, ninth tergum; T9p, left process of ninth tergum; v, vesica; vp, vesical process; y, y-sclerite.

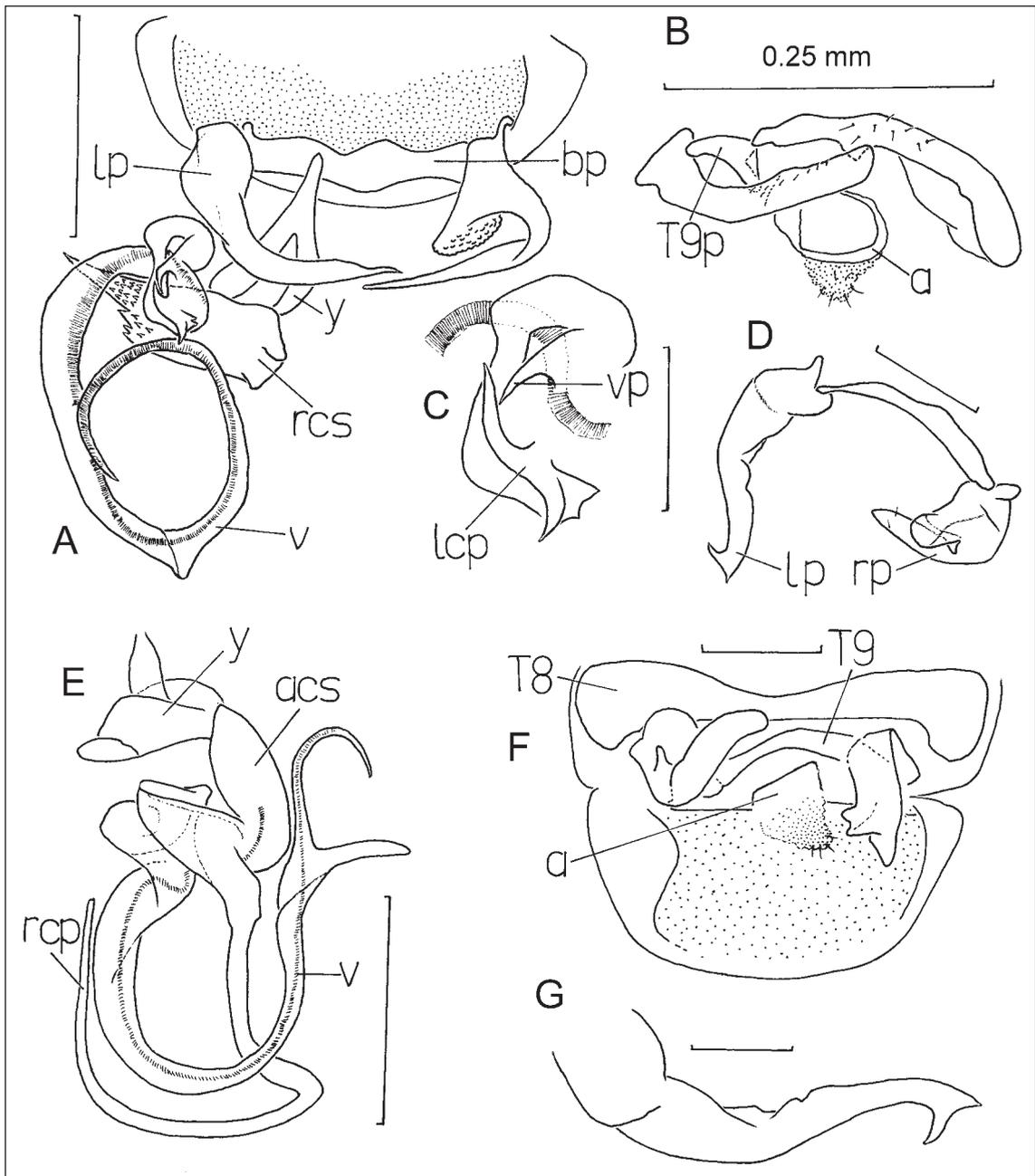


FIG. 19. Male genitalia. A-C, *Hypselosoma nordiensis* sp. nov.; A, genital capsule with aedeagus folded out; B, T9, laterotergites and anophore; C, processes at base of vesica and left conjunctival sclerite. D-G, *H. oculatum* Reuter; D, basal plate and parameres; E, aedeagus; F, T9, laterotergites and genital capsule with aedeagus removed; G, apex left paramere. acs, anterior conjunctival sclerite; bp, basal plate; lcp, left conjunctival process; lp, left paramere; rcp, right conjunctival process; rcs, right conjunctival sclerite; rp, right paramere; T8, eighth tergum; T9, ninth tergum; T9p, left process of ninth tergum; v, vesica; y, y-sclerite. Scale lines 0.25 mm.

