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First data on autumn Geometridae (Lepidoptera) on the Kuril Islands

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Abstract. The autumn fauna of geometrid moths (Lepidoptera: Geometridae) from Kunashir Island is considered for the first time. Thirty two species are listed, among which two species — *Ramobia mediodivisa* Inoue, 1953, and *Martania fulvida* (Butler, 1881) are recorded for the fauna of Russia for the first time, and eight species are newly indicated for the Kuril Islands — *Colotois pennaria* (Linnaeus, 1761), *Orthonama obstipata* (Fabricius, 1794), *Photoscotia lucicolens* (Butler, 1878), *Epirrita autumnata* (Borkhausen, 1794), *Gandaritis fixseni* (Bremer, 1864), *Pennithera comis* (Butler, 1879), *Venusia phasma* (Butler, 1879) and *Spiralisigna subpumilata* (Inoue, 1972). The phenological aspects of the collection period of the moths are briefly discussed.

Keywords: Lepidoptera, Geometridae, fauna, new records, Russia, Kuril Islands, Kunashir

Первые данные об осенних пяденицах (Lepidoptera: Geometridae) на Курильских островах

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Аннотация. Впервые рассмотрена осенняя фауна пядениц (Lepidoptera: Geometridae) острова Кунашир. Приведено 32 вида, среди которых 2 вида – *Ramobia mediodivisa* Inoue, 1953 и *Martania fulvida* (Butler, 1881) отмечены впервые для фауны России, и 8 видов указаны впервые для Курильских островов – *Colotois pennaria* (Linnaeus, 1761), *Orthonama obstipata* (Fabricius, 1794), *Photoscotia lucicolens* (Butler, 1878), *Epirrita autumnata* (Borkhausen, 1794), *Gandaritis fixseni* (Bremer, 1864), *Pennithera comis* (Butler, 1879), *Venusia phasma* (Butler, 1879) и *Spiralisigna subpumilata* (Inoue, 1972). Кратко рассмотрены фенологические аспекты периода сбора бабочек.

Ключевые слова: Lepidoptera, Geometridae, фауна, новые находки, Россия, Курильские острова, Кунашир

Introduction

Fauna of moths of the Kuril Islands has not yet been sufficiently 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, since their previous literary indications are in need of revision (Beljaev, Mironov 2019). Almost all of the above species, 220, are known from the best studied island, Kunashir, with the exception of five species recorded only from neighboring islands, Shikotan and Iturup (Beljaev 2016).

Recently 11 species of geometrids have been added to the Kunashir fauna (Rybalkin 2020; Rybalkin et al. 2022), which was included in South Kuril region in the electronic version 2.3 of the *Catalog of Lepidoptera of Russia* (Beljaev, Mironov 2023). In addition, three species (*Protoboarmia faustinata* (Warren, 1897), *Xerodes albonotaria* (Bremer, 1864) and *Scopula frigidaria* (Möschler, 1860) have to be added to the Kunashir fauna based on the data on the GBIF website (Kurina 2023). Thus, to date, 221 species of Geometridae are known from Kunashir, excluding those requiring confirmation.

This publication deals with autumn fauna of geometrid moths on Kunashir Island, before totally unknown.

Material and methods

The materials were collected by one of the authors, Vladimir V. Dubatolov, during the expedition on Kunashir Island in September and October 2022, which was undertaken in collaboration with Vadim K. Zinchenko. Moths were collected at the light of a 160-watt DRV lamp powered by a portable gasoline generator, as well as in a light trap with 8-watt LED-lamps powered by a 12-volt battery, and using scented baits.

The collection sites and dates for moths on Kunashir Island were as follows:

Yuzhno-Kurilsk, office of the Kurilsky Nature Reserve, 44°02'24" N, 145°51'37" E, 13–14.09.2022: moths were collected at the light of the DRV lamp in the coastal

wasteland with plots of meadows and with a small number of various planted trees and shrubs on the territory of the office;

Danilovskii Cordon, 43°57'14" N, 145°35'35" E, 15–24.09.2022, and 7–12.10.2022: it is located on the ruderal wasteland among the seaside tall grass meadows; moths were collected at light on the wall of the cordon building facing to the mountain slope with mixed coniferous-deciduous forest, and on scented baits.

Andreevskii Cordon, 43°53'16" N, 145°37'29" E, 25.09–7.10.2022, and 14–25.10.2022: moths were collected at light and in light traps on the plateau with the sparse mixed forest west to the cordon in different places, and on scented baits on the nearby mountain slope.

Sequence of taxa is given according to Beljaev & Mironov (2019). Distribution of species is given from west to east and from north to south, with more details in East Asia. The distribution in Russia is adopted from Beljaev, Mironov (2023), in Japan — from Nakajima (2011), Nakajima, Yazaki (2011) and Sato (2011), in Korea — from Kim et al. (2001) and Kim et al. (2016), general distribution — mainly from Beljaev (2016), with some clarifications when necessary.

Species new to Russia are marked with double asterisks (**), and species new to Kunashir Island are marked with a single asterisk (*).

All the material is deposited in Institute of Systematics and Ecology of Animals, Novosibirsk.

