

Eleven Species, Including Three Unrecorded Species, Belonging to Coleophoridae (Lepidoptera) Collected from Baengnyeong and Yeonpyeong Islands, Korea

Minyoung Kim^{1*}, Bong-Woo Lee², Heung-Sik Lee³ and Kyu-Tek Park⁴

¹Plant Quarantine Technology Center, Animal and Plant Quarantine Agency, Suwon 443-400, Republic of Korea

²Division of Forest Biodiversity, Korea National Arboretum, Soheul, Pocheon 487-821, Republic of Korea

³Yeongnam Regional Office, Animal and Plant Quarantine Agency, Busan 600-016, Republic of Korea

⁴The Korean Academy of Science and Technology, Seongnam 463-808, Republic of Korea

백령도와 연평도에서 채집된 한국산 통나방과 (나비목)의 3 미기록종

김민영^{1*} · 이봉우² · 이흥식³ · 박규택⁴

¹농림축산검역본부 식물검역기술개발센터, ²국립수목원, ³농림축산검역본부 영남지역본부, ⁴한국과학기술한림원

ABSTRACT: Eleven *Coleophora* species were found in a faunistic survey for the family Coleophoridae (Lepidoptera: Gelechioidea) in Baengnyeong and Yeonpyeong Islands, located near the Northern Limit Line in the West Sea. Among them, three species *Coleophora adjunctella* Hodgkinson, *C. chenopodii* Oku, and *C. kurokoi* Oku have been recorded for the first time in Korea. For the newly recorded species, taxonomic remarks and illustrations of the adults and female genitalia have been provided.

Key words: *Coleophora*, Coleophoridae, Is. Baengnyeong, Is. Yeonpyeong, New record, Lepidoptera, Korea

초 록: 백령도와 연평도의 곤충상 조사결과, 통나방과 (나비목: 뿔나방상과)의 11종이 서해안지역에서는 처음으로 기록되었다. 그 중 *Coleophora adjunctella* Hodgkinson, *C. chenopodii* Oku, 그리고 *C. kurokoi* Oku는 한반도에서 처음으로 기록되는 종으로 이들 종 동정에 필요한 성충과 암컷 생식기 사진을 함께 기재한다.

검색어: *Coleophora*, 통나방과, 미기록종, 백령도, 연평도, 나비목, 한국

Is. Baengnyeong and Is. Yeonpyeong are located in the West Sea and belong administratively to Ongjin-gun, Incheon Metropolitan City, Korea. Is. Baengnyeong with width of 45.8 km² lies near the Northern Limit Line (NLL) and is approximately 10 km away from Jangyeo-gun, Prov. Hwanghae, North Korea. Is. Yeonpyeong is located about 80 km west of Incheon, South Korea, and 12 km south of the coast of North Korea. Due to an inconvenience to approach those islands, the fauna of

Lepidoptera has not been well known, with only few surveys on Macrolepidoptera by Lee et al. (2006), Park et al. (2006), and Park et al. (2012). However, no report on Coleophoridae has been made and this is the first report for Coleophoridae in Is. Baengnyeong and Is. Yeonpyeong of the West Sea.

The family Coleophoridae is closely related to Blastobasidae, Momphidae, and Pterolonchidae, and the rank of Coleophoridae has been confused, due to lack of phylogenetic analysis. Hodges (1998) assigned these four families into Coleophoridae as subfamilies: Coleophorinae, Blastobasinae, Momphinae, and Pterolonchinae. Whereas, Karsholt and Razowski (1996) and Baldizzone et al. (2006) treated it as a family. According to

*Corresponding author: mothmy@korea.kr

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Figs. 1-3. Adults: 1. *Coleophora adjunctella* Hodgkinson; 2. *Coleophora chenopodii* Oku; 3. *Coleophora kurokoi* Oku.