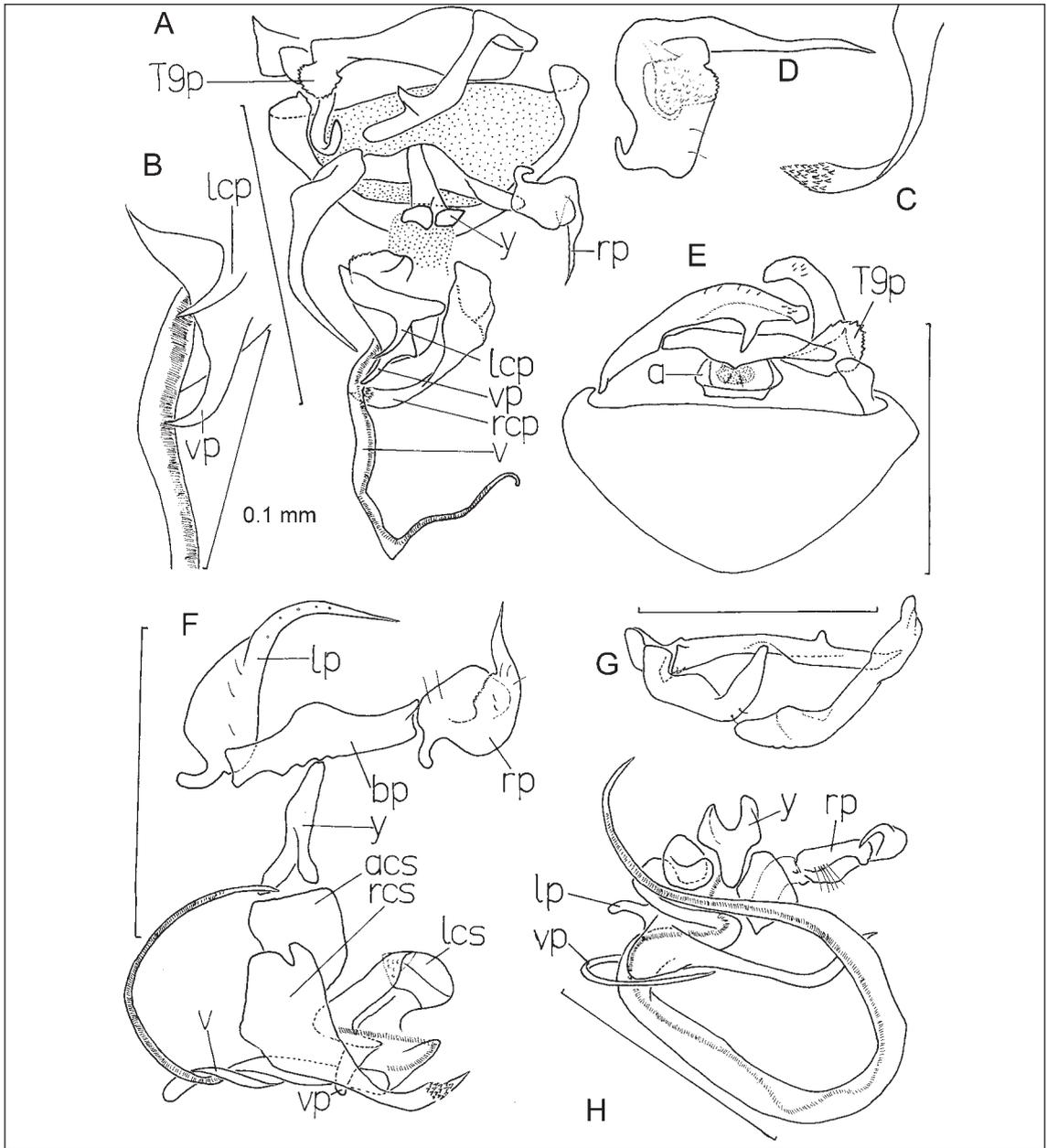


FIG. 20. Male genitalia. A-F, *Hypselosoma rembaiensis* sp. nov.; A, caudum with aedeagus folded out and left conjunctival sclerite dorsal; B, base of vesica; C, apex right conjunctival process; D, right paramere; E, caudum, anterior view; F, aedeagus, basal plate and parameres with right conjunctival sclerite dorsal; G-H, *H. touhoensis* sp. nov.; G, T9 and laterotergites; H, aedeagus, basal plate and parameres. acs, anterior conjunctival sclerite; bp, basal plate; lcp, left conjunctival process; lcs, left conjunctival sclerite; lp, left paramere; rcp, right conjunctival process; rcs, right conjunctival sclerite; rp, right paramere; T9p, left process of ninth tergum; v, vesica; vp, vesical process; y, y-sclerite. Scale lines 0.25 mm except B.

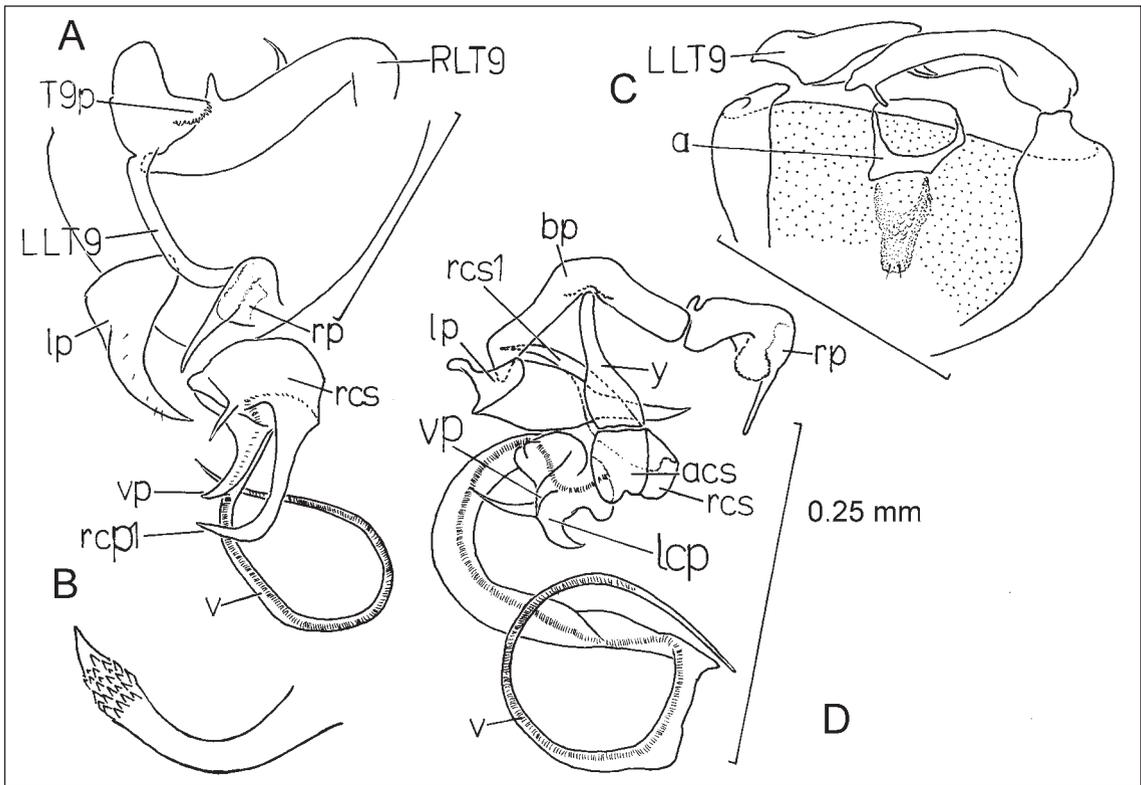


FIG. 21. Male genitalia. A-B, *Hypselosoma trachyacanthatum* sp. nov.; A, caudum with aedeagus folded out; B, apex right conjunctival process. C-D, *H. triacanthatum* sp. nov.; C, T9, appendages, anophore and genital capsule, dorsal; D, aedeagus, basal plate and parameres. acs, anterior conjunctival sclerite; bp, basal plate; lp, left paramere; LLT9, left ninth laterotergite; RLT9, right ninth laterotergite; rcp, right conjunctival process; rcs, right conjunctival sclerite; rp, right paramere; T9p, left process of ninth tergum; v, vesica; vp, vesical process; y, y-sclerite. Scale lines 0.25 mm.

**Distribution.** Known from six disjunct localities at 470-1000 m a.s.l. in the southern half of Grande Terre (Fig. 23E). It is sympatric with *H. triacanthatum* and *H. oculatum*.

**Notes.** The presence of ocelli in an elytrous male is unusual in Hypselosomatinae but occurs in *Pateena* (Hill, 1980) whose males are pterygodimorphic with macropters being rare.

***Hypselosoma touhoensis* sp. nov.**  
(Figs 1I, 10F, 20G-H, 22B, Table 1)

**Etymology.** From the type locality.

**Material.** HOLOTYPE male: 20°47'56"S x 165°13'50"E, Touho TV tower, 400 or 470 m, GBM, 28.xi.2003-30.i.2004, RFTI, QM11485, 5 slides, 16369

(MNHN(EH)). Paratype: 1 m as for holotype, T165666. Other material: 1 m, same site, GBM, 30.i.2004, RP, trees & logs, QM 11507, T165667, vial + 2 slides (QM).

**Diagnosis.** The slender tarsi, highly convex and rotund, elytrous form and apical lobes on the elytra distinguish males of this species.

**Description.** *Elytrous male.* Black except antennae, labrum, maxillary plates, labium and legs dark brown.

Overall form is distinctively cylindrical because of the tumid, horizontal pronotal disc and abruptly rounded elytral apices each with a drooping lobe (Fig. 1I).

