

The checklist of geometrid moths (Lepidoptera) of Altai Krai with new regional records and tree pest overview

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Abstract

Here we provide the checklist of geometrid moths for Altai Krai compiled based on original data, published records and exploration of the Geometridae collection stored in the Zoological Institute of the Russian Academy of Sciences (St Petersburg). The checklist accounts 262 species discovered in Altai Krai in 1897–2023. Among them, nine species collected during our field trips are documented for the region for the first time: *Eilicrinia cordiaria* (Hübner, 1790), *Charissa (Dysgnophos) turfosaria* (Wehrli, 1922), *Jankowskia bituminaria* (Lederer, 1853), *Apocheima hispidaria* ([Denis & Schiffermüller, 1775), *Macaria (Speranza) halituarina* (Guenée, 1858), *Scopula dignata* (Guenée, [1858]), *Cyclophora pendularia* (Clerck, 1759), *Eupithecia orphnata* W.Petersen, 1909 and *Eupithecia thalictrata* (Püngeler, 1902). Overall, 42 out of 262 geometrid species (i.e. 16%) from 29 genera are known as tree pests enabling to cause significant damage to their host plants in the region and beyond.

Keywords

Insects, Lepidoptera, Geometridae, geometrid moths, fauna, Altai, Siberia, Russia

Introduction

Geometridae is one of the largest families of Lepidoptera (Van Nieukerken et al. 2011). In Russia, particularly in Siberia, the geometrid fauna remains fragmentally studied with scarce new records and species descriptions appearing in literature (Vasilenko 2011, 2012; Erlacher and Erlacher 2016; Knyazev et al. 2017; Vasilenko et al. 2017). In term of geometrid knowledge, the Baikal region and Omsk Oblast are the most explored regions in Siberia, with 361 and 252 species documented, respectively (Knyazev 2020; Makhov and Lukhtanov 2021). In 2011, 103 species of geometrid moths were found solely in the State Nature Reserve “Tigireksky” (West Altai) (Volynkin et al. 2011). In 2016, a new species *Gnophopsodos sabine* S. Erlacher & J. Erlacher, 2016 was described in the highlands of the Tigirek Range (Erlacher and Erlacher 2016). In 2018, the Geometridae list of the reserve was supplemented with other 17 species (Naydenov and Yakovlev 2018). In 2016, 22 species of geometrid moths were registered in the protected area “Belokurikha Natural Park” (Vasilenko et al. 2016). In 2017, three species were discovered for the fauna of Altai Krai: *Cryopega bajaria* ([Denis & Schiffermüller], 1775); *Limeria macraria* Staudinger, 1892 and *Trichopteryx polycommata* ([Denis & Schiffermüller], 1775) (Perunov 2017a). In 2019, a list comprising 318 species of geometrid moths was compiled for the territory of the Pre-Altai region (Kemerovo Oblast, Novosibirsk Oblast (right bank of the Ob River), Altai Krai (without the Kulunda steppe)) and provided in the Catalogue of the Lepidoptera of Russia (Beljaev and Mironov 2019).

Here we continue exploring the territory of Altai, and provide the checklist of geometrid moths of Altai Krai based on the material collected during our expeditions, studied museum specimens and early published records from this administrative region.

Materials and methods

Altai Krai is located in the central part of Eurasia in the south of Western Siberia (Fig. 1A). Territory of the region is situated at an altitude of 100–150 m to 2300–2400 m and covers an area of about 168,000 km². Most of the region's territory belongs to the West Siberian Plain. The flat part is presented by steppe and forest steppe, including a ribbon forest. The mountain part is located on the eastern and southern sides: Salair Ridge and the Altai Mountains. The mountain area is characterized by the presence of the dark coniferous forests, subalpine woodlands, subalpine and alpine meadows and alpine tundra.

The study is based on the material, which we collected in Altai Krai in the period of 1973–2023, as well as the specimens received from other collectors: M.N. Perunova, A.A. Kostomarov, M.V. Burmistrov, R.V. Yakovlev, V.V. Rudoi, L.S. Snigireva, K.E. Naydenova and P.A. Pavlova. Additionally, the Geometridae collection of the Zoological Institute, Russian Academy of Sciences (St. Petersburg, Russia)

was researched. Finally, the faunistic publications on Lepidoptera of the Altai Krai published in 2011–2018 were checked (Volynkin et al. 2011; Erlacher and Erlacher 2016; Vasilenko et al. 2016; Perunov 2017a; Naydenov and Yakovlev 2018).

Overall, the studied material originated from 116 localities in Altai Krai, including 107 localities visited during our expeditions (mainly expeditions by Yu.E. Perunov) (Fig. 1B). Collecting localities given from literary sources are indicated by references. Most of them were caught at night using a lamp arc mercury-tungsten lamp and ultraviolet lamp; day-species were caught mowing with a butterfly net. Images of imago were taken by the camera of Canon EOS 70D illuminated in Light-box and camera of Olympus DP74. The genitalia slides were examined with Olympus SZX16 microscope. The taxonomy is accepted according to the Lepidoptera Catalog of Russia (Sinev 2019).

In the checklist, the sampled localities are abbreviated for easy use. The new species for Altai Krai are marked by the symbol *.

Abbreviations of localities used in the text:

A – Aleysk, 52°29'N 82°46'E: (a) 03.06.1992; (b) 03.06.2002;

Alt1 – Altaisky district, Komarovsky pass, 51°39'N 85°22'E, 22.06.1997;

Alt2 – Altaisky district, near of Nizhny Komar vill., Krivaya Sosnovka river, 51°44'N 85°18'E, 28.05.1986;

Alt3 – Altaisky district, Beloe vill., 51°37'N 85°20'E: (a) 05.08.1986; (b) 23.09.1987; (c) 28.07.1988; (d) 22.07.1989; (e) 10-12.07.1992; (f) 28.07.1993; (g) 09-10.06.1994; (h) 10.06.1995; (i) 07.06.1996; (j) 25.06.1997;

Alt4 – Altaisky district, Valley of Peschanaya river, 51°49'42.8"N 084°47'55.8"E, 21.07.–1.08.2015 (Vasilenko et al. 2016);

B – Barnaul, 53°21'N 83°46'E: (a) 19.05.[18]98; (b) 14-17.05.1899; (c) 15.06.1913, leg. Maslov & Luri; (d) 26.06.1973; (e) 11.06.1975; (f) 01.08.1980; (g) 12-28.06.1981; (h) 19.07.1981; (i) 31.08.1981; (j) 05.06.1982; (k) 09.06.1983; (l) 18.07.1983; (m) 11.05.1984; (n) 15.05.1987; (o) 29.08.1987; (p) 05.09.1987; (q) 21-23.04.1990; (r) 04.05.1990; (s) 18-20.06.1992; (t) 16.04.1995; (u) 18.07.2003; (v) 06.06.2006; (w) 22.06.2013;

B1 – Barnaul, airport, 53°21'N 83°33'E, 02.07.[19]81, leg. Prasolov V.;

B2 – Barnaul, Lebyazhye vill., 53°14'N 83°39'E: (a) 16-25.05.1980; (b) 18.08.1980; (c) 16-17.05.1981; (d) 19.06.1981; (e) 16.05.1982; (f) 25.05.1991; (g) 03.05.1992; (h) 16.05.1992; (i) 31.05-13.06.1992; (j) 28.05.1994; (k) 10-15.06.1994; (l) 25.05.1996; (m) 23.06.1996; (n) 04-14.06.2004;

B3 – Barnaul, Nauchny Gorodok vill., 53°25'N 83°32'E: (a) 12.05.1987; (b) 12.05.1991; (c) 02-07.06.1991; (d) 24.05.1992; (e) 24.04.1997;

B4 – Barnaul, horticulture “Trud”, 53°16'04"N 83°44'36"E, 05.05.1984;

B5 – Barnaul, horticulture “Energetic”, 53°15'53"N 83°44'59"E, 10.08.1979;

B6 – Barnaul, Yuzhny settlement, 53°15'N 83°41'E: (a) 14.05.1981; (b) 05-07.06.1981; (c) 20.08.1981; (d) 20.08.1995;

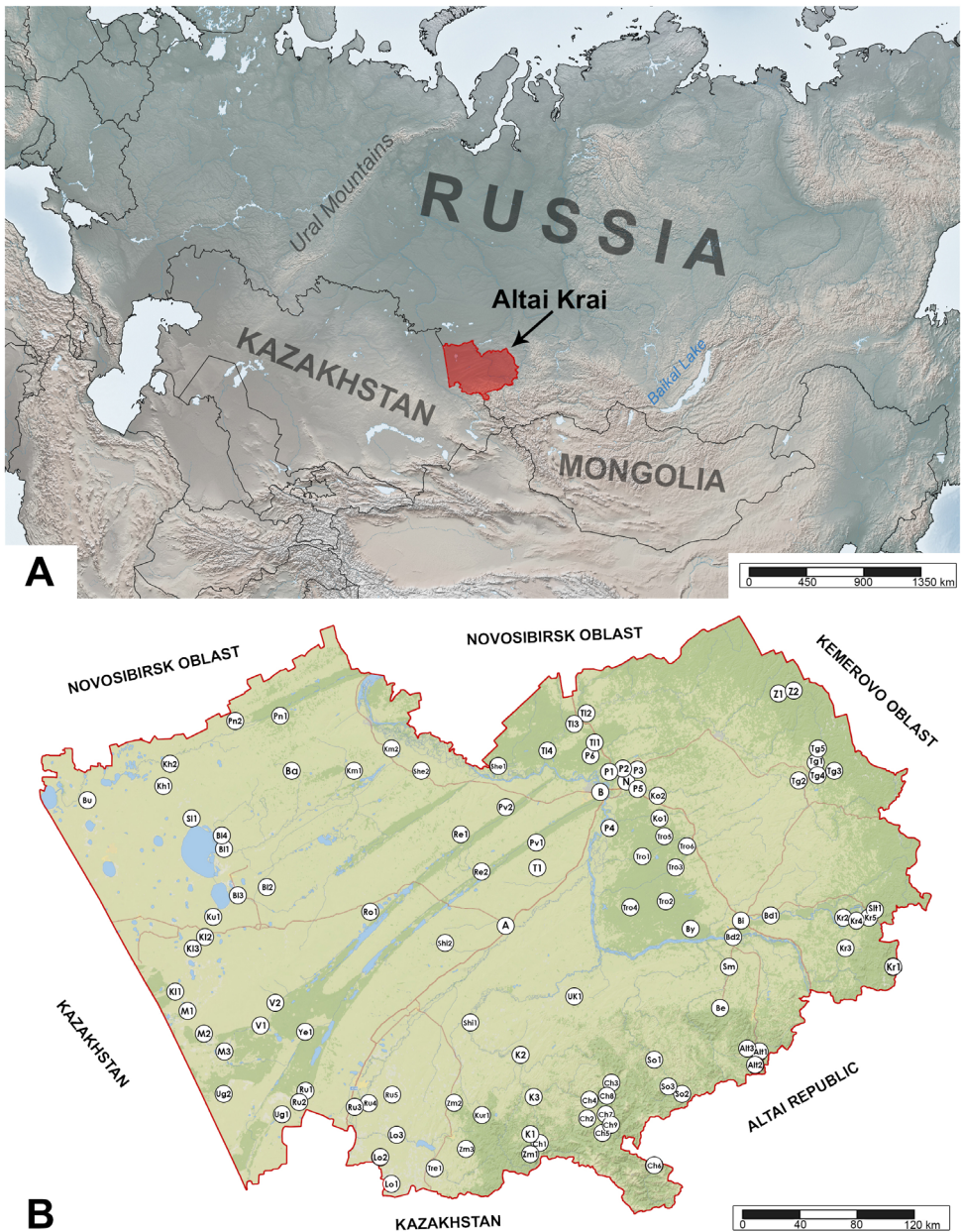


Figure 1. The location of Altai Krai (A) and sampled localities (B). Full names of indicated localities are provided in the paper text (see Material and methods).

