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Original article

First report on two species of genus *Monopis* (Lepidoptera, Tineidae) collected by feather trap in KoreaDong-June Lee<sup>a</sup>, Young-Don Ju<sup>a</sup>, Ulzijjargal Bayarsaikhan<sup>a</sup>, Bo-Sun Park<sup>a</sup>, Sol-Moon Na<sup>a</sup>, Jae-Won Kim<sup>a</sup>, Bong-Woo Lee<sup>b</sup>, Yang-Seop Bae<sup>a,c,\*</sup><sup>a</sup> Division of Life Science, Incheon National University, Incheon, 22012, South Korea<sup>b</sup> Korea National Arboretum, Pocheon, Gyeonggi Province, 11186, South Korea<sup>c</sup> Bio-Resource and Environmental Center, College of Life Sciences and Bioengineering, Incheon National University, Incheon, 22012, South Korea

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## ABSTRACT

Two species of tined moths, *Monopis longella* (Walker, 1863) and *Monopis congestella* (Walker, 1864) were collected using artificial feather traps in Korea, with *M. congestella* reported for the first time from Korea. This is the first report of the use of feather traps to collect moths in Korea, and the biological information regarding *M. longella* and *M. congestella* are presented for the first time in Korea. The adults are briefly described and illustrated, including the male and female genitalia.

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## Introduction

Many species of the subfamily Tineinae, such as *Tinea*, *Niditinea*, and *Monopis*, have been reported in bird nests, feces, and wool products. The larvae of these moths feed on keratin and chitin sources, such as feathers, fur, pellets, arthropod remains, guano, and wool (Robinson 1988; Robinson & Nielsen 1993). The genus *Monopis* Hübner is characterized as having a forewing with a characteristic subhyaline spot in the discoidal cell and M<sub>3</sub> stalked with CuA<sub>1</sub>, rod-shaped saccus, and the inner surface of valva with a dense patch of setae in the male genitalia. The genus currently comprises approximately 100 named species, which are widespread and diverse throughout the Old World, but poorly represented in the New World (Robinson & Nielsen 1993). There are 36 species in the Palaearctic and Oriental regions (Xiao & Li 2006), five of which were reported to occur in Korea (Park et al 2012; Byun et al 2014).

In this study, two species of tined moths, *Monopis longella* (Walker, 1863) and *Monopis congestella* (Walker, 1864), were collected using artificial feather traps in Korea, with *Monopis*

*congestella* (Walker, 1864) reported for the first time from Korea. This is also the first report of collecting moths by feather trap in Korea. Additionally, biological information regarding *M. longella* and *M. congestella* are presented for the first time in Korea. The adults are briefly described and illustrated, including male and female genitalia.