Abbreviations: JAO — Jewish Autonomous Oblast; Kr. — Krai; Obl. — Oblast; Pen. — Peninsula; RFE — Russian Far East; VO — visual observation; ibid. — ibidem; ind. — individual(s).

Results

List of species

Family GEOMETRIDAE

Subfamily Ennominae

Cabera purus (Butler, 1878)

Material. Andreevskii Cordon, at light, 4.10.2022 — 2♀.

Distribution. Russia (S RFE: S Amurskaya Obl., JAO, S Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir, Shikotan); N China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. In Japan it develops in two generations, moths fly May-June and July-August (Sato 2011). Larvae feed on various species of *Alnus* spp. and *Betula* spp. (Betulaceae).

Lomographa simplicior (Butler, 1871)

Material. Yuzhno-Kurilsk, 13–14.09.2022 — 3♀.

Distribution. Russia (S RFE: SW Sakhalin (Beljaev, Titova 2023), S Kurils — Kunashir, Shikotan); SW China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima, Yakushima, Tanegashima).

Remarks. In Japan moths appear from the end of August and can be seen until the end of October. Larvae were noted feeding on various arboreal plants from rose family — *Malus*, *Cerasus*, *Padus*, *Sorbus* (Rosaceae), and on *Quercus crispula* and *Quercus acutissima* (Fagaceae) (Sato 2011). In Sakhalin moths were collected from the second week of August (Beljaev, Titova 2023).

Garaeus specularis Moore, 1868

Material. Danilovskii Cordon, at light, 18.09.2022 — 1♂; Andreevskii Cordon, at light, 25–26.09.2022 — 1♀.

Distribution. Russia (S RFE: S Kurils — Kunashir); China (SW, Central and E, Taiwan), ?Korea, Japan (Hokkaido, Honshu, Shikoku and Kyushu), NE and N India, Nepal.

Remarks. The species was first reported from Kunashir by Rybalkin (2020) at the first half of September in a large number of individuals. In Japan it develops in two generations, moths are common everywhere and can be seen from July to October; overwinters as eggs (Sato 2011). On Kurils, evidently, it produces only one generation, as at summer time it has never been met. On Kunashir, in Japan and Korea the subspecies *Garaeus specularis mactans* (Butler, 1878) (= *fenestratus* Butler, 1881) is distributed, which, however, weakly differs from nominative form from India (Sato 2011). Presence of this species in Korea needs to be confirmed, as there is no other information ever since Prout (1912) first reported it

without collection site data (Kim et al. 2016). Larvae are polyphagous, in Japan they feed on various arboreal leaved plants (Sato 2011).

****Colotois pennaria*** (Linnaeus, 1761)

Material. Andreevskii Cordon, 14.10.2022 — 27♂, 7♀; ibid, 16.10.2022 — 2♂; at light, 16–17.10.2022 — 1♂; ibid, 17–18.10.2022 — 3♂; ibid, 18–19.10.2022 — 2♂; ibid, 19.10.2022 — 3♂; ibid, 19–20.10.2022 — 3♂; ibid, 20.10.2022 — 4♂, 3♀; ibid, forest, 20–21.10.2022 — 8♂; ibid, 21–22.10.2022 — 4♂, 7♀; ibid, forest, 21–22.10.2022 — 2♂; ibid, 22–23.10.2022 — 27♂, 10♀; ibid, forest with oaks on slope, in light trap, 23.10.2022 — 1♀; ibid, 23–24.10.2022 — 5♀ + VO; ibid, 24–25.10.2022 — 2♀; ibid, 25.10.2022 — VO; forest across the Andreevka River, 21–22.10.2022 — 4♂, 1♀.

Distribution. Russia (European part, Crimea, Urals, S RFE: Amurskaya Obl., S Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir); Europe, N Africa, Turkey, Transcaucasia, Turkmenistan, NE China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu), N America (introduced?).

Remarks. A new species for the Kuril Islands, when it is represented by the East Asian subspecies *C. p. ussuriensis* O. Bang-Haas, 1927. This is an autumn species, in Japan it appears from the end of August and can be seen until the end of October (Sato 2011), but on Kunashir it began to fly only at middle October. Larvae are polyphagous, feed on various arboreal leaved plants.

Ennomos nephotropa Prout, 1930

Material. Danilovskii Cordon, at light, 18.09.2022 — 1♀; Andreevskii Cordon, at light, 25–26.09.2022 — 4♂, 2♀; ibid, 29.09.2022 — 3♂; ibid, 30.09.2022 — 1♂; ibid, 4.10.2022 — 1♂.

Distribution. Russia (S RFE: Sakhalin, S Kurils — Kunashir); Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. Moths fly on Kunashir from beginning of September (Rybalkin 2020) to beginning of October. In Japan they occur from the end of June and can be seen until October (Sato 2011). Host plants of larvae in Japan are many arboreal broad-leaved plants (Sato 2011).

Ourapteryx maculicaudaria (Motschulsky, 1866)

Material. Andreevskii Cordon, at light, 25–26.09.2022 — 1♂; 26.09.2022 — VO; Danilovskii Cordon, at light, 17.09.2022 — 1♀; ibid, 18.09.2022 — 1♂, 1♀; ibid, 22.09.2022 — 1♀; ibid, 24.09.2022 — 1♀; ibid, in LED-trap: 18.09.2022 — 1♀.