- B7** – Barnaul, M. A. Lisavenko arboretum; 53°17'30.1"N 83°46'09.1"E 200 m., 18.06.2023, leg. Naydenov A.E.;
- Ba** – Baevsky district, Chumanka vill., 53°30'N 80°28'E, 06.07.1989;
- Bd1** – Biysky district, Maloeniseiskoe, 52°34'N 85°30'E, 21.08.2007;
- Bd2** – Biysky district, lake Kanonerskoye, 52°28'N 85°11'E, 2-6.08.2006, leg. Krivohatskiy V.;
- Be** – Belokurikha, 51°60'N 84°59'E, 24.07.2015;
- Bi** – Biysk, 52°30'N 85°09'E: (a) 21.05.1897; (b) 1897, leg. Gauvalt; (c) 10.06.1916, leg. Varaksina; (d) 11-12.05.2011; (e) 06.04.2016;
- Bl1** – Blagoveshchensky district, W of Shimolino vill., Kulundinskoye lake, 52°60'N 79°56'E, 15.08.1983;
- Bl2** – Blagoveshchensky district, Gladen vill., 52°46'N 80°15'E, 25.06.1992;
- Bl3** – Blagoveshchensky district, Nizhny Kuchuk, 52°42'N 79°56'E, 22-23.06.1992;
- Bl4** – Blagoveshchensky district, 15 km SSW of Nizhnyaya Suyetka vill., 53°05.347'N, 79°47.377'E, h=100 m, 10-12.05.2020, leg. Naydenov A.E.;
- Bu** – Burlinsky district, Burla vill., 53°20'N 78°20'E, 12.07.1990;
- By** – Bystroistoksky district, between Sokolovo and Akulikha vill., 52°28'N 84°40'E, 28.05.2004;
- Ch1** – Charyshsky district, 4km SSE Tigirek vill., 51°06'N 83°02'E, h=1000 m, 05.07.2016, leg. Naydenov A.E.;
- Ch2** – Charyshsky district, Berezovka vill., 51°16'N 83°36'E: (a) 26-29.06.1986; (b) 29.06.1988; (c) 28.06.2016; (d) 14.09.2019;
- Ch3** – Charyshsky district, Maly Bashchelak vill., 51°29'N 83°49'E: (a) 26.06.1986; (b) 21.07.2004;
- Ch4** – Charyshsky district, Charyshskoe vill., 51°23'N 83°34'E: (a) 27.07.1992; (b) 06.06.2002; (c) 01.08.2019; (d) 11.09.2019;
- Ch5** – Charyshsky district, Sentelek vill., 51°12'N 83°45'E: (a) 02.08.1992; (b) 22.07.2004;
- Ch6** – Charyshsky district, 3 km from Kumir river mouth, 50°59'N 84°17'E, 25.07.1998;
- Ch7** – Charyshsky district, Aba vill., 51°17'N 83°48'E, 10.07.1992;
- Ch8** – Charyshsky district, Borovlyanka vill., 51°24'N 83°45'E, 06.09.1992;
- Ch9** – Charyshsky district, vicinity of the village Sentelek, 5 km SW of the village Mashenka, the basin of the river Charysh, 51°14'28.2"N 83°48'51.3"E, h=624,8 m, dry meadows, 30.05.2020, leg. Yakovlev R.V. & Rudoi V.V.;
- K1** – Krasnoshchekovsky district, Tigirek vill., 51°08'45"N 83°02'11"E, h=484 m: (a) 15-17.05.2001, leg. Perunov Yu.E.; (b) 16.05.2002, leg. Perunov Yu.E.; (c) 14-24.07.2004, leg. Burmistrov M.V.; (d) 03-04.08.2004, leg. Burmistrov M.V.; (e) 04-08.08.2005, leg. Perunov Yu.E.; (f) 15.07.2006, leg. Perunov Yu.E.; (g) 29.06.2006, leg. Nedoshivina S.V.; (h) 04-07.08.2008, leg. Perunov Yu.E.; (i) 25-29.06.2013, leg. Sinev S.Yu.; (j) 12.07.2013, leg. Krugova T.M.; (k) 7-12.07.2014, leg. Sinev S.Yu.; (l) 02-05.07.2016, leg. Naydenov A.E.;
- K2** – Krasnoshchekovsky district, Kharlovo vill., 51°41'N 82°51'E, 15.05.2001;

K3 – Krasnoshchekovsky district, Charysh river valley, 3 km WNW of Ust'-Chayrka vill., 51°26.296'N, 83°04.230'E, h=330 m, 18–20.05.2020, leg. Naydenov A.E (Fig. 2A);

Kl1 – Klyuchevsky district, Pokrovka vill., 52°02'N 79°21'E: (a) 06-07.06.2008; (b) 15.06.2012; (c) 16.05.2012; (d) 22.09.2022;

Kl2 – Klyuchevsky district, Zelenaya Polyana vill., 52°24'N 79°38'E, 20.06.1993;

Kl3 – Klyuchevsky district, S of coast of lake Shukyrtuz, 3 km E of Istimis vill., 52°21.736'N, 79°21.080'E, h=130 m, 12–13.05.2020, leg. Naydenov A.E. (Fig. 2B);

Km1 – Kamensky district, Vetrenno-Teleutskoe vill., 53°27'N 81°10'E, 30.07.1989;

Km2 – Kamensky district, Gonokhovo vill., 53°38'N 81°32'E, 03.09.1989;

Kh1 – Khabarsky district, Protasovo vill., 53°25'N 79°10'E, 11.06.1988;

Kh2 – Khabarsky district, Novoilinka vill., 53°33'N 79°15'E, 13.06.1988;

Kr1 – Krasnogorsky district, 30 km SE Kaltash vill., 52°12'N 86°42'E: (a) 13-14.05.2004; (b) 25-27.07.2005;

Kr2 – Krasnogorsky district, Frunze vill., 52°35'N 86°20'E: (a) 11-12.05.2004; (b) 25.07.2005; (c) 30.05.2012;

Kr3 – Krasnogorsky district, Chapsha river, 52°21'N 86°18'E, 14.06.2001;

Kr4 – Krasnogorsky district, Makaryevkoe vill., 52°33'N 86°27'E, 17.08.2004;

Kr5 – Krasnogorsky district, Balyksa vill., 52°32'N 86°33'E, 26.07.2007;

Ko1 – Kosikhinsky district, 2 km W of Lake Krasilovo vill., 53°10'N 84°20'E: (a) 19.07.1990; (b) 01.07.1996; (c) 10.08.2010; (d) 17-23.06.2014, leg. Snigireva L.S.;

Ko2 – Kosikhinsky district, Malakhovo vill., 53°21'N 84°24'E, 22.07.1979;

Ku1 – Kulundinsky district, Ekaterinovka vill., 52°34'N 79°36'E, 26.06.1990;

Kur1 – Kur'insky district, 7.5 km W of Kolyvan village, Loktevka river basin, N 51°18'08.5", E 82°29'05.3" h=416,7 m, willow-birch forest and meadow glades, 01.06.2020, leg. Yakovlev R.V. & Rudoi V.V.;

Lo1 – Loktevskiy district, Zolotukha vill., 50°48'N 81°31'E, 15.07.1987;

Lo2 – Loktevskiy district, Gornyak, 50°59'N 81°27'E, 11.07.1987;

Lo3 – Loktevskiy district, Aley river valley, 1 km N of Ust'yanka vill., 51°09.793'N, 81°35.764'E, h=330 m: (a) 17–18.05.2020, leg. Naydenov A.E.; (b) 01.06.2020, leg. Yakovlev R.V. & Rudoi V.V. (Fig. 2C);

M1 – Mikhailovsky district, Nikolaevka vill., 51°55'N 79°24'E: (a) 19-28.06.1980; (b) 19-25.07.1980;

M2 – Mikhailovsky district, 8 km SW Mikhailovskoe vill., 51°46'13"N 79°39'32"E: (a) 20-21.07.2012; (b) 26.07.2013;

M3 – Mikhailovsky district, N of coast of lake Yodnoe, 2 km NNE of Malinovoe Ozero vill., 51°41.852'N, 79°47.899'E, h=160 m, 13-14.05.2020, leg. Naydenov A.E.; N – Novoaltaysk, 53°25'N 83°56'E, 23.06.1915, coll. Schuko;

P1 – Pervomaisky district, Mylnikovo vill., 53°27'50.5"N 83°46'33.1"E, h=146 m: (a) 18-19.04.2020, leg. Naydenov A.E. & Naydenova K.E.; (b) 19-24.05.2021, leg. Naydenov A.E. & Naydenova K.E.; (c) 13.07.2019, leg. Naydenov A.E. & Naydenova K.E.; (d) 28.08.2021, leg. Naydenov A.E. & Naydenova K.E. (Fig. 2D);

P2 – Pervomaisky district, 3 km NE Novoaltaysk, 53°25'49"N 83°58'11"E, leg. Naydenov A.E.: (a) 11.06.2014; (b) 14-25.07.2014; (c) 15.05.2015; (d) 05.06.2015; (e) 28.08.2016

P3 – Pervomaisky district, station Ukladochnaya, 15 km NE Novoaltaysk, 53°28'N 84°06'E: (a) 29.04.1997; (b) 05.05.2001; (c) 09.07.2002; (d) 13-29.06.2005; (e) 19.06.2006; (f) 08.05.2006; (g) 07.08.2007; (h) 02-12.07.2008; (i) 13-23.07.2008; (j) 01-08.08.2008; (k) 30.08-06.09.2008; (l) 03.10.2008; (m) 24.04.2009; (n) 01-08.05.2009; (o) 15-29.05.2009; (p) 12.06.2009; (q) 21-26.06.2009; (r) 10-17.07.2009; (s) 21.08.2009; (t) 04-12.09.2009; (u) 05.05.2010; (v) 06.06.2010; (w) 10-26.06.2010; (x) 30.06-14.07.2010; (y) 21-30.07.2010; (z) 06.08.2010; (aa) 20-27.08.2010; (ab) 10.09.2010; (ac) 02.10.2010; (ad) 16-23.04.2011; (ae) 20-28.05.2011; (af) 02-17.06.2011; (ag) 18-30.06.2011; (ah) 06.08.2011; (ai) 03.09.2011; (aj) 20.04.2012; (ak) 10-15.06.2012; (al) 05-09.07.2012; (am) 27.07.2012; (an) 17.08.2012; (ao) 06-13.07.2013; (ap) 15-29.05.2015; (aq) 05-16.06.2015; (ar) 19-28.06.2015; (as) 04-11.07.2015; (at) 17-31.07.2015; (au) 20-23.04.2016; (av) 14.05.2016;

P4 – Pervomaisky district, Bobrovka vill., 53°10'N 83°52'E, 11.06.1983;

P5 – Pervomaisky district, Berezovka vill., 53°24'N 84°00'E, 13.07.1983;

P6 – Pervomaisky district, Kislukhinsky Reserve, 53°38'N 83°39'E, 05.07.1990;

Pv1 – Pavlovsky district, Kolyvanskoye vill., 53°02'N 82°53'E: (a) 22.08.1993; (b) 25.05.2004;

Pv2 – Pavlovsky district, Rogozikha vill., 53°15'N 82°46'E: (a) 14.08.1980; (b) 18.05.2004;

Pn1 – Pankrushikhinsky district, Pankrushikha vill., 53°49'N 80°20'E: (a) 01-03.07.1988; (b) 02.07.2015;

Pn2 – Pankrushikhinsky district, Uryvaevo vill., 53°47'N 79°56'E, 01.08.1988;

Re1 – Rebrikhinsky district, Rebrikha vill., 53°04'N 82°20'E, 02.07.2014;

Re2 – Rebrikhinsky district, Chernyavka vill., 52°53'38"N 82°33'56"E, 14.09.1980;

Ro1 – Romanovsky district, Guseletovo vill., 52°33'N 81°22'E, 10.06.1987;

Ru1 – Rubtsovsky district, Rakity vill., 51°26'N 80°41'E, 15.06.1984;

Ru2 – Rubtsovsky district, Bolshaya Shelkovka vill., 51°25'N 80°38'E, 08.06.1984;

Ru3 – Rubtsovsky district, Novoaleksandrovka vill., 51°22'N 81°09'E, 20.06.1984;

Ru4 – Rubtsovsky district, Samarka vill., 51°22'N 81°16'E, 10.06.1984;

