



## Taxonomic review of the genus *Phyllonorycter* Hübner (Lepidoptera: Gracillariidae) in Korea

Da-Som Kim, Bong-Kyu Byun\*

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



### ARTICLE INFO

**Keywords:**  
*Phyllonorycter*  
 Gracillariidae  
 Lepidoptera  
 New record  
 Korea

### ABSTRACT

This study was conducted to review the genus *Phyllonorycter* in Korea. In this study, totally 19 species in the genus were recognized from Korea. Among them, four species, *P. cretata* (Kumata), *P. japonica* (Kumata), *P. rostrispinosa* (Kumata) and *P. stephanandrae* (Kumata) are reported for the first time from Korea. All the available species were briefly redescribed with illustrations of the adult and genital structures. A key to the species was also provided.

### Introduction

The family Gracillariidae is the major group of leaf-miners, comprising 1966 described species of 106 genera in the world (De Prins and De Prins, 2016; Kawahara et al., 2017). Among them, Lithocolletinae, a subfamily of Gracillariidae, comprises 508 species of 10 genera worldwide (De Prins and Kawahara, 2012). In this subfamily, *Phyllonorycter* is one of the largest genera with 401 described species in the world (De Prins and De Prins, 2005; De Prins and Kawahara, 2012). The adults of the genus are mostly tiny with metallic goldish or yellow brownish ground color and white streaks on apex of forewing. Also, the adults keep their body parallel to surface or lowering the head at rest (Kristensen, 1999).

Because of their characteristic feeding habits, the family Gracillariidae has been known as leafminers. Genus *Phyllonorycter* is a typical leafminer, having three early sap-feeding and two later tissue feeding instars (Davis and Deschka, 2001; De Prins and Kawahara, 2012). Some species in the genus have been known as serious pests of agricultural and ornamental plants, which often cause serious damages to crops (e.g. *Phyllonorycter blancardella*). More than 7706 records of host plants have been known as host plants for the genus *Phyllonorycter* in the world (De Prins and De Prins, 2006–2016).

In Korea, the first record of the genus *Phyllonorycter* was *P. ringoniella* with the name as *Lithocolletis triflorella* by Nakayama and Okamoto (1940). After them, Park (1975) synonymized this species with *Phyllonorycter ringoniella*. Later, Kumata and Park (1978) described a new species, *P. koreana* from Korea. In “Microlepidoptera of Korea (Park, 1983)”, a total of 10 species of the genus, including 8 newly recorded species < *P. nipponicella*, *P. acutissima*, *P. kamijoi*, *P. aino*, *P.*

*issikii*, *P. pastorella*, *P. melacoronis*, and *P. ulmi* > was listed as them to be distributed in Korea.

Also, Kumata et al. (1983) added one species, *P. similis*. Park and Han (1986) reported 3 newly recorded species: *P. leucocorona*, *P. orientalis* and *P. pygmaea*. Recently, Kim and Byun (2016) added one species, *P. styracis* with DNA barcode data. Consequently, 15 species have been recorded from Korea to date (ESK & KSAE, 1994; Byun et al., 2009; Paek et al., 2010; Park et al., 2012).

In this study, a total of 19 species of the genus *Phyllonorycter* were recognized from Korea with four newly species: *P. cretata* (Kumata), *P. japonica* (Kumata), *P. rostrispinosa* (Kumata) and *P. stephanandrae* (Kumata). All the known species were enumerated and briefly redescribed with taxonomic arrangement. Also their available information, including their collecting locality, host plant and distribution range is also provided.

### Materials and methods

All the materials examined in this study were deposited in the Systematic Entomology Laboratory, Hannam University, Daejeon, Korea (SELHNU). Male and female genitalia were dissected and mounted with Euparal mountant, following Holloway et al. (1987). Images of adults were taken by using the digital camera (Canon EOS 600D, Canon Inc., Ota, Tokyo, Japan), for genitalia were taken by using the digital camera attached to the microscope, LEICA M205C (© Leica Microsystems, Wetzlar, Hesse, Germany).

