

# New records of five species of Lepidoptera (Cosmopterigidae, Tortricidae, Pyralidae and Erebidae) from sand-dunes along the western coastline of Korea

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Three localities of coastal sand-dunes along the western coastline of Korea: Sindu-ri, Sinhap-ri, and Jaeun-do, were surveyed for the lepidopteran fauna. This survey resulted in the records of five species new to Korea: a species of Cosmopterigidae, *Cosmopterix flavidella* Kuroko, 2011, based on eight specimens from Sinhap-ri and Jaeun-do; a species of Tortricidae, *Noduliferola abstrusa* Kuznetzov, 1973, based on five specimens from Sinhap-ri and Jaeun-do; a species of Pyralidae, *Maliarpha borealis* Sasaki, 2012, based on four specimens from Sindu-ri; and two species of Erebidae, *Ectoblemma rosella* Sugi, 1982 and *Metachrostis miasma* (Hampson, 1891), based on one specimen for each from Jaeun-do. Three genera, *Noduliferola* Kuznetzov, 1973, *Maliarpha* Ragonot, 1888 and *Ectoblemma* Sugi, 1982, are introduced for the first time to the Korean fauna. Two species, *Noduliferola abstrusa* and *Maliarpha borealis*, are suggested as the indicator species for coastal sand-dunes. The superficial and genital features of the five species found from this study are described and illustrated. A photograph of the female genitalia of *Ectoblemma rosella* is provided for the first time.

Keywords: coastal sand-dunes, Cosmopterigidae, Erebidae, new records, Pyralidae, Tortricidae

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## INTRODUCTION

Coastal dunes are one of the landscapes in ocean sandy beaches, formed above the high water mark (Maun, 2009). They are featured by the impact of the maritime system resulting in unique climate and ecosystems (McLachlan and Brown, 2006). Geographic characteristics of the Korean Peninsula include extensive coastlines that house numerous coastal sand-dunes. For example, in the western coastline alone, about 60 sites of coastal dunes are known (Woo, 2001). The areas are popular for leisure activities and thus under high pressure of development. Woo (2001) pointed out the necessity of restoration for coastal dunes in Korea, as most of those are already damaged or destroyed. For designing the restoration program, the biotas of the coastal sand-dunes need to be critically scrutinized, but remain poorly-studied. The situation is even worse for nocturnal lepidopterans, since only fragmentary studies have been conducted from a few coastal dunes such as Sindu, Woncheong, Sohwang and Jangsin (Nam and Cho, 2003; Sohn *et al.*,

2009).

The present author has investigated the lepidoptera fauna of the coastal sand-dunes along the western coastlines of Korea since 2003. The inventories revealed three genera and five species of Lepidoptera new to Korea. The aims of this article are to report those faunistic novelties and discuss their potential to serve as the habitat indicators for coastal dunes.

## MATERIALS AND METHODS

Moth specimens were obtained from my field works on the sand-dunes in Sindu-ri, Taeon (three rounds: June 3<sup>rd</sup>, 2003; September 21<sup>st</sup>, 2004; September 1<sup>st</sup>, 2005), the island Jaeundo, Sinan (one round: July 16<sup>th</sup>, 2017), and Sinhap-ri, Seocheon (two rounds: June 20<sup>th</sup>, 2020; August 20<sup>th</sup>, 2020). Adult moths were captured by two types of light traps: a white screen with a black light (DC 12V, 15W: BioQuip Products) and the Universal Light Traps (BioQuip Products).

Pinned specimens were examined using a stereoscope (Olympus SZX7, Olympus ©). After examination, they were deposited in two insect collections: the Gongju National University of Education (GJUE) and the National Institute of Biological Resources (NIBR). Slide specimens of genitalia were prepared following Clarke (1941) with some modifications. In the specimen data, the "GSN" in brackets indicate the serial number of genitalia slide. Terms for genitalia follow Klots (1970). Plant names follow an online database, "The Plant List" ([www.theplantlist.org](http://www.theplantlist.org)).

## TAXONOMIC ACCOUNTS

Family Cosmopterigidae Heinemann et Wocke, 1876

### *Cosmopterix flavidella* Kuroko, 2011

남방창날개뿔나방 (Figs. 1A, 2C)

*Cosmopterix flavidella* Kuroko, 2011: 107. Type locality: Japan, Kyushu, Iriomote Isl., Uehara.