Ru5 – Rubtsovsky district, Kiziha river valley, 4 km W of Nazarovka vill., 51°25.843'N, 81°36.111'E, h=270 m, 15–16.05.2020, leg. Naydenov A.E.;

T1 – Topchikhinsky district, 7 km N Topchiha vill., 52°53'07.0"N 83°05'52.7"E, leg. Naydenov A.E.: (a) 04-05.07.2012; (b) 04.05.2014; (c) 7.08.2015; (d) 20.07.2021;

Tl1 – Talmensky district, Ozerki station, 53°40'N 83°41'E: (a) 06.07.2003; (b) 15.05.2006; (c) 02.06.2006; (d) 18.10.2006 (larvae); (e) 09.07.2007; (f) 19-25.07.2007;

Tl2 – Talmensky district, Talmenka vill., 53°48'N 83°33'E: (a) 15.06.1986; (b) 04.07.1986;

Tl3 – Talmensky district, Staroperunovo vill., 53°46'N 83°27'E, 31.07.1981;

Tl4 – Talmensky district, Yazovo vill., 53°35'N 83°10'E, 10.07.1991;

- Tre1** – Tretyakovsky district, 5 km NW of Ekaterininskoe vill., 50°56'12"N 81°57'20"E, h=320–375 m, 01.05.2021, leg. Naydenov A.E. & Rudoi V.V.;
- Tro1** – Troitsky district, Ozero-Petrovskoe vill., 52°57'N 84°18'E: (a) 14.08.1982; (b) 26.05.2015;
- Tro2** – Troitsky district, Borovlyanka vill., 52°38'N 84°26'E: (a) 02.07.2005; (b) 04.06.2006; (c) 23.09.2006; (d) 30–31.07.2014; (e) 08.10.2014 (larvae);
- Tro3** – Troitsky district, Zagainovo vill., 52°52'N 84°31'E, 19.06.2019;
- Tro4** – Troitsky district, Chervanka vill., 52°36'N 84°04'E 11.07.2019;
- Tro5** – Troitsky district, Zavodskoye vill., 53°04'N 84°25'E: (a) 10.08.2010; (b) 04.06.2014;
- Tro6** – Troitsky district, Troitskoe vill., 52°59'N 84°40'E, 10.08.1997;
- Tg1** – Togulsky district, 13 km N Togul vill., 53°35'N 85°49'E, 25.07.2002;
- Tg2** – Togulsky district, Titovo vill., 53°24'N 85°45'E, 06–11.07.2011;
- Tg3** – Togulsky district, reserve “Togulsky”, 53°31'N 86°11'E, 06.07.2011;
- Tg4** – Togulsky district, Togul vill., 53°28'N 85°54'E, 12.09.1992;
- Tg5** – Togulsky district, 7.5 km N Shumikha vill., 53°41'N 85°59'E, 05–09.06.2023, leg. Pavlova P.A.;
- Sl1** – Slavgorodsky district, Znamenka vill., 53°09'N 79°28'E: (a) 20.07.2011; (b) 24.04.2012;
- She1** – Shelabolikhinskiy district, Inya vill., 53°26'N 82°36'E: (a) 30.06.2004; (b) 07.07.2005;
- She2** – Shelabolikhinskiy district, Krutishka vill., 53°27'N 81°49'E: (a) 14–16.08.1984; (b) 09.09.1984; (c) 17.08.1989;
- Shi1** – Shipunovsky district, Eltsovka vill., 51°54'N 82°23'E, 13–21.08.1983;
- Shi2** – Shipunovsky district, Bobrovka vill., 52°24'N 82°07'E, 10.08.1983;
- So1** – Soloneshensky district, Soloneshensky vill., 51°39'N 84°19'E, 16.05.1991;
- So2** – Soloneshensky district, near Tog-Altai village, Denisova Cave, 51°23'53.0"N 84°40'30.9"E, h=610 m, 29.05.2020, leg. Yakovlev R.V. & Rudoi V.V.;
- So3** – Soloneshensky district, near Topol'noye vill., 51°27'N 84°29'E, H=570–1000 m, 15–20.08.2018, leg. Naydenov A.E. & Yakovlev R.V.;
- Slt1** – Soltonsky district, Saydyp vill., 52°34'N 86°34'E, 21.04.2007;
- Sm1** – Smolensky district, Peschanaya river, 52°16'N 85°03'E, 26.07.2015;
- Sm2** – Smolensky district, near Belokurikha city, 51°55'21.4"N 84°59'14.1"E, 21.07.–1.08.2015 (Vasilenko et al. 2016);
- Ug1** – Uglovsky district, Krugloe vill., 51°17'N 80°26'E, 06.06.2009;
- Ug2** – Uglovsky district, Pavlovka vill., 51°23'N 79°47'E, 24.05.2016;
- UK1** – Ust-Kalmansky district, Kalmanka river, 52°54'N 83°34'E, 03.06.2002;
- V1** – Volchikhinsky district, Bychye lake, 51°52'N 80°13'E, 21.07.1980;
- V2** – Volchikhinsky district, Volchikha vill., 52°01'N 80°21'E, 21.10.2013 (larvae);
- Ye1** – Yegoryevsky district, Novosovetsky vill., 51°49'N 80°38'E, 27.07.2013;
- Z1** – Zarinsky district, 10 km W Tyagun, 53°56'N 85°30'E: (a) 12.06.2004; (b) 04.08.2011; (c) 05–15.07.2013; (d) 11.08.2016; (e) 28.06.2017; (f) 26.08.2020 leg. Naydenov A.E. (Fig. 2E);

Z2 – Zarinsky district, Togulenok station, 53°57'N 85°47'E: (a) 20.06.1980; (b) 19-20.07.1980; (c) 20.06.2002; (d) 14.07.2011; (e) 16-17.08.2016;

Zm1 – Zmeinogorsky district, 12 km SSW Tigirek vill., Tigiretsky ridge, 51°02'N 82°58'E, h=1470 m: (a) 16–19.07.2012, leg. Volynkin A. (Erlacher and Erlacher 2016); (b) 8-10.07.2016, leg. Naydenov A.E. (Fig. 2F);

Zm2 – Zmeinogorsky district, 5.5 km NE of Savvushka, 51°23'03"N 82°12'30"E, h=340-360 m: (a); 25.07.2014, leg. Naydenov A.E. (b) 03.05.2021, leg. Naydenov A.E. & Rudoi V.V.;

Zm3 – Zmeinogorsky district, Lazurka vill., 51°05'N 82°22'E, 15-16.07.1996.

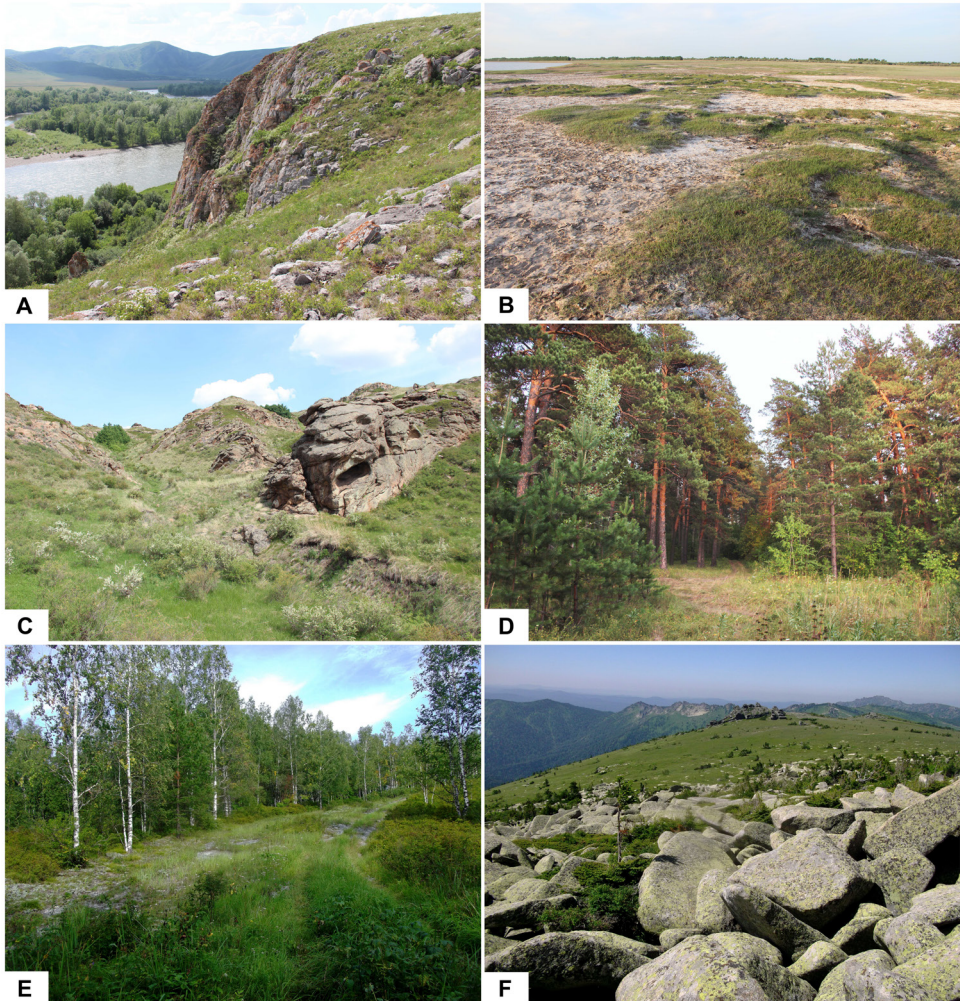


Figure 2. The collected biotopes in Altai Krai: **A.** Charysh river valley, 3 km WNW of Ust'-Chagyrka vill.; **B.** S coast of the lake Shukyrtyuz, 3 km E of Istimis vill.; **C.** Aley river valley, 1 km N of Ust'yanka vill.; **D.** Pervomaisky district, near Mylnikovo vill.; **E.** Zarinsky district, near Tyagun station; **F.** Tigiretsky ridge, 12 km SSW Tigirek vill.

Result

I. Novel regional records

On the territory of Altai Krai, overall 262 species of geometrid moths have been documented. Among them, following nine species represented new regional records.

1. *Ellicrinia cordiaria* (Hübner, 1790) (Fig. 3A)

Distribution. West-Palaeartic. In Europe, from easternmost Austria, southern Slovakia and the Balkans through Ukraine, Crimea, southern Russia and Crimea to southern Urals. Outside Europe, the species occurs in Turkey, Caucasus region, northern Iran and Central Asia (Skou and Sihvonen 2015).

Hostplants. *Salix* (Salicaceae) (Fajčík 2003; Szekely 2011).

Remarks. A.V. Kulak (2017) recorded the species range expansion to the north in Central and Eastern Europe due to desiccation of floodplain ecosystems where quick and significant rising of annual average temperature take place.

2. *Charissa (Dysgnophos) turfosa* (Wehrli, 1922) (Fig. 3B)

Distribution. Siberian-Far Eastern, boreomontane. Middle Ural, Yamalo-Nenets Autonomous Okrug, Republic of Altai, Irkutskaya Oblast, Buryatia, Transbaikalia, Yakutia, Chukotka, Magadanskaya Oblast, southern part of Khabarovsk Krai, Primorsky Krai, and Northern Mongolia (Makhov 2021).

Hostplants: Brassicaceae (Burnasheva, 2011).

3. *Jankowskia bituminaria* (Lederer, 1853) (Fig. 3C)

Distribution. Siberian-Far Eastern, subboreal. Southern part of Western Siberia, southern part of Krasnoyarsky Krai, southern Altai, Khakassia, Tuva, Irkutskaya Oblast, Buryatia, Transbaikalia, Amurskaya Oblast, southern part of Khabarovsk Krai, Primorye. Outside Russia, in Northern China, Northern Korea (Makhov 2021).

Hostplants. *Spiraea aquilegifolia* (Rosaceae), *Ribes nigrum*, *R. uva-crispa* (Grossulariaceae) (Gordeeva and Gordeev 2007, Beljaev 2016).

4. *Apocheima hispidaria* ([Denis & Schiffermüller], 1775) (Fig. 3D)

Distribution. West-Palaeartic. In Europe, from the Urals to Great Britain and northern Portugal and from southern Scandinavia to the Mediterranean (Müller et al. 2019). Outside Europe, in the Caucasus region, Turkey, East Kazakhstan and South Siberia.

