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New Lithosiinae from Papua, Indonesia (Lepidoptera: Arctiidae)

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Abstract

Ten new species and two new genera of Lithosiinae (Lepidoptera: Arctiidae) are being described from Papua Indonesia (West New Guinea) and related species from Papua are reviewed. The new genera are *Emelieana* **gen.nov.** and *Micronyctemera* **gen.nov.** The new species are *Trischalis splendens* **sp.n.**, *T. purpurastrata* **sp.n.**, *T. zahrae* **sp.n.**, *Emelieana aureolineata* **sp.n.**, *Notata zumkehreri* **sp.n.**, *Micronyctemera fojaensis* **sp.n.**, *Acco postmetallica* **sp.n.**, *A. albipuncta* **sp.n.**, *A. fasciata* **sp.n.** and *Scoliacma flava* **sp.n.** *Trischalis iridescens orientalis* ROTHSCCHILD, 1913 **syn.nov.** is synonymized with *Trischalis iridescens iridescens* ROTHSCCHILD, 1913. The adults and genitalia are depicted.

Zusammenfassung

Zehn neue Arten und zwei neue Gattungen der Lithosiinae (Lepidoptera: Arctiidae) werden aus Papua Indonesien (West Neu Guinea) beschrieben und verwandte Arten aus Papua werden revidiert. Die neuen Gattungen sind *Emelieana* **gen.nov.** und

Micronyctemera **gen.nov.** Die neuen Arten sind *Trischalis splendens* **sp.n.**, *T. purpurastrata* **sp.n.**, *T. zahrae* **sp.n.**, *Emelieana aureolineata* **sp.n.**, *Notata zumkehri* **sp.n.**, *Micronyctemera fojaensis* **sp.n.**, *Acco postmetallica* **sp.n.**, *A. albipuncta* **sp.n.**, *A. fasciata* **sp.n.** und *Scoliacma flava* **sp.n.** *Trischalis iridescens orientalis* ROTHSCCHILD, 1913 **syn.nov.** wird mit *Trischalis iridescens iridescens* ROTHSCCHILD, 1913 synonymisiert. Die Falter und Genitalien werden abgebildet.

Introduction

In connection with the project of the Papua Insects Foundation to draw up an inventory and to map all insects from Papua Indonesia, new discovered species are described and published. The specimens originate from collections or newly received material. In this publication some new species of Lithosiinae (Lepidoptera: Arctiidae) are described, mostly from recently obtained expedition material. It is to be expected that further publications will follow since many more new species are waiting for descriptions. The project of the Papua Insects Foundation focusses on Papua Indonesia only, which comprises the western part of New Guinea till 141° East at the PNG border, the Schouten Islands (Biak and Supiori), Numfor, Japen and the Raja Ampat Islands (Waigeo, Batanta, Salawati and Misool). More details can be found on the website of the foundation (www.papua-insects.nl).

Used abbreviations:

- Fwl.....Forewing length (from base to apex)
PNG.....Papua New Guinea
BMNH.....Natural History Museum (formerly British Museum for Natural History), London, UK
CMWM.....Museum Thomas Witt (assigned to ZSMC), Munich, Germany
KSP.....Koleksi Serangga Papua (Private collection Henk van Mastrigt), Jayapura, Papua, Indonesia
MZB.....Museum Zoologicum Bogoriense, Cibinong, Java, Indonesia
RMNH.....Naturalis (Nationaal Natuurhistorisch Museum) (formerly Rijksmuseum voor Natuurlijke Historie), Leyden, The Netherlands
ZMAN.....Zoölogisch Museum Amsterdam, University of Amsterdam, The Netherlands
ZMHB.....Museum für Naturkunde der Humboldt Universität, Berlin, Germany
ZSMC.....Zoologische Staatssammlung München (des Bayerischen Staates), Munich, Germany

***Trischalis* HAMPSON, 1894**

Type species: *Hemonia flava* HAMPSON, 1893

Checklist of all *Trischalis* species:

absconditana (WALKER, 1963) [Sri Lanka, Borneo?]

flava HAMPSON, 1893

aureoplagiata (ROTHSCHILD, 1913) [New Guinea, Kai Islands, Queensland]

connexa GAEDE, 1925 [Papua New Guinea]

convoluta HAMPSON, 1918 [Philippines]

iridescens ROTHSCHILD, 1913 [New Guinea]

orientalis ROTHSCHILD, 1913 **syn.nov.**

purpurastrata **sp.n.** [Papua Indonesia]

splendens **sp.n.** [Papua Indonesia]

stomata HOLLOWAY, 2001 [Singapore, Sarawak, Brunei, Bali]

subaurana (WALKER, 1863) [from East India and Hainan (Southeast China) to the Bismarck Archipelago]

metalligera BUTLER, 1882

abbreviata SEITZ, 1914

zahrae **sp.n.** [New Guinea]

***Trischalis splendens* sp.n.** (Figs 3, 29-30)

M a t e r i a l : Holotype: ♂, "Irian Jaya, Kec. Borme, Borme 900 m, 17-24.ix.1998, Henk v. Mastrigt", KSP. Paratype: 1 ♂, "Prov. Papua, Kab. Pegunungan Bintang, Borme, 900 m, 26.vii-1.viii.2006, KEP/UNCEN", KSP.

External characters: Male: Fwl. 9-10 mm. Antenna bipectinate, dark brown. Head and thorax black with purple shimmer, abdomen blackish brown.

Forewing elongate with almost straight costa, apex rounded, tornal half of termen slightly concave. Basal half of forewing orange-yellow, distal half dark brown, divided by a curved transverse shining purple line. Wingbase and costa dark brown, at wingbase with purple shimmer. Hindmargin of forewing somewhat crumpled, metallic bronze-coloured. Fringes dark brown.

Hindwing triangular with narrow apex. Basal half whitish, costa ochreous yellow, distal half and dorsum black.

Female unknown.

Male genitalia (Figs 29-30): Uncus rather broad trowel-shaped. Valva long and slender, cucullus distally broad and rounded with tiny corona and with a ventral indentation. Aedeagus robust, in the middle with a thickening, distally trumpet-shaped. Vesica with a field of about fourty short spines.

E t y m o l o g y : The name refers to the shining and beautiful colour combination of this species.

***Trischalis purpurastrata* sp.n.** (Figs 4, 31-32)

M a t e r i a l : Holotype: ♂, "Indonesia Papua, Kecamatan Nipsan, Walmak 1710 m, 4°07'S - 138°36'E, 31.i.-09.ii.2005, at light; cultivated area, UNCEN-ZMA Expedition, Papua Indonesia 2005", ZMAN. Paratypes: 2♂♂: same data as holotype, ZMAN (1), KSP (1).

External characters: Male: Fwl. 9 mm. Antenna bipectinate. Antenna, head and thorax with copper-red shimmer. Abdomen shining pale yellow.

Forewing rather broad with strongly arched basal costa, apex almost rectangular and termen straight. Groundcolour of forewing brown with two oblique purple costal striae of which the inner irregularly runs to the dorsum. Basal costa and the purple striae with broad purple shimmer. A small white spot at the end of the cell. Hindmargin more or less crumpled and curled, metallic bronze-coloured, its inner edge with purple shimmer.

Hindwing broad with rounded apex. Pale yellow, costa, apex and fringes slightly darker. Female unknown.

Male genitalia (Figs 31-32): Uncus narrow, bottle-shaped. Valva long and slender, in the middle slightly broadening. Tip of the valva rounded with tiny corona, along the ventral side of the valva with numerous micro-spines. Aedeagus robust, in the middle with strong and sharp edged rim, distal part of aedeagus at one side split (not damaged!). Vesica with only a few micro-spines.

E t y m o l o g y : The name refers to the purple striae on the forewing.

