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NEW DATA ON GEOMETRID MOTHS (LEPIDOPTERA: GEOMETRIDAE) FROM AMURSKAYA OBLAST

A. A. Kuzmin¹⁾, E. A. Beljaev^{2,*}

1) All-Russian Research Institute of Soybean, Blagoveshchensk 675027, Russia.
E-mail: bianor@yandex.ru

2) Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far
Eastern Branch of the Russian Academy of Sciences, Vladivostok 690022, Russia.

*Corresponding author, E-mail: beljaev@ibss.dvo.ru

Summary. An annotated list of 30 species of Geometridae from Amurskaya oblast is given. Twenty seven species are recorded from this region for the first time and the distribution of three species in Amurskaya oblast is confirmed by studied specimens. The diagnostic differences of *Meteima gilva* Djakonov, 1952 from *M. mediorufa* (Bastelberger, 1911) and *Operophtera peninsularis* Djakonov, 1931 from *O. brunnea* Nakajima, 1991 are discussed. General distribution of *Perizoma contrita* (Prout, 1914) и *Photoscotosia atrostrigata* (Bremer, 1864) is clarified.

Key words: Lepidoptera, Geometridae, fauna, systematic, distribution, Russian Far East.

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Резюме. Приведен аннотированный список 30 видов пядениц Амурской области. Из них 27 видов впервые указываются из этого региона, а наличие еще 3 видов в Амурской области подтверждается исследованным материалом.

Даны диагностические отличия *Meteima gilva* Djakonov, 1952 от *M. mediorufa* (Bastelberger, 1911) и *Operophtera peninsularis* Djakonov, 1931 от *O. brunnea* Nakajima, 1991. Уточнено общее распространение *Perizoma contrita* (Prout, 1914) и *Photoscotia atrostrigata* (Bremer, 1864).

INTRODUCTION

The first data on geometrid moths of Amurskaya oblast were published in 19th century. Totally 60 species of Geometridae collected mainly in the vicinity of Blagoveshchensk and along Amur River in Amurskaya oblast are listed (Hedemann, 1881a, 1881b, 1879; Graeser, 1889, 1890a, 1890b, 1892; Staudinger, 1897). Later a few faunistic and taxonomic papers were published (Vasileva & Epova, 1987; Viidalepp, 1987a, 2005; Viidalepp & Mironov, 1988a, 1988b, 1990; Beljaev, 1992; Vasilenko, 1998, 2002; Mironov, 2005). In general works on the geometrid moths of the former USSR (Viidalepp, 1976b, 1977, 1978, 1979; Mironov, 1990, 1991) the territory of Amurskaya oblast, Jewish Autonomous oblast and the southern part of Khabarovskii krai was united under the name "Priamurye", therefore it does not allow us to clarify the geometrid fauna of each region.

