

TWO NEW SPECIES OF *LOPHOMILIA* WARREN, 1913
(LEPIDOPTERA: NOCTUIDAE, HYPENINAE)
FROM ASIAN TROPICS

SOHN, J.-C.¹ and RONKAY, L.²

¹*Department of Entomology, University of Maryland
4112 Plant Sciences Building, College Park, MD 20742, USA. E-mail: jsohn@umd.edu*
²*Department of Zoology, Hungarian Natural History Museum
H-1088 Budapest, Baross u. 13, Hungary. E-mail: ronkay@mail.zoo.nhmus.hu*

Two new species of the East Asiatic Noctuidae genus *Lophomilia* WARREN, *Lophomilia fusca* sp. n. from Taiwan and *L. posteburna* sp. n. from Vietnam, are described. The species are compared with other similar species in external and genital features. Photos of the adults and genitalia are provided.

Key words: Lepidoptera, Noctuidae, Hypeninae, *Lophomilia*, Taiwan, Vietnam

INTRODUCTION

The “quadrifine” noctuid genus *Lophomilia* is a group of moths whose body is rather slender and forewings usually have a characteristic median marking on dorsum. The systematic position of *Lophomilia* in the mega-family Noctuidae has been varied according to the “quadrifine” clade experiencing remarkable change in its infrastructure. It is currently placed in the Hypeninae by KONONENKO and BEHOUNEK (2009), following HOLLOWAY’s (2005) transfer of *Hepatica* STAUDINGER, 1892 and *Mecistoptera* HAMPSON, 1893, two genera closely related with *Lophomilia*, into the subfamily.

The placement of the *Mecistoptera* genus-group is also still tentative, according to HOLLOWAY (2008), the clade may deserve a subfamily rank.

The genus was described by WARREN (1913) to accommodate *Egnasia polybapta* BUTLER, 1879. Since the original designation, the number of species in *Lophomilia* has increased due to the transfer of improperly placed species: e.g. *Micardia flaviplaga* BUTLER, 1878 and *Mecistoptera variegata* HAMPSON, 1895, transferred by SUGI (1959) and POOLE (1989), respectively. Recently, KONONENKO and HAN (2007) synonymised *Atuntsea* BERIO, 1977 with *Lophomilia* and transferred two species, *L. hoenei* BERIO, 1977 and *L. kogii* SUGI, 1977. However, the generic concept of *Lophomilia* in relation with putative sister genera is still unsatisfactory. As an example, KONONENKO and BEHOUNEK (2009) suggested possible congeneric relationships of *Lophomilia* with *Hepatica* and *Coarica* MOORE,

1882, based on similarity in their genitalic characters. Since no critical revisions of these genera are available, further research on *Lophomilia* is necessary.

There is no definitive synapomorphy for the members of *Lophomilia*. Characters in the genitalia that may help to recognize species of *Lophomilia* include: i) sickle-shaped uncus, ii) costa often separated from valve, iii) base of clasper connected with a belt-like sclerotized area directed to valval base, iv) distal end of sacculus often extended to form a process, v) ductus bursae almost entirely sclerotized, flattened, vi) corpus bursae oval, and vii) signum a small circular scobination.

A total of 14 East Asiatic species have currently been assigned to *Lophomilia* (KONONENKO & BEHOUNEK 2009). Manchuria, a vast geographic region in north-east Asia, has the highest species diversity. However, this situation could change, considering recent finds of new species from the Sino-Himalayan regions. The aim of this paper is to describe two new species of *Lophomilia* with photos of adults and genitalia. These findings may show that *Lophomilia* is much more diverse in the Asian tropics than was formerly known and justify more extensive exploration in that region.

DESCRIPTIONS OF NEW SPECIES

***Lophomilia fusca* sp. n.**

(Figs 1–2, 6–7, 10)

Type material. Holotype: male, Hueisun Exp[erimental] Forest, Nantou, Taiwan, 22–24.X.1998, leg. MEY & EBERT. Genitalia slide No. RL10070m. The holotype is deposited in the Museum für Naturkunde, Leibnitz Institut für Evolution und Biodiversitätsforschung (formerly Museum für Naturkunde, Humboldt-Universität; ZMHU), Berlin, Germany.

Paratypes: 1 male and 1 female with the same data as the holotype; slide Nos RL7633m, 10107f (coll. ZMHU Berlin); 1 male, Taiwan, Taichung Co., Anmashan Mt, 2275 m, 9.VII.1996, leg. C. M. FU (coll. FU).