Hostplants. In Europe, *Quercus* (Fagaceae), *Salix aurita* (Salicaceae), *Carpinus betulus* (Betulaceae), *Malus domestica*, *Prunus avium*, *P. spinosa* (Rosaceae), *Populus tremula* (Salicaceae), *Castanea*, *Fagus* (Fagaceae), and *Ulmus* (Ulmaceae) (Müller et al. 2019).

5. *Macaria (Speranza) halituaria* (Guenée, 1858) (Fig. 3E)

Distribution. Central-Palaearctic. Altai Mountains, northwestern China, Tian Shan and Pamir Mountains (Viidalepp 1988).

Hostplants. Unknown.

6. *Scopula dignata* (Guenée, [1858]) (Fig. 3F)

Distribution. Siberian-Far Eastern, subboreal. Southern Siberia and Russian Far East. In Asia: Mongolia, Northern China, Korea (Makhov 2023).

Hostplants. Unknown.

7. *Cyclophora pendularia* (Clerck, 1759) (Fig. 3G)

Distribution. West-Palaearctic, temperate. Europe, Urals and West Siberia.

Hostplants. *Salix* (Salicaceae), *Alnus* (Betulaceae) (Hausmann 2004).

8. *Eupithecia orphnata* W.Petersen, 1909 (Fig. 3H)

Distribution. West-Palaearctic, temperate. In Europe, locally in Western, Central and Southern Europe, southern Scandinavia. In Asia, in Turkey, Kazakhstan, Tajikistan, Kyrgyzstan, Armenia, and Azerbaijan. In Russia, in south of European part, South Ural, and south of Western Siberia.

Hostplants. The larvae polyphagous. Flowers, seeds and leaves mainly of Asteraceae, leaves of *Quercus robur* (Fagaceae) (Mironov 2003).

9. *Eupithecia thalictrata* (Püngeler, 1902) (Fig. 3I)

Distribution. Transeurasian, temperate. In Europe locally in France, Switzerland, Italy, Austria, Poland, Lithuania, and Estonia. In Russia, in European part, South Ural, South Siberia, Russian Far East. Asia: Northern Kazakhstan, China, Mongolia, and Japan (Hokkaido).

Hostplants. Flowers and seeds of *Thalictrum* (Ranunculaceae) (Mironov 2005).

Pestiferous geometrid species

Overall, 42 out of 262 geometrid species (i.e. 16%) are known as pests of trees and shrubs, some of them can provide regular outbreaks in nature. Among them, there are the representatives of following genera: genus *Eulithis* Hübner, 1821 (4 species), genera *Macaria* Curtis, 1826 and *Eupithecia* Curtis, 1825 (by 3 species each), genera *Lomographa* Hübner, 1825, *Plagodis* Hübner, 1823, *Biston* Leach, 1815, *Lycia* Hübner, 1825, *Hypomecis* Hübner, 1821, and *Abraxas* Leach, 1815 (by 2 species each), and genera *Odontopera* Stephens, 1831, *Selenia* Hübner, 1823, *Apeira* Gistel, 1848, *Ennomos* Treitschke, 1825, *Opisthograptis* Hübner, 1823, *Angerona* Duponchel, 1829, *Ascotis* Hübner, 1825, *Bupalus* Leach, 1815, *Cryopega* Dumont, 1925, *Erannis* Hübner, 1825, *Apocheima* Hübner, 1825, *Ematurga* Lederer, 1853, *Geometra* Linnaeus, 1758, *Mesoleuca* Hübner, 1825, *Pelurga* Hübner, 1825, *Venusia* Curtis, 1839, *Rheumaptera* Hübner, 1822, *Operophtera* Hübner, 1825, *Trichopteryx* Hübner, 1825,

Pasiphila Meyrick, 1883 (by 1 species each). On the territory of Altai Krai, the following pestiferous species were documented:

1. *Lomographa bimaculata* (Fabricius, 1775)

The larvae can damage *Prunus*, *Padus*, *Sorbus*, *Crataegus* (Rosaceae); they can also develop on *Betula*, *Carpinus*, (Betulaceae), *Tilia* (Malvaceae), *Fagus*, *Quercus* (Fagaceae) (Mironov 1999).

2. *Lomographa temerata* ([Denis & Schiffermüller], 1775)

The larvae can damage *Malus*, *Prunus*, *Crataegus*, *Padus*, *Rosa* (Rosaceae); they can also develop on *Quercus*, *Fagus* (Fagaceae), *Acer* (Sapindaceae), *Salix* (Salicaceae), *Betula* (Betulaceae), and *Impatiens* (Balsaminaceae) (Mironov 1999).

3. *Odontopera bidentata* (Clerck, 1759)

The larvae can damage *Betula* (Betulaceae), *Populus*, *Salix* (Salicaceae) in forests on Altai Krai (Perunov 2017b).

4. *Selenia tetralunaria* (Hufnagel, 1767)

The larvae can damage *Malus*, *Prunus*, *Crataegus*, *Padus*, *Rosa* (Rosaceae); they can also develop on *Betula*, *Alnus* (Betulaceae), *Salix* (Salicaceae), *Quercus* (Fagaceae), *Tilia* (Malvaceae) and *Fraxinus* (Oleaceae) (Mironov 1999).

5. *Plagodis dolabraria* (Linnaeus, 1767)

The species has been noted as a tree pest in Altai Krai (Perunov 2017b). The larvae can damage various shrubs and trees: *Lonicera* (Caprifoliaceae), *Crataegus*, *Sorbus*, *Rubus*, *Prunus* (Rosaceae), *Ulmus* (Ulmaceae), *Salix* (Salicaceae), *Betula* (Betulaceae) (Beljaev 2016).

6. *Plagodis pulveraria* (Linnaeus, 1758)

The larvae can damage *Sorbus*, *Prunus* (Rosaceae), *Lonicera* (Caprifoliaceae), *Vaccinium* (Ericaceae); they can also develop on *Quercus* (Fagaceae), *Betula*, *Alnus* (Betulaceae), and *Salix* (Salicaceae) (Mironov 1999).

7. *Apeira syringaria* (Linnaeus, 1758)

The caterpillars can develop on *Lonicera*, *Symphoricarpos* (Caprifoliaceae), *Syringa*, *Ligustrum* (Oleaceae), *Spiraea* (Rosaceae) (Beljaev 2016; Burnasheva 2011; Mironov 1999).

8. *Ennomos autumnaria* (Werneburg, 1859)

The larvae can damage *Malus*, *Pyrus*, *Prunus* (Rosaceae), *Ribes* (Grossulariaceae), *Vaccinium* (Ericaceae); they can also develop on *Betula*, *Alnus* (Betulaceae), *Quercus* (Fagaceae), *Ulmus* (Ulmaceae), *Tilia* (Malvaceae) (Mironov 1999). In ur-

ban forest plantations in Moscow damage has been noted by this species (Belov 2011).

9. *Opisthograptis luteolata* (Linnaeus, 1758)

The larvae can damage *Malus*, *Pyrus*, *Prunus*, *Sorbus*, *Rosa* (Rosaceae), *Ribes* (Grossulariaceae), *Lonicera* (Caprifoliaceae), *Betula* (Betulaceae), *Salix* (Salicaceae), *Quercus* (Fagaceae) (Mironov 1999).

10. *Angerona prunaria* (Linnaeus, 1758)

The larvae can damage *Prunus*, *Crataegus*, *Sorbus*, *Rubus*, *Rosa* (Rosaceae), *Ribes* (Grossulariaceae), *Lonicera* (Caprifoliaceae), *Vaccinium* (Ericaceae); they can also develop on *Corylus*, *Betula*, *Alnus*, *Carpinus* (Betulaceae), *Salix*, *Populus* (Salicaceae), *Fagus* (Fagaceae), *Frangula* (Rhamnaceae), *Sambucus* (Adoxaceae), *Aralia* (Araliaceae), *Calluna*, *Ledum* (Ericaceae), *Plantago* (Plantaginaceae) and *Taraxacum* (Asteraceae) (Mironov 1999).

11. *Ascotis selenaria* ([Denis & Schiffermüller], 1775)

The larvae can damage *Malus*, *Pyrus*, *Prunus*, *Rosa* (Rosaceae), and *Ribes* (Grossulariaceae) (Mironov 1999).

12. *Bupalus piniaria* (Linnaeus, 1758)

The species can notably damage trees in forest as well as in ornamental coniferous plantations (Vorontsov 1982). The larvae can damage *Pinus sylvestris* and other conifers: *Picea*, *Abies* (Pinaceae) etc. (Beljaev 2016). Outbreaks occur regularly in various parts of the species vast range (Palnikova and Yagunov 2011). On the territory of Western Siberia, its outbreaks covered about 400 thousand hectares of forest plantations from Novosibirsk to Kazakhstan (Kolomiets 1977).

13. *Cryopega bajaria* ([Denis & Schiffermüller], 1775)

The larvae can damage *Malus*, *Prunus*, *Crataegus* (Rosaceae); they can also develop on *Acer* (Sapindaceae), *Betula* (Betulaceae), *Ligustrum* (Oleaceae), *Rosa* (Rosaceae) and *Robinia pseudoacacia* (Fabaceae) (Mironov 1999).

14. *Erannis jacobsoni* (Djakonov, 1926)

A typical pest of *Larix* (Pinaceae) capable to outbreak (Rozhkov et al. 1966).

15. *Biston betularia* (Linnaeus, 1758)

The species is able to outbreak in *Betula* (Betulaceae) forests in Western Siberia (Kolomiets and Artamonov 1985) and Kazakhstan (Kazansky 1958). The species plays a dominant role in the formation foci in Altai Krai forests (Perunov 2017b). Also, the larvae can damage *Malus*, *Prunus*, *Sorbus*, *Rubus* (Rosaceae), *Lonicera* (Caprifoliaceae) (Mironov 1999).

16. *Biston strataria* (Hufnagel, 1767)

The species has been noted as a tree pest in Altai Krai. The larvae predominantly feed on leaves of *Populus* (Salicaceae) and *Betula* (Betulaceae) (Perunov 2017b); they can also damage *Malus* (Rosaceae) (Mironov 1999).

17. *Lycia hirtaria* (Clerck, 1759)

The larvae can damage many cultivated trees and bushes: *Malus*, *Prunus*, *Cydonia*, *Sorbus*, *Rosa* (Rosaceae). Also, they can develop on *Betula* (Betulaceae), *Salix*, *Populus* (Salicaceae), *Acer* (Sapindaceae), *Fraxinus* (Oleaceae), *Quercus* (Fagaceae), *Tilia* (Malvaceae), *Ulmus* (Ulmaceae) (Mironov 1999). The species has been noted as a tree pest in Altai Krai (Perunov 2017b).

18. *Lycia pomonaria* (Hübner, 1790)

The larvae can damage *Betula* (Betulaceae), *Populus*, *Salix* (Salicaceae), *Prunus*, *Spiraea* (Rosaceae) (Beljaev 2016).

19. *Apocheima hispidaria* ([Denis & Schiffermüller], 1775)

The larvae can damage leaves of *Malus* and *Crataegus* (Rosaceae), *Quercus* (Fagaceae) and *Ulmus* (Ulmaceae) (Mironov 1999).

20. *Hypomecis punctinalis* (Scopoli, 1763)

The species has been noted as a tree pest in Altai Krai (Perunov 2017b). The larvae can damage leaves of cultivated plants: *Malus*, *Pyrus*, *Prunus* (Rosaceae), *Berberis* (Berberidaceae), *Hippophae* (Elaeagnaceae), *Vaccinium* (Ericaceae). Also, they can develop on *Betula* (Betulaceae), *Salix*, *Populus* (Salicaceae), *Tilia* (Malvaceae), *Quercus* (Fagaceae), *Acer* (Sapindaceae), *Fraxinus* (Oleaceae), *Picea*, *Abies*, *Pinus* and *Larix* (Pinaceae) (Mironov 1999).

21. *Hypomecis roboraria* ([Denis & Schiffermüller], 1775)

The larvae can damage *Malus* (Rosaceae), *Betula* (Betulaceae), *Ulmus* (Ulmaceae), and *Salix* (Salicaceae) (Beljaev 2016; Mironov 1999).

