A revision of the genus *Metallolophia* Warren (Lepidoptera, Geometridae, Geometrinae)

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Abstract

The Geometrine genus *Metallolophia* is revised. In addition to the 11 species known, five new species are described as new. All the known species are redescribed and lectotypes are designated for *M. opalina* (Warren), *M. arenaria* (Leech) and *M. danielaria* (Oberthür) (= *M. arenaria* (Leech)). The male of *M. ocellata* (Warren) and the females of *M. medullosa* Inoue and *M. devecisi* Herbulot are described for the first time. The generic characters based on all species are summarized and a key to all taxa is given. Illustrations of moths and genitalia are presented. The new and revised taxa are: *Metallolophia purpurivenata* sp. nov., *Metallolophia cuneataria* sp. nov., *Metallolophia inanularia* sp. nov., *Metallolophia flavomaculata* sp. nov., *Metallolophia stueningi* sp. nov. and *Metallolophia ostrumaria* Xue, syn. nov. (of *Metallolophia albescens* Inoue).

Keywords: Revision, Lepidoptera, taxonomy, South-East Asia, new species, Geometridae, Metallolophia

Introduction

Warren (1895) described the genus *Metallolophia* to accommodate the Bornean species *Hypochroma viticosta* Walker. His brief original description is as follows: ‘Fore wings narrower than in the allied genera, cut away at the anal angle; antenna of male thick, beset with very short, stout pectinations; abdomen with metallic crests on first three segments’.

Prout (1912a) re-defined and redescribed the genus, using many more characters. He included *Terpna opalina* Warren, *Terpna (?) ocellata* Warren, *Terpna subradiata* Warren and *Pachyodes arenaria* Leech in the genus. He also discussed the relationship of *Metallolophia* to *Aeolochroma* Prout, 1912 and *Terpna* (= *Pachyodes* Guenée, [1858]: *Terpna*, based on a misspelling, is an unavailable name (see Fletcher 1979)). Although Prout speculated that *Metallolophia* might be a ‘section’ of *Aeolochroma*, he left both genera separate, and gave as the most important diagnostic character: ‘The inner margin of the hind wing seems always relatively longer than in *Aeolochroma*’. Discussing the metallic crests on the abdomen, Prout argued that ‘the metallic crests are not of generic value, being apparently absent in all but the type species, while on the other hand they are shown in one species of *Aeolochroma*’. He
was evidently not satisfied with these conclusions, as he added: ‘Unfortunately, we have only had access to very meagre material, and largely in inferior condition’.

Oberthür (1913) described a new species, *M. danielaria*, from Sichuan, China, which was treated as a junior synonym of *M. arenaria* (Leech) by Prout (1932, 1934). Nothing further was published on the genus until Inoue (1988) described a new species: *M. medullosa* from Mindanao, Philippines. Since then, several new species have been described by different authors. Holloway (1996) summarized the diagnostic characters. A total of 11 named species have been included in the genus (Scoble 1999).

In recent years, new material has been collected or discovered in collections and new taxa need to be described; some synonymic problems have arisen, and lectotype designation is necessary for three species: hence a revision of the genus based on a wider study of material available in collections is now timely. The purposes of this paper are: to summarize the generic characters based on all known taxa; to describe five new species; to ensure stability for certain taxa by designating lectotypes; to publish the male of *M. ocellata* (Warren) and females of *M. medullosa* Inoue and *M. devecisi* Herbulot; to give diagnostic characters to *M. devecisi* Herbulot; to sink *M. ostrumaria* Xue as a new junior synonym of *M. albescens* Inoue; and to add several taxonomic notes.

Finally, a note of caution: although considerably more is known about the moth fauna of South, East and South-East Asia than was the case a couple of decades ago, the Lepidoptera fauna of many areas is still comparatively unexplored. It is likely that much still remains to be discovered.

**Material and methods**

Most specimens examined are from three collections: those of the Institute of Zoology, Chinese Academy of Sciences, Beijing, China; the Natural History Museum, London, UK; and the Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany. Some other small collections were also examined. The type of *M. devecisi* Herbulot was photographed by Dr A. Hausmann in the Zoologische Staatssammlung München. The depositories of all the types and examined specimens are indicated as follows: BMNH, The Natural History Museum, London, UK; FSIHP, The Forestry Science Institute of Hunan Province, China; IZCAS, Institute of Zoology, Chinese Academy of Sciences, Beijing, China; MDS, private collection of Manfred D. Sommerer, München, Germany; NSMT, National Science Museum (Natural History), Tokyo, Japan; ORHANT, private collection of Georges Orhant, Wailly-Beaucamp, France; OUM, Oxford University Museum of Natural History, Oxford, UK; ZFMK, Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany; ZSM, Zoologische Staatssammlung München, Germany.

The standard dissection methods used in the Lepidoptera section, Department of Entomology, The Natural History Museum, London were used to prepare the genitalia. Photographs of type specimens in London were taken using automontage software, elsewhere by using various conventional or digital cameras and microscopes. Terminology of wing venation follows the Comstock–Needham System (Comstock 1918) and that of the genitalia follows that of Pierce (1914), Klots (1956) and Nichols (1989). The digital images were enhanced and the plates compiled using Adobe Photoshop.

*Metallophoria* Warren

*Metallophoria* Warren, 1895: 88. Type species: *Hypochroma vitticosta* Walker 1860 (Borneo: Sarawak), by original designation.
Tribal and subtribal affiliation

Metallolophia belongs to the group of stout-bodied genera within the Geometrini tentatively defined as the subtribe Pseudoterpniti by Holloway (1996). Holloway provided a number of characters defining the genus, in particular the presence of dark streaks or spots basal to the fore wing discal spot, and the diagnostic ornamentation of the valve, consisting of 'a rather boarmiine-like expansion and setation to the apex of the costa; a central basal lobe; a sclerotised, digitate or blade-like saccular process'. He mentioned in addition the apical saw-like serration on the aedeagus, and the single moderate, rather blunt cornutus distally on the small vesica. Additional distinctions from closely related genera are given in the section below on 'diagnosis'. Contrary to Holloway (1996), a lack of setal patches on the third sternite does not define the genus, since we found such patches in a number of species of the genus (Figure 79). Dr Dieter Stüning (in private correspondence) found that the setae on the cucullus of the valvae are very specialized, being scale-like, apically flattened and dentate (Figure 80). This character could be diagnostic for the genus, though not all species have been examined for this character.

Description

Frons not prominent; palpus short, strong, the third segment minute in male, variable in female; antenna in male lamellate in type species, variable in remaining species.
(Figure 1a–d), in female simple; body stout, coax and ventral side of thorax hairy; abdomen with dorsal crests on segments 2–4, in some species metallic and glossy. Wings with outer margin crenulate or rounded, hind wing in male with inner margin elongate; discal spots on both upperside and underside of wings prominently large, pale centred and bounded by a dark line. In most species, a tinge of purple or violet on wings, especially on underside.

Venation (Figure 1e). Fore wing: subcosta and R₁ free, R₂–₅ stalked, discocellulars curved, M₂ arising from the middle of the discocellulars, generally not close to M₁. Hind wing: Rs arising from cell, not stalked with M₁; 3A present.