Base of labrum not tumid in profile but salient above plane of flat clypeal apex and less salient

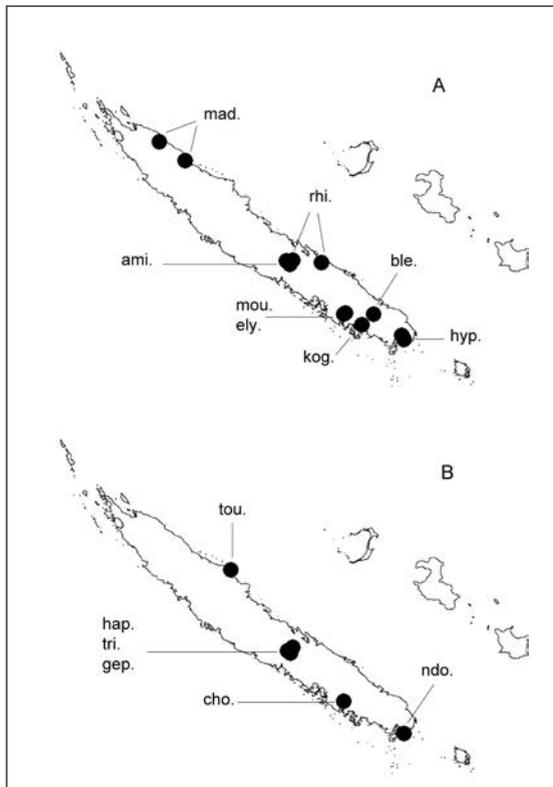


FIG. 22. Localities in Grande Terre, New Caledonia from which *Hypselosoma* species have been described. A, *H. hypselosomatum* group; B, six species with few localities. ami. *H. amieuensis* sp. nov.; ble. *H. bleuensis* sp. nov.; cho. *H. chorizobregmatum* sp. nov.; ely. *H. elytratum* sp. nov.; gep. *H. gephyrobregmatum* sp. nov.; hap. *H. haplacanthotum* sp. nov.; kog. *H. koghiensis* sp. nov.; mad. *H. mandjeliensis* sp. nov.; mou., *H. mouensis* sp. nov.; ndo., *H. ndouaensis* sp. nov.; rhi. *H. rhinatum* sp. nov.; tou., *H. touhoensis* sp. nov.; tri., *H. triacanthatum* sp. nov.

than setae of clypeal organ; maxillary plates smoothly convex, without erect macrosetae; bucculae without erect macroseta, with tubercle; clypeal organ present in flat, semicircular area on anterior margin and bearing many erect, incurved setae.

Disc of pronotum impunctate, abruptly constricted, anterior halves of lateral margins roundly convergent, calli tumid, posterior halves straight and parallel, posterior margin straight and declivent, posterior angles not tumid.

Scutellum sparsely, finely punctate; medial ends of mesosternal transverse carinae acute.

Fore and mid tarsi not swollen (Fig. 10F).

Elytra highly convex in profile, no overlap, punctate, venation not evident; glabrous furrow along path of vein Sc extending 95% to elytral apices demarcating costal cell which is inclined at roughly 30° below horizontal to form a sloping, tapering shelf a little wider than width of hind femora; hypocostal lamina at least 1.5 times depth of hind femora and inclined at roughly 45°, extending to elytral apices and joining small, apical lobe.

S3 organ not well defined but possibly elongate, transverse, medial depression bearing dense spicules adjoined posteriorly by long setae.

**Genitalia.** left process of T9 short and tapering; left LT9 present as a medially procurved arm; right LT9 with broad, rounded apex, without digitate process on ventral margin at midlength (Fig. 20G); distal lobe of right paramere very slender, spinous, twice as long as proximal lobe; left paramere slender, curved, spine-like, with bulbous base lacking spine and lamella; left and right conjunctival sclerites possibly without processes; vesical process slender, recurved, spine shorter than left paramere; vesica stout, recurved at midlength (Fig. 20H).

*Elytrous female.* Unknown

**Distribution.** Known from one locality at 400 m a.s.l. in northern Grande Terre and sympatric with *H. trachyacanthatum* (Fig. 22B).

**Notes.** The male has female facies in convex elytra and unswollen fore and mid tarsi which are rare in the subfamily (see Discussion). The rudimentary S3 organ has similarity with *H. acantheen* Hill, 1991 of New Zealand.

***Hypselosoma trachyacanthatum* sp. nov.**

(Figs 1J, 2G, 3H, 3P, 4F, 6D, 9D, 11K, 21A-B, 23F, Table 1)

**Etymology.** Greek, provided with a rough spine (spiculate right conjunctival process).

**Material.** Holotype male: 20°47'56"S x 165°13'50"E, Touho TV tower, 470 m, GBM, 30.i.2004, RP, trees & logs, QM11507, 4 slides, 16370 (MNHN(EH)). Paratype: 1 f,

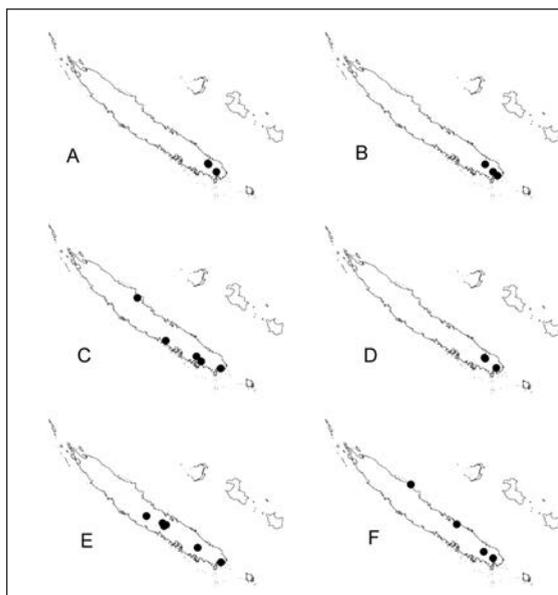


FIG. 23. Localities in Grande Terre, New Caledonia from which *Hypselosoma* species have been described. A, *H. dicroum* sp. nov.; B, *H. nordiensis* sp. nov.; C, *H. oculatum* Reuter (including Reuter, Poppius and Wygodzinsky sites); D, *H. onceronotatum* sp. nov.; E, *H. rembaiensis* sp. nov.; F, *H. trachyacanthatum* sp. nov.

as for holotype, 4 slides, T165665. Other material: 1 m, 21°34'35"S x 166°7'24"E, Col de Petchecara, 250 m, GBM, 22.xi.2003-28.i.2004, RFIT, QM11473, T165681; 1 m, 22°14'16"S x 166°50'1"E, Pic du Pin site 2, 250 m, GBM & PG, 26.xi.2004, RB, QM11797, T165682; 2 m, 22°6'41"S x 166°38'51"E, Rivière Bleue, Mois de Mai, 400 m, GBM, 19.xi.2001, RB, QM8968, T165683-4 (QM).

**Diagnosis.** The convex form, flat setigerous clypeal organ, sclerotized and punctate corium and absent anal cell distinguish males of this species and *H. haplacanthatum*. The former has a serrate process on the left side of T9 while the latter does not.

**Description.** *Macropterous male.* Black to dark brown, frons sometimes uniformly a little paler than clypeus (but without pair of red patches), antennae, labrum, maxillary plates, labium dark brown; coxae and femora dark brown, femoral apices, tibiae and tarsi light brown (not so in *H. hypselosomatum* group); forewing membrane black to dark brown proximally becoming brown distally (costal cell black) as well as pale

triangular area at base of remigium between costal cell and clavus.

Profile convex but less than in members of the *H. hypselosomatum* group (Fig. 1J).

Base of labrum not tumid in profile but salient above plane of flat apex of clypeus and less salient than setae of clypeal organ; maxillary plates smoothly convex, without erect macrosetae; bucculae without macroseta, with tubercle; clypeal organ present in flat, semicircular area on anterior margin and bearing many erect, incurved setae (Fig. 4F).

Lateral margins of disc of pronotum (Fig. 3H) sinuously convergent, disc weakly constricted anteriorly, calli not tumid, disc punctate (less coarsely than forewings), posterior margin sinuously convex; medial ends of mesosternal transverse carinae acute (Fig. 6D).

