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FIRST DATA ON THE SPECIES COMPOSITION OF THE FAMILY GRACILLARIIDAE (LEPIDOPTERA) ON FURUGELM ISLAND IN THE PRIMORSKY KRAI, RUSSIA

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Summary. A study of material from the family Gracillariidae (Lepidoptera) collected on Furugelm Island in 2015 and 2024 resulted in the identification of 8 species for the first time for this island. One of these, *Phyllonorycter leucocorona* (Kumata, 1957), is recorded as new to the fauna of Russia. Its morphological characteristics, photographs of the moth and male genitalia, and a discussion of the features of its genital structures are presented. A list of the identified species is provided.

Key words: gracillariid moths, fauna, new records, morphology, male genitalia, Russian Far East.

С. В. Барышникова, И. А. Махов. Первые сведения о видовом составе сем. Gracillariidae (Lepidoptera) на о. Фуругельма в Приморском крае России // Дальневосточный энтомолог. 2025. N 538. С. 12-19.

Резюме. В результате изучения материала по сем. Gracillariidae (Lepidoptera), собранного на о. Фуругельма в 2015 и 2024 гг., для этого острова были впервые идентифицированы 8 видов, из которых *Phyllonorycter leucocorona* (Kumata, 1957) оказался новым для фауны России. Приводится его морфологическая характеристика, фотографии бабочки и гениталий самца, обсуждаются особенности строения его генитальных структур. Дан список видов Gracillariidae о. Фуругельма.

INTRODUCTION

This article is devoted to the new finds of Gracillariidae on Furugelm Island, which is located in the Peter the Great Gulf, the south of Primorsky Krai (Fig. 1). The family of gracillariid leaf miners (Lepidoptera, Gracillariidae) is currently represented in Primorsky Krai of Russia by 117 species belonging to 23 genera from 6 subfamilies (Baryshnikova, 2024). Information about representatives of the family Gracillariidae from the islands of the Peter the Great Gulf was published by Ponomarenko and Zinchenko (2013). However, these findings were presented in the form of tabular data on the total number of taxa (genera and species). Thus, for Furugelm Island, the authors indicated four species from two genera, without listing them. When comparing island faunas, only one species from this family was

mentioned for this island – *Calybites phasianipennella* (Hübner, [1813]). New collections on Furugelm Island, as well as previously collected material, allowed us to establish eight species of gracillariid moths for the southernmost island of Russia covered mainly by broadleaf forest (Fig. 2).

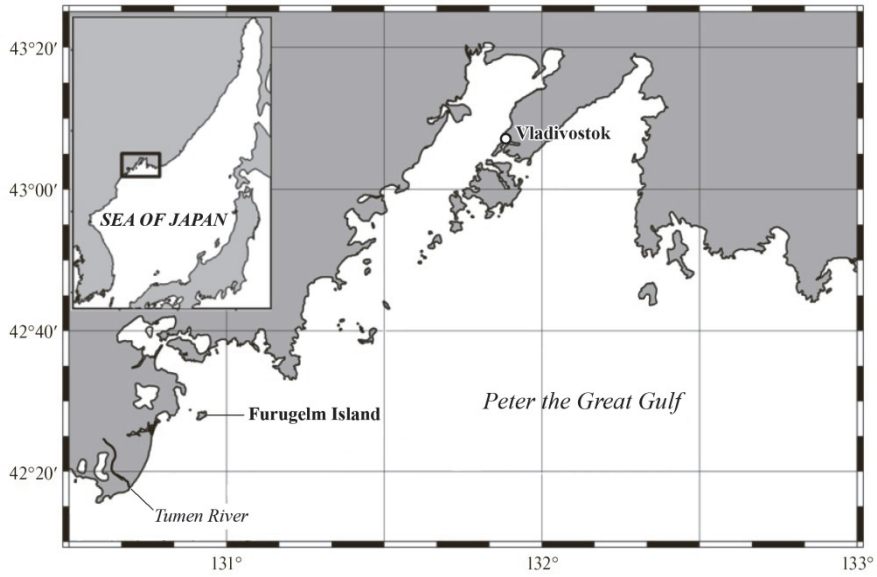

Fig. 1. Schematic map of the south of Primorsky Krai (ex Trusenkova *et al*., 2022 with modifications).

