

[研究文章 Research Article]

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First Record of *Ozola japonica* Prout, 1910 (Lepidoptera: Geometridae: Desmobathrinae) from Taiwan, and a Preliminary Conservation Assessment of its Yangmingshan Population

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Abstract. The study provides the first record of the geometrid species *Ozola japonica* Prout, 1910 from Taiwan, based on specimens from a single population in the Yangmingshan region. Based on this restricted known distribution, a preliminary assessment of conservation potential for this population is also provided.

Key words: Fauna, continental island, Oriental region, *Premna*, Lamiaceae

Introduction

The desmobathrine genus *Ozola* Walker, 1861 is widely distributed in the Old World, and is represented by about 30 species in the Oriental region (Holloway, 1996; Yazaki, 2019). Hitherto represented in Taiwan by a single species, *O. defectata* Inoue, 1971 (Inoue, 1992), the present study provides the first record of an additional *Ozola* species, and raises potential conservation issues associated with its apparently restricted distribution.

Materials and methods

Specimens from the following institutions were either loaned or examined on site:

NSMT – National Science Museum, Tsukuba (previously Tokyo).

TFRI – Insect collection of Taiwan Forestry Research Institute, Taipei.

Genitalia preparations for morphological studies

Genitalia were prepared following the method described by Holloway et al. (1987), with the following modifications: After maceration of the abdomen in 10% KOH and subsequent cleaning, male genitalia were carefully removed from the abdomen and abdominal segments 1–8 were opened along the caudocephalic axis from the right side. Female genitalia were removed entirely from the abdomen, cleaned and mounted ventral side facing upwards. All the membranous genital tubes and bursae derived from the genital openings were preserved. Genitalia and abdominal skins of both sexes were stained with pen ink (Pilot), preserved in 70% ethanol then transferred in 99.5% ethanol before mounting in Euparal on slides. Specimens were photographed using a Nikon D600 digital camera and slides were photographed using a Nikon D500 digital camera with flash.

Results

Ozola japonica Prout, 1910

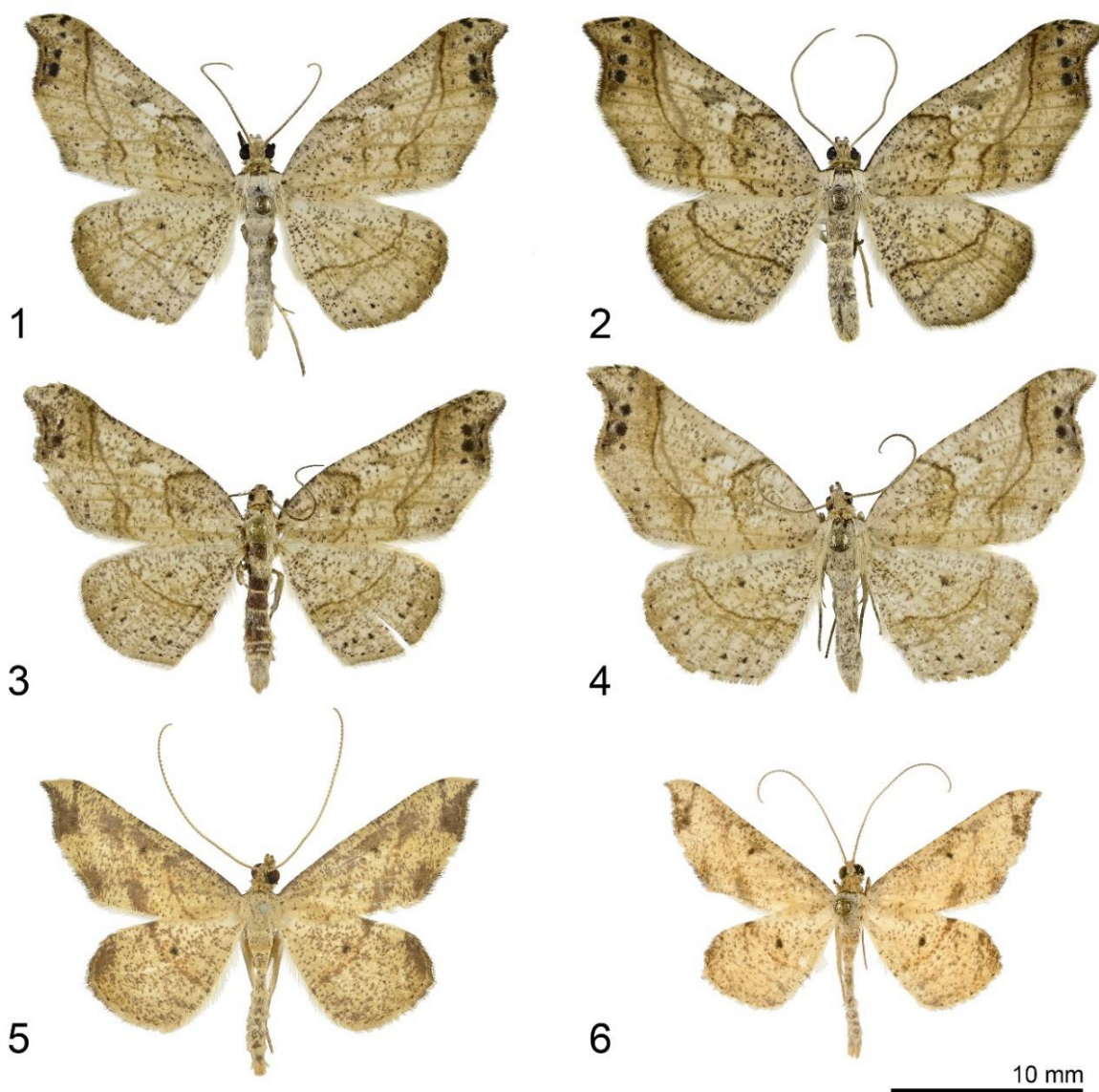
日本小褐尺蛾

(Figs 1–4, 7–12)

Ozola impedita japonica Prout, 1910, *Gen. Ins.* 104: 94.