**Abbreviations:** S (Seoul), GG (Gyeonggi-do), GW (Gangwon-do), CB (Chungcheongbuk-do), CN (Chungcheongnam-do), JB (Jeollabuk-do), JN (Jeollanam-do), GB (Gyeongsangbuk-do), GN

\* Corresponding author.

E-mail address: [bkbyun@hnu.ac.kr](mailto:bkbyun@hnu.ac.kr) (B.-K. Byun).

(Gyeongsangnam-do), JJ (Jeju-do), SEL/HNU (Systematics Entomology Lab., Hannam University), HNUHM (Hannam University Natural History Museum), KNIC/KNA (Korea National Insect Collection, Korea National Arboretum), NAS (National Institute of Agricultural Science), CIS/KNU (Center for Insect Systematics, Kangwon National University), INU (Department of Life Sciences, Incheon National University), EIHU (Entomological Institute, Hokkaido University). Also, the newly species were marked with the superscript ‘\*’ at the right of species name in the manuscripts.

## Systematic accounts

### Order Lepidoptera Linnaeus, 1758

#### Family Gracillariidae Stainton, 1854

##### Subfamily Lithocolletinae Stainton, 1854

#### Genus *Phyllonorycter* Hübner, 1822

*Phyllonorycter* Hübner, 1806. Type species: *Phalaena rajella* Linnaeus, 1758.

*Lithocolletis* Hübner, 1825.

*Eucestis* Hübner, 1825.

*Eucesta* Hübner, 1826.

*Hirsuta* Bruand, 1851.

*Lithocolletes* Dyar, 1903.

*Phyllonorycter* Walsingham (de Grey), 1914.

*Hirsuta* Fletcher, 1929.

#### Key to species of the genus *Phyllonorycter* Hübner in Korea

1. Thorax covered with whitish scales. Forewing white ground color with hook-shaped blackish scale on the apex.....  
.....*P. leucocorona* (Kumata)  
– Thorax covered with shiny brownish scales. Forewing with golden brown ground color..... 2
2. Face covered with white scales or mixed with pale brownish scales..... 3  
– Face covered with yellowish scales or blackish ..... 15
3. White distinct streaks on forewing and two yellow streaks on thorax..... 4  
– White uncertain markings on forewing and one or no yellow streaks on thorax..... 12
4. Costo-basal of forewing formed as one, not divided two parts..... 5  
– Costo-basal of forewing divided into two parts..... 9
5. 8th sternite of male genitalia developed .....6  
– 9th sternite of male genitalia developed..... *P. kamijoi* (Kumata)
6. Apex of 8th sternite of male genitalia separated to two tips with some setae..... 7  
– Apex of 8th sternite of male genitalia not separated.....  
..... *P. japonica* (Kumata)
7. 8th sternite of male genitalia rectangular.....  
..... *P. acutissimae* (Kumata)  
– 8th sternite of male genitalia not rectangular..... 8
8. Setae on valva present along the marginal area of valva..... *P. nipponicella* (Issiki)  
– Setae on valva present along the distal half of valva..... *P. similis* (Kumata)
9. White streaks on forewing enclosed with blackish line..... *P. aino* (Kumata)  
– White streaks on forewing not enclosed or blackish line on the outer margin of streaks..... 10
10. Forewing medio-basal streak reaching to costo-basal line..... *P. styrcis* (Kumata)  
– Forewing medio-basal streak not reaching to costo-basal line..... 11
11. 8th abdominal segment of female without scales or

