

Қазақстан Республикасы экология, геология және табиғи
ресурстар министрлігі
Орман шаруашылығы және жануарлар дүниесі комитеті
«Катонқарағай мемлекеттік ұлттық табиғи паркі» РММ

Министерство экологии, геологии и природных ресурсов
Республики Казахстан
Комитет лесного хозяйства и животного мира
РГУ «Катон-Карагайский государственный
национальный природный парк»

**Катонқарағай мемлекеттік ұлттық
табиғи паркінің еңбектері**

**Труды Катон-Карагайского государственного
национального природного парка**

2 Том

Өскемен, 2022

УДК 712.23
ББК 28.088.л6
К22

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Труды Катон-Карагайского государственного национального
природного парка. Издательство «Медиа-Альянс», г. Усть-Каменогорск,
2022. – 498 с.

ISBN: 978-601-7887-63-6

Катонқарағай мемлекеттік ұлттық табиғи паркі еңбектерінің екінші томында құрылу тарихы, физикалық-географиялық жағдайы, функционалдау және даму мәселелері, сонымен қатар аймақтың биологиялық алуантүрлілігін зерттеуге арналған мақалалар ұсынылған.

Басылым зоолог, ботаник, эколог, орман өсіруші мамандарына, табиғат қорғау мекемелерінің қызметкерлеріне, жаратылыстану және орман шаруашылығы жоғары оқу орындары мен арнайы орта оқу орындарының оқытушылары мен студенттеріне, биология, география және жаратылыстану пәндерінің мұғалімдеріне, өлкетанушыларға, сондай-ақ табиғатты зерттеу және қорғау мәселелеріне қызығушылық танытқан оқырмандардың кең ауқымына арналған.

Второй том трудов посвящен 20-ти летию Катон-Карагайского государственного национального природного парка. В нем представлены статьи по истории становления природоохранного учреждения, а также результаты работ исследователей и научных сотрудников по изучению биологического разнообразия и историко-культурного наследия Южного и Центрального Алтая.

Издание предназначено для специалистов – зоологов, ботаников, географов, экологов, лесоводов, сотрудников природоохранных учреждений, преподавателей и студентов естественных факультетов ВУЗов, учителей биологии и географии, краеведов и широкого круга читателей, интересующихся природой родного края.

Рекомендовано к изданию Научно-техническим советом Катон-Карагайского государственного национального природного парка.

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национального природного парка, 2022
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ПРЕДИСЛОВИЕ

Главное место в сохранении биологического разнообразия занимают особо охраняемые природные территории, которые призваны сохранять биоразнообразие, восстанавливать нарушенные участки и объекты природно-заповедного фонда, проводить научные исследования, содействовать развитию рекреации, экотуризма и экологического просвещения. И в этих условиях особое значение приобретают те территории, которые, становятся очагами сохранения биоразнообразия и стабилизации биосферы планеты. Так, 17 июля 2021 года исполнилось 20 лет со дня выхода постановления Правительства Республики Казахстан о создании Катон-Карагайского государственного национального природного парка. Он, и по сей день, является самым большим национальным парком в Республике Казахстан. Катон-Карагайский государственный национальный природный парк - это в первую очередь природоохранное и научное учреждение, коллектив которого на протяжении уже 20 лет вносит вклад в сохранение биоразнообразия и восстановление уникальных ландшафтов Южного Алтая. Выгодное расположение территории национального парка на стыке 4х стран: России, Монголии, Китая и Казахстана, и приграничное расположение ряда ООПТ в этих странах, имеющих не только большой природоохранный опыт, но и включенных во Всемирное природное и культурное наследие ЮНЕСКО, является основой для международного сотрудничества по сохранению уникальной природы и историко-культурного наследия Большого Алтая. И это не просто слова, за этим стоит большая работа коллектива, который из года в год успешно реализует плановые мероприятия обеспечивая охрану природно-территориального комплекса и изучение объектов природно-заповедного фонда. Сегодня, это природоохранное и научное учреждение, имеющее два международных статуса как биосферный резерват ЮНЕСКО «БР Катон-Карагай» и трансграничный биосферный резерват «Большой Алтай», созданного на базе БР «Катон-Карагай» (Республика Казахстан) и Катунского биосферного заповедника (Россия). А в 2019 году благодаря активной поддержке наших российских коллег, мы были включены в Международный альянс охраняемых территорий IAPA. Вхождение во Всемирную сеть биосферных резерватов и международную общественную организацию - для нас это большая ответственность, которую мы, в лице Республики Казахстан, взяли перед мировым сообществом по сохранению и изучению живой и неживой природы и обеспечению устойчивого развития местных сообществ. И эта работа проводится совместно с НПО, проектами ГЭФ/ПРООН, общественными фондами, бизнес-структурами, исследователь-

BUTTERFLIES (LEPIDOPTERA: PAPILIONOIDEA) OF THE KATON-KARAGAI NATIONAL NATURE PARK, KAZAKHSTAN

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Abstract. Katon-Karagai State National Nature Park is situated in the most elevated part of the Altai Mts and occupies the easternmost extremity of the territory of Kazakhstan. Based on own data and all existing literature, a checklist of its reliably recorded butterfly fauna containing 146 species has been compiled. *Spialia orbifer* and *Coenonympha oedippus* are for the first time reported for the territory. The old records of *Pyrgus carthami* and *Hyponephele narica* have been excluded as erroneous for biogeographical and ecological reasons, respectively. Comparison with the butterfly fauna of adjacent ranges of Altai in Kazakhstan suggests that the list is far from being complete and further research is necessary. Habitat association of butterfly species is briefly outlined. Absence of records of some 'Mongolian' species found in the Russian territory close to the park borders is supposed to be due to higher humidity of the Bukhtarma River uppermost valley.

Introduction

The Katon-Karagai State National Nature Park occupies the northern part of the easternmost territory of Kazakhstan, including its easternmost tip, and extends from 84°54' E to 87°19' E from west to east (for ca 170 km) and from 48°54' N to 49°48' N (for ca 90 km at the broadest place); the core area is 643,477 ha and the peripheral buffer zone with restricted economic activity is 46,774 ha [4, 22].

The northernmost point of the Park is at the same time its highest point as being the Belukha Mountain summit (49°48'25" N, 86°35'23" E) of 4,509 m a.s.l., which is also the highest point of the Altai-Sayan Mountain System. The lowest point (ca 550 m a.s.l.) is where the Bukhtarma River leaves the Park territory near Ust'-Yazovaya village; hence elevations at the Park territory vary as much as for almost 4 thousand metres. Most of the northern border of the Park, which is also the border of Kazakhstan and Russia, except for its eastern one third, goes along the crest of the Listvyaga Range (the highest mountain at this its part is Tesninskiy Belok, 2,575 m a.s.l.), but along the Berel' River valley the Park (and Kazakhstan) territory extends to north-east to reach Belukha, which is at the Katunskiy Mt. Range. To the east of Berel', the border of the park and Kazakhstan outlines the south-western and southern foot of the Ukok Plateau but does not extend to its top surface. The Park embraces the sources of the Bukhtarma River (Fig. 1), which is its main river. In the south the Bukhtarma valley is bordered, from east to west, by Yuzhnyy Altai, Tarbagatai (not to confuse with Tarbagatai Mts in Almaty Province) and Sarymsakty (up to 3,773 m a.s.l. at the Berkutaul Mt., mentioned in old literature as the Berkutsu Mt) Ranges. The two latter ranges actually form one latitudinally oriented mountain chain joint to Yuzhnyy Altai from the north at its middle. The park territory does not include the Yuzhnyy Altai Range northern slopes facing the Bukhtarma headwaters, but at ca 8643 the Park southern border crosses this range and extends to the south into the upper valleys of the Kara-Koba and Arasanovka Rivers; then it returns to the north and westerly of the longitude of Katon-Karagai it goes along the crest of the Sarym-Sakty Range.

