

**FIRST DATA ON THE SPRING GEOMETRID MOTHS (LEPIDOPTERA: GEOMETRIDAE) OF KUNASHIR ISLAND, SOUTH KURILES**

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**Summary.** The late-spring fauna of geometrid moths (Lepidoptera: Geometridae) from Kunashir Island is considered for the first time. Thirty-six species are listed, among which one species, *Myrioblephara ciliornaria* (Püngeler, 1903) is recorded for the fauna of Russia for the first time, and 7 species are newly indicated for the Kuril Islands: *Cleora leucophaea* (Butler, 1878), *Trichopteryx fastuosa* Inoue, 1958, *Trichopteryx terranea* (Butler, 1878), *Trichopteryx ussurica* (Wehrli, 1927), *Esakiopteryx volitans* (Butler, 1878), *Eupithecia clavifera* Inoue, 1955 and *Eupithecia daemionata* Dietze, 1904.

**Key words:** Lepidoptera, geometrid moths, fauna, new records, Kuril Islands, Russian Far East.

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**Резюме.** Впервые рассмотрена поздневесенная фауна пядениц (Lepidoptera: Geometridae) острова Кунашир. Приведен список 36 видов, среди которых один вид, *Myrioblephara ciliornaria* (Püngeler, 1903) впервые приводится для фауны России и впервые для Курильских островов указывается 7 видов: *Cleora leucophaea* (Butler, 1878), *Trichopteryx fastuosa* Inoue, 1958, *Trichopteryx terranea* (Butler, 1878), *Trichopteryx ussurica* (Wehrli, 1927), *Esakiopteryx volitans* (Butler, 1878), *Eupithecia clavifera* Inoue, 1955 и *Eupithecia daemionata* Dietze, 1904.

**INTRODUCTION**

Despite many years of efforts, the fauna of the moths of the Kuril Islands has not yet been fully studied. The latest printed report on Lepidoptera in Russia (Sinev, 2019) for the South Kuril region (including the Urup, Iturup, Kunashir and the Lesser Kuril Chain) lists 225 species of geometrids, of which 13 species are indicated with a question mark, as the previous literary indications of it in need of revision (Beljaev & Mironov, 2019). Almost all of the above species are known from the Kunashir, with the exception of 4 species that have so far been recorded only on Shikotan (*Hypoxystis mandli* Schawerda, 1924; *Eulithis convergenata* (Bremer, 1864); *Gandaritis fixseni* (Bremer, 1864); *Paradysstroma corussaria* (Oberthür,

1880)), and one species which known so far only from Urup and Iturup (*Epirrita autumnata* (Borkhausen, 1794)) (Beljaev, 2016). However, all these species are likely to inhabit Kunashir also.

Considering the recent publications (Rybalkin, 2020; Rybalkin *et al.*, 2022), adapted in the electronic version 2.2 of the Catalog of Lepidoptera of Russia, 11 species of geometrids have been added to the list of species of the South Kuril region (Beljaev & Mironov, 2023), all of which were found on Kunashir Island. In addition, 3 questioned species (*Protoarmia faustinata* (Warren, 1897); *Xerodes albonotaria* (Bremer, 1864); and *Scopula frigidaria* (Möschler, 1860)) have to be added to the main list based on the data on the GBIF website (Kurina, 2023), all from Kunashir. Thus, to date, 221 species of geometrid moths are known from Kunashir, excluding those requiring confirmation.

This paper publishes eight species of geometrid moths new to Kunashir Island (and to the southern Kurils as a whole), among which one species is new to Russia. Since the spring fauna of geometrids from the Kurils was still unknown, a list of all geometrid species collected together with new finds is given, including species published earlier (Rybalkin *et al.*, 2022).