Male genitalia. Uncus vestigial, socii like pencil tips, lying close to each other. Saccus small. Valva generally broad, costa expanded to the apex, with a thick patch of scale-like setae; a well-developed basal lobe extending to the centre of the valva; saccular process sclerotized, terminal part expanded, covered with minute spines; aedeagus with a sclerotized saw-like band, vesica small, with a single ‘Y’-shaped cornutus. In most species, male abdomen with a pair of setal patches on 3rd sternite, sometimes the two setal patches expanded and joined together.

Female genitalia. Apophyses anteriores wanting; apophyses posteriores moderately long; ductus bursae short and broad, corpus bursae pyriform, semi-sclerotized, without signum.

Differentiation from related genera

This genus differs from Aeolochroma Prout in that the discocellulars of the fore wing are not angled at M₂, and the inner margin of the hind wing is elongate, and always distinctly longer than the costa; from Pachyodes Guenée in that the frons is not prominent (in Pachyodes the frons is very strongly protuberant), vein M₂ of the fore wing arises from the middle of the discocellulars, and generally not close to the base of M₁. In general, characters of the genitalia as described by Holloway (1996) are the best distinction, but the most constant external characters of Metallolophia are: the discal spots on both upperside and underside are prominently large, especially on the fore wing, pale centred and bounded by a dark line; on the underside of the fore wing there is always a round black or dark purple spot proximally to the discal spot and a purplish streak below the round spot; in most species there is a tinge of purple or violet on the wings, especially on the underside.

Key to species

1. Postmedian line dark, completely separate from subterminal band, well expressed on underside of both wings underside sometimes with clear trace of the line on upperside; male antenna shortly bipectinate (Figure 1c, d) (M. inanularia male unknown) .....................2
   – Postmedian line absent or very faint or almost completely merged with the subterminal band on the underside of the wings; male antenna lamellate or nearly simple (Figure 1a, b) ..................9

2. Postmedian line on fore wing gently curving outwards from costa to M₃, and forming a sharp tooth on Cu₁, at the nearest point to the terminal margin; undersurface of wing pale pink ..................... M. assamensis
– Postmedian line on fore wing gently curved or wavy from costa to M₃, seldom weakly or bluntly angled, without sharp tooth, the angle nearest to the terminal margin lying on M₃, undersurface not pale pink ............. 3

3. Subterminal band on underside of both wings purplish black, as strong as postmedian line, continuous throughout ................. 4
– Subterminal band on underside of both wings purplish to brown, much fainter than postmedian line, interrupted at middle or disappearing below middle ........ 5

4. Anterior half of postmedian line on fore wing underside rounded and broader at its outer margin, width at M₂ about 2.5 mm .............. M. devecisi
– Anterior half of postmedian line on fore wing underside straight and narrower at its outer margin, width at M₂ 2.0 mm or less ................ M. ocellata

5. Most wing markings yellowish brown or golden-brown, the postmedian line on fore wing band like, yellowish brown, without blackish coloration M. flavomaculata
– Wing markings not yellowish brown or golden-brown, the postmedian line on fore wing thin, black or blackish ......................... 6

6. Postmedian band on the underside of fore wing with the spot between Cu₁ and Cu₂ much expanded inwards to near the lower margin of cell, its width much larger than the width between it and cell ................ M. stueningi
– Postmedian band on the underside of fore wing with the spot between Cu₁ and Cu₂ as wide as other spots of the postmedian line, or only a little bigger, its width much less than the width between it and cell .................................. 7

7. Dark boundaries of fore wing discal spot very weak or completely wanting; female with the corpus bursae shorter than apophyses posteriores ........ M. inanularia
– Dark boundaries of fore wing discal spot always present and clear; female with the corpus bursae twice as long as apophyses posteriores ........................................... 8

8. Discal spot on upperside of fore wing narrower towards the costa and expanded near its base, where it is about twice as wide as at the top of the spot; underside of fore wing from near base to postmedian line suffused with purple under the cell and Cu₂, without dark streak .................. M. cuneataria
– Width of discal spot on fore wing upperside nearly the same from top to bottom; underside of fore wing without suffusion as above or suffusion very faint, but a distinct purplish black streak near base ................. M. arenaria

9. Subcostal area of fore wing pale or white .................................................. 10
– Subcostal area of fore wing not pale or white ...................................... 12

10. Postmedian line of fore wing deeply bending towards base near costa ........ 11
– Postmedian line of fore wing nearly straight, though dentate from inner margin to costa ................................................. M. albescens

11. Small moths (length of fore wing 19–21 mm); underside greyish brown, fore wing with a black round dot proximally to the discal spot, hind wing underside without discal spot ........................................ M. vitticosta
– Large moths (length of fore wing 26–27 mm); underside purplish, fore wing with an elongate streak proximally to the discal spot, hind wing underside with dark purple discal spot ........................................ M. opalina
12. All veins covered with dark purple on underside of the wings. *M. purpurivenata*
   - None of the veins covered with purple colour on the underside of the wings.  

13. Underside of both wings with broad blackish subterminal band, as dark as discal spot.
   - Underside of both wings without blackish subterminal band, or subterminal band, if present, weak and much paler than discal spot.  

14. Inner margin of the discal spots on fore wing upperside deeply concave; basal half of hind wing underside white. *M. medullosa*
   - Inner margin of the discal spots on fore wing upperside straight as normal; basal half of hind wing underside yellow. *M. subradiata*

15. Subterminal line on hind wing upperside with two sharp black ‘teeth’ between M₁ and M₃. *M. variegata*
   - Subterminal line on hind wing upperside faint, without black ‘teeth’ between M₁ and M₃. *M. cineracea*

**Metallolophia vitticosta** (Walker)
(Figures 1–5, 44, 53, 68)

*Hypochroma vitticosta* Walker, 1860: 438. Holotype ♂, [Malaysia]: Sarawak (OUM).
*Metallolophia vitticosta*: Warren, 1895: 88; Prout, 1912a: 37; Prout, 1932: 54, pl. 8f; Holloway, 1996: 203, Figures 147, 157, pl. 5: 17.

**Description**

Length of fore wing ♂ 19 mm; ♀ 21 mm. Vertex, frons and terminal half of palpus blackish brown mixed with a few red scales in male, pale brown in female. Antenna in male lamellate, with the segments short and broad (Figure 1a, b), in female almost simple, all segments shorter than diameter of flagellum. Third segment of female palpus elongate, as long as one-third of second. Abdominal crests strongly metallic. Wings in male narrowed, fore wing elongate, its outer margin very oblique; hind wing with inner margin much more elongate than in other species. Both sexes with outer margin of both wings strongly crenulate. Fore wing with a pale (white in fresh specimens) zone below the costa, rest of wings suffused with brown (green in fresh specimens), discal spots and postmedian lines indistinct on both wings. An indistinct zigzag antemedian line present on fore wing below the pale zone, the postmedian line on fore wing running outwards from costa to M₃, then suddenly turning back inward, gently bending to inner margin, forming a blunt angle on M₃. Underside pale brown, with a hue of light purplish, outer half with a faint dark subterminal band. Fore wing with a blackish purple double-streak-like discal spot, a round black spot proximally to it and a faint purplish streak below the round spot. Hind wing with a faint, elongate discal spot on upperside.

