

# A new species of *Europlema* Holloway, 1998 from Korea (Lepidoptera: Uraniidae, Epipleminae)

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## Abstract

A new species of Epipleminae, *Europlema koreana* Sohn, sp. n. is described from Korea on the basis of 15 specimens in the type series. It is distinguished from a congener, *E. nubifasciaria* (Leech, 1897) in the wing patterns and the features of the male and female genitalia. Its generic assignment to *Europlema* Holloway, 1998 is discussed. KEY WORDS: Lepidoptera, Uraniidae, Epipleminae, *Europlema*, North Korea, South Korea.

## Una nueva especie de *Europlema* Holloway, 1998 de Corea (Lepidoptera: Uraniidae, Epipleminae)

## Resumen

Se describe de Corea una nueva especie de Epipleminae, *Europlema koreana* Sohn, sp. n. sobre la base de 15 especímenes en la serie tipo. Se distingue de su congénere, *E. nubifasciaria* (Leech, 1897) en los dibujos de las alas y en la genitalia del macho y de la hembra. Se discute la asignación genérica de *Europlema* Holloway, 1998. PALABRAS CLAVE: Lepidoptera, Uraniidae, Epipleminae, *Europlema*, Corea del Norte, Corea del Sur.

## Introduction

*Europlema* was designated by HOLLOWAY (1998) who divided the previously ill-defined genus, *Epiplema* Herrich-Schäffer, 1855. The *Europlema* differs from other resembling epiplemine genera in having the characteristic fascies on the white wings, the triangular uncus, and a slender process on each valva in the male genitalia. The adults of *Europlema* exhibit a unique resting posture with the forewings and hindwings folded in a Z-shaped way in cross-section (HOLLOWAY, 1998).

The genus comprises a total of 13 species occurring in a broad zone spanning the Indo-Australian region to the temperate Asia (HOLLOWAY, 1998; SINEV, 2016). *Europlema semibrinnea* (Pagenstecher, 1888) shows the broadest distribution in the genus, possibly associated with its stepping-stone dispersals along the Australasian archipelagoes (DE FREINA & FISHER, 2013). There are just few studies on the life history of *Europlema* but all known hostplants for the genus belong to Verbenaceae.

The first record of *Europlema* from Korea was given by SOHN *et al.* (2019) with *Europlema nubifasciaria* (Leech, 1897) (= *E. leleji* Sinev, 2016). The aim of this article is to describe a new species of *Europlema* from Korea and to discuss the comparative morphology between the two closely related congeners, *E. nubifasciaria* and *E. koreana* Sohn, sp. n. and their distribution within the country.

## Material and methods

Specimens examined were obtained from the insect collections of the Department of Science Education, Gongju National University of Education, South Korea (GNUE) and the Hungarian Natural History Museum, Budapest, Hungary (HNHM). The genitalia were dissected following CLARKE (1941), except for staining with Chlorazol black and permanently mounting with Euparal medium and essence. Terms for genitalia and wing venation followed KLOTS (1970) and WOOTTON (1979), respectively. Verbatim label data were provided only for the primary type. In the label data, the pipe marks (“|”) indicated the line spacing and the abbreviation “GSN” stood for genitalia slide number.

## Taxonomic accounts

*Europlema* Holloway, 1998

*Europlema* Holloway, 1998. *Malay. Nat. J.*, **52**: 116.

Type species: *Erosia desistaria* Walker, 1861.

### *Europlema koreana* Sohn, sp. n.

[Korean name: Woori-goun-ssangkorinabang]

Holotype ♂: “HOLOTYPE / *Europlema* / *koreana* Sohn” [red label], “KOREA, Gyonggi Prov. / Pocheon, Gwangleung / 3-VI-1999 / coll. Jae-Cheon Sohn”, “Sohn / Genitalia slide ♂ / (SJC-81)-( )” [pink label], deposited in GNUE.

Paratypes (2 ♂♂, 12 ♀♀): SOUTH KOREA: [Gangwon Prov.] Gangleung, Sogeumgang, 2 ♀♀, 11-VII-2004 (JC Sohn), [GSN] SJC-48, GNUE; Pyeongchang, Mitam-myeon, Mt. Jaechisan, 1 ♀, 29-VII-1996 (JC Sohn), [GSN] SJC-138, GNUE; Yeongwol, Mt. Jangseongsan, 1 ♂, 25-VII-1999 (JC Sohn), [GSN] SJC-137, GNUE. [Chungbuk Prov.], Boeun, Mt. Sogrisan, Templ. Beopjusa, 1 ♀, 25-VIII-2002 (JC Sohn), GNUE; Jecheon, Hansu-myeon, Songgae, Mt. Weolagsan, 4 ♀♀, 20-VI-2006 (JC Sohn), [WSN] SJC-W056, [GSN] SJC-1107, GNUE; ditto (N36°51'56.0" E128°05'20.0", Alt. 222 m), 2 ♀♀, 15-18-VI-2007 (JC Sohn), GNUE; Jincheon, Jincheon-eup, Mt. Taeryongsan, 1 ♀, 11-VII-2005 (JC Sohn), GNUE. [Gyeongnam Prov.], Masan, Hapcho-gu, Jinjeon-ri, Mt. Yeohangsan, Osilgol [valley], 1 ♀, 12-13-VI-1999 (JS Park), [GSN] SJC-1108, GNUE. NORTH KOREA [Gaeseong], Hotel Janamsan, 1 ♀, 29-VII-1982 (L. Forró, L. Ronkay), No. 873, HNHM.

