



Heterophleps inusitata, an extremely rare new moth species from western Yunnan, China (Lepidoptera, Geometridae, Larentiinae)

JING LI^{1,2}, NAN JIANG^{1,2} & HONGXIANG HAN^{1,3}

¹Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, Beijing 100101 China.
E-mail: lijing@ioz.ac.cn; jiangn@ioz.ac.cn; hanhx@ioz.ac.cn.

²Graduate University of Chinese Academy of Sciences, Beijing 100049 China.

³Corresponding author

Heinitang is a small Lisu Nationality village located in western Yunnan Province, China, near the frontier of Myanmar. It is surrounded by low mountains covered with evergreen forests and shrubs (Fig. 1). As a tradition, the natives often cut and burn the forests for agriculture, resulting in increasing loss of forest habitat (Fig. 2). The moth fauna of this place is quite diverse, but as in other areas of the world, the biodiversity is decreasing due to more frequent human activities.

Twenty years ago, a female larentiine moth with unusual wing shape and pattern was caught at Heinitang for the first time. Although several expeditions have been carried out at Heinitang and adjacent areas in the past ten years, no new material has been found. With increasing destruction of habitat, the possibility of finding new material of this moth is diminishing, and the purpose of this paper is to describe this extremely rare new species and bring attention to its plight. This new species has some features in common with the genus *Heterophleps* Herrich-Schäffer, 1854, but also has some atypical features. Therefore, it may belong to *Heterophleps* or a new genus closely related to *Heterophleps*, but it is clear that a single female is not enough to clarify the systematic position of the new species.

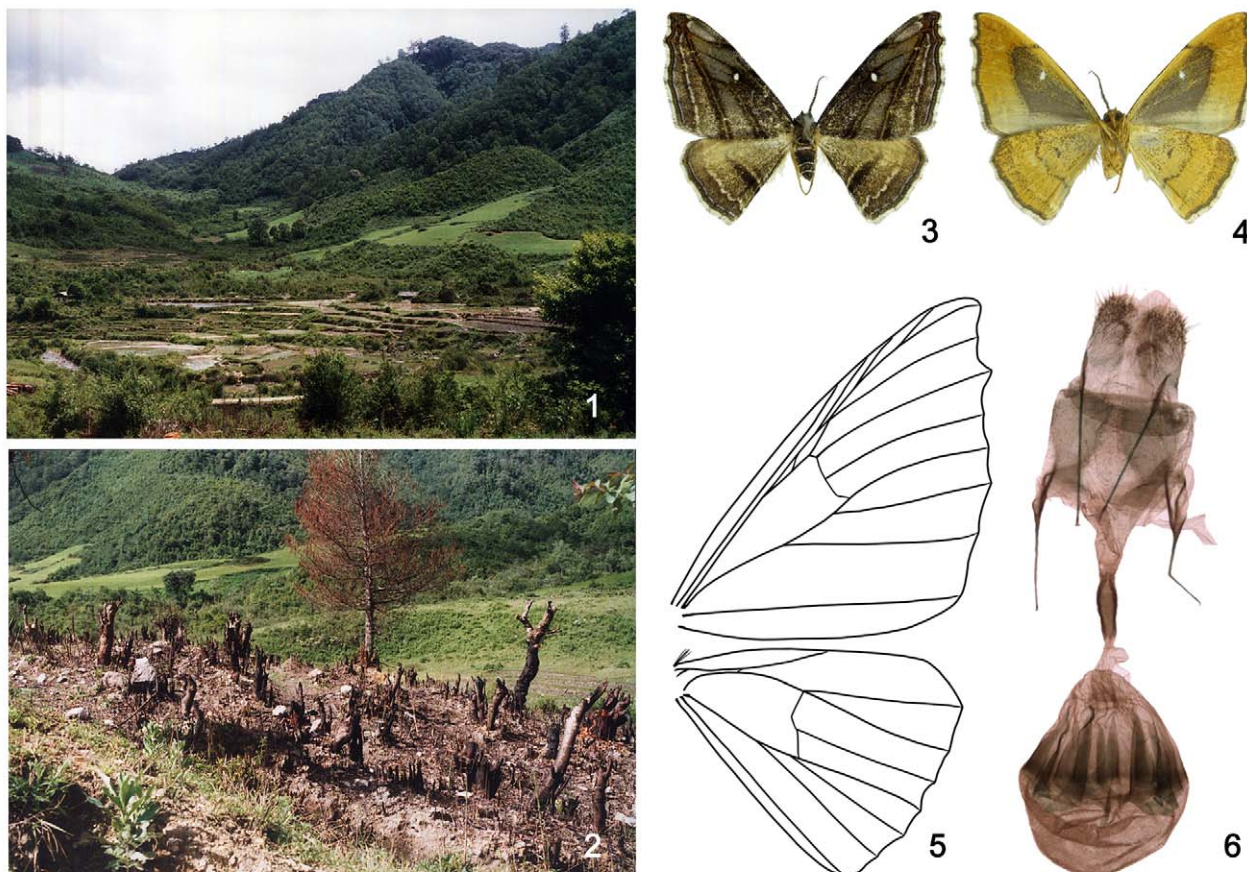
Heterophleps inusitata Li, Jiang & Han sp. nov.

