

[研究文章 Research Article]

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## On the First Record of *Erebus crepuscularis* (Linnaeus, 1758) in Lanyu and Green Island (Lepidoptera, Erebidae, Erebinae)

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**Abstract.** The *Erebus* Latreille, 1810 populations of Lanyu and Green Island are confirmed to represent a new recorded species, *Erebus crepuscularis* (Linnaeus, 1758) in the present study. Specimens of both sexes and their genitalia are illustrated and compared with that of the widely distributed Oriental species *Erebus ephesperis* (Hübner, 1827).

**Keywords:** Fauna, Wallace's Line, Oriental region, *Smilax*, Smilacaceae

### Introduction

The genus *Erebus* Latreille, 1810 contains about 40 species ranging in the Indo-Australian region (Poole, 1989). According to the faunistic checklist documented in Sugi (1992) and Heppner (2012), 6 species in total are distributed on the main island Taiwan. The *Erebus* populations of Lanyu and Green Island have previously been identified as *E. ephesperis* (Hübner, 1827) by Yang (2000) and Fu & Hsu (2009), respectively. Due to the subtle appearance differences of the examined specimens among Taiwan, Green Island as well as Lanyu. The present study intends to confirm the species identity of these two populations.

### Materials and methods

The specimens were examined or borrowed from the following institutions:

CCMF Collection of Chien-Ming Fu, Taichung;

NMNS National Museum of Natural Science, Taichung;

TFRI Insect collection of Taiwan Forestry Research Institute, Taipei.

Genitalia preparations for morphological studies

Genitalia were prepared following the general method described, e.g., by Holloway et al. (1987) with slight modification. 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 up. 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

#### *Erebus crepuscularis* (Linnaeus, 1758)

目裳蛾

(Figs 1–3, 5, 6, 7, 9)

*Phalaena (Noctua) crepuscularis* Linnaeus, 1758, *Syst. Nat.* (Edn 10) **1**: 509  
*Nyctipao leucotaenia* Guenée, 1852, *Hist. nat. Ins., Spec. gén. Lépid.* **7** (Noct. 3): 184  
*Nyctipao dentifascia* Walker, 1865, *List. Spec. Lepid. Insects. Colln. Br. Mus.* **33**: 947  
*Nyctipao crepuscularis*: Moore, 1878, *Proc. Zool. Soc. Lond.* **1878** (4): 849.  
*Nyctipao dentifascia obscura* Bethune-Baker, 1906, *Novit. Zool.* **13**: 250.  
*Erebus leucotaenia* ab. *subobscura* Rothschild, 1915, *Novit. Zool.* **22** (2): 211.  
*Erebus saparaea* Swinhoe, 1918, *Ann. Mag. Nat. Hist.* (London) (9) **2**: 84.  
*Nyctipao albicrustata* Prout, 1919, *Ann. Mag. Nat. Hist.* (London) (9) **3**: 170.  
*Erebus speciosus* Hulstaert, 1924, *Ann. Soc. Ent. Belg.* **64**: 91.  
*Nyctipao meforensis* Prout, 1924, *Bull. Hill. Mus.* **1**: 436, pl. 14, f. 1.  
*Nyctipao phaea* Turner, 1933, *Trans. R. Soc. S. Aust.* **57**: 164.  
*Erebus ephesperis*: Chen, 1999: 1020, pl. 51: 1; Fu & Hsu, 2009: 55, pl. 8: 25; Yang, 2000: 23, nec Hübner, 1827

