

First report of Harmacloninae (Lepidoptera, Tineidae) in Korea

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Previously, 33 species, 18 genera, eight subfamilies of the family Tineidae were reported in Korea. In this study detail a new record to Korea, species, *Micrerethista denticulata* Davis, 1998 in the subfamily Harmacloninae in Korea. This species is the most widespread species of the genus in southern Asia, ranging from Thailand through Indonesia to southern Japan but absent from New Guinea. Globally, Harmacloninae Davis, 1998 includes 22 species of two genera. The subfamily can be distinguished from the other Tineidae subfamilies by an additional wing locking mechanism, loss of pretarsal arolium and pseudempodial seta, tympanic organ in abdominal sternum II, enlargement of sternal apophyses, and aedeagus with basal midventral keel in male genitalia. The morphological characteristics of this subfamily and species are described, and illustrations of examined species and the key characters for each subfamilies of the family Tineidae from Korea are provided.

Keywords: genitalia, Harmacloninae, key characters, *Micrerethista*, new record, wing venation

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INTRODUCTION

The subfamily Harmacloninae Davis, 1998, belonging to the family Tineidae, globally includes 22 species in two genera (Davis, 1998). The subfamily Harmacloninae has often been treated as the family Arrhenophanidae (Fletcher, 1929; Bradly, 1951) and Harmaclonidae (Davis, 1988) or as a subfamily Myrmecozelinae of Tineidae (Busck, 1914; Robinson and Nielsen, 1993). Recently, it has been treated as subfamily Harmacloninae belonging to the family Tineidae by Davis (1998).

Harmacloninae is best defined by the combination of the following unique characters (Davis, 1998): (1) an additional wing-locking mechanism, (2) loss of pretarsal arolium and pseudempodial seta, (3) tympanic organ in abdominal sternum II, (4) enlargement of sternal apophyses, and (5) aedeagus with basal midventral keel.

The genus *Micrerethista* Meyrick, 1938, currently comprises 11 named species, which are widespread and diverse throughout the Australian and Oriental regions.

Although the tineid fauna of Korea remains poorly known, considerable progress has been made over that last 12 years (Kim and Bae, 2007; Sohn, 2007; Byun *et al.*, 2014). Lee *et al.* (2016; 2017a; 2017b; 2018) enumer-

ated 33 species, 18 genera, of eight subfamilies. In this study, we dealt with an additional subfamily Harmacloninae, newly recorded in Korea, with the species *Micrerethista denticulata* Davis, 1998. This species is the most widespread species of the genus in southern Asia, ranging from Thailand through Indonesia to southern Japan, but absent from New Guinea (Davis, 1998).

MATERIALS AND METHODS

The specimens were collected using light traps with a mercury vapor lamp (220V/200W; Dongseong Co., Korea) and four black light lamps (FL20SbL; Kumho Co., Korea). Genitalia were dissected and examined under a Leica EZ4 stereo microscope (Leica, Wetzlar, Germany). Images of adults were taken using a Cannon EOS 50D digital camera attached to a Cannon EF 100 mm F2.8 Macro USM lens (Cannon, Inc., Tokyo, Japan). Images of genitalia were taken using a Leica DM2500 stereo microscope attached to a Leica ICC50 E (Leica, Wetzlar, Germany). Voucher specimens are deposited in the Bio-Resource and Environmental Center, Incheon National University, Korea.

