SHILAP Revta. lepid., 50 (199) septiembre 2022: 417-423 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.54

A new species of *Pelagodes* Holloway, 1996 and a new species of *Thalassodes* Guenée, 1857 from Luzon, the Philippine islands (Lepidoptera: Geometridae, Geometrinae, Thalassodini)

A. Lindt, K. Sarv & J. Viidalepp

Abstract

Two new species of Thalassodini, *Pelagodes tuustiae* Lindt, Sarv & Viidalepp, sp. n. and *Thalassodes lennuki* Lindt, Sarv & Viidalepp, sp. n., are described from Luzon, Philippines. The adults, their male and female genitalia characteristics are described and illustrated.
KEY WORDS: Lepidoptera, Geometridae, Geometrinae, Thalassodini, new species, morphology, taxonomy, Philippine islands.

Una nueva especie de *Pelagodes* Holloway, 1996 y una nueva especie de *Thalassodes* Guenée, 1857 de Luzón, Filipinas (Lepidoptera: Geometridae, Geometrinae, Thalassodini)

Resumen

Se describen dos nuevas especies de Thalassodini, *Pelagodes tuustiae* Lindt, Sarv & Viidalepp, sp. n. y *Thalassodes lennuki* Lindt, Sarv & Viidalepp, sp. n., de Luzón, Filipinas. Se describe e ilustra el adulto y las características de la genitalia del macho y de la hembra.
PALABRAS CLAVE: Lepidoptera, Geometridae, Geometrinae, Thalassodini, nueva especie, morfología, taxonomía, Filipinas.

Introduction

Oriental tropical green coloured looper moths are relatively well studied due the publications by Inoue and Holloway. INOUE (1961) separated *Thalassodes* Guenée, 1857 in the tribe of its own, Thalassodini but it was combined within Hemitheiti by HOLLOWAY (1996). The tribal status of Thalassodini was restored by BAN *et al*. (2019).

HOLLOWAY (1996) separated from *Thalassodes* two genera, *Orothalassodes* Holloway, 1996 and *Pelagodes* Holloway, 1996. PARSONS *et al*. (1999) listed 90 Old Word species in these three genera. INOUE (2006) described further species and the fourth genus *Reniformvalva* Inoue, 2006 with one species. Han Hongxiang and Xue Dayong published a solid treatment of Chinese Geometrinae, followed by a special treatment of the Thalassodini species (2010, 2011), VIIDALEPP *et al*. (2012) added a further Chinese species. Genetic analysis was published by BAN *et al*. (2019).

PARSONS *et al*. (1999) listed 58 and 22 species for *Thalassodes* and *Pelagodes*, respectively,

INOUE (2006), HAN & XUE (2011) and VIIDALEPP *et al*. (2012) added new taxa and the genus *Reniformvalva* Inoue, 2006. This way the number of Oriental and Indoaustralian Thalassodini species has reached 123 (PLOTKIN & KAWAHARA, 2019). Quite recently the fifth genus *Sternitornatodes* Sommerer & Tautel, 2021 was added with the description a further, 124th Thalassodini species.

We add descriptions of two new species below.

Material and methods

The present study was stimulated by attempts to identify moths accumulated in the entomological collection of the Estonian Museum of Natural History (TAMZ, Tallinn) and in the entomological collection of the Institute of Zoology and Botany, of the Estonian Academy of sciences (IZBE), which is deposited at the Estonian University of Life Sciences (Tartu). The main material for this study was collected in 2013 by Aare Lindt. Additional materials were collected by Keijo Sarv from Sulawesi and compared with descriptions by DEBAUCHE (1941).

We have integrated external morphological data, male and female genitalia characteristics, spatial distribution data and wing facies data in this study. The identification of male genitalia characters by brushing scales off the last sternite is easy, but identification of female genitalia characters requires dissection. Genital slides of males and females were treated using established procedures (HARDWICK, 1950), embedded in Euparal and photographed in ventral view. The genitalia slide numbers are added to illustrations to allow their comparison with related materials.

The type specimens are registered in the PlutoF database.