Besides Belukha, the park includes such remarkable and popular places as the Rakhmanovskie Klyuchi spa, the ancient burial mounds of Berel'skie Kurgany and so-called 'Austrian Road' going through the Burkhat Pass at the junction of Sarymsakty and Tarbagatai Ranges to the south to Lake Markakol' [22].

Although situated almost in the centre of the Altai Mountains, the Park is nevertheless open to humid air masses going from the west because of the western general direction of the Bukhtarma River valley, so the Park's climate, vegetation and flora represent humid versions of those typical for the Altai elevated parts. Most of the territory below tree line is covered by mountain taiga (mostly larch) and, at lower levels, birch forests alternating with expositional steppe patches on southern slopes, and forest meadows, while highlands are occupied by alpine meadows, mountain tundras (mostly of dwarf birch), screes and nival zone.

Although most of the Bukhtarma Valley is easily accessible, while Katon Karagai has always been a well populated and known village, data of the

butterfly fauna of the territory considered appeared surprisingly scarce. In early XX century, Meinhard [19-20] published some specimens collected by the Altaian expeditions by V.I. Vereshchagin (in 1909) and V.V. Sapozhnikov (in 1905) at Lake Bukhtarminskoe and Berel' and Rakhmanovskie Klyuchi villages and the Bukhtarma River valley within the contemporary territory of the Park, while Kardakoff [9] published a list of species collected in June-July 1912 at Katon-Karagai village and Altaiskaya stanitsa (these two settlements inhabited, respectively, by Kazakhs and Russians, were just 2 km apart and now merged into the present-day Katon-Karagai) In 1930, S.D. Lavrov [15] published butterfly collections made by N.N. Zakharyin and N.A. Plotnikov in 1925 at the same Katon Karagai and Altayskaya stanitsa environs, as well as the nearby "Berkut-su" (Berkutaul) Mt. in the Sarym-Sakty Mt. Range. Then only in 1987 the studies were proceeded with the first author of this paper (further in the text **OK**) who obtained some data from Yazevka village, the Yazovaya River and Berel' upper reaches, which were published 7 years later [12]. In 1990 and 1997, Vadim Zinchenko (further on **VZ**) collected butterflies at Katon Karagai village, Sarym-Sakty River headwaters and the Burkhat Pass, the specimens being preserved in the Siberian Zoological Museum at the Institute of Systematics and Ecology of Animals of Siberian Branch of the Russian Academy of Sciences, Novosibirsk (ISEA further in the text). These data were published only much later in the book by Vadim Tshikolovets and colleagues [29]. In 2010-2013 Alexey Zhdanko and Sergey Toropov made several expeditions focused on butterflies which also visited the Park, In 2013 and 2015, two volumes of their luxuriantly illustrated book 'The butterflies of eastern Turan, Targabatai, Saur and south-west Altai' were published [26-27], which summarised their data. Unfortunately, the authors provided exact locations, which can be precisely corresponded to the Park territory, only in captions to their numerous photographs of butterflies.

Aliya Gabdullina (further on **AG**) has been collecting butterflies in the Park since 2005. All her data mentioned below are collected specimens preserved in the collection of the Katon Karagai National Park. In 2010 and 2012, Oleg Kosterin (**OK**) made two trips focused to the Bukhtarma River headwaters and the Ukok Plateau southern foot, aimed to find some butterfly species known from the neighbouring Russian territory but not yet registered in Kazakhstan (see 'Discussion'). His data mentioned below are partly specimens preserved in ISEA, partly photographic records and partly field notes on easily recognisable common species. Svyatoslav Knyazev (further on **SK**) visited the National Park for four days in June 2016 and made visual registrations of butterflies.

In 2016, a handbook summarising all existing faunal data on butterflies of Kazakhstan was published by V. Tshikolovets et al. [29], which is a

comprehensive and still ultimate source of data of the Katon-Karagai National Park, including all here presented data by **OK**, **AG** and **VZ**. The annotated list of butterflies of the Katon-Karagai National Nature Park provided below is based on this source and refers to it. Only data by **SK** and new (2021) data by **AG**, both small, are published here for the first time.

Localities examined

The localities examined by **OK** were as follows:

Environs of the waterfall on the Yazovaya River at the junction of Listvyaga and Katunskiy Ranges, 10 km NNW of Yazevka village, 49°31' N, 86°17' E, ca 1,600 m a.s.l., a big meadowy glade and spruce taiga.

Environs of Yazevka village, at the confluence of the Yazovaya and Belaya Berel Rivers, 49°26–27' N, 86°20–21' E, ca 1,200–1300 m a.s.l.

Bayyrman Terrain 3.5 km NNE of Katon Karagai village – steppen southern slopes, meadows at their feet and on a gully western slope (here with sparse birches), rocks on the crest, a field on the foot plain, 49°11'35–56" N, 85°37'26–55" E, 1,090–1,230 m a.s.l.

The Sarymsakty River in Katon-Karagai village – more or less bushy shingle banks, floodplain meadows, a birch forest, steppen slope of the right bank, 49°09–10" N, 85°17'–37" E, 1,025–1,089 m a.s.l.

The broad valley of the Kara-Koba River upper reaches from Verkhnee Zimovye cordon to 2 km NE of it, vast meadows and a small lake, 49°03'35"–04'26" N, 86°00'40"–02'45" E, 1,633–1,670 m a.s.l.

The Tarbagatai River valley between the Sarymsarky and Tarbagatai Ranges, 5–5.5–6.5 km NE of Verkhnee Zimovye cordon, with a hilly ancient moraine formed by melting of a 'dead' (no more movable) glacier, with numerous lakes and sedge and cottongrass swamps, patches of larch taiga with a dwarf birch understorey, and large meadows; also southern slopes of the Sarymsakty Range eastern spurs with short grass subalpine meadows, 49°05–06' N, 85°56–58' E, 2,000–2,230 m a.s.l.

The eastern slopes of the Karashongal Mountain (the eastern spur of Listvyaga Range) 6 km WNW of Ust'-Chindagatuy village. Damp glades among dwarf birch tundra, rather dry meadows below huge screes, subnival alpine meadow patches above the screes; the uppermost point ~49°16', 86°55', ~2,500 m a.s.l.

The Ust'-Chindagatuy village environs - southern and western slopes covered by meadow steppe and steppe proper, larch forest margins, meadows in the Chindagatuy and Bukhtarma River floodplains, 49°14–15' N, 86°58'55"–87°00'04" E, 1,722–1,842 m a.s.l.

The Lake Bukhtarminskoe left bank at the outlet river – open larch taiga with dwarf birch understorey, peat moss bogs, sedge swamps, small forest meadows, 49°16'23–51'' N, 86°58'16–35'' E, 2,130–2,140 m a.s.l.