Figs. 3–6

Type material. Holotype, female, China: Yunnan: Tengchong, Heinitang, 1930 m, 28–30 May 1992, collected by Xue Dayong (deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China).

Description. Female. Antenna black mixed with white scales dorsally, about two-fifths length of forewing, bipectinate in basal three-fourths, filiform in terminal one-fourth; rami black, arising from central base of ventral side of each segment, parallel with antenna shaft basally and curled terminally, length of the longest ramus about six times of antenna shaft diameter. Frons not protruding, smooth-scaled, black mixed with reddish brown. Labial palpus reddish brown, black terminally, extending slightly beyond frons. Vertex, patagium and tegula black mixed with white. Metanotum white. Abdomen with dorsal side black with white transverse lines. *Wing pattern.* Forewing length: 17 mm. Forewing with apex slightly protruding, outer margin curved gently and sharply protruding at M_1 . Hindwing with outer margin slightly wavy, anal margin straight. Forewing with basal half blackish brown, scattered with silvery grey scales; antemedial and postmedial lines forming two black patches on costa, reddish brown, banded with black on both sides below costa; antemedial line ‘>’ shaped, forming a sharp tooth on M_3 ; discal spot white, oval, very conspicuous; the area between antemedial and postmedial lines densely covered with silvery grey scales, M_1 and M_3 veins black in this area; postmedial line extending along R_5 to submarginal line, then folding back and straight to anal margin, forming a sharp angle just below R_5 ; a reddish brown patch present below apex; submarginal line white, wavy above R_5 , interrupted on R_5 , almost straight below R_5 ; R_4 , R_5 and M_1 veins reddish brown outside submarginal line; terminal line black, with a silvery grey line inside; basal half of fringes reddish brown between costa and M_1 , blackish brown below M_1 , terminal half greyish white mixed with black. Hindwing greyish yellow, densely scattered with blackish brown scales except costal area; discal spot silvery grey, short strip-like, indistinct; postmedial line distinct below R_s , black, broad and straight; submarginal line greyish yellow, wavy slightly; terminal line and fringes similar to those of forewing. Underside: ochreous to yellowish brown, dark grey from base to postmedial line on forewing; postmedial and terminal lines dark grey; forewing with postmedial line oblique outwards between costa and M_1 and inwards below M_1 , discal spot

similar to upperside; hindwing with postmedial line wavy, discal spot dark grey, short strip-like. *Venation*. Forewing with areole double; R_{2+4} and R_5 arising from posterior angle of areole; M_1 separate from areole. Hindwing with $Sc+R_1$ separate from cell, connected by a slender, oblique bar at middle of cell; R_s and M_1 arising from anterior angle of cell; discocellulars weakly biangulate; M_2 arising from the second angle of discocellulars, a little close to M_3 ; CuA_1 arising from just before posterior angle of cell; 3A absent. *Female genitalia*. Papillae analis oval, covered with dense setae. Apophyses posteriores and apophyses anteriores slender and long. Sterigma not well developed. Ductus bursae slender and long, with antrum at middle. Corpus bursae large, almost rounded, membranous; twelve long strip-like signa at posterior half of corpus bursae, acute posteriorly and broad anteriorly.