**Male genitalia** (Figure 53). Valva broad at the terminal half. Central basal lobe and saccular process long; terminal part of the lobe blade-like; end of saccular process shortly curved, outer margin of process irregularly expanded and forming some characteristic thorns.
Female genitalia (Figure 68). Ductus bursae longer than in congeners, corpus bursae pyriform, short, only a little longer than apophyses posteriores.

Specimens examined

Malaysia: Holotype: ♂ [Malaysia]: Sarawak (OUM); 1 ♀, Sarawak: Gunong Mulu National Park, R.G.S. Exped. 1977–78 (J. D. Holloway et al.), Site 20, 150 m; 1 ♂, West Melinau Gorge, grid reference 422577 (BMNH); 1 ♀ (Borneo, no further data, BMNH). Vietnam: 1 ♂, Bach-Ma National Park, 16°10′N, 107°54′E, 1200 m, 6 August 1996, coll. Siniaev and Afonin (ZSM).

Distribution

Vietnam; Indonesia: Sumatra; Malaysia: Sarawak.

Metallolophia opalina (Warren) (Figures 6, 7, 45, 54, 69)

*Terpna opalina* Warren, 1893: 349, pl. 32, Fig. 14. Lectotype ♀, Sikkim, here designated (BMNH).

*Pseudoterpna opalina*: Hampson, 1895: 475.

*Metallolophia opalina*: Prout, 1912a: 38; Prout, 1932: 54, pl. 8f.

Description

Length of fore wing: 26–27 mm. Head light brown; third segment of palpus not elongate. Antenna thickened filiform in male, simple in female, segments as long as diameter of flagellum. Abdominal crests minute, with a few metallic scales. Wings broad, the outer margin of both wings shallowly crenulate. Fore wing with a broad pale zone below costa, the remainder brown, scattered with dense dark purplish brown streaks, the terminal area olive-green between veins. Antemedian line zigzag on fore wing, discal spots on both wings rather large, with the dark boundaries very faint. Postmedian line dentate, forming sharp teeth on M₁ and M₃ on fore wing, with short blackish teeth projecting distad along veins on hind wing. Underside almost uniformly purplish, fore wing with an elongate streak proximally to the discal spot, hind wing underside with dark purple discal spot.

Male genitalia (Figure 54). Socii with lower third constricted and upper third bulging, tips hook-like. Terminal part of central basal lobe of valva round and reniform. Saccular process short, terminal part straight. Valva expanded to a curving lobe distal to the saccular process, then gently narrowing to the apex.

Female genitalia (Figure 69). Very similar to *M. arenaria* (Leech), but with corpus bursae longer. Total length of ductus bursae and corpus bursae about 2.8 times length of apophyses posteriores.

Specimens examined

Sikkim: 1 ♀, here designated as Lectotype: label data: Type label, Sikkim, Möller, 1887, coll. H. J. Elwes, Rothschild bequest B.M.1939-1, ?type, *Pachyodes opalina* Warr.
Figures 2–21. Adults of *Metallophia*. (2–5) *M. vitticosta* (Walker) (BMNH). (2, 3) ♀: (2) upperside, (3) underside. (4, 5) ♂: (4) upperside, (5) underside. (6, 7) *M. opalina* (Warren) (lectotype, ♂, BMNH): (6) upperside, (7) underside. (8, 9) *M. albescens* Inoue (paratype, ♀, IZCAS): (8) upperside, (9) underside. (10, 11) *M. albescens* ssp. nov. (holotype, ♀, IZCAS): (10) upperside, (11) underside. (12, 13) *M. purpurivenata* sp. nov. (holotype, ♂, IZCAS): (12) upperside, (13) underside. (14, 15) *M. subradiata* (Warren) (holotype, ♂, BMNH): (14) upperside, (15) underside. (16, 17) *M. medullosa* Inoue (holotype, ♂, NSMT): (16) upperside, (17) underside. (18, 19) *M. variegata* Holloway (paratype, ♂, BMNH): (18) upperside, (19) underside. (20, 21) *M. cineracea* Holloway (paratype, ♂, BMNH): (20) upperside, (21) underside. Natural size.
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Metallolophia albescens

Metallolophia albescens Inoue, 1992: 156, Figures 14, 19. Holotype ♂, China: Chekiang [Zhejiang] (misspelled as ‘Checkiang’ in original description); Wenchow (ZFMK).

Metallolophia ostrumaria

Metallolophia ostrumaria Xue, 1992: 810, Figure 2595. Holotype ♂, China: Hunan: Sangzhi: Tianping Shan (IZCAS) syn. nov.

Description

Length of fore wing: ♂ 21–24 mm; ♀ 25 mm. Frons and palpus brown to blackish brown; female palpus with third segment somewhat elongate; antenna simple in both sexes, all segments shorter than diameter of flagellum in male; abdominal crests metallically glossy, but rather weaker than in type species. Wings of male broader than in type species; outer margin of fore wing not oblique and inner margin of hind wing only slightly elongate. Wing shape of female as in previous species. Pale zone on fore wing distinct, the densely scattered dark streaks fresh violet rather than purplish brown. Discal spots distinctly narrower than in M. opalina (Warren). The most important difference compared to the previous species is that the postmedian line of the fore wing is nearly straight, though dentate from inner margin to costa. Underside of wings suffused with a pale purplish hue, the subterminal band darker but not clearly defined; discal spots on both wings dark purplish, a small streak in the cell and a large one on the fold proximally to the discal spot on the fore wing.

Male genitalia (Figure 55). Tip of socii a little bent. Valva ample, terminal part of central basal lobe rounded. Saccular process strong, terminal part flattened into an obliquely dentate apex.

Female genitalia (Figure 70). Ductus bursae shorter and broader than in M. vitticosta (Walker). Corpus bursae pyriform, shorter than the apophyses posteriores.

Specimens examined

China: HOLOTYPE: ♂, Checkiang [Zhejiang]: Wenchow, June to July 1939, coll. H. Höne (ZFMK). PARATYPES: 19♂♂, same data. 1♂, same locality and collector, July 1939 (ZFMK); 2♂♂, same data (IZCAS). Other material: 3♂♂, 1♀ (holotype and paratypes of
M. ostrumaria Xue), Hunan: Sangzhi: Tianping Shan, 12 August to 1 September 1981, native collector (2♂, 1♀ in IZCAS, 1♂ in FSIHP); 1♂, Yunnan: Yongshan, 1400 m, 9 August 1980, coll. Guo Youli (IZCAS); 1♂, Guangdong: Linping, 23 October 1923, H. Höne; 1♂, China: Canton, coll. H. Höne (ZFMK). Vietnam: 2♂♂, Mt Fan-si-pan, Champa, 1500–1800 m, 8–29 May 1993, coll. A. Schintlmeister (ZFMK).

Distribution
China: Zhejiang, Hunan, Guangdong, Yunnan; northern part of Vietnam.

Remarks
Specimens from Yunnan, China (Figures 10, 11, 56) and the northern part of Vietnam are of a slightly larger, distinctly marked form. Length of fore wing in male 25 mm; antenna a little more serrate; discal spots on both wings much smaller than in type series.

