

Korean Species of the Genus *Parornix* (Lepidoptera, Gracillariidae)

Da-Som Kim¹, Jae-In Oh², Ji-Young Lee², Bong-Kyu Byun^{2,*}

¹Basic Science Division, National Science Museum of Korea, Daejeon 34143, Korea

²Department of Biological Science and Biotechnology, Hannam University, Daejeon 34054, Korea

ABSTRACT

The genus *Parornix* Spuler, 1910 is a small group within the subfamily Parornichinae belonging to the family Gracillariidae in Korea. The subfamily Parornichinae was recently established as a taxonomic category by Kawahara & Ohshima, 2017, based on the largest dataset in a phylogenetic study. In this study, we reviewed the Korean species of the genus *Parornix*. In total, 5 species were recognized from Korea. Among them, one species, *Parornix loganella* (Stainton, 1848) is recorded for the first time from Korea. Descriptions and illustrations of the adults and genitalia of them are provided herein.

Keywords: Gracillariidae, Parornichinae, new record, leafminer, taxonomy, Korea

INTRODUCTION

In Korea, 101 species of 25 genera of the Gracillariidae have been known to date (Byun et al., 2009; Shin et al., 2015; Kim and Byun, 2016, 2017, 2019, 2022a, 2022b, 2022c; Lee et al., 2017; Park and Lee, 2021; Kim et al., 2022a, 2022b, 2022c, 2022d, 2022e, 2023; Lee and Jeun, 2022).

The subfamily Parornichinae, is a relatively large group with more than 100 described species under four genera worldwide. Recently, Kawahara & Ohshima, 2017 (Kawahara et al., 2017) established this group as a new subfamily with a well supported clade comprising *Callisto* and *Parornix*. They are well characterized by a single branch in the cubital vein and hindwing venation with an additional vein arising anteriorly from the Rs vein. They are cosmopolitan group and most of them are distributed in the Oriental regions with 3 recognized species, as well as 24 species in the Nearctic, 3 species in the Neotropical and 52 species in the Palearctic regions (Prins and Prins, 2006-2023).

In Korea, the first recorded species of the genus *Parornix* was *P. multimaculata* (Matsumura) by Park (1983). Later, Kawahara et al. (2010) added two species, *P. alni* Kumata and *P. betulae* (Stainton). Recently, Lee and Jeun (2022) reported one species, *P. ermolaevi* Kuznetzov. Consequently, four species of the genus have been known from Korea to date.

This study was to review and enumerate all of the Korean species of the genus *Parornix* with available information. As a result, a total of five species were recognized from Korea. Among them, one species, *Parornix loganella* (Stainton, 1848) is reported for the first time from Korea.

MATERIALS AND METHODS

The specimens examined in this study were deposited at the Systematic Entomology Laboratory, Hannam University, Daejeon, Korea (HNUSEL). Male and female genitalia were dissected and mounted with Euparal solution, following the procedure described by Holloway et al. (1987). Images of the adult were captured using a digital camera (Canon EOS 600D; Canon Inc., Tokyo, Japan). Images of the genitalia were captured using a digital camera attached to LEICA M205C microscope (Leica Microsystems, Wetzlar, Germany) and refined using an image editing software, Adobe Photoshop CS5.

Abbreviations in this study are as follows: S, Seoul; GG, Gyeonggi-do; GW, Gangwon-do; GB, Gyeongsangbuk-do; IC, Incheon; DJ, Daejeon; TL, type locality; TD, type depository.

Specimen depositories used in this study were from the

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***To whom correspondence should be addressed**

Tel: 82-42-629-8892, Fax: 82-42-629-8933
E-mail: bkbyun@hnu.ac.kr

following collections: NHMUK, The Natural History Museum, London, United Kingdom; EIHU, Entomological Institute, Hokkaido University, Japan; HNUSEL, Hannam University, Korea; INU, Department of Life Sciences, Incheon National University, Korea; ZIRAS, Zoological Institute, Russian Academy of Science, St. Petersburg, Russia.

SYSTEMATIC ACCOUNTS

Order Lepidoptera Linnaeus, 1758.
Family Gracillariidae Stainton, 1854
Subfamily Parornichinae Kawahara & Ohshima, 2016
Type genus: *Parornix* Spuler, 1910.