**Specimens examined. TAIWAN.** 1♀, Taitung County, Green Island, Fire-Burned Hill, 185 m, 6. IV. 2008, leg. C. M. Fu (CCMF); 1♀, same collecting locality, 21. VI. 2008, leg. C. M. Fu (CCMF); 1♀, Taitung County, Fire-Burned Hill, 270m, 22. VI. 2008, leg. C. M. Fu; 1♀, Taitung County, Fire-Burned Hill, 260m, 23. VI. 2008, leg. C. M. Fu. (CCMF); 1♂, Taitung Lanyu, Tianchr No.1, 24-26. IX. 1998, leg. H. T. Shih (NMNS); 3♂♂1♀, same collecting locality, 28. IV-1. V. 1999 H. T. Shih (NMNS); 1♀, Taitung Lanyu, Tianchr No. 2, 27. IV. 1999, leg. H. T. Shih & C. H. Chang (NMNS); 1♂, same collecting locality, 24-26. IX. 1998, leg. H. T. Shih & T. J. Chen (NMNS); 2♂♂, same collecting locality, 24-27. X. 2000, leg. M. M. Yang & H. T. Shih (NMNS); 2♂♂, Taitung, Lanyu, Younghsing No. 4, 26-29. I. 1999, leg. H. T. Shih (NMNS); 4♂♂1♀, same collecting locality, 27-29. VI. 1999, leg. H. T. Shih, slide NMNS ENT3209-280♀ (NMNS); 6♂♂, same collecting locality, 24-27. X. 1999, leg. M. M. Yang & H. T. Shih (NMNS); 1♂, Taitung, Lanyu, Younghsing, 28-29. II. 2000, leg. W. L. Lin & M. F. Lou (NMNS); 1♂, [Taitung Co.], Lanyu Is., Weather St., 5. III. 1991 leg. H. Y. Wang (NMNS); 1♀, [Taitung Co.], Lanyu Is., Lighthouse, 14. XI. 1990, leg. H. Y. Wang (NMNS); 1♂, same collecting locality, 4. III. 1991, leg. H. Y. Wang (NMNS); 2♀♀, [Taitung Co.], Lanyu Is., Yeongshing Farm, 30. VIII. 1990, leg. H. Y. Wang (NMNS); 1♂, Lanyu, Yunshin Farm, 4. IV. 2018, leg. C. H. Ma (TFRI); 1♂, Lanyu, Datienci, 6. IV. 2018, leg. C. H. Ma (TFRI).

**Taxonomic notes.** The lectotype of *Phalaena crepuscularis* Linnaeus, 1758 was illustrated by Mikkola & Honey (1993: fig. 12).

**Diagnosis.** The general appearance of *Erebus crepuscularis* is very similar to that of *E. ephesperis* (Figs 4, 8, 10) but it is darker and larger (wingspan ca. 85 mm rather than ca. 80 mm). These related species represent the only members of this genus that have the slender, flattened uncus (Holloway, 2005). Most females of *crepuscularis* have white transversal medial band on both wings but this character is absent in males. Both sexes of *E. ephesperis*, showing less sexual dimorphism as commented by Holloway (2005), have medial band on both wings. In the male genitalia, the sacculus process is wider with obtuse apex rather than narrow with tapered apex; the presence of one cornutus rather than two cornuti. In the female genitalia, the larger and more elliptic appendix bursae rather than smaller and round one; the elongate, narrower corpus bursae rather than short and wide one.

**Distribution and bionomics.** Indonesia, the Philippines, Australia; Green Island and Lanyu (new records). The populations in Green Island and Lanyu Island occur throughout the year except in May and August based on the examination of available voucher specimens. Yang (2000) gave the host plant information of Lanyu's *Erebus* (misidentified as *E. ephesperis*) as the family Smilacaceae. Though all known *Erebus* species are specialized on this plant family, the immature stage and actual host plant of this species are still waiting for investigation.

**Remarks.** Chen (1999) incorrectly recorded *E. ephesperis* as “*E. crepuscularis* 目裳蛾” in China. Apart from this misidentification, we still follow the given Chinese recommended name of Chen's (1999) “*E. crepuscularis*” since this taxon represents the type species of the genus *Erebus* (目裳蛾屬).