Distribution. Russia (S RFE: SE Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Iturup, Kunashir); Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima).

Remarks. In Japan the species develops in two generations, moths appear in June–July and September–October (Sato 2011). In continental RFE and in Sakhalin and the Kurils it develops in one generation and moths fly from August. Larvae feed on various Taxaceae (*Taxus*, *Torreya*, *Cephalotaxus*) and were noted on *Picea jezoensis* (Pinaceae) (Sato 2011).

Gigantalcis flavolinearia (Leech, 1891)

Material. Danilovskii Cordon, at light, 23–24.09.2022 — 2♂; ibid, 7.10.2022 — 1♂; Andreevskii Cordon, at light, 1–2.10.2022 — 2♂; ibid, 4.10.2022 — 1♀; ibid, forest with oaks on slope, in light-trap, 16.10.2022 — 1♀.

Distribution. Russia (S RFE: SW Sakhalin, S Kurils — Kunashir); Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. This is an autumn species, flying on Kunashir from the second week of September (Rybalkin 2020) to mid-October and in Japan from September to November. Host plants of larvae in Japan are arboreal Rosaceae (*Cerasus*, *Malus*, *Sorbus*) (Sato 2011).

Cusiala stipitaria (Oberthür, 1880)

Material. Danilovskii Cordon, at light, 24.09.2022 — 1♂; Andreevskii Cordon, at light, 21.10.2022 — 1♀; ibid, 25.09.2022 — 1♂; ibid, forest above the cordon, at light, 26.09.2022 — 1♂.

Distribution. Russia (S RFE: Amurskaya Obl., S Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir); NE and SW China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima, Yakushima, Amami Oshima).

Remarks. Normally moths fly in May and June, as they overwinter as pupae. The collected moths represent small specimens

likely belonging to partial second generation, leaving no offspring. Larvae feed on various leaved trees and shrubs.

*****Ramobia mediodivisa*** Inoue, 1953 (Fig. 1: A)

Material. Danilovskii Cordon, at light, 24.09.2022 — 1♂, 1♀.

Distribution. Russia (S RFE: S Kurils — Kunashir); S Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. A new species for the fauna of Russia. This is an autumn species, flying in Japan from September to November; overwinters as eggs (Sato 2011). Host plant of larvae, probably, are *Magnolia* spp. (Magnoliaceae), as in Japan the hatched larvae were successfully bred on *Magnolia obovata*, and related species, *Ramobia basifuscaria* (Leech, 1891), also feeds on this tree (Sato 2011).

Alcis medialbifera Inoue, 1972

Material. Danilovskii Cordon, at light, 15.09.2022 — 2♂, 1♀; ibid, 16.09.2022 — VO of many ind.; ibid, 17.09.2022 — many ind.; ibid, 18.09.2022 — 1♀ + VO of many ind.; ibid, 22–23.09.2022 — 2♀ + VO; ibid, 23.09.2022 — 2♂, 1♀ + VO; ibid, forest with oaks on slope, in LED-trap, 18.09.2022 — 3♀; Andreevskii Cordon, at light, 25–26.09.2022 — 2♀; ibid, 26.09.2022 — VO; ibid, 29.09.2022 — VO; ibid, 30.09.2022 — VO; ibid, 1.10.2022 — VO; ibid, at day time, 27.09.2022 — 1♀ (Zinchenko); cospes on slope, at light, 26.09.2022 — VO.

Distribution. Russia (S RFE: Amurskaya Obl., S Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir, Shikotan); NE China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. In Japan it develops in one generation, moths occur from August to October (Sato 2011). Larvae feed on various conifers (Pinaceae).

Alcis picata (Butler, 1881)

Material. Danilovskii Cordon, at light, 16.09.2022 — 2♀.

Distribution. Russia (S RFE: S Kurils — Kunashir, Shikotan); Korea, Japan (Hokkaido, Honshu).

Remarks. In Japan moths appear from July to September (Sato 2011). Natural host plants