***Trischalis zahrae* sp.n.** (Figs 8-9, 33-34, 37-38)

M a t e r i a l : Holotype: ♂, "Indonesia, Irian Jaya, Rasiei 10 km S Wasior, at light, 5.xi.1993; Wandammen Peninsula, A.J. de Boer, A.L.M. Rutten & R. de Vos", ZMAN. Paratypes: 13♂♂, 10♀♀: 1♀, "Indonesia, Irian Jaya, Sentani, at light, 12.x.1993; Cyclops Mountains, A.J. de Boer, A.L.M. Rutten & R. de Vos", ZMAN; 1♀, "Indonesia, Irian Jaya, Gn. Bembab 15 km N Ransiki, 350 m, at light, 2.iii.1996; Birdshead Peninsula, ZMA-Expedition 1996", ZMAN; 1♀, "Indonesia, Irian Jaya, Prafi, 15 km West of Andai, 0°52' S - 133°53' E, secondary forest, 200 m, at light, 29.i.1996; Birdshead Peninsula, ZMA-Expedition 1996", ZMAN; 1♀, "Indonesia, Irian Jaya, Arfak mountains, Warkapi (nr Breie), 500 m, primary lowland forest, at light, 12.xi.1993; Birdshead Peninsula, A.J. de Boer, A.L.M. Rutten & R. de Vos", KSP; 1♀, "Indonesia, Irian Jaya, Rasiei 10 km S Wasior, at light, 5.xi.1993; Wandammen Peninsula, A.J. de Boer, A.L.M. Rutten & R. de Vos", MZB; 1♀, "Indonesia, Irian Jaya, Nabire, 6 km O Samabusa Lagari, 9-13.xii.1993, Primärurwald, 50m, leg. R. Brechlin & K. Cerny", CMWM; 1♂, "Indonesia, Irian Jaya, Nabire, Irian Jaya Highway, km 15, 150m, Sekundärwald, 25.xi.1997, leg. K. Cerny", CMWM; 2♂♂, 1♀, "Indonesia, Irian Jaya, 90 km SW Sentani, Taja, 400m, Primärurwald und Sekundärvegetation, 7.xii.1997, leg. K. Cerny", CMWM; 1♂, 2♀♀, "Dt. Neu Guinea, Kaiserin Augustafluss Expedition, Hauptlager Malu, vi-viii.1912, leg. Bürgers", ZMHB; 1♂, "Holl. New Guinea, Baro [= Baru], 5.x.1910, leg. Moszkowski", ZMHB; 8♂♂, 1♀, Irian Jaya, Brazza River, 250 m, 6-14.xi.1971, G. Konrad, ZSMC.

External characters: Similar to *T. iridescens* ROTHSCHILD, 1913 (Fig. 7) (see below) but usually larger, fwl. 8-9 mm, while that of *T. iridescens* is 6-7 mm. Head and patagia golden yellow, thorax and tegulae brown (in *T. iridescens* thorax yellow, sometimes with pale greyish brown). Antenna in male bipectinate, in female filiform, dark brown-yellow

or greyish (in *T. iridescens* antenna bright yellow). Abdomen in male grey-brown, distal end yellow, in female entire abdomen yellow.

Forewing with groundcolour pale yellow. Costa with basal third and wingbase dark metal blue or purple-brown coloured, at costa connected to a dark, rather broad and arched transfers line (in *T. iridescens* this line is finer, strongly arched and more shiny metal coloured). At the outside of this line a distinct and broad grey streak (in *T. iridescens* much weaker or lacking). Hindmargin of forewing rather broadly bronze-purple coloured (in *T. iridescens* narrower).

Hindwing entirely pale yellow. In some males the hindmargin somewhat suffused with brown (not in *T. iridescens*).

Male genitalia (Figs 33-34): Uncus broad trowel-shaped. Valva long and slender, slightly curved and gradually broadening towards the tip of the valva. Tip of the valva rounded with tiny corona, ventrally with a faint blunt angle. Aedeagus robust, with a thickening in the middle and distally trumpet-shaped. Vesica with a field of about 30-40 short spines.

The male genitalia of the sibling species *T. iridescens* (Figs 35-36) (in order to compare with those of *T. zahrae*): Uncus narrow and more or less bottle-shaped. Valva rather short, distally broadened and club-shaped. Tip of valva rounded with ventrally rather long corona. Aedeagus in the middle slightly noded, distally not trumpet-shaped. Vesica with a field of numerous micro-spines.

Female genitalia (Fig. 37): Ostium wide and almost unsclerotized. Ductus bursae broad with cervix bursae clearly defined, broad and kidney-shaped. Connection between ductus bursae and cervix bursae partly sclerotized. Bursa copulatrix relatively large without signa. Spermatheca very large, almost as large as the bursa copulatrix.

The female genitalia of the sibling species *T. iridescens* (Fig. 39) (in order to compare with those of *T. zahrae*): Ostium small and slightly sclerotized. Ductus bursae narrower than in *T. zahrae*, without defined cervix bursae, some sclerotization in the first part of the ductus bursae. Ductus seminalis broader than in *T. zahrae*. Bursa copulatrix distinctly smaller than spermatheca.

E t y m o l o g y : The species is named in honour of my friend and companion, Zahra MANSOURI, the mother of my lovely daughter. The collecting of insects in Papua made her lonely waiting and suffering at home for which patience I am truly thankful to her.

N o t e : An extremely dark patterned specimen (Fig. 9) was found in Papua New Guinea in the Western Highlands at the Baiyer River (BMNH). The female shows some differences in the structure of cervix bursae and ductus seminalis (Fig. 38) but to judge this soft tissue character from just one specimen seems rather precarious. When males are available its status can be judged with certainty. For the moment we consider it to belong to *T. zahrae* but we do not include this specimen into the type series.

Other *Trischalis* species from Papua Indonesia:

***Trischalis aureoplagiata* (ROTHSCHILD, 1913) (Fig. 5)**

Eugoa aureoplagiata ROTHSCCHILD, 1913: 222; SEITZ, 1914: 121.

Trischalis aureoplagiata: HAMPSON, 1914: 816; STRAND, 1922: 858; EDWARDS, 1996: 279; HOLLOWAY, 2001: 430.

Distribution: New Guinea, Kai Islands, Australia (Queensland). In Papua known from Marina Valen (Sarmi, Mamberamo Tengah), Borme (Star Mountains), Prafi (Northern Arfak, Birdshead Peninsula), Dotir (Wandammen Peninsula) and Samabusa Lagari (near Nabire).

***Trischalis iridescens* ROTHSCCHILD, 1913 (Figs 7, 35-36, 39)**

Trischalis iridescens iridescens ROTHSCCHILD, 1913: 222.

Trischalis iridescens orientalis ROTHSCCHILD, 1913: 222; STRAND, 1922: 858 **syn. nov.**

Trischalis iridescens: HAMPSON, 1914: 815; STRAND, 1922: 858; HOLLOWAY, 2001: 430.

Trischallis (sic) *iridescens*: SEITZ, 1914: 123.

Trischallis (sic) *iridescens orientalis*: SEITZ, 1914: 123.

Trischalis orientalis HAMPSON, 1914: 815.

Taxonomical note: ROTHSCCHILD (1913) originally describes *orientalis* as a subspecies of *iridescens*, while HAMPSON (1914) considers it to be a good species judged from the veins M_2 and M_3 "which are in *orientalis* separate and in *iridescens* shortly stalked". This is, however, a variable feature in *Trischalis* and certainly not a valid specific character. Moreover, the wingpattern and size of both types are identical. Both taxa are therefore considered to be conspecific and even considered not to be different subspecies.

For a comparison of the genitalia with those from *Trischalis zahrae*, see above.