**Description** (Fig. 1A). Head with vertex dark grayish brown, with white streaks medially and laterally; labial palpus dark brown dorsally, white ventrally; antenna as long as forewing, pale grayish brown, partly intermixed with dark-brown scales. Thorax with tegula dark grayish brown, with white streaks laterally; mesonotum dark grayish brown, with white streak medially. Forewing length 3.4–5.1 mm, dark grayish brown, with two short and three long, transverse, white streaks in basal 2/3; discal spot small, black; distal 1/3 pale orange with two silvery-white longitudinal fasciae medially and along posterior margin; terminal line transverse, white; cilia pale grayish brown. Hindwing and cilia pale grayish brown. Male genitalia (Fig. 2C) with right arm of uncus elongate, dilated in shoe-shape apically; anellus lobe narrow in basal half, broad, falcate and setose in distal half; valva broadened to apex, short-setose; costa up-curved in distal 1/3; phallus stout, broadened to base, open dorsally.

**Material examined.** 6♂, Chungcheongnam-do, Seocheon-gun, Seo-myeon, Sinhap-ri sand-dunes (N36°08'47.6", E126°32'33.6"), 20 August 2020 (JC Sohn), GJUE & NIBR. 2♂, Jeollanam-do, Sinan-gun, Is. Jaeundo, Jaeun-myeon, Gojang-ri, Oegi sand-dunes (N34°53'44.5", E126°00'27.4"), 16 July 2017 (JC Sohn), [GSN] SJC-1254, GJUE.

**Distribution.** Korea (new record), Japan, Taiwan, China (Jiangxi).

**Host plants.** Poaceae - *Saccharum kanashiroi* (Ohwi) Ohwi (Kuroko, 2011).

**Remarks.** Kuroko (2015) assigned this species to the *coryphaea* species-group in the genus *Cosmopterix*. This

species seems to occur in various types of habitats including sand-dunes.

Family Tortricidae Latreille, 1803

### *Noduliferola abstrusa* Kuznetsov, 1973

순비기애기잎말이나방 (Figs. 1B, 2D, 3A)

*Noduliferola abstrusa* Kuznetsov, 1973: 685. Type locality: China, Kiangsu Prov., Nanjing.

**Description** (Fig. 1B). Head with vertex and frons pale brownish gray; labial palpus pale brownish gray, with scale-tufts on 2<sup>nd</sup> segment; antenna half length of forewing, pale brownish gray. Thorax with tegula and mesonotum purplish gray. Forewing length 4.5–5 mm, protruding apically, pale brownish gray, striolated with dark brown; costa with dark brown strigulae; dark brown oblique bar present between discal area and middle of costa; apical area dark brown; cilia pale brownish gray. Hindwing fuscous; fringe pale brownish gray. Male genitalia (Fig. 2D) with uncus small, triangular; gnathos band like, with lateral arms broadened basally; tegumen converged to uncus; pedunculus with enlarged pocket and long-scale tufts; valva rectangular in basal half, enlarged in distal half, with triangular apex; cucullus setose; distal end of sacculus with a patch of spiniform setae above and long spine on ventral edge; phallus stout, conical, with numerous needle-like cornuti. Female genitalia (Fig. 3A) with papillae anales large, flat, setose; apophysis posterioris shorter than apophysis anterioris; ostium bursae large, subquadrate, surrounded by sclerotized ring, densely spinulate caudally; ductus bursae sclerotized, broadened to corpus bursae, with a pair of keels anteriorly; corpus bursae long-oval, 2× longer than ductus bursae, spinulate, with two horn-shaped signa at caudal 1/3.

**Material examined.** 1♂1♀, Chungcheongnam-do, Seocheon-gun, Seo-myeon, Sinhap-ri sand-dunes (N36°08'47.6", E126°32'33.6"), 16 July 2020 (JC Sohn), [GSN] SJC-1251 (♀), GJUE; 1♂, *ditto*, 20 August 2020 (JC Sohn), [GSN] SJC-1252, GJUE; 2♀, Jeollanam-do, Sinan-gun, Is. Jaeundo, Jaeun-myeon, Gojang-ri, Oegi sand-dunes (N34°53'44.5", E126°00'27.4"), 16 July 2017 (JC Sohn), GJUE & NIBR.

**Distribution.** Korea (new record), Japan, China.

**Host plants.** Verbenaceae - *Vitex trifolia* subsp. *litoralis* Steenis (Nasu *et al.*, 2005).

**Remarks.** The genus *Noduliferola* Kuznetsov, 1973 was established with the type species, *N. abstrusa*. The genus currently comprises nine species occurring in East and Southeast Asia, Australia and Micronesia (Brown, 2005). It is introduced for the first time for the Korean fauna. Given the larval host plants, *N. abstrusa* can play role of a indicator species for coastal dunes.