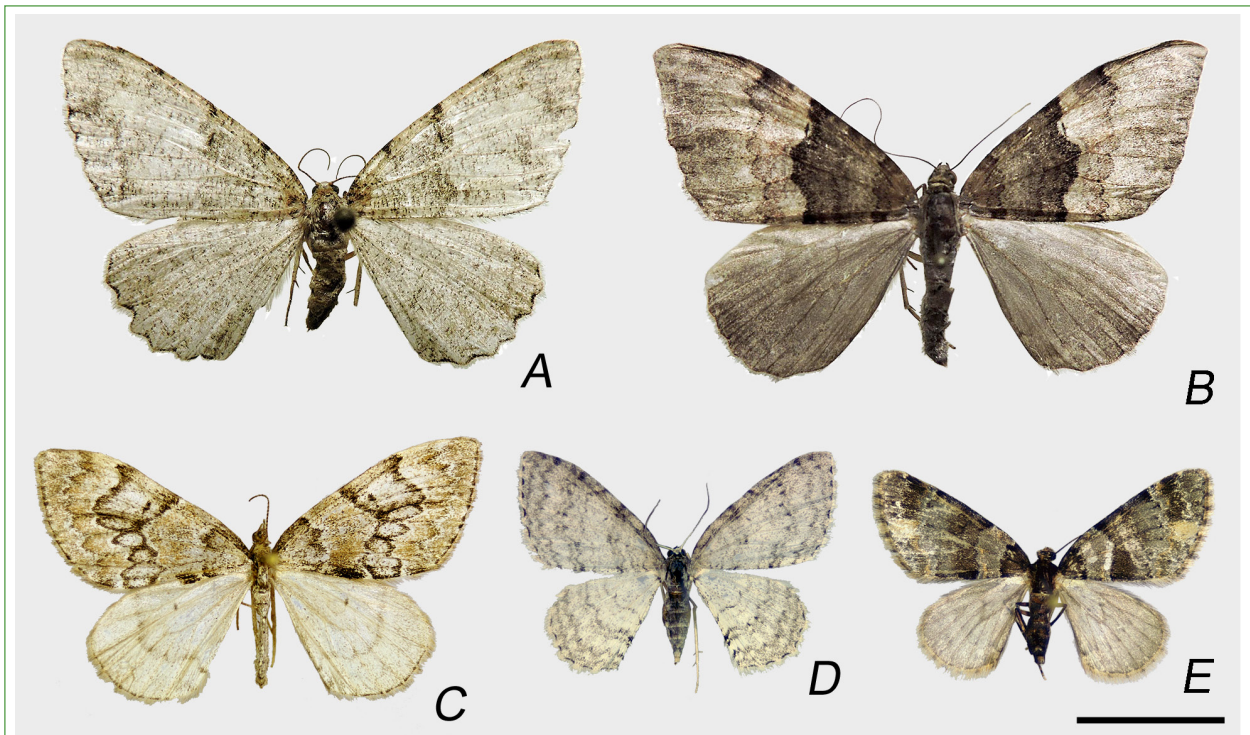


Fig. 1. New geometrid moths (Geomtridae) from Kunashir Island: A — *Ramobia mediodivisa*, female; B — *Photoscotosia lucicolens*, female; C — *Pennithera comis*, female; D — *Venusia phasma*, female; E — *Martania fulvida*, female. The scale bar — 10 mm

Рис. 1. Новые виды пядениц (Geomtridae) с о-ва Кунашир: A — *Ramobia mediodivisa*, самка; B — *Photoscotosia lucicolens*, самка; C — *Pennithera comis*, самка; D — *Venusia phasma*, самка; E — *Martania fulvida*, самка. Масштабная линейка — 10 мм

unknown, but the larvae have been successfully bred on various plants, including conifers (*Larix*, Pinaceae) (Sato 2011).

Subfamily Geometrinae

Hemithea aestivaria (Hübner, 1799)

Material. Andreevskii Cordon, at light, 25–26.09.2022 — 1♀.

Distribution. Russia (European part, N Caucasus, Urals, W Siberia, S Siberia, S Yakutia, S RFE: Amurskaya Obl., JAO, S Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir); Europe, Turkey, Transcaucasia, N Kazakhstan, Mongolia, NE and N China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima, Iriomote Island), N America (introduced).

Remarks. In N and Central Japan moths appear from June to early August (Nakajima 2011). This specimen from Kunashir, collecting at the end of September, evidently, appears in result of some developmental impairment. Larvae are polyphagous on various woody and herbaceous plants.

Subfamily Larentiinae

**Orthonama obstipata* (Fabricius, 1794)

Material. Danilovskii Cordon, 11–12.10.2022 — 1♂.

Distribution. Russia (European part, N Caucasus, Urals, S Siberia, S RFE: Amurskaya Obl., Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir); almost cosmopolitan, except most northern and most southern territories, and Australia.

Remarks. A new species for the Kuril Islands, but possibly migrant, as in Europe north of subtropics (Hausmann, Viidalepp 2012). In Japan it occurs through all islands, is common, and moths appear from the end of March to the beginning of November (Nakajima, Yazaki 2011). Larvae are polyphagous on herbs, shrubs and trees.

Costaconvexa caespitaria (Christoph, 1881)

Material. Yuzhno-Kurilsk, 13.09.2022 — 1♂.

Distribution. Russia (S Siberia: Zabaikalskii Kr., S RFE: Amurskaya Obl., S Khabarovskii Kr., Primorskii Kr., S Kurils — Kunashir); Korea, Japan (Hokkaido, Honshu, Shikoku).

Remarks. In Japan the species develops in two generations, in Central Honshu moths appear in May–June and September–October. Host plant is unknown (Nakajima, Yazaki 2011). Larvae of the West Palearctic species, *Costaconvexa polygrammata* (Borkhausen, 1794), feed on *Galium* spp. (Rubiaceae) (Hausmann, Viidalepp 2012).

Photoscotosia atrostrigata (Bremer, 1864)

Material. Danilovskii Cordon, at light, 16.09.2022 — 1♂; ibid, 18–19.09.2022 — 1♂; above Andreevskii Cordon, forest edge, at light, 26.09.2022 — 1♂; Andreevskii Cordon, at light, 1.10.2022 — 1♀; ibid, 4.10.2022 — 1♀.