Forewing (Fig. 9D) with substantial corial punctation as for *H. haplacanthatum*.

S3 organ (Fig. 11K) semicircular with straight, sclerotized, posterior margin projecting a little on left but not right side and anterior margin lacking peripheral setae.

**Genitalia.** left process of T9 short, broad, with serrate apex; left LT9 present as a medially procurved arm; right LT9 with lobed, possibly hyaline apex (not hyaline digit), digitate process on ventral margin at midlength (Fig. 21A); distal lobe of right paramere twice as long as broad, proximal lobe; left paramere curved, tapering, spine-like, with bulbous base lacking lamella and spine; left conjunctival sclerite with short, straight spinous process; right conjunctival sclerite with long curved spine bearing tumid, spiculate apex (Fig. 21B); base of vesica with curved, spinous process half as long as right conjunctival spine; vesica abruptly recurved beyond midlength (Fig. 21A).

*Elytrous female.* (Fig. 2G). Colour like male, elytra black.

Base of labrum not tumid in profile but salient above apex of clypeus; maxillary plates without erect macrosetae; bucculae with tubercle, without macroseta.

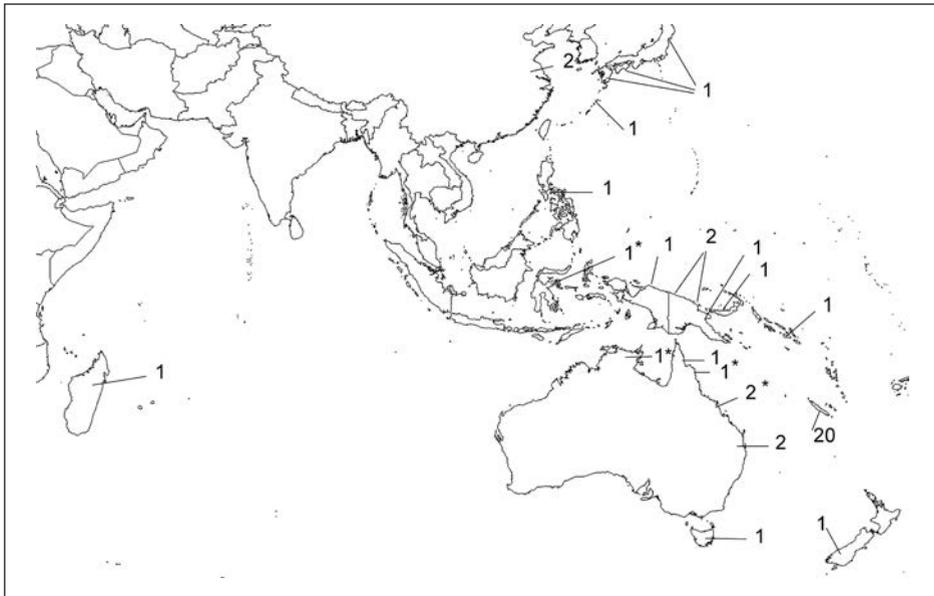


FIG. 24. World distribution of *Hypselosoma* showing number of species at localities including one undescribed species at each of the asterisked localities and including New Caledonian species described here.

Disc punctate, lateral margins of disc roundly convergent anteriorly, tumid posteriorly; posterior margin mostly straight but tumid at angles (Fig. 3P).

Elytra highly convex in profile, punctate (including clavus), venation not evident except 1AN faintly, no overlap; glabrous furrow along path of vein Sc extending roughly 90% to elytral apices demarcating costal cell which is inclined at roughly 30° below horizontal to form a sloping, tapering shelf a little wider than depth of hind femora; hypocostal lamina at least 1.5 times depth of hind femora and inclined at roughly 45°, extending 90% to elytral apices.

**Distribution.** Known from four disjunct locations at 250-400 m a.s.l. mostly in the southern half of Grande Terre (Fig. 23F). It is sympatric with *H. touhoensis* in the north and *H. rhinatum* in the south.

***Hypselosoma triacanthatum* sp. nov.**

(Figs 1K, 2H, 3Q, 4G, 9E, 11L, 21C-D, 22B, Table 1)

**Etymology.** Greek, provided with three spines (three short spines arising from left conjunctival process and base of vesica).

**Material.** HOLOTYPE male: 21°36'36"S x 165°48'37"E, Col d'Amieu, west slope, upper, 470 m, GBM, 27.i.2003, RB, QM11546, 4 slides, 16371 (MNHN(EH)). Paratype: 1f, as for holotype, T165679. Other material: 1f, 21°35'6"S x 165°47'44"E, Col d'Amieu, 2km W (or 3.5km NNW), GBM & DC, 8.v.1984, RB, QM4258 (vial, translucent), T165680 (QM).

**Diagnosis.** The flat, macropterous form, recessed, non-setigerous clypeal organ bounded anteriorly by a pale bridge, sclerotized corium with punctation limited to veins, similarly limited claval punctation and presence of an anal cell distinguish males of this species.

**Description.** *Macropterous male.* Black, head uniformly dark brown, antennae, labrum, maxillary plates, labium dark brown; legs dark brown proximally, femoral apices and tibiae light brown but tarsi darker; forewing membrane black to dark

brown proximally becoming brown distally (costal cell black) as well as pale triangular area at base of basal cell.

Overall profile weakly convex (Fig. 1K).

Base of labrum not tumid in profile and less salient than 'bridge' lying anterior to clypeal organ; maxillary plates without erect macrosetae; bucculae without erect macroseta, with tubercle; clypeal organ present, separated from anterior margin by pair of fused lobes forming a pale bridge anterior to circular pit surrounded by many short, adpressed, incurved setae (Fig. 4G).

Disc of pronotum punctate; gradually constricted anteriorly, lateral margins sinuously convergent, calli not tumid, posterior margin sinuously convex, angles not tumid; medial ends of transverse mesosternal carinae acute.

Forewing (Fig. 9E) moderately explanate; costal cell sclerotized (faintly punctate or granulate on ventral surface in slide preparation), flat, depressed below inclined, explanate costal margin which is 2-3 membranal-vein widths in dorsal view forming a broad furrow about 25% from edge; hypocoastal lamina about 1.5 hind femoral widths; glabrous furrow along posterior margin of costal cell; possible ventral carinae on Sc+R+M (proximal posterior edge of costal cell); five corial cells (in addition to costal cell) wholly (cell R and trapezoidal cell) or partly sclerotized and veins marginally punctate; clavus sclerotized and veins marginally punctate but small anal cell present, venation discernible.

S3 organ (Fig. 11L) semicircular, with straight, sclerotized posterior margin extending beyond lateral angles, right projection longer than left and widening basally, semicircle without peripheral row of long setae anteriorly, with many long setae adjoining posteriorly on tumidity of S3 and medially on S4.

**Genitalia.** left process of T9 not observed; left LT9 present as a medially procurved arm; right LT9 with round, decurved, hyaline apex (no hyaline digit), with spine subapically, with spine on ventral margin at midlength (Fig. 21C); distal lobe of right paramere slender, spinous, twice as long as proximal lobe; left paramere

curved, spine-like with bulbous base lacking lamella and spine; left conjunctival sclerite with two short, curved spines; right conjunctival sclerite with one long, curved spine subequal to left paramere; vesical base with one curved spine adjacent to and shorter than those on left conjunctival sclerite (or perhaps this spine also originates on left conjunctival process); vesica abruptly bent near midlength into loop, with short projection at bend and second widening near three-quarters from base (Fig. 21D).