The Muzdy-Bulak brook valley and the southern slope of the Ukok Plateau foot 15 km E of Ust-Chingadatuy village – subalpine meadows with the uppermost outposts of Siberian stone pine forest, alpine meadows, *Dryas* tundra on ancient lateral moraine, stony slopes with xerophytic vegetation, damp dwarf birch mountain tundras, 49°13'08–26'' N, 87°10–14' E, 2,230–2,400 m a.s.l.

The localities examined by **SK** were as follows:

The Kara-Koba River upper valley. Meadows at spruce forest margins, ~49°01'43'' N, 86°01'04'' E., 1,600–1,700 m a.s.l.

Burkhat Pass through the junction of Sarymsakty and Tarbagatai Ranges. Last trees, dwarf birch tundra, subalpine and alpine meadows ~49°06'49'' N, 86°01'58'' E., 2,000–2,500 m a.s.l.

For the data on most of the localities examined by **AG** see [4]. The new localities added in this paper were as follows:

Budkeev Farm: 1 km N of Korobikha village, the Bukhtarma River right bank, at D. Budkeev's bee farm, 49°17' N, 85°15' E, ca 650 m a.s.l.

Ukok Pass: the brink of the Ukok Plateau at the Bukhtarma River sources: 49°13'32'' N, 87°15'11'' E, ca 2500 m a.s.l.

Ust'-Sobachye terrain, 49°17' N, 85°15' E, ca 650 m a.s.l.

Medvedskiy pitomnik, 49°11' N, 85°20' E, ca 900 m a.s.l.

Zhanaulga bridge: at the bridge at Zhanaulga village, 49°11' N, 85°47' E, ca 860 m a.s.l.

Sukhaya Rechka terrain: 2 km S of Katon Karagay, 49°09' N, 85°36' E, ca 1,200 m a.s.l.

Zhalpakzhurt terrain: 49°05'29'' N, 85°39'29'' E, ca 1,850 m a.s.l.

Barlyk (formerly Pechi) village: 49°23'' N, 86°07' E, ca 610 m a.s.l.

Takyr Mountain: 48°57–58'' N, 85°26–31' E, 1,800–2,600 m a.s.l.

Alatay station: 48°60'' N, 86°05' E, ca 1,480 m a.s.l.

Annotated list of butterfly species of Katon-Karagai State National Nature Park

The butterfly taxonomy mostly follows [5–6], with some later amendments. Species which we assume obviously polytypic are listed under subspecific names, monotypic species or species controversial with respect to subspecies are listed under specific names.

The list provides the precise localities and, where available, also dates (those by Sapozhnikov and Vereshchagin – according to the Julian calendar, as

published in [19–20]), but not the number of specimens, since e.g. not all data reported by Lavrov [15] and **OK** were specimens while all data by **SK** were visual registrations. Since almost all the data included have been published before, we provide the relevant references and also the names used in each source. Only well verbally specified reports explicitly referring to the Park territory are taken into account, so that general indications of mountain ranges (which could be extrapolations) or dots in maps (which may be unprecise) are discarded. Meinhard [19] reported some butterflies collected by the 1905 expedition by V.V. Sapozhnikov as merely 'the Bukhtarma River Valley' but from the book by Sapozhnikov himself [23] including the detailed diary we infer that all collections were made within the current territory of the park, which he entered on 16 VII 1905 from Ukok Plateau and left on 28 VII 1905 at the Yazevaya River mouth; leaving the Bukhtarma for Irtysh on 1 VIII 1905 (according to the Julian calendar). The source [19] mentions for the Bukhtarma Valley also such dates as 3 VII, 2 VIII, 9 VIII and 21 VIII, when Sapozhnikov was not there at all. We assume 21 VIII to be a typo of 21 VII while the data for the rest of those dates are dubious. The Park encloses few rather small areas around Ushbulak, Katon-Karagai and Shyngystay villages attributed to neither its core area nor buffer zone, but the data from them are nevertheless included as representing the same terrain.

HESPERIIDAE

1. *Carcharodus alceae* (Esper, [1780])

Tshikolovets et al., 2016 [29] (as *Carcharodus alceae alcae* (Esper, [1780])): **AG**: Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005.

2. *Muschampia tessellum tessellum* (Hübner, [1803])

Tshikolovets et al., 2016 [29] (as *Muschampia tessellum tessellum* (Hübner, [1803])): **VZ**: Rakhmanovskie Klyuchi, 26–28 VII 1997. **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010; Ust'-Chindagatuy env., 4 VII 2012.

3. *Pyrgus malvae malvae* (Linnaeus, 1758)

Meinhard, 1910 [19] (as *Hesperia amalvae* L.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Kosterin, 1994 [12] (as *Pyrgus malvae* (Linnaeus, 1758)): Yazovka [Listvyaga Range, Yazevka] village).

Tshikolovets et al., 2016 [29] (as *Pyrgus malvae malvae* (Linnaeus, 1758)): **AG**: Chernovaya village env., Tyoplyy Klyuch River left bank, 20 VI 2007; Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 23–25 V 2006; 10 km SW of Katon-Karagai, Solonechnaya terrain, 15 V 2006.

4. *Pyrgus sibiricus* (Reverdin, 1911)

Tshikolovets et al., 2016 [29] (as *Pyrgus sibiricus sibiricus* (Reverdin, 1911)): **VZ**: Burkhat Pass, 23 VI 1997. **OK**: 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012.

5. *Pyrgus alveus* (Hübner, [1803])

Meinhard, 1910 [19] (as *Hesperia alveus* Hb.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Lavrov, 1930 [15] (as *Hesperia alveus alveus* Hbn.): Katon-Karagai, 1 VIII 1925.

Tshikolovets et al., 2016 [29] (as *Pyrgus alveus alveus* (Hübner, [1803])): **VZ**: Sarymsakty mt. range, Sarymsakty River upper reaches, 29 VIII 1990. **OK**: Katon-Karagai village, Sarymsakty River bank, 31 VII 2010; Ust'-Chindagatuy env., 3 VII 2012.

(*Pyrgus carthami* (Hübner, [1813]))

Lavrov, 1930 [15] (as *Hesperia carthami carthami* Hbn.): Katon-Karagai, 1 VIII 1925.

Remark: This is a West-Palaearctic species very unlikely to occur in the Altai Mts. Some misidentification could be involved.)

6. *Spialia orbifer* (Hübner, [1823])

AG: Ust'-Sobachye terrain, 3 VI 2021 (1 specimen)

Remark: this is the first record of this species for the Katon-Karagai National Nature Park territory.

7. *Thymelicus lineola* (Ochsenheimer, 1808)

Lavrov, 1930 [15] (as *Adoepa lineola lineola* O): Katon-Karagai, 1 VIII 1925.

Tshikolovets et al., 2016 [29] (as *Thymelicus lineola* (Ochsenheimer, 1808)): **VZ**: Burkhat Pass, 29 VIII 1990; Sarymsakty Mt. Range, Sarymsakty River, 22 VIII 1990. **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010, 28 VI 2012; Sarymsakty River valley at Katon-Karagai, 29 VI 2012; Tarbagatai Range, env. of Verkhnee Zimovye cordon, 26-27 VII 2010; Bukhtarma River valley between Archaty and Ust'-Chindagatuy, 28 VII 2010. **AG**: Katon-Karagai env., Shirokiy Log terrain, 15 VII 2005.

8. *Ochlodes sylvanus* (Esper, [1779])

Tshikolovets et al., 2016 [29] (as *Ochlodes sylvanus sylvanus* (Esper, [1779])): **AG**: Sogornoe village env., 23 VI 2006.