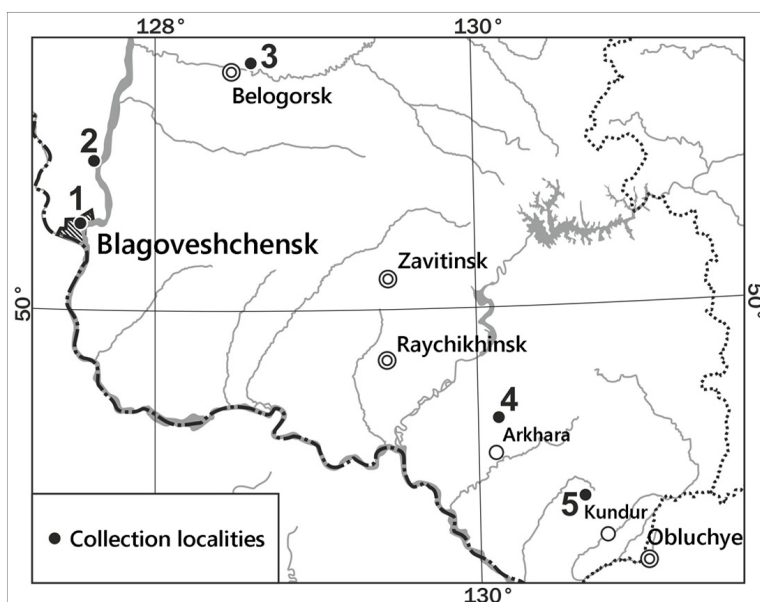


Fig. 1. Map of the studied localities in Amurskaya oblast. 1 – Blagoveshchensk, 50°18'N, 127°33'E; 2 – Blagoveshchensky district, Mukhinka tract, 50°32'N, 127°38'E; 3 – Seryshevsky district, 8 km E Belogorsk, Belogorka village, 50°55'N, 128°37'E; 4 – Arkharinsky district, the valley of the Krivoy Domikan River, 49°33'N, 130°05'E; 5 – Arkharinsky district, 12 km NW Tarmanchukan railway station, 49°14'N, 130°38'E.

For the first time since the 19th century, the geometrid fauna of the Amurskaya oblast (named as "Middle Amur Region") was inventoried in the Catalogue of the Lepidoptera of Russia and 283 species of the family Geometridae were listed for this region (Mironov *et al.*, 2008). Later the data on the geometrid moths of Blagoveshchensk vicinity and Zeysky Nature Reserve is published (Beljaev *et al.*, 2010; Dubatolov *et al.*, 2014; Beljaev & Kuzmin, 2015). As a result 372 species of geometrid moths are listed from Amurskaya oblast, named as the "Middle Amur Region" (Beljaev, 2016). A list of new for Amurskaya oblast species of Geometridae is given in this paper.

MATERIAL AND METHODS

The moths were collected on the light of a core of mercury lamp DRL 250, powered by a portable electric generator, and also in daytime and evening time by catching active insects using an entomological net by the first author in Blagoveshchensky, Arkharinsky and Seryshevsky districts of Amurskaya oblast in 2013–2015 (Fig. 1). Totally 111 specimens of geometrid moths were collected. The order of species in the list and nomenclature follow to Beljaev (2016). The distribution of species is added by the chorological characteristics of their ranges according to Beljaev (2011a). The species recorded from Amurskaya oblast for the first time are asterisked (*).

LIST OF THE SPECIES

Family Geometridae

Subfamily Ennominae

**Cabera griseolimbata* (Oberthür, 1879)

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 6♂, 1♀; same locality, 17.VII 2015, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Kunashir Island), China, Korea, Japan. Far Eastern subboreal forest species.

**Euchristophia cumulata* (Christoph, 1881)

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 8♂, 2♀; same locality, 27.VII 2016, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), China, Korea, Japan. Far Eastern subboreal-subtropical forest species.

**Lomographa nivea* (Djakonov, 1936)

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan railway station, 30.V 2015, 5♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), Korea, Japan. Far Eastern subboreal forest species.

****Meteima gilva* Djakonov, 1952**

Figs 2–7

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 30.V 2015, 5♀. Primorskii krai: Shkotovsky district, 6 km W Novaya Moskva, 43°21'N, 132°39'E, h=167 m, 20.IV 2002, 1♂ (E. Beljaev); Ussuriisky district, 42 km SW Ussuriisk, Krounovka River, 43°37'20"N, 131°29'33"E, h=200 m, 4.V 2002, 1♀ (E. Beljaev).

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), Korea, Japan (Tsushima Islands). Far Eastern continental subboreal forest species.

NOTES. The specific rank of *M. gilva* was restored recently from the subspecies of *Meteima mediorufa* (Bastelberger, 1911) (Beljaev, 2016) to whom it was subordinated by Inoue (1987). *M. gilva* reliably differs from *M. mediorufa* on the forewings by lighter transverse lines, a smoothly arched the postmedian transverse line without pronounced protrusion between the veins of M_1-Cu_2 , a weaker darkening of the transverse lines when crossing with the veins of the wing, in the male genitalia (Figs 5, 6) by a twice as long as the separate cornutus on the vesica and narrower dilation of the distal portion of the uncus, and in the female genitalia by a much broader antrum. Images of the genitalia of *M. mediorufa* see Inoue (1986, figs. 50, 51; 1987, figs. 3, 4, 5) and Yazaki (2010, figs. 17, 18).