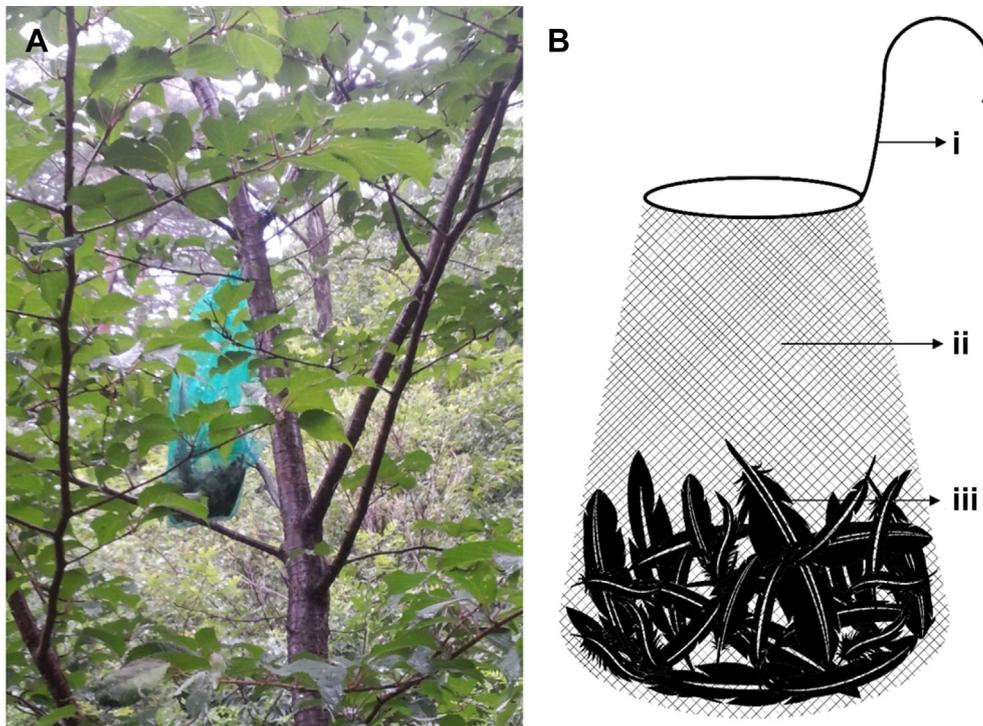
## Materials and methods

The feather traps containing feathers, pellets, and feces of a raptorial bird were used to attract moths to a trap (Figure 1). We set two feather traps at each of two locations: Mount Cheonchuk in Gyeongsangbuk-do, and Mount Gyeyang in Incheon-si. Each trap was set in a tree at a height of approximately 3 m from July 2014 to September 2014. The feather traps were constructed from a polyethylene net (diam. 10 cm × 50 cm) and coated wire (diam. 3 mm), and contained 200–300 g of feathers, pellets, and feces of a raptorial bird in each trap. After being retrieved from the field, feathers and pellets from the traps were separated from detritus, and identified moth larvae were reared in a rearing cage. Images of adults and genitalia were taken using a Cannon EOS 50D digital camera attached to a Cannon EF 100 mm F2.8 Macro USM lens (Canon, Inc., Tokyo, Japan) and a Leica DM 2500 microscope (Leica, Wetzlar, Germany). Voucher specimens were deposited in the

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**Figure 1.** Feather trap. A, set feather trap; B, schematic of feather trap: i, coated wire (diam. 3 mm); ii, polyethylene net (diam. 10 cm × 50 cm); iii, 200–300 g feathers, pellets, and feces of a raptorial bird.

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### Systematic accounts

Family Tineidae Latreille, 1810  
 Subfamily Tineinae Latreille, 1810  
 Genus *Monopis* Hübner, 1825

#### *Monopis longella* (Walker, 1863) 점흰무늬좁나방(신칭)

*Tinea longella* Walker, 1863: 479. Type locality: India.  
*Monopis pseudagyrtia* Meyrick, 1919: 240. Type locality: India.  
*Monopis pavlovskii* Zagulajev, 1955: 282. Type locality: USSR.  
*Monopis longella* Huang et al 2011: 1–14.

**Adult** (Figures 2A and 2B). Wingspan 12–16 mm in male, 15–18 mm in female. Head creamy white with erect scales on vertex and frons. Labial palpus outer side dark brown, inner side of second segment yellowish brown with apex creamy white. Antenna filiform; scape dark brown with yellowish white scales, each segment dark brown in basal half, light brown in distal half. Maxillary palpus yellowish brown. Thorax anterior and posterior end dark brown; tegula yellowish white. Forewing approximately 2.8–3.0 times as long as wide including fringe (about 3.1–3.3 times as long as wide excluding fringe); ground color dark brown, a large rectangular oblique white marking at costa from basal 1/3 to 4/5, which includes dark brown macula along costa from 3/5 to 4/5; fringe short. Hindwing 2.1–2.2 times as long as wide including fringe, 2.5–2.7 times as long as wide excluding fringe; ground color light gray.

**Male genitalia** (Figures 3A and 3B). Male genitalia similar to Korean species of *Tinea*. Saccus slender, elongate, about 2.3 times as long as length of valva. Uncus with wide base and pointed at tip, arms of gnathos with in two pointed tips at top. Valva elongate and broad, about 3.0 times as long as width, with few setae directed towards base. Aedeagus rather long, approximately 2.1 times as long as length of valva.

**Female genitalia** (Figures 4A and 4B). Ovipositor short with papillae anales setae. Bursae copulatrix approximately 2.2 times as long as length of apophyses anteriores. Apophyses posteriores approximately 1.3 times as long as length of apophyses anteriores. Ductus bursae with numerous wrinkles. Corpus bursae with five to six thorn like signa.

**Material examined.** 13 ♂, 9 ♀, Mount Cheonchuk, Uljin-gun, Gyeongsangbuk-do, 28 VII 2014 (Y. S. Bae, Y. D. Ju, S. M. Na, D. J. Lee & Y. G. Lee); 1 ♂, 5 ♀, Mount Gyesan, Gyesan-dong, Incheon-si, 20 IX 2014 (Y. S. Bae et al), gen. slide no. UIB-5505, UIB-5507.

**Distribution.** Korea, Japan, China, Russia (Far East), Thailand, Malaysia, Philippines, India.

**Biology.** The larvae feed on keratin sources (feather, fur, and pellets) used in feather traps.

**Remarks.** Twenty-two moths emerged from the feather trap placed at Mount Cheonchuk from June 22, 2014 to July 28, 2014, and six moths emerged from the feather trap placed at Mount Gyeongang from August 24, 2014 to September 20, 2014. This species was recorded from Korea as *Monopis pavlovskii* Zagulajev, 1955, by Ponomarenko and Park (1996b), after synonymized to *Monopis longella* (Walker 1863) by Huang (2011).

#### *Monopis congestella* (Walker, 1864) 무더기좁나방(신칭)

*Rhitha congestella* Walker, 1864. Type locality: Sarawak.  
*Monopis congestella* Robinson, 1988.

**Adult.** (Figures 2C and 2D). Wingspan 12–15 mm in male, 14–18 mm in female. Head creamy white erect scales on vertex and frons. Labial palpus creamy white with blackish brown scales in outer side second segment. Antenna filiform; scape brown with yellowish white, each segment dark brown in basal half, light brown in distal half. Maxillary palpus yellowish brown scales. Thorax dark brown. Forewing approximately 2.6–2.8 times as long as including fringe (about 3.1–3.2 times as long as excluding fringe), ground color dark brown, with three creamy white markings, large rounded marking at costa from basal 1/2 to 2/3, the other large rectangular marking at

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