Results

Pelagodes tuustiae Lindt, Sarv & Viidalepp, sp. n. (Figs 1-4)

Material: Holotype, 1 ♂, PHILIPPINES, Luzon, Naibo, 1400 m, 16º57’18”N, 20º38’59”E, 13-VI-2013 (A. Lindt), Type id. TAMZ0175908. Paratypes (2 ♂♂, 2 ♀♀): 1 ♂, PHILIPPINES, Luzon, Adams, 950 m, 18º27’14”N, 20º58’33”E, 09-VI-2013 (gen. 361) (A. Lindt); 1 ♀, Luzon, Naibo, 1400 m, 16º57’18”N, 20º38’59”E, 13-VI-2013, (gen. 385) (A. Lindt); 1 ♂, 1 ♀, Luzon, Calanasan, 850 m, 18º21’58”N, 21º02’29”E, 10-VI-2013 (A. Lindt).

The holotype is deposited in the zoological collection of the Estonian Museum of Natural History (Tallinn), the paratypes are in the Estonian Museum of Natural History, in the IZBE insect collection (Tartu) and in the private collection of A. Lindt. Association of sexes: collected in the same locality and night in Calanasan and Naibo.

Description. Wingspan, males 30-31 mm, females 32-33 mm (Figs 1-2). The frons is green, the fillet white, vertex bluish green, the palpi light brown. Antennae light brown dorsally scaled green, simple in female and pectinated in male, the length of external and inner pectination on the tenth segment as 1.3 mm and 1.0 mm, respectively. Thorax and abdomen bluish green. Wings bluish green with white strigulation and postmedial line, marginal line thin, dark, accentuated at vein ends. Male genitalia (Fig. 3): Valva distally truncate, with a thinner ventro-distal flap. Costal edge of valva convex, without any process; the dorsal edge of sacculus marked by a ridge, reaching the costa as a free spine. Juxta horseshoe-shaped with thin, curved dorsal processes. Aedeagus without cornuti. Sternite A8 with a strong, slender base with anterior processes stick-like, posterior processes consisting of inner short stick-like and external long, out curved, black, saw-dentate parts.

Female genitalia (Fig. 4) short and broad, the sterigma with a pair of folded processes, the signum bicornuate.

Female genitalia are similar to those of *Pelagodes forficatus* Inoue, 2006 but differ in the presence of a spear-shaped signum.

Diagnosis: Differing from all known species of *Pelagodes* in the shape of processes of the

eighth sternite of male abdomen which are bifid, with a short digitiform inner part and a long, out curved, black, saw-dentate external process. Female genitalia: The ostium broad, ductus bursae very short, two bold, folded postvaginalis structures present.

Discussion: The characteristics of this new species combine together a valva like in *Pelagodes ultimarius* Inoue, 2006, bipartite posterior processes of the sternite A8 of *Pelagodes cancriformis* Viidalepp, Lindt & Han, 2012 and pronounced antero-lateral processes of juxta similar to those in the species of *Orothalassodes curiosa* (Swinhoe, 1902) species group but these species have hind wings well roundish, not angulate at vein M3.

Ecology: The species inhabits mountain forests at 850-1400 m elevation.

Etymology: The new species *Pelagodes tuustiae* is dedicated to A. Tuusti, director of the Estonian Museum of Natural History, for her promoting field studies in biology.

***Thalassodes lennuki* Lindt, Sarv & Viidalepp, sp. n.** (Figs 5-8)

Material: Holotype, 1 ♂, PHILIPPINES, Luzon, Solsona, 1270 m, 11-VI-2013, 18º05’34”N, 120º53’58”E, (gen. 369) (A. Lindt), Type id. TAMZ0175907. Paratypes (6 ♂, 26 ♂, ♀♀): PHILIPPINES, Luzon, 2 ♂♂, Bongabon>E, 02-VI-2013 (gen. 416); 3 ♀♀, Calanasan, 10-VI-2013; 19 ♀♀, Solsona, 11-VI-2013 (gen. ♀410, 417, 4411); 1 ♂, Cabangan, 18º21’58”N, 21º02’29”E, 13-VI-2013; 1 ♂, 1 ♀, Cabangan, 16-VI-2016 (gen. ♂370, ♀413, 4407) (A. Lindt). 2 ♂♂, SULAWESI, Malewong, 72 m, 15-I-2015, 03º36’03”S, 120º21’56”E, (gen. 392); 1 ♀, Malino 1081 m, 13-I-2015, 05º15’11”S, 119º51’13”E (gen. 461); 1 ♀, Sulawesi, Rante Pao 791 m, 17-I-2015, 02º59’40”S, 119º52’24”E; 1 ♀, Palopo 14 km NW, 1143 m, 18-I-2015, 02º57’11”S, 120º04’15”E (K. Sarv).