****Selenia sordidaria* Leech, 1897**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 30.V 2015, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), China, Korea, Japan. Far Eastern subboreal forest species.

NOTES. In Amurskaya oblast this species is represented by Japanese-Manchurian subspecies *S. sordidaria djakonovi* O.Bang-Haas, 1927.

****Agaraeus parva* (Hedemann, 1881)**

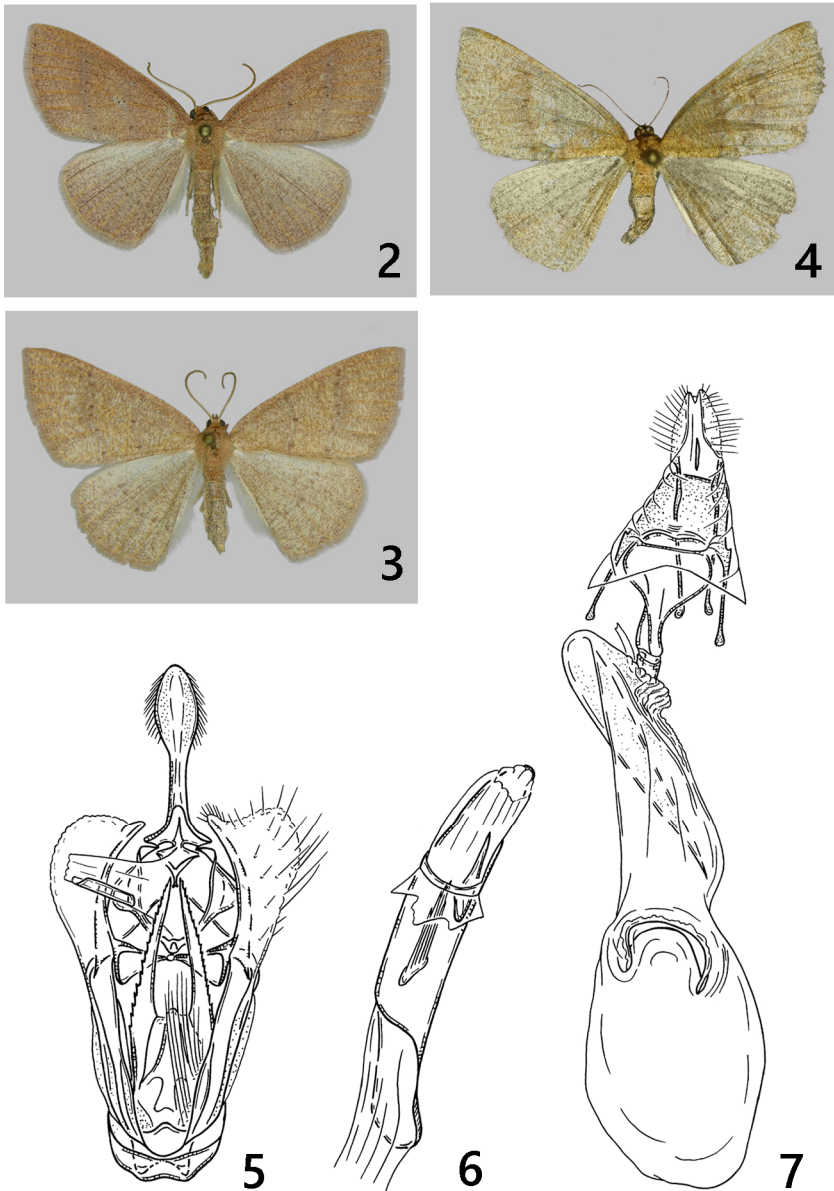
MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 24.VII 2014, 2♂; same locality, 30.VII 2015, 2♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), China, Korea, Japan. Far Eastern subboreal forest species.