Diagnosis. This new species belongs to the *L. polybapta* species-group, being superficially closest to *L. rustica* KONONENKO et BEHOUNEK, 2009, described from East and South China, but it is easily distinguished from the latter by dark fuscous colour of forewings with sinuous postmedian line and less protruding apex.

The autapomorphies of the new species are: i) the very short, lanceolate uncus (the only similar species in this respect is *L. albicosta* YOSHIMOTO, 1993); ii) the extremely short tegumen and the enormously long vinculum; iii) the specially modified, very long and dorsally bird-head-like sclerite connecting tegumen and vinculum; iv) the rather deeply incised terminal margin of the valva; v) the sym-

metrical, more or less boot-shaped distal end of the clasper; vi) the huge, heavily sclerotised, symmetrical ostium–anthrum complex with sinuous posterior margin and large, ear-shaped postero-lateral flaps; and vii) the posteriorly evenly dilated, medio-laterally folded, flattened and heavily sclerotised ductus bursae. All other congeners have a remarkably longer uncus and tegumen, shorter vinculum, a flat, more or less bean-shaped sclerite, and differently shaped valva and clasper. General configuration of valva and clasper of *L. fusca* sp. n. is most similar to those in *L. kobesi* KONONENKO et BEHOUNEK, 2009, but with easily recognisable differences; the detailed comparison of male genitalia of the two related species reveals substantial differences in the above-mentioned features.

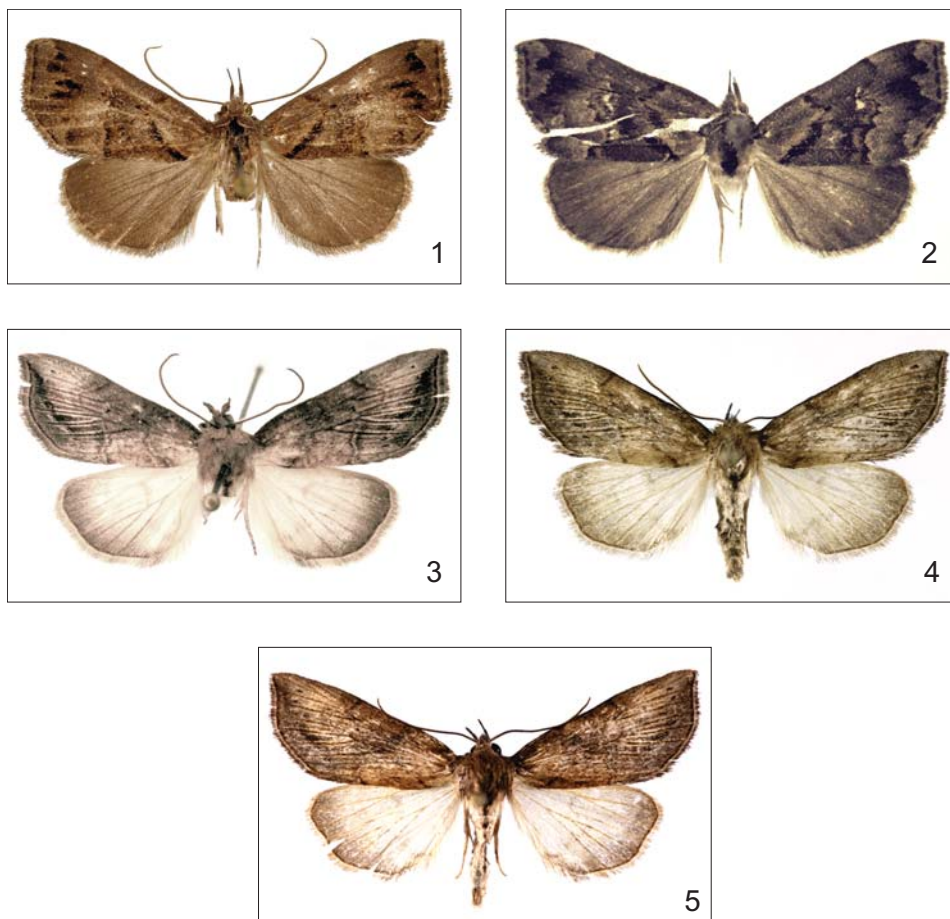
Description. External morphology (Figs 1–2) – Wingspan 26–27 mm. Head: vertex with hair-like scales appressed, dark brown with brownish grey tip; frons brownish white. Antennae lost in the present specimen; scape dark brown dorsally, brownish white ventrally. Labial palpi porrect; 1st segment 1/2 as long as eye diameter, dark brown on exterior surface, tinged with yellowish white around base and on interior surface; 2nd segment three times longer than 1st, evenly thick throughout, dark brown except white on basal 2/3 of interior surface; 3rd segment 1/2 as long as 2nd, dark brown, with obtuse, white apex. Thorax and abdomen: patagia brownish grey; tegulae dark brown, thin-edged with brownish white along posterior margin; a black tuft on anterior part of mesoscutum; mesonotum dark brown; mesoscutellum with a large, black tuft posteriorly. Forelegs, coxa dark brown, densely covered with white hairs; femur dark brown sparsely intermixed with white dorsally, white ventrally; tarsomeres dark brown dorsally, white ventrally, with a brownish white ring on each distal end. Midlegs same as forelegs except with remarkably thickened tibiae. Hindleg coxa brownish white; femur to tarsus greyish brown dorsally, brownish white ventrally; tibiae and tarsomeres with a whitish brown ring on each distal end. Forewing length 12–12.5 mm (n = 2), triangular, with slightly sinuous termen, angled apex and oblique tornus, fuscous; antemedial line brownish black, oblique, bent on anterior 1/3, bordered inward with light brown; postmedial line, perpendicular to costa, sinuate by veins, adjoined interiorly with a brown dotted line on dorsal area; reniform spot on distal end of cell, yellowish white; subterminal line irregularly sinuate, diffused inward with brownish black; marginal line black, dotted by veins; fringes dark brown, bordered inside with light brown. Hindwing flabellate, dark brownish grey, darker to distal margin; fringes greyish brown. Abdomen yellowish grey dorsally, brownish white ventrally.