The materials were collected by the first author on Kunashir from 18 May to 4 June 2021 in the Tretyakovo village located 4.5 km NW of Mendeleevo airport, at the west coast of the island (43°59'30.44" N; 145°38'56.26" E). The collection site is located at the border of mixed forest (with predominance of *Quercus* sp., *Acer* sp., *Betula* sp., *Alnus* sp., *Ulmus* sp., *Prunus* sp., *Picea* sp., *Abies* sp.) and meadows with thickets of *Rosa* sp.). The moths were collected at a light trap using a DRV-250 lamp.

Nomenclature and order of taxa is given according to the Catalogue of the Lepidoptera of Russia (Beljaev & Mironov, 2019). The distribution of species is adopted from Beljaev (2016), if another not stated. Double asterisks (\*\*) indicate the species new to Russia and one asterisk (\*) indicates species new to Kunashir Island. For newly recorded species general distribution and remarks with known host plants of larvae are provided. For species previously known from the island first literature reports are given. All the material is deposited in the private collection of S. Rybalkin.

## LIST OF SPECIES

### Family Geometridae

#### Subfamily Ennominae

##### ***Parabapta aetheriata* (Graeser, 1889)**

*Parabapta aetheriata*: Rybalkin *et al.*, 2022: 22.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 20–21.V 2021, 2 ♂, 26.05.–4.VI 2021, 7 ♂.

##### ***Petrophora chlorosata* (Scopoli, 1763)**

*Petrophora chlorosata*: Mironov *et al.*, 2008: 195.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 20.V–4.VI 2021, 14 ex.

##### ***Odontopera bidentata* (Clerck, 1759)**

*Gonodontis bidentata*: Konovalova, 1970: 176.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 23–25.V 2021, 1 ♂, 27.V–3.VI 2021, 1 ♂.

***Selenia tetralunaria* (Hufnagel, 1769)**

*Selenia tetralunaria*: Mironov *et al.*, 2008: 192.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 20–21.V 2021, 1 ♂.

***Endropiodes indictinaria* (Bremer, 1864)**

*Endropiodes indictinaria*: Konovalova, 1970: 176.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 21–22.V 2021, 1 ♂.

***Cleora insolita* (Butler, 1878)**

*Cleora insolita*: Viidalepp, 1996: 89.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 20.V–3.VI 2021, 8 ♂.

**\**Cleora leucophaea* (Butler, 1878)**

Fig. 1

MATERIAL. **Russia**: Kunashir Island, 4.5 km NW Mendeleevo airport, Tretyakovo village, 21–22.V 2021, 2 ♂, 1 ♀, leg. S. Rybalkin.

DISTRIBUTION. Russia (Primorskii Krai, S Kurils – Kunashir), Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima), Korea, China (Taiwan). This species is recorded from Kuril Islands for the first time.

REMARKS. The larvae are polyphagous on different leaved trees, in Japan they recorded on *Quercus salicina*, *Castanea crenata* (Fagaceae), *Malus* (Rosaceae) and *Wisteria floribunda* (Fabaceae) (Sato, 2011).

***Ectropis crepuscularia* (Denis et Schiffmüller, 1775)**

*Boarmia bistortata* (Goeze, 1781): Konovalova, 1970: 177.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 21–22.V 2021, 1 ♂, 1 ♀, 26.V–3.VI 2021, 2 ♀.

***Ectropis obliqua* (Prout, 1915)**

*Ectropis obliqua*: Mironov *et al.*, 2008: 202, 338.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 23–25.V 2021, 1 ♂, 1 ♀.

***Aethalura ignobilis* (Butler, 1878)**

*Aethalura ignobilis*: Viidalepp, 1979: 791.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 20–21.V 2021, 1 ♂, 27.V–3.VI 2021, 1 ♂, 1 ♀.

**\*\**Myrioblephara cilicornaria* (Püngeler, 1903)**

Fig. 2

**MATERIAL.** Russia: Kunashir Island, 4.5 km NW Mendeleevo airport, Tretyakovo village, 27.V 2021, 1 ♂, leg. S. Rybalkin.