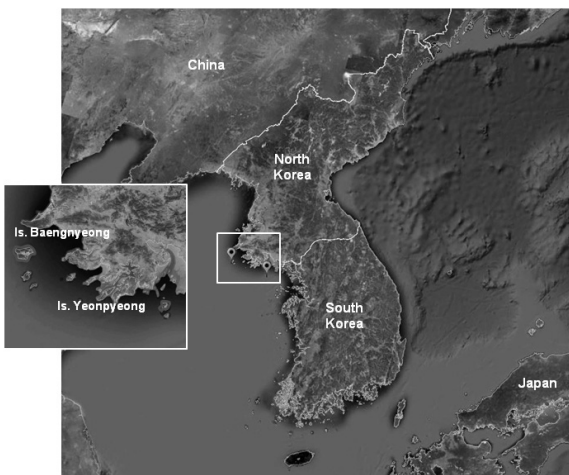


Fig. 4. Map indicating the location of Baengnyeong and Yeonpyeong Islands.

a new phylogenetic study of superfamily Gelechioidea based on 19 nuclear gene sequences by Mitter et al. (pers. comm), the four families are monophyletic and sister to the main with Gelechiidae and Cosmopterigidae. Within the clade including the four families, each family is strongly monophyletic with bootstrap proportions of 100% in maximum likelihood analysis and Coleophoridae appears to be more closely related to Momphidae than to Blastobasidae. The family comprises more than 1,342 known species worldwide and most of them, except 16 species or less, belong to *Coleophora* (Baldizzone et al. 2006). As records of the adjacent countries, 43 species are known in China (Baldizzone, 1989; Hua, 2005) and 67 species in Japan (www.jpmoth.org). In Korea, 28 species in the only genus *Coleophora* have been recognized (Kim et al. 2013). From the material collected from both islands, we found 11 species of *Coleophora*, including three species which have not been recorded from Korea.

Materials and methods

The present study is based on the specimens collected from two islands; Is. Baengnyeong and Is. Yeonpyeong in the West Sea in 2006 and 2010. The material is deposited in the Korea National Arboretum (KNA) and a part of them are in the private collection of Plant Quarantine Technology Center, Animal and Plant Quarantine Agency (QIA). The specimens were collected mainly by light traps, using Mercury vapour lamps (220 V/200 W). For morphological studies, external structures and genital characters were examined under a stereo microscope (Leica S8 APO; Leica, Germany). A Nikon D90 (Nikon, Japan) and Carl Zeiss Axio Imager. M2 (Zeiss, Germany) were used for the digital photography. The microscopic images were taken by using the IMT i-Solution System (IMT i-Solution Inc., Scarborough, Canada). Terminology for the genitalia follows Razowski (1989).

Systematic accounts

Family Coleophoridae Hübner, [1825]

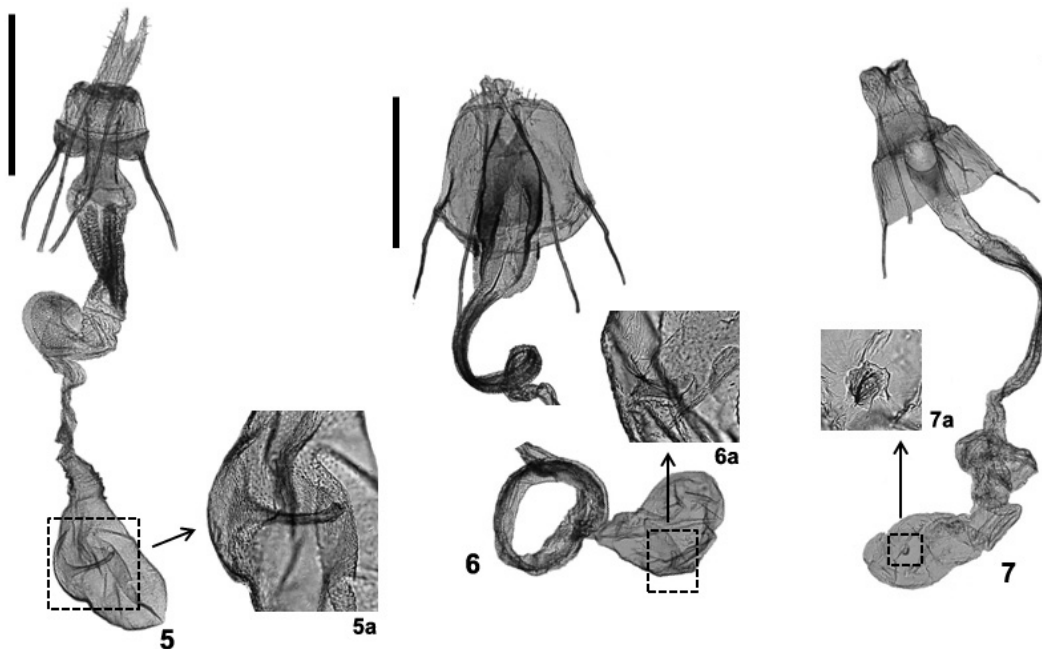
Genus *Coleophora* Hübner, 1822, Type species: *Tinea anatipennella* Hübner, 1796.