- setae..... *P. rostrispinosa* (Kumata)  
– 8th abdominal segment of female with scales or setae...  
..... *P. ringoniella* (Matsumura)
12. Male genitalia symmetrical..... 13  
– Male genitalia asymmetrical..... *P. issikii* (Kumata)
  13. Valva with string-like projection..... *P. orientalis* (Kumata)  
– Valva without projection..... 14
  14. Valva with a hook-shaped short seta on apex. Aedeagus hammer-like..... *P. ulmi* (Kumata)  
– Valva without seta on apex. Aedeagus moderate.....  
..... *P. pastorella* (Zeller)
  15. Forewing pale brown with white streaks.....  
..... *P. koreana* Kumata and Park  
– Forewing dark brown with metallic silvery streaks..... 16
  16. Face covered with tufted black scales..... *P. melacoronis* (Kumata)  
– Face covered with tufted brown scales..... 17
  17. Forewing dorso-basal separated..... *P. pygmaea* (Kumata)  
– Forewing dorso-basal not separated.....  
..... *P. stephanandrae* (Kumata)

#### *Phyllonorycter acutissimae* (Kumata, 1963) (Figs. 1A, 3A, 5A)

*Lithocolletis acutissimae* Kumata, 1963: 81–82. Type locality: Honshu, Japan.

**Adult** (Fig. 1A). Wingspan 6.0–7.0 mm. Head covered with tuft of white scales and separated two bunches; frons smooth with shiny white scales; antenna whitish gray. Thorax yellowish gold with one white streak on middle and two white streaks on both sides near the forewing. Legs pale yellow. Forewing ground color shiny yellowish brown, with white streaks. Medio-basal streak straight, extending to basal 1/2 parallel with costa, rather broad to apex. Dorso-basal streak shorter than medio-basal streak. Two vertical angulate white streaks with black lines on inner margin of each streak, second streak usually divided to two parts. A distinct black blotch placed on apex, with short white streaks around apex; apex and apical margin of wing encircled with blackish scales; cilia whitish gray. Hindwing lanceolate, ground color whitish gray and cilia white.

**Male genitalia** (Fig. 3A). 8th sternite wide, flap like, both lateral margins parallel and apical margin divided into two tips with short setae on each tip. Tegumen expanded and tapering towards apex; valvae expanded, rounded at apex and drooped with densely setae on ventral surface; vinculum U-shaped; saccus broad and rounded. Aedeagus slender, as long as valva.

**Female genitalia** (Fig. 5A). Palpillae anales a little expanded with long scales on apex; apophyses anteriores slender, as long as three times of apophyses posteriores; ostium bursae weakly sclerotized. Corpus bursae long, with a sclerotized triangular signum.

**Material examined.** 1♀, Suwon, GG, 28 iv 1976 (KT Park); 1♀, Suwon, GG, 14 iii 1977 (JC Paik)-coll. NAS; 1♀, Mt. Dodram, GG, 19 v 1990 (KT Park); 5♂8♀, Hongneung, S, 28 iv 1998 (KS Oh & WY Jang), genitalia slide no. HNU/SEL-524,525; 1♂, Chuncheon, GW, 2 vii 1985 (KT Park); 1♂1♀, Sejong City, 12 vi 2015 (BK Byun), genitalia slide no. HNU/SEL-5211, 5233; 1♂, Mt. Yeongchwi, JN, 23 v 2014 (BK Byun), genitalia slide no. HNU/SEL-5243-coll. HNU/SEL.

**Distribution.** Korea (South), Japan.

**Host plants.** *Quercus acutissima* Carruthers, *Q. mongolica* Fischer var. *grosseserrata* Rehder & Wilson, *Q. serrata* Thunb., *Q. variabilis* Blume, *Castanea crenata* Sieb. & Zucc. (Fagaceae) (Kumata, 1963, 1982; Kumata et al., 1983; De Prins and De Prins, 2005).

**Remarks.** This species was first reported by Park (1983) from Korea.

#### *Phyllonorycter aino* (Kumata, 1963)

*Lithocolletis aino* Kumata, 1963: 11–13. Type locality: Hokkaido, Japan.

**Distribution.** Korea (South), Japan.

**Host plant.** *Spiraea salicifolia* L. (Rosaceae) (Kumata, 1963; Kumata et al., 1983; De Prins and De Prins, 2005).

Download English Version:

<https://daneshyari.com/en/article/5763456>

Download Persian Version:

<https://daneshyari.com/article/5763456>

[Daneshyari.com](https://daneshyari.com)