Genus *Parornix* Spuler, 1910
Parornix Spuler, 1910: 410.
Type species: *Ornix anglicella* Stainton, 1850.

¹*Parornix alni* Kumata, 1965

Parornix alni Kumata, 1965: 64–66. TL: Honshu, Japan.
TD: EIHU (holotype; paratypes).

Previous material record. Korea: 4 females, GW, Yeongwol, Changwon-ri, Saeseulmak, 28 Jul 2008 (coll. Sohn J.C.), genitalia slide number SJC-788, 3 adults in 100% EtOH (Kawahara et al., 2010).
Wingspan 8.0–9.0 mm.

Male genitalia. See Kumata (1965).

Female genitalia. See Kawahara et al. (2010).

Distribution. Korea, Japan and Russia.

Host plants. *Alnus hirsuta* Turcz. [Betulaceae] in Japan (Kumata 1965; Prins and Prins, 2016–2023). *Alnus hirsuta* Turcz. [Betulaceae] in Russia (Ermolaev, 1987; Prins and Prins, 2016–2023).

Remarks. This species was first reported in Korea by Kawahara et al. (2010), based on four female specimens collected from Yeongwol, Gangwon Province.

²*Parornix betulae* (Stainton, 1854)

Ornix betulae Stainton, 1854: 205–206. TL: United Kingdom. TD: NHMUK (holotype).

Material examined. Korea: 1 female, GG, Mt. Kalbongsan, 25 Jul 2015, gen. slide no. HNUSEL-7057-coll. HNUSEL.

Previous material record. Korea: 1 female, GW, Yeongwol, Changwon-ri, Saeseulmak, 28 Jul 2008 (coll. Sohn J.C.), genitalia slide no. SJC-802 (Kawahara et al., 2010).
Wingspan 7.0 mm.

Male genitalia. See Kumata (1965).

Female genitalia. See Kawahara et al. (2010).

Distribution. Korea, Japan, Russia, Austria, Belarus, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, Ukraine, United Kingdom and Canada.

Host plants. *Betula platyphylla* Sukaczew [Betulaceae] in Japan (Kumata, 1965; Prins and Prins, 2016–2023). *Betula costata* Trautv., *B. mandshurica* (Regel) Nakai, *B. microphylla* Bunge, *B. occidentalis* Hook., *B. pendula* Roth., *B. platyphylla* Sukaczew, *B. sp.* [Betulaceae] in Russia (Ermolaev, 1981, 1987; Kirichenko et al., 2017; Akulov et al., 2018; Prins and Prins, 2016–2023). *Betula sp.* [Betulaceae] in Belgium (de Crombrughe de Picquendaale, 1906; Prins and Prins, 2016–2023). *B. sp.* [Betulaceae] in Denmark (Larsen, 1916; Prins and Prins, 2016–2023). *Betula alba* L., *B. ermanii* Chamisso, *B. humilis* Schrank, *B. lutea* Mich., *B. nana* L., *B. pendula* Roth., *B. pubescens* Ehrh., *B. sp.*, *B. utilis* D. Don [Betulaceae] in Germany (Steudel and Hofmann, 1882; Disqué, 1901; Buhr, 1935; Osthelder, 1951; Prins and Prins, 2016–2023). *Betula pendula* Roth., *B. pubescens* Ehrh. [Betulaceae] in Hungary (Szöcs, 1971, 1981; Prins and Prins, 2016–2023). *Betula pendula* Roth., *B. sp.* [Betulaceae] in Italy (Hartig, 1939; Klimesch, 1950; Prins and Prins, 2016–2023). *Betula sp.* [Betulaceae] in Lithuania (Ivinskis et al., 1985; Prins and Prins, 2016–2023). *Betula alba* L. [Betulaceae] in Netherlands (de Graaf and Snellen, 1868; Prins and Prins, 2016–2023). *Betula pendula* Roth. [Betulaceae] in Norway (Grønlien, 1924; Prins and Prins, 2016–2023). *Betula pendula* Roth., *B. pubescens* Ehrh., *B. sp.* [Betulaceae] in Poland (Büttner, 1880; Buszko and Baraniak, 1989; Vidal and Buszko, 1990; Prins and Prins, 2016–2023). *Betula pubescens* Ehrh. [Betulaceae] in Portugal (Corley, 2015; Prins and Prins, 2016–2023). *Betula pendula* Roth. [Betulaceae] in Slovakia (Hrubý, 1964; Prins and Prins, 2016–2023). *Betula sp.* [Betulaceae] in Sweden (Benander, 1944; Prins and Prins, 2016–2023). *Betula sp.* [Betulaceae] in Switzerland (Frey, 1856; Prins and Prins, 2016–2023).