*Elytrous female.* Colour black except head uniformly dark brown, antennae, labrum, maxillary plates, labium and bases of legs dark brown, tarsi, tibiae and apices of femora lighter.

Moderately convex in profile (Fig. 2H).

Base of labrum not tumid in profile, salient above clypeal plane; maxillary plates without erect macrosetae; bucculae with tubercle, without erect macroseta.

Disc of pronotum impunctate except transverse line of punctures posteriorly, disc constricted anteriorly, anterior halves of lateral margins roundly convergent, posterior halves tumid, posterior margin weakly convex, not tumid except angles projecting a little posteriorly (Fig. 3Q).

Elytra moderately convex in profile, no overlap, punctate (including clavus), venation not evident except 1AN faintly; glabrous furrow along path of vein Sc extending 80-90% to elytral apices demarking costal cell which is inclined at roughly 30° below horizontal to form a sloping, tapering shelf a little wider than width of hind femora; hypocoastal lamina at least 1.5 times depth of hind femora and inclined at roughly 45°, extending 90% to elytral apices.

**Distribution.** Known from two adjacent localities at 400-470 m a.s.l. near Col d'Amieu where it is sympatric with *H. rembaiensis* (Fig. 22B).

**Notes.** The ocular macrosetae of the holotype appeared to be absent but perhaps were destroyed during preservation whereas their absence in several specimens of *H. oculatum* is less likely an artefact. The fused clypeal lobes

form a pale bridge anterior to clypeal organ. *H. gephyrobregmatum*, which is elytrous, has a similar bridge but it is not pale and the lobes seem less completely fused as indicated by a probable sulcus visible at 80X magnification. In *H. chorizobregmatum* the lobes are contiguous but apparently not fused and project over the labrum. *H. triacanthatum* shares a trispinous configuration of left conjunctival and vesical processes (Fig. 21D) with *H. gephyrobregmatum* (Fig. 17G) and *H. nordiensis* (Fig. 19C). The vesical form is like *H. chorizobregmatum* (Fig. 17A), *H. haplacanthatum* (Fig. 18C) and *H. nordiensis* (Fig. 19A) in having an abrupt bend and widening at midlength with a lesser widening distally.

## DISCUSSION

**Definition of the *Hypselosomatum* Species Group.** Eight species of *Hypselosoma* are separable mainly by details of male genitalia as tabulated in Table 2 and hereby defined as the *H. hypselosomatum* group. Characters for recognition of this group are as follows: male and female relatively highly convex; male clypeal organ absent; male pronotal disc smoothly rounded and tapering anteriorly (lateral margins not sinuous in dorsal view), lacking weak transverse impression; male costal margin not explanate, hypocoastal lamina narrow; costal cell impunctate (but perhaps granulate ventrally), flat not concave; female costal cell in same plane as surrounding area; male claval veins impunctate (granulate ventrally); female elytra smooth; male S3 organ subcircular, with single row of peripheral setae, without sclerotized posterior rim; spatulate left conjunctival process; 1-3 right conjunctival processes; hyaline digit on the apex of the right LT9 (except *H. elytratum*) and with lamella and spine near base of the left paramere.

The males are macropterous except for *H. elytratum* which occurs at the highest locality for the genus in New Caledonia (summit of Mt Mou, 1200 m). No members of the *H. hypselosomatum* group occur sympatrically, although *H. amieuensis* and *H. rhinatum* occur closely near Col d'Amieu. *H. oculatum* has similar convexity, fore wings, elytra and male S3 organ but possesses

a clypeal organ and has dissimilar conjunctival sclerites.

**Trends in wing sclerotization.** The species show a variety of states of sclerotization of the forewing but without a simple progressive trend. Among macropterous and submacropterous species, two (*H. haplacanthatum* and *H. trachyacanthatum*) have the clavus and three corial cells entirely or almost entirely sclerotized and punctate (Figs 8D, 9D). Another two species (*H. chorizobregmatum* and *H. nordiensis*) have the clavus sclerotized and punctate and the corial cells are partly sclerotized but impunctate except adjacent to the claval suture (Figs 8A, F). In the preceding four species the anal cell on the clavus is totally obliterated. In *H. triacanthatum* (Fig. 9E) the sclerotized and partly punctate clavus retains a small anal cell but the corial sclerotization has progressed to punctuation along the vein margins. In the submacropterous *H. ndouaensis* (Fig. 8E) the sclerotized and weakly punctate clavus retains a small anal cell while the corial cells are sclerotized and possess punctuation along the veins. In *H. dicroum* (Fig. 8B) the clavus is impunctate and retains an anal cell while the sclerotization of the corium is less than the preceding species and lacking any punctuation. In all the preceding species the costal cell is depressed and the margin weakly to strongly explanate. In *H. oculatum* (Fig. 9A) and macropterous species of the *H. hypselosomatum* group (Figs 7A-E) the costal cell is flush with the corial plane and the margin not explanate while the sclerotization of the corium and clavus is comparable to *H. dicroum* and without signs of punctuation. Among the three elytrous species *H. touhoensis* (Fig. 9C) seems most specialised with a highly convex form and lobate apices on the elytra.

**Male S3 organ and male clypeal organ.** Wygodzinsky (1959) described a variety of male S3 organs (S2 in his terminology). The New Caledonian species contain a subset of these forms and separate into three groups on this character. One form is a subcircular area with a single, anterior, peripheral row of setae and no sclerotized posterior rim (Figs 10A, C, E, 11A, H). The second form is a semicircular

area lacking anterior setae but possessing a sclerotized posterior margin that projects laterally, especially on right side (Figs 10D, 11B-D, 11F, 11I-K, 11L). The third form is an ill-defined setigerous impression (Fig. 11J). The S3 organ of *H. haplacanthatum* (Fig. 11E) is assigned here to the first form but seems to possess a sclerotized posterior margin. The S3 organ of *H. nordiensis* (Fig. 11G) is assigned to the second form although it seems more subcircular than semicircular. Otherwise, among New Caledonian species, only *H. oculatum* (Fig. 11H) and the *H. hypselosomatum* group (Fig. 11A) share the first form of S3 organ but it occurs in all Australian species. The second form possibly does not occur outside New Caledonia while the third form probably does occur elsewhere, judging by Wygodzinsky (1959).

The male clypeal organ has several forms: (1) absent (Fig. 4A); (2) a flat, setigerous area perhaps embracing a pore (Fig. 4F); (3) a weakly or strongly elevated, setigerous area embracing a pore (Figs 4E, 5) and (4) a pit embraced by fused or unfused lobes (Figs 4B, C, D, G). The flat and salient forms have not been described outside New Caledonia but the organ is absent in several species outside New Caledonia and the lobate form occurs in *H. schizobregmatum* Hill, 1987 (Queensland), *H. hickmani* (Tasmania), *H. acantheen* (New Zealand) and *H. hirashimai* Esaki and Miyamoto, 1959 (Japan). One Queensland species (*H. oncerochilotum* Hill, 1987) that lacks a clypeal organ possesses a unique and probably analogous structure on the labrum. Males of other Australian hypselosomatine genera often possess an analogous organ on the pronotum (*Rectilamina* and *Cryptomannus*) or the clavus (*Duonota*) (Hill, 1984). In the Ogeriinae, *Kaimon* Hill possesses a probably analogous structure on the male vertex (Hill, 2004).

Among Australian, New Zealand and New Caledonian *Hypselosoma* the male S3 organ occurs in species with or without a clypeal organ. These two characters occur among the New Caledonian species as follows:

*H. hypselosomatum* group have a subcircular S3 organ and no clypeal organ.