Distribution: A common species in New Guinea. In Papua Indonesia known from Mt Goliath (Gn. Yamin, Jayawijaya Mountains), Ngat Biep (Arfak Mountains), Warkapi (Arfak), Prafi (Arfak), Tuan Wowi (Arfak), Warmare Dua (Arfak), Andai (Arfak), Taja (90 km SW Sentani), Borme (Star Mountains), Wamena (Baliem Valley), Brazza River (South Jayawijaya Mts), Kwerba (Mamberamo Area), Lower Digul River, Mimika (Casuarine Coast), Nabire, Sarmi (Mamberamo Atas), Sentani, Depapre (Cyclop Mts), Dotir (Wandammen Peninsula).

***Trischalis subaurana* (WALKER, 1863) (Fig. 6)**

Tospitis subaurana WALKER, 1863: 432.

Trischalis subaurana: HAMPSON, 1900: 549; STRAND, 1922: 858; EECKE, 1926: 269; HOLLOWAY, 2001: 430.

Trischallis (sic) *subaurana*: SEITZ, 1914: 123.

Pallene ? *metalligera* BUTLER, 1882: 226.

Hemonia metalligera: PAGENSTECHE, 1900: 58.

Trischallis (sic) *absconditana* ab. *abbreviata* SEITZ, 1914: 123 (infraspecific).

Trischalis absconditana f. *abbreviata*: STRAND, 1922: 858.

D i s t r i b u t i o n : A wide area from East India and Hainan (Southeast China) to the Bismarck Archipelago (Papua New Guinea). In Papua known from Yongsu, Yemang (near Jayapura), Andai (Arfak Mts), Bembab (Arfak), Biak.

***Emelieana* gen.nov.**

Type species: *Emelieana aureolineata* **sp.n.** (described below) by present designation.

A monotypical genus which externally somewhat resembles *Trischalis* HAMPSON, 1894 but with distinct differences in wingshape and genitalia. Its systematic position is not clear yet.

Antenna of males bipectinate; eyes large but not touching each other, ventro-caudal positioned on the head and therefore dorsally not visible; labial palpa very small and narrow, less than half the diameter of the eyes; proboscis short. Foreleg without spur; mid leg tibia with 2 spurs at the end of tibia, inner spur half time longer than outer spur; hindleg tibia with 4 spurs, first pair of spurs at two-third of tibia with inner spur half time longer than outer spur, second pair of spurs at the end of tibia with both spurs of equal length, as long as the outer spur of the first pair.

Forewing (Fig. 1) broad with sharp apex and convex costa in outer wing half. Hindwing distinctly smaller than forewing with rounded apex. Forewing with apical veins r_3 to r_5 stalked, unlike in *Trischalis* which has only veins r_4 and r_5 shortly stalked. Hindwing with peculiar venation and an extremely large cell. Only 5 visible veins, other veins reduced.

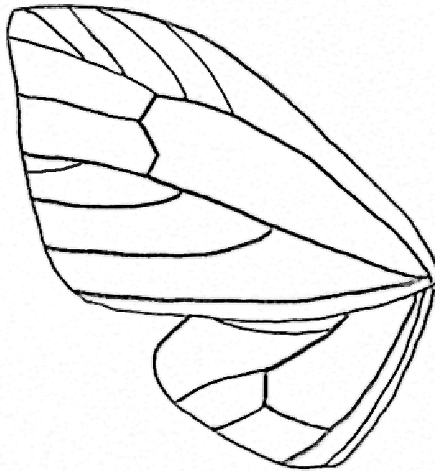


Fig. 1: Wing venation of *Emelieana aureolineata*

E t y m o l o g y : The genus is named in honour of miss Emelie BEENTJES, whose father, Niek BEENTJES, supported the Papua Insects Foundation financially.

***Emelieana aureolineata* sp.n.** (Fig. 1, 10, 40-41)

M a t e r i a l : Holotype: ♂, "Arfak Mts. 300 m, Warmare Dua, 0°58'S, 133°53'E, 27.ii.1996, at light, primary forest/cultiv. area; Indonesia, Irian Jaya, Birdshead Peninsula, ZMA-exp. 1996", ZMAN. Paratype: 1 ♂, "Birdshead Peninsula, Tuan Wowi (nr Andai), primary lowland forest, 240 m, at light, 2.xi.1993; Indonesia, Irian Jaya, A.J. de Boer, A.L.M. Rutten & R. de Vos", ZMAN.

External characters: Male: Fwl. 5 mm. Antenna pale yellow, bipectinate. Head and tegulae shiny yellow-brown. Thorax dark golden metallic. Abdomen red-brown. Legs yellow-brown, spurs as described with genus. Ground colour of forewing yellow-brown with shiny golden linear pattern as follows: apical part of the costa and complete termen with golden rim; a curved and slightly broadening golden transverse line from innerside tornus crossing the cell and reaching the middle of the costa; subcostal vein from the curved line to the wingbase scaled with golden; the space between costal edge and costal fold shiny golden between wingbase and curved transverse line. Hindwing white, in the apical part and along termen slightly suffused with yellow-brown.

Female unknown.

Male genitalia (Figs 40-41): Uncus long, stretched and swollen in the middle, at the top with characteristic long curled hairs. Valva broad with cucullus split in two parts: the costal part broad with a hooked distal tip with rather long setae, the inner part basally broad and suddenly narrowing in a sharp point. Sacculus with a long, straight and slender extension, at the end with some short setae. Saccus broad and indented. Juxta very large, pentacle-shaped. Aedeagus short and thick with three bundles of numerous cornuti.

E t y m o l o g y : The name refers to the golden linear pattern on the forewing.

***Notata* HAMPSON, 1891**

Type species: *Notata parva* HAMPSON, 1891

Checklist of all *Notata* species:

modica (LUCAS, 1894) [Queensland, Australia]

parva HAMPSON, 1891 [Oriental region, including Taiwan, the Philippines and the Sunda Islands Borneo, Sumatra, Java and Bali]

zumkehri sp.n. [New Guinea]

***Notata zumkehri* sp.n.** (Figs 11-12, 42-43, 46-47)

M a t e r i a l : Holotype: ♂, "Indonesia Papua, Kecamatan Abenaho, Pass Valley 1950 m, 3°51'S - 139°05' E, 18-25.ii.2005, at light; cultivated area/disturbed montane forest, UNCEN-ZMA Expedition, Papua Indonesia 2005", ZMAN. Paratypes: 2♂♂, 5♀♀: 1♂, 5♀♀, "Indonesia Papua, Kecamatan Nipsan, Walmak 1710 m, 4°07'S - 139°38' E, 31.i.-9.ii.2005, at light; cultivated area, UNCEN-ZMA Expedition, Papua Indonesia 2005", (1♂, 3♀♀) ZMAN, (1♀) KSP, (1♀) MZB; 1♂, "[Papua] New Guinea: E. Highlands, Daulo Pass, 8000 ft, 22.vii.1974; E.W. Classey, B.M. 1974-408", BMNH.

External characters: Fwl. ♂ 9 mm, ♀ 10 mm. Male and female with head, patagia and tegulae white, thorax grey. Male with antenna dark brown, filiform and shortly ciliated. Abdomen grey, dorsally suffused with dark brown on the middle segments.

Forewing of male elongate with arched costa, apex rectangular, tornus rounded. Wing colour glossy white, on the underside of the wingbase with more or less triangular dark brown androconial patch which can be seen through the upperside of the wing.

Hindwing almost perfectly round, grey with apical area somewhat brownish grey. On the upperside of the hindwing in costal area a more or less triangular dark brown androconial patch. The hindwing of the only known PNG specimen is not grey but white. This could well be a geographical form. More material is needed to prove any subspecific status.

Forewing of female broader than in male, apex sharp with oblique termen. Wing colour glossy white.

Hindwing rounded but normally shaped, grey.

Male genitalia (Figs 42-43): Uncus short and broad, droplet-shaped with a sharp top. Valva at base narrow, distally broadening. Cucullus distally with long and slender downward curved process, at the base of the process with a distinct sclerotized curl ending in a sharp thorn which is connected to a sclerotized ridge running over the corema between sacculus and cucullus. Top of corema more or less rounded with a ventral lobe. Aedeagus short, bottle-shaped, without cornuti.