**Fig. 1.** Adult habitus. A. *Cosmopterix flavidella* Kuroko, 2011, male. B. *Noduliferola abstrusa* Kuznetsov, 1973, female. C. *Maliarpha borealis* Sasaki, 2012, male. D. *Ectoblemma rosella* Sugi, 1982, female. E. *Metachrostis miasma* (Hampson, 1891), male. Scale bars = 4 mm.

Family Pyralidae Latreille, 1809

***Maliarpha borealis* Sasaki, 2012**

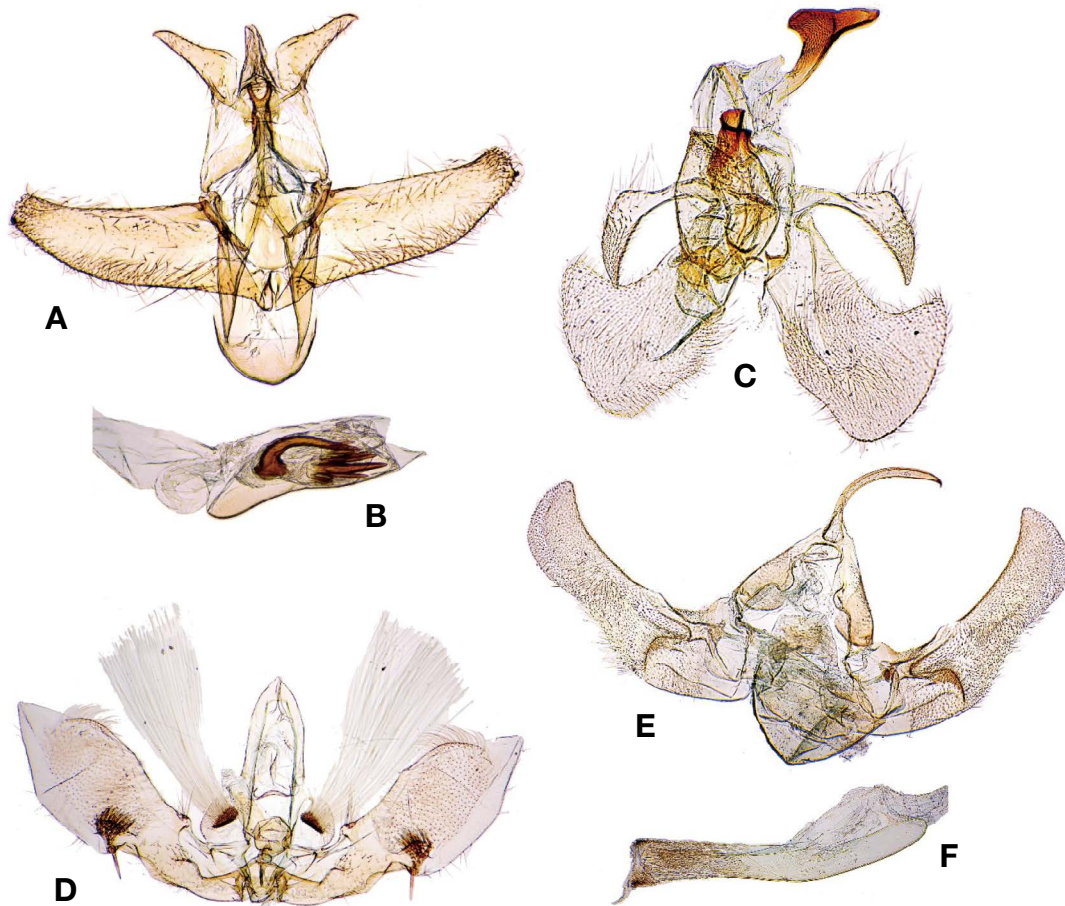
모래새알락명나방 (Figs. 1C, 2A, 2B, 3B)

*Maliarpha borealis* Sasaki, 2012: 89. Type locality: Japan, Akita Pref., Akita City, Wariyama.