Distribution. Russia (S RFE: S Amurskaya Obl., S Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir, Shikotan); China (except west, including Taiwan), Korea, Japan (Hokkaido, Honshu, Shikoku).

Remarks. In Japan in central Honshu moths appear in May–June and September–October. There are no records in the field, but in Japan larvae derived from eggs, were successfully breed only on *Artemisia indica* var. *maximowiczii* (Nakajima, Yazaki 2011).

**Photoscotosia lucicolens* (Butler, 1878)

(Fig. 1: B)

Material. Andreevskii Cordon, slope path inside forest, 18–19.10.2022 — 1♀.

Distribution. Russia (SW Primorskii Kr., S Kurils — Kunashir); NE China (Jilin), S Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Yakushima).

Remarks. A new species for the Kuril Islands. Second report of this species from Russia after first record in S Primorskii Kr. (Beljaev, Knyazev 2021). In Central Japan moths fly twice — from June to July and in October, but on the Kurils they have never been reported at summer. Larvae are probably polyphagous on deciduous trees and shrubs (Nakajima, Yazaki 2011).

Eulithis achatinellaria (Oberthür, 1880)

Material. Yuzhno-Kurilsk, 13.09.2022 — VO; Danilovskii Cordon, at light, 15.09.2022 — 1 ind. VO; ibid, 16.09.2022 — 1♂.

Distribution. Russia (S of West Siberia, S Siberia, S Yakutia, S RFE: S Amurskaya Obl., JAO, S Khabarovskii Kr., Primorskii Kr., S

and central Sakhalin, S Kurils — Kunashir, Shikotan); Mongolia, China (NE, N, Western Plateau), Korea, Japan (Hokkaido). In Beljaev (2016: 416), the distribution of *E. achatinellaria* in “Honshu, Shikoku, Kyushu, Tsushima, Yakushima, Okinawa” is given erroneously in result of a misprint.

Remarks. In Japan moths occur in eastern Hokkaido from August to September in small numbers (Nakajima, Yazaki 2011). Known host plants of the *E. achatinellaria* larvae in Yakutia are *Salix* (Salicaceae) and *Ribes* (Grossulariaceae) (Burnasheva 2011); probably, as in *Eulithis testata* (Linnaeus, 1761), they are polyphagous on low deciduous trees and shrubs.

Eulithis ledereri (Bremer, 1864)

Material. Danilovskii Cordon, at light, 18.09.2022 — 1♀.

Distribution. Russia (S RFE: S Amurskaya Obl., S Khabarovskii Kr., Primorskii Kr., S Sakhalin, S Kurils — Kunashir); N and NE China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima, Yakushima).

Remarks. In Japan moths appear twice a year, in central Honshu in June–July and September–October, but depending on the region, it can be seen until early November (Nakajima, Yazaki 2011). Larvae feed on various species of Vitaceae (Nakajima, Yazaki 2011; Beljaev 2016).

**Gandaritis fixseni* (Bremer, 1864)

Material. Danilovskii Cordon, at light, 16.09.2022 — 1 ♀VO; ibid, 17.09.2022 — 1♀ VO; ibid, 18.09.2022 — 2♂, 1♀; ibid, 22–23.09.2022 — 2 ♂ + VO; ibid, 23.09.2022 — 1 ♂ + VO; ibid, 24.09.2022 — VO; above Andreevskii Cordon, forest edge, at light, 26.09.2022 — VO.

Distribution. Russia (S RFE: S Amurskaya Obl., JAO, S Khabarovskii Kr., Primorskii Kr., S Sakhalin, S Kurils — Kunashir, Shikotan); China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima, Tanegashima, Yakushima, Amami Oshima).

Remarks. A new species for Kunashir; reference of *G. fixseni* for this island in Vasilenko, Dubatolov (2021) is erroneous. In Japan moths can be seen from June to November,

probably in two or three generations (Nakajima, Yazaki 2011). In S RFE, at northern limit of its distribution, the species develops in one generation and flies in August and September. Larvae feed on various species of *Actinidia* (Beljaev 2016), in Japan also on *Schizophragma hydrangeoides* (Hydrangeaceae) (Nakajima, Yazaki 2011).

****Pennithera comis*** (Butler, 1879)

(Fig. 1: C)

Material. Danilovskii Cordon, at light, 20–21.09.2022 — 1♀; *ibid*, 7.10.2022 — 1♀; Andreevskii Cordon, at light, 29.09.2022 — 1♂; *ibid*, 1.10.2022 — 1♀; *ibid*, at scented baits, 1.10.2022 — 1♀; *ibid*, 5.10.2022 — 1♀; *ibid*, 6–7.10.2022 — 1♂; *ibid*, 22.10.2022 — 1♂.

Distribution. Russia (S RFE: S Khabarovskii Kr., Primorskii Kr., S Sakhalin, S Kurils – Kunashir); ?SW China (Sichuan, Yunnan), Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima).

Remarks. A new species for Kunashir and the Kuril Islands. This is an autumn species, flying in Japan from August to November (Nakajima, Yazaki 2011). Host plants of larvae are various *Abies* (Pinaceae). Distribution of this species in SW China needs to be confirmed.