22. *Ematurga atomaria* (Linnaeus, 1758)

The species has been noted as a tree pest in Altai Krai causing damage to *Betula* (Betulaceae), *Populus*, *Salix* (Salicaceae) (Perunov 2017b). The larvae can also develop on different deciduous trees, shrubs, herbaceous plants: *Artemisia*, *Centaurea* (Asteraceae), *Vicia*, *Lotus* (Fabaceae), *Vaccinium uliginosum*, *Ledum palustre* (Ericaceae) (Beljaev 2016; Burnasheva 2011).

23. *Abraxas grossulariata* (Linnaeus, 1758)

The species is a serious pest of *Ribes* (Grossulariaceae) in Europe and Siberia; they can also develop on *Spiraea* (Rosaceae), *Ulmus* (Ulmaceae), *Vaccinium* (Ericaceae), *Larix*, *Abies* (Pinaceae) etc. (Mironov 1999).

24. *Abraxas sylvata* (Scopoli, 1763)

This species can be especially damaging on *Prunus padus* in some years; they can also develop on *Prunus* (Rosaceae), *Ribes* (Grossulariaceae), *Corylus*, *Betula* (Betulaceae), *Fagus* (Fagaceae), and *Ulmus* (Ulmaceae) (Mironov 1999).

25. *Macaria brunneata* (Thunberg, 1784)

The larvae can damage *Pyrus* (Rosaceae), *Salix* (Salicaceae), *Vaccinium*, and *Ledum* (Ericaceae) (Mironov 1999).

26. *Macaria notata* (Linnaeus, 1758)

The species has been noted as a tree pest in Altai Krai damaging *Betula* (Betulaceae), *Salix* (Salicaceae) (Perunov 2017b).

27. *Macaria wauaria* (Linnaeus, 1758)

The larvae can damage *Prunus* (Rosaceae), *Ribes* (Grossulariaceae) (Mironov 1999).

28. *Geometra papilionaria* (Linnaeus, 1758)

The larvae can damage *Frangula* (Rhamnaceae), *Corylus*, *Betula*, *Alnus* (Betulaceae), *Salix* (Salicaceae), *Tilia* (Malvaceae) (Mironov 1999).

29. *Mesoleuca albicillata* (Linnaeus, 1758)

The larvae can damage *Rubus* (Rosaceae) (Mironov 1999).

30. *Pelurga comitata* (Linnaeus, 1758)

The larvae can damage *Ribes* (Grossulariaceae) (Mironov 1999).

31. *Eulithis mellinata* (Fabricius, 1787)

The larvae can damage *Ribes* (Grossulariaceae) (Mironov 1999).

32. *Eulithis prunata* (Linnaeus, 1758)

The larvae can damage *Ribes* (Grossulariaceae), *Sorbus*, *Crataegus* (Rosaceae); they can also develop on *Quercus* (Fagaceae), *Salix* (Salicaceae) and other deciduous trees (Mironov 1999).

33. *Eulithis populata* (Linnaeus, 1758)

The larvae can damage *Ribes* (Grossulariaceae); they can also develop on *Salix*, *Populus* (Salicaceae), *Vaccinium* (Ericaceae), and *Chamaenerion* (Onagraceae) (Mironov 1999).

34. *Eulithis pyropata* (Hübner, 1809)

The larvae can damage *Ribes* (Grossulariaceae) (Mironov 1999).

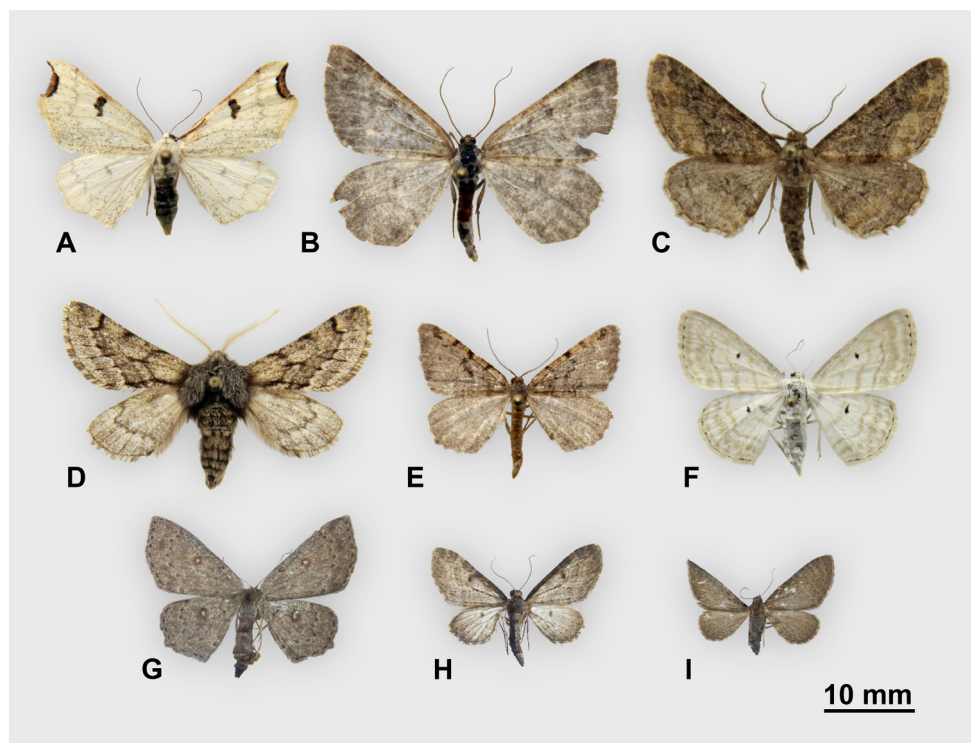


Figure 3. Geometrid moths new for Altai Krai fauna: **A.** *Eilicrinia cordiaria* (Hübner, 1790), male, Loktevskiy district, Aley river valley, 1 km N of Ust'yanka vill., 17–18.05.2020; **B.** *Charissa* (*Dysgnophos*) *turfosaria* (Wehrli, 1922), male, Krasnoshchekovsky district, Charysh river valley, 3 km WNW of Ust'-Chagyrka vill., 18–20.05.2020; **C.** *Jankowskia bituminaria* (Lederer, 1853), male, Loktevskiy district, Aley river valley, 1 km N of Ust'yanka vill., 17–18.05.2020; **D.** *Apocheima hispidaria* ([Denis & Schifferrmüller], 1775), male, Slavgorodsky district, Znamenka vill., 24.04.2012; **E.** *Macaria* (*Speranza*) *halituararia* (Guenée, 1858), male, Loktevskiy district, Aley river valley, 1 km N of Ust'yanka vill., 01.06.2020; **F.** *Scopula dignata* (Guenée, [1858]), male, Charyshsky district, Charyshskoe vill., 01.08.2019; **G.** *Cyclophora pendularia* (Clerck, 1759), male, Togulsky district, Titovo vill., 06–11.07.2011; **H.** *Eupithecia orphnata* W. Petersen, 1909, male, Pervomaisky district, station Ukladochnaya, 12.06.2009; **I.** *Eupithecia thalictrata* (Püngeler, 1902), male, Zarinsky district, 10 km W Tyagun, 05–15.07.2013.

35. *Venusia cambrica* Curtis, 1839

The larvae can damage buds and leaves of *Lonicera* (Caprifoliaceae) (Mironov 1999).

36. *Rheumaptera hastata* (Linnaeus, 1758)

The species has been noted as a tree pest in Altai Krai damaging *Betula* (Betulaceae) (Perunov 2017b).

37. *Operophtera brumata* (Linnaeus, 1758)

The larvae can damage *Pyrus*, *Malus*, *Prunus* (Rosaceae) and other deciduous trees: *Tilia* (Malvaceae), *Quercus* (Fagaceae), *Ulmus* (Ulmaceae), *Corylus* (Betulaceae), *Fraxinus* (Oleaceae) etc. (Mironov 1999).

38. *Trichopteryx polycommata* ([Denis & Schiffermüller], 1775)

The larvae can damage buds and leaves of *Lonicera* (Caprifoliaceae) (Mironov 1999).

39. *Pasiphila rectangulata* (Linnaeus, 1758)

The larvae can damage flowers of *Malus*, *Pyrus*, *Prunus*, *Cydonia* (Rosaceae) (Mironov 1999).

40. *Eupithecia exigua* (Hübner, [1813])

The larvae can damage leaves and fruits of *Berberis* (Berberidaceae), *Crataegus*, *Prunus*, *Sorbus* (Rosaceae), *Ribes* (Grossulariaceae), *Frangula* (Rhamnaceae), *Fraxinus* (Oleaceae), *Viburnum* (Adoxaceae), *Cornus* (Cornaceae), *Salix* (Salicaceae), and *Acer* (Sapindaceae) (Mironov 1999).

41. *Eupithecia assimilata* Doubleday, 1856

The larvae can damage *Ribes* (Grossulariaceae) and *Humulus* (Cannabaceae) (Mironov 1999).

42. *Eupithecia innotata* (Hufnagel, 1767)

The larvae can damage *Sorbus*, *Crataegus*, *Prunus*, *Cotoneaster*, *Rosa* (Rosaceae), *Hippophae* (Elaeagnaceae); they can also develop on *Fraxinus* (Oleaceae), *Salix* (Salicaceae), *Alnus* (Betulaceae), *Sambucus* (Adoxaceae), *Frangula* (Rhamnaceae), *Lonicera* (Caprifoliaceae), *Tamarix* (Tamaricaceae) and *Artemisia* (Asteraceae) (Mironov 1999).

The checklist of geometrids of Altai Krai

Subfamily ARCHIEARINAE

1. *Archiearis notha* (Hübner, [1803]) – Kr2(a), P1(b)
2. *Archiearis parthenias* (Linnaeus, 1761) – B(q, r), B2(d), B3(e), Kr2(a), P3(a, b, ad), Zm2(b)

Subfamily ENNOMINAE

3. *Cabera exanthemata* (Scopoli, 1763) – K1(Volynkin et al. 2011), P3(g, h, j, x, af, ar), Ru5, She1, Tg2, Tg5
4. *Cabera leptographa* Wehrli, 1936 – P1(c)

5. *Cabera pusaria* (Linnaeus, 1758) – B2(i, m, n), Ch1, K1(Volynkin et al. 2011), K1(l), P3(aq, ar), V1, Z1(c), Zm1(b)
6. **Eilicrinia cordiaria* (Hübner, 1790) – Lo3(a)
7. *Lomographa bimaculata* (Fabricius, 1775) – B2(i), Kl3, Kr1(a), P3(o, af, aq, ar, av), Tg5
8. *Lomographa temerata* ([Denis & Schiffermüller], 1775) – K1(Volynkin et al. 2011), K1(a, e, i), P3(af, aq), Tg5, Tro5(b), Zm1(b)
9. *Odontopera bidentata* (Clerck, 1759) – K1(Volynkin et al. 2011), So2, Tg5
10. *Crocallis elinguaris* (Linnaeus, 1758) – Ch4(d), Z1(d)
11. *Petrophora chlorosata* (Scopoli, 1763) – K1(Volynkin et al. 2011), K3, Kr1(a), Kr2(a, c), P3(w), Tg5
12. *Selenia dentaria* (Fabricius, 1775) – B(k), Kr2(a), P3(ae), Ru5
13. *Selenia tetralunaria* (Hufnagel, 1767) – B(e), B2(a), Bl4, K1(Volynkin et al. 2011), P3(n, y), Tg5
14. *Cepphis advenaria* (Hübner, 1790) – B2(k), P3(ak), Tg5, Tl1(d), Tro3, Z1(e)
15. *Plagodis dolabraria* (Linnaeus, 1767) – P3(w, ag, af, ak, ar), Tg5
16. *Plagodis pulveraria* (Linnaeus, 1758) – B(k), B2(a), Bi(d), K3, Kr2(c), P1(a, b), Tg5
17. *Pseudopanthera macularia* (Linnaeus, 1758) – Alt3(g), B2(i), K1(Volynkin et al. 2011), K1(a), P3(d, o), So2, Tro3, Uk1, Z2(b), Zm1(b)
18. *Epione repandaria* (Hufnagel, 1767) – Kr1(b), Tro5(a)
19. *Epione vespertaria* (Linnaeus, 1767) – Alt4, Sm1
20. *Apeira syringaria* (Linnaeus, 1758) – K1(Volynkin et al. 2011), P3(q, w), T1(c), Tg2, Z1(c, e)
21. *Opisthograptis luteolata* (Linnaeus, 1758) – B(a, g, k), K1(Volynkin et al. 2011), Ko1(d), P2(a), P3(o, w, ae)
22. *Ennomos autumnaria* (Werneburg, 1859) – Bd2, Km2, Kr4, P3(k, t, ai), Re2, She2(a), So3, T1(c)
23. *Ourapteryx sambucaria* (Linnaeus, 1758) – B(l)
24. *Hylaea fasciaria* (Linnaeus, 1758) – Alt4, K1(Volynkin et al. 2011), K1(c, e), She1(a)
25. *Perconia strigillaria* (Hübner, 1787) – Alt3(g), K1(Volynkin et al. 2011), Kl1(b), Ug2
26. *Gnophopsodos ravistriolaria* (Wehrli, 1922) – Zm1(a) (Erlacher and Erlacher 2016)
27. *Gnophopsodos sabine* S.Erlacher & J.Erlacher, 2016 – Zm1(a) (Erlacher and Erlacher 2016)
28. **Charissa (Dysgnophos) turfosa* (Wehrli, 1922) – K3, Kur1
29. *Charissa (Kemtrognophos) ambiguata* (Duponchel, 1830) – Ch9, Kur1
30. *Angerona prunaria* (Linnaeus, 1758) – B(d, g), Ch2(a), K1(Volynkin et al. 2011), Lo3(b), T1(a), Z2(b), Zm1(b)
31. *Chariaspilates formosaria* (Eversmann, 1837) – K1(Volynkin et al. 2011), K1(c, l)