Ozola japonica: Prout, 1912–1916: 10, pl. 1f; Holloway, 1996: 164; Nakajima, 2011: 204, pl. 1-40-5, 6; Yazaki & Wang, 2018: 178, 19, 56; Yazaki, 2019: 10, figs 6, 10, 14; Kishida, 2020: 33.

Specimens examined. JAPAN (type locality): 1♂, Nagasaki, Goto Is., Fukuejima I., Ogawara Dam, 170 m, 26. VI. 1996, leg. M. Owada, slide NSMT-SW1357♂ (NSMT); 1♀, Tsushima, Kamitsushima, Kuchinashidani Tunnel, 250 m, 3. VII. 2011, leg. M. Owada, slide NSMT1358♀ (NSMT). **TAIWAN:** Taipei City: 2♂♂2♀♀, Tamshui, Erziping, 800 m, 15-16-VI. 2021, leg. S. Wu & S. S. Wu, slide TFRI209673♂ & 209673♀ (TFRI).



Figures 1–8. *Ozola* spp. 1–4, 7–8. *O. japonica* Prout, 1910; 1, 3, 7, 8. Taiwan; 2, 4. Japan; 5, 6. *O. defectata* Inoue, 1971; 1, 3, 5, 7. Male; 2, 4, 6, 8. Female. Courtesy of specimens: TFRI (1, 2, 5, 6), NSMT (3, 4). Scale bar = 10 mm. Photo by Shipher Wu.

Taxonomic notes. Yazaki (2019) reviewed the *Ozola impedita* (Walker, 1861) group, in which he included four species, including one newly described in that paper. The Taiwanese specimen is externally similar to the other members of this group and can be identified (based on the genitalia of both sexes) as *O. japonica*, originally described in Japan by Prout (1910), and recently recorded in Nanling Mts, S. China (Yazaki & Wang, 2018). The genitalia of *O. japonica* are distinct from those of other species in *impedita* group, based on *O. japonica*'s: longer apical valval processes; broader, undulate ventrobasal valval processes, and the absence of a vesical cornutus (Figs 9, 10); the short and slender corpus bursae, with the posterior part thinly sclerotized, and bearing some stout spines (Figs 11, 12). Slight variation in the shape of apical valval process has been observed among *O. japonica* specimens from Taiwan (Fig. 9), Japan (Fig. 10), and China (see Yazaki, 2019: fig. 10).



Figures 9–12. Genitalia of *Ozola japonica* Prout, 1910. 9. Male, Taiwan (TFRI); 10. Male, Japan (NSMT); 11. Female, Taiwan (TFRI); 12. Female, Japan (NSMT). Photo by Shipher Wu.

Diagnosis. Diagnoses of species within *Ozola impedita* group should be based primarily on genitalic characters because external characters such as wing patterns can be similar among species; species in this group are also known to be allopatrically distributed (Yazaki, 2019). In Taiwan, *O. japonica* has been collected from sites above 400m in the Yangmingshan (Northern Taiwan), while *O. defectata* Inoue, 1971 (Figs 5, 6), known to occur allopatrically, is primarily distributed below 200 m in the coastal forest. *O. japonica* can be distinguished from *O. defectata* by the anterior margin of the forewing, bowing outwards slightly basomedially and straightening apically in *O. japonica*, while running almost straight throughout in *O. defectata*; by the distinct wing fasciae in *O. japonica* compared to the more indistinct darkened patch through the tornal region and medial part of inner margin.

Distribution. Japan, China (Yazaki and Wang, 2018); Taiwan (new record).

Discussion

According to Nakajima (2011), the larvae of *O. japonica* feed on *Premna microphylla* Turcz. (Lamiaceae) in Japan. While collecting at night in Erziping area of the Yangmingshan region in June, 2021, around 20 *O. japonica* individuals were observed resting within a radius of 10 meters from a *P. microphylla* individual; immature stages were not observed, likely due to phenological reasons. Chung (2018) gave the distribution of *P. microphylla* of Taiwan in the North and East of the island, however this moth species seems to be restricted in Yangminshan region, an independent mountain system of Northern Taiwan, based on 35 Citizen

Science records deposited in the database of Taiwan Moth Information Center (<https://twmoth.tesri.gov.tw/>, accessed 4 October 2021). In contrast, *O. defectata* Inoue, 1971 feeds on another *Premna* species, *P. serratifolia* L.; both moth and plant species are widely distributed around the coastal region based on similar numbers of Citizen Science records (about 30 records) in the same database. To the best of my best knowledge, *O. japonica* is the only case of a Taiwanese moth species being restrict to the Yangmingshan region. Further study is needed to clarify the hostplant and potential broader distribution range of *O. japonica* in Taiwan, despite *Premna microphylla* being the only representative of the genus *Premna* in this region (Huang, 1983). If this species does indeed have a relatively restricted distribution, as this study suggests, then the level of threat to this species is low for the time being because its entire distribution is within the Yangmingshan National Park.

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日本小褐尺蛾的臺灣首次紀錄以及對其陽明山族群的初步保育評估（鱗翅目：尺蛾科：細尺蛾亞科）

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摘要: 本研究首次記錄尺蛾類群的日本小褐尺蛾 (*Ozola japonica* Prout, 1910) 在臺灣的分布。由於本種在臺灣已知的分布僅限於陽明山山區，因此對此族群作初步的保育評估。

關鍵詞: 生物相、大陸型島嶼、東方區、魚臭木屬、唇形科