The holotype is deposited in the collection of the Estonian Museum of Natural History (Tallinn), the paratypes are in the Estonian Museum of Natural History, in the IZBE insect collection (Tartu) and in the private collection of A. Lindt and in the private collection of K. Sarv.

Description: Wingspan 24-27 mm in males, 28-33 mm in females (Figs 5-6). The frons is green, the fillet between antennae bases white, the vertex bluish green. The palpi are green above, white below, projecting before the frons about 0.25 mm in males, 0.6 mm in average in females. The antenna is brownish with white dorsal scaling on its basal one-fourth. The external and inner pectination of male antennae are long, reaching 0.8 mm and 1.0 mm, respectively, on the tenth antennomere. A white dorsal line on metathorax and abdomen. The hind tarsus of male is one-half length of the tibia which is dilated and provided with a hair pencil. Wings bluish green, the antemedial and postmedial lines are white, the strigulation duller whitish, the marginal line grey, disrupted and faint. The fringe is basally greenish, distally whitish. The distal margin of forewing is slightly convex, that of hindwing subangulate at the vein M3. Geographical variation. The dorsal edging of juxta is even in one specimen from Sulawesi, while it is dilating dorsally in the specimens from Luzon.

Female genitalia with ostium parallel-sided (Fig. 8), about 0.5 mm long, the border between ductus bursae and corpus bursae with a circular fold as in *Thalassodes dissitoides* Holloway, 1996. A signum is present. The female genitalia of *T. dissitoides* has a similar circular fold between ductus and corpus bursae, but the ductus is longer, as long as corpus bursae in this species.

Diagnosis: Medium-sized species differing from other congeners with a white lined dorsum of abdomen in that the dorsal line is continuous (the dorsal line is fragmented in *Thalassodes indistantus* Inoue, 2006 and in *T. yazakii* Inoue, 2006, and other species have white spots on tergites if any). The frons is dark green in the new species and in *T. yazakii* whilst dark brown in *T. indistantus*. The valva (Fig. 7) of the male genitalia has a short spur or tiny spicule on an oblique fold near the middle of valva while other species may have a spicule on the saccular edge of the valva. The female genitalia with ductus bursae short, ending in a strong ring-fold on the corpus bursae.

Discussion: The male genitalia of *T. sundissepta* (Holloway, 1996, fig. 285) has a similar but angulate, not rounded broad edging to the juxta. *T. dissepta* (Holloway, 1996, fig. 274) has an

oblique fold traversing the valva and producing a spine at the ventral margin of valva; this spine is in the centre of valva in the new species. *T. indistantus* has a spine to ventral margin of valva and the dorsal sclerotization of juxta present but slender. Quite possibly, this species is the "closely related species from Luzon" mentioned by Holloway in the descriptive text for *T. sundissepta* (Holloway, 1996: 256). INOUE (2006: 219, fig. 101) listed *T. dissitoides* for Mindanao Isle based on a single female which has a much longer colliculum than in the new species under description.

Association of sexes: both males and females were collected together the same night at Salsona and Cabangan sites.

Etymology: The new species is named after Lennart Lennuk, head of collections of the Estonian Museum of Natural History.

Acknowledgements

The authors would like to thank Robert Barry Davis for linguistic revision of the text and Lennart Lennuk for processing the Figures. Dr Antonio Vives Moreno kindly provided the translation of the text of Abstract to Spanish.