This paper is based on the collections by the second author in 2024 and by S.Yu. Sinev in 2015 on Furugelm Island. A total of 22 specimens were collected or found dried in a window. Processing of these specimens made it possible to find a species *Phyllonorycter leucocorona* (Kumata, 1957), which is first recorded for the fauna of Russia. This little-known (or rare) species was described from Japan and then discovered in Korea (Park & Han, 1986). Our specimen was referred to this species based on the characteristic external features of the moth and a comparison of its genitalia with a drawing and photograph of the genitalia of the type specimen (Kumata, 1957: fig. 2 B; De Prins & De Prins, 2011–2024). Here we provide a morphological description of *Ph. leucocorona*, with a discussion of the structural peculiarities of the male genital apparatus and the list of gracillariid species occurred in Furugelm Island.

MATERIAL AND METHODS

Identified by first author 22 specimens are kept in the collection of Zoological Institute, Russian Academy of sciences (ZIN RAS). In the species list, the information on host plants and distribution of moths is given according to the review of Far Eastern gracillariids (Kirichenko *et al*., 2019) and Annotated catalogue of the insects of Russian Far East (Baryshnikova, 2016), as well as the works of Shin *et a*l., 2015; Liu *et al*., 2018 and Kim & Byun, 2019.

Moths were determined using several reviews (Kumata, 1963; Noreika, 1997; Kim & Byun, 2017; Kirichenko *et al*., 2019; De Prins & De Prins, 2011–2024) and by comparison with the specimens from the collection of ZIN RAS.

The genitalia preparations were made by maceration of soft tissue of abdomens in 10% KOH solution followed by manipulation in glycerol using binocular microscope MC–2ZOOM. The terminology of the elements of forewing pattern and genital sclerites follows Kuznetzov (1981: Figs 151, 155).

Fig. 2. Furugelm Island, habitats. A, B – view of the Zapadnaya Bay; C – slope of the southern part of the island; D – broadleaf forest, the most common biotope on the island.

The photograph of the total view of the moth was captured with a Canon 5D Mark IV digital camera equipped with a Canon MP-E 65mm f/2.8 1–5x macro lens and Canon Macro Twin Lite MT-26EX-RT, flash, and Helicon stacking software (Helicon Focus 7.03). The photograph of the genitalia was captured using a Nikon SMZ25 stereoscopic microscope with a Nikon DS-Ri2 digital camera. The images were processed using NIS-Elements BR software.

LIST OF SPECIES

***Phyllonorycter leucocorona* (Kumata, 1957)**
Figs 3, 4

Lithocolletis leucocorona Kumata, 1957: 66–67. Type locality: Japan, Sapporo.

MATERIAL EXAMINED. Russia: Primorsky Krai, Khasansky District, 23 km SSE of Posyet, Furugelm Island, 42.452278N, 130.915667E, date of find 22.V 2024, 1 ♂, I. Makhov.

MOTH. (Fig. 3). Wing expanse 8 mm. Head, frons, head tuft, thorax, tegulae, and forewing background pure white. Antennae white with brown annulations on segments. Forewing with broad and long longitudinal streak slightly obliquely extending from wing costal margin just above wing base towards wing apex, colored pale yellow and bordered with brown scales. Three oblique yellowish streaks in outer part of costal margin fusing by apices into a yellowish area near apex of wing. Two narrow yellowish, bordered with brown scales, dorsal streaks extending from wing dorsal margin before and behind its middle and fusing with other elements of pattern in wing outer area. Apical dot black, black apical streak developed. Hind wings and fringes of both wings whitish. Legs white with dark spots on tarsi.

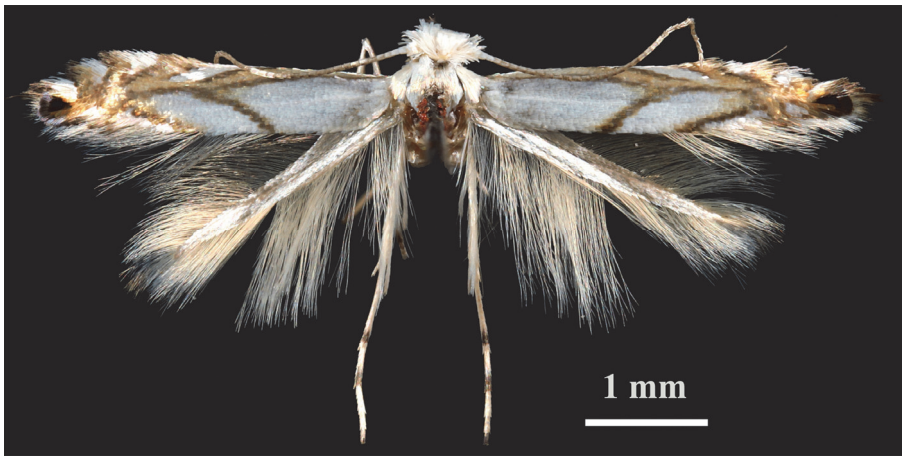

Figure 3. *Phyllonorycter leucocorona*, imago.