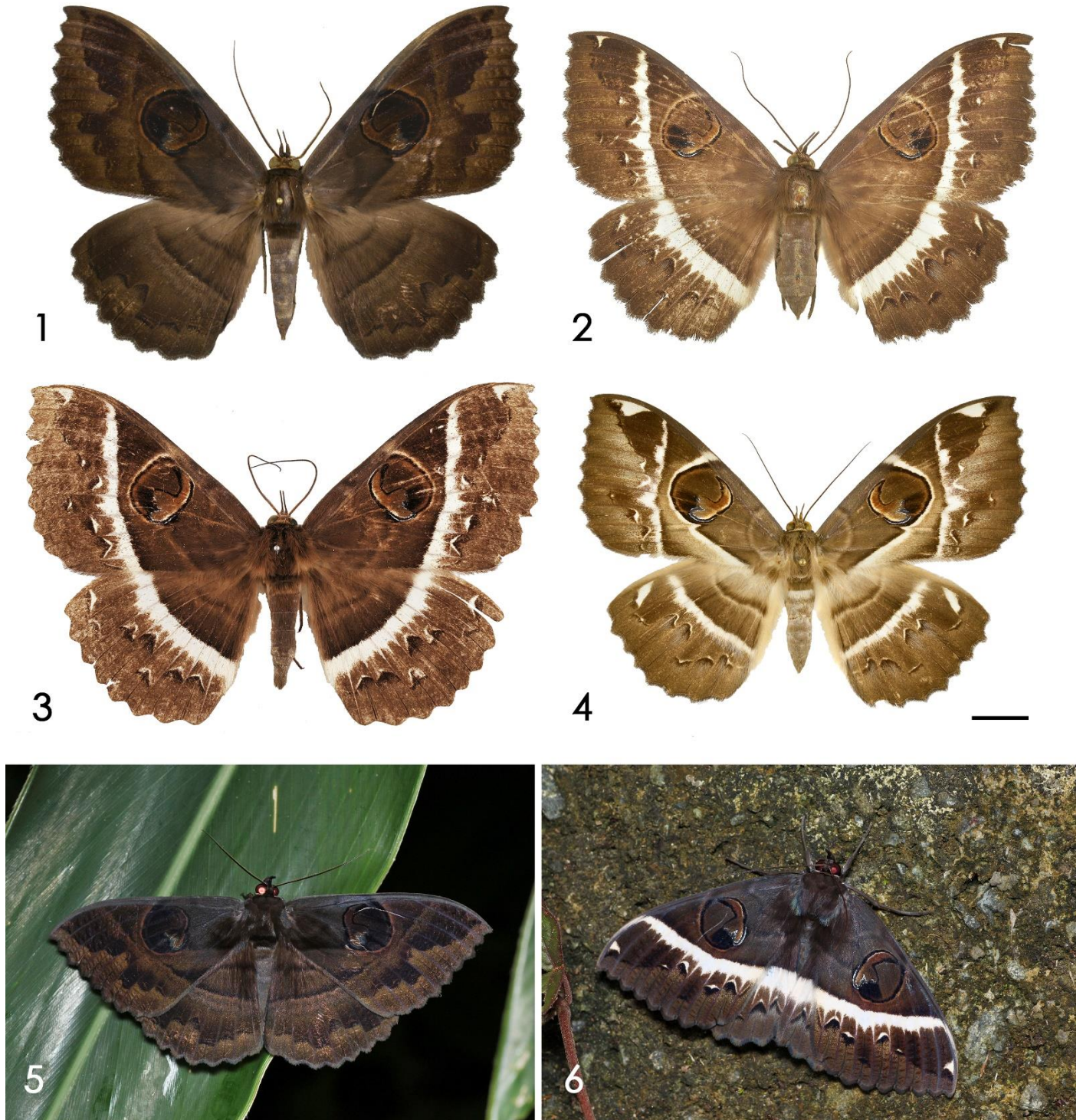


Figure 1–6. Habitus of *Erebus* species. 1–3, 5, 6. *E. crepuscularis* (Linnaeus, 1758), Lanyu; 1, 5. Male; 2, 3, 6. Female; 4. *E. ephesperis* (Hübner, 1827), Taiwan, female. Scale bar= 10 mm. Deposition of specimens: TFRI (1, 4), NMNS (2); CCMF (3). Photo by Shipher Wu (1–4), Cheng-Han Ma.