Diagnoses: This species is similar to another congener from Korea, *E. nubifasciaria* in overall appearance but it differs from the latter in having the broader postmedian line on the forewing, the narrower uncus, the broader valva in the male genitalia, and the smaller signum in the female genitalia.

Description: Adults (Figs 1-4): Head with vertex white; frons dark grayish brown. Antenna 1/2 as long as forewing costa; scape white, intermixed with pale brownish gray scales ventrally; flagellomere I-V entirely white dorsally; remaining flagellomeres white on dorso-distal half, grayish brown on dorso-basal half. Labial palpus short, dark grayish brown on outer surface, white on inner surface; 1<sup>st</sup> segment 1/2 as long as 2<sup>nd</sup>, 3<sup>rd</sup> segment 1/3 as long as 2<sup>nd</sup>, acuminate apically. Thorax with patagium, tegula, mesonotum white; mesoscutellum pale brownish gray. Foreleg with coxa and femur grayish brown mesally, white laterally; tibia and tarsomeres grayish brown dorsally, white ventrally. Midleg with coxa grayish brown, tinged with white marginally; femur white, intermixed with pale grayish brown scales dorsally; tibia pale grayish brown dorsally, white ventrally; tarsomeres dark grayish brown dorsally, white ventrally. Hindleg with coxa pale grayish brown, tinged with white marginally; femur and tibia pale grayish brown dorsally, white ventrally; 1<sup>st</sup> tarsomere white, intermixed with dark grayish brown scales on dorso-basal half; remaining each tarsomere dark brown dorsally, white ventrally, with white ring distally. Forewing length 7.0-8.3 mm, white, mottled with pale grayish brown on subcostal area of antemedian and subbasal zones, striolate with dark brown along costal area and sparsely on dorsal area; median area mottled with dark grayish brown; discal patch as four lunulate marks reddish brown on basal half, dark brown on distal half; postmedian and tornal area mottled with

dark grayish brown, densely intermixed with pale grayish blue scales; submarginal area with mottled grayish brown markings along row of three black dots; fringe white, tinged with dark grayish brown on apical, medial, and tornal areas. Hindwing white, with a tail at vein  $M_3$ ; subbasal area striolate with dark brown; longitudinal fascia comprising dark brown and pale grayish blue scales running from base to middle of termen; median line dark brown, strongly convex medially, broadened on posterior 1/3, juxtaposed with reddish brown along inner margin and with pale grayish blue along outer margin; postmedian area broadly tinged with grayish brown on posterior 4/5, intermixed with pale grayish blue scales, with oblique, reddish brown bar at anterior 1/3; submarginal area with four reddish brown ocellate markings; marginal line present between  $M_1$  and  $M_3$ , dark brown; fringe pale reddish brown, tinged with white on anterior 1/5 of termen. Abdomen with 1<sup>st</sup> tergum white; remaining terga dark grayish brown, with white band distally on each segment; sterna white.

Male genitalia (Figs 3-4): Uncus lanceolate in distal half, obtuse apically, with dense downward-directing, long setae laterally. Tegumen trapezoidal; gnathos band-like, angulate medially. Valva subrhomboidal, narrowly round apically, half-length of uncus, densely setose on distal 1/3; basal process digitate, as long as uncus, densely setose on distal 1/2; costa convex at distal 2/5; sacculus slightly convex at distal 2/5. Anellus short, scobinate; juxta broad-elliptical, concave medioposteriorly. Vinculum broadly round. Phallus (Fig. 4) tapered to apex from middle, with spinulate zone in distal half.

Female genitalia (Fig. 2): Papilla analis subquadrate, long-setose, spinulate on apical area. Postvaginal area with transverse wrinkles. Apophysis posterioris slender, 2x longer than apophysis anterioris. Ostium bursae small, on bowl-like, invaginated area. Ductus bursae broadened at middle, as long as corpus bursae; antrum 1/16 as long as ductus bursae, ring-like, depressed medially; ductus seminalis coiled. Corpus bursae globular, with a signum at middle; signum elliptical, slightly constricted medially, denticulate.

Distribution: South Korea, North Korea.