Male genitalia (Figs 6–7) – Uncus medium-long, 1/2 as long as juxta, lanceolate, falcate apically. Tegumen very short, subtriangular; connecting sclerite between tegumen and vinculum with tooth-like projection outward, recurved above articulation, appearing as a head of a bird. Transtilla broad, with wide, medial cleavage; vinculum extremely long, its ventral section V-shaped, medial section almost parallel, but with slightly constricted sides, dorsal section curved outwardly and connected to tegumen. Juxta an inverted, high trapezoid plate, with a small triangular projection on lower margin and bifid upper margin; saccus small, hump-like. Valva elongate, gradually broadened distally, with terminal margin concave medially; clasper on distal 1/3 of valva, boot-shaped, connected with a narrow, band-like, sclerotized zone directed to valval base; costa thin, except basally; sacculus slightly broadened on basal 1/5, thereafter thin. Aedeagus thick, cylindrical; coecum narrower than aedeagus; carina thin, with an outward spine; proximal part of vesica granulated, with two spinulated zones, medial zone part globular, with a densely granulated diverticula, distal zone part thin, tubular.

Female genitalia (Fig. 10) – Ovipositor rather short and broad, cylindrical, only slightly tapering posteriorly; papillae anales broadly quadrangular, finely setose; both pairs of gonapophyses short, straight. Ostium–antrum complex huge and heavily sclerotised, very broad, more or less quadrangular, with large, finely pointed, ear-like postero-lateral flaps and smaller, medially finely incised postero-medial hump. Ductus bursae relatively long, flattened, strongly sclerotised, distal half trapezoidal, proximal half considerably narrower, with larger medio-lateral fold. Appendix bursae rounded conical, ample, finely wrinkled; corpus bursae spacious, sacculiform, without sclerotised section or signum.

Distribution. Taiwan.

Etymology. The species name, *fusca*, is derived from the Latin adjective ‘*fuscus*’, meaning ‘dark-coloured’ and refers to the dark fuscous forewings of the new species.



Figs 1–5. Two new species of *Lophomilia*. 1–2 = *L. fusca* sp. n.: 1 = holotype, 2 = paratype; 3–5 = *L. posteburna* sp. n.: 3 = holotype, 4–5 = paratypes