32. *Hypoxystis pluviaria* (Fabricius, 1787) – Alt2, B(n), B2(e, f, h, l), B3(b), Bi(c), K1(Volynkin et al. 2011), K1(b), Kr1(a), P3(ap), So1
33. *Synopsia sociaria* (Hübner, 1799) – K1(a), Lo3(a), P3(j, k)
34. *Synopsia strictaria* Lederer, 1853 – K1(Volynkin et al. 2011), K1(i)
35. *Aspitates* (*Megaspilates*) *mundataria* (Stoll, 1782) – Alt3(e), Bl2, K1(l), Ku1
36. *Aspitates* (*Napuca*) *albaria* (Bartel, 1903) – Lo3(a)
37. *Siona lineata* (Scopoli, 1763) – Alt1, Alt3(h), B2(i), Ch3(a), Ch4(b), Ch9, K1(Volynkin et al. 2011), K1(i), Kh1, Kr3, Kur1, P3(a, r), So2
38. *Cleora cinctaria* ([Denis & Schiffermüller], 1775) – B(m, n), B2(g), B3(d), Bi(b), K1(Volynkin et al. 2011), K1(a), Kr2(a), P1(b), P2(c), P3(n, u, ap, au, av), Ru5, T1(b), Tro2(e)
39. *Ascotis selenaria* ([Denis & Schiffermüller], 1775) – B(l), B6(b), K1(Volynkin et al. 2011), K1(c), P3(af, aq, at)
40. *Ectropis crepuscularia* ([Denis & Schiffermüller], 1775) – Alt3(h), B2(n), K1(Volynkin et al. 2011), K3, Ko1(d), Kr1(a), Kr2(c), P3(n, w, ae, ar), Pv1(b), Ru3
41. *Parectropis similaria* (Hufnagel, 1767) – B2(m), P3(d, x, af, ar, aq)
42. *Aethalura punctulata* ([Denis & Schiffermüller], 1775) – B2(a), K1(Volynkin et al. 2011), K1(a), Kr2(c), P3(n, o, w, ap), Tro1(b)
43. *Arichanna melanaria* (Linnaeus, 1758) – Alt3(f), Alt4, K1(Volynkin et al. 2011), K1(c)
44. *Bupalus piniaria* (Linnaeus, 1758) – B2(i), B6(b), By, Ko1(d), P3(aq), T1(b)
45. *Cryopega bajaria* ([Denis & Schiffermüller], 1775) – P3(ac)
46. *Erannis jacobsoni* (Djakonov, 1926) – Alt3(b), Tro2(c)
47. *Biston betularia* (Linnaeus, 1758) – K1(Volynkin et al. 2011), K1(c, i), Ko2, P1(c), P2(b), P3(r, as), T1(a), Tg2
48. *Biston strataria* (Hufnagel, 1767) – B(m), B4, P1(a), Slt1, V2
49. **Jankowskia bituminaria* (Lederer, 1853) – Lo3(a, b)
50. *Lycia hirtaria* (Clerck, 1759) – B(t, q), B4, B6(a), K1(Volynkin et al. 2011), K1(b), Kr1(a), P1(a), P2(c), P3(ae, ap), Sl1(b)
51. *Lycia pomonaria* (Hübner, 1790) – P3(m)
52. *Phigalia djakonovi* Moltrecht, 1933 – Bi(e), P3(m, aj)
53. **Apocheima hispidaria* ([Denis & Schiffermüller], 1775) – Sl1(b)
54. *Hypomecis punctinalis* (Scopoli, 1763) – B(g), K1(Volynkin et al. 2011), P2(d), P3(h, w, x, af), Tro2(e)
55. *Hypomecis roboraria* ([Denis & Schiffermüller], 1775) – K1(Volynkin et al. 2011), P3(ag, aq, ar), She1(a), Sm2
56. *Ematurga atomaria* (Linnaeus, 1758) – A(b), Alt3(g), B1(f), B2(c, h, k, m), B3(c), K1(Volynkin et al. 2011), K1(a), Kh1, Kh2, Kr3, P3(at), Pn1(a), Ro1, So2, Zm1(b)
57. *Deileptenia ribeata* (Clerck, 1759) – Kr1(b), Kr2(b), Zm1(b)
58. *Paradarisa consonaria* (Hübner, 1799) – K1(Volynkin et al. 2011), K1(a), Kr2(a)

59. *Alcis deversata* (Staudinger, 1892) – Alt3(f), Alt4, B(u), B7, Ch5(a, b), Ch6, Ch7, Ch9, Ch9K1(Volynkin et al. 2011), K1(c, e, f, l), Kr1(b), Kr2(b), Kr5, P3(h, i, j, af, ar, at), P6, Pn1(b), Sm2, So3, Tg2, Tl1(e, f), Z1(b)
60. *Alcis extinctaria* (Eversmann, 1851) – Alt4, K1(Volynkin et al. 2011), Lo3(b), So2
61. *Alcis jubata* (Thunberg, 1788) – Be, Sm2, Z1(c)
62. *Xerodes semilutata* (Lederer, 1853) – K3, Kr2(a), So1
63. *Abraxas grossulariata* (Linnaeus, 1758) – B(e, g), Tl2(a), Ye1, Z1(c), Z3
64. *Abraxas karafutonis* Matsumura, 1925 – K1(l)
65. *Abraxas sylvata* (Scopoli, 1763) – Alt3(g), B2(d), Ch2(a), Ch4(b), K1(Volynkin et al. 2011), M1(a), P1(c), T1(a), Tl2(b), Z2(a), Z3
66. *Stegania cararia* (Hübner, 1790) – P3(aq, ap), Sm2, Z1(e)
67. *Stegania dalmataria* (Guenée, 1858) – Kl3, Ru3, Ug2
68. *Lomaspilis marginata* (Linnaeus, 1758) – A(b), Alt3(h), B2(i, k), K1(Volynkin et al. 2011), Ch9, K1(e, l), Lo3(a), M1(b), P2(d), P3(i, af, ar, as, aq), Sm2, Tg2, Tg5, Z2(a)
69. *Lomaspilis nigrita* Heydemann, 1936 – K1(e), P3(x, ar, aq), Tg5
70. *Heliomata glarearia* ([Denis & Schiffermüller], 1775) – Ba, Bl2, Ch2(b), Ch4(b), K1(Volynkin et al. 2011), K1(c, i, l), Kh1, Kl1(a), Kur1, Lo3(a), M1(a), P3(u, af, ap, ar), She1(a)
71. *Isturgia arenacearia* ([Denis & Schiffermüller], 1775) – Ch4(b), Kur1, P1(c), P2(d), P3(w, af, aq), Ru4, Ru5, Tg2
72. *Isturgia murinaria* ([Denis & Schiffermüller], 1775) – B1, B3(c), K1(Volynkin et al. 2011), K1(e), K2, Kh1, M1(b), Lo1, Shi1, P2(d), P3(j, af, av), Sl1(b), Tg2, She1(a), Tl1(f), Kl1(a)
73. *Narraga fasciolaria* (Hufnagel, 1767) – M3
74. *Narraga tessularia* (Metzner, 1845) – She1(a), M2(a, b)
75. *Digrammia rippertaria* (Duponchel, 1830) – M2(b)
76. *Macaria (Macaria) alternata* ([Denis & Schiffermüller], 1775) – B2 (m), Bd2, K1(Volynkin et al. 2011), K3, Kl3, Lo3(a, b), P3(aa, ak, aq, ar, as, at), Ru5, She1(a), Tg5, Z1(c)
77. *Macaria (Macaria) liturata* (Clerck, 1759) – P2(d), Pn1(a), Pv1(b), She1(a)
78. *Macaria (Macaria) notata* (Linnaeus, 1758) – B2(n), K1(Volynkin et al. 2011), Kh2, P3(h, q, aq, ar, at), Tg5
79. *Macaria (Macaria) shanghaiaria* Walker, 1861 – K1(l), P2(d), P3(r)
80. *Macaria (Macaria) signaria* (Hübner, 1809) – Tg5, Z1(c)
81. *Macaria (Speranza) brunneata* (Thunberg, 1784) – K1(Volynkin et al. 2011), K1(l)
82. **Macaria (Speranza) halituararia* (Guenée, 1858) – Lo3(b)
83. *Macaria (Speranza) wauaria* (Linnaeus, 1758) – B(g), Ru4, Z1(c)
84. *Chiasmia clathrata* (Linnaeus, 1758) – Alt3 (g, h), B2(c), Bd2, Bl4, Ch2(c), Ch4, Ch9, K1 (Volynkin et al. 2011), K1(c, e), Kl1(a), Kr1(a), Kr3, Ko1(b), Kur1, P1(b), P3 (d, u, av), Pn1 (a), Ru5, Sm2, So2, T1(a), Tg1, Tg5, Zm3

85. *Chiasmia saburraria* (Eversmann, 1851) – K3, Lo3(b)

Subfamily DESMOBATHRINAE

86. *Gypsochroa renitidata* (Hübner, 1817) – P3(h, x, ag, ak)

Subfamily GEOMETRINAE

87. *Geometra papilionaria* (Linnaeus, 1758) – K1(Volynkin et al. 2011), Ko1(a), M1(a), She1(a), Sm2, Tro2(a), P1(c), P3(w)
 88. *Thetidia smaragdaria* (Fabricius, 1787) – Bl2, K1(l), M1(a), P3(x), Pn1(a), Pn2, She1(a)
 89. *Hemistola chrysoprasaria* (Esper, 1795) – B7, K1(c, f, l)
 90. *Hemistola zimmermanni* (Hedemann, 1879) – K1(Volynkin et al. 2011)
 91. *Hemithea aestivaria* (Hübner, [1799]) – B(g), K1(Volynkin et al. 2011), P3(j, x), Z1(c)
 92. *Jodis putata* (Linnaeus, 1758) – P3(w, ao), She1(a), Tg5, Z2(b)
 93. *Thalera fimbrialis* (Scopoli, 1763) – K1(Volynkin et al. 2011), M1(a), P3(h, x)
 94. *Dyschloropsis impararia* (Guenée, [1858]) – K1(Volynkin et al. 2011), Lo3(b)
 95. *Chlorissa cloraria* (Hübner, [1813]) – K3, Ru5, Tg5
 96. *Chlorissa viridata* (Linnaeus, 1758) – A(b), B(b, k), K1(Volynkin et al. 2011), Kh1, Kh2, Kl1(a), P3(w, af)

