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Short communication

Two New Records of *Scopula* (Lepidoptera: Geometridae) from Korea

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ABSTRACT

Two species of *Scopula*, *S. asthena* Inoue, 1943 and *S. tenuisocius* Inoue, 1942, were newly recorded from Korea. *Scopula asthena* can be distinguished by the bipectinate male antennae and whitish wings with four blackish dots on each wing. This species is similar to *S. superior* (Butler, 1878) but differs in the large blackish discal dots on both wings. *Scopula tenuisocius* can be distinguished by its whitish forewing with light grayish, dentate antemedial line, short-line shaped discal dot and line light grayish, weakly rounded, dentate postmedial line, and whitish hindwing with a blackish discal dot and light grayish, undulating medial lines. *Scopula tenuisocius* is similar to *S. floslactata* (Haworth, 1809) but the species can be distinguished by the thinner and blackish subterminal line of the forewing that appears minutely dentate along the line. To date, 41 species of the genus *Scopula* are known in Korea.

Keywords: Geometridae, Sterrhinae, *Scopula*, Korea

INTRODUCTION

The genus *Scopula* Schrank consists of small and medium-sized geometrid moths in the subfamily Sterrhinae. Worldwide, there are 800 species of the genus, and 39 species in Korea (Scoble, 1999; Choi and Kim, 2016; Choi et al., 2020). This paper reports two additional records of *Scopula* in Korea.

All collected adults were preserved in a freezer and mounted for examination. For slide preparation of male and female genitalia, each specimen was prepared by boiling the abdomen in 10% KOH for approximately 20 min. The scales and tissues were removed, stained with Chlorazol black, and mounted on slides in a Euparal solution.

The terminology of the adult, including the male and female genitalia, refers to Hausmann (2001). The distance from the tip of the left forewing to the right forewing was used for wingspan measurements. The materials were deposited in the Collection of Insects of the Department of Environmental Education, Mokpo National University, and Yangpyeong Insect Museum. Abbreviations used in the paper were as follows: TL, type locality; GG, Gyeonggi-do; JN, Jeollanam-do.

SYSTEMATIC ACCOUNTS

Order Lepidoptera Linnaeus, 1758
Family Geometridae Leach, 1815
Subfamily Sterrhinae Meyrick, 1892
Genus *Scopula* Schrank, 1802

[1]**Scopula asthena* Inoue, 1943 (Fig. 1A)

Scopula asthena Inoue, 1943: 3. TL. Japan: Honshu, Takao-san.

Material examined. 1 male, Korea: JN: Gurye, Mt. Jirisan National Park, 35°17′31″N, 127°29′39′E, 660 m above sea level, 8 Jun 2019, Choi SW.

Diagnosis. Wingspan 18 mm. Male antennae bipectinate; frons broad and covered with whitish scales; labial palpi moderate in length, approximately 1.5 times the eye diameter, slightly projected beyond the frons. Body whitish. Hind tibia with long whitish sexual tufts. Forewing whitish; discal dot distinct, blackish; antemedial, postmedial, and subterminal lines parallel, light grayish, undulating. Hindwing whitish, discal dot

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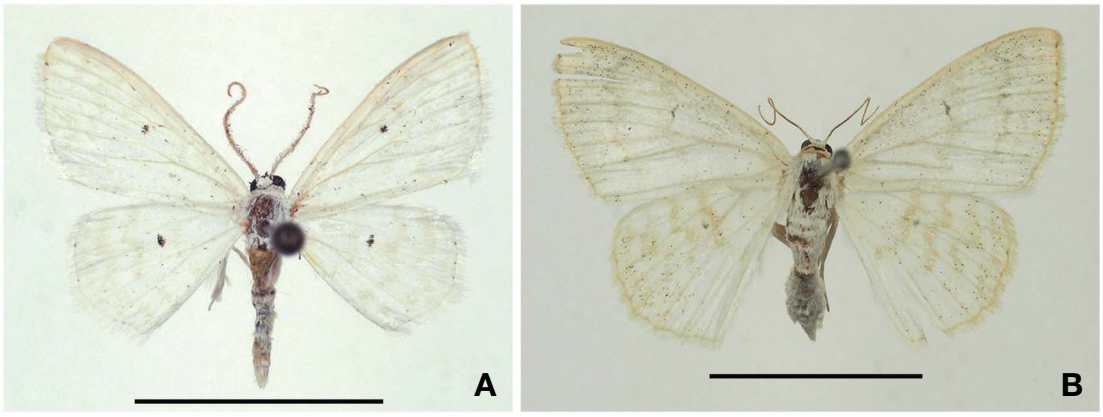

Fig. 1. Adults of *Scopula* in Korea. A, *S. asthena*; B, *S. tenuisocius*. Scale bars: A, B = 10 mm.