Metallolophia purpurivenata Han and Xue sp. nov.
(Figures 12, 13, 57, 71)

Description
Length of fore wing: ♂ 19–24 mm; ♀ 26 mm. Frons pale brown to brown, vertex white; palpus pale brown to blackish brown; in female third segment of palpus only slightly elongate. Antenna simple but rather thick in both sexes, blackish brown with the dorsal part covered with pale scales. Abdominal crests weakly metallically glossy. Wings with outer margin round and smooth, without crenulations. Ground colour of wings white, with individually variable suffusion of violet colour, but always with prominent scattering of dark purple streaks. Discal spot on fore wing drop-like, that on hind wing small, almost obscured by dense dark purple streaks. Postmedian line dentate, not continuous, consisting of triangular blackish purple teeth on the veins. Underside white, all veins covered with dark purple; base of both wings yellow; a dark purple patch in the cell, close to base, on both wings; fore wing with dark discal spot, and an inconspicuous postmedian band and apical suffusion of dark purple. Discal spot on the hind wing underside absent or very weak.

Male genitalia (Figure 57). Socii wide, with sharp points at tips. Valva produced and weakly angled on the ventral side at middle; central basal lobe expanded, irregularly rounded. Saccular process very thin and small, apical part finger-like, not expanded.

Female genitalia (Figure 71). Ductus bursae not sharply divided from corpus bursae, total length of both about 1.5 times the apophyses posteriores.

Diagnosis
This new species differs from all congeners in that all veins are covered with dark purple on the underside of the wings, and in the extremely small saccular process of the male valve.
HOLOTYPE: ♂, China: Guangxi: Fangcheng: Fulong, 500 m, 24 May 1999, coll. Zhang Yanzhou (IZCAS).

PARATYPES: China: 7♂, 1♀, Guangxi: Fangcheng: Fulong, 300–500 m, 24–25 May 1999, coll. Zhang Yanzhou, Yuan Decheng, Liu Dajun (IZCAS). Vietnam: 1♂, Mt Fanzi-pan: Cha-pa, 2400 m, 8–29 May 1993, coll. A. Schintlmeister (ZFMK).

Distribution
China: Guangxi; Vietnam.

**Metallophilia subradiata** (Warren)
(Figures 14, 15, 47, 58, 72)
*Terpna subradiata* Warren, 1897: 388. Holotype ♀, [Peninsular Malaysia]: Penang (BMNH).
*Metallophilia subradiata*: Prout, 1912a: 38; Prout, 1932: 54; Holloway, 1996: 203, Figures 146, pl. 5: 18.

Description
Length of fore wing: ♂ 23 mm; ♀ 25 mm. Frons and terminal half of palpus greyish brown; third segment of female palpus moderately elongate. Antenna very weakly lamellate or serrate in male, simple in female. Abdominal crests very weak, without metallic glossy sheen. Wings rather broad, inner margin of hind wing in both sexes slightly elongate, outer margin weakly crenulate. Fore wing pale brown mixed with dense dark purplish streaks and irregular greenish irroration; a large pale area below costa from antemedian to postmedian line; discal spot reniform, with centre pale greenish and ring black; antemedian line zigzag; postmedian line dentate. Hind wing darker than fore wing, tinged with red brown near base and becoming greyish brown or greenish towards outer margin; discal spot white-centred, ring inconspicuous. Underside pale, the yellow area from base extending to middle of wing, sometimes even to the dark subterminal band on the hind wing; discal spot and small streak proximally to it on fore wing underside dark purple; a large but pale streak on the fold; hind wing underside with discal spot absent in male and very weak in female.

Male genitalia (Figure 58). Socii thick and short. Valva broad at proximal half, abruptly narrowing beyond the middle point; terminal part of central basal lobe very broad, semicircular, much more weakly sclerotized. Saccular process stick-like, thin and long, only very slightly expanded at the tip.

Female genitalia (Figure 72). Ductus bursae short and narrow, gradually merging with corpus bursae, total length of both about 1.8 times that of apophyses posteriores.

Specimens examined
Malaysia: HOLOTYPE: 1♀, Penang 1896, coll. Curtis (BMNH). 1♂, Sarawak, Gunong Mulu National Park, R.G.S. Exped. 1977–78 (J. D. Holloway et al.), Site 25, 900 m, April 1978, Sarawak, grid reference 427550 (BMNH). Indonesia: 11♂♂, Sumatra, 150–180 m,
November 1967–1973, coll. E. Diehl (ZSM); 1♂, northern Sumatra, Gunung Malayu vic., Aek Tarum, 150 m, 20 November 1982, coll. Dr Diehl, in coll. Sommerer (ZSM); 1♂, northern Sumatra (Simalungun), ‘Holzweg 2’, 1050 m, 28 km SW Siantar, 98° 59’ E, 2° 46’ N, 1 June 1986, coll. Dr E. W. Diehl, in coll. Sommerer (ZSM); 1♀, northern Sumatra, 10 km N of Prapat Ainoli Forest, 1400 m, 14 July 1979, [coll.] B. Turlin (ZSM).

**Distribution**

Malaysia: peninsular Malaysia, Sarawak; Indonesia: Sumatra, Borneo and Sulawesi.

*Metallolophia medullosa* Inoue

(Figures 16, 17, 59, 73)

*Metallolophia medullosa* Inoue, 1988: 97, Figures 1a, b, 2a. Holotype ♀, [Philippines]: Mindanao, Davao, Upper Baracatan, Apo Range, Mt Talomo, 1100 m (NSMT).

**Description**

Length of fore wing: ♂ 22–24 mm; ♀ 24 mm. Antennae in both sexes filiform. Differs from congeners in broader wings, reminiscent of *Pingasa*. Wings white, basal and terminal area olive-green. Fore wing with a double wave in the antemedian line, inner margin of discal spots deeply concave; postmedian line olive-green, dentate; an indistinct white patch at the middle of the terminal dark band. Hind wing with discal spot very faint. Underside white, fore wing with purplish tinge, a dark purple spot proximal to discal spot and a shuttle-like patch below the origin of Cu2; hind wing underside with a very small discal spot; terminal area of both wings underside occupied by a dark purple band, with white spots at apex and middle.

**Male genitalia** (Figure 59). Near *M. subradiata* (Warren). Socii narrower than in that species. Terminal half of valva triangular; basal lobe very narrow and small. Stick-like saccular process much broader at terminal half. Aedeagus shorter than in *M. subradiata* (Warren). Male abdomen lacking setal patches on third sternite.

**Female genitalia** (Figure 73). Close to those of *M. albescens* Inoue. Ductus bursae shorter and broader, lamella postvaginalis smaller.

**Specimens examined**

**Philippines:** Holotype: 1♂, Mindanao, Davao, Upper Baracatan, Apo Range, Mt Talomo, 1100 m, 17–19 August 1985, coll. M. Iwada (NSMT); 5♂♂, 1♀, Luzon, Ifugao, Banaue, 1200 m, 8–12 February 1988, coll. A. Schintlmeister; 2♂♂, Negros, Mt Kanlaon, primary forest, 600 m, February 1997, coll. R. Brechlin; 1♂, Mindanao, Bukidnon, Mt Dalongdong, 800 m, 1–3 October 1988, coll. A. Schintlmeister (ZFMK); 4♂♂, 2♀♀, Negros, Mt Canlaon, about 1000 m, August to September 1995, ex coll. Inoue (MDS).

