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New records of Notodontidae and Erebidae (Lepidoptera) in the Lower Ussuri basin (Russian Far East, Khabarovsk region)

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Abstract. New finds of five nemoral species of Notodontidae and Erebidae in the Lower Ussuri basin (Bikin district of the Khabarovsk region) are presented. *Odontosia patricia* Stichel, 1918 (Notodontidae), *Zanclognatha lilacina* (Butler, 1879) and *Enispa albosignata* (Staudinger, 1892) (Erebidae) were found in the Khabarovsk region for the first time. In the past, the only Russian records of these species had come from the southern part of Primorsky region. The habitation of *Phalera assimilis* (Bremer et Grey, 1853) (Notodontidae) in the Khabarovsk region has been confirmed. New finds of a rare species *Numenes disparilis* Staudinger, 1887 (Erebidae) outside of its regular flight time are presented.

Keywords: Notodontidae, Erebidae, new records, Lower Ussuri basin, Khabarovsk region, Russian Far East.

Новые находки хохлаток и эребид (Lepidoptera: Notodontidae, Erebidae) из низовьев р. Уссури (Хабаровский край, Дальний Восток России)

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Аннотация. Приводятся сведения о новых находках пяти неморальных видов из семейств Notodontidae и Erebidae в бассейне нижнего течения р. Уссури (Бикинский район Хабаровского края). *Odontosia patricia* Stichel, 1918 (Notodontidae), *Zanclognatha lilacina* (Butler, 1879) и *Enispa albosignata* (Staudinger, 1892) (Erebidae) впервые обнаружены в Хабаровском крае. Ранее на территории России эти виды отмечались только из южной части Приморского края. Подтверждено обитание *Phalera assimilis* (Bremer et Grey, 1853) (Notodontidae) в Хабаровском крае. Представлены новые находки редкого вида *Numenes disparilis* Staudinger, 1887 (Erebidae) вне периода его основного лёта.

Ключевые слова: Notodontidae, Erebidae, новые находки, бассейн нижнего течения р. Уссури, Хабаровский край, Дальний Восток России.

Introduction

The extent to which Lepidoptera have been studied is uneven across the lower reaches of the Ussuri river. The most representative data comes from the mouth of the Ussuri river, i. e. the area to the South of Khabarovsk (Dubatolov, Dolgikh 2007; 2009; Dubatolov et al. 2013; Dubatolov 2020, etc.). This area was found to be the northern boundary of the ranges of many nemoral Lepidoptera species. The areas upstream of the Ussuri river remain poorly studied. Studies of the Lepidoptera fauna of the Bikin district of the Khabarovsk region conducted in 2008, 2017, 2020 and 2021 revealed many species that had not been previously recorded in the Khabarovsk region. The mouth of the Bikin river serves as the northern boundary for some species, which do not occur in the environs of Khabarovsk to the north of it. These include *Pryeria sinica* Moore, 1877 (Zygaenidae), *Rhodinia jankowskii* (Oberthür, 1880) (Saturniidae), *Ambulyx tobii* (Inoue, 1976) (Sphingidae), *Stauropus basalis* Moore, 1877, *Phalera flavescens* (Bremer et Grey, 1853) (Notodontidae), *Numenes disparilis* Staudinger, 1887, *Catocala eminens* Staudinger, 1892 (Erebidae), *Acrodontis kotshubeji* Sheljuzhko, 1944 (Geometridae), *Sephisa princeps* (Fixsen, 1887) (Nymphalidae) and some others (Koshkin 2014; 2021; Koshkin et al. 2021). Some other lepidopteran species are quite numerous in the Bikin district, but are only known from single finds to the north of it: *Rhodinia fugax* (Butler, 1877) (Saturniidae), *Phalerodonta bombycina* (Oberthür, 1880) (Notodontidae), *Catocala nivea* Butler, 1877, *C. actaea* Felder et Rogenhofer, 1874 (Erebidae), *Siglophora sanguinolenta* (Moore, 1888) (Nolidae) (Koshkin et al. 2021; Koshkin 2021). All of these species are closely tied with cedar-deciduous forest habitats and practically do not occur outside of such habitats.

This paper continues my series of studies on Bikin district's Lepidoptera and offers evidence that makes it possible to add four species of Notodontidae and Erebidae to the fauna of the Khabarovsk region. In the past, the only Russian records of these species had come from the southern part of Primorsky region.