MALE GENITALIA (Fig. 4). Uncus symmetrical, vinculum with very small, slender saccus; aedeagus not long, with a hook-like projection at apex. Valvae markedly asymmetrical; left valva narrow and right valva wide and swollen, apices of both with small, slightly curved spines directed outwards. The angle of the preparation did not allow good identification of small asymmetrical outgrowths with filaments visible at the bases of valvae on the drawing in the original description (Kumata, 1957; Fig. 2B), but not recognizable on the photograph of holotype (De Prins & De Prins, 2011-2024). The lobe of abdominal sternite VIII slightly narrowed and rounded caudally.

HOST PLANTS. In Japan: *Quercus dentata* (Kumata, 1957; Sato & Tabe, 2023), *Q. serrata* (Kumata, 1961) *Q. cerris* and *Quercus* sp. (Robinson *et al*., 2023); in Korea: *Q. mongolica*, *Q. dentata* (Park & Han, 1986). From them *Q. mongolica* and *Q. dentata* also grow in the southern Primorsky Krai and represented in Furugelm Island (Figs 2A, B, D).

DISTRIBUTION. Russia (new record): Primorsky Krai. Outside Russia: Japan, Korea.

REMARKS. The specimen was found dried. However, the date of its find may correspond to the time of flight, as the moth was fresh and in a good condition.

In the general appearance and, especially, in the shape of male genitalia, *P. leucocorona* is very distinctive and differs well from the majority of congeners, forming a separate morphological group within the species of the genus *Phyllonorycter*, trophically associated with

fagacean plants (Baryshnikova, 2012). Surprisingly, this species reveals considerable similarity in the shape of male genitalia with the plane leaf-miner *Phyllonorycter platani* (Staudinger, 1870), being distinguished from this species by mirror-image arrangement of valvae: wide and swollen right valva and narrow left valva in *P. leucocorona* and, conversely, narrow right valva and wide and swollen left valva in *P. platani*. The great morphological similarity of male genital parts, with account of their morphological originality in two taxa is, probably, associated with these species to retain independently developed male genital structures early for the genus *Phyllonorycter* or for some of its evolutionary lineages. *P. leucocorona* was not recorded in the Russian Far East, despite many years of collecting gracillariids there by various researchers. Data on *P. leucocorona* in Japan and Korea are sparse and absent from China, as the moths from the genus *Phyllonorycter* have been poorly studied in this country. We can suggest that the population density of this species has remained low more than half a century since its description. It is not also excluded the accidental entrance of *P. leucocorona* into southernmost area of Primorsky Krai.

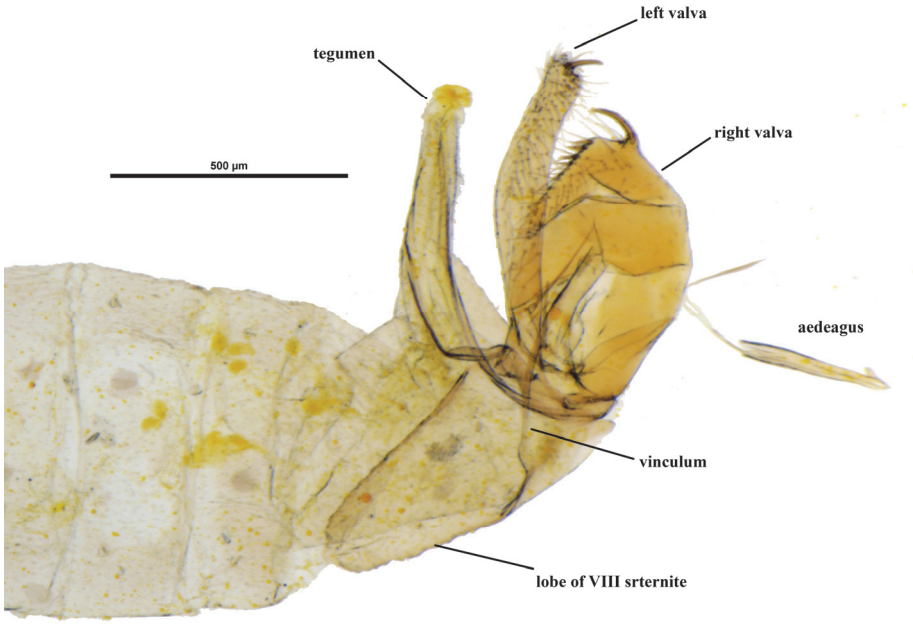

Fig. 4. *Phyllonorycter leucocorona*, male; terminal part of the abdomen with the genital segment.

