

New record of the genus *Erannis* Hübner, [1825] from India (Lepidoptera: Geometridae, Ennominae)

S. Kumari, V. P. Uniyal & A. P. Singh

Abstract

The genus *Erannis* Hübner, [1825] is typically known to be distributed in the Holarctic region. The present paper represents the first record of *Erannis kashmirensis* László, 2003 from India. The species was described from Pakistan and it was previously known exclusively from its type series collected in the NW Himalayas. A brief diagnosis of the habitus, genitalia and photographic illustrations of the species were provided for the validation of the record from India.

KEY WORDS: Lepidoptera, Geometridae, Ennominae, *Erannis*, India.

Nuevo registro del género *Erannis* Hübner, [1825] para India (Lepidoptera: Geometridae, Ennominae)

Resumen

El género *Erannis* Hübner, [1825] es típicamente conocido por su distribución Holártica. El presente trabajo representa el primer registro de *Erannis kashmirensis* László, 2003 para India. La especie fue descrita de Pakistán y fue previamente conocida exclusivamente de su serie tipo colectada en el NO del Himalaya. Se proporciona una breve diagnóstico sobre su morfología, genitalia e ilustración fotográfica de la especie para la validación del registro para India.

PALABRAS CLAVE: Lepidoptera, Geometridae, Ennominae, *Erannis*, India.

Introduction

The Geometridae is the second largest family of moths with 23,002 (VAN NIEUKERKEN *et al.*, 2011) species described and distributed all over the world except the Antarctica. The genus *Erannis* Hübner, [1825] belongs to the Boarmiini tribe of the subfamily Ennominae (JIANG *et al.*, 2017). A total of 17 species and subspecies belong to this particular genus are known to be distributed mainly in the Holarctic region (RINDGE, 1975; PARSONS *et al.*, 1999; LÁSZLÓ, 2003; MÜLLER *et al.*, 2019). *Erannis kashmirensis* László, 2003 has been so far documented and described by LÁSZLÓ (2003) from the north-western Himalayan region of Pakistan. Only the males of species belonging to the genus *Erannis* have functional wings and can fly towards light traps. The females are known to bear non-functional “short wing-stumps” (MÜLLER *et al.*, 2019) and therefore can't fly, are still unknown for *E. kashmirensis*. The present paper documents the first distributional record of the genus *Erannis* Hübner, [1825] from India.

Material and methods

The specimen was collected during preliminary survey conducted in Lahaul and Spiti district in the month of November 2020. Traditional light trap method with vertical white sheet and 160 watt of Mercury vapour lamp were used to trap the moths. The specimen was collected using glass killing jars charged with ethyl acetate vapours as a killing agent. Specimen preparation was done using standard methods of rehydration, pinning and labelling defined for order Lepidoptera.

Dissection methods of ROBINSON (1976) was used to study the external characteristics of genitalia. The abdomen was firstly detached and kept overnight in 10% KOH for softening the tissues. In the next morning, it was dissected in 20% ethyl alcohol. Microscopic photography was done by a MICAPS MicroView 3.7 digital camera and software by using stereomicroscope.

Results

The reported specimen was collected from Jahalman watershed of Udaipur subdivision near to Jahalman forest rest house at an elevation of 2941m above mean sea level (Figure 1). The local vegetation (Figure 2) around sampling location includes, *Salix fragilis* L. as a major tree species followed by *Populus nigra* L. and stunted form of *Juniperus macropoda* Boiss. Among the shrubs, *Hippophae rhamnoides* (L.) A. Nelson and *Rosa webbiana* Wall. ex Royle were the two major species (RAWAT *et al.*, 2010). A small apple (*Pyrus malus* L.) orchard was also part of the local habitat around the light trapping site.

Taxonomic account

Erannis Hübner, [1825]

Erannis Hübner, [1825] 1816. *Verz. Schmett.*: 320

Type species: *Phalaena defoliaria* Clerck, 1759. *Icon. Ins.*: pl. 7, fig. 4, by subsequent designation of HULST (1896a: 363).

An up-to-date characterisation of the genus *Erannis* was provided by MÜLLER *et al.* (2019).

Distribution: Holarctic (RINDGE, 1975; PARSONS *et al.*, 1999; MÜLLER *et al.*, 2019).

Erannis kashmirensis László, 2003

Erannis kashmirensis László, 2003. *Acta zool. hung.*, **49**(2): 153-158

Material examined: 1 ♂, INDIA, Jahalman Forest rest House, Lahaul and Spiti District, Himachal Pradesh, 32.637283 N, 76.866831 E, 2941 mamsl, 12-XI-2020, coll. Shabnam Kumari, Preserved in Wildlife Institute of India.