The male genitalia of the related species *Notata parva* HAMPSON, 1891 (Figs 44-45) (in order to compare with those of *N. zumkehri*): Uncus like in *N. zumkehri*. Valva very similar to that of *N. zumkehri*, but the long process of the cucullus in *N. parva* shorter and without sclerotized curl at its base. On corema without a sclerotized ridge but with an unsclerotized lobe in the centre. Top of corema straight, angled and without a lobe. Aedeagus similar to that of *N. zumkehri*, somewhat longer and without cornuti.

Female genitalia (Figs 46-47): Antrum broadly funnel-shaped, not sclerotized. Ductus copulatrix long, slender and straight, ending in a broad and dividing simple cervix bursae. Ductus seminalis broad and running to a very large spermatheca. The smaller bursa copulatrix in the lower part covered with numerous star-shaped sclerotizations, deep indented forming a heart-shaped field.

The female genitalia of the related species *N. parva* (Fig. 48) is very similar to *N. zumkehri*. The only significant difference seems to be the contrast of the sclerotization of the bursa copulatrix, which is in *N. parva* much weaker than in *N. zumkehri*.

E t y m o l o g y : The species is named in honour of Drs. P.J. ZUMKEHR, microlepidopterist, who collected the holotype.

Note: *Notata parva* HAMPSON, 1891 (Fig. 13) is, apart from being yellow instead of white, very similar to *N. zumkehrri*. However, the male hindwings of *N. parva* are not round, as in *N. zumkehrri*, but of a more current triangular shape. It is very doubtful that the quite differently patterned and shaped *N. modica* LUCAS, 1894 from Queensland also belongs to the genus. A check of the genitalia should prove its status but no material was available to us yet.

***Micronyctemera* gen. nov.**

Type species: *Micronyctemera fojaensis* **sp.n.** (described below) by present designation.

A monotypical genus with some affinities with *Zygaenosia* HAMPSON, 1900, though with much broader hindwings and different venation (Fig. 2).

Antenna of males bipectinate, females with fasciculate antenna; eyes, latero-caudal positioned on the head and clearly visible dorsally; labial palpaes small, porrect, reaching just to the front of the head with distal segment sharply pointed and with long hairs; proboscis short. Foreleg with one tibial spur; mid leg and hindleg tibia with 2 short spurs.

Forewing (Fig. 2) elongate with rounded apex, tornus wide and rounded. Hindwing broad with rounded apex and tornus. Forewing with only the apical veins r_4 and r_5 stalked, veins r_1 and r_2 fused in the middle. Hindwing with an open cell, only a thin inward branch at the end of the cell, in the origin of veins m_1 and m_2 .

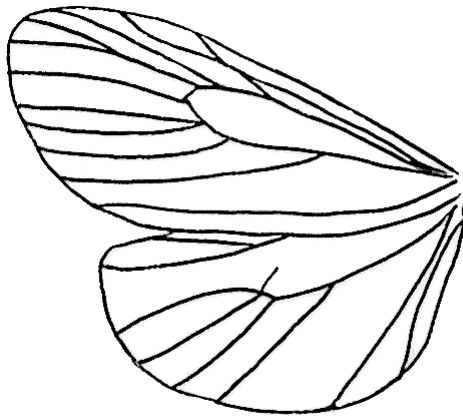


Fig. 2: Wing venation of *Micronyctemera fojaensis*.

E t y m o l o g y : The name refers to the external resemblance with the Arctiinae genus *Nyctemera* HÜBNER, [1820] and its much smaller size.

***Micronyctemera fojaensis* sp.n.** (Figs 14-15, 49-52)

M a t e r i a l : Holotype: ♂, "Indonesia, Papua, Kabupaten Sarmi, Peg. Foja, 1650 m, 2°34.5' S - 138°42.9' E, 23.xi-7.xii.2005, Ci-Rap Mamberamo-Foya", MZB. Paratypes: 2♂♂, 2♀♀: same data as holotype, (1♂) ZMAN, (1♂, 2♀♀) KSP.

External characters: Fwl. ♂ 9 mm, ♀ 9 mm. Antenna of male bipectinate, of female fasciculate. Head, antenna, thorax and abdomen black.

Forewing with costa, termen and dorsum broadly black, with a snowy white elongate oval shaped central area. The white in the female more extended.

Hindwing snowy white with a black margin along costa and termen, ending in tornus. Again in the female the white more extended.

Male genitalia (Figs 49-50): Uncus finger-shaped, rather short. Tegumen with strong folded inner rim. Valva narrow with simple cucullus, distally ending in a narrow corema. Sacculus with a strong folded rim which is extended with an upwards curved slender process, just as long as the corema and with a sharp top. Saccus V-shaped. Juxta large, consisting of two slightly sclerotized elongate parts. Aedeagus rather short and thick. Vesica with at least five strongly defined fields of cornuti: one large and long cornutum and four bundles of shorter thorns and one with tiny spines. Unfortunately it was impossible to evert the vesica, with danger of damaging the aedeagus too much.

Female genitalia (Figs 51-52): Typical drop-shaped anal lobes with a sharp distal end. Antrum wide and hardly sclerotized, ductus bursae short and unsclerotized. Bursa copulatrix large and folded into two parts, with a long and slender sclerotized garland, covered with spines, running in a sort of a spiral over the surface of the bursa, in the centre of the bursa a rounded signum with tiny spines and below that again a sclerotized garland with spines. The three areas with sclerotized structures are marked with arrows in Figure 52.

Unfortunately the genitalia of the dissected female specimen turned out to be severely moulded. It was not possible to clean it properly and therefore some structures may be difficult to observe in the picture.

E t y m o l o g y : The species is named after the Foja Mountains where all known specimens have been collected.

***Acco* BETHUNE-BAKER, 1904**

Type species *bicolora* BETHUNE-BAKER, 1904

Males and females in the genus *Acco* are characterized by strong sexual dimorphism which caused that males of *bicolora* BETHUNE-BAKER, 1904 and females of *albicosta* HAMPSON, 1914 used to be considered to belong to different genera. Now more material has become available, and the other sex of both species is known, it becomes clear that both taxa in fact are congeneric. *Acco albicosta* from New Guinea was previously considered to belong to *Meteura* HAMPSON, 1900 but it proved to belong to *Acco* BETHUNE-BAKER, 1904. The type species of *Meteura* is *Scoliacma cervina* LUCAS, 1890 which is endemic for Australia is not congeneric with the species from New Guinea.

The males of *Acco* have a modified bladder-shaped area on the forewing in the basal field near the dorsum. This corresponds with a patch of modified scales on the rather

small hindwing in the basal field near the costa. The females lack these characters and have normally shaped broader fore- and hindwings.

Nothing is known about the biology of the species, but it was striking to find in the abdomina of all dissected specimens of every species a granulated purple-red colour, especially in the intestines. This might indicate that the larvae feed on purple-red coloured flowers of certain plants or it might be from glands producing a certain defensive fluid.

Checklist of all *Acco* species:

albicosta (HAMPSON, 1914) **comb. nov.** [New Guinea]

albipuncta **sp.n.** [Papua Indonesia]

bicolora BETHUNE-BAKER, 1904 [New Guinea]

fasciata **sp.n.** [Papua Indonesia]

postmetallica **sp.n.** [Papua Indonesia]

***Acco postmetallica* sp.n. (Figs 16-17, 53-54)**

M a t e r i a l : Holotype: ♂, "Irian Jaya, Ci-Rap Furu Camp, Dabra-Mambramo, 138°38'10"E 3°17'04"S, 1-7.ix.2000, Henk van Mastrigt", KSP. Paratype: 1♂, "Irian Jaya, Kec. Borne, Borne, 900 m, 17-24.ix.1998, Henk v. Mastrigt", ZMAN.