**Distribution**

Philippines: Mindanao, Luzon, Negros. Recorded here from Negros for the first time.
Metallolophia variegata Holloway
(Figures 18, 19, 48, 60)

Metallolophia variegata Holloway, 1996: 204, pl. 5, [Figure 21]; Figure 149. Holotype ♂, Borneo: Sarawak, Gunung Mulu National Park (BMNH).

Description

Male. Length of fore wing: 16–17 mm. Frons brown, terminal half of palpus greyish brown. Antenna lamellate. Abdominal crests strongly metallically glossy. Wings broad, hind wing with inner margin only slightly elongated, outer margin of both wings weakly crenulate. Wing colour much paler than all congeners, with a tinge of incarnadine. Markings dark brown, without purplish on upperside. Antemedian line on fore wing slightly wavy, almost vertical to inner margin; shape of postmedian line similar to that of M. vitticosta (Walker), with the angle on M₃ very sharp and pointed; subterminal line with a row of small dots between veins and a big dark patch on costa. Postmedian line on hind wing dentate, with a sharp and very exaggerated tooth on M₃; subterminal line expressed as a faint but conspicuous band, with blackish teeth between veins, the two teeth between M₁ and M₃ being much larger than the others. Rings of discal spots on both wings irregularly shaped, with a conspicuous irroration of dark brown scales below the hind wing discal spot. Underside suffused with pale purplish grey tinge, fore wing with discal spot dark brown, shaped like a double streak, with a minute round white-centred black spot proximal to the discal spot, and a faint brown patch below the round spot; discal spot on hind wing very faint; both wings with an inconspicuous dark subterminal band.

Male genitalia (Figure 60). Socii comparatively narrow. Valva of almost equal width throughout; terminal part of central basal lobe evenly rounded at the apex, and weakly sclerotized. Saccular process narrow, blade-like.

Female. Unknown.

Specimens examined

Malaysia: Paratype: 1 ♂, Sarawak: Gunung Mulu National Park, R.G.S. Expedition 1977–78 (J. D. Holloway et al. Site 25, 900 m, April, Mt Api, grid reference 427550 (BMNH).

Distribution

Malaysia: Sarawak.

Metallolophia cineracea Holloway
(Figures 20, 21, 49, 74)

Metallolophia cineracea Holloway, 1996: 204, Figure 148, pl. 5, [Figures 19, 20]. Holotype ♂, Borneo: Brunei, Telisai (BMNH).

Description

Length of fore wing: ♂ 16 mm; ♀ 15–20 mm. Frons brown, terminal half of palpus grey, third segment of female palpus of medium length. Antenna lamellate in both sexes.
Abdominal crests with metallic glossy sheen. Wing shape as in previous species, with colour more grey or greyish brown, irrorated with many more dark blackish scales. Markings on both wings and both upper- and underside same as in *M. variegata* Holloway, but subterminal lines missing; discal spot, although of same shape as in that species, much weaker on upperside; underside much darker, purplish grey, subterminal band rather indistinct.

*Male genitalia.* Very similar to previous species, differing only in having the apical part of the valva narrower, the central basal lobe of the valva somewhat quadrate and the blade-like saccular process slightly broader.

*Female genitalia* (Figure 74). Very similar to those of *M. albescens* Inoue. Ductus bursae somewhat thinner and shorter, corpus bursae a little bigger.

**Specimens examined**

**Brunei:** PARATYPE: 1♀, 15 m, Telisai, sandy heath forest and Gymnostoma, 13 December 1979, coll. M. G. Allen (BMNH).

**Distribution**

Brunei.

**Remarks**

It is possible that *M. cineracea* and *M. variegata* may represent seasonal forms or ecologically separated forms of the same species, judging from the similarity of the genitalia, size and pattern, but more collecting, particularly in the areas between the locations where the type material originates, would be necessary to establish this.

*Metallolophia assamensis* Orhant

(Figures 22, 23, 61)

*Metallolophia assamensis* Orhant, 2000: 1, Figures 10, 11, 18. Holotype ♂, North-east India: Assam (ORHANT).

**Description**

*Male.* Length of fore wing: 17.5–18 mm. A little larger than previous two species. Head pale brown, antenna bipectinate. Wings ochreous-grey, lines black. Fore wing with basal and terminal areas a little darker, central part paler; antemedian line very oblique, not waved, weakly curved near inner margin; discal spot relatively small, irregularly shaped, slightly produced outwards at upper and lower angles; postmedian line oblique and nearly straight from costa to M₃, forming a small angle at M₃ and then running outwards again to Cu₁, where it forms a very sharp angle and turns back, deeply curved, to inner margin. Hind wing more uniformly coloured, with white-centred discal spot incompletely ringed with black; postmedian line almost same shape as on fore wing, with longest tooth on Cu₁,
not on M₃ as in other species; short black bars running outwards from postmedian on veins, especially Rs, M₁, M₃ and Cu₁. Underside whitish pink, with barely visible shadow of upperside lines; fore wing with discal spot in the form of a double streak and anterior half of postmedian line dark purplish; a dark patch before apex on costa.

Male genitalia (Figure 61). Socii broad at base, curving outwards to a narrow point. Small uncus present between socii. Valva narrow, a little curved ventrally at middle. Terminal part of basal lobe of valva shaped like a crow’s head, with the beak very sharply pointed. Sacculus process narrow but strongly sclerotized, with three or four huge spines on the terminal part. Aedeagus relatively small.

Female. Unknown.

Specimens examined

India: Holoype: 1♂, Assam: Kaziranga: Kohara soil, 80 m, 28 July 1995, coll. G. Orhant (ORHANT); Paratype: 1♂, Assam: Nameri National Park, 60 km N of Tezpur, 150 m, 27°20’N, 93°15’E, 24 July to 2 August 1997, coll. Afonin and Siniaev (ZSM).

Distribution

India: Assam.

Metallolophia arenaria (Leech) (Figures 24–27, 50, 62, 75)

Pachyodes arenaria Leech 1889: 144, pl. 9, Figure 12. Lectotype ♀, China: [Jiangxi]: Kiukiang, here designated (BMNH).
Pseudoterpna arenaria: Leech 1897: 229.
Metallolophia arenaria: Prout 1912a: 38; Prout 1912b: 12, pl. 1e; Prout 1932: 54. Chu 1981: 114, pl. 30, Figure 769.
Hypochroma danielaria Oberthür 1913: 291, pl. 173, Figure 1697. Lectotype ♀, China: [Sichuan]: Siao-lou, here designated (ZFMK).
Metallolophia danielaria: Prout 1934: 6, pl. 1g (as syn. of Metallolophia arenaria (Leech))