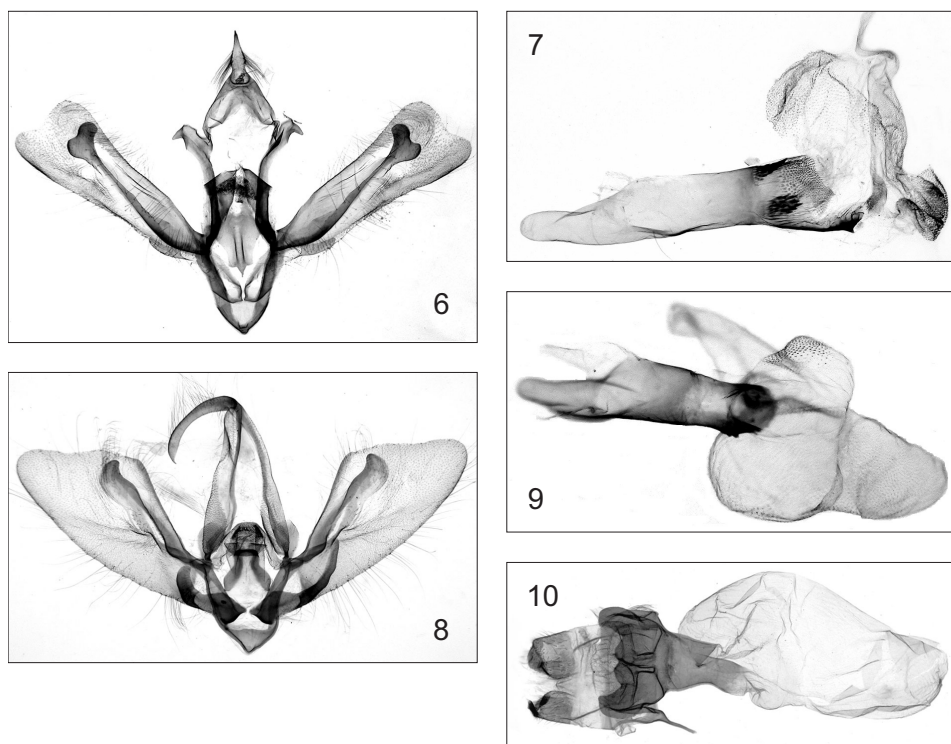
Lophomilia posteburna sp. n.

(Figs 3–5, 8–9)

Type material. Holotype: male, Vietnam, Prov. Lao Cai, Fan-si-pan Mts, 4 km W[est] Cat Cat, 1920 m, 13.III.1998, leg. L. PEREGOVITS & T. VÁSÁRHELYI. Genitalia slide No. RL7667m. The holotype is deposited in the Hungarian Natural History Museum (HNHM), Budapest.

Paratypes: 2 males, Prov. Lao Cai, Hoang Lien NP, Tram Ton, forest edge, at light, 1915 m, 22.3493723°N, 103.7704565°E, 8–11.IV.2010, VN2010PL_4, leg. L. PAPP, L. PEREGOVITS & Z. SOLTÉSZ (coll. HNHM).

Diagnosis. The new species is the second known member of the *L. violescens* species-group. *Lophomilia posteburna* is very similar to *L. violescens* YOSHIMOTO, 1993, described from Nepal, but different from the latter by ivory-coloured interior region of hindwing and also greyish suffusion between postmedial and subterminal lines of forewing. Triangular valvae of *L. posteburna* in male genitalia are similar to those of *L. violescens* and *Hepatica anceps* STAUDINGER, 1892, but the



Figs 6–10. Genitalia of the two new *Lophomilia* species: 6–7 = *L. fusca* sp. n., male, paratype; 8–9 = *L. posteburna* sp. n., male, holotype; 10 = *L. fusca* sp. n., female, paratype, genitalia

uncus is considerably narrower and the saccular projection is much more asymmetrical than in the two related species, being finer, longer and thinner than those of *L. violescens*. The clasper is shortened but distally broader than in *L. violescens*, somewhat longer and distally more dilated and more sinuous than in *H. anceps*; the shape of the juxta of the three species is also different, as the juxta of the new species lacks the large dorso-medial flap which is present in *L. violescens*, and is larger, basally and broader than that of *H. anceps*.

Description. External morphology (Figs 3–5) – Wingspan 29–31 mm. Head: vertex with hair-like scales dark brown except light brown near posterior margin, all with whitish tip; frons dark brown. Antennae 1/2 as long as forewing; scape dark brown; flagellomeres dark brown, with short pectens ventrally. Labial palpi ascending; 1st segment 1/3 as long as eye diameter, dark brown; 2nd segment evenly thick throughout, 5 times longer than 1st, dark brown, intermixed with yellowish white scales at interior surface; 3rd segment 1/3 as long as 2nd, dark brown, sparsely intermixed with yellowish white scale-hairs, obtuse apically. Thorax and abdomen: patagia pale brown, sparsely intermixed with dark brown; tegulae brownish grey, sparsely intermixed with dark brown; mesonotum pale brown with a dark grey tuft posteriorly. Foreleg coxa with dense, brownish grey hairs; femur to tarsus dark brown; tarsomeres with a white ring on each distal apex. Midlegs dark brown dorsally, brownish white ventrally; tibia thickened with hairs; tarsomeres with a white ring on each distal end. Hindleg coxa and femur yellowish white, hairy; tibia dark brown intermixed with white on exterior side, yellowish white on interior side, thickened with hairs; tarsomeres dark brown intermixed with white, with white ring on each distal end. Forewing length 14–15 mm ($n = 3$), triangular, with round termen, angled apex and oblique tornus, fuscous; dorsal base tinged with yellowish white; antemedial line doubled, arched, sinuate by veins; postmedial line doubled, oblique, deeply angulated beyond discal cell; dark brown spot on the distal end of discal cell; submarginal suffusion arched, brownish black, interrupted by veins, turning to apex on anterior 1/4; space between postmedial and subterminal lines suffused with grey, with dark brown transverse streaks along veins and two small dots on potential extension to costa of subterminal line; fringes dark brownish grey. Hindwing flabellate, with slightly sinuous termen, pale yellow; postmedial line vague, dark brown; marginal shade dark brown; fringes yellowish grey. Abdomen yellowish grey dorsally, with dark brown raised scales medially on 2nd abdominal tergite, yellowish white ventrally.