BIBLIOGRAPHY

BAN, X., NAN, J., RUI, C., XUE, D. & HAN, H., 2019.– Tribal classification and phylogeny of Geometrinae (Lepidoptera: Geometridae) inferred from seven gene regions.– *Zoological Journal of the Linnean Society*, **184**: 653-672 (2018).

DEBAUCHE, H., 1941.– Geometridae de Celebes (Lepidoptera, Heterocera).– *Mémoires de Musée Royal d'Histoire Naturelle de Belgique*, (2) **22**: 1-46.

HAN, H. X. & XUE, D., 2010.– Lepidoptera Geometridae Geometrinae.– *Fauna Sinica*, **54**: 787 pp., figs 929, 20 pls. Science Press, Beijing.

HAN, H. X. & XUE, D., 2011.– *Thalassodes* and related taxa of emerald moths in China (Geometridae, Geometrinae).– *Zootaxa,* **3019**: 26-50.

HARDWICK, D. F., 1950.– Preparation of slide mounts of lepidopterous genitalia.– *The Canadian Entomologist*, **62**(11): 231-235.

HOLLOWAY, J. D., 1996.– Moths of Borneo with special reference to Mt Kinabalu.– *Malayan Nature Society*, **49**: 147-326.

INOUE, H., 1961.– Lepidoptera, Geometridae.– *Insecta Japonica,* **1**(4): 106 pp.

INOUE, H., 2006.– *Thalassodes*-group of Emerald Moths from Sulawesi and the Philippine Islands (Geometridae, Geometrinae).– *Tinea*, **19**(3): 214-243.

PLOTKIN, D. & KAWAHARA, A. Y., 2020.– Review of recent taxonomic changes to the emerald moths (Lepidoptera: Geometridae: Geometrinae).– *Biodiversity Data Journal*, **8**: e52190. Doi: 10.3879/BDJ.8.e52190.

SOMMERER, M. & TAUTEL, C., 2021.– *Sternitornatodes* - a new genus in the Pelagodes group of Emerald Moths (Geometridae, Geometrinae), with description of the new species *St. echinus* from Luzon (Philippines).– *Tinea*, **26**(1): 55-59.

VIIDALEPP, J., LINDT, A. & HAN, H., 2012.– *Pelagodes cancrifomis*, a new emerald moths' species from the north of Thailand, Laos and southern China (Lepidoptera: Geometridae: Geometrinae).– *Zootaxa*, **3478**: 429-433.