SK: the Kara-Koba River upper reaches, 28–29 VI 2016.

9. *Hesperia comma comma* (Linnaeus, 1758)

Tshikolovets et al., 2016 [29] (as *Hesperia comma comma* (Linnaeus, 1758)): **VZ**: Katon-Karagai settl. env., 21 VIII 1990. **OK**: Bukhtarma River valley between Archaty and Ust'-Chindagatuy, 28 VII 2010.

10. *Carterocephalus palaemon albiguttata* Christoph, 1893

Kosterin, 1994 [12] (as *Carterocephalus palaemon* (Pallas, 1771)): Yazovka [Yazevka village, Listvyaga Range], 1 VII 1987.

11. *Carterocephalus silvicola* (Meigen, 1830)

Kosterin, 1994 [12] (as *Carterocephalus silvicolus* (Meigen, 1829)): Yazovka [Yazevka village]; Waterfall [at Yazovaya River downstream of Yazovoe lake], 14 VII 1987.

AG: Katon-Karagai environs, bogged forest ('sogra'), 21 V 2021 (G.A. Bolbotov et V.M. Vorobyev leg.).

12. *Heteropterus morpheus* (Pallas, 1771)

Tshikolovets et al., 2016 [29] (as *Heteropterus morpheus morpheus* (Pallas, 1771)): Zhanpeisova leg.: Chernovaya village env., Tyoplyy Klyuch River left bank, 20 VI 2007.

PAPILIONIDAE

13. *Papilio machaon machaon* Linnaeus, 1758

Kardakoff, 1913 [9] (as *Papilio machaon machaom* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Papilio machaon machaom* L.): Katon-Karagai, 28-31 VII 1925.

Toropov & Zhdanko, 2013 [26] (as *Papilio machaon* (Linnaeus, 1758) ssp. *orientis* Verity, 1911): Sarym-Sakty Mt. R., Ushkungei; Sarym-Sakty Mt. R., Burkhat).

Tshikolovets et al., 2016 [29] (as *Papilio machaon machaon* Linnaeus, 1758): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012. **AG**: East Kazakhstan Prov., Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 31 V 2006.

SK: the Kara-Koba River upper reaches, 28-29 VI 2016. **AG**: Sarymsakty Range, Zhalpakzhurt terrain, 10 VI 2021 (V.N. Vorobyov leg.).

14. *Parnassius apollo alpherakyi* Krulikovskiy, 1906

Kardakoff, 1913 [9] (as *Parnassia apollo* L.): Katon-Karagai and Altaiskaya stanitsa.

Meinhard, 1913 [19] (as *Parnassius apollo* var. *sibirica* Nordm.): The Bukhtarma River valley: 21 VIII and 3 VII 1905 (a typo; should be 21 VII then at Berel'skoe village [23]; the latter date dubious).

Tshikolovets et al., 2016 [29] (as *Parnassius apollo sibiricus* (Nordmann, 1851)): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012. **AG**: Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 29 IX 2005; 15–20 VII 2007; Katon-Karagai env., Shirokiy Log terrain, 15 VII 2005; East Kazakhstan Prov., 2–3 km N of Katon-Karagai, Bukhtarminskie Mts. spurs, Bayyrman terrain, 4 VII 2005. David Thomas: Bukhtarma valley

between Katon-Karagai and Berezovskiy, 49°08.538' N 85°06.839 E, 1019 m, 4 VII 2012;

AG: Takyr Mt., 48°57'14" N, 85°26'41' E, 1,800 m a.s.l., 7-8 VII 2021 (V.M. Vorobyov leg.).

15. *Parnassius nomion korshunovi* Kreuzberg et Pljustsh, 1992

Kardakoff, 1913 [9] (as *Parnassia nomion* F.): Katon-Karagai and Altaiskaya stanitsa.

Tshikolovets et al., 2016 [29] (as *Parnassius nomion nomion* Fischer de Waldheim, 1824): **OK:** Ust'-Chindagatuy env., 3–5 VII 2012 (Fig. 2). **AG:** Katon-Karagai env., Bukhtarma River left bank, 22 VIII 2006; 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 15–20 VII 2007.

16. *Parnassius phoebus phoebus* (Fabricius, 1793)

Meinhard, 1910 [19] (as *Parnassius delius* Esp. var. *Sedakovii* Mén.): the Bukhtarma River valley: 2 VIII 1905 (an error, could be 22 VII then at Berel'skoe village [23]).

Meinhard, 1913 [20] (as *Parnassius delius* Esp.): Rakhmanovskie klyuchi: 3 VII 1909.

Kosterin, 1994 [12] (as *Parnassius phoebus* (Fabricius, 1793)): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2013 [26] (as *Parnassius phoebus* (Fabricius, 1793) ssp. *phoebus*): Sarym-Sakty Mt. R., Burkhat Pass; Sarym-Sakty Mt. R., Ushkungei; Sarym-Sakty Mt. R., Baiberdy.

Tshikolovets et al., 2016 [29] (as *Parnassius phoebus phoebus* (Fabricius, 1793)): **OK:** 6 km NW Verkhnee Zimovye cordon, Tarbagatai River valley, an ancient dead glacier moraine, ca. 2100 m, 27 VII 2010; Lake Bukhtarminskoe, 4 VII 2012; 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 30 VI–2 VII 2012. Starikov leg.: Tarbagatai Range, Pronikha River headwaters, 2400 m, 30 VI.

AG: Takyr Mt., highlands, 48°57'59" N, 85°28'49' E, 2,450 m a.s.l., 7-8 VII 2021 (V.M. Vorobyov leg.).

17. *Parnassius stubbendorffii stubbendorffii* Ménétriès, 1849

Lavrov, 1930 [15] (as *Parnassius stubbendorffii stubbendorffii* Mén.): the Saralka River, 21 VII 1925.

Toropov & Zhdanko, 2013 [26] (as *Parnassius stubbendorffii* Ménétriès, 1849 ssp. *typicus* Bryk, 1914.): 18–19 (Sarym-Sakty Mt. R., Katon-Karagai village; Sarym-Sakty Mt. R., Kara-Koba).

18. *Parnassius ariadne* (Lederer, 1853)

Suvortzev, 1894 [25] (as *Parnassius clarius* Ev.): Altai: N. Narym Mts., Altaiskaya stanitsa (Katon-Karagai)" [The geographic information is

contradictory since Katon-Karagai is far from Altayskaya Stanitsa and Narym Range, so this report is obscure].

Lavrov, 1930 [15] (as *Parnassius clarius dentata* Aust.): Katon-Karagai.

Kosterin, 1994 [12] (as *Parnassius ariadne* Lederer, 1853): Yazovka [Yazevka village, Listvyaga Range].

AG: Ust'-Sobachye terrain, the Bukhtarma left bank, 49°17' N, 85°15' E, 3 VI 2021 (a female)

19. *Parnassius evermanni evermanni* [Ménétriès] in Siemaschko, [1850]

Lavrov, 1930 [15] (as *Parnassius evermanni* Mén.): at the Berkut-su Mt, the closest high mountain to Katon-Karagai (the 'central plot' at 2,300 m a.s.l., 20-21 VII 1925; the Saralka River right headwater, 20 VII 1925; the Berkut-su Mt. slope, 25 VII 1925; the Sarymsak River bank, 31 VII).