TAXONOMIC ACCOUNTS

Key to the Korean subfamilies of Tineidae based on male genitalia

- 1. Gnathos absent 2
- Gnathos present 3
- 2. Juxta fused with inner faces of valvae
..... Teichobiinae Heinemann, 1870
- Juxta not fused with inner face of valvae
..... Scardiinae Eyer, 1924
- 3. Valva with digitiform processes 4
- Valva without digitiform processes 5
- 4. Apex of uncus articulated
..... Harmacloninae Davis, 1998
- Apex of uncus rounded
..... Nemapogoninae Hinton, 1955
- 5. Saccus elongate and stick shaped 6
- Saccus not elongate and stick shaped 8
- 6. Lobes of uncus fused and forming an articulated hook
..... Tineinae Latreille, 1810
- Lobes of uncus not fused and forming an articulated hook 7
- 7. Uncus with developed spinose lobes
..... Hieroxestinae Meyrick, 1893
- Uncus with not developed spinose lobes
..... Myrmecozelinae Căpușe, 1968
- 8. Valvae fused medially at base
..... Hapsiferinae Zagulyaev, 1968
- Valvae not fused medially at base
..... Erechthiinae Meyrick, 1880

Family Tineidae Latreille, 1810
 Subfamily Harmacloninae Davis, 1998
 Harmacloninae Davis, 1998: 18. Type genus: *Harmaclona* Busck, 1914.

General morphology. Generally, from small to large sized moths. Wings slender, devoid of microtrichia except on subhumeral and subanal regions of forewing; wings with an additional wing-locking mechanism consisting of stiff rows of scales from dorsal edge of forewing and subcostal area of hindwing. Pretarsus with arolium and pseudempodial seta absent. Male with a single, stout frenular bristle; female with 0–4 smaller frenular bristles. Abdomen with a pair of tuberculate plates on sternum II (Fig. 1). Male genitalia with short to elongate saccus; un-



Fig. 1. Paired tympanic organs on SII of *Micrerethista denticulata* Davis, 1998.

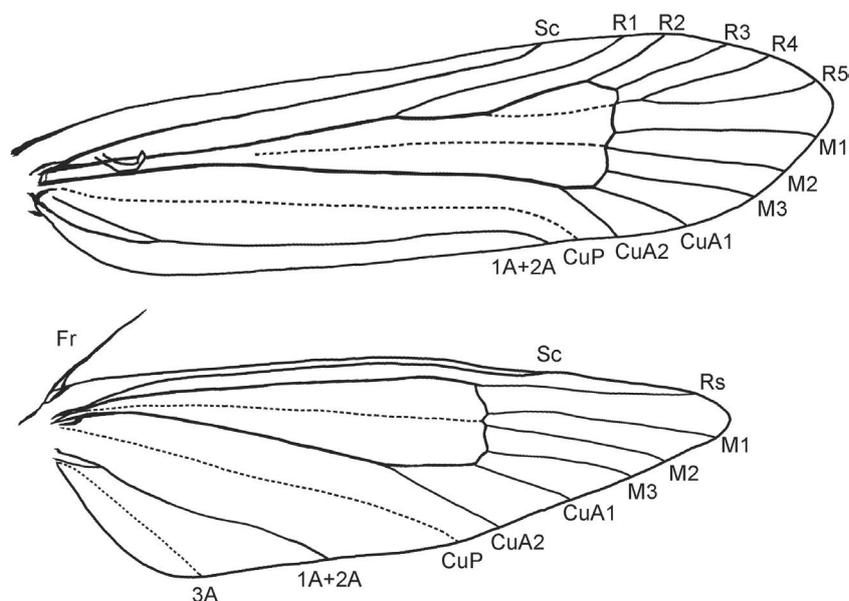


Fig. 2. Wing venation of *Micrerethista denticulata* Davis, 1998, ♂.

cus and tegumen fused, slightly concave; gnathos present (*Micrerethista*) or absent (*Harmaclona*); valva divided into a dorsal cucullar lobe and a ventral saccular lobe; juxta forming a firm, sclerotized tube around aedeagus; aedeagus with a basal midventral keel and without cornuti. Female genitalia elongate, telescoping, with a pair of ventral pseudapophyses within A10; signum present (*Harmaclona*) or absent (*Micrerethista*) (Davis, 1998).

Biology. Life history is very little known for this group. Fletcher (1933) reported on the biology of *Harmaclona tephrantha* (Meyrick, 1916) in India. Larvae of this moth are found from *Buchanania latifolia* Roxburgh (Anacardiaceae). The larval tunnels are to be several inches long, black stained, and free of wood-dust. Prior to pupation the larva closes the tunnel with a thin operculum.