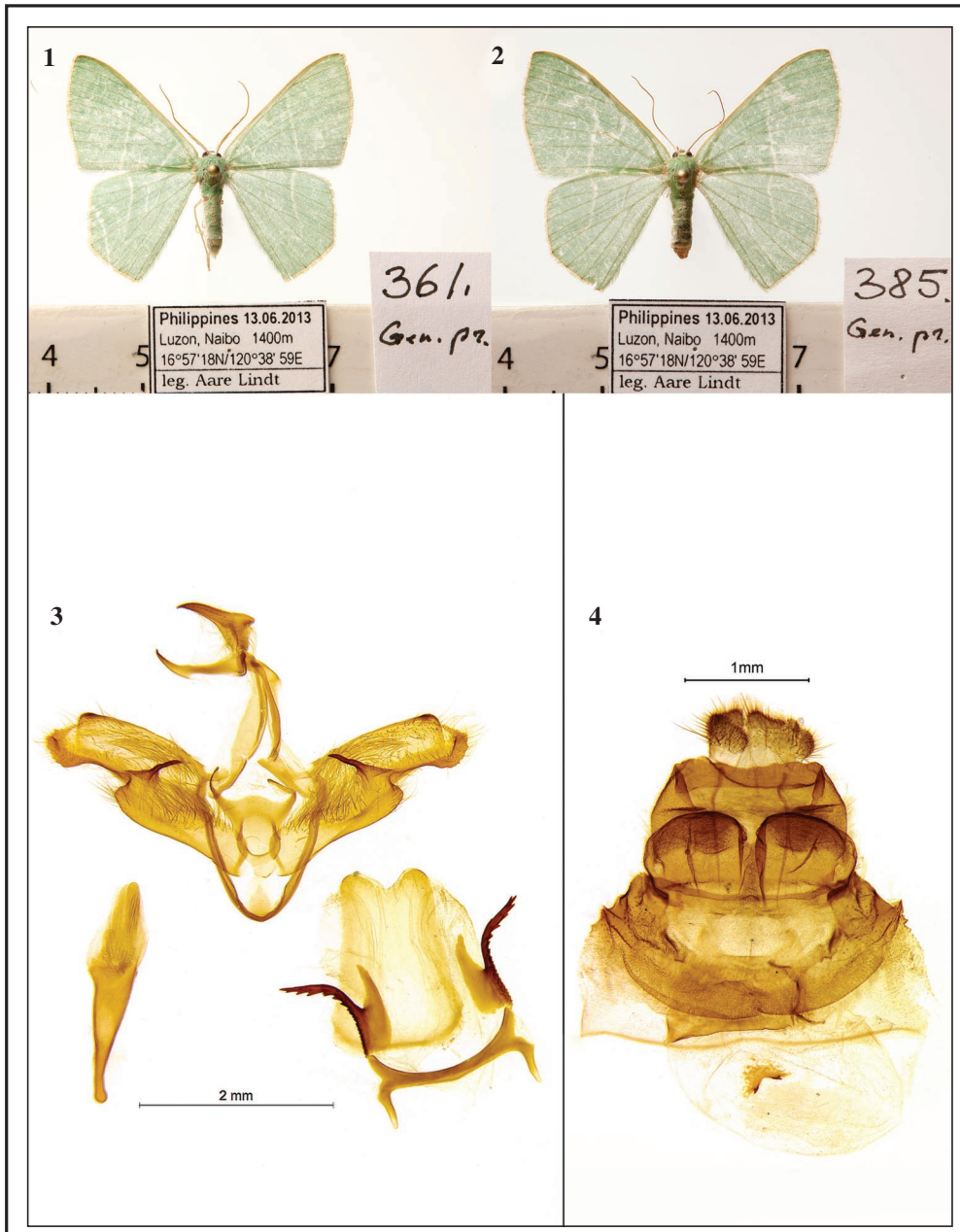
A. L.
Estonian Museum of Natural History,
Lai St, 29A
EE-00001 Tallinn
ESTONIA / *ESTONIA*
E-mail: aare.lindt@loodusmuuseum.ee
https://orcid.org/0000-0003-2235-4822

*K. S.
LUISA Translation Agency
Õismäe tee, 113A-18
EE-13515 Tallinn
ESTONIA / *ESTONIA*
E-mail: keijo.sarv@gmail.com
https://orcid.org/0000-0003-4028-4215