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

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 30.V 2015, 13♂, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island, Kunashir Island), China (Taiwan Island), Korea, Japan. Far Eastern subboreal-subtropical forest species.



Figs 2–7. *Meteima gilva* Djakonov, 1952. 2 – male, Primorskii krai; 3 – female, Primorskii krai; 4 – female, Amurskaya oblast; 5, 6 – the male genitalia, Primorskii krai: 5 – genital segment; 6 – phallos; 7 – the female genitalia, Primorskii krai.

****Amraica superans* (Butler, 1878)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 1♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Kunashir Island), China, Korea, Japan. Far Eastern subboreal-subtropical forest species.

NOTES. In Amurskaya oblast this species is represented by Manchurian subspecies *A. superans confusa* (Staudinger, 1897).

****Aporhoptrina semiorbiculata* (Christoph, 1881)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 1♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Zabaykalsky krai, ?Buryatia), China, Korea, Japan. Siberian-Far Eastern subboreal forest species.

Subfamily Geometrinae

****Comibaena tancrei* (Graeser, 1890)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 3♂, 7♀; same locality, 27.VII 2016, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, ?Sakhalin Island), China, Korea. Far Eastern continental subboreal forest species.

Subfamily Larentiinae

****Leptostegna tenerata* Christoph, 1881**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 14.VII 2014, 1♂; same locality, 10.VII 2015, 2♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Kunashir Island), China, Korea, Japan. Far Eastern subboreal forest species.

****Trichopteryx ustata* (Christoph, 1881)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 30.V 2015, 2♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island), China, Korea, Japan. Far Eastern subboreal forest species.

***Photoscotosia atrostrigata* (Bremer, 1864)**

MATERIAL. Amurskaya oblast: Blagoveshchensk, 4.IX 2016, 2♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island, Kunashir and Shikotan Islands), China, Korea, Japan. Far Eastern subboreal-subtropical forest species.

NOTES. Previously this species was recorded as probably occurring in Amurskaya oblast (Mironov *et al.*, 2008; Beljaev, 2016). Our material confirm the present of *Ph. atrostrigata* in this region of Russia. Reports of this species from Siberia, namely "Gorno-Altai region" and "Tuva region" (Mironov *et al.*, 2008; Belyaev *et al.*, 2010; Beljaev, 2011b; Vasilenko *et al.*, 2013; Beljaev, 2016), are based on the misprint in the first cited publication. Thus, distribution of *Ph. atrostrigata* in Russia is limited by the southern regions of the Russian Far East only.

****Trichodezia kindermanni* (Bremer, 1864)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 17.VII 2015, 1♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin, Urup, Kunashir and Shikotan Islands, Zabaykalsky krai, Buryatia), China, Korea, Japan. Siberian-Far Eastern subboreal forest species.

****Eustroma melancholica* (Butler, 1878)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 1♂; same locality, 17.VII 2015, 1♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island, Kunashir Island), China, Korea, Japan. Far Eastern subboreal-subtropical forest species.

****Gandaritis fixseni* (Bremer, 1864)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 14.VIII 2014, 2♂, 1♀; same locality, 24.VIII 2014, 2♂, 1♀; same locality, 7.IX 2014, 1♀; Krivoy Domikan River, 25.VIII 2014, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island, Shikotan Island), China, Korea, Japan. Far Eastern subboreal-subtropical forest species.

****Gandaritis agnes* (Butler, 1878)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 2♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island, Kunashir Island), China, Korea, Japan. Far Eastern subboreal forest species.

NOTES. In Amurskaya oblast this species is represented by the continental subspecies *G. agnes festinaria* (Christoph, 1881).

****Dysstroma korbi* (Heydemann, 1929)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 4.VIII 2014, 1♂; same locality, 24.VIII 2014, 2♀; same locality, 7.IX 2014, 1♀; Blagoveshchensk, 13.VIII 2013, 1♂; Svobodnensky District, Buzuli village, 8.XII 1995, 1♂ (A.N. Streltsov).