*H. oculatum* has a subcircular S3 organ and strongly salient clypeal organ (not mentioned by Wygodzinsky, 1959).

*H. haplacanthatum* has a probably subcircular S3 organ and a flat clypeal organ.

*H. dicroum*, *H. ndouaensis*, *H. rembaiensis* and *H. trachyacanthatum* have a semicircular S3 organ and flat clypeal organ.

*H. chorizobregmatum*, *H. gephyrobregmatum*, and *H. triacanthatum* have a semicircular S3 organ and a lobate or bridged clypeal organ.

*H. nordiensis* has a sub- to semicircular S3 organ and weakly salient clypeal organ.

*H. touhuensis* has an ill-defined setigerous impression on male S3 (perhaps no S3 organ) and flat clypeal organ.

**Distribution and microendemism.** The comparative richness of New Caledonian *Hypselosoma* indicated in Figure 24 is exceeded by *Schizoptera* Fieber in Trinidad with 32 species of which 29 occurred at one site (Emsley, 1969).

Two broad localities in New Caledonia seem particularly rich in *Hypselosoma* species, namely Rivière Bleue and Col d'Amieu with five and six species respectively, occurring within a few kilometers at each locality. Seven species occur within a 20 km radius of Mt Koghis, the type locality of *H. oculatum*. Other localities have 1-3 species each and many species have small distributions usually in the southern half of Grande Terre. *H. rembaiensis*, *H. trachyacanthatum* and *H. oculatum* have relatively broad distributions (Fig. 23). Sites visited by Queensland Museum collectors that did not yield *Hypselosoma* species include: Col de Mouirange, Rivière des Pirogues, Bois du Sud on Yaté to Nouméa Road, Mt Do, La Koua stream and Ningua Reserve on road southwest from Thio, Tontouta River (perhaps near La Foa, a site of *H. oculatum*), Farino sites near Col d'Amieu, Aoupinié sites, Ateou, Pwanaki, Tiea Reserve, Forêt Plate, Pindaï Peninsula, Forêt Francis and Grottes d'Adio. The main absences occur in the northwest coast. The distributions are summarised as follows from northwest to south east along the axis of Grande Terre:

## New Caledonian *Hypselosoma*

1. Mandjéla sawmill, 700 m: macropterous *H. mandjeliensis*.
2. Mt Panié refuge 900-1330 m: macropterous *H. mandjeliensis*.
3. Touho TV tower, 400-470 m: macropterous *H. trachyacanthatum* and elytrous *H. touhoensis*.
4. Pic de Amoa north slope, 500 m: macropterous *H. oculatum*.
5. Col de Rousettes, forestry track: elytrous *H. rembaiensis*.
6. Table Unio summit, 1000 m: submacropterous *H. amieuensis* and elytrous *H. rembaiensis*.
7. Col d'Amieu, 2 km W (3.5km NNW), 400 m: macropterous *H. triacanthatum*.
8. Col d'Amieu sawmill, 400 m: submacropterous *H. amieuensis* and elytrous *H. gephyrobregmatum*.
9. Col d'Amieu upper west slope, 470 m: elytrous *H. rembaiensis* and macropterous *H. triacanthatum*.
10. Col d'Amieu, 4 km N, 300 m: submacropterous *H. rhinatum* and macropterous *H. halploacanthatum*.
11. Mt Rembai 750 m: elytrous *H. rembaiensis*.
12. Cape de Petchecara: macropterous *H. rhinatum* and *H. trachyacanthatum*.
13. La Foa (site of Wygodzinsky, 1959): macropterous *H. oculatum*.
14. Mt Mou base, 200 m: macropterous *H. chorizobregmatum* and *H. mouensis*.
15. Mt Mou summit, 1150 m: elytrous *H. elytratum*.
16. Dzumac Road: macropterous *H. oculatum* and elytrous *H. rembaiensis*.
17. Mt Koghis track entrance, 500 m: macropterous *H. koghiensis* (possibly site of *H. oculatum* in Reuter 1890 and Poppius 1910).
18. Forêt de la Thy Reserve: macropterous *H. oculatum*.
19. Rivière Bleue main forest, 120-160 m: macropterous *H. dicroum* and *H. nordiensis*, and *H. onceronotatum* (male pteromorph unknown).
20. Rivière Bleue main forest 250 m: macropterous *H. bleuensis* and *H. nordiensis*.
21. Rivière Bleue, Mois de Mai, 400 m: macropterous *H. trachyacanthatum*.
22. Pic du Pin, site 1, 280 m: macropterous *H. dicroum* and *H. nordiensis*.
23. Pic du Pin, site 2, 280 m: macropterous *H. trachyacanthatum*.
24. Pic du Grand 250 m: macropterous *H. hypselosomatum* and *H. onceronotatum* (male pteromorph unknown).
25. Forêt Nord summit, 480-600 m: elytrous *H. rembaiensis*.
26. Forêt Nord site 2 200 m: macropterous *H. sp.* near *hypselosomatum*, *H. oculatum* and *H. nordiensis*.
27. Cape Ndoua, 50 m: macropterous *H. ndouaensis*.

In summarising the distribution of *Kaimon* species in the wet tropics of North Queensland, Australia, Hill (2004) found that many localities had one endemic non-macropterous species supplemented by one or two widespread macropterous species. This pattern was not strongly evident in New Caledonian *Hypselosoma* although sympatric pairs often include a member of the mostly macropterous *H. hypselosomatum* group and a species (macropterous or elytrous) not from that group. Grandcolas *et al.* (2008) cited evidence that sympatry of New Caledonian plants, insects, snails and lizards usually involves different clades. Other than the *H. hypselosomatum* group, it is not possible to properly define clades of *Hypselosoma* here but of the 27 'sites' recognised above 13 have one species, 13 have two species and one has three species. None of the pairs at the 13 sympatric sites share the same form of both clypeal and S3 organ although at one site each, a pair shares either a circular S3 organ (site 17), a semicircular S3 organ (site 9) or a flat clypeal organ (site 3). At the site with three species (site 26), at least one pair shares a circular S3 organ. In addition, no two members of the *H. hypselosomatum* group occur sympatrically.

**Dispersal.** The Hypselosomatinae show elements of relictual distribution but also recent dispersal and radiation. Hill (1984) suggested radiation in the Miocene-Pliocene to explain the diversity of Australian genera. However, Hill (1991) also implied *H. hickmani* of Tasmania and *H. acantheen* of New Zealand were relicts dating from the separation of those places 80M y.a. They are very similar while *H. hickmani* is unlike other Australian *Hypselosoma*, which occur in Queensland and northern New South Wales but are absent in Victoria and the remainder of New South Wales. Previously, Wygodzinsky (1959) explained the disjunct distribution of *Hypselosoma* in Madagascar as the result of the transport of vegetative material on the equatorial current from the Pacific rim across the Indian Ocean. Citing Millot (1952), he said 'forest fauna is particularly apt to be transported' by ocean currents. Figure 24 suggests the possibility of transoceanic dispersal of *Hypselosoma* westwards around the Pacific rim. Grandcolas *et al.* (2008) questioned the relictual nature of New Caledonian fauna suggesting it had colonised since 37 Ma and that much microendemism arose 2-3Ma. Perrichot *et al.* (2007) said of the Hypselosomatinae that the occurrence 'of isolated genera in Madagascar and North America, together with the French amber fossils ... merely reflects a relict distribution'. Their omission of *Ommatides insignis* on the volcanic, oceanic Lesser Antilles adjoining South America and *Williamsocoris ornatus* in Argentina does not detract from this statement. Nevertheless, the diversity of *Hypselosoma* in New Caledonia and hypselosomatine genera in Australia suggests they have an ancient but active lineage.