Ecliptopera pryeri (Butler, 1881)

Material. Andreevskii Cordon, at light, 29.09.2022 — 1♀; Danilovskii Cordon, at light, 23–24.09.2022 — 1♂.

Distribution. Russia (S RFE: SW Sakhalin, S Kurils — Kunashir and ?Iturup); ?S Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. Appearing of moths in Japan is not clarified (Nakajima, Yazaki 2011); in Sakhalin and the Kurils they occur from mid-July to beginning of November (Beljaev, Titova 2023). Larval hostplant is unknown. As a result of long history of confusion of *E. pryeri* and *Ecliptopera silaceata* (Denis & Schiffermüller, 1775) in East Asia, old indications of both species here need to be verified (Beljaev 2016: 616–617).

Ecliptopera umbrosaria (Motschulsky, 1861)

Material. Danilovskii Cordon, at light, 16–17.09.2022 — 1♀.

Distribution. Russia (S RFE: S Khabarovskii

Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir); China (NE, N, central, SW, Taiwan) Korea, Japan (Hokkaido, Honshu, Izu Islands, Shikoku, Kyushu, Tsushima, Ryukyu Islands).

Remarks. In central Japan moths appear from early May to June and from late August to October, in two generations. Larvae feed on various species of Vitaceae (Nakajima, Yazaki 2011). The subspecific specification of moths from Sakhalin and the Kurils is under the question (Beljaev 2016; Beljaev, Mironov 2019). Viidalepp (1977; 1996) assigned moths from Sakhalin to the continental subspecies *E. u. phaedropa* (Prout, 1938) and moths from S Kurils — to Japanese nominative subspecies *E. u. umbrosaria*. But specimen from Iturup in Swedish Museum of Natural History was posted on the GBIF site (Holston 2023) as *E. u. phaedropa*. Our specimens from Sakhalin and Kunashir, although they are noticeably smaller than the Japanese ones, are quite consistent with them in the pattern of the wings. So, we consider moths from Sakhalin and the Kurils belonging to *E. u. umbrosaria*.

Eustroma reticulata (Denis et Schiffermüller, 1775)

Material. Danilovskii Cordon, at light, 18–19.09.2022 — 1♀.

Distribution. Russia (European part, Urals, W Siberia, S Siberia, RFE: Magadanskaya Obl., Kamchatka Pen., Amurskaya Obl., JAO, Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kunashir); Europe, China (except the west), Korea, Japan (Hokkaido, Honshu, Kyushu).

Remarks. On the Kurils, it is represented by the East Asian subspecies *E. r. chosenicola* Bryk, 1949. In Japan it develops in one generation, in Hokkaido moths fly from August to September (Nakajima, Yazaki 2011). Larvae are monophagous on *Impatiens noli-tangere* (Balsaminaceae) (Hausmann, Viidalepp 2012). Literary and internet indications of *E. reticulata* for Northern Mongolia are based on a misprint in Beljaev, Vasilenko (2002).

Dystromma citrata (Linnaeus, 1761)

Material. Yuzhno-Kurilsk, 13–14.09.2022 — 1♂; above Andreevskii Cordon, forest edge, at light, 26.09.2022 — 1♀ + VO; Andreevs-

kii Cordon, at light, 25–26.09.2022 — 9♀; ibid, 30.09.2022 — 1♀; ibid, 1.10.2022 — 1♀; ibid, 16.10.2022 — 2♀; ibid, at scented baits, 2.10.2022 — 1♀; Andreevskii Cordon, at light, 16–17.10.2022 — 1♀; ibid, 25–26.09.2022 — 3♀; ibid, copses on slope, mixed broadleaf forest, in light-trap, 26.09.2022 — 1♂.

Distribution. Russia (European part, N Caucasus, Urals, W Siberia, S Siberia, Jakutia, RFE: Kamchatka Pen., Amurskaya Obl., JAO, S Khabarovskii Kr., Primorskii Kr., Sakhalin, Kurils); Europe, Turkey, Transcaucasia, N Kazakhstan, Mongolia, China, Korea, Japan, N India, N America.

Remarks. In Japan moths appear from May to November and occur 2–3 times a year, larvae are recorded on 18 species of plants from Polygonaceae, Rosaceae, Ericaceae and Asteraceae (Nakajima, Yazaki 2011). However, the taxonomy of moths, in Japan currently associated with *D. citrata*, needs revision, as a possible mix of several species (Beljaev 2016). In Europe, the species develops in one long generation, moths usually occur from later June to mid-September (Hausmann, Viidalepp 2012), which is generally consistent with the tier occulting on RFE. Larvae in Europe are polyphagous on low trees, shrubs and prostrate shrubs, prefer Ericaceae (Hausmann, Viidalepp 2012).

Dysstroma korbi (Heydemann, 1929)

Material. Andreevskii Cordon, 25–26.09.2022 — 2♀; 16–17.10.2022 — 1♀.

Distribution. Russia (S RFE: S Amurskaya Obl., Primorskii Kr., S Kurils — Kunashir); NE China, Korea, Japan (Hokkaido, Honshu).