**Description** (Fig. 1C). Head with vertex pale brown, intermixed with white scales posteromedially; frons dark brownish gray; labial palpus pale brownish gray, tinged with white ventrally and mesally; antenna 3/4 as long as forewing, pale brownish gray. Thorax with tegula and mesonotum pale brown. Forewing length 8.1–9.2 mm, gradually broadened to termen, pale brown, intermixed with white and dark brown scales on radial, terminal and dorsal areas; discal spot present at lower angle of discal cell, black; fringe pale gray. Hindwing pale gray, lustrous; fringe pale gray. Male genitalia (Fig. 2A, B) with uncus rectangular, concave posteriorly; tuba

anales protruding beyond uncus, narrowed distally; socius elongate-triangular, claw-shaped apically, sparsely setose; gnathos bifid apically; tagumen trapezoidal; valva elongate, narrowed to apex; costa nearly straight in basal 5/6; saccular margin broadly round; sacculus long-setose, with dentiform process at distal end; apical area lobate, densely setose; phallus short with one large, strongly-curved spiniform cornutus and eight straight, spiniform cornuti in various length. Female genitalia (Fig. 3B) with papillae anales subtriangular, densely setose; apophyses anteriores as long as apophyses posteriores; ostium bursae small; ductus bursae greatly dilated in posterior 2/3, with sclerotized areas internally; corpus bursae as long as ductus bursae, blobular; signum absent.

**Material examined.** 1♂2♀, Chungcheongnam-do, Tean-gun, Wonbug-myeon, Sindu-ri sand-dunes, 3 June 2003 (JC Sohn), GJUE & NIBR; 1♀, ditto, 1 September 2005 (JC Sohn), [GSN] SJC-457, GJUE.



**Fig. 2.** Male genitalia. A, B. *Maliarpha borealis* Sasaki, 2012 (A: genital capsule, B: phallus). C. *Cosmopterix flavidella* Kuroko, 2011. D. *Noduliferola abstrusa* Kuznetsov, 1973. E, F. *Metachrostis miasma* (Hampson, 1891) (E: genital capsule, F: phallus).

**Distribution.** Korea (new record), Japan.

**Host plants.** Unknown.

**Remarks.** Sasaki (2012) hinted the association of this species with coastal sand-dunes. The present data corroborates his proposal. The genus *Maliarpha* Ragonot, 1888 is reported for the first time from Korea. It currently comprises eight species occurring in East Asia, India, Papua New Guinea, and Ethiopian regions.

Family Erebidae Leach, 1815

***Ectoblemma rosella* Sugi, 1982**

땅꼬마짚름나방 (Figs. 1D, 3C)

*Ectoblemma rosella* Sugi, 1982: 803. Type locality: Japan, Shizuoka Pref., Iwata.

**Description** (Fig. 1D). Head with vertex grayish pink, intermixed with pale brown scales; frons dark brownish gray; labial palpus pale yellowish gray, intermixed with fuscous scales; antenna 1/2 as long as forewing, pale yellowish gray. Thorax with tegula and mesonotum

dark pink, intermixed with pale brown scales. Forewing length 4.2 mm, triangular, angulate at middle of termen, grayish pink, intermixed with pale brown and dark brown scales; antemedian and postmedian lines dark brown, curved at anterior 1/3; subterminal area with dark brown irrorations; terminal dashes dark brown; fringe grayish pink in basal half, pale orange in distal half, intermixed with dark brown scales. Hindwing concolorous with forewing, angulate at anterior 1/5; antemedian dash dark brown; postmedian line curved at anterior 1/4, dark brown; subterminal line pale pink; terminal dashes dark brown; fringe grayish pink, intermixed with dark brown scales. Female genitalia (Fig. 3C) with papillae anales subrectangular, setose; apophyses posteriors 1.3 × longer than apophyses anteriores; ductus bursae gradually broadened to corpus bursae, scobinate in caudal 1/3, dilated at connection with ductus seminalis; corpus bursae small, globular; signum absent.

**Material examined.** 1 ♀, Jeollanam-do, Sinan-gun, Is. Jaundo, Jaeun-myeon, Gojang-ri, Oegi sand-dunes (N34°53'44.5", E126°00'27.4"), 16 July 2017 (JC Sohn),