Subfamily STERRHINAE

97. *Cleta filacearia* (Herrich-Schäffer, 1847) – Lo3(a), M3
 98. *Idaea aureolaria* ([Denis & Schifferrmüller], 1775) – Bl3, K1(I, j), Kl2, M1(a), P3(d, r, w, x), Ug2
 99. *Idaea aversata* (Linnaeus, 1758) – Bd2, K1(Volynkin et al. 2011), K1(h), Kr2(b), P3(h, i, j, x, ak), Ru4, Z1(c)
 100. *Idaea biselata* (Hufnagel, 1767) – B2(b), K1(Volynkin et al. 2011), K1(e, l), Kr1(b), Kr2(b), Kr5, P1(d), Sm2, Z1(c)
 101. *Idaea descitaria* (Christoph, 1893) – B(j), M3
 102. *Idaea dimidiata* (Hufnagel, 1767) – Ch3(b), Tg2
 103. *Idaea emarginata* (Linnaeus, 1758) – K1(Volynkin et al. 2011), P3(j), Tro2(d)
 104. *Idaea mancipiata* (Staudinger, 1871) – T1(d), Zm(a)
 105. *Idaea muricata* (Hufnagel, 1767) – Alt3(j), K1(Volynkin et al. 2011), K1(c), P3(ar), Pv2(a)
 106. *Idaea pallidata* ([Denis & Schifferrmüller], 1775) – A(a), K3, P3(w, ak)
 107. *Idaea rusticata* ([Denis & Schifferrmüller], 1775) – Ku1, M1(a), Ru4, She1(a), T1(d)

108. *Idaea sericeata* (Hübner, [1813]) – Ru1
109. *Idaea serpentata* (Hufnagel, 1767) – Alt3(a, d, f), Bi(b), K1(e), Kr1(b), Lo1, She1(b)
110. *Idaea straminata* (Borkhausen, 1794) – Bl2, P3(i, j, x, z, aa)
111. *Idaea sylvestraria* (Hübner, [1799]) – M2(a), P3(j, x, y, am)
112. *Limeria macraria* Staudinger, 1892 – M2(a)
113. *Scopula beckeraria* (Lederer, 1853) – Bl4, Kl3, Lo3(a), M1(b), M2(a, b), M3, Pn1(a), Ru2, Ru5
114. *Scopula decorata* ([Denis & Schiffermüller], 1775) – K1(l), K3, Kl1(a, d), Lo3(b), M2(a, b), Ru1
115. **Scopula dignata* (Guenée, [1858]) – Ch4(c)
116. *Scopula floslactata* (Haworth, 1809) – B(g), B2(k), Ch1, P3(d, h, aq), Tg2, Tg5, Tro3
117. *Scopula frigidaria* (Möschler, 1860) – K1(Volynkin et al. 2011)
118. *Scopula immorata* (Linnaeus, 1758) – B2(l, m, n), Kr4, P3(q, w, x), P4
119. *Scopula immutata* (Linnaeus, 1758) – K1(l), K1(Volynkin et al. 2011), P3(h, ag)
120. *Scopula incanata* (Linnaeus, 1758) – Alt3 (h, j), K1(e), K3, Lo3(a), Z2(c)
121. *Scopula marginepunctata* (Goeze, 1781) – Alt4, Lo3(a), Ru5, Tre1, Zm2(b)
122. *Scopula nemoraria* (Hübner, [1799]) – K1(l)
123. *Scopula nigropunctata* (Hufnagel, 1767) – K1(Volynkin et al. 2011), P3(h, x, ag), Tro4
124. *Scopula ornata* (Scopoli, 1763) – K1(Volynkin et al. 2011), K1(a, e), K3, Lo2, M2(a), P3(i, j, ae), So3, Tl1(f), Ru3
125. *Scopula rubiginata* (Hufnagel, 1767) – Bd2, K1(Volynkin et al. 2011), K1(d, e, l), Kn2, Kr2(b), Lo3(a), P3(e, j, q, w, aa, ag, ak), Pn2, Zm2
126. *Scopula subpunctaria* (Herrich-Schäffer, 1847) – Alt3(e, g), B(h), Ch5(b), K1(c), P3(j, al), Sm2, Tl1(f), Tg2, Z1(f)
127. *Scopula tessellaria* (Boisduval, 1840) – K3, Lo3(b)
128. *Scopula umbelaria* (Hübner, [1813]) – M1(a), P3(af, ar, as)
129. *Scopula virginalis* (Fourcroy, 1785) – Bd1, K1(Volynkin et al. 2011), P3(x), Tg2
130. *Scopula virgulata* ([Denis & Schiffermüller], 1775) – Alt3(a, e), Ba, K1(Volynkin et al. 2011), K1(c, f), P3(r, w, aa, ag), Tl1(f), She1(a)
131. *Rhodostrophia jacularia* (Hübner, [1813]) – K1(l)
132. *Rhodostrophia vibicaria* (Clerck, 1759) – Alt3(e), B(c), Bl3, Ch2(a), Lo3(b), M1(a), P3(h), She1(a), Ru1, Zm1(b)
133. *Cyclophora albipunctata* (Hufnagel, 1767) – P3(j, z, ae, at), Tg2, Z1(c)
134. **Cyclophora pendularia* (Clerck, 1759) – Bd2, Tg2
135. *Timandra comae* Schmidt, 1931 – Alt3(j), B(i, g), K1(e, f), Lo1, P3(j, k, ai, ah), Tl1(f), Tg2, Shi2
136. *Timandra reompta* (Prout, 1930) – K1(Volynkin et al. 2011)
137. *Casilda antophillaria* (Hübner, [1813]) – M2(b)

138. *Lythria cruentaria* (Hufnagel, 1767) – B(a), B2(a, h), Kh1
 139. *Lythria purpuraria* (Linnaeus, 1758) – B(c), M1(b), Bl1, Ru1, Pn1(a), K1(e),
 Kl1(a), Ug1, P3(j), Ye1

Subfamily LARENTIINAE

140. *Cataclysmes rigata* (Hübner, [1813]) – Ch9, K1(Volynkin et al. 2011),
 Lo3(a)
 141. *Phibalapteryx virgata* (Hufnagel, 1767) – B3(b), K1(Volynkin et al. 2011),
 K1(f), Kl1(c), Kur1, M2(b), P3(j, ae), Ru5
 142. *Scotopteryx chenopodiata* (Linnaeus, 1758) – Alt4, B(g), Ch3(b), Ch5(b),
 K1(Volynkin et al. 2011), K1(c, e), Km1, Kr1(b), P1(c), P3(h, j, aa, al), Tg2,
 Zm2(a)
 143. *Costaconvexa polygrammata* (Borkhausen, 1794) – B(p), Bl4
 144. *Catarhoe cuculata* (Hufnagel, 1767) – K1(Volynkin et al. 2011), K1(i),
 M2(b), P3
 145. *Catarhoe rubidata* ([Denis & Schifferrmüller], 1775) – P3(h, x)
 146. *Campptogramma bilineata* (Linnaeus, 1758) – B(a), Ko1(c)
 147. *Ochyria quadrifasiata* (Clerck, 1759) – K1(Volynkin et al. 2011), K1(c, e),
 P1(c), P3(r, x, al), Tg2, Tl1(f)
 148. *Orthonama vittata* (Borkhausen, 1794) – P3(s), Shi1
 149. *Xanthorhoe biriviata* (Borkhausen, 1794) – K1(l), Kr1(a), Kr2(a), So1, Tg2,
 Tg5, Tro3
 150. *Xanthorhoe ferrugata* (Clerck, 1759) – B7, Bd2, K1(i, l), P3(q, ar)
 151. *Xanthorhoe fluctuata* (Linnaeus, 1758) – B(v), Ch3(b), K1(Volynkin et al.
 2011), Lo3(a), P2(c), P3(j, o, u, w, aa, ae, af, ah), Tl1(f), Tro2(b), Z1(b)
 152. *Xanthorhoe montanata* ([Denis & Schifferrmüller], 1775) – Alt1, Alt3(a, d,
 h), Ch2(a), K1(Volynkin et al. 2011), K1(i, f, l), N, P3(d), Z(b)
 153. *Xanthorhoe spadicearia* ([Denis & Schifferrmüller], 1775) – B(g), Kr4, Tg5
 154. *Xanthorhoe stupida* (Alpheraky, 1897) – K1(Volynkin et al. 2011)
 155. *Euphyia unangulata* (Haworth, 1809) – B(g), Bd2, Ch9, K1(Volynkin et al.
 2011), Kr4, P2(e), P3(h, r, w, x, af), Tg5, Z1(b, e)
 156. *Epirrhoe alternata* (Müller, 1764) – Alt4, B2(i), Ch3(b), K1(Volynkin et al.
 2011), K1(c, e, f), M1(b), P3(o, w, x, ar, as), She1(a), Sm2, Tg2, Tg5, Tl1(f),
 Zm1(b), Zm2(a)
 157. *Epirrhoe hastulata* (Hübner, 1790) – B2(i), P3(aq), Zm1(b)
 158. *Epirrhoe pupillata* (Thunberg, 1788) – K1(Volynkin et al. 2011), P3(o, x, y,
 af, am, aq, as)
 159. *Epirrhoe tartuensis* Mols, 1965 – K1(c), K1(Volynkin et al. 2011), P3(as)
 160. *Epirrhoe tristata* (Linnaeus, 1758) – Alt3(c, h), K3
 161. *Earophila badiata* ([Denis & Schifferrmüller], 1775) – B(n), Bi(d), Bl4,
 K1(a), P3(n)
 162. *Earophila kolomietsi* Vasilenko, 2003 – K1(Volynkin et al. 2011)

163. *Anticlea derivata* ([Denis & Schiffermüller], 1775) – B2(j), K1(Volynkin et al. 2011), K1(a), Kr2(a), Sl1(b)
164. *Mesoleuca albicillata* (Linnaeus, 1758) – Alt3(j), B2(g, m, n), Ch9, K1(Volynkin et al. 2011), K1(c, i), P3(x, ar), She1(a), Tro3, Z1(c), Z2(b)
165. *Pelurga comitata* (Linnaeus, 1758) – Bd2, Ch3(b), K1(Volynkin et al. 2011), K1(d, l), P1(c), P3(at), Sl1(a), Tl1(f)
166. *Pseudentephria lamata* (Staudinger, 1897) – Tg2
167. *Larentia clavaria* (Haworth, 1809) – B(o), P3(l, t, ab), She2(b)
168. *Spargania luctuata* ([Denis & Schiffermüller], 1775) – K1(l), Zm1(b)
169. *Hydriomena furcata* (Thunberg, 1784) – K1(l), Sm1, Sm2
170. *Colostygia aptata* (Hübner, [1813]) – Alt3(a), K1(Volynkin et al. 2011), K1(l)
171. *Colostygia pectinataria* (Knoch, 1781) – K1(i), Tg2, Z1(c)
172. *Colostygia turbata* (Hübner, [1799]) – Kr1(b)
173. *Electrophaes corylata* (Thunberg, 1792) – B(g), Ko1(d), P3(o, af, ag, ak)
174. *Dysstroma citrata* (Linnaeus, 1761) – Alt4, B6(c, d), Ch8, K1(e), Kr4, P3(j, aa, an), Tro6, Sm2, Z1(b, d), Z2(c)
175. *Dysstroma truncata* (Hufnagel, 1767) – K1(Volynkin et al. 2011), So3
176. *Cidaria fulvata* (Forster, 1771) – K1(Volynkin et al. 2011), K1(c, k)
177. *Thera obeliscata* (Hübner, [1787]) – Tl4
178. *Thera variata* ([Denis & Schiffermüller], 1775) – Ch1, Sm2
179. *Heterothera taigana* (Djakonov, 1926) – K1(l), Zm1(b)
180. *Eustroma reticulata* ([Denis & Schiffermüller], 1775) – Sm2, Z1(c)
181. *Eulithis achatinellaria* (Oberthür, 1880) – P3(aa), So3
182. *Eulithis mellinata* (Fabricius, 1787) – B(g), Lo3(b), M1(b), P3(h, x, ar), So3, T1(d)
183. *Eulithis prunata* (Linnaeus, 1758) – Ch4(a), K1(Volynkin et al. 2011), K1(c), Kr1(b), P3(t, aa, ah, at), T1(a), Zm2(a)
184. *Eulithis testata* (Linnaeus, 1761) – Alt4, K1(Volynkin et al. 2011), K1(e), Kr1(b), Kr4, Pv1(a), Shi1, Tl1(f), Tro1(a), P2(e), P3(aa)
185. *Gandaritis pyraliata* ([Denis & Schiffermüller], 1775) – K1(Volynkin et al. 2011), P3(z)
186. *Ecliptopera capitata* (Herrich-Schäffer, [1839]) – B(s), K1(l), Tg5
187. *Ecliptopera silaceata* ([Denis & Schiffermüller], 1775) – K1(Volynkin et al. 2011)
188. *Polythrena coloraria* (Herrich-Schäffer, 1855) – Z2(c), Zm1(b)
189. *Cosmorhoe ocellata* (Linnaeus, 1758) – K1(Volynkin et al. 2011), K1(f), P3(r, w, ag, al, as)
190. *Nebula serpentinata* (Lederer, 1853) – K1(Volynkin et al. 2011), P2(b)
191. *Lampropteryx suffumata* ([Denis & Schiffermüller], 1775) – B2(a), Kr2(a, c), So3, Tg5
192. *Epirrita autumnata* (Borkhausen, 1794) – Alt3(b), Ch2(d), Tg4
193. *Asthena amurensis* (Staudinger, 1897) – Alt3(j), B2(n), K1(Volynkin et al. 2011), Z1(c), Zm1(b)