Remarks. This species was first reported in Korea by Kawahara et al. (2010), based on one female specimen collected from Yeongwol, Gangwon Province.

³*Parornix ermolaevi* Kuznetsov, 1979

Parornix ermolaevi Kuznetsov, 1979: 97. TL: South Primorye, Russia. TD: ZIRAS.

Material examined. Korea: 1 male, DJ, Mt. Jeogosan, 29

Korean name: ¹물오리가는나방, ²박달가는나방, ³개암나무가는나방

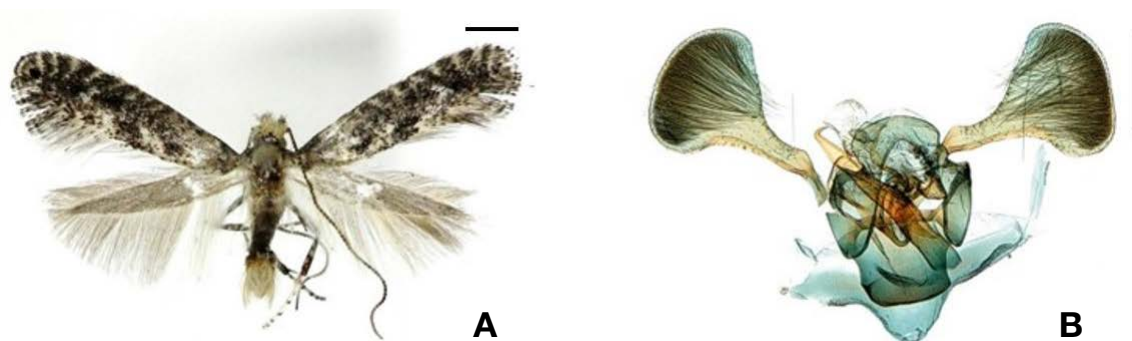


Fig. 1. *Parornix loganella* (Stainton, 1848). A, Adult; B, Male genitalia (gen. slide no. HNUSEL-5326). Scale bars: A, B=0.5 mm.

Apr 2023, gen. slide no. HNUSEL-7058-coll. HNUSEL.

Previous material record. Korea: 1 female, GW, Inje-gun, Girin-myeon, Bangdong-ri, 17 Aug 2021, (Lee GE), gen. slide no. LGE21051f, DNA voucher no. LGE-G528 (NIBR) (Lee and Jeun, 2022).

Wingspan 7.5 mm.

Male genitalia. See Kuznetsov (1979).

Female genitalia. See Lee and Jeun (2022).

Distribution. Korea and Russia.

Host plants. *Corylus heterophylla* Fisch. ex Trautv., *C. sieboldiana* Blume (Betulaceae) (Kirichenko et al., 2019).

Remarks. This species was first reported in Korea by Kawahara et al. (2010), based on one female specimen collected from Inje-gun, Gangwon Province.

¹**Parornix loganella* (Stainton, 1848)

Argyromiges loganella Stainton, 1848: 2162. TL: England, United Kingdom. TD: unknown.

Material examined. Korea: 2 males, GW, Mt. Taebaeksan, 11 May 2017 (leg. Byun BK), gen. slide no. HNUSEL-5326, 5441-coll. HNUSEL.