Remarks: This species distributes broadly in the central and southern parts of the Korean peninsula. Given the collecting records in the present study and the on-line observation data by the citizen scientists, no allopatric relationships were detected in the distributions of two closely related congeners, *E. koreana* and *E. nubifasciaria*, in Korea.

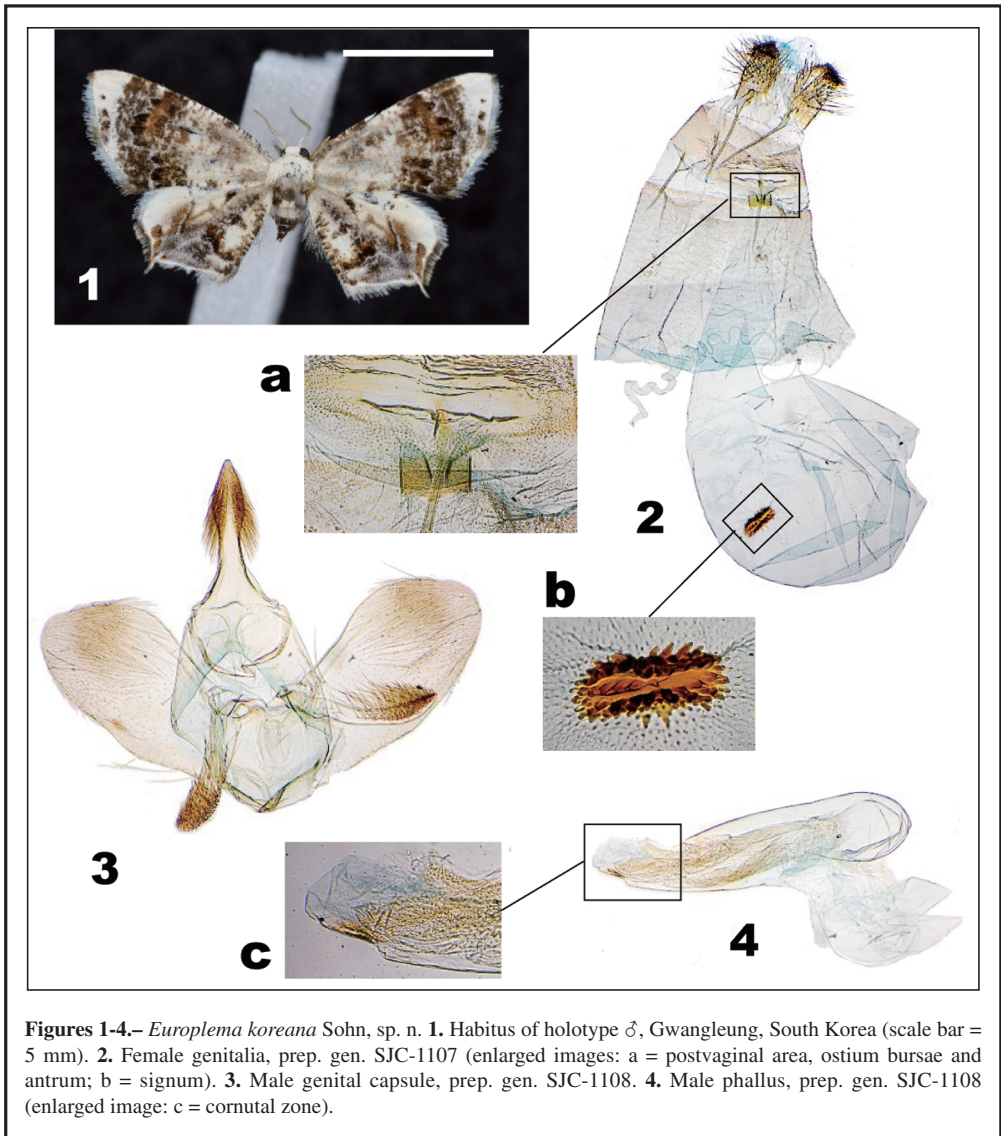
## Discussion

Overall morphological features indicate that two species, *Europlema koreana* and *E. nubifasciaria*, are closely related and they belong to the *Epilema styx* species-complex sensu SOHN & YEN (2005). The species-complex shares a few characteristics with *Europlema* sensu HOLLOWAY (1998) in the male genitalia: i) the triangular uncus folded longitudinally in a roof-like manner, ventrally setose and ii) the valvae with a distinctive, slender process arising from the base ventrally. SINEV (2016) assigned *E. nubifasciaria* (= *E. leleji*) to *Europlema*, based on those similarities.

An association of the *Epilema styx* species-complex with *Europlema* seems premature and thus needs further attention. The species-complex differs from *Europlema* in two characteristics: i) the forewing venation with the  $Rs_1$  separated from  $Rs_{2+3}$  and ii) the medial part of gnathos in the male genitalia as a convergent band. These differences may merit a new genus for the *Epilema styx* species-complex. To test that possibility, an integrative study with morphological and molecular data is on the way by the present author.

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