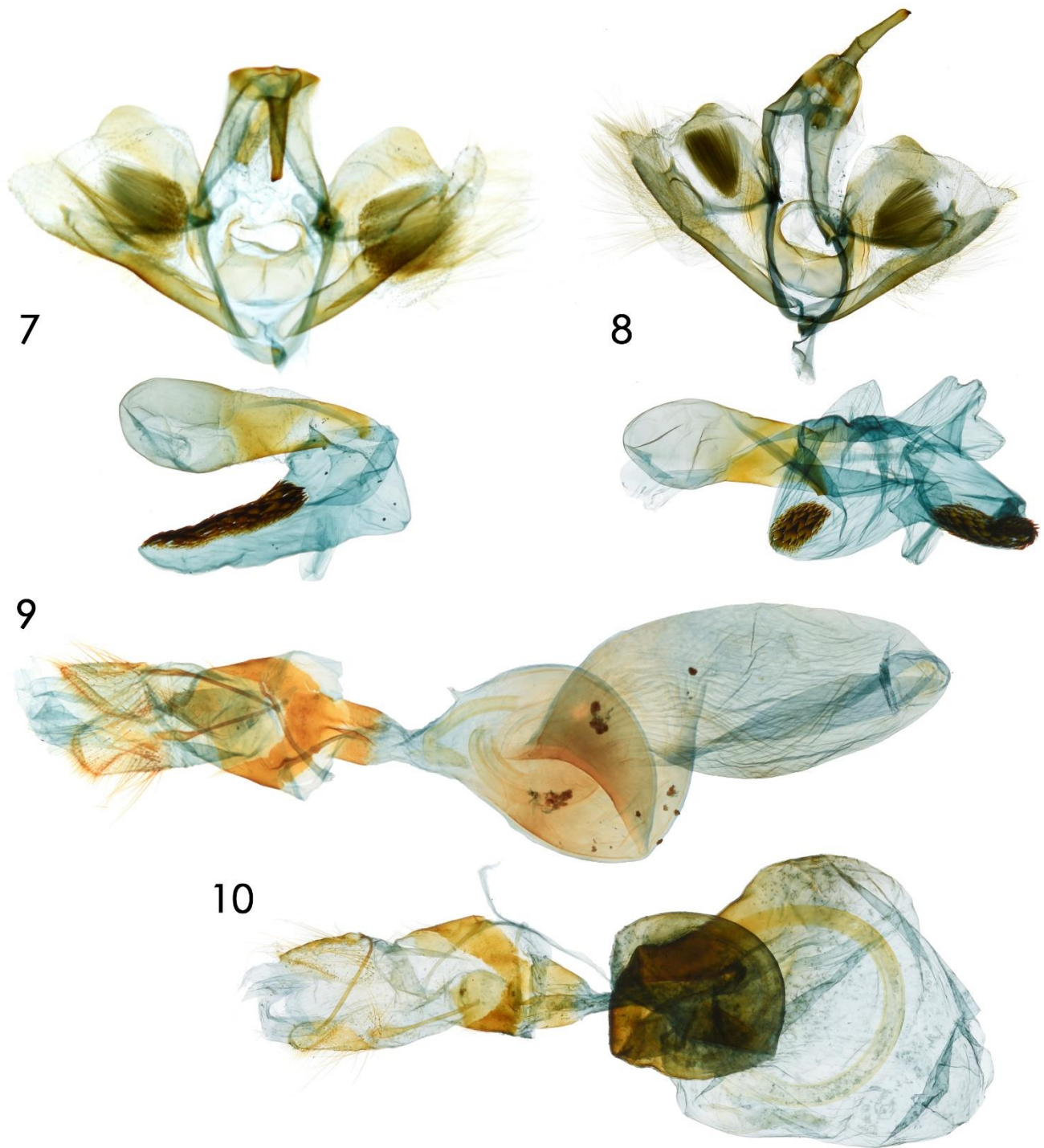


Figure 7–10. Genitalia of *Erebus* species. 7. *E. crepuscularis* (Linnaeus, 1758), Lanyu, male genitalia (TFRI); 9. Ditto, female genitalia (NMNS); 8. *E. ephesperis* (Hübner, 1827), Taiwan (TFRI); 10. Ditto, female genitalia (TFRI). Deposition of specimens: TFRI (7, 9, 10), NMNS (8). Photo by Shipher Wu.

#### Discussion

The moth faunas of Lanyu and Green Island were earlier investigated by Yang (2000) and Fu & Hsu (2009), respectively. The recent taxonomic reviews, i.e., Sato et al. (2011), Owada & Fu (2020), Owada (2021), revealed the identifications of species distributed in these two islands can be re-evaluated since some species are externally similar to those on the adjacent islands, i.e., Taiwan, Okinawa Islands and the Philippines were misidentified, as the situation reported in the present study. The study of the faunistic differences and causes of the moths on both sides of the so-called “New Wallace Line (Kano, 1941)” will depend on more systematic and solid taxonomic studies in the future.

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**目裳蛾 (*Erebus crepuscularis* (Linnaeus, 1758)) 在蘭嶼與綠島的首次紀錄 (鱗翅目：裳蛾科：裳蛾亞科)**

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**摘要：**蘭嶼與綠島產目裳蛾屬 (*Erebus* Latreille, 1810) 族群於本研究證實為新紀錄種目裳蛾 (*E. crepuscularis* (Linnaeus, 1758))。其雌雄標本與生殖器圖示，並與東方區廣布種 (*E. ephesperis* (Hübner, 1827)) 作比較。

**關鍵詞：**生物相、華萊士線、東方區、菝葜屬 (*Smilax*)、菝葜科 (Smilacaceae)