External characters: Male: Fwl. 7 mm. Short antenna grey-brown, scarcely ciliated. Head, thorax and abdomen brown, patagia snowy white. Abdomen with an anal tuft of light brown hairs.

Forewing rather broad with sharp apex. Dorsum basally with modified bladder, obviously with scent function. This bladder, however, not so pronounced as in *A. bicolora* and of the same colour as forewing. Groundcolour of forewing grey-brown with costa snowy white, termen with undulated and narrow white rim.

Hindwing rounded and rather small. Grey with tornal area folded, probably with scent hairs. The centre of the hindwing with shiny silvery metallic scales, which give the hindwings a transparent appearance.

Female unknown.

Male genitalia (Figs 53-54): Uncus very long, needle-shaped, slightly curved. Valva with a hook-shaped costal process. This process is rather short and simple, uprising and curved distally with a sharp tip. Cucullus ending in a triangle-shaped slightly sclerotized bag (corema) with a sharp top. Aedeagus rather short and thick, with one short blunt cornutum and one long and curved compiled cornutum.

E t y m o l o g y : The name refers to the shiny metallic field on the hindwing.

***Acco albipuncta* sp.n.** (Figs 19-20, 55-58)

M a t e r i a l : Holotype: ♂, "Irian Jaya, Lembah Kamu, Moanemani, 1645 m, 27-28.ii.1995, Henk van Mastrigt", KSP. Paratypes: 2 ♀♀: 1 ♀, "Indonesia Papua, Kecamatan Nipsan, Walmak 1710 m, 4°07'S - 138°36'E, 31.i.-09.ii.2005, at light; disturbed montane forest, UNCEN-ZMA Expedition, Papua Indonesia 2005", ZMAN; 1 ♀, "Indonesia, Papua, Kabupaten Sarmi, Peg. Foja, 1650 m, 2°34.5' S - 138°42.9' E, 23.xi-7.xii.2005, Ci-Rap Mamberamo-Foya (nr. KSP42296)", KSP.

External characters: Male: Fwl. 8 mm. Antenna scarcely ciliated, grey-brown. Head and thorax grey-brown, but patagia (collar) snow-white. Abdomen pale greyish brown with a long anal tuft.

Forewing with an angled tornus and somewhat convex dorsum with a brush of hairs, at the underside with an androconial patch which corresponds with such a patch on the upperside of the hindwing costa. Forewing grey-brown coloured with base of costa white and with an oval-shaped white spot just below the cell in the middle of the wing. Fringes white.

Hindwing with highly arched costa with a small black androconial patch as mentioned above. Apex excavated, dorsal area hairy. Groundcolour of hindwing pale grey.

Female: Fwl. 9 mm. Antenna like in male, but scarcer ciliated. Head and thorax brown with snow-white patagia (collar) and metathorax. Abdomen grey and much thicker than in male, distally with a bronze coloured tuft.

Forewing of normal shape, somewhat triangular. Groundcolour shiny bronze-brown with costa, fringes and base of dorsum snow-white, apical part of costa not white but as groundcolour. An oval-shaped snow-white spot just below the cell in the middle of the wing.

Hindwing grey with pale grey fringes.

Male genitalia (Figs 55-56): Uncus very long and slender, curved downwards. Valva (including corema) long and narrow. Costal process on the valve very large with a trumpet-shaped base, strongly curved downwards and slightly broadening in the middle and ending in a very sharp top. Corema narrow and long, longer than the sclerotized part of the valva. Aedeagus long with a long and slender cornutum which is just as long as the aedeagus.

Female genitalia (Figs 57-58): Anal lobes square-shaped. Ostium and genital plate hardly sclerotized, ductus bursae short and broad, slightly sclerotized. Bursa copulatrix long and slender with two long opposite rows of short needles pointed distad.

E t y m o l o g y : The name refers to the white spot in the middle of the forewing.

***Acco fasciata* sp.n.** (Figs 18, 59-61)

M a t e r i a l : Holotype: ♀, "Arfak Mts. 300m, Warmare Dua, 0°58' S, 133°53' E, 27.ii.1996, at light, primary forest/cultiv. area; Indonesia, Irian Jaya, Birdshead Peninsula, ZMA-exp. 1996", ZMAN. Paratype: 1 ♀, same data as holotype, ZMAN.

External characters: Female: Fwl. 7-7.5 mm. Antenna scarcely and ciliated, grey-brown. Head dark brown. Patagia white, tegulae caudal part white, distally grey-brown. Thorax

(except for patagia and tegulae) grey-brown. Abdomen dark brown, distally with an ochreous coloured broad tuft.

Forewing normal shaped, groundcolour white with a concave broad submarginal grey-brown fascia and a subbasal field in the same colour, leaving the costa white.

Hindwing entirely grey.

Male unknown.

Variation: The paratype shows a slightly extended grey-brown colouring on the forewing, but the white innerspaces are still distinctly visible.

Female genitalia (Figs 59-61): Anal lobes square-shaped. Ostium and antrum very slightly sclerotized. Cervix bursae heavily sclerotized and complicated folded, more or less shield-shaped ventrally with an undulated rim. Bursa copulatrix globular with in the lower two-third part numerous tiny star-shaped signa.

E t y m o l o g y : The name refers to the grey-brown fascia on the forewing.

Other *Acco* species from Papua:

***Acco bicolora* BETHUNE-BAKER, 1904** (Figs 21-22, 62-65)

Acco bicolora BETHUNE-BAKER, 1904: 418; DRAUDT, 1914: 211; HAMPSON, 1914: 582; STRAND, 1922: 654; WATSON et al., 1980: 1.

Acco bicoloria (sic): GAEDE, 1925: 242.

Male genitalia (Figs 62-63): Uncus long and needle-shaped, curved down (in Fig. 62 lacking). Costal process on valva basally rather thick and long, first part retracting and then sharply curved and slightly waved. Cucullus with corema short, with one fold and rounded at the top. Aedeagus with a long and rather thick undulated compiled cornutum.

Female genitalia (Figs 64-65): Anal lobes square-shaped. Ostium and antrum hardly sclerotized. Cervix bursae large and complicated folded and slightly sclerotized, with four fields of signa of which one bears about 20-25 long thorns. Bursa copulatrix somewhat smaller than cervix bursae, globular and without distinct signa.

D i s t r i b u t i o n : The species is recorded from PNG (Dinawa, Aroa River) and Papua Indonesia (Borme), all from mountainous areas.

***Acco albicosta* (HAMPSON, 1914) comb.nov.** (Figs 23-24, 66-69)

Metura (sic) *albicosta* HAMPSON, 1914: 475.

Metoura albicosta: STRAND, 1922: 527.

Male genitalia (Figs 66-67): Uncus long and straight, dagger-shaped. Costal process on valva very long, basally slightly retracting and curved outwards, at the tip slightly bend down and rather blunt. Corema on cucullus short, triangle-shaped with a rounded top. Aedeagus rather short and thick with one straight and long and slender compiled cornutum.

Female genitalia (Figs 68-69): Anal lobes square-shaped. Ostium and antrum hardly sclerotized. Cervix bursae large, for the greater part fused with the bursa copulatrix,

heavily covered by garlands of numerous small and larger thorns, especially in the central part.

Distribution: Mainly distributed in Papua Indonesia but also recorded from PNG. In Papua known from the Central Mountain Range (Borme, Brazza River, Mabilabol, Mimika, Mt Goliath [= Gn. Yamin], Utakwa River) and the Cyclops Mountains at the north coast (Depapre).

***Scoliacma* MEYRICK, 1886**

Type species: *Lithosia bicolora* BOISDUVAL, 1832

The genus *Scoliacma* comprises at present 24 Indo-Australian species, but it is very heterogeneous and probably consists of several genera. The two species dealt with below probably also actually do not belong to *Scoliacma* s.str. It is therefore not useful to list all 24 species here in a checklist since they need further revision first.