Description

Length of fore wing: ♂ 22–26 mm; ♀ 26–28.5 mm. Frons and palpus brown, mixed with black, third segment of female palpus elongated to equal one-third length of second segment. Male antennae shortly bipectinate, with antennal branches longer than diameter of flagellum (Figure 1c, d). Abdominal crests pale brown surrounded by black metallic hair-scales. Wings rather broad, hind wing with inner margin a little elongate in male. Outer margins on both wings rounded, without crenulations. Ground colour white, scattered with dense blackish purple scales. Area inside antemedian line of fore wing and terminal area of both wings suffused with olive green. Transverse lines black, gently waved and curved, without any sharp tooth, postmedian line on hind wing generally very faint or invisible. Large reniform discal spot on fore wing always ringed by a black boundary, with
Figures 22–43. Adults of *Metallophilia*. (22, 23) *M. assamensis* Orhant (paratype, ♀, ZSM): (22) upperside, (23) underside. (24, 25) *M. arenaria* (Leech) (lectotype, ♂, BMNH): (24) upperside, (25) underside. (26, 27) *M. arenaria* (Leech) (♂, IZCAS): (26) upperside, (27) underside. (28, 29) *M. cuneataria* sp. nov. (holotype, ♀, IZCAS): (28) upperside, (29) underside. (30, 31) *M. inamularia* sp. nov. (holotype, ♂, IZCAS): (30) upperside, (31) underside. (32, 33) *M. ocellata* (Warren) (holotype, ♂, BMNH): (32) upperside, (33) underside. (34, 35) *M. ocellata* (Warren) (♂, ORHANT): (34) upperside, (35) underside. (36, 37) *M. devecisi* Herbulot (holotype, ♀, ZSM): (36) upperside, (37) underside.
Figures 38–43. Adults of *Metallolophia*. (38, 39) *M. devecii* Herbulot (♀, ZSM): (38) upperside, (39) underside. (40, 41) *M. flavomaculata* sp. nov. (holotype, ♀, IZCAS); (40) upperside, (41) underside. (42, 43) *M. stuningi* sp. nov. (paratype, ♀, IZCAS); (42) upperside, (43) underside. Natural size. Figures 44–52. Labels of type (except Fig. 44) specimens. (44) *M. vitticosta* (BMNH). (45) *M. opalina* (BMNH). (46) *M. albescens albescens* (IZCAS). (47) *M. subradiata* (BMNH). (48) *M. variegata* (BMNH). (49) *M. cineracea* (BMNH). (50) *M. arenaria* (BMNH). (51) *M. ocellata* (BMNH). (52) *M. devecii* (ZSM).
its centre olive green; boundary of hind wing discal spot replaced by an indistinct olive patch. Underside white, markings bright to dark purple, almost identical on both wings; basal area with a quadrate or oval spot in middle of cell, a larger oval or shuttle-like patch below it on fold area (small or wanting in female hindwing), and fold area on fore wing suffused with uniform light violet; discal spots large and distinct on both wings; postmedian line narrow band-like, angled at base of cell, as dark as rings of discal spots; subterminal band a little lighter, extending to outer margin except on apices, which are white on both wings.

Figures 53–56. Male genitalia. (53) *M. vitticosta* (BMNH Geom-10607). (54) *M. opalina* (BMNH Geom-20969). (55) *M. albescens* (BMNH Geom-20970). (56) *M. albescens yunnanensis* ssp. nov., holotype (IZCAS Geom-00106). Scale bar: 1 mm.
Male genitalia (Figure 62). Socii thick and short. Valva strongly produced at middle, much narrower towards apex; basal lobe with its proximal half expanded, terminal half depressed in the middle, in the shape of a peanut. Saccular process thick but somewhat short, apical part expanded, bearing well-developed tiny spines. ‘Y’-shaped cornutus in aedeagus well developed, vesica with an additional small bubble-like sclerite.

Figures 57–60. Male genitalia. (57) *M. purpurivenata* sp. nov., holotype (IZCAS Geom-00107). (58) *M. subradiata* (BMNH Geom-16759). (59) *M. medullosa* (ZFMK 2739). (60) *M. variegata* (BMNH Geom-10598). Scale bar: 1 mm.
Female genitalia (Figure 75). Corpus bursae with evenly tapered sides. Total length of ductus bursae and corpus bursae more than twice as long as apophyses posteriores.

Specimens examined

**China:** lectotype of *Pachyodes arenaria* Leech, here designated: ♀, [Jiangxi, Jiujiang]; label data: Kiukiang, June 1887, A. E. Pratt, Leech coll. 1900–64, *Pachyodes arenaria* sp. [nov.], (BMNH). Jiangxi: 10♂♂, 1♀, Lushan, 12–17 June 1974, coll. Zhang Bao-lin; 3♂♂, 23 June to 23 July 1975, coll. Liu You-qiao; 1♀, Jiulianshan, 9 June 1975, coll. Zhang Bao-lin
(IZCAS); Fujian: 7♂♂, 2♀♀, Kuatun, 2300 m, 21 May to 4 June, 26 June, 2 July, 1 November 1938, and 1946 (ZFMK); 7♂♂, 4♀♀, Wuyi: Sangang, 10 May to 21 June 1983, coll. Wang Lin-yao, Zhang Bao-lin; 2♂♂, 1♀, Chongan, Xingcun, Sangang, 740 m, 12–17 June 1960, Zhang Yi-ran (IZCAS); Zhejiang: 1♂, West-Tien-Mu-Shan, 1600 m, 2 July 1932, coll. H. Höne (BMNH); 6♂♂, 1♀, West-Tien-Mu-Shan, 1600 m, 18 June to 3 July 1932, coll. H. Höne; 4♂♂, Ost-Tien-Mu-Shan, 1500 m, 18 June to 1 July 1931, coll. H. Höne; 16♂♂, Wenchow, June to July 1939, coll. H. Höne; 1♂, Mokanshan b. Hangchow,
June 1919, coll. H. Höne (ZFMK); 1♀, Changxing, May 1981, nat. coll. (IZCAS); Hunan: 3♂♂, Hoeng-Shang [Hengshan], 900 m, 29–30 May, 17 June 1933, coll. H. Höne (ZFMK); lectotype of Hypochroma danielaria Oberthür, here designated, label data: Siao-lou, 1900–1901 (ZFMK); 1♀, same data; 1♀, Siao-lou, 1901; 1♂, Tientsuen, figd Seitz 4 (Suppl.) pl. 1g, 1901; 1♂, Thibet Oriental [Sichuan] 1903; 1♂, Ginfu-Shan, Kr. Nanchuan, May 1929, coll. Friedrich, in coll. Wehrli (ZFMK); Yunnan: Menga, 1♂, no further data (IZCAS); Taiwan: 1♂, Hualien [Hualian]: Taroko N.P., Hsipan, 270 m, coll. Csorba and Ronkay (ZSM).

Figures 69–74. Female genitalia. (69) M. opalina (IZCAS Geom-00103). (70) M. albescens (IZCAS Geom-00030). (71) M. purpurivenata sp. nov., holotype (IZCAS Geom-00109). (72) M. subradiata (BMNH Geom-20968). (73) M. medullosa (ZFMK 2740). (74) M. cineracea (BMNH). Scale bar: 1 mm.
Distribution
China: Jiangxi, Fujian, Taiwan, Hunan, Zhejiang, Sichuan, Yunnan.

Remarks
Lectotypes for *Pachyodes arenaria* Leech and *Hypochroma danielaria* Oberthür are here designated in order to provide certainty and stability. This species, as well as the genus *Metallolophia* is new to the fauna of Taiwan.
Metallophilia cuneataria Han and Xue sp. nov.
(Figures 28, 29, 63, 76)

Description

Length of fore wing: ♂ 29 mm; ♀ 32 mm. Very close to M. arenaria (Leech), but much larger. Frons black in male, pale brown in female, palpus greyish brown. Antennal branches longer than diameter of flagellum in male. Markings of wings similar to arenaria, but differ...
as follows: discal spot on upperside of fore wing narrower towards costa and expanded near lower end, where it is about twice as wide as at the upper end. Underside with discal spot on fore wing even more sharply expanded toward lower end, becoming pyriform; violet suffusion under cell and Cu₂ more uniform, lacking dark oval patch; subterminal band much weaker.