Materials and methods

This paper is based on specimens collected in Bikin district of the Khabarovsk region (south of the Russian Far East). *Phalera assimilis*, females of *Numenes disparilis* and *Zanclognatha lilacina* were collected at night with the simultaneous use of DRL 250 W and LepiLed lamps. A male of *N. disparilis*, males of *Odontosia patricia* and female of *Enispa albosignata* were caught in automatic light traps with LepiLED lamps.

Photographs of adults were taken with a Sony SLT-A65 digital camera with a Sony 2.8/50 macro lens. The genitalia of *Odontosia* species are photographed using Zeiss Stemi 2000-C Stereo Microscope with Zeiss AxioCam ERc5s Microscope Camera.

Voucher material is deposited in the author's private collection.

Results

Family Notodontidae

Phalera assimilis (Bremer et Grey, 1853)

(Figs. 1A–B)

Material examined. 2♂, 1♀, Russia, Khabarovsk region, Bikin district, 8 km SE Boitsovo village, upper reaches of Shivki river, vicinity of "Shivki" scientific station belonging to the Institute of Water and Ecology Problems of the Far Eastern Branch of the Russian Academy of Sciences, 46°55'06" N, 134°23'04" E, 165 m, mixed coniferous-broad leaved forest, 23–26 July 2021 (E. S. Koshkin leg.).

Distribution. Russia: Khabarovsk region, Primorsky region; China (including Taiwan); Korea; Japan (Schintlmeister 2008; Chistyakov, Dubatolov 2016).

Remarks. Schintlmeister (2008) reports this species in the Khabarovsk region (Khabarovsk) and the south-west of the Jewish Autonomous region without providing any further details. V. Dubatolov writes that he is not aware of any finds of *Ph. assimi-*

lis from around Khabarovsk (Dubatolov et al. 2013). In the "Annotated catalogue of the insects of Russian Far East", the distribution of *Ph. assimilis* in the Khabarovsk region is questioned (Chistyakov, Dubatolov 2016). The second edition of the Catalogue of the Lepidoptera of Russia indicates that, within Russia, this species is only distributed in the Primorsky region (Matov, Dubatolov 2019). Thus, new finds from the Bikin district confirm *Ph. assimilis*'s presence in the south of the Khabarovsk region.

***Odontosia patricia* Stichel, 1918**
(Figs. 1C, 1E)

Material examined. 3♂, Russia, Khabarovsk region, Bikin district, 8 km SE of Boitsovo village, upper reaches of Shivki river, vicinity of "Shivki" scientific station belonging to the Institute of Water and Ecology Problems of the Far Eastern Branch of the Russian Academy of Sciences, 46°55'06" N, 134°23'04" E, 165 m, mixed coniferous-broad leaved forest, 8 May 2021 (E. S. Koshkin leg.).

Distribution. Russia: Khabarovsk region (first records), Primorsky region; Korea (Schintlmeister 2008).

Remarks. V. Dubatolov raised the question of the boundary between the ranges of closely related species *O. brinikhi* Dubatolov, 2006 and *O. patricia*, inhabiting the south of the Russian Far East (Dubatolov, Dolgikh 2007; Dubatolov 2011; 2019). He points to the bilobed apex of the uncus in the male genitalia of *O. patricia* as one of the important features distinguishing it from *O. brinikhi* (Fig. 1E). The apex of the uncus in *O. brinikhi* is not bilobed (Fig. 1F). The forewing of *O. patricia* is brownish-gray with whitish suffusion; a dark medial field bounded by whitish antemedial and postmedial zigzag lines are clearly visible; there is a noticeable whitish spot in the tornal angle; discal spot is more or less distinct (Kobayashi et al. 2006) (Fig. 1C). *O. brinikhi* forewing's pattern is less contrasting, and many details are often diffuse (Fig. 1D). Schintlmeister (2008) considers *O. brinikhi* a subspecies of *O. patricia*.

O. brinikhi is widespread in Eastern Siberia and the Amur basin, from the East Sayan mountains in the west to the coast of the Tatar strait in the east and from Central Yakutia (Sakha Republic) in the north to Khabarovsk in the south (Kobayashi et al. 2006; Dubatolov, Dolgikh 2007; Dubatolov 2011; 2019). The range of *O. patricia* is limited to the southern part of Primorsky region and Korea (Schintlmeister 2008; Chistyakov, Dubatolov 2016). However, Schintlmeister marked a locality in Sovetsko-Gavansky district of the Khabarovsk region on an *O. patricia* range map included in his book (2008). This is most likely a mistake. V. Dubatolov writes that he studied extensive material on *Odontosia* from the coast of the Tatar strait and other localities within the Khabarovsk region (Dubatolov, Dolgikh 2007; Dubatolov 2011; 2019). None of the males had a bilobed uncus. It was concluded that there is no reliable data on *O. patricia* presence in the Khabarovsk region, and all similar specimens belong to *O. brinikhi*.