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), China, Korea, Japan. Far Eastern subboreal meadow-forest species.

****Paradysstroma corussaria* (Oberthür, 1880)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 24.VIII 2014, 1♂.

DISTRIBUTION. Russia: (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island, Shikotan Island), Korea, Japan. Far Eastern subboreal forest species.

****Operophtera brunnea* Nakajima, 1991**

Figs 8–10

MATERIAL. Amurskaya oblast: Blagoveshchensk, 8.X 2016, 1♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island), China, Korea, Japan. Far Eastern subboreal forest species.

NOTES. In the Amurskaya oblast this species is represented by the continental subspecies *O. brunnea pallida* Beljaev, 1996.

****Operophtera peninsularis* Djakonov, 1931**

Figs 11–14

MATERIAL. Amurskaya oblast: Blagoveshchensk, 8.X 2016, 1♂.

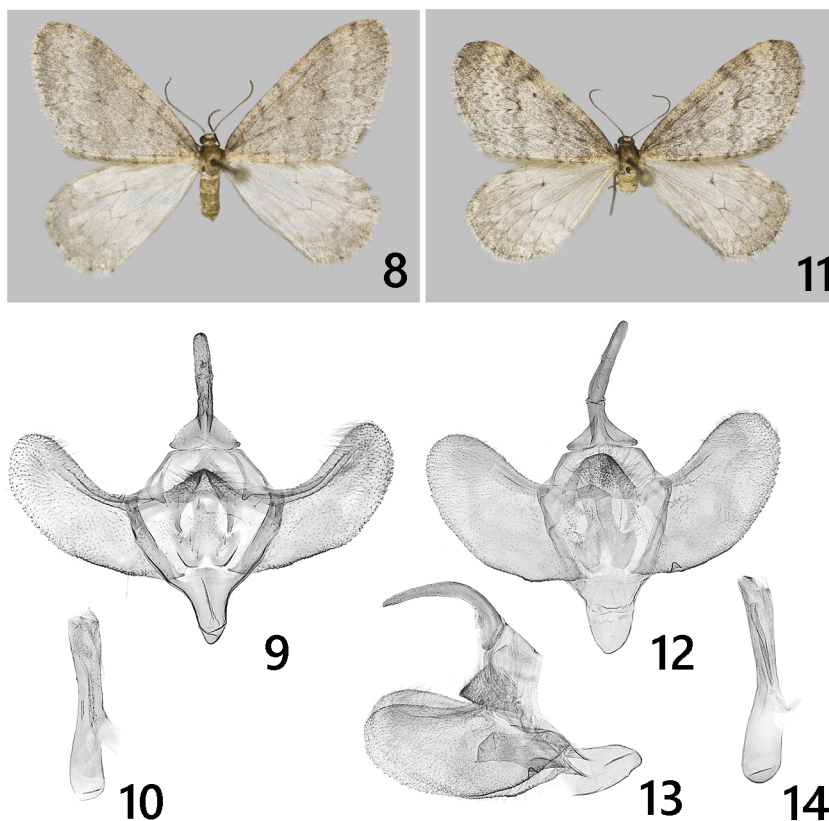
DISTRIBUTION. Russia (Magadanskaya oblast, Kamchatka Peninsula, Amurskaya oblast, Khabarovskii krai, Sakhalin Island). Far Eastern sub-oceanic boreal forest species.

NOTES. A little known species related to the American *Operophtera bruceata* (Hulst, 1886). The general range of *O. peninsularis* is uncertain; in the Amur basin it is sympatric with the similar on appearance, usually abundant species *O. brunnea*, which can mask the presence of *O. peninsularis*. Externally, *O. peninsularis* differs from *O. brunnea* by the narrower forewings and a dark gray coloration, by more distinct transverse lines delimiting the medial field, and by more acute fracture of the postmedial transverse line on the vein M_1 , (Fig. 8 vs. Fig. 11), and in the male genitalia by the wider valvae, by longer and thinner uncus, by much broader saccus and by more massive basal process of aedeagus (Figs 12–14 vs. Figs 9, 10). The new locality of *O. peninsularis* is situated considerably westward to the nearest known locality in Khabarovskii krai (Komsomolsk-na-Amure).