Male genitalia (Figure 63). Valva less produced at middle and much broadened apically. Basal lobe of valva much broader than in M. arenaria (Leech). Saccular process slightly thicker than in that species.

Female genitalia (Figure 76). Corpus bursae very long, its total length plus the short ductus bursae more than 3.4 times length of apophyses posteriores.

Diagnosis
Very close to M. arenaria (Leech), but differs from that species in having the discal spot on the fore wing differently shaped and lacking the dark oval patch beneath the cell on the fore wing underside. The different shape of the valva and its basal lobe in the male and the very long corpus bursae in the female are also distinctive.

HoLOTYPE: ♂, China: Guangxi: Mt Miaoershan, 1900 m, 14 July 1985, coll. Wang Ziqing (IZCAS).
ParATYPE: ♀, China: Guangxi: Mt Miaoershan, 1600 m, 5 July 1985, coll. Fang Chenglai (IZCAS).

Distribution
China: Guangxi.

Metallolophia inanularia Han and Xue sp. nov.
(Figures 30, 31, 77)

Description
Female. Length of fore wing: 30 mm. Large. Frons black, palpus brown, mixed with grey. Body and wings scattered with extensive olive green. Outer margins of both wings weakly crenulate. Fore wing with transverse lines much thicker than in the two previous species; antemedian line deeply curved convexly, not with a double undulation as in its allies; postmedian line angled on M₃ (curved in the previous two species); large olive green discal spot almost without ring. Hind wing with discal spot very weak, the black postmedian line thin and clear. On underside, discal spots large, especially on hind wing, where spot expanded on both sides, proximally touching the patch in the cell and distally extending to the band-like postmedian line, which on both wings placed more proximally than in the allied species; subterminal band dark purple but much reduced, becoming a row of joined spots below M₃ on both wings; without light violet suffusion below cell and Cu₂ on fore wing, which is present in allied species.
Female genitalia (Figure 77). Ductus bursae and corpus bursae very short, pyriform, total length a little shorter than length of apophyses posteriores. Lamella postvaginalis broad, rectangular.

Male. Unknown.

Diagnosis

Weakly crenulate outer margins of both wings, absence of black ring on fore wing discal spot, curved antemedian and angled postmedian lines all distinguish this species from allied species. The female genitalia are very different from the previous two species, more similar to those of M. albescens Inoue, the markings of which are however different.

HOLOTYPE: ♀, China: Guangxi: Jinxiu: Linhaishanzhuang, 1000 m, 2 July 2000, coll. Li Wenzhu (IZCAS).

Distribution

China: Guangxi.

Metallolophia ocellata (Warren) (Figures 32–35, 51, 64)

Terpna (?) ocellata Warren, 1897: 207, pl. 5: 25. Holotype ♀, [India]: Khasi Hills (BMNH).

Pseudoterpna ocellata: Hampson, 1903: 654.

Metallolophia ocellata: Prout, 1912a: 38; Prout, 1932: 54.

Description

Length of fore wing: 25 mm. Frons and palpus brown. Antenna in male shortly bipectinate, length of branches a little longer than diameter of the flagellum; female antenna simple. Abdominal crests ringed with blackish and with metallic gloss in male, the crests very weak in female. Wing shape similar to that of M. arenaria (Leech), male hind wing not narrowed, its inner margin only slightly elongate. Ground colour of wings white, with a tinge of purplish, irrorated with dark purple streaks; transverse markings brown to olive-green, forming three interrupted fasciae at the terminal area; fore wing with an inconspicuous pale band below costa. Discal spot on fore wing regular, heavily ringed black; that on the hind wing a little smaller and weaker. Fore wing with a small spot in the cell, proximal to discal spot, and a black streak below 2A near base. Underside white with purplish hue, yellow near base, markings dark purple; both wings with discal spots very dark, the white centre nearly obsolete; postmedian fascia fairly strong, running on fore wing straight from costa to M3; subterminal band continuous, but with a whitish spot on apex and at middle on both wings and a white patch below middle of hind wing; fore wing with a small spot proximal to discal spot, and a large oval patch below it.

Male genitalia (Figure 64). Socii thinner and longer than in M. arenaria (Leech). Valva not produced at middle and quickly narrowing to apex. Terminal part of central basal lobe of
valva triangular. Saccular process stick-like, thin but with tip a little expanded in shape of a foot. Male abdomen lacking setal patches on third sternite. Female genitalia not examined.

Specimens examined

India: HOLOTYPE: ♀, Khasi Hills, September 1896, nat. coll. (BMNH); 4♂♂, West Meghalaya, Garo Hills, Nokrek, 1150 m, 2–13 July 1997, coll. Afonin and Siniaev (two in ORHANT and two in ZSM); Vietnam: 2♂♂, Bach-Ma, National Park, 16°9’N, 107°4’E, 1200 m, 6 August 1996, coll. Herbulot (ZSM).

Distribution

North-east India; southern Vietnam.

Remarks

The male of this species is described here for the first time, which makes possible comparison of this species and the following M. devecisi Herbulot. See discussion under the latter.

Metallolophia devecisi Herbulot
(Figures 36–39, 52, 65, 78)

Metallolophia devecisi Herbulot, 1989: 171, Figures 2, 3. Holotype ♂, West Malaysia [Peninsular Malaysia]: Cameron Highlands, Strawberry Park (ZSM).

Description

Length of fore wing: ♂ 26 mm; ♀ 27 mm. Very similar to the previous species M. ocellata (Warren). Frons and terminal part of palpus blackish brown. Abdominal crests almost without blackish hair. Wings, especially inner margin of hind wing, narrower and more elongate than ocellata. Fore wing with pale band below costa more conspicuous, hind wing with olive-green much extended along veins. Underside similar to ocellata, except that postmedian fascia on fore wing is rounded from costa to M₃, then continuous to Cu₂, where it bends outwards and forms a distinct angle at its inner margin.

Male genitalia (Figure 65). Very similar to those of M. ocellata. Valva not narrowed towards apex; basal lobe of valva a little smaller.

Female genitalia (Figure 78). Ductus bursae not clearly differentiated from corpus bursae, with a distinct sclerotized ring. Corpus bursae small and pyriform, with weakly sclerotized ridges on the posterior half.

Specimens examined

Malaysia: HOLOTYPE: ♂, Peninsular Malaysia, Cameron Highlands, Strawberry Park, 23 June 1988, coll. C. Herbulot (ZSM); 1♀, Cameron Highlands, rte Tapah-Tanah Rata
PK57, 1400 m, 1 August 1991, coll. J. Haxaire (ZSM). **Indonesia**: northern Sumatra, 1♂, (Langkat) vic. Stabat, 60 km NW Medan, 2 September 1977, coll. M. Sommerer (MDS); 1♂, (Karo) Berastagi, 1000 m, 4 June 1973, coll. M. Sommerer, genitalia slide: ZSM G 789 (MDS).