Diagnosis: The males of *E. kashmirensis* resembles superficially *E. potopolskii* Viidalepp, 1988 with no striking differences in external male genitalia features (LÁSZLÓ, 2003). However, *E. kashmirensis* can be easily distinguished based on the following characters: Adult males (Figure 3): Length of forewings is almost 25 mm (wingspan 39-45mm and forewing length 21-27 in original description), comparatively paler and with less dense brownish-irroration, longer straight section of postmedial line. Hindwings pale and without the traces of transverse lines.

Male genitalia (Figs 4-5): Ribbon-like gnathos with apically rounded and triangular medial plate, large, well sclerotised shield-shaped juxta with comparatively narrower and rounded dorsal lobe.

The female and early life-history stages of the species are unknown and have not been documented in the current study.

Distribution: Pakistan (LÁSZLÓ, 2003), China (GBIF, unpublished and unconfirmed record),

India (Himachal Pradesh) **new record**.

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BIBLIOGRAPHY

- JIANG, N., LI, X., HAUSMANN, A., CHENG, R., XUE, D. & HAN, H., 2017.– A molecular phylogeny of the Palaearctic and Oriental members of the tribe Boarmiini (Lepidoptera: Geometridae: Ennominae).– *Invertebrate Systematics*, **31**(4): 427–441 <https://doi.org/10.1071/IS17005>.
- LÁSZLÓ, M., 2003.– New species of the Genus *Erannis* Hübner, [1825] 1816 from the North-West Himalaya and Iran (Lepidoptera: Geometridae).– *Acta Zoologica Academiae Scientiarum Hungaricae*, **49**(2): 153–158.
- MÜLLER, B., ERLACHER, S., HAUSMANN, A., RAJAEI, H., SIHVONEN, P. & SKOU, P., 2019.– Ennominae II.– *Geometrid Moths of Europe*, **6**: 1–562 pp. + 563–806 pp. Brill, Leiden.
- PARSONS, M. S., SCOBLE, M. J., HONEY, H. R., PITKIN, L. M. & PITKIN, R. B., 1999.– The catalogue.– In M. J. SCOBLE (ed.). *Geometrid moths of the world: a catalogue (Lepidoptera: Geometridae)*: 1016 + 129 pp. CSIRO Published, Collingwood.
- RAWAT, Y. S., VISHVAKARMA, S. C. R., OINAM, S. S. & KUNIYAL, J. C., 2010.– Diversity, distribution and vegetation assessment in the Jahlmanal watershed in cold desert of the Lahaul valley, northwestern Himalaya, India.– *iForest - Biogeosciences and Forestry*, **3**: 65–71. doi: 10.3832/ifor0532-003.
- RINDGE, H. F., 1975.– A revision of the New world Bistonini (Lepidoptera: Geometridae). Genus: *Erannis* Hübner.– *Bulletin of the American Museum of Natural History*, **156**: 142–148.
- ROBINSON, G. S., 1976.– The preparation of the slides of Lepidoptera Genitalia with special reference to the microlepidoptera.– *Entomologist's Gazette*, **27**: 127–132.
- VAN NIEUKERKEN, E. J., KAILA, L., KITCHING, I. J., KRISTENSEN, N. P., LEES, D. C., MINET, J., MITTER, C., MUTANEN, M., REGIER, J. C., SIMONSEN, T. J., WAHLBERG, N., YEN, S.-H., ZAHIRI, R., ADAMSKI, D., BAIXERAS, J., BARTSCH, D., BENGTSOON, B. A., BROWN, J. W., BUCHELI, S. R., DAVIS, D. R., DE PRINS, W., EPSTEIN, M. E., GENTILI-POOLE, P., GIELIS, C., HATTEKNSCHWILER, P., HAUSMANN, A., HOLLOWAY, J. D., KALLIES, A., KARSHOLT, O., KAWAHARA, A. Y., KOSTER, J. C., KOZLOV, M. V., LAFONTAINE, J. D., LAMAS, G., LANDRY, J.-F., LEE, S., NUSS, M., PARK, K.-T., PENZ, C., ROTA, J., SCHINTLMMEISTER, A., SCHMIDT, B. C., SOHN, J.-C., SOLIS, M. A., TARMANN, G. M., WARREN, A. D., WELLER, S., YAKOVLEV, R. V., ZOLOTUHIN, V. V. & ZWICK, A., 2011.– Order Lepidoptera Linnaeus, 1758.– In Z.-Q. ZHANG (editor). *Animal Biodiversity: An outline of Higher classification and survey of taxonomic richness*.– *Zootaxa*, **3148**: 212–221.
- VIIDALEPP, J. R., 1988.– *Fauna pyadenits gor Srednei Azii* [Geometridae fauna of the Central Asian mountains]: 169 pp. Nauka, Moscow.