Sorimachi, 1999 [24] (as *Parnassius evermanni sarymsaktyensis* ssp. nov.): Upper Sarym-Sakty Riv., Sarym-Sakty Mts., E. Kazakhstan; Upper Sarym-Sakty Riv., Chingistau Pass, Sarym-Sakty Mts., E. Kazakhstan.

Dietz, 2000 [3] (as *Parnassius evermanni altaicus* f. *sarymsaktyensis*): Sarym-Sakty River, Sarym-Sakty Mts.

Toropov & Zhdanko, 2013 [26] (as *Parnassius evermanni* [Ménétriès] in Siemaschko, 1850 ssp. *sarymsaktyensis* Sorimachi, 1999): Sarym-Sakty Mt. R., Sarym-Sakty River; Sarym-Sakty Mt. R., Tautekeli; Sarym-Sakty Mt. R., Ushkungei.

Tshikolovets et al., 2016 [29] (as *Parnassius evermanni evermanni* [Ménétriès] in Siemaschko, [1850]): **SZMN ISEA** (collector not indicated): Katon-Karagai, 4 and 19 VII 1919. Zoological Museum of Kyiv University, Ukraine (**ZMKU**): Altai, Katon-Karagai, 16 VII–1 VIII 1925, S. Lavrov.

20. *Parnassius tenedius tenedius* Eversmann, 1851

Toropov & Zhdanko, 2013 [26] (as *Parnassius tenedius* Eversmann, 1851 ssp. *nigromaculatus* Niepelt, 1916): Sarym-Sakty Mt. R., Katon-Karagai. [This locality is mentioned only at a habitat photo but the relevant dot is present in the locality map]

PIERIDAE

21. *Leptidea sinapis* (Linnaeus, 1758)

Kardakoff, 1913 [9] (as *Leptidea sinapis* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Leptidea sinapis sinapis* L.): Katon-Karagai, the Sarymsak River bank, 11 VII 1925.

Toropov & Zhdanko, 2013 [26] (as *Leptidea sinapis* (Linnaeus, 1758) ssp. *sinapis*): Sarym-Sakty Mt. R., Tau-Tekeli; Sarym-Sakty Mt. R., Katon-Karagai.

Tshikolovets et al., 2016 [29] (as *Leptidea sinapis sinapis* (Linnaeus,

1758)): **AG:** Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 23 V 2006.

SK: the Kara-Koba River upper reaches, 28-29 VI 2016.

AG: Barlyk (Pechi) village environs, 4 V 2021 (V.M. Vorobyev leg.); Katon-Karagai village, 14 V 2021 (V.M. Vorobyev leg.).

22. *Leptidea juvernica* Williams, 1946

Kosterin, 1994 [12] (as *Leptidea morsei* (Fenton, 1881) [misidentification]): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Kosterin, 2007 [14] (as *Leptidea reali yakovlevi* Mazel, 2001): E[ast] K[azakhstan] Province], Altai, Katon-Karagai District, 15 km W of Rakhmanovskie Klyuchi village, the Yazovaya River valley.

Toropov & Zhdanko, 2013 [26] (as *Leptidea reali* Reissinger, 1990 ssp. *yakovlevi* Mazel, 2001): Junction of Sarymsakty and Tarbagatai Mt. R.; Sarym-Sakty Mt. R., Tautekeli.

23. *Leptidea morsei* (Fenton, 1882)

Tshikolovets et al., 2016 [29] (as *Leptidea morsei morsei* (Fenton, 1882)): **AG:** Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 22 V 2006; 2 km S of Katon-Karagai, Sad terrain, 13 VI 2006.

AG: the Bukhtarma left bank, 49°16' N, 85°18' E, 3 VI 2021.

24. *Anthocharis cardamines cardamines* (Linnaeus, 1758)

Kardakoff, 1913 [9] (as *Euchloë cardamines* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Antocharis cardamines cardamines* L.): Katon-Karagai, 17 VII, 1925.

Toropov & Zhdanko, 2013 [26] (as *Anthocharis cardamines* (Linnaeus, 1758) ssp. *sajana* Rober <sic>, 1907): Sarym-Sakty Mt. R., Burkhat.

Tshikolovets et al., 2016 [29] (as *Anthocharis cardamines* (Linnaeus, 1758)): **AG:** Chernovaya village env., Tyoplyy Klyuch River left bank, 20 VI 2007. David Thomas: Bukhtarma valley between Katon-Karagai and Berezovskiy, 49°08.538' N 85°06.839 E, 1019 m, 4 VII 2012.

SK: the Kara-Koba River upper reaches, 28-29 VI 2016.

25. *Euchloe ochracea dubatolovi* Korshunov in Korshunov et Gorbunov, 1995

Kardakoff, 1913 [9] (as *Euchloe belia* v. *simplonia* Frr.): Katon-Karagai and Altaiskaya stanitsa.

Toropov & Zhdanko, 2013 [26] (*Euchloe ausonia* (Hübner, [1803]) ssp. *dubatolovi* Korshunov, 1995): Sarym-Sakty Mt. R., Ushkungei.

Tshikolovets et al., 2016 [29] (as *Euchloe ochracea dubatolovi* (Korshunov, 1995)): **VZ:** Rakhmanovskie Klyuchi, 26–28 VII. 1997; Burkhat Pass, 24 VI 1997. **OK:** Sarymsakty River valley at Katon-Karagai, 29 VI 2012.

26. *Euchloe creusa emiorientalis* Korshunov et P. Gorbunov, 1995

Kosterin, 1994 [12] (as *Euchloe creusa* (Doubleday, 1847) ssp. *orientalis* (Bremer, 1864)): waterfall at Yazovaya River.

Toropov & Zhdanko, 2013 [26] (as *Euchloe creusa* (Doubleday & Hewiston, [1874]) ssp. *emiorientalis* (Verity, [1911])): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Euchloe creusa orientalis* (Bremer, 1864)): **OK:** 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI – 2 VII 2012.

27. *Pontia chloridice* (Hübner, [1813])

Kardakoff, 1913 [9] (as *Pieris chloridice* Hb.: Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Euchloë chloridice chloridice* Hbn): Katon-Karagai, 28 VII – 1 VIII 1925.

28. *Pontia daplidice edusa* (Fabricius, 1777)

Meinhard, 1910 [19] (as *Pieris daplidice* L.): Berel'skoe village: 21 VII 1905; the Bukhtarma River valley, 26 VII 1905 (that is between Berel'skoe and Chingistay villages [23]).

Kardakoff, 1913 [9] (as *Pieris claplidice* <sic!> L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Loucochloë* <sic!> *daplidice daplidice* L.): fields and long fallow lands at Katon-Karagai, 12 VII – 1 VIII 1925.

Kosterin, 1994 [12] (as *Pontia edusa* (Fabricius, 1777)): Yazovka [Yazevka village], Waterfall [at Yazovaya River downstream of Yazovoe lake].

Tshikolovets et al., 2016 [29] (as *Pontia daplidice daplidice* (Linnaeus, 1758)): **VZ:** Sarymsakty Range, Sarymsakty River upper reaches, 1–2 VII 1987 and 29 VIII 1990; Burkhat Pass, 23 VI 1997. **OK:** East Kazakhstan Prov., NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010, 28 VI 2012; East Kazakhstan Prov., Ust'-Chindagatuy env., 3 VII 2012; East Kazakhstan Prov., Lake Bukhtarminskoe, 29 VII 2010; East Kazakhstan Prov., 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; East Kazakhstan Prov., 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012. **AG:** East Kazakhstan Prov., Tarbagatai Range, Verkhnee Zimovye cordon, 4–6 VII 2006.