**DISTRIBUTION.** Russia (S Kurils – Kunashir), Japan (Hokkaido, Honshu, Kyushu) (Sato, 2011), S Korea (Kim *et al.*, 2001), China (Taiwan) (Sato, 1986; Fu *et al.*, 2013). This species is new for the fauna of Russia.

**REMARKS.** Known host plants are different Fagaceae: in Japan hatched larvae were fed with *Quercus crispula* (Sato, 2011), and larva was found and successfully developed on *Castanea crenata* (Anonym, 2022). In Japan moth appearing from late April to late May, overwinters as pupae (Sato, 2011). R. Sato (2011) considers *Myrioblephara cilicornaria* as endemic to Japan.

***Cusiala stipitaria* (Oberthür, 1880)**

*Boarmia stipitaria*: Konovalova, 1970: 177.

**MATERIAL.** Russia: Kunashir Island, Tretyakovo, 21–22.V 2021, 1 ♂.

***Lycia hirtaria parallelaria* Inoue, 1958**

*Lycia hirtaria* (Clerck, 1759): Mironov *et al.*, 2008: 202.

**MATERIAL.** Russia: Kunashir Island, Tretyakovo, 18.V–4.VI 2021, 60 ♂.

**REMARKS.** The island subspecies *L. h. parallelaria* from Japan, Sakhalin and Kurils differs markedly from the continental moths of *L. hirtaria* in the wing pattern and male genitalia structure, and possibly deserves species rank; molecular studies are required.

***Lassaba nikkonis* (Butler, 1881)**

*Lassaba nikkonis*: Rybalkin *et al.*, 2022: 22.

**MATERIAL.** Russia: Kunashir Island, Tretyakovo, 18–25.V 2021, 17 ♂, 5 ♀, 4.VI 2021, 1 ♀.

***Paradarisa consonaria* (Hübner, 1799)**

*Ectropis consonaria*: Viidalepp, 1979: 791.