***Coleophora adjunctella* Hodgkinson, 1882** (Figs. 1, 5-5a)
흰머통나방(신칭)

Coleophora adjunctella Hodgkinson, 1882, Ent. Monthly Mag., 18: 189; Razowski, 1990: 116-117; Karsholt and Razowski, 1996: 90; Baldizzone and Savenkov, 2002: 373; Baldizzone, Wolf, and Landry, 2006: 21.

Type locality (TL): Ulverston, United Kingdom.

Diagnosis. The species is similar to the European species



Figs. 5-7. Female genitalia: 5. *Coleophora adjunctella* Hodgkinson; 5a. Close-up of the signum; 6. *Coleophora chenopodii* Oku; 6a. Close-up of the signum; 7. *Coleophora kurokoi* Oku; 7a. Close-up of the signum (scale bar: 0.5 mm).

Coleophora maritimella Newman in the wing pattern, but it can be easily differentiated by the absence of whitish costal streak on the forewing.

Redescription for adult (Fig. 1). Wingspan 8.0-11.0 mm. Head and thorax reddish brown. Frons dark brown; vertex brown. Antenna reddish brown; dark brown speckling with fuscous scales beyond two-thirds of antenna; shorter than diameter of eye; flagellum reddish brown. Labial palps brown. Forewing ground color pale brownish orange; streaks invisible; fringe pale brownish orange on termen, tinged with yellowish brown on tornus and posterior margin. Hindwing pale brownish orange. Legs reddish brown; tarsi with creamy-white basal part of each segment. Male is not available in this study.

Female genitalia (Figs. 5-5a). Papillae anales elongated, lobed laterally. Apophyses posteriores about more than twice length of apophyses anteriores. Sterigma short, caudal margin concaved; ostial plate broad. Antrum tubular, sclerotized. Ductus bursae long, inflated spines in distal 1/3 length with two rows of thick conical spines; middle part inflated, membranous, coiled; anterior 1/3 narrow, membranous. Corpus bursae ovate; signum lanceolate in basal part, with long, thorn-like median process (Fig. 5a).

Material examined. 1 ♀, Is. Yeonpyeong, Ongin-gun, Incheon

Metropolitan City, N37°40'21.0", E125°42'42.6", 31.viii.2010 (SY Park & JS Lim), genitalia slide no. Animal and Plant Quarantine Agency (QIA)-37.

Host plant. *Juncus gerardii* Loisel. (Juncaceae) (Emmet, 1996).

Distribution. Korea (new record), Russian Far East, Turkey, Turkmenistan, Iran, Afganistan, Europe.

***Coleophora chenopodii* Oku, 1965** (Figs. 2, 6-6a) 서해명아 주통나방(신칭)

Coleophora chenopodii Oku, 1965, Ins. Mat., 27: 121; Baldizzone, Wolf, and Landry, 2006: 41.