194. *Euchoeca nebulata* (Scopoli, 1763) – K1(Volynkin et al. 2011)
195. *Venusia blomeri* (Curtis, 1832) – B7, Ko1(d), P3(x, ag), Tg2, Tg5, Z1(c)
196. *Venusia cambrica* Curtis, 1839 – Alt3(d), Z1(c)
197. *Hydrelia flammeolaria* (Hufnagel, 1767) – B2(n), Ko1(d), P3(w, x, af, ag, ak)
198. *Hydrelia sylvata* ([Denis & Schiffermüller], 1775) – Ko1(d), P3(ag), Tro3, Z1(e)
199. *Philereme vetulata* ([Denis & Schiffermüller], 1775) – B7
200. *Rheumaptera hastata* (Linnaeus, 1758) – B(g), Tro3, Z2(b), Zm1(b)
201. *Rheumaptera subhastata* (Nolcken, 1870) – Z1(a)
202. *Rheumaptera (Hydria) undulata* (Linnaeus, 1758) – Alt3(j), B(g), K1(Volynkin et al. 2011), K1(g), Ko1(d), Kr1(b), M1(a), P3(e, r), Tg3
203. *Baptria tibiale* (Esper, 1791) – Alt3(e, g, h, i, j), P3(w)
204. *Coenocalpe lapidata* (Hübner, 1809) – So3
205. *Horisme aemulata* (Hübner, [1813]) – K1(Volynkin et al. 2011)
206. *Horisme aquata* (Hübner, [1813]) – M2(a), K3, Kur1
207. *Horisme scotosiata* (Guenée, 1858) – Alt3(f), K1(e), Zm2(a)
208. *Horisme tersata* (Denis & Schiffermüller, 1775) – Alt3(f), K1(Volynkin et al. 2011), P3(ae, ak, aq)
209. *Horisme vitalbata* (Denis & Schiffermüller, 1775) – P3(h)
210. *Melanthia procellata* (Denis & Schiffermüller, 1775) – K1(Volynkin et al. 2011), K1(e, l), Z1(e), Zm2(a)
211. *Anticollix sparsata* (Treitschke, 1828) – B(g), P3(h)
212. *Schistostege nubilaria* (Hübner, [1799]) – Alt3(d), Ch5(a), K1(l)
213. *Odezia atrata* (Linnaeus, 1758) – Alt1, Alt3(a, d, g), K1(l)
214. *Aplocera plagiata* (Linnaeus, 1758) – Lo3(a), K1(Volynkin et al. 2011),
215. *Lithostege farinata* (Hufnagel, 1767) – Bl3, K1(i, l), Kl2, M1(b), P3(d, h, i, w, ak, ar, at), Ro1, Shel(a), T1(a)
216. *Lobophora halterata* (Hufnagel, 1767) – B2(f), Bl4, P3(ae, af, ak)
217. *Pterapherapteryx sexalata* (Retzius, 1783) – P3(af, ao, ar), Tg5, Z1(c)
218. *Acasis appensata* (Eversmann, 1842) – Kr2(a)
219. *Acasis viretata* (Hübner, [1799]) – Tl1(a)
220. *Trichopteryx carpinata* (Borkhausen, 1794) – B2(g), Bi(d), P3(n, ad, aj, au, av)
221. *Trichopteryx polycommata* ([Denis & Schiffermüller], 1775) – P3(au), Zm2(b)
222. *Perizoma albulata* (Denis & Schiffermüller, 1775) – Ch5(a), K1(l), K1(Volynkin et al. 2011), K1(c, d, e), P3(s, w, x, y, ag, ak, ar), Zm1(b)
223. *Perizoma alchemillata* (Linnaeus, 1758) – K1(Volynkin et al. 2011), K1(c, e), Kr2(b), P3(h, x, ag, al, as), Tg2
224. *Perizoma flavofasciata* (Thunberg, 1792) – B(g), K1(Volynkin et al. 2011), P3(w, x, ag, al), Tg2
225. *Perizoma hydrata* (Treitschke, 1829) – Alt4, K1(Volynkin et al. 2011), P3(w, af, ag, aq), Sm2

226. *Martania taeniata* (Stephens, 1831) – Bi(c)
227. *Gagitodes sagittata* (Fabricius, 1787) – K1(Volynkin et al. 2011), K1(f), P3(x)
228. *Chloroclystis v-ata* (Haworth, 1809) – Tg5, Z1(c)
229. *Pasiphila chloerata* (Mabille, 1870) – P3(ar), Tg2, Z1(c)
230. *Pasiphila rectangulata* (Linnaeus, 1758) – B7
231. *Eupithecia abietaria* (Goeze, 1781) – P3(r), Tg5
232. *Eupithecia absinthiata* (Clerck, 1759) – K1(Volynkin et al. 2011), K1(a), Lo3(a), P3(y, as), Z1(c)
233. *Eupithecia assimilata* Doubleday, 1856 – B(f), B5, Kh2, P3(e, r, o, q, v, af, ag, al, as), Pv2, Tg2
234. *Eupithecia biornata* Christoph, 1867 – Bu, M1(b), M2(a), Ye1
235. *Eupithecia carpophilata* Staudinger, 1897 – P3(ar, as)
236. *Eupithecia centaureata* (Denis & Schiffermüller, 1775) – K1(Volynkin et al. 2011), K1(e), K13, M2(b), P3(x, af, ag, ak)
237. *Eupithecia denotata* (Hübner, [1813]) – Kr2(b)
238. *Eupithecia exigua* (Hübner, [1813]) – B7, K1(Volynkin et al. 2011), K1(i), K3, Lo3(a), Ru5
239. *Eupithecia extensaria* (Freyer, 1845) – Bl4, K13, Lo3(a)
240. *Eupithecia extraversaria* Herrich-Schäffer, 1852 – K1(k), K3, Ru5
241. *Eupithecia icterata* (De Villers, 1789) – K1(Volynkin et al. 2011), K1(a), P3(j, h, r, x, y, z, aa, ag, as), T1(d), Tg2, Ye1
242. *Eupithecia innotata* (Hufnagel, 1767) – Bl4, K1(Volynkin et al. 2011), K1(e), K13, Lo3(a), M3, P3(o, x, y, ag), Ru5
243. *Eupithecia jezonica* Matsumura, 1927 – B7, K1(Volynkin et al. 2011), K1(e)
244. *Eupithecia lariciata* (Freyer, 1842) – K1(j)
245. *Eupithecia laquaearia* Herrich-Schäffer, [1848] – M2(a)
246. *Eupithecia linariata* ([Denis & Schiffermüller], 1775) – Bd2, K1(k), M2(a, b), P1(d), P3(g, h, x, ag, af, as), Tg2, Tl1(f), Shi1
247. *Eupithecia ochridata* Schutze & Pinker, 1968 – K1(a), Lo3(a), Ru3
248. **Eupithecia orphnata* W.Petersen, 1909 – P3(p), Ru5
249. *Eupithecia pimpinellata* (Hübner, [1813]) – K1(j)
250. *Eupithecia plumbeolata* (Haworth, 1809) – K1(i), P3(y)
251. *Eupithecia satyrata* (Hübner, [1813]) – Alt3(h), K1(Volynkin et al. 2011), Lo3(a), P3(w, x, aq, ar)
252. *Eupithecia simplicata* (Haworth, 1809) – M1(b), T1(d)
253. *Eupithecia sinuosaria* (Eversmann, 1848) – B(s), She2(a), T1(d)
254. *Eupithecia subbrunneata* Dietze, 1904 – K1(i, j)
255. *Eupithecia subfuscata* (Haworth, 1809) – B(g), K1(Volynkin et al. 2011), P3(o, w, x, af, ag, al), Z1(c)
256. *Eupithecia subumbrata* ([Denis & Schiffermüller], 1775) – K1(i), P3(q, w, x, ae, af, ag, ar)
257. *Eupithecia succenturiata* (Linnaeus, 1758) – K1(Volynkin et al. 2011), K1(j), P3(h, r, x, ag, ar, ak), T1(d), Tg2

258. **Eupithecia thalictрата* (Püngeler, 1902) – P3(af), Z1(c)
259. *Eupithecia tripunctaria* Herrich-Schäffer, 1852 – K1(c), P3(q, w)
260. *Eupithecia venosata* (Fabricius, 1787) – K1(k), Re1, Tg2, P3(r, x, al)
261. *Eupithecia virgaureata* Doubleday, 1861 – K3, Ru5
262. *Eupithecia vulgata* (Haworth, 1809) – B(w), K1(Volynkin et al. 2011), P1(b), Re1

Conclusion

Altogether 262 species of geometrid moths from 6 subfamily were documented in Altai Krai: Archiearinae (2 species), Ennominae (83 species), Desmobathrinae (1 species), Geometrinae (10 species), Larentiinae (123 species), Sterrhinae (43 species). The species discovered in the Altai Krai for the first time are known in neighboring Russian regions (i.e. Omsk Oblast, Altai Republic) and Eastern Kazakhstan. New records clarify their distribution borders. Around 16% of all geometrids of the region are represented by the pestiferous species; they are from following genera: *Eulithis* Hübner, 1821 (4 species), *Macaria* Curtis, 1826 and *Eupithecia* Curtis, 1825 (3 species), *Lomographa* Hübner, 1825, *Plagodis* Hübner, 1823, *Biston* Leach, 1815, *Lycia* Hübner, 1825, *Hypomecis* Hübner, 1821, and *Abraxas* Leach, 1815 (2 species), and *Odontopera* Stephens, 1831, *Selenia* Hübner, 1823, *Apeira* Gistel, 1848, *Ennomos* Treitschke, 1825, *Opisthograptis* Hübner, 1823, *Angerona* Duponchel, 1829, *Ascotis* Hübner, 1825, *Bupalus* Leach, 1815, *Cryopega* Dumont, 1925, *Erannis* Hübner, 1825, *Apocheima* Hübner, 1825, *Ematurga* Lederer, 1853, *Geometra* Linnaeus, 1758, *Mesoleuca* Hübner, 1825, *Pelurga* Hübner, 1825, *Venusia* Curtis, 1839, *Rheumaptera* Hübner, 1822, *Operophtera* Hübner, 1825, *Trichopteryx* Hübner, 1825, *Pasiphila* Meyrick, 1883 (by 1 species each).

Despite, significant efforts devoted to compile the checklist of geometrids of Altai Krai, we admit that this list is still far to be exhaustive. Many species noted in the neighboring regions of Russia and Kazakhstan have not been found in the Altai Krai yet, but likely, they are present in the region and remain overlook. Further field studies would be required to clarify the diversity of this large and economically important group of moths in the region and, thus, clarify their modern ranges and impact to ecosystems.

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