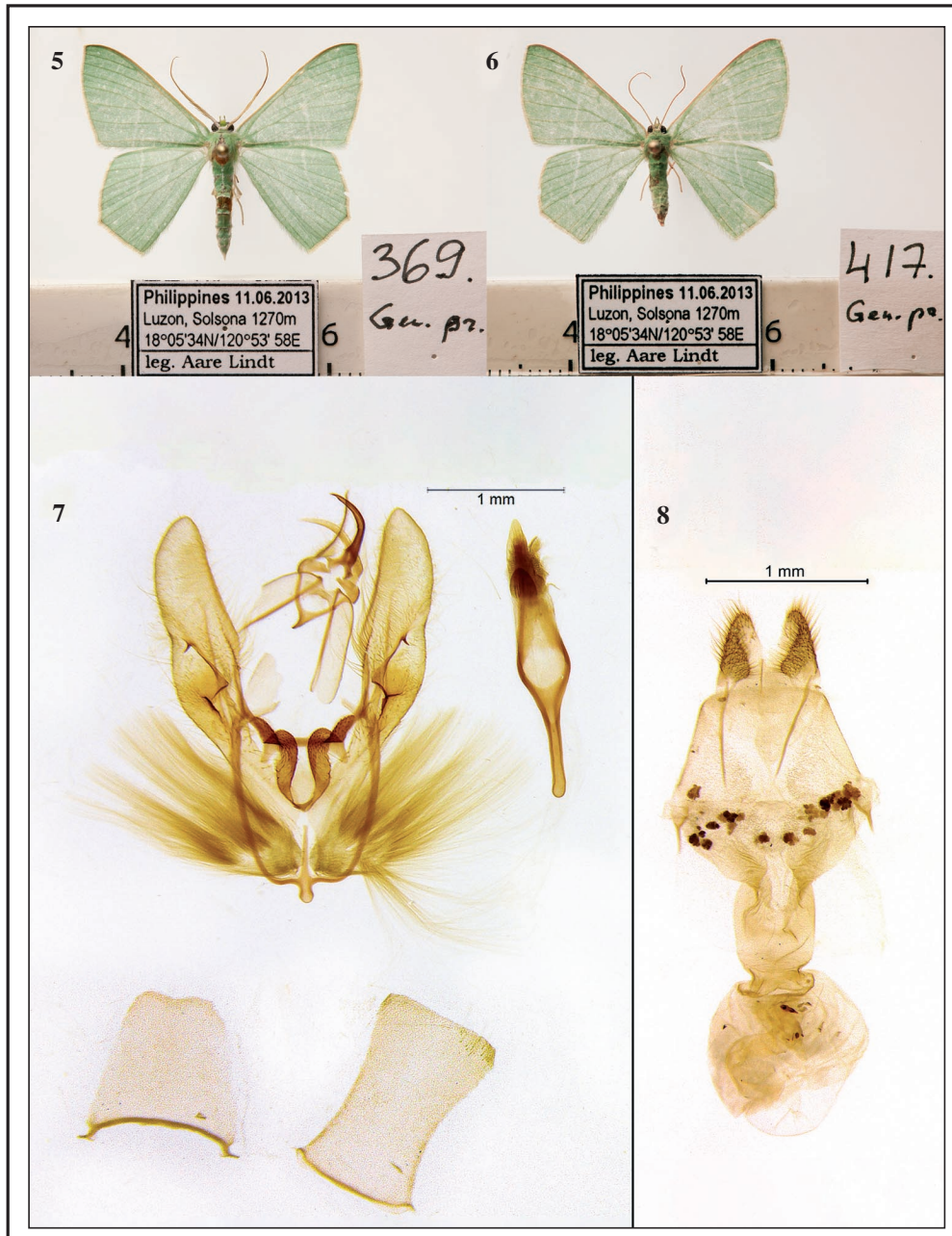
J. V.
Estonian University of Life Sciences
Kreutzwaldi, 5D
EE-51006 Tartu
ESTONIA / *ESTONIA*
E-mail: vjaan@emu.ee
https://orcid.org/0000-0003-1517-6271

*Autor para la correspondencia / *Corresponding author*

(Recibido para publicación / *Received for publication* 2-IX-2021)
(Revisado y aceptado / *Revised and accepted* 20-X-2021)
(Publicado / *Published* 30-IX-2022)



Figures 1-4.– *Pelagodes tuustiae* Lindt, Sarv & Viidalepp, sp. n. **1.** Holotype male of *Pelagodes tuustiae*, sp. n. **2.** female paratypes of *Pelagodes tuustiae* Lindt, Sarv & Viidalepp, sp. n. **3.** male genitalia, aedeagus and the last sternite of *P. tuustiae* Lindt, Sarv & Viidalepp, sp. n. **4.** female genitalia of *P. tuustiae* Lindt, Sarv & Viidalepp, sp. n.



Figures 5-8.– *Thalassodes lennuki* Lindt, Sarv & Viidalepp, sp. n. **5.** Holotype male of *Thalassodes lennuki* Lindt, Sarv & Viidalepp, sp. n. **6.** female paratypes of *Thalassodes lennuki* Lindt, Sarv & Viidalepp, sp. n. **7.** male genitalia, aedeagus and the last sternite of *Thalassodes lennuki* Lindt, Sarv & Viidalepp, sp. n. **8.** female genitalia of *Thalassodes lennuki* Lindt, Sarv & Viidalepp, sp. n.