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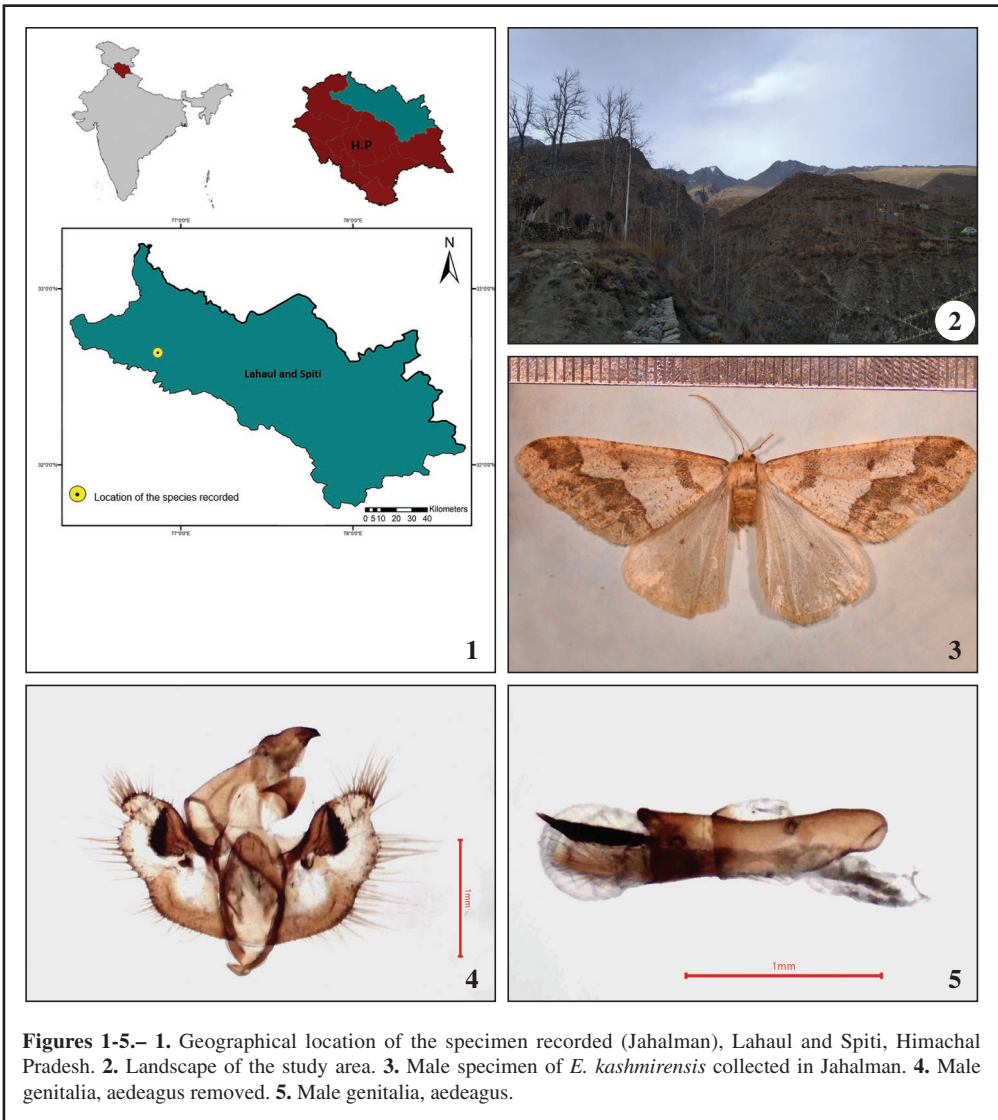
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Figures 1-5.– 1. Geographical location of the specimen recorded (Jahalman), Lahaul and Spiti, Himachal Pradesh. 2. Landscape of the study area. 3. Male specimen of *E. kashmirensis* collected in Jahalman. 4. Male genitalia, aedeagus removed. 5. Male genitalia, aedeagus.