TL: Sapporo, Hokkaido, Japan.

Diagnosis. The female genitalia (Figs. 6-6a) is similar to those of *Coleophora versurella* Zeller, but it can be distinguished by the female genitalia: corpus bursae large, characteristic sterigma and long median process of signum. The forewing is relatively broad with costa gradually arched.

Redescription for adult (Fig. 2). Wingspan 11.0-13.0 mm. Head and thorax pale ochreous brown. Frons brown, tinged with yellowish brown. Antenna with brown scape entirely, as long as diameter of eye; flagellum white entirely. Labial palps

white; second segment with brownish grey; third segment tinged with white. Forewing ground color pale brownish orange, with fine brownish streaks along veins; fringe brownish orange, rarely mixed with dark brownish scales. Hindwing more or less lanceolate; fringes brownish orange. Legs grayish brown. Male is not available in this study.

Female genitalia (Figs. 6-6a). Papillae anales small. Apophyses posteriores twice as long as apophyses anteriores. Lamella postvaginalis long, heavily sclerotized, deeply incised on caudal margin, with elongate lateral lobes anteriorly. Ostium bursae broad, thick, concave of caudal margin of sterigma. Ductus bursae long, narrow, with two long, band-like rows of tiny conical spines. Corpus bursae rather small, pear-like; signum with a thorn-like median process.

Material examined. 1 ♀, Is. Yeonpyeong, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6", 31.viii.2010 (SY Park & JS Lim), gen. slide no. QIA-26.

Host plant. *Chenopodium album* var. *centrorubrum* Makino (Chenopodiaceae) (Oku, 1965).

Distribution. Korea (new record), Japan (Hokkaido, Honshu, Shikoku), Russian Far East.

***Coleophora kurokoi* Oku, 1974** (Figs. 3, 7-7a) 국화통나방 (신칭)

Coleophora kurokoi Oku, 1974, Kontyû, 42: 256-257; Baldizzone, 1989: 208; Baldizzone, Wolf, and Landry, 2006: 72. TL: Sakai, Osaka, Japan.

Diagnosis. This species is similar to *Coleophora yomogiella* Oku in the superficial and in the genitalia structure, but is clearly distinguished from the latter by the female genitalia with chitinized ductus bursae, in the caudal and central part. Adult and larval cases are smaller than *C. yomogiella*.

Redescription for adult (Fig. 3). Wingspan 9.0-11.0 mm. Head and frons ochreous brown. Antenna with creamy white, somewhat faded apically narrowed, and shorter than diameter of eye; flagellum yellowish white entirely. Labial palps white; second segment with ochreous brown. Forewing ground color ochreous brown, streaked with creamy white along costa and veins; fringe orange white, tinged with creamy white. Hindwing brownish grey, narrowed apically. Legs with entirely ochreous brown. Male is not available in this study.

Female genitalia (Figs. 7-7a). Papillae anales small and short. Apophyses posteriores about twice as long as apophyses anteriores. Ostium bursae U-shaped, concave on caudal margin of sterigma. Ductus bursae long, narrow, with chitinized wall on its terminal 1/5 and central 1/5. Corpus bursae elongate, with a signum of small patch.

Material examined. 1 ♀, Is. Baengnyeong, Ongin-gun, Incheon Metropolitan City, 15.viii.2006 (KT Park & TM Kang), genitalia slide no. QIA-32; 2 ♀, Is. Yeonpyeong, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6, 31.viii.2010 (SY Park & JS Lim), gen. slide no. QIA-30, 36.

Host plant. *Chrysanthemum morifolium* Ramatuelle var. *sinense* Makino and *Artemisia princeps* Pamp. (Asteraceae) (Oku, 1974).

Distribution. Korea (new record), China (Yunnan, Zhejiang), Japan (Honshu).