***Scoliacma flava* nov.sp** (Figs 25-26, 70-71)

M a t e r i a l : Holotype: ♂, "Indonesia, Papua, Kecamatan Nipsan, Walmak, 1710 m, 4°07' S - 139°38' E, 31.i-9.ii.2005, at light; cultivated area, UNCEN-ZMA Expedition, Papua Indonesia 2005", ZMAN. Paratypes: 2♂♂, 11♀♀: 2♂♂, 7♀♀. same data as holotype, (1♂, 6♀♀) ZMAN, (1♂, 1♀) KSP, (1♂, 1♀) MZB; 1♀, "Indonesia, Papua, Kecamatan Abenaho, Pass Valley, 1950 m, 3°51' S - 139°05' E, 11-17.ii.2005, at light; disturbed montane forest, UNCEN-ZMA Expedition, Papua Indonesia 2005", ZMAN; 3♀♀, "Indonesia, Papua, Kecamatan Oksibil, Mabilabol, 1340 m, 4°54' S - 140°37' E, 21-25.ii.2005, at light; disturbed montane forest, UNCEN-ZMA Expedition, Papua Indonesia 2005", ZMAN.

External characters: Male: Fwl. 16-17 mm. Antenna bipectinate, pale brown. Head and thorax yolk-yellow. Abdomen yellowish brown with a yellow anal tuft.

Forewing distinctly different than in female: rather broad with almost square angle at apex and a straight hindmargin. Dorsum deeply convex with a brush of pale yellow androconial hairs. Groundcolour of forewing yolk-yellow, the cell pale yellow. Underside of forewing below the cell with long yellow hairs.

Hindwing very broad, costa high convex, rounded apex and tornus. Dorsum somewhat crumpled with long yellow hairs. Groundcolour shiny yellowish white with yellow fringes. Ternal area yellow, fading towards wing centre.

Female: 13-15 mm (female). Antenna filiform, pale greyish brown. Head and thorax as in male. Fore- and hindwings of normal shape. Forewing elongate, entirely yolk-yellow to pale yellow. Hindwing pale yellow, fringeline darker yellow.

Male genitalia (Figs 70-71): Tegumen basally broad, closed and tapering towards top, the uncus slender and straight finger-shaped, only slightly sclerotized. Valva with cucullus almost unsclerotized corema, clasper club-shaped. Sacculus with a long slender upwards curved extension with a sharp top. Aedeagus cylindrical and straight, coecum narrow and rather long. Vesica with a field of numerous tiny chitine drops.

The male genitalia of the related species *Scoliacma virginea* BETHUNE-BAKER, 1908 (Figs 72-73) (in order to compare with those of *S. flava*): Very similar to *S. flava*, though the most distinguishing character is the different shape of the clasper which is in *S.*

virginea undulated and tongue-shaped (not as broad and club-shaped as in *S. flava*). Aedeagus cylindrical, broader than in *S. flava*, coecum not particularly narrow. Vesica with numerous tiny chitine drops.

Female genitalia (Figs 74-75): Ostium with sclerotized rim. First part of ductus bursae funnel-shaped and ribbed. Second part of the ductus bursae (cervix bursae) broad and not sclerotized, bursa copulatrix globular, at the base with a small circular signum composed of tiny chitine drops.

The female genitalia of *Scoliacma virginea* BETHUNE-BAKER, 1908 (Figs 76-77) (in order to compare with those of *S. flava*): Almost identical to *S. flava*. First part of ductus bursae shorter than in *S. flava*. Circular signum composed of small chitine drops, somewhat heavier sclerotized than in *S. flava*.

Note: A close relation with *Scoliacma virginea* BETHUNE-BAKER, 1908 (Figs 27-28) is clearly indicated, even before checking the genitalia, by the similar typical forewing shape of the male, although the white wingcolour is very different. The shape and structure of the male hindwing is, however, clearly different. Another difference is the lack of androconial hairs as seen in *S. flava*. It is remarkable that such externally distinctly different species are so very similar in the genitalia. In the females no significant differences could be found, in the males only the clasper shows a difference.

Etymology: The name refers to the yellow colour of the wings.

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Legend

Figs 3-28: Adults of Lithosiinae.

Fig. 3: *Trischalis splendens* sp.n., holotype (male). Fwl. 9-10 mm.

Fig. 4: *Trischalis purpurastrata* sp.n., holotype (male). Fwl. 9 mm.

Fig. 5: *Trischalis aureoplagiata* (ROTHSCHILD, 1913), holotype (male, BMNH). Fwl. 9 mm.

- Fig. 6:** *Trischalis subaurana* (WALKER, 1863) (male), Indonesia, Irian Jaya, Biak, Japanese cave, 6.iii.1996, ZMAN-expedition (ZMAN). Fwl. 9 mm.
- Fig. 7:** *Trischalis iridescens* ROTHSCILD, 1913 (male), Indonesia, Irian Jaya, Cyclop Mountains, Depapre, 21.i.1996, ZMAN-expedition (ZMAN). Fwl. 6-7 mm.
- Fig. 8:** *Trischalis zahrae* sp. nov., holotype (male). Fwl. 8-9 mm.
- Fig. 9:** *Trischalis zahrae*, dark form (female), Papua New Guinea, Western Highlands, Baiyer River, 20.i.1986, D.J.L. Agassiz (BMNH).
- Fig. 10:** *Emelieana aureolineata* sp.n., holotype (male). Fwl. 5 mm.
- Fig. 11:** *Notata zumkehri* sp.n., holotype (male). Fwl. 9 mm.
- Fig. 12:** *Notata zumkehri* sp.n., paratype (female), Indonesia, Papua, Central Highlands, Kecamatan Nipsan, Walmak, 31.i-9.ii.2005, UNCEN-ZMAN expedition (ZMAN). Fwl. 9 mm.
- Fig. 13:** *Notata parva* HAMPSON, 1891 (male), Nederlands Indië, Bali, 1939, J.M.A. van Groenendael (ZMAN). Fwl. 9 mm.
- Fig. 14:** *Micronyctemera fojaensis* sp.n., paratype (male), Indonesia, Papua, Kabupaten Sarmi, Peg. Foja, 23.xi-7.xii.2005, Ci-Rap (Foja) expedition (ZMAN). Fwl. 9 mm.
- Fig. 15:** *Micronyctemera fojaensis* sp.n., paratype (female), Indonesia, Papua, Kabupaten Sarmi, Peg. Foja, 23.xi-7.xii.2005, Ci-Rap (Foja) expedition (KSP). Fwl. 9 mm.
- Fig. 16:** *Acco postmetallica* sp.n., holotype (male). Fwl. 7 mm.
- Fig. 17:** *Acco postmetallica* sp.n., paratype (male), Indonesia, Irian Jaya, Kec. Borme, Borme, 900 m, 17-24.ix.1998, Henk van Mastrigt (ZMAN). Fwl. 7 mm.
- Fig. 18:** *Acco fasciata* sp.n., holotype (female). Fwl. 7-7,5 mm.
- Fig. 19:** *Acco albipuncta* sp.n., holotype (male). Fwl. 8 mm.
- Fig. 20:** *Acco albipuncta*, paratype (female), Indonesia, Papua, Kecamatan Nipsan, Walmak, 31.i-9.ii.2005, UNCEN-ZMAN expedition (ZMAN). Fwl. 8 mm.
- Fig. 21:** *Acco bicolora* BETHUNE-BAKER, 1904 (male), British New Guinea, Aroa River, 1902, A.E. Pratt (BMNH). Fwl. 8 mm.
- Fig. 22:** *Acco bicolora* BETHUNE-BAKER, 1904, syntype (female). Fwl. 8 mm.
- Fig. 23:** *Acco albicosta* (HAMPSON, 1914). (male), Indonesia, Irian Jaya, Kec. Borme, Borme, 900 m, 17-24.ix.1998, Henk van Mastrigt (KSP). Fwl. 8 mm.
- Fig. 24:** *Acco albicosta* (HAMPSON, 1914) (female), Indonesia, Irian Jaya, Cyclop Mountains, Depapre, 11.x.1993, A.J. de Boer, A.L.M. Rutten & R. de Vos (ZMAN). Fwl. 7 mm.
- Fig. 25:** *Scoliacma flava* sp. nov., holotype (male). Fwl. 16 mm
- Fig. 26:** *Scoliacma flava* sp.n., paratype (female), Indonesia, Papua, Kecamatan Nipsan, Walmak, 31.i-9.ii.2005, UNCEN-ZMAN expedition (ZMAN). Fwl. 17 mm.
- Fig. 27:** *Scoliacma virginea* BETHUNE-BAKER, 1908 (male), Indonesia, Papua, Central Highlands, Kecamatan Abenaho, Pass Valley, 11-17.ii.2005, UNCEN-ZMAN expedition (ZMAN). Fwl. 16 mm
- Fig. 28:** *Scoliacma virginea* BETHUNE-BAKER, 1908 (female), Indonesia, Papua, Central Highlands, Kecamatan Abenaho, Pass Valley, 11-17.ii.2005, UNCEN-ZMAN expedition (ZMAN). Fwl. 17 mm.
- Figs 29-77:** Male and female genitalia.