AG: Barlyk (Pechi) village environs, 4 V 2021 (V.M. Vorobyev leg.)

29. *Pontia callidice kalora* (Moore, 1865)

Kardakoff, 1913 [9] (as *Pieris callidica* v. *orientalis* Alph.): Katon-Karagai and Altaiskaya stanitsa.

Meinhard, 1910 [19] (as *Pieris callidice* Esp.): S.-E. Altai: Berel'skoe village env.: 21 VII 1905.

Kosterin, 1994 [12] (as *Synchloe callidice* (Hübner, [1800]): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2013 [26] (as *Pontia callidice* (Hübner, [1800]) ssp. *halasia* Huang & Murayama, 1992): Sarym-Sakty Mt. R., Burkhat Pass; Sarym-Sakty Mt. R., Ushkungei.

Tshikolovets et al., 2016 [29] (as *Pontia callidice kalora* (Moore, 1865): **OK:** Sarymsakty Range E end, Tarbagatai River valley, 27 VII 2010; 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012.

30. *Pieris rapae* (Linnaeus, 1758)

Kardakoff, 1913 [9] (as *Pieris rapae v. orientalis* Obbl. <sic!>): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Pieris rapae rapae* L. gen. aest. *aestivus* Ver. et ab. *immaculata* Str.): Katon-Karagai, 1 VIII 1925.

Tshikolovets et al., 2016 [29], as *Pieris rapae rapae* (Linnaeus, 1758): **OK:** Lake Bukhtarminskoe, 29 VII 2010. **AG:** Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005; 2–3 km N of Katon-Karagai, Bukhtarminsk Mts. spurs, Bayyrman terrain, 4 VII 2005.

AG: Medvedskiy pitomnik, 30 V 2021 (G.A. Bolbotov leg.); Katon-Karagai. 10 VI 2021.

31. *Pieris napi napi* (Linnaeus, 1758)

Kardakoff, 1913 [9] (as *Pieris napi* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Pieris napi bryonides* Schel.): Altaiskaya stanitsa 16 VII 1925.

Kosterin, 1994 [12] (as *Pieris napi* (Linnaeus, 1758)): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2013 [26] (as *Pieris napi* (Linnaeus, 1758) ssp. *euorientis* Verity, [1908]): Sarym-Sakty Mt. R., Sarym-Sakty River; Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Tautekeli; Sarym-Sakty Mt. R., Katon-Karagai.

Tshikolovets et al., 2016 [29] (as *Pieris napi napi* (Linnaeus, 1758)): **VZ:** Burkhat Pass, ~2150 m, 23 VI 1997; E. Kazakhstan, Rakhmanovskie Klyuchi, 26 VI, 26–28 VII 1997. **OK:** East Kazakhstan Prov., 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 2280 m, 30 VI – 2 VII 2012. **AG:** East Kazakhstan Prov., Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 31 V 2006; 10 km SW of Katon-Karagai, Solonechnaya terrain, 15 V 2006; 2–3 km N of Katon-Karagai, Bukhtarminsk Mts. spurs, Bayyrman terrain, 4 VII 2005.

SK: Burkhat Pass, 27–28 VI 2016; the Kara-Koba River upper reaches,

28–29 VI 2016.

AG: Katon-Karagai environs, bogged forest ('sogra'), 21 V 2021 (G.A. Bolbotov et V.M. Vorobyev leg.).

32. *Aporia crataegi* (Linnaeus, 1758)

Kardakoff, 1913 [9] (as *Aporia crataegi* L.): Katon-Karagai and Altaiskaya stanitsa.

Toropov & Zhdanko, 2013 [26] (as *Aporia crataegi* (Linnaeus, 1758) ssp. *meinhardi* Krulikowsky, 1909): Bukhtarma Mt. R., Chingiztai.

Tshikolovets et al., 2016 [29] (as *Aporia crataegi* (Linnaeus, 1758)): **OK:** NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012; Sarymsakty River bank at Katon-Karagai, 29 VI 2012; Ust'-Chindagatuy env., 3 VII 2012; Lake Bukhtarminskoe, 4 VII 2012; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI – 2 VII 2012. **AG:** Chernovaya village env., Tyoplyy Klyuch River left bank, 20 VI 2007; 2–3 km N of Katon-Karagai, Bukhtarminsk Mts. spurs, Bayyrman terrain, 4 VII 2005.

SK: the Kara-Koba River upper reaches, 28–29 VI 2016.

AG: the Bukhtarma left bank, 49°16'N, 85°18'E, 3 VI 2021; **AG:** Budkeev Farm, 22 VI 2021.

33. *Colias hyale hyale* (Linnaeus, 1758)

Meinhard, 1910 [19] (as *Colias hyale* L.): the Bukhtarma River valley: 11 VII – 2 VIII 1905 (sic).

Kardakoff, 1913 [9] (as *Colias hyale* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Colias hyale* L. subsp.?): Katon-Karagai.

Kosterin, 1994 [12] (as *Colias hyale* (Linnaeus, 1758)): Yazovka [Yazevka village].

Toropov & Zhdanko, 2013 [26] (as *Colias hyale* (Linnaeus, 1758) ssp. *altaica* Verity, [1911]): Sarym-Sakty Mt. R., Burkhat.

Tshikolovets et al., 2016 [29] (as *Colias hyale hyale* (Linnaeus, 1758)): **VZ:** Sarymsakty Range, Sarymsakty River headwaters, 29 VIII 1990; Burkhat Pass, 24 VI 1997. **OK:** NE/ env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010; Sarymsakty River valley at Katon-Karagai, 31 VII 2010, 29 VI 2012; 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; Ust'-Chindagatuy env., 3 VII 2012; Lake Bukhtarminskoe, 29 VII 2010; 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 2280 m, 30 VI – 2 VII 2012. **AG:** Burkhat Pass, 2141 m, 5 VII 2006; Tarbagatai Range, Verkhnee Zimovye cordon, 4–6 VII 2006; Shyngystay village env., Lake Standart, Kubentau terrain, 30 V 2006; Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 29 IX 2005.

34. *Colias chrysotheme elena* P. Gorbunov, 1995

Lavrov, 1930 [15] (as *Colias chrysotheme sibirica* Gr.-Grsh.): Katon-Karagai, 28 VIII 1925 (maybe this record referred to the nominotypical subspecies).

Toropov & Zhdanko, 2013 [26] (as *Colias chrysotheme* Esper, [1781] ssp. *elena* P. Gorbunov, 1995): 104 (Sarym-Sakty Mt. R., Tautekeli River).

Tshikolovets et al., 2016 [29] (as *Colias chrysotheme elena* P. Gorbunov, 1995): **OK**: Ust'-Chindagatuy env., 30 VI, 3 VII, 6 VII 2012 (Fig. 3).

35. *Colias tyche tyche* (Böber, 1812)

Tshikolovets et al., 2016 [29] (as *Colias tyche tyche* (Böber, 1812)): **OK**: 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 2280 m, 30 VI – 2 VII 2012.

36. *Gonepteryx rhamni rhamni* (Linnaeus, 1758)

Tshikolovets et al., 2016 [29] (as *Gonepteryx rhamni rhamni* (Linnaeus, 1758)): **AG**: Sogornoe village env., 24 VI 2006; Sarymsakty Range, 10 km SW of Katon-Karagai, Solonechnaya terrain, 15 V 2006.