FIGURES 1–6. 1, Heinitang, the type locality of *Heterophleps inusitata* sp. nov.; 2, burning forests for cultivation of soil at Heinitang; 3–6. *H. inusitata* sp. nov., 3, female, holotype, upperside (1.5X); 4, ditto, underside (1.5X); 5, venation; 6, female genitalia.

Diagnosis. The new species is similar to other congeners in the very broad forewing with the outer margin longer than the anal margin and double areoles; the hindwing $Sc+R_1$ is separated from the cell and connected by a short bar near the middle of the cell; the strip-like signa around the corpus bursae of the female genitalia. But it can be easily distinguished by many other characters, especially the bipectinate female antenna and the protrusion on M_1 of the forewing outer margin.

Distribution. China (Yunnan).

Etymology. The specific name is derived from the Latin word *inusitatus*, which means rare or uncommon.

Remarks. The genus *Heterophleps* is a member of the tribe Trichopterigini within the subfamily Larentiinae. Parsons *et al.* (1999) included several generic names as junior synonyms of *Heterophleps*, including *Lygranoa* Butler, 1878 and *Ortholithoidia* Wehrli, 1932, which were considered as subgenera by Prout (1914) and Wehrli (1932). Species of *Heterophleps* are mainly distributed in eastern Asia, with three representatives in North America. Until now, 25 species in *Heterophleps* have been recognized, with 12 species recorded in China (Xue & Zhu 1999). The new species agrees with some morphological characters of *Heterophleps* but unlike any known members of the genus in some aspects, including the bipectinate female antenna, the dentate forewing outer margin and the unusual wing pattern. It is

likely that the new species belongs to a new genus, but many important generic diagnostic characters are based on male characters in the tribe Trichopterigini (e.g., male antenna, venation, wing shape, genitalia, some secondary sex characteristics). Thus it may not be possible to make a generic or subgeneric assessment before finding a male or another close relative of the new species.

Acknowledgements

We appreciate the work of Yang Chao in preparing the photographs. This work was supported by the National Science Foundation of China (No. 31172127, NSFC-J0930004) and a grant from the Key Laboratory of the Zoological Systematics and Evolution, Chinese Academy of Sciences (No. O529YX5105).

References

- Butler, A.G. (1878) Descriptions of new species of Heterocera from Japan. Part III. Geometridae. *Annals and Magazine of Natural History*, (5) 1, 392–407, 440–452.
- Herrich-Schäffer, G.A.W. (1854) *Sammlung neuer, oder wenig bekannter, Aussereuropäischer Schmetterlinge*, (1) 1 (5–12), wrapper, pls. 17–48, figs 77–258.
- Parsons, M.S., Scoble, M.J., Honey, M.R., Pitkin, L.M. & Pitkin, B.R. (1999) The catalogue. In: Scoble, M.J. (Ed.), *Geometrid moths of the world: a Catalogue (Lepidoptera, Geometridae)*. CSIRO, Collingwood, pp. 1–1016.
- Prout, L.B. (1912–1916) The Palaearctic Geometrae. In: Seitz, A. (Ed.), *The Macrolepidoptera of the World*. Vol. 4. Verlag A. Kernen, Stuttgart, pp. 1–479, pls. 1–25.
- Wehrli, E. (1932) Ein neues Genus, ein neues Subgenus und 4 neue Arten von Geometriden aus meiner Sammlung. *Entomologische Rundschau*, 49, 220–222, 225–227.
- Xue, D-Y & Zhu, H-F. (1999) *Fauna Sinica (Insecta Vol.15, Lepidoptera, Geometridae, Larentiinae)*. Science Press, Beijing, xxxii+1090 pp, 1197 figs, 25 pls.