- Figs 29-30:** Male genitalia of *Trischalis splendens*, holotype (KSP25173). (29) Genital armature; (30) aedeagus.
- Figs 31-32:** Male genitalia of *Trischalis purpurastriata*, paratype (RV1200). (31) Genital armature; (32) aedeagus.
- Figs 33-34:** Male genitalia of *Trischalis zahrae*, holotype (RV1196). (33) Genital armature; (34) aedeagus.
- Figs 35-36:** Male genitalia of *Trischalis iridescens*. (35) Genital armature (RV1195); (36) aedeagus (RV1197).
- Figs 37-38:** Female genitalia of *Trischalis zahrae*. (37) paratype (RV1199); (38) specimen BM5996.
- Fig. 39:** Female genitalia of *Trischalis iridescens* (RV1198).
- Figs 40-41:** Male genitalia of *Emelieana aureolineata*, paratype (RV1216). (40) Genital armature; (41) aedeagus.
- Figs 42-43:** Male genitalia of *Notata zumkehri*, paratype (RV1191). (42) Genital armature; (43) aedeagus.
- Figs 44-45:** Male genitalia of *Notata parva* (RV1194). (44) Genital armature; (45) aedeagus.
- Figs 46-47:** Female genitalia of *Notata zumkehri*, paratype (RV1192). (46) total view; (47) signum.
- Fig. 48:** Female genitalia of *Notata parva* (BM5010).
- Figs 49-50:** Male genitalia of *Micronyctemera fojaensis*, paratype (RV1232). (49) Genital armature; (50) aedeagus.
- Figs 51-52:** Female genitalia of *Micronyctemera fojaensis*, paratype (KSP42258). (51) total view; (52) signa, the arrows show the different fields of spines.
- Figs 53-54:** Male genitalia of *Acco postmetallica*, paratype (RV1217). (53) Genital armature; (54) aedeagus.
- Figs 55-56:** Male genitalia of *Acco albipuncta*, holotype (KSP25275). (55) Genital armature; (56) aedeagus.
- Figs 57-58:** Female genitalia of *Acco albipuncta*, paratype (KSP42296). (57) total view; (58) signa.
- Fig. 59:** Female genitalia of *Acco fasciata*, paratype (RV1215).
- Figs 60-61:** Details of female genitalia of *Acco fasciata*, paratype (RV1215). (60) cervix bursae; (61) signa.
- Figs 62-63:** Male genitalia of *Acco bicolora* (BM5978). (62) Genital armature; (63) aedeagus.
- Figs 64-65:** Female genitalia of *Acco bicolora* (BM5979). (64) total view; (65) signa.
- Figs 66-67:** Male genitalia of *Acco albicosta* (BM5976). (66) Genital armature; (67) aedeagus.
- Figs 68-69:** Female genitalia of *Acco albicosta* (BM5977). (68) total view; (69) signa.
- Figs 70-71:** Male genitalia of *Scoliacma flava*, paratype (RV1230). (70) Genital armature; (71) aedeagus.
- Figs 72-73:** Male genitalia of *Scoliacma virginea* (RV1228). (72) Genital armature; (73) aedeagus.
- Figs 74-75:** Female genitalia of *Scoliacma flava*, paratype (RV1231). (74) total view; (75) signum.
- Figs 76-77:** Female genitalia of *Scoliacma virginea* (RV1229). (76) total view; (77) signum.





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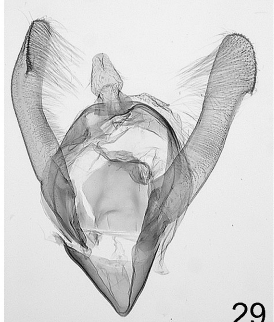


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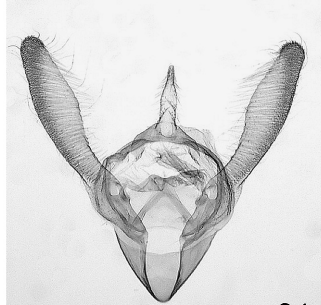