***Hydreliia nisaria (Christoph, 1881)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 1♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), ?China, Korea, Japan. Far Eastern subboreal forest species.



Figs 8–14. *Operophtera* spp. from Amurskaya oblast. 8–10 – *O. brunnea* Nakajima, 1991: 8 – male; 9, 10 – male genitalia: 9 – genital segment, ventral view; 10 – phallos; 11–14 – *Operophtera peninsularis* Djakonov, 1931: 11 – male; 12–14 – male genitalia: 12 – genital segment, ventral view; 13 – the same, lateral view; 14 – phallos.

***Venusia laria Oberthür, 1893**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 14.VII 2014, 1♂; same locality, 10.VII 2015, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), China, Japan. Far Eastern subboreal-subtropical forest species.

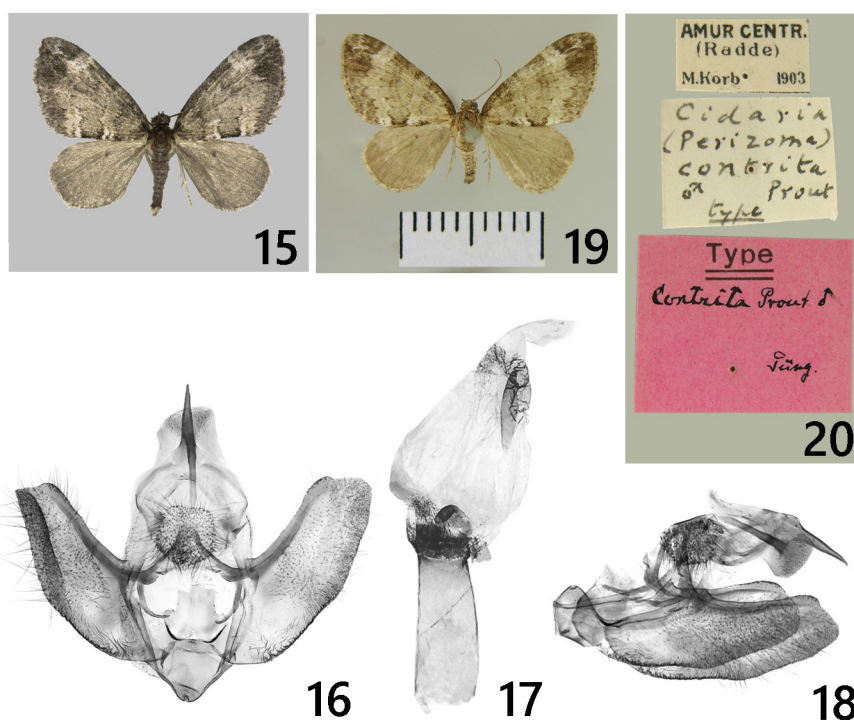
NOTES. In Amurskaya oblast this species is represented by the Japanese-Manchurian subspecies *V. laria ilara* (Prout, 1938).

***Perizoma contrita* (Prout, 1914)**

Figs 15–20

TYPE MATERIAL. Holotype (Figs 19, 20) – ♂, "Amur Centr. (Radde) M. Korb 1903" [= Russia, Jewish Autonomous oblast], deposited in the Museum für Naturkunde der Humboldt-Universität, Berlin, Germany.

OTHER MATERIAL EXAMINED. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 1♂; Primorskii krai: Khasansky district, 7 km N Zanadvorovka, 17.VIII 1984, 1♂ (S. Sinev) (kept in the Zoological Institute, St. Petersburg, Russia).



Figs 15–20. *Perizoma contrita* (Prout, 1914). 15–18 – specimen from Amurskaya oblast: 15 – male; 16–18 – male genitalia: 16 – genital segment, ventral view; 16 – fallos; 18 – genital segment, lateral view; 19 – holotype male; 20 – labels of holotype.