**Distribution**

Malaysia: West Malaysia; Indonesia: Sumatra; Thailand.

**Remarks**

G. Orhant (personal communication) stated that ‘*Metallolophia devecisi* Herbulot, 1989 is certainly a synonym or a ssp of *M. ocellata* (Warren). I have in my collection 2 males of *M. ocellata*. It is really the same’. Mr Sommerer (personal communication) found, based on his collection from Sumatra, significant differences in the postmedian fascia on the fore wing underside. However, he was only able to compare his males with the type female in BMNH. With the kind help of both parties, we have been able to compare males from the subcontinent and South-East Asia more meticulously, in respect of both facies and genitalia. On the basis of the male antenna, the general aspect and the distribution range, we believe that the male specimens from North-East India collected by G. Orhant are true *M. ocellata* (Warren), while the male specimens from Sumatra collected by Mr Sommerer are specifically distinct, and referable to *M. devecisi* Herbulot. The latter differs from *M. ocellata* (Warren) in many respects, most notably the different male wing shape, and should be considered as distinct at the specific level. There are also two males in coll. A. Pinratana, Bangkok, from Doi Inthanon, Chiangmai Province, North Thailand, collected in November 1997. These have been checked by Dr D. Stünig, who also provided digital images. We believe that these are also *devecisi*. The female of this species is described here for the first time.

*Metallolophia flavomaculata* Han and Xue sp. nov.

(Figures 40, 41, 66)

**Description**

*Male*. Length of fore wing: 27–28 mm. Frons and terminal half of palpus brown to pale brown. Antenna shortly bipectinate, with blackish grey rather than brown branches, as in other species. Abdominal crests bright yellow brown, without metallic gloss. Wing shape as in *M. arenaria* (Leech), the outer margins perfectly rounded, not produced at the ends of veins. Wing colour white scattered with sparse brown or grey scales, markings yellowish brown to grey on upperside, without purple lustre of other species. Fore wing with a basal yellow-brown patch, extending to postmedian fascia along costa; antemedian line consisting of some interrupted black streaks; discal spot large, partly ringed with blackish brown; postmedian fascia with a row of greyish brown spots and a thin line distally to the spots, the line bluntly angled on M₁ and M₃; a broad yellowish brown subterminal band interrupted at middle, and grey at apical area. Hind wing with discal spot, postmedian fascia and subterminal band lighter and greyer than on fore wing. Underside with a weak tinge of violet, markings dark greyish brown; marking patterns as in *M. arenaria* (Leech),
the postmedian fascia placed more distally, and sharply angled on M₃, while on hind wing very deeply curved outwards; subterminal band as on upperside, but darker.

**Male genitalia** (Figure 66). Close to *M. arenaria* (Leech). Socii short and broad. Shape of valva differs in more distinct angle at middle of saccular margin and much narrower terminal half. Terminal part of central basal lobe of valva slightly broadened. Saccular process more produced. The additional small bubble-like sclerite on vesica larger and rounder than in *M. arenaria*.

**Female.** Unknown.

**Diagnosis**

This species can be easily recognized by its yellow-brown markings. The greater part of the wings is white and there is no purplish tinge or olive-green on the upper side.

**Holotype:** ♂, **China:** Fujian: Wuyi: Sangang, 21 June 1983, coll. Zhang Baolin (IZCAS).

**Paratype:** 1♂, **China:** Fukien [Fujian]: Kuatun [Guadun], 2300 m, 19 May 1938, coll. Höne (ZFMK).

**Distribution**

China: Fujian.

*Metallolophia stueningi* Han and Xue sp. nov. (Figures 42, 43, 67)

**Description**

**Male.** Length of fore wing: 26–28 mm. Very close to *M. arenaria* (Leech). Frons and palpus black. Antennal branches distinctly shorter than diameter of flagellum. Abdominal crests on second abdominal segment very weak, on abdominal segments 3–4 normally developed, but without metallic gloss. Both wings with outer margin crenulate, the concavities between M₃ and Cu₁ deeper than the others. Wing colours as in *M. arenaria*, but with antemedian line on fore wing, and postmedian line on both wings much more sharply expressed; antemedian line of fore wing with a distinct inner, and postmedian line on both wings, a distinct outer white shade. Postmedian line on fore wing much more strongly curved than in *M. arenaria*. The large reniform discal spot on the fore wing broader, with the boundary weak and indistinct. Fringes olive green, mixed with a little white between veins. Underside: close to *M. arenaria*, but large reniform discal spot on both wings with the central white area reduced; purple postmedian band on fore wing stronger, with spot between Cu₁ and Cu₂ much expanded inwards, almost touching lower margin of cell. Trace of upperside postmedian line distinct between R₅ and Cu₁, distant from postmedian band. Postmedian band on hind wing underside much weaker. Subterminal band dark purple, interrupted under M₃, not extended to outer margin on fore wing.
Male genitalia (Figure 67). Socii thick and short. Valva narrower than that of *M. arenaria*, less produced at middle; basal lobe with the terminal half round, not peanut-shaped. Saccular process identical to that in *M. arenaria*. Aedeagus smaller, ‘Y’-shaped cornutus much narrower, a little shorter, the additional bubble-like sclerite very small and weak.

Female. Unknown.

Diagnosis

The new species is very closely related to *M. arenaria* (Leech), but there are several distinct differences. The antennal branches are as long as the diameter of the shaft, while in *M. arenaria* the antennal branches are always longer than the diameter of the shaft. The postmedian line on the fore wing between M₁ and Cu₁ protrudes much more strongly than in *M. arenaria*. On the fore wing underside, the postmedian band has the spot between Cu₁ and Cu₂ much more expanded inwards to near the lower margin of cell, and the subterminal band on the fore wing not extending to the outer margin, while in *M. arenaria* the spot between Cu₁ and Cu₂ is not expanded inwards, and the subterminal band extends to the outer margin. In the male genitalia the valvae are narrower, and the terminal half of the basal lobe round, as against centrally constricted in *M. arenaria*; the ‘Y’-shaped cornutus and the additional bubble-like sclerite are smaller than those in *M. arenaria*.

**HOLOTYPE:** 3♂, Vietnam, Mt Fan-si-pan, Cha-pa, 1500–1800 m, 22°15′N, 103°46′E, 8–29 May 1993, coll. Sinjaev and Simonov, ex coll. A. Schintlmeister (ZFMK).

**PARATYPES:** 3♂♂, N. Vietnam: Mt Fan-si-pan, Cha-pa, 1500–1800 m, 22°15′N, 103°46′E, 8–29 May 1993, coll. Sinjaev and Simonov, ex coll. A. Schintlmeister; 1♂, N. Vietnam, Mt Fan-si-pan, western slopes, Cha-pa (=Sapa), 1600–1800 m, 22°0′N, 103°0′E, sec. forest/cult. area, 10 June to 6 July 1994, coll. V. Sinjaev and local collectors (ZFMK); 1♂, N. Vietnam: Mt Fan-si-pan, Cha-pa, 1500–1800 m, 22°15′N, 103°46′E, 8–29 May 1993, coll. Sinjaev and Simonov, ex coll. A. Schintlmeister (IZCAS).

Distribution

Vietnam.

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