Most Hypselosomatinae live in wet forests but some occupy other moist habitats that seldom burn (Hill, 1984 and 1991, Schuh and Slater, 1995). *Pateena* Hill typically occurs in wet, tussock grassland. Hill found *H. hickmani* within hollow forest logs but it is not restricted to forest habitats and occurs from sea level to 1000 m in Tasmania. Perrichot *et al.* (2007) said that in 'the mangroves of Singapore, schizopterids ... shelter under dead wood during high tide' and reported tanaidacan

crustaceans, occupants of marine and brackish habitats, included in French amber with *Buzinia*. Two species of *Hypselosoma* live in intertidal habitats, namely *H. hirashimai* Esaki and Miyamoto of Japan 'among grasses and rushes ... where the ground is submerged under sea water at the time of high tide' (Esaki and Miyamoto, 1959) and an undescribed species from Queensland in graminoid coastal saltpan sward near Seaforth (Hill, 1987). These observations suggest that some Hypselosomatinae survive periodic immersion and occur in habitats where dispersal within vegetation by oceanic currents is likely so that the disjunct distributions of Hypselosomatinae may not be entirely relictual.

**Notable Characters of Hypselosomatinae.** Esaki and Miyamoto (1959) defined the Hypselosomatini as possessing four-segmented, male fore and mid tarsi among other characters. Emsley (1969) showed these were swollen but not truly tetramerous. In *Semangananus* Štys the intermediate and distal tarsomeres increase in diameter where they connect and the intermediate tarsomere has an internal apodeme adjacent to a slight constriction which create the impression of a segmental division (Štys, 1974). However, these tarsi are not swollen in the hypselosomatine *Glyptocombus*, *Williamsocoris* and *H. touhoensis* while apparently similarly swollen tarsi occur in the ceratocombid genus *Koamula* Štys, 1982.

The pronotal collar is absent in *Williamsocoris* and overlapped by the disc in *Cryptomannus*. Hill (2004) noted that in genera allied to *Ogeria* (not Hypselosomatinae) the collar is present or absent suggesting this character has little value in defining subfamilies.

Despite Emsley's statement (1969) in support of the primitiveness of *Hypselosoma*, it has three pairs of spiracles whereas most other genera of Hypselosomatinae such as *Glyptocombus*, *Williamsocoris*, *Pateena* and allied Australian genera have 5-6 pairs. Esaki and Miyamoto (1959) said the first to fifth abdominal spiracles were reduced in *H. hirashimai* but no vestigial spiracles have been observed on those segments in Australian, New Zealand and New Caledonian species by this author.

Perhaps the presence of a setigerous pore at the base of the costal cell (Fig. 9F), which overlies the thoracic spiracle, in *Hypselosoma* and its absence in *Pateena* is correlated with fewer abdominal spiracles in the former. Nevertheless, *Hypselosoma* has the most plesiomorphic male genitalia among Hypselosomatinae and perhaps all Schizopteridae.

Despite Carpintero and Dellapé's statement (2006), the spermatheca (at least, a sclerotized spermatheca) is absent in *Hypselosoma*.

Perrichot *et al.* (2007) and Azar and Nel (2010) provide valuable figures of the venation of fossil Hypselosomatinae but also include some misunderstandings of characters of the subfamily. *Glyptocombus*, *Williamsocoris* and the Australian Hypselosomatinae have four not three marginal cells beyond the costal cell (Fig. 6I) although the most distal cell is sometimes lost by fusion of distal veins as in *Rectilamina oblonga* Hill, 1984, *R. illacuna* Hill, 1984 and an undescribed elytrous *Glyptocombus* noted by Hill (1980). In these two *Rectilamina* species the costal cell is sclerotized and the wing has a wide hypocostal lamina giving greater rigidity (Hill, 1984). The costal cell is also sclerotized in two other *Rectilamina* species, *Duonota decoricuada* Hill, 1984, *Pateena elimata*, Hill, 1980 and all *Hypselosoma* (some of which also have sclerotized corial cells). Three rather than four marginal cells arise in *Libanohypselosoma* because the most proximal cell (adjacent to the costal cell) is absent rather than a distal cell. The very unusual path of their vein R is unlike modern Hypselosomatinae in departing the associated vein well proximally of the level of the trapezoidal cell and rejoining their vein M1 rather than travelling independently to the costal margin. It takes a curved path in reverse to all other veins. This possibly stiffens the basal, costal part of the wing as does the sclerotization of the costal cell in many modern species. Some modern non-hypselosomatine Schizopteridae also stiffen the proximal costa by a sclerotized costal cell (*Voccoroda* Wygodzinsky, 1950) or lobate 'costal' vein (*Pachyplagia* Gross, 1951, *Ogeria* Distant, 1913 and *Humpatanannus* Wygodzinsky, 1950).

Azar and Nel mention a 'claval depression' in *Libanohypselosoma*. This is possibly a sensory organ otherwise only known in males of *Duonota*. Probable analogous organs occur on the clypeus of some *Hypselosoma* and the pronotal collar of *Cryptomannus* and *Rectilamina*.

The three labral macrosetae of *Libanohypselosoma*, *Buzinia* and *Tanaia* do distinguish them from *Hypselosoma* but also align them with adult *Duonota*, *Pateena*, *Ordirete* and *Macromannus*. Three labral macrosetae are typical of intermediate instar nymphs of all Australian genera whether 0, 1, 3 or 5 occur on the adult labrum. The fourth and fifth macrosetae appear in late instar nymphs of *Hypselosoma* (Hill, 1984).

The three labial segments described for *Libanohypselosoma* and *Buzinia* do not link these genera more with Hypselosomatinae than with Ogeriinae (Perrichot *et al.*, 2007) because the labium is three-segmented in Schizopterinae and four-segmented in both Hypselosomatinae and Ogeriinae. The third and fourth segments often appear connate so that miscounting is possible, particularly in amber fossils.

The articulated male laterotergites of *Cryptostemma* (Dipsocoridae) may be homologous with those of *Hypselosoma*. The asymmetrical appendages in *Hypselosoma*, here termed LT9, do not bear spiracles but these are present on T8. The appendages articulate subbasally with the anterodorsal angles of the genital capsule and the ends of a large, discrete T9, which bridges the open genital capsule anteriorly, but their bases project into segment 8 as expansions for the attachment of muscles (Figs 14A, D, 15B, D). During dissection of *H. gephyrobregmatum* a ligamentary connection was observed between the left LT9 and a sclerite torn from posterior margin of S8, perhaps an internal S9. A similar broken connection to the right LT9 was also observed (Fig. 17E). These ligaments join the laterotergites subbasally, that is distal of expanded area for muscle attachment. The asymmetrical appendages in *Cryptostemma*, termed LT8 in Hill (1987b), bear spiracles while T8 does not. The appendages articulate subbasally with a slender rudimentary T9 sclerite that lies anterior to the closed genital

capsule and articulate basally with the ends of T8. Processes at the bridge of the genital capsule guide movements of the laterotergites. Both genera have a long, spinous left paramere and compact right paramere but the vesical form differs considerably, being long and coiled in *Cryptostemma*.