DISTRIBUTION. Russia (Amurskaya oblast, Jewish Autonomous oblast, Primorskii krai, ?South Siberia), Korea, Japan (Hokkaido, Honshu).

NOTES. This rare species was described from "Central Amurland" (Prout, 1914: 261) without precise localization. We clarify that the type of *Perizoma contrita* is originated from Jewish Autonomous oblast, while Amurskaya oblast was erroneously considered as the type locality of this species (Beljaev & Oh, 2001; Mironov *et al.*, 2008). Thus, formally this species is listed here from Amurskaya oblast for the first time based on examined specimen. *Perizoma contrita* was recorded from South Siberia (Djakonov, 1926; Viidalepp, 1977; Viidalepp, 1996; Shodotova *et al.*, 2007; Mironov *et al.*, 2008), but all these records need to be revised; probably, they are misidentifications of the local form of *Perizoma hydrata* (Treitschke, 1829) with whitened medial and basal areas of the forewing (see Beljaev, 2016). *Perizoma contrita* differs from *P. hydrata* by the postmedial line on forewing less dentate and more ached outwardly, by the darker coloration of hindwing; by the obtuse valvae and by presence of straight digital cornutus on the vesica of phallos (Figs 16–18).

****Eupithecia gigantea* Staudinger, 1897**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 2♂, 3♀; same locality, 17.VII 2015, 2♂, 5♀; same locality, 27.VII 2016, 2♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island, Kunashir Island), China, Korea, Japan. Far Eastern subboreal forest species.

****Eupithecia tripunctaria* Herrich-Schäffer, [1852]**

MATERIAL. Amurskaya oblast: Blagoveshchensk, 25.VII 2014, 2♀; same locality, 6.VIII 2015, 1♀; 12 km NW Tarmanchukan station, 10.VII 2015, 1♀; same locality, 27.VII 2016, 1♂.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai, Sakhalin Island, Kunashir Island, South Siberia, Urals, European part, Northern Caucasus), China, Korea, Japan, Transcaucasia, Europe, North America. Trans-holarctic temperate meadow-forest species.

****Eupithecia detritata* Staudinger, 1897**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 4♀; Mukhinka tract, 27.VI 2014, 1♂; same locality, 27.VI 2014, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), China, Korea, Japan. Far Eastern subboreal forest species.

***Eupithecia indissolubilis* Vojnits, 1979**

MATERIAL. Amurskaya oblast: Belogorka village, 12.VI 2014, 1♂; Mukhinka tract, 6.VI 2015, 1♂.

DISTRIBUTION. Russia (Amurskaya oblast, Zabaykalskii krai, Buryatia, Irkutskaya oblast, Altai Republic), China (Shaanxi). Siberian-Far Eastern continental subboreal meadow species.

NOTES. This species was reported from the Russian Far East as *Eupithecia assa* Mironov, 1989 (Mironov *et al.*, 2008) or as *E. indissolubilis* (Mironov, 2016) without definite localities. Here this species is recorded from Amurskaya oblast for the first time based on examined specimens.

****Eupithecia bella* Staudinger, 1897**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 10.VII 2015, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), China. Far Eastern continental subboreal meadow-forest species.

Subfamily Sterrhinae

****Idaea effusaria* (Christoph, 1881)**

MATERIAL. Amurskaya oblast: 12 km NW Tarmanchukan station, 27.VII 2016, 1♀.

DISTRIBUTION. Russia (Amurskaya oblast, Khabarovskii krai, Primorskii krai), China, Korea, Japan. Far Eastern subboreal meadow-forest species.

CONCLUSION

Thus, 27 species of Geometridae are recorded from Amurskaya oblast for the first time, and three doubtful species are firstly confirmed by materials from this region. Most species (21) were collected in the surroundings of Tarmanchukan station, which is located near the northern boundary of the distribution of cedar-broad-leaved forests. Almost all of them are characterized by the East Asian subboreal and subboreal-subtropical types of areal, and, probably, they have here the north-western boundary of its distribution.

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