Adult (Fig. 1A). Wingspan 8.5 mm. Head smooth and white; maxillary palpus white, dark brown on lateral parts and apical parts acute; labial palpus four times longer than that of maxillary palpus, dark brown scale laterally and second segment white with a fine brown ring apically; antenna white basally and gray forward to apex; antenna with scape white mixed with brown scale, a blackish brown ring apically, the ring width almost same with a segment of antenna and a tuft of white and blackish brown scales on ventral parts. Thorax white with pale light brown scales; legs white mixed with dark or light brown scales and coloration of brown scale more lighter in hind legs than the others; fore coxa with two rings on basal and apical parts respectively and apical one

more dark than that of basal; fore femur and tibia covered with dark brown scales; fore tarsus with three dark brown rings dividing same intervals and a small dark brown spot between tibia and first ring of tarsus; middle femur blackish brown with white scales; middle tibia basal parts blackish brown with a white ring and apical parts blackish brown; middle tarsus with three blackish brown rings at same intervals; hind femur white with light brown spot on dorsal margin near apical; hind tibia white with two rings on basal and apical parts and bristles on ventral margin; hind tarsus with four brown rings and first one more broad than the others.

Forewing ground color ochreous with five white fasciae obliquely; all fasciae extended from costa to dorsal margin roughly with blackish edge; first fascia slightly rounded to basal; second fascia most irregular and broadened to dorsal margin; fourth fascia more slightly narrower than third or almost same; fifth fascia most slender and slightly curved at 2/3 near apical costa parts; a distinct blackish distal part with a white spot on apex. Hindwing lanceolate and ground color goldish gray.

Male genitalia (Fig. 1B). Tegumen 1.5 times longer than valva and somewhat ovate with 1–2 laterally setae. Valva slightly elongated, narrow and curved sharply at 2/3 of costal margin, apical part elongated with a blunt apex; long hairs from apical to dorsal margin except for costal margin, a fan-shaped comb with 10 spreading teeth. Vinculum rather reduced and short. Saccus narrow and apex blunt or slightly angular at both side of base. Aedeagus straight and tubular with sclerotized and blunt apex; apical spinules tiny and slightly blunt.

Female genitalia. Unknown.

Distribution. Korea (new record), Russia, Denmark, Estonia, Finland, Latvia, Lithuania, Norway, Sweden and United Kingdom.

Host plants. *Betula* sp. [Betulaceae] in United Kingdom

Korean name: ¹*노란꼬리가는나방 (신칭)

(Meyrick, 1927; Prins and Prins, 2016-2023). *Betula* sp. [Betulaceae] in Sweden (Benander, 1944; Prins and Prins, 2016-2023). *Betula* sp. [Betulaceae] in Denmark (Buhl et al., 1992; Prins and Prins, 2016-2023).

Remarks. This species is reported for the first time in Korea.

¹*Parornix multimaculata* (Matsumura, 1931)

Lyoneta multimaculata Matsumura, 1931: 1106. TL: Hokkaido, Japan. TD: EIHU (holotype).

Material examined. Korea: 1 female, S, Hongneung, 16 Aug 1996 (leg. Byun BK), gen. slide no. HNUSEL-5322-coll. HNUSEL; 1 female, GB, Gyeongju-si, Geoncheon-eup, Mt. Danseoksan, 31 Aug 2016 (leg. Bae SY, Shin YM, Nam JW, Kim MH), gen slide no. HNUSEL-5445-coll. INU.

Adult. Wingspan 8.5 mm.

Male genitalia. See Kumata (1965).

Female genitalia. See Kumata (1965).

Distribution. Korea, Japan, and Russia.

Host plants. *Malus baccata* (L.) Borkh., *M. baccata* Borkh. var. *mandshurica* C. K. Schn., *Prunus avium* L., *P. mume* Siebold & Zucc., *P. salicina* Lindl., *P. sargentii* Rehder [Rosaceae] in Japan (Kumata, 1965; Ermolaev, 1981; Prins and Prins, 2016-2023). *Prunus maximowiczii* Rupr., *P. salicina* Lindl., *P. ussuriensis* Koval. & Kostina [Rosaceae] in Russia (Ermolaev, 1987, 1988; Prins and Prins, 2016-2023).

Remarks. This species was first reported as *Callisto multimaculata* Matsumura in Korea by Park (1983), based on the specimen from Suweon, Gyeonggi-do.

ORCID

Da-Som Kim: <https://orcid.org/0000-0002-9988-0225>

Jae-In Oh: <https://orcid.org/0000-0001-8589-0521>

Ji-Young Lee: <https://orcid.org/0000-0001-8215-7957>

Bong-Kyu Byun: <https://orcid.org/0000-0003-0393-6464>

CONFLICTS OF INTEREST

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

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Korean name: ¹매화가는나방

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