Prior to our research, there was no data about *Odontosia* species from the southernmost part of Khabarovsk region (Bikin district). Males collected in May 2021 in the upper reaches of Shivki river belong to *O. patricia* both in their appearance and in the structure of male genitalia (bilobed uncus) (Figs. 1C, 1E). Specimens similar to *O. brinikhi* were not found. Interestingly, the only *O. brinikhi* was recorded 200 km to the north, close to Khabarovsk (Dubatolov, Dolgikh 2007). Probably, the boundary between the ranges of these closely related taxa is located in the lower reaches of the Ussuri river in the southwest of the Khabarovsk region. The finds of *O. patricia* from the Bikin district are the first reliable evidence of its residence in the Khabarovsk region.

Family Erebidae

Subfamily Lymantriinae

***Numenes disparilis* Staudinger, 1887**
(Figs 2A–B)

Material examined. 1♂, 2♀, Russia, Khabarovsk region, Bikin district, 8 km SE of Boitsovo village, upper reaches of Shivki river, vicinity of "Shivki" scientific station belonging to the Institute of Water and Ecology

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Fig. 1. Notodontidae species from Khabarovsk region (Russia): *A — Phalera assimilis*, male; *B — Ph. assimilis*, female; *C, E — Odontosia patricia*, male; *D, F — O. brinikhi*, male. *A–D* — adults, *E–F* — male genitalia. Localities: *A–C, E* — 8 km SE Boitsovo, upper reaches of Shivki river; *D, F* — Bureinsky Nature Reserve, upper reaches of Pravaya Bureya river, cordon "Kontrolnyi Punkt Svyazi"

Рис. 1. Виды Notodontidae из Хабаровского края (Россия): *A — Phalera assimilis*, самец; *B — Ph. assimilis*, самка; *C, E — Odontosia patricia*, самец; *D, F — O. brinikhi*, самец. *A–D* — имаго, *E–F* — гениталии самца. Места сбора: *A–C, E* — 8 км ЮВ с. Бойцово, верховья р. Шивки; *D, F* — Буреинский заповедник, верхнее течение р. Правая Бурея, кордон «Контрольный пункт связи»

Problems of the Far Eastern Branch of the Russian Academy of Sciences, 46°55'06" N, 134°23'04" E, 165 m, mixed coniferous-broad leaved forest, 8 September 2021 (E. S. Koshkin leg.).

Distribution. Russia: Khabarovsk region, Primorsky region; China; Korea; Japan (Chistyakov et al. 2016).

Remarks. One of the rarest Lymantriinae species inhabiting the Khabarovsk region. Pre-