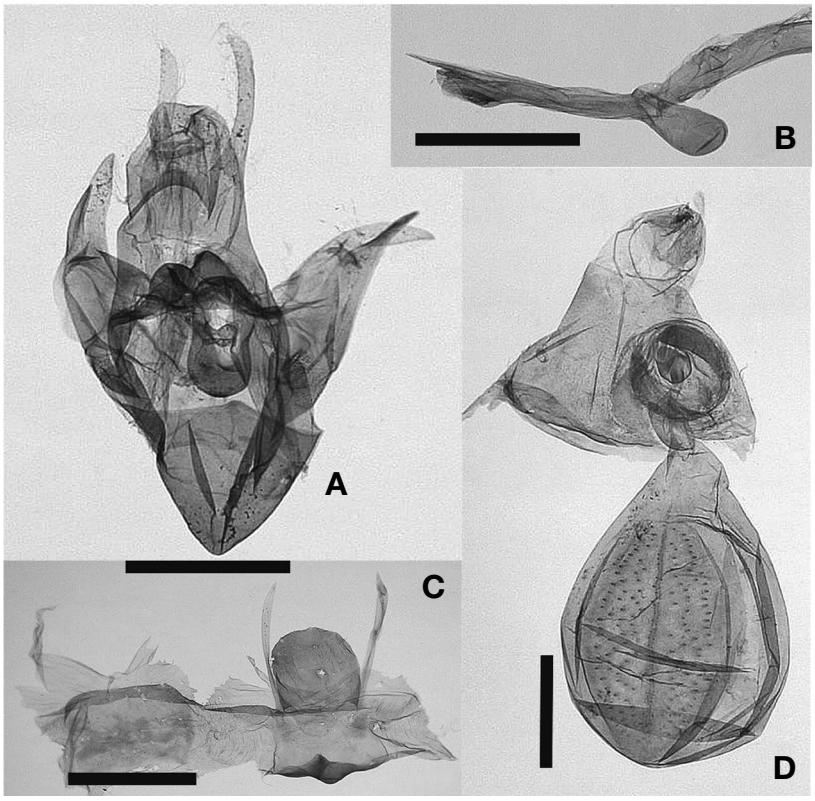

Fig. 2. Male and female genitalia of *Scopula* in Korea. A, Male genital capsule; B, Aedeagus; C, Eighth abdomen; D, Female genitalia. A–C, *S. asthena*; D, *S. tenuisocius*. Scale bars: A–D = 0.5 mm.

blackish, antemedial, postmedial and subterminal lines parallel, light grayish, strongly undulating. Abdomen whitish. Eighth sternite large rounded plate-shaped mappa with almost symmetrical long, slender cerata, approximately twice the length of the mappa (Fig. 2C). Male genitalia (Fig. 2A, B). Uncus absent; socii long digitate, almost half the length of the tegumen; transtilla with a pair of swollen rounded process-shaped; juxta tongue-shaped; saccus long, triangular. Valva stout, triangular, distally bifurcated with a membranous, tapered fibula and a sharply sclerotized spinular valvula. Aedeagus rod-shaped with a sharply pointed process in proximal part; cornutus absent.

Distribution. Korea, Japan.

Remarks. *Scopula asthena* is similar to *S. superior* (Butler,

1878) in the shape of the medial lines of the fore- and hindwings, but can be distinguished by the large blackish discal dots on both wings. The male genitalia of *S. asthena* are similar to those of *S. superior* but can be distinguished by the straight socii and the sharp valvular of the valva.

[1]***Scopula tenuisocius* Inoue, 1942 (Fig. 1B)**

Scopula tenuisocius Inoue, 1942: 9. TL. Japan: Nagano Prefecture, Karuizawa.

Material examined. 1 female, Korea: GG: Yangpyeong, 15 Jun 2004, Shin YH.

Diagnosis. Wingspan 25 mm. Antennae filiform in female; frons dark ochreous; labial palpi moderate in length, approximately 1.5 times of eye diameter, dorsally covered with dark ochreous scales. Forewing whitish; antemedial line light grayish, dentate, weakly slanted, discal dot short-line shaped, blackish; postmedial line light grayish, weakly rounded, dentate, costally projected, subtermen tinged with light black scales. Hindwing whitish, discal dot blackish; antemedial, postmedial, and subterminal lines parallel, light grayish, undulating; termen with light grayish line. Female genitalia (Fig. 2D). Papilla anales simple, rounded; posterior apophyses the same length as the anterior apophyses; sterigmata well developed with a thick rounded plate; ductus bursae short; corpus bursae large ovate, with one transverse line and approximately six undulating lines of spicules that form a large oval-shaped plate.

Distribution. Korea, Japan.

Remarks. *Scopula tenuisocius* is similar to *S. floslactata* (Haworth, 1809) in the shape of medial lines of fore- and hindwings, but can be distinguished by the thinner and blackish subterminal line of the forewing that shows minutely dentate along the line. The female genitalia of *S. tenuisocius* are similar to those of *S. floslactata* but can be distinguished by the short ductus bursae and the large ovate corpus bursae with a large plate-shaped signa patch. The larvae of *S. tenuisocius* feed on various plant species including *Polygonum thunbergii* in Japan (Kaneko, 2011).

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CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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