**MATERIAL.** Russia: Kunashir Island, Tretyakovo, 20.V–4.VI 2021, 31 ♂, 12 ♀.

***Pseuderannis lomezemia* (Prout, 1930)**

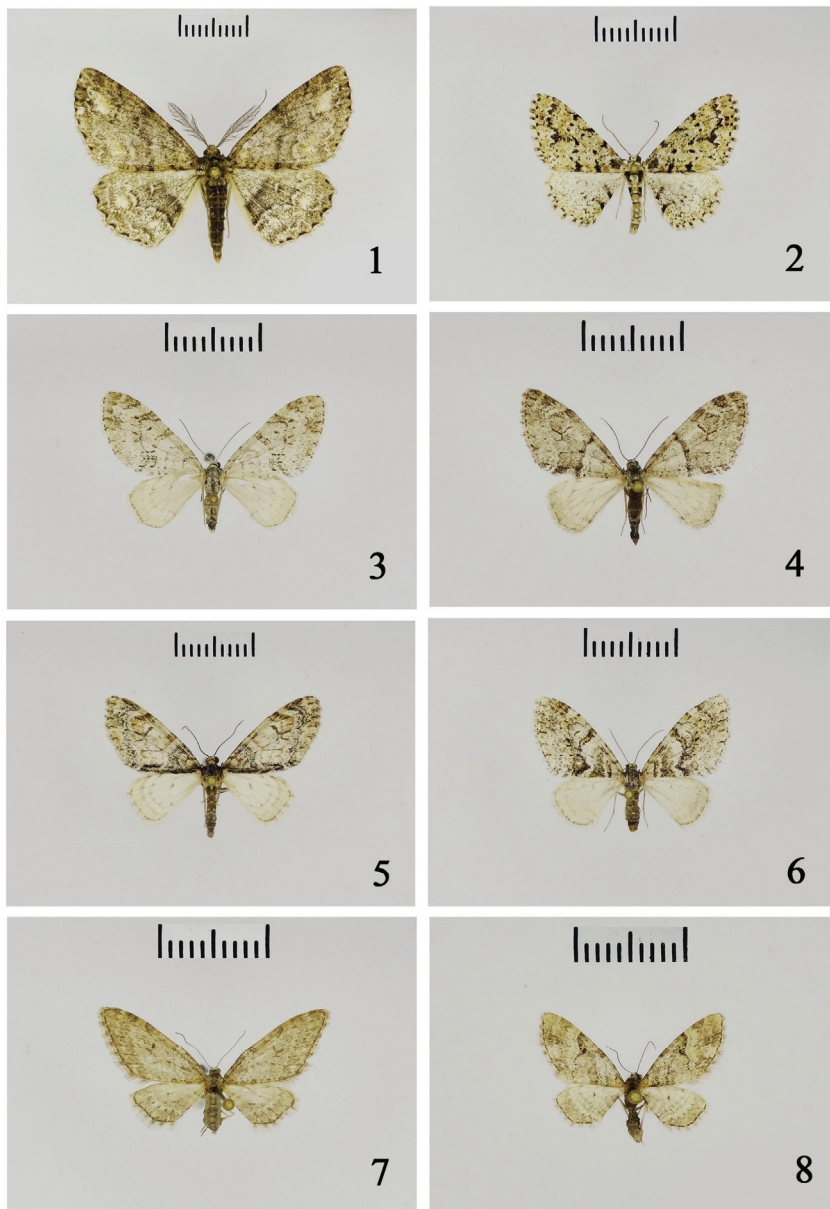
*Pseuderannis lomezemia*: Rybalkin *et al.*, 2022: 22.

**MATERIAL.** Russia: Kunashir Island, Tretyakovo, 18.V–3.VI 2021, 35 ♂, 47 ♀.

***Xerodes rufescentaria* (Motschulsky, 1861)**

*Xerodes rufescentaria*: Beljaev, 2016: 566.

**MATERIAL.** Russia: Kunashir Island, Tretyakovo, 18.V–4.VI 2021, 33 ♂, 13 ♀.



Figs 1–9. Moths from Kunashir Island, dorsal view. 1 – *Cleora leucophaea* (Butler, 1878), ♂; 2 – *Myrioblephara cilicornaria* (Püngeler, 1903), ♂; 3 – *Trichopteryx fastuosa* Inoue, 1958; 4 – *Trichopteryx terranea* (Butler, 1878); 5 – *Trichopteryx ussurica* (Wehrli, 1927), ♂; 6 – *Esakiopteryx volitans* (Butler, 1878), ♀; 7 – *Eupithecia clavifera* Inoue, 1955; 8 – *Eupithecia daemionata* Dietze, 1904.

## Subfamily Larentiinae

### *Acasis viretata* (Hübner, 1799)

*Acasis viretata*: Vasilenko, 1992: 283.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 18–25.V 2021, 9 ex., 4.VI 2021, 2 ex.

### \**Trichopteryx fastuosa* Inoue, 1958

Fig. 3

MATERIAL. **Russia**: Kunashir Island, 4.5 km NW Mendeleevo airport, Tretyakovo village, 18–26.V 2021, 12 ex., leg. S. Rybalkin.

DISTRIBUTION. Russia (SW Sakhalin: Beljaev & Titova, 2023; S Kurils – Kunashir), Japan (Hokkaido, Honshu, Shikoku, Kyushu), China (Taiwan).

REMARKS. The larvae possibly are polyphagous on different trees, in Japan they reared on *Fagus japonica* (Fagaceae), *Carpinus japonica* (Betulaceae) and *Acer amoenum* (Sapindaceae) (Hashimoto, 2021).

### *Trichopteryx hemana* (Butler, 1878)

*Trichopteryx hemana*: Rybalkin *et al.*, 2022: 23.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 18.V–4.VI 2021, 65 ex.