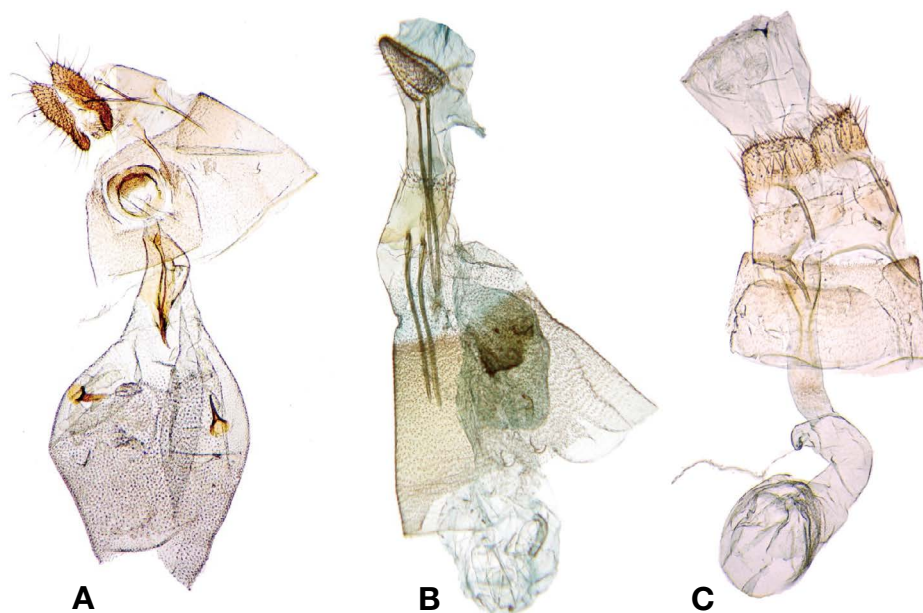


Fig. 3. Female genitalia. A. *Noduliferola abstrusa* Kuznetsov, 1973. B. *Maliarpha borealis* Sasaki, 2012. C. *Ectoblemma rosella* Sugi, 1982.

[GSN] SJC-1301, NIBR.

**Distribution.** Korea (new record), Japan, India.

**Host plants.** Unknown.

**Remarks.** The online collecting data of this species in Japan suggest that it occurs in various types of habitats including coastal dunes. The monotypic genus *Ectoblemma* Sugi, 1982 is reported for the first time from Korea.

***Metachrostis miasma* (Hampson, 1891)**

나도몽뚝날개짤름나방 (Figs. 1E, 2E, 2F)

*Erastria miasma* Hampson, 1891: 12, 73. Type locality:

India, Tamil Nadu, Nilgiris.

*Metachrostis miasma*; Hampson, 1894: 325; Kononenko et Matov, 2009: 13.

*Eublemma miasma*; Hampson, 1910: 101; Yoshimoto, 1999: 28.

*Leptosia miasma*; Warren in Seitz, 1911: 260.

*Trilophonota tegulata* Wileman et West, 1929: 14. Type locality: Philippines, Luzon, Klondyke.

**Description** (Fig. 1E). Head with vertex and frons dark brownish gray, speckled with pale brownish gray; labial palpus brownish gray, speckled with pale brownish gray, tinged with dark purplish brown on terminal 1/3, brownish white mesally; antenna 1/2 as long as forewing, purplish brown. Thorax with tegula and mesonotum dark purplish brown. Forewing length 7.3 mm, triangular, broadly round tornally pale purplish gray; subbasal area irrorated with dark brown; antemedian line dark brown, narrow, sinuous; median line dark brown, broadened

posteriorly; postmedian line dark brown, with narrow branch at costal 1/3; subterminal and terminal line black, narrow, undulate; cilia pale purplish gray, speckled with dark brown. Hindwing grayish brown; tornal area mottled with dark brown; subterminal line present only on posterior 1/4, black; terminal line black, narrow, undulate; cilia pale purplish gray, speckled with dark brown. Male genitalia (Fig. 2E, F) with uncus elongate, curved, with hooked tip; tegumen triangular; gnathos as a pair of lobes; valva elongate, broadened in basal half, protruding dorsad at apex, setose; costa curved, with bulge at basal 1/3; clasper as subtriangular, setose bulge; sacculus broadly round; vinculum subtriangular. Phallus slightly broadened in distal half, curved at middle, with spinulate cornutal zone 1/3 as long as phallus.

**Material examined.** 1♂, Jeollanam-do, Sinan-gun, Is. Jaeundo, Jaeun-myeon, Gojang-ri, Oegi sand-dunes (N34° 53'44.5", E126°00'27.4"), 16 July 2017 (JC Sohn), [GSN] SJC-1255, NIBR.

**Distribution.** Korea (new record), Japan, China, Philippines, Indonesia, New Caledonia, Papua New Guinea (St. Matthias Isl.), Australia.

**Host plants.** Unknown.

**Remarks.** This species differs from another congener, *M. sinevi* Matov et Kononenko, 2009, known from Korea (Sohn and Cho, 2014), in having the darker ground coloration, a narrower valva with a bulge on costa, and a narrower coecum. Given the collecting records from various countries, the habitats of this species seem to be not restricted to the coastal sand-dunes.

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