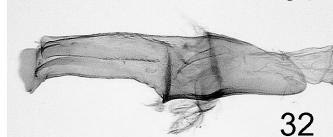
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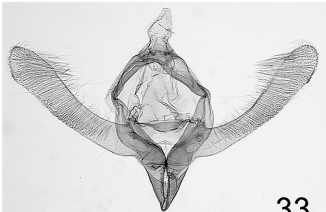
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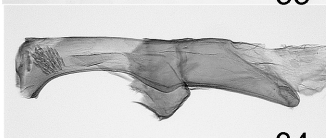
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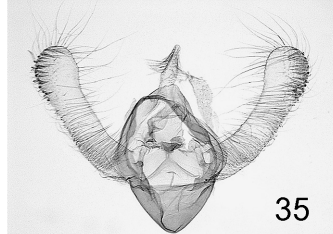
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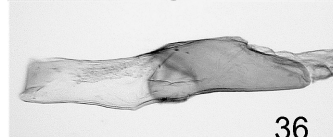
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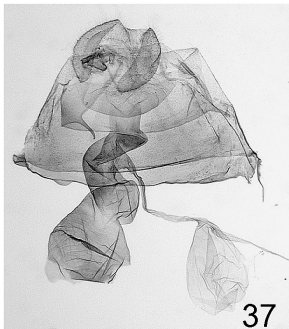
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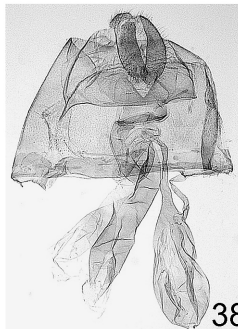
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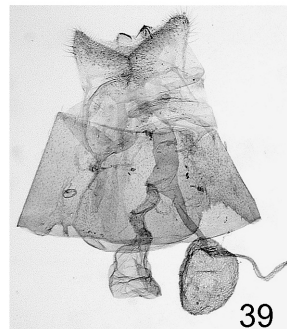
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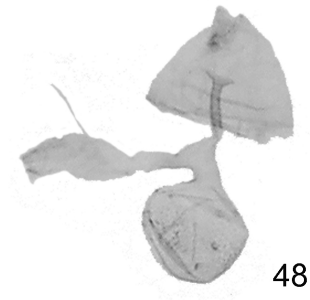
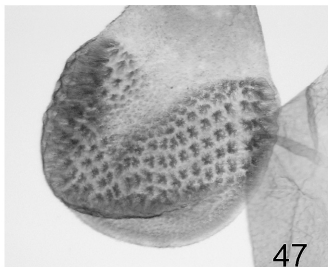
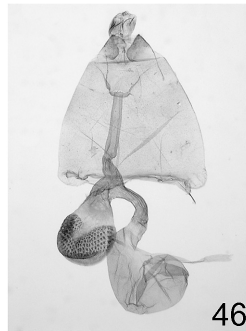
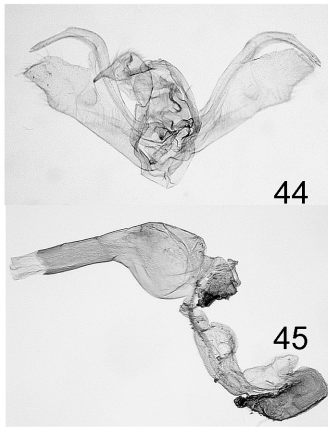
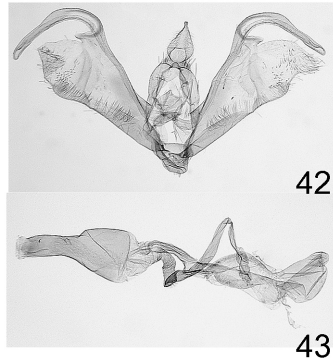
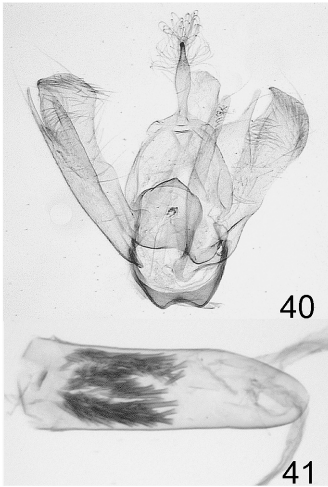
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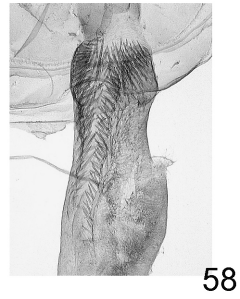
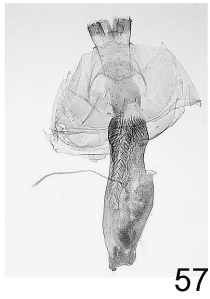
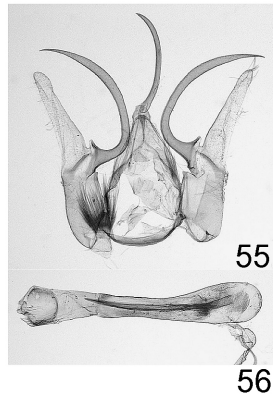
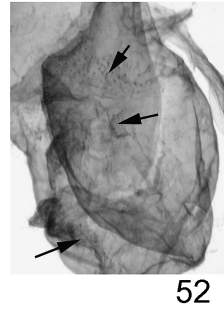
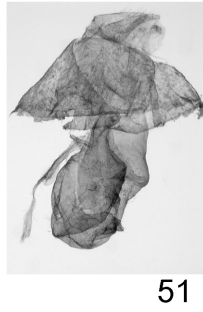


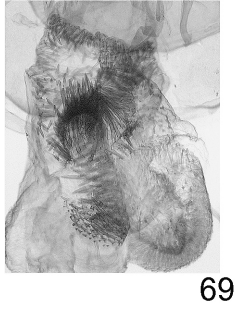
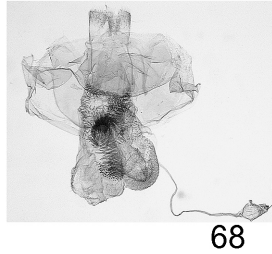
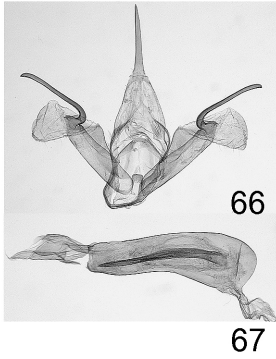
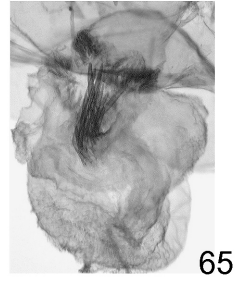
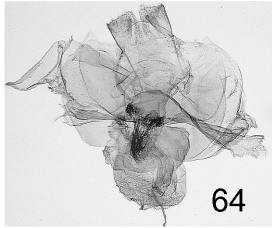
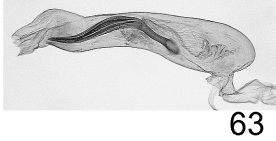
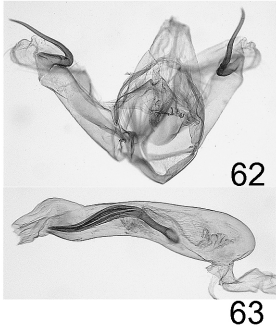
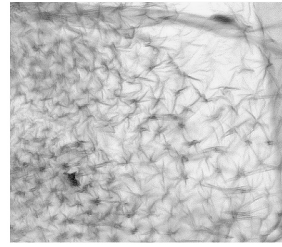
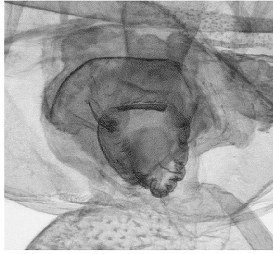
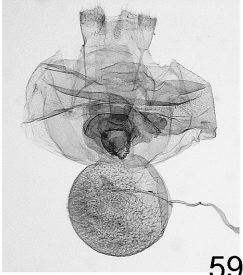
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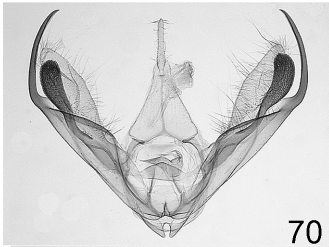


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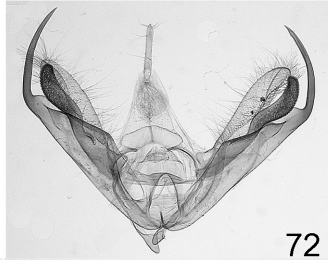




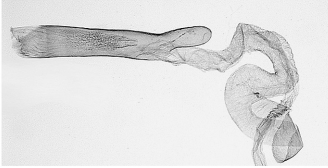




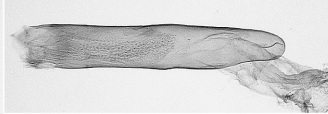
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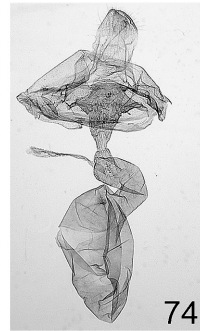
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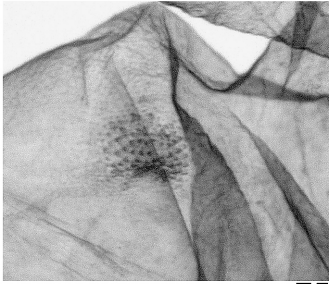
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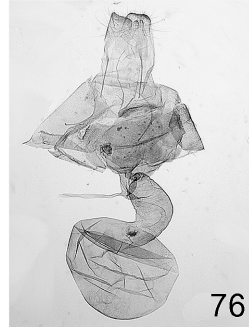
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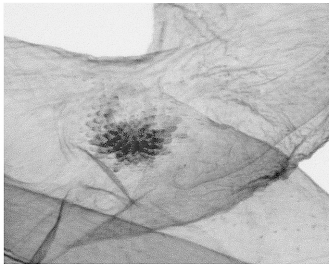
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