### \**Trichopteryx terranea* (Butler, 1878)

Fig. 4

MATERIAL. **Russia**: Kunashir Island, 4.5 km NW Mendeleevo airport, Tretyakovo village, 21–27.V 2021, 8 ex., leg. S. Rybalkin.

DISTRIBUTION. Russia (S Amurskaya Oblast, S Khabarovskii Krai, Primorskii Krai, S Kurils – Kunashir), China (Heilongjiang, Taiwan), Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima). Here this species is recorded for the first time from the Kuril Islands.

REMARKS. In Japan known hostplants of the species is *Quercus myrsinifolia* (Fagaceae), and hatched larvae were fed with *Quercus glauca* (Fagaceae) and *Zelkova serrata* (Ulmaceae) (Hashimoto, 2021).

### \**Trichopteryx ussurica* (Wehrli, 1927)

Fig. 5

MATERIAL. **Russia**: Kunashir Island, 4.5 km NW Mendeleevo airport, Tretyakovo village, 20.V 2021, 1 ♂, leg. S. Rybalkin.

DISTRIBUTION. Russia (S Khabarovskii Krai, Primorskii Krai), Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima). Here this species is recorded for the first time from the Kuril Island.

REMARKS. In Japan known hostplants of the larvae is *Ligustrum obtusifolium* (Oleaceae) (Hashimoto, 2021). This plant species absents in the Russian Far East but *Ligustrum tschonoskii*

(= *L. yezoense*) is known from Kurils and Sakhalin. Also, *Syringa reticulata* (Oleaceae) (in Khabarovskii Krai Primorskii Krai and S Kurils) from related genus could be hostplant for *T. ussurica*.

***Paralobophora ustata* (Christoph, 1881)**

*Trichopteryx ustata*: Rybalkin *et al.*, 2022: 23.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 18.V–3.VI 2021, 4 ♂, 3 ♀.

**\**Esakiopteryx volitans* (Butler, 1878)**

Fig. 6

MATERIAL. **Russia**: Kunashir Island, 4.5 km NW Mendeleevo airport, Tretyakovo village, 21.V 2021, 1 ♀, leg. S. Rybalkin.

DISTRIBUTION. Russia (S Amurskaya Oblast, S Khabarovskii Krai, Primorskii Krai, S Kurils – Kunashir), NE China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima) (Hashimoto, 2021). This species is recorded from Kuril Islands for the first time.

REMARKS. In the continental part of the Russian Far East larvae feed on *Quercus mongolica* (Fagaceae) (Beljaev, 2016), in Japan – on *Fagus japonica* and different *Quercus* spp. (Fagaceae) (Hashimoto, 2021).

***Idiotephria evanescens* (Staudinger, 1897)**

*Idiotephria evanescens* Rybalkin *et al.*, 2022: 22.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 18.V–4.VI 2021, 14 ex.

***Euphyia cineraria* (Butler, 1878)**

*Euphyia cineraria luctuosaria* (Oberthür, 1879): Viidalepp, 1977: 571.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 27.V–3.VI 2021, 1 ♂.

***Euphyia unangulata* (Haworth, 1809)**

*Cidaria (Euphyia) tonnaichana sregnelli* Bryk 1942: 72.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 21–22.V 2021, 16 ex.

***Xanthorhoe biriviata* (Borkhausen, 1794)**

*Xanthorhoe biriviata angularia* (Leech, 1897): Viidalepp, 1977: 564.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 18–22.V 2021, 2 ♂, 26–27.V 2021, 1 ♀.

***Lampropteryx otregiata* (Metcalf, 1917)**

*Lampropteryx otregiata*: Kuwayama, 1967: 75.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 20–21.V 2021, 1 ex., 26.V–3.VI 2021, 3 ex.