Remarks. In Japan moths fly twice in May–June and September–October. Known host plant if larvae in Japan is *Quercus myrsinifolia* (Fagaceae) (Nakajima, Yazaki 2011).

****Epirrita autumnata*** (Borkhausen, 1794)

Material. Andreevskii Cordon, 14.10.2022 — 4♂, 1♀; ibid, 16–17.10.2022 — 3♂; ibid, 17–18.10.2022 — 2♂; ibid, 20–21.10.2022 — 12♂; ibid, 21–22.10.2022 — 30♂, 5♀; ibid, 22–23.10.2022 — 7♂, 2♀; ibid, 23–24.10.2022 — 19♂; ibid, 24.10.2022 — 3♂; ibid, 24–25.10.2022 — 4♂; 2 ibid, 5.10.2022 — 1♂; ibid, at scented baits: 20.10.2022 — 4♂,

21–22.10.2022 — 3♂, 1♀, 22–23.10.2022 — 1♂; Andreevskii Cordon, forest on slope, 20–21.10.2022 — 8♂; ibid, 22–23.10.2022 — 5♂, 1♀; ibid, forest across the Andreevka River, 21–22.10.2022 — 3♂, 1♀; ibid, 24–25.10.2022 — 5♂; Andreevskii Cordon, forest, 21–22.10.2022 — 2♂; ibid, 22–23.10.2022 — 1♂, 2♀; ibid 23–24.10.2022 — 15♂, 3♀; ibid, 23–24.10.2022 — 2♂; ibid, forest with oaks, in light-trap, 18.10.2022 — 1♂; ibid, 23.10.2022 — 18♂.

Distribution. Russia (European part, N Caucasus, Urals, W Siberia, S Siberia, Jakutia, RFE: Magadanskaya Obl., Kamchatskii Kr., Amurskaya Obl., JAO, Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Urup and Iturup); Europe, Turkey, Transcaucasia, N Kazakhstan, Mongolia, China (E Inner Mongolia), Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu), ?N America.

Remarks. A new species for the Kunashir Islands, flying in October, as in Japan (Nakajima, Yazaki 2011). This is a single autumn species of geometrids, before known on the Kurils from Urup and Iturup (Bryk 1942). Larvae in Europe are polyphagous on various trees and shrubs, on the RFE prefer Betulaceae and Salicaceae. In East Asia the subspecies *E. a. autumnus* (Bryk, 1942) is distributed, described from Iturup.

****Venusia phasma*** (Butler, 1879)

(Fig. 1: D)

Material. Andreevskii Cordon, 5–6.10.2022 — 2♂, 5♀; ibid, 6.10.2022 — 1♀; ibid, 18.10.2022 — 1♀; ibid, 19–20.10.2022 — 1♀; ibid, 22–23.10.2022 — 1♂; ibid, 23–24.10.2022 — 1♂, 3♀; Danilovskii Cordon, at light, 20–21.09.2022 — 1♂; ibid, 7–8.10.2022 — 2♀; ibid, 11–12.10.2022 — 2♂.

Distribution. Russia (S RFE: ?S Primorskii Kr., SW Sakhalin (Beljaev, Titova 2023), S Kurils — Kunashir); ?S Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. A new species for the Kuril Islands. This is an autumn species, in Japan in Kanto region flying from mid-September to late October. In Japan larvae feed on leaves and seeds of *Fagus crenata* (Fagaceae) (Nakajima, Yazaki 2011); on Kunashir, possibly, they feed on

Quercus mongolica subsp. *crispula* (Fagaceae). Reports of this species from Russia, Primorskii Kr. are doubtful, and those from Korea need to be confirmed (Beljaev, Titova 2023).

*****Martania fulvida*** (Butler, 1881)

(Fig. 1: E)

Material. Danilovskii Cordon, 21–22.09.2022 — 1♀; ibid, 22–23.09.2022 — 1♀; ibid, 7–8.10.2022 — 1♀.

Distribution. Russia (S RFE: S Kurils — Kunashir); Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. A new species for the fauna of Russia. All earlier indications, including those in Japanese literature (Nakajima, Yazaki 2011: 288), are based on the erroneous identification of *Martania saxea* (Wileman, 1911) (see Vasilenko, Beljaev 2011; Beljaev 2016). Trophic relationships of larvae are not known. Nakajima, Yazaki (2011: 288) report that the moths around Kanto region appear twice a year, in May–June and September–October, and in the alpine zone, they appear in July–August and occur once a year. According to Sayama et al. (2012: 25), moths were collected in Central Hokkaido in beginning of July and in beginning of September. On Kunashir, the island nearest to Hokkaido, the moths were collected in the end of September and in the beginning October, and they have never been registered at summer time. Possibly, the specimens collected on Hokkaido in July belong to another species.

Martania saxea (Wileman, 1911)

Material. Danilovskii Cordon, at light, 16–17.09.2022 — 2♂, 1♀; ibid, 22–23.09.2022 — 1♀; ibid, 7.10.2022 — 1♂.

Distribution. Russia (S RFE: S Amurskaya Obl., S Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Urup, Iturup, Kunashir); NE China, Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu).

Remarks. In Japan moths appear once a year from July to August (Nakajima, Yazaki 2011: 288). Host plant is unknown.