Genus *Micrerethista* Meyrick, 1938

Micrerethista Meyrick, 1938: 527. Type species: *Micrerethista mochlacma* Meyrick, 1938.

Syncopacma Meyrick, 1938: 527. Type species: *Syncopacma capnozona* Meyrick, 1938.

General morphology. Generally, from small to large sized moths. Wings pale gray irrorated with brown and fuscous in most species. Head covered with light gray to gray scales in most species. Forewing and hindwing with base of media simple in discal cell (Fig. 2). Wing venation is usually complete. Male genitalia are characterized by the following characters: vinculum usually abruptly constricted to form slender; saccus slightly short; gnathos divided to partially fused, consisting of paired, slender arms connected by membrane; aedeagus with mid ventral keel present. Female genitalia are characterized by following

characters: ductus bursae usually elongate and exceeding length of anterior apophyses; a slender band of spicules often extending the length of ductus from antrum to corpus bursae; signum absent.

Remarks. Total 11 species of the genus *Micrerethista* are recorded globally: one species from Japan, two species from Indonesia, two species from Thailand, two species from Brunei, two species from New Guinea, four species from Australia, and one species from Central Africa Republic (Davis, 1998).

***Micrerethista denticulata* Davis, 1998**

얼룩머리좁나방 (신칭) (Figs. 1-5)

Micrerethista denticulata Davis, 1998: 29. Type locality: Thailand.

Adult (Figs. 1, 3). Wingspan 12-16 mm in male, 14 mm in female. Head covered white to pale gray, heavily spotted with dark brown to fuscous, subapically banded scales. Antenna flagellum with dorsum entirely covered



Fig. 3. Adult of *Micrerethista denticulata* Davis, 1998, ♂.

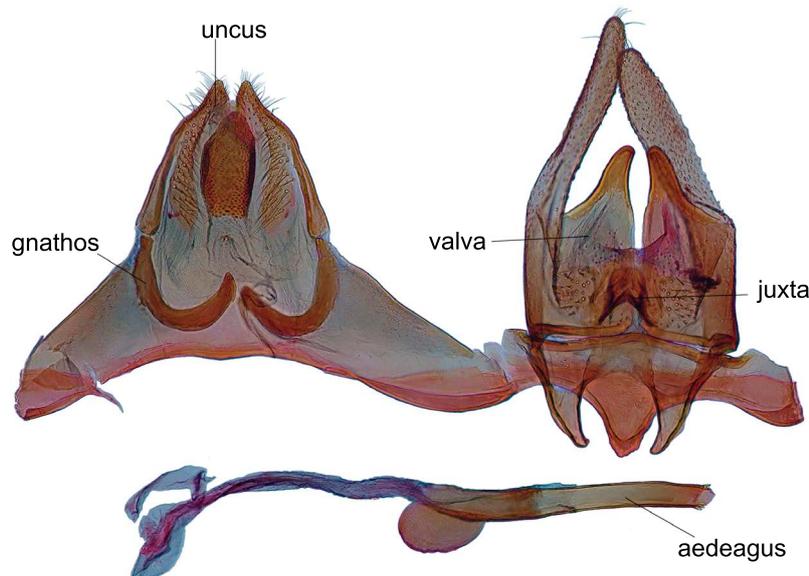


Fig. 4. Male genitalia of *Micrerethista denticulata* Davis, 1998.