Some other comparisons with *Cryptostemma* warrant consideration. The non-sheathing vesical sclerite of *Cryptostemma* (Hill, 1987b) may be homologous with the vesical process of *Hypselosoma*. Conjunctival sclerites 1, 2 and 3 of *Cryptostemma* (Hill, 1987b) may be homologous with the anterior conjunctival sclerite, left conjunctival sclerite(s) and right conjunctival sclerite, respectively of *Hypselosoma* (Hill, 1987a). The two struts connecting the basal plate to the conjunctival complex of *Cryptostemma* appear in *Hypselosoma* as the Y-sclerite (Hill, 1987a). This sclerite may be homologous with the U-sclerite or circular sclerite which is partly overlapped by the arcuate basal plate in *Pateena*, allied Australian genera and *Glyptocombus*. In these genera the anterior and lateral conjunctival sclerites may be represented by the rigid 'spermathecal bulb' which fills the opening of the U-sclerite to transform it into a circular sclerite. In *Glyptocombus* there appear to be elongate, conjunctival processes but in the Australia genera these are absent.

The medial, sometimes asymmetric S3 organ of male *Hypselosoma* may be analogous with the asymmetrical pocket on the left side of S3 in male *Cryptostemma*.

In some preserved specimens of *Hypselosoma* the bifid right paramere is positioned like a peg or clip restraining the right forewing and perhaps does the same during copulation. In a specimen of *H. oculatum* the left paramere was observed restraining the forewing.

#### ERRATA

In Hill (1980) the first couplet of the key should be transposed and for *H. hickmani* the male S8 is longer on left than right not vice versa. In the differential diagnosis for *Pateena* in Hill (1980) it should be understood that *Hypselosoma* also has stout antennal lamellae (shaped like a elephant's

ear) and four marginal cells on the forewing while *Glyptocombus* does not. Hill (1985) stated that *Pateena* is allopatric to *Hypselosoma* in Tasmania. Subsequent collecting confirm this is true for most localities, with *Hypselosoma* present in the south and northeast of the island and *Pateena* in the northwest and central east of the island. However, the genera meet at the montane Black Bog Creek near Cradle Mountain where two *Pateena* species occur sympatrically with *H. hickmani*. At this site, the microhabitats appear to be partitioned with *Hypselosoma* typically found among *Gleichenia* ferns on stream edges, *P. elimata* in wet heath adjacently and *P. polymitarior* Hill, 1980 more remotely on higher and comparatively drier ground in wet *Poa* tussock grassland.

#### ACKNOWLEDGEMENTS

I thank Dr G. B. Monteith and his coworkers in the Queensland Museum for the opportunity to study this material, Dr Christine Johnson for the loan of material from the American Museum of Natural History, Dr Dávid Rédei and Dr Christine Lambkin for many constructive comments on the manuscript.

#### LITERATURE CITED

- Allen, R.T. & Carlton, C.E. 1989. New records of Ceratocombidae and Schizopteridae from Arkansas (Heteroptera: Schizopteridae). *Journal of the Kansas Entomological Society* **62**(1): 125-126.
- Azar, D. & Nel, A. 2010. The earliest fossil schizopterid bug (Insecta: Heteroptera) in the Lower Cretaceous amber of Lebanon. *Annales de la Société Entomologique de France* (nouvelle série) **46**(1-2): 193-197.
- Carpintero, D.L. & Dellapé, P.M. 2006. *Williamsocoris*, a new genus of Schizopteridae (Heteroptera) from Argentina. *Zoological Science* **23**(7): 653-655.
- Esaki, T. & Miyamoto, S. 1959. A new or little known *Hypselosoma* from Anami-Oshima and Japan, with the proposal of a new tribe for the genus (Hemiptera). *Sieboldia Acta Biologica* **2**(2): 109-120, plates 14-17.
- Emsley, M. G. 1969. The Schizopteridae (Hemiptera: Heteroptera) with the description of new species from Trinidad. *Memoirs of the American Entomological Society* **25**: 1-154.

- Grandcolas, P., Murienne, J., Robillard, T., Desutter-Grandcolas, L., Jourdan, H., Guilbert, E. & Deharveng, L. 2008. New Caledonia: a very old Darwinian island? *Philosophical Transactions of the Royal Society (B)* 363: 3309-3317.
- Heidemann, O. 1905. A new genus and species of the hemipterous family Ceratocombidae from the United States. *Proceedings of the entomological Society of Washington* 7: 192-194.
- Hill, L. 1980. Tasmanian Dipsocoroidea (Hemiptera: Heteroptera). *Journal of the Australian Entomological Society* 19: 107-127.
1984. New genera of Hypselosomatinae (Heteroptera: Schizopteridae) from Australia. *Australian Journal of Zoology*, Supplementary Series 103:1-55.
- 1985a. New records and species of *Duonota* (Heteroptera: Schizopteridae) *Australian Journal of Zoology* 33: 263-271.
- 1985b. New records and species of *Pateena* (Heteroptera: Schizopteridae) *Australian Journal of Zoology* 33: 273-281.
- 1987a. Four new Australian species of *Hypselosoma* Reuter (Heteroptera: Schizopteridae). *Journal of the Australian Entomological Society* 26: 265-276.
- 1987b. First record of Dipsocoridae (Hemiptera) from Australia with the descriptions of four new species of *Cryptostemma* Herrich-Schaffer. *Journal of the Australian Entomological Society* 26: 129-139.
1991. *Hypselosoma acantheen* n. sp. (Heteroptera: Schizopteridae), first record of the family in New Zealand. *New Zealand Journal of Zoology* 18: 75-81.
2004. *Kaimon* (Heteroptera: Schizopteridae), a new, speciose genus from Australia. *Memoirs of the Queensland Museum* 49(2): 603-647.
- Perrichot, V., Nel, A. & Néraudeau, D. 2007. Schizopterid bugs (Insecta: Heteroptera) in mid-Cretaceous ambers from France and Myanmar (Burma). *Paleontology* 50(6): 1367-1374.
- Poppius, B. 1910. Neue Ceratocombiden. Öfversigt af Finska Vetenskaps-Societetens Förhandlingar, 52 Afd. A (1): 1-14.
- Rédei, D. 2007. A new species of the family Hypsipterygidae from Vietnam, with notes on the hypsipterygid fore wing venation (Heteroptera, Dipsocoromorpha). *Deutsche Entomologische Zeitschrift* 54(1): 43-50.
- Ren, S. & Zheng, L. 1992. New species and new records of Dipsocoromorpha (Hemiptera: Heteroptera) from China. *Entomotaxonomia* 14(3):187-186.
- Reuter, O. M. 1891. Monographia Ceratocombidarum orbis terrestris. *Acta Societatis Scientiarum fennicae* 19(6): 1-27, 1 plate.
- Schuh, R.T. & Slater, J.A. 1995. *True Bugs of the World*. (Cornell University Press: Ithaca and London).
- Štys, P. 1970. On the morphology and classification of the family Dipsocoridae s. lat., with particular reference to the genus *Hypsipteryx* Drake (Heteroptera). *Acta Entomologica Bohemoslovaca* 67: 21-46.
1974. *Semangananus mirus* gen. n., sp. n. from Celebes - a bug with accessory male genitalia (Heteroptera, Schizopteridae). *Acta Entomologica Bohemoslovaca* 71:382-397.
- Uhler, P.R. 1894. A list of the Hemiptera-Heteroptera of the families Anthocoridae and Ceratocombidae collected by Mr. H.H. Smith in the island of St Vincent (B), Descriptions of new genera and species. *Proceedings of the Zoological Society of London* 1894: 157-160.
- Wygodzinsky, P. 1959. Un nouvel *Hypselosoma* de Madagascar, avec la description d'autres especes et des observations sur le genre (Schizopterinae, Dipsocoridae, Hemiptera). *Mémoires de Institut Scientifique de Madagascar (E)* 11: 509-539.