LYCAENIDAE

37. *Thecla betulae* (Linnaeus, 1758)

Toropov & Zhdanko, 2015 [27] (as *Thecla betulae* (Linnaeus, 1758): Bukhtarma River valley, Katon Karagai [This locality is mentioned only in a caption to a larval foodplant photo. The locality map has no dot at Katon-Karagai but has two dots east of it in the National Park territory. We found it possible to consider this common species as reported for the Park, in spite of this controversy.].

38. *Callophrys rubi* (Linnaeus, 1758)

Tshikolovets et al., 2016 [29] (as *Callophrys rubi rubi* (Linnaeus, 1758)): **AG**: Sogornoe village env., 26 IV 2006.

AG: Barlyk (Pechi) village environs, 14 IV and 4 V 2021 (V.M. Vorobyev leg.)

39. *Lycaena helle* ([Denis & Schiffermüller], 1775)

Toropov & Zhdanko, 2015 [27] (as *Lycaena helle* ([Denis et Schiffermüller, 1775]) ssp. *phintonis* (Fruhstorfer, 1910)): Sarym-Sakty Mt. R., Tautekeli; Sarym-Sakty Mt. R., Ushkungei; Sarym-Sakty Mt. R., Baiberdy.

Tshikolovets et al., 2016 [29] (as *Lycaena helle helle* ([Denis & Schiffermüller], 1775)): **AG**: Chernovaya village env., Tyoplyy Klyuch River left bank, 21 VI 2007; Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 31 VI 2006.

SK: Burkhat Pass, 27-28 VI 2016.

AG: Katon-Karagai environs, bogged forest ('sogra'), 21 V 2021 (G.A. Bolbotov et V.M. Vorobyev leg.).

40. *Thersamolycaena alciphron alciphron* (Rottemburg, 1775)

Lavrov, 1930 [15] (as *Chrysophanus alciphron alciphron* Rott.): Katon-Karagai, 26 VII 1925.

Tshikolovets et al., 2016 [29] (as *Lycaena alciphron alciphron* (Rottemburg, 1775)): **OK**: Sarymsakty River bank at Katon-Karagai, 29 VI 2012.

41. *Heodes virgaureae* (Linnaeus, 1758)

Kardakoff, 1913 [9] (as *Chrysophamus* <sic> *virgaureae* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Chrysophanus virgaureae inalinus* Ver.): Katon-Karagai, 8 VII – 1 VIII 1925.

Toropov & Zhdanko, 2015 [27] (as *Heodes virgaureae* (Linnaeus, 1758) ssp. *virgaureae*): Sarymsakty Mt. R., Chingiztai village; Sarym-Sakty Mt. R., Katon-Karagai.

Tshikolovets et al., 2016 [29] (as *Lycaena virgaureae virgaureae* (Linnaeus, 1758)): **OK**: 6 km NW Verkhnee Zimovye cordon, Tarbagatai River valley, an ancient dead glacier moraine, ca. 2100 m, 27 VII 2010; Bukhtarma River valley between Archaty and Ust'-Chindagatuy, 28 VII 2010; Ust'-Chindagatuy env., 3 VII 2012.

42. *Palaeochrysophanus hippothoe sajana* (Kozhantschikov, 1923)

Tshikolovets et al., 2016 [29] (as *Lycaena hippothoe hippothoe* (Linnaeus, 1761)): **OK**: 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010 (Fig. 4).

43. *Tongeia fischeri* (Eversmann, 1843)

Kosterin, 1994 [12] (as *Tongeia fischeri* (Eversmann, 1843)): 57 (Yazovka [Yazevka village]).

Tshikolovets et al., 2016 [29] (as *Tongeia fischeri fischeri* (Eversmann, 1843)): **AG**: Shyngystay village env., Lake Standart, Kubentau terrain, 30 V 2006.

44. *Cupido minimus minimus* (Fuessly, 1775)

Kosterin, 1994 [12] (as *Cupido minimus* (Fuessly, 1775)): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2015 [27] (as *Cupido minimus* (Fuessly, 1775) ssp. *minimus*): Sarym-Sakty Mt. R., Baiberdy.

Tshikolovets et al., 2016 [29] (as *Cupido minimus minimus* (Fuessly, 1775)): **OK**: East Kazakhstan Prov., Ust'-Chindagatuy env., 3 VII 2012.

SK: Burkhat Pass, 27–28 VI 2016; the Kara-Koba River upper reaches, 28–29 VI 2016.

45. *Scolitantides orion* (Pallas, 1771)

Kosterin, 1994 [12] (as *Scolitantides orion* (Pallas, 1771)): Yazovka [Yazevka village].

SK: Burkhat Pass, 27–28 VI 2016.

46. *Glaucopsyche alexis* (Poda, 1761)
 Lavrov, 1930 [15] (as *Lycaena cyllarus cyllarus* Rott.): Katon-Karagai, 23 VII 1925.
 Toropov & Zhdanko, 2015 [27] (as *Glaucopsyche alexis* (Poda, 1761) ssp. *alexis*): Bukhtarma River valley, Ust-Sogornoe.
 Tshikolovets et al., 2016 [29] (as *Glaucopsyche alexis alexis* (Poda, 1761)): **AG**: 2 km S of Katon-Karagai, Sad terrain, 13 VI 2006.

47. *Maculinea alcon alcon* ([Denis & Schiffermüller], 1775)
 Kardakoff, 1913 [9] (as *Lycvaena alcon* F.): Katon-Karagai and Altaiskaya stanitsa.
 Tshikolovets et al., 2016 [29] (as *Maculinea alcon alcon* ([Denis & Schiffermüller], 1775)): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012

48. *Maculinea teleius obscurata* (Staudinger, 1892)
 Lavrov, 1930 [15] (as *Lycaena euphemus obscurata* Stgr.): Altaiskaya stanitsa, 1 VIII 1925.
 Toropov & Zhdanko, 2015 [27] (as *Phengaris teleius* (Bergstrasser, [1779]) ssp. *obscurata* (Staudinger, 1892)): Sarym-Sakty Mt. R., Kara-Koba [this locality is subscribed for the photos of a habitat and the foodplant, but the relevant dot is shown on the locality map.]

49. *Maculinea nausithous* (Bergsträsser, 1779)
 Tshikolovets et al., 2016 [29] (as *Maculinea nausithous nausithous* (Bergsträsser, 1779)): **OK**: Ust'-Chindagatuy env., 3 VII 2012.

50. *Maculinea arion arion* (Linnaeus, 1758)
 Kosterin, 1994 [12] (as *Maculinea arion* (Linnaeus, 1758)): Yazovka [Yazevka village], (Waterfall [at Yazovaya River downstream of Yazovoe lake].

51. *Plebejus argyrognomon mongolicus* (Rühl, [1893])
 Kardakoff, 1913 [9] (as *Lycaena argyrognomon* Bgstr.): Katon-Karagai and Altaiskaya stanitsa.
 Tshikolovets et al., 2016 [29] (as *Plebejus argyrognomon mongolicus* (Rühl, [1893])): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012. **AG**: Kara-Koba River valley, Bauyrkora cordon, 4 VII 2006.