Male genitalia (Figs 8–9) – Uncus elongate, curved, falcate terminally, hairy dorsally. Tegumen long, triangular, with inner margin of lateral arms strongly sclerotized. Transtilla inverted broad U-shaped; juxta wide, elliptical, with rectangular projection on upper margin; vinculum inverted trapezoidal, with triangular plate distally; saccus invisible. Valva elongate, triangular, broadened to truncate apex; costa thin except at base, as long as tegumen; clasper small, thick, tooth-like, connected to band-like sclerotized zone directing to and fusing with costal base; sacculus strongly sclerotized, rhomboid basally, with an inward-curved, thick process, left process shorter and thicker. Aedeagus thick, cylindrical; coecum narrower than aedeagus; two carinal bars triangular, ventral one with denticula. Proximal part of vesica globular, with two diverticula, ventral one thimble-like, dorsal one semiglobular, densely granulated vertically, distal part conical, tubular distally.

Female genitalia: unknown.

Distribution. Northern Vietnam.

Etymology. The species name, *posteburna*, is a combination of two Latin words, “*post*” and “*eburnus*”, each of which means “*behind*” and “*ivory*”, and refers to ivory-coloured hindwings of the new species.

*

Acknowledgements – We would like to express our cordial thanks to Mr MARTIN R. HONEY (Natural History Museum, London), and Dr WOLFRAM MEY (Museum für Naturkunde, Leibniz Institut für Evolution und Biodiversitätsforschung; Berlin), and Mr CHIEN-MING FU (Taiping, Taiwan) for allowing us to check type specimens and the loan of the material of *Lophomilia fusca* for studies. The authors are indebted to Mr GÁBOR RONKAY and Mr ZOLTÁN SOLTÉSZ for the excellent digital images. This research was also supported by the National Office for Research and Technology (Grant No. VN-10/2006; L. RONKAY).

REFERENCES

- HOLLOWAY, J. D. (2005) The moths of Borneo. Parts 15 & 16, Noctuidae: Catocalinae. *Malayan Nature Journal* **58**(1–4): 1–529.
- HOLLOWAY, J. D. (2009) The moths of Borneo. Part 17, Noctuidae: Rivulinae, Phytometrinae, Hypeninae, Hypenodinae. *Malayan Nature Journal* **60**(1–4): 1–268.
- KONONENKO, V. S. & BEHOUNEK, G. (2009) A revision of the genus *Lophomilia* Warren, 1913 with description of four new species from East Asia (Lepidoptera: Noctuidae: Hypeninae). *Zootaxa* **1989**: 1–22.
- KONONENKO, V. S. & HAN, H.-L. (2007) Atlas genitalia of the Noctuidae in Korea (Lepidoptera). In: PARK, K. T. (ed.): *Insects of Korea* [11]. 464 pp.
- POOLE, R. W. (1989) Noctuidae. *Lepidopterorum Catalogus* (New series) 118. Parts 1–3. E. J. Brill, Leiden. 1314 pp.
- SUGI, S. (1959) Noctuidae. In: *Iconographia Insectorum Japonicorum* (Lepidoptera). Hokuryukan, Tokyo, pp. 105–195.
- WARREN, W. (1913) Die Gross-Schmetterlinge des Palaearctischen Faunengebietes. Bd. 3. Eulenartige Nachtfalter. In: SEITZ, A. (ed.): *Die Gross-Schmetterlinge der Erde*. Stuttgart, 511 pp.

Revised version received August 14, 2009, accepted October 10, 2010, published June 10, 2011