***Venusia semistrigata* (Christoph, 1881)**

*Venusia semistrigata*: Rybalkin *et al.*, 2022: 24.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 18.V–3.VI 2021, 7 ex.

***Pasiphila excisa* (Butler, 1878)**

*Rhinoprora excisa*: Mironov, 1990: 660.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 21–22.V 2021, 1 ♂.

**\**Eupithecia clavifera* Inoue, 1955**

Fig. 7

MATERIAL. **Russia**: Kunashir Island, 4.5 km NW Mendeleevo airport, Tretyakovo village, 18.V–4.VI 2021, 38 ex., leg. S. Rybalkin.

DISTRIBUTION. Russia: S RFE (S Khabarovskii Krai, Primorskii Krai, S Kurils – Kunashir), Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima), S Korea, China (Gansu, Shaanxi, Taiwan).

REMARKS. The larvae are polyphagous on different leaved shrubs and trees, in Japan they recorded on Fabaceae, Fagaceae, Rosaceae, Cornaceae and Caprifoliaceae (Nakajima & Yazaki, 2011).

**\**Eupithecia daemionata* Dietze, 1904**

Fig. 8

MATERIAL. **Russia**: Kunashir Island, 4.5 km NW Mendeleevo airport, Tretyakovo village, 18.V–4.VI 2021, 6 ex., leg. S. Rybalkin.

DISTRIBUTION. Russia (Amurskaya Oblast, Khabarovskii Krai, Primorskii Krai, Sakhalin, S Kurils – Kunashir), Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima), S Korea, NE China. This species is recorded from Kuril Islands for the first time.

REMARKS. Host plants are unknown.

***Eupithecia kurilensis* Bryk, 1942**

*Eupithecia kurilensis*: Viidalepp, Mironov, 1988b: 284.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 27.V–3.VI 2021, 1 ♂.

***Eupithecia tantilloides* Inoue, 1958**

*Eupithecia tantilloides*: Viidalepp, 1978: 756.

MATERIAL. Russia: Kunashir Island, Tretyakovo, 27.V–3.VI 2021, 2 ♂.

## CONCLUSION

Considering the latest finds of 8 species published here, the fauna of geometrid moths of Kunashir Island has reached 229 species. Apparently, their summer fauna on the island is mainly revealed, since recent intensive collecting at light, carried out in the beginning of August, did not bring new findings (Vasilenko & Dubatolov, 2021). The collecting of moths



performed at the end of spring and in the first days of summer, gave 15 new species of geometrids for Kunashir (7 of them was published in Rybalkin *et al.*, 2022), which is near the half (~42%) of all 36 ones collected in this period. All newly found species have East Asian ranges and are known from Hokkaido. Probably, collections at earlier dates and in other places of the island may reveal a number of new species of spring moths for Kunashir, which are known from the neighboring island.

Phenologically, the beginning of the collection of moths coincides with the flowering of the cherry *Prunus sargentii* (= *Prunus sachalinensis*) (Fig. 9) and the aspeking of the flowering of *Erythronium japonicum* (Liliaceae) under the still completely leafless forest canopy. The phenophase of oak *Quercus crispula* corresponds to the swollen bud. The leaf unfolding and expanded leaf growth occurred only at the end of May. The delay of the oak phenophases in Kunashir was about 2 weeks compared to the one-latitudinal coastal territories of the continental Russian Far East.

Five species were most numerous: *Pseuderannis lomozenia* (82 collected ex.), *Trichopteryx hemana* (65 ex.), *Lycia hirtaria* (60 ex.), *Xerodes rufescentaria* (46 ex.) and *Paradarisa consonaria* (43 ex.), which usually also common on the continental Far Eastern same latitude territories.



Fig. 9. Deciduous forest near the collection site with leafy *Betula ermanii*, flowering *Prunus sargentii* and *Quercus crispula* retaining last year's brown leaves yet. (Photo by S. A. Rybalkin, 20 May 2021).

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