****Spiralisigna subpumilata*** (Inoue, 1972)

Material. Danilovskii Cordon, 11–22.10.2022 — 1♀.

Distribution. Russia (S RFE: S Primorskii Kr., S Kurils — Kunashir); Japan (Hokkaido, Hon-

shu, Ogasawara Islands, Shikoku, Kyushu, Tsushima, Amami Oshima, Okinawa Island, Ishigaki Island, Iriomote Island), China (Hong Kong), S Korea.

Remarks. A new species for the Kuril Islands. In Japan known host plants are *Ulmus parvifolia*, flowers and young fruits (Ulmaceae), *Mangifera indica* (Anacardiaceae), *Dendrocalia crepidifolia*, *Bidens pilosa* (Asteraceae), and moths occur in October (Nakajima, Yazaki 2011). Possibly *S. subpumilata* is migrant in Primorskii Kr. and on Kunashir.

Pasiphila excisa (Butler, 1878)

Material. Andreevskii Cordon, 16–17.10.2022 — 1♂.

Distribution. Russia (S RFE: SE Khabarovskii Kr., Primorskii Kr., S Sakhalin, S Kurils — Kunashir); Korea, Japan (Hokkaido, Honshu, Izu Islands, Shikoku, Kyushu, Tsushima, Yakushima).

Remarks. In Japan in central Honshu moths fly from May to October, in two or three generations. Larvae feed on flowers of many Ericaceae, and were recorded on flowers of *Quercus glauca* (Fagaceae) and *Eurya japonica* (Pentaptylaccaceae) (Nakajima, Yazaki 2011).

Subfamily Sterrhinae

Idaea biselata (Hufnagel, 1767)

Material. Yuzhno-Kurilsk, 13.09.2022 — 2♂, 2♀; Danilovskii Cordon, at light, 16–17.09.2022 — 1♂; ibid, 18-19.09.2022 — 1♂.

Distribution. Russia (European part, Crimea, N Caucasus, Urals, W Siberia, S Siberia, S Yakutia, S RFE: Amurskaya Obl., JAO, Khabarovskii Kr., Primorskii Kr., Sakhalin, S Kurils — Kumashir, Shikotan), Europe, Turkey, Transcaucasia, Kazakhstan, Mongolia, NE China, Korea, Japan (Hokkaido, Honshu, Shikoku and Kyushu).

Remarks. Larvae feed on withered and fallen leaves of various plants. On Kunashir the East Asian subspecies *I. b. extincta* (Staudinger, 1897) is distributed.

Conclusion

The autumn fauna of geometrid moths on Kuril Island was almost totally unknown. Before *Epirrita autumnata* was reported only from Urup and Iturup (Bryk 1942), and from

Kunashir nothing was known. The period of collecting of moths in Kunashir (September 13 – October 25) coincides with the end of the phenological subseason “summer recession” (снад лета) (average start and end dates: 1 – 19 September), with the subseason “first autumn” (первоосень) (average start and end dates: 20 September – 22 October) and the start of the subseason “deep autumn” (глубокая осень) (average start and end dates are 23 October – 21 November) on this island (Eremenko, Barkalov 2009). In 2022, on 26 October, at the Andreevskii Cordon, the authors observed the first frosts down to $-0,7^{\circ}\text{C}$, according to a digital thermometer on the building.

In general, this time is characterized by mass coloring of the leaves of woody plants at the beginning and middle of the period, and by mass leaf fall at the end.

At this period 32 species of geometrids were collected, from which two species are new to Russia (*Ramobia mediodivisa* and *Martania fulvida*), and eight species reported from Kunashir for the first time (*Colotois pennaria*, *Orthonama obstipata*, *Photoscotia lucicolens*, *Epirrita autumnata*, *Gandaritis fixseni*, *Pennithera comis*, *Venusia phasma* and *Spiralisigna subpumilata*). Considering these species, the known fauna of geometrid moths of Kunashir Island has reached 231 species.

Most collected species of geometrids belong to the second generation of moths (some of them, possibly, “deadlock” as they cannot continue development, as for example *Cusiala stipitaria* and *Hemithea aestivaria*), or to long flying moths of the later summer phenological group. We can attribute seven species (22%) only to the autumn moths proper: *Co-*

lotois pennaria, *Gigantalcis flavolinearia*, *Ramobia mediodivisa*, *Pennithera comis*, *Epirrita autumnata*, *Venusia phasma* and *Spiralisigna subpumilata*, but the latter subtropical species could be episodic migrant on the RFE territory.

Attention is drawn to the fact that no autumn geometrids with apterous females, distributed on neighboring Hokkaido, were discovered. There are members of genera *Pachyerrannis* Inoue, 1982 (one species), *Erannis* Hübner, 1825 (two species), *Larerrannis* Wehrli, 1935 (one species), *Alsophila* Hübner, 1825 (two species), *Inurois* Butler, 1879 (five species) and *Operophtera* Hübner, 1825 (three species) (Nakajima 2011; Nakajima, Yazaki 2011; Sato 2011). Possibly, at least some of them could be found on Kunashir in the phenological subseason “deep autumn”, covering the end of October and most of November.

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