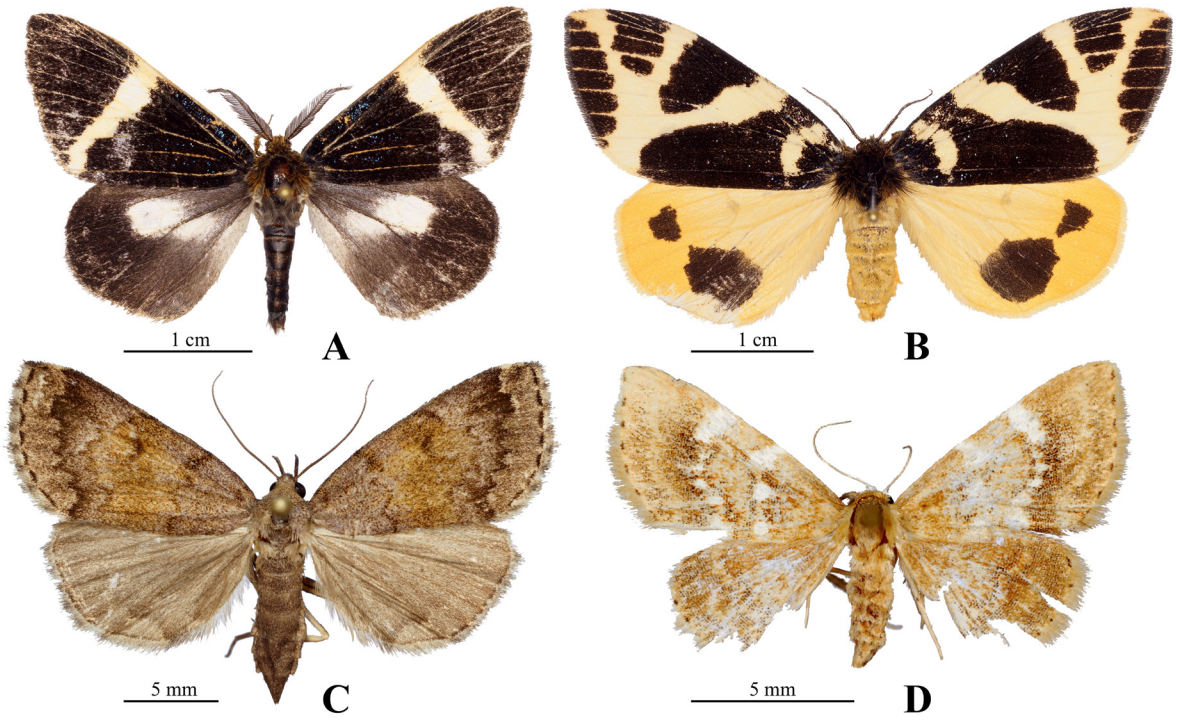

Fig. 2. Erebidae species from Khabarovsk region (Russia): *A* — *Numenes disparilis*, male; *B* — *N. disparilis*, female; *C* — *Zanclognatha lilacina*, female; *D* — *Enispa albosignata*, female. *A*–*D* — adults. All specimens from Bikin district: 8 km SE Boitsovo, upper reaches of Shivki river

Рис. 2. Виды Erebidae из Хабаровского края (Россия): *A* — *Numenes disparilis*, самец; *B* — *N. disparilis*, самка; *C* — *Zanclognatha lilacina*, самка; *D* — *Enispa albosignata*, самка. *A*–*D* — имаго. Все экземпляры собраны в Бикинском р-не в 8 км ЮВ с. Бойцово, в верховьях р. Шивки

viously it was only known from a single find of a female in the upper reaches of the Durmin river (Imeni Lazo district) (Koshkin 2011). Later, one female was collected in the upper reaches of the Shivki river in the Bikin district (Koshkin 2021). New material confirms the presence of a stable population of *N. disparilis* in this area. Two females and a male were collected in early autumn, outside of this species' regular flight time, which is from July to mid-August. Perhaps these individuals belong to the second generation, which was made possible by the abnormally hot summer of 2021. The moths were collected in the first half of the night. Females were attracted to the mixed light of 250 W DRL and LepiLED lamps; the male was collected in an automatic light trap with a LepiLED UV lamp. This is notable because males usually fly during the day and are extremely rare in collections. *N. disparilis* should be included into the Red List of the Khabarovsk region due to its rarity at the northern limit of its distribution.

Subfamily Herminiinae

***Zanclognatha lilacina* (Butler, 1879)**

(Fig. 2C)

Material examined. 2♀, Russia, Khabarovsk region, Bikin district, 8 km SE of Boitsovo village, upper reaches of Shivki river, vicinity of "Shivki" scientific station belonging to the Institute of Water and Ecology Problems of the Far Eastern Branch of the Russian Academy of Sciences, 46°55'06" N, 134°23'04" E, 165 m, mixed coniferous-broad leaved forest, from 29 June to 1 July 2021 (E. S. Koshkin leg.); 1 ♀, same locality and collector, 7 September 2021.

Distribution. Russia: Khabarovsk region (first records), Primorsky region; China; Korea; Japan (Kononenko 2010; 2016a; Matov et al. 2019).

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Remarks. It is not clear whether the females collected in the Bikin district are migrants from the areas to the south, or whether the process of species naturalization has begun here. Larval host plant is *Abies* (Kononenko 2010). This is one of the dominant tree species in the upper reaches of the Shivki river.

Subfamily Boletobiinae

***Enispa albosignata* (Staudinger, 1892)**
(Fig. 2D)

Material examined. 1♀, Russia, Khabarovsk region, Bikin district, 8 km SE of Boitsovo village, upper reaches of Shivki river, vicinity of "Shivki" scientific station belonging to the Institute of Water and Ecology Problems of the Far Eastern Branch of the Russian Academy of Sciences, 46°55'06" N, 134°23'04" E, 165 m, mixed coniferous-broad leaved forest, 25 July 2021 (E. S. Koshkin leg.).

Distribution. Russia: Khabarovsk region (first record), Primorsky region; North China; Korea (Kononenko 2010; 2016b; Matov et al. 2019).

Remarks. In the past, the only Russian record of this species came from the southern part of Primorsky region (Kononenko 2010; 2016b). A single female collected in the Bikin district of the Khabarovsk region is probably a vagrant from a more southern area.

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