List of the species collected in Is. Baengnyeong and Is. Yeonpyeong, with some taxonomic remarks

***Coleophora adpersella* Benander, 1939**

1 ♂, Is. Yeonpyeong, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6", 31.viii.2010 (SY Park & JS Lim), genitalia slide no. QIA-27.

Distribution. Korea (Central), China (Shaanxi), Japan (Honshu), Russian Far East, Caucasus, Europe.

Remarks. This species was reported for the first time from Korea by Baldizzone and Savenkov (2002), based on male specimen collected in Chuncheon, Prov. Gangwon.

***Coleophora cristata* Baldizzone, 1989**

1 ♂, Is. Yeonpyeong, Yeonpyeong-myeon, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6", 2.ix.2010 (SY Park & JS Lim), genitalia slide no. QIA-29.

Distribution. Korea (Central), Eastern China, Japan (Honshu), Russian Far East.

Remarks. This species was reported for the first time from Korea by Park and Baldizzone (1992).

***Coleophora falkovitshella* Vives, 1984**

1 ♀, Is. Yeonpyeong, Yeonpyeong-myeon, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6",

31.viii.2010 (SY Park & JS Lim), genitalia slide no. QIA-28.

Distribution. Korea (Central), Japan (Honshu), Russian Far East, Mongolia.

Remarks. This species was reported for the first time from Korea by Kim and Park (2009), based on female specimen collected in Chuncheon, Prov. Gangwon.

***Coleophora flavovena* Matsumura, 1931**

1 ♀, Is. Yeonpyeong, Yeonpyeong-myeon, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6", 8.vii.2010 (SY Park, JS Lim & GH Ko), genitalia slide no. QIA-24.

Distribution. Korea (Central), Japan (Hokkaido, Honshu), Russian Far East.

Remarks. It was first reported from Korea by Baldizzone and Oku (1990), and it is one of the common species in the central part of the Korean peninsula.

***Coleophora juncivora* Baldizzone and Oku, 1990**

1 ♀, Is. Yeonpyeong, Yeonpyeong-myeon, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6", 2.ix.2010 (SY Park & JS Lim), genitalia slide no. QIA-31.

Distribution. Korea (Central), Japan (Honshu).

Remarks. This species was reported for the first time from Korea by Park and Baldizzone (1992), based on female specimen collected in Jeongseon, Prov. Gangwon, the central part of the Peninsula.

***Coleophora parki* Baldizzone and Savenkov, 2002**

1 ♀, Is. Yeonpyeong, Yeonpyeong-myeon, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6", 2.ix.2010 (SY Park & JS Lim), genitalia slide no. QIA-33.

Distribution. Korea (Central), Russian Far East (Primorye).

Remarks. This species was reported for the first time from Korea by Baldizzone and Savenkov (2002).

***Coleophora therinella* Tengström, 1848**

1 ♀, Is. Yeonpyeong, Yeonpyeong-myeon, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6", 31.viii.2010 (SY Park & JS Lim), genitalia slide no. QIA-21.

Distribution. Korea (Central, South), Japan (Honshu), Russian Far East, Southern Siberia, Altai, Caucasus, Mongolia,

Europe, North America.

Remarks. This species was reported for the first time from Korea by Park and Baldizzone (1992).

***Coleophora vibicigerella* Zeller, 1839**

1 ♂, Is. Baengnyeong, Baengnyeong-myeon, Ongin-gun, Incheon Metropolitan City, 15.viii.2006 (KT Park & TM Kang), genitalia slide no. QIA-20; 1 ♂, Is. Yeonpyeong, Yeonpyeong-myeon, Ongin-gun, Incheon Metropolitan City, N37°40'21.0", E125°42'42.6", 6.vii.2010 (SY Park, JS Lim & GH Ko), genitalia slide no. QIA-22.

Distribution. Korea (Central, South), China, Europe, North Africa, Kazakhstan, Kyrgyzstan, Altai.

Remarks. This species was reported for the first time from Korea by Park and Baldizzone (1992).

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