***Phyllonorycter issikii* (Kumata, 1963)**

MATERIAL EXAMINED. Russia: Primorsky Krai, Khasansky District, 59 km SW of Slavyanka, Furugelm Island, 42.466667N, 130.916667E, h=0-100m, 19-21.VII 2015, 1 ♂, 1 ♀, S.Yu. Sinev.

DISTRIBUTION. In Russia: European part, Urals, Western Siberia, Altai-Sayanian region, Khabarovsky Krai, Primorsky Krai. Outside Russia: Japan, Korea, China, Europe.

HOST PLANTS. *Tilia* (Malvaceae).

***Phyllonorycter* sp.**

MATERIAL EXAMINED. Russia: Primorsky Krai, Khasansky District, 23 km SSE of Posyet, Furugelm Island, 42.452278N, 130.915667E, 16,21, 22, 24 V 2024, 7 ♀, at light, I. Makhov.

HOST PLANTS. *Quercus*, *Castanea crenata* (Fagaceae)

REMARK. This species belongs to the complex of *Phyllonorycter nipponicella* (Issiki, 1930). This grouping comprises five morphologically closely related species (Sato & Tabe, 2023), whose reliable discrimination requires additional material.

***Liocrobyla desmodiella* Kuroko, 1982**

MATERIAL EXAMINED. Russia: Primorsky Krai, Khasansky District, 59 km SW of Slavyanka, Furugelm Island, 42.466667N, 130.916667E, 0-100 m, 15-18.VII and 19-21.VII 2015, 1 ♂, 1 ♀, S.Yu. Sinev.

DISTRIBUTION. In Russia: Khabarovsky Krai, Jewish Autonomous Oblast, Primorsky Krai. Outside Russia: Japan, Korea, China.

HOST PLANTS. *Desmodium oldhamii*, *Hylodesmum podocarpum*, *Lespedeza cyrtobotrya*, *Ohwia caudata* (Fabaceae).

***Caloptilia pulverea* Kumata, 1966**

MATERIAL EXAMINED. Russia: Primorsky Krai, Khasansky District, 59 km SW of Slavyanka, Furugelm Island, 42.466667N, 130.916667E, h=0-100 m, 19-21.VII 2015, 1 ♀, S.Yu. Sinev..

DISTRIBUTION. In Russia: Magadanskaya Oblast, Amurskaya Oblast, Khabarovsky Krai, Primorsky Krai, Sakhalinskaya Oblast (including the Southern Kuril Islands), Zabaikalsky Krai. Outside Russia: Japan, Korea, China.

HOST PLANTS. *Alnus* (Betulaceae).

***Caloptilia sapporella* (Matsumura, 1931)**

MATERIAL EXAMINED. Russia: Primorsky Krai, Khasansky District, 23 km SSE of Posyet, Furugelm Island, 42.452278N, 130.915667E, at light, 14, 18, 21.V 2024, 6 ex., I. Makhov.

DISTRIBUTION. In Russia: Amurskaya Oblast, Khabarovsky Krai, Primorsky Krai, Sakhalinskaya Oblast (including the Southern Kuril Islands). Outside Russia: Japan, Korea, China.

HOST PLANTS. *Quercus*, *Castanea crenata* (Fagaceae).

***Parornix retrusella* Kuznetzov, 1979**

MATERIAL EXAMINED. Russia: Primorsky Krai, Khasansky District, 23 km SSE of Posyet, Furugelm Island, 42.452278N, 130.915667E, at light, 16, 22.V 2024, 2 ♂, I. Makhov.

DISTRIBUTION. In Russia: Khabarovsky Krai, Primorsky Krai.

HOST PLANTS. *Crataegus pinnatifida* (Rosaceae).

***Acrocercops amurenssis* Kuznetzov, 1960**

MATERIAL EXAMINED. Russia: Primorsky Krai, Khasansky District, 59 km SW of Slavyanka, Furugelm Island, 42.466667N, 130.916667E, 0-100 m, 19-21.VII 2015, 1 ♀, S.Yu. Sinev.

DISTRIBUTION. In Russia: Zabaikalsky Krai, Amurskaya Oblast, Khabarovsky Krai, Primorsky Krai. Outside Russia: China.

HOST PLANTS. *Quercus mongolica* (Fagaceae).

CONCLUSION

Totally, eight species of Gracillariidae are found on Furugelm Island. Of them, *Phyllonorycter leucocorona* is recorded from Russia for the first time and *Acrocercops amurenssis, Caloptilia pulverea*, *C. sapporella*, *Liocrobyla desmodiella*, *Parornix retrusella*, *Phyllonorycter issikii*, and *Phyllonorycter* sp. are new for the fauna of this southernmost island of Russia.

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