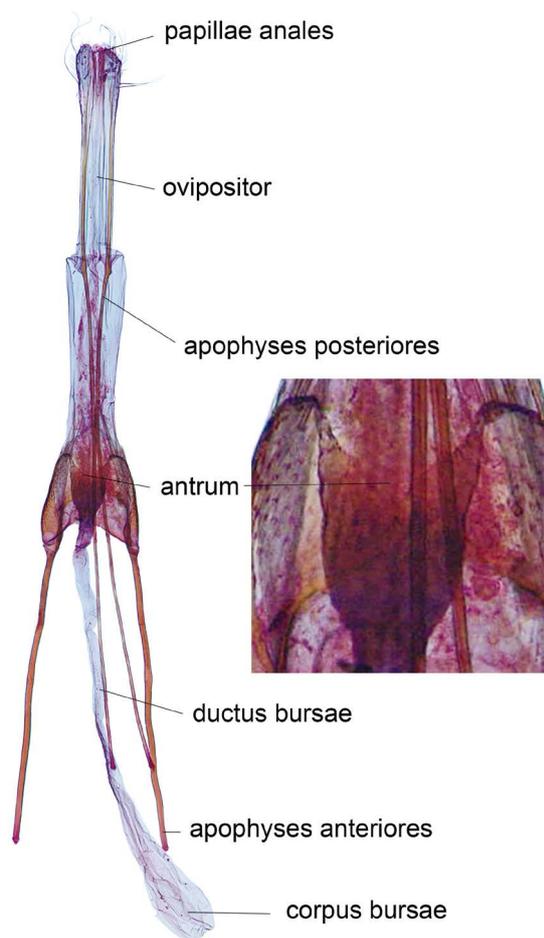


Fig. 5. Female genitalia of *Micrerethista denticulata* Davis, 1998.

with broad white scales over basal 1/3, becoming grayish-brown, and 2/5 of forewing length. Labial palpus similar to head in color except covered laterally with more fuscous scales. Thorax similar to head in color except darker, with more fuscous-tipped scales and a few scattered, pale brown scales. Forewing white to light gray with scattered, fuscous-tipped scales forming a spotted pattern; costal area the palest, with heavier irroration of fuscous dorsal to radius and with largest fuscous spot at distal end of cell. Hindwing usually gray, sometimes with a pale golden luster. Abdomen sternum II is strongly modified with a pair of ventral tympana.

Male genitalia (Fig. 4). Uncus triangular with bifid tips, and with numerous setae inwardly. A pair of arms gnathos hook-shaped. Valva with dorsal lobe moderately slender at base, about 6 times as long as the length of saccus. Juxta large, slightly turn V-shaped. Saccus short, about 0.5 times as long as length of uncus, with rounded tip. Aedeagus cylindrical with three pairs of minute spines along lateral rim of apex; basal keel well developed.

Female genitalia (Fig. 5). Ovipositor long with papillae

anales setae. Apophyses posteriores approximately 1.9 times as long as apophyses anteriores. Ventral margin of ostium slightly U-shaped. Antrum flared caudally. Ductus bursae approximately 0.7 times as long as the length of apophyses anteriores. Corpus bursae semiovalate, without sigum.

Material examined. 1♂, 1♀, Mt. Sokri, Sangju-si, Gyeongsangbuk-do, 17. VII. 1998 (Bae Y.S., Ahn N.H. & Kim Y.G.); 3♂, Mt Godae, Yeoncheon-gun, Gyeonggi-do, 11–12. VII. 2000 (Paek M.K.); 5♂, 1♀, Mt. Deokga, Wonju-si, Gangwon-do, 6. VII. 2016 (Bae Y. S., Lee D.J., & Ko J.H.); 4♂, Mt. Baekun, Gwangyang-si, Jeollanam-do, 24. VI. 2018 (Bae Y.S., Lee D.J., Ko J.H., Lee T.G., Cha Y.B., & Jang C.M.) genitalia slide no. INU-5621, -5622 (Incheon National University).

Distribution. Korea (Gyeonggi-do, Gangwon-do, Gyeongsangbuk-do, Jeollanam-do), Japan, Indonesia, Malaysia, Thailand.

Remarks. This species is distinguished from the other species by following characters; male genitalia with reduced phallotreme teeth; latter lacks the prominent, basal keel of the aedeagus.

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