52a. *Plebejus idas uiguricus* Zhdanko, 2000
 Lavrov, 1930 [15] (as *Lycaena idas idas* L. (= *argyrognomon argyrognomon* Bgstr.)): Altaiskaya stanitsa (this report could refer the previous species as well).
 Zhdanko, 2013 [31] (as *Plebejus uiguricus burchati* Zhdanko, ssp. n.): East Kazakhstan, Sarymsakty Mts., Tautekeli.
 Toropov & Zhdanko, 2015 [27] (as *Plebejus uiguricus* Zhdanko, 2000 ssp.

burchati (Zhdanko, 2014 (2013)): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Plebejus idas uiguricus* Zhdanko, 2000): **OK**: Ust'-Chindagatuy env., 30 VI, 3 VII 2012; Bukhtarma River valley between Archaty and Ust'-Chindagatuy, 28 VII 2010. **AG**: Katon-Karagai, 4 VII 2005; Katon-Karagai env., Bukhtarma River left bank, 22 VIII 2006.

AG: Katon-Karagai environs, bogged forest ('sogra'), 21 V 2021 (G.A. Bolbotov et V.M. Vorobyev leg.).

Remark. The subspecies *P. idas uiguricus* Zhdanko, 2000 is intermediate between *P. idas idas* (Linnaeus, 1761), inhabiting the plains of Kazakhstan and West Siberia, and the Altaian subspecies *P. i. ongodai* Tutt, 1909) with respect to the male UPS outer black border breadth. Its geographical limits are unknown, maybe there is a cline with respect to this character in West Kazakhstan [5, 28].

52b. *Plebejus idas ?sailjugemicus* Zhdanko et Samodurov in Zhdanko, 1999

Toropov & Zhdanko, 2015 [27] (as *Plebejus idas* (Linnaeus, 1761) ssp. *idas* [misidentification?]): Sarym-Sakty Mt. R., Tautekeli Riverm 2,000 m.

Remark. *P. idas sailjugemicus* is a small butterfly with narrow black border in male UPS inhabiting highlands (tundras, *Kobresia myosuroides* communities and meadows above tree lines) of the highest ranges of Altai, while meadows of their lower elevations within the forest and forest-steppe belts are inhabited by *P. i. ongodai* [5]. For some reason, Toropov & Zhdanko [26] attributed their specimens and photos from highlands ("h 2,000 m") of the Tautekeli River valley in the Sarym-Sakty Mountain Range to *P. idas idas* which is absent from Altai Mts and is impossible in highlands. The appearance and habitat of the butterflies presented suggest *P. i. sailjugemicus* (if so then misidentified by its own author). However, the highly expectable occurrence of this taxon in highlands of the Katon-Karagai National Park in particular and Kazakhstan in general should be corroborated by specimen examination.

53. *Plebejus argus clarasiatica* (Verity, 1931)

Lavrov, 1930 [15] (as *Lycaena aegon aegon* Schiff. (= *argus argus* L.)): Katon-Karagai.

Kosterin, 1994 [12] (as *Plebejus argus* (Linnaeus, 1758)): 57 (Yazovka [Yazevka village]).

Tshikolovets et al., 2016 [29] (as *Plebejus argus argus* (Linnaeus, 1758)): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012; Sarymsakty River valley at Katon-Karagai, 29 VI 2012. **AG**: Chernovaya village env., Tyoplyy Klyuch River left bank, 20 VI 2007; Sarymsakty Range, 10 km SW of Katon-Karagai, Solonechnaya terrain, 15 V 2006.

AG: Alalay station, 10 VII 2021 (S.A. Kurumova leg.).

54. *Glabroculus cyane* (Eversmann, 1837)
Lavrov, 1930 [15] (as *Lycaena cyane* Ev. ? subsp. *kozhantshikovi* Sheljuzhko): Katon-Karagai, 16 VII 1925.
55. *Eumedonia eumedon eumedon* (Esper, [1780])
Lavrov, 1930 [15] (as *Lycaena eumedon eumedon* Esp.): Katon-Karagai, 16 VII – 1 VIII 1925.
Kosterin, 1994 [12] (as *Eumedonia eumedon* (Esper, 1780)): Waterfall [at Yazovaya River downstream of Yazovoe lake]
Toropov & Zhdanko, 2015 [27] (as *Eumedonia eumedon* (Esper, [1780]) ssp. *antiqua* (Staudinger, 1899)): Sarym-Sakty Mt. R., Tautekeli River; Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Tautekeli.
Tshikolovets et al., 2016 [29] (as *Polyommatus eumedon eumedon* (Esper, [1780])): **OK**: East Kazakhstan Prov., Ust'-Chindagatuy env.
SK: Burkhat Pass, 27-28 VI 2016.
56. *Aricia artaxerxes allous* (Geyer, [1836])
Obraztsov, 1934 [21] (as *Lycaena inhonora* Jach.): Altaj: Katon-Karagaj.
Kosterin, 1994 [12], as *Aricia allous* (Hübner, 1819): Waterfall [at Yazovaya River downstream of of Yazovoe lake].
Toropov & Zhdanko, 2015 [27] (as *Aricia artaxerxes* (Fabricius, 1793) ssp. *strandii* (Obraztsov, 1935)): Sarym-Sakty Mt. R., Tautekeli River.
Tshikolovets et al., 2016 [29] (as *Polyommatus artaxerxes allous* (Geyer, [1836])): **OK**: Ust'-Chindagatuy env., 3 VII 2012; Lake Bukhtarminskoe, 29 VII 2010. **AG**: Tarbagatai Range, Verkhnee Zimovye cordon, 4–6 VII 2006.
57. *Aricia nicias* (Meigen, 1830)
Toropov & Zhdanko, 2015 [27] (as *Pseudoaricia nicias* (Meigen, 1829) ssp. *bittis* (Fruhstorfer, 1915)): Sarym-Sakty Mt. R., Ust-Sogornoe; Sarym-Sakty Mt. R., Katon-Karagai.
58. *Agriades optilete* (Knoch, 1781)
Tshikolovets et al., 2016 [29] (as *Polyommatus optilete sibiricus* (Staudinger, 1892)): **OK**: Listvyaga Range, Lake Bukhtarminskoe, 29 VII 2010.
Habitat. Mountain taiga, forest bogs, mountain tundras, at 800-2500 m.
59. *Agriades orbitulus pheretimus* (Staudinger, 1892)
Toropov & Zhdanko, 2015 [27] (as *Albulina orbitula* (de Prunner, 1798) ssp. *sajana* (Heyne in Rühl, [1895])): Sarym-Sakty Mt. R., Tautekeli.
Tshikolovets et al., 2016 [29] (as *Polyommatus orbitulus pheretimus* (Staudinger, 1892)): **OK**: Ust'-Chindagatuy env., 3 VII 2012; Lake Bukhtarminskoe, 29 VII 2010; 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012. **AG**: Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 20 VI 2006.
60. *Agriades glandon diodorus* (Bremer, 1861)

Lavrov, 1930 [15] (as *Lycaena orbitulus wosnesenskii* Mén): highlands (“belki”) of Katon-Karagai, 28 VII 1925.
Toropov & Zhdanko, 2015 [27] (as *Agriades glandon* (de Prunner, 1798) ssp. *diodorus* (Bremer, 1861)): Sarym-Sakty Mt. R., Tautekeli.
61. *Cyaniris semiargus semiargus* (Rottemburg, 1775)
Meinhard, 1910 [19] (as *Lycaena semiargus* Rott.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).
Kosterin, 1994 [12] (as *Cyaniris semiargus* (Rottemburg, 1775)): 59 (Yazovka [Yazevka village]).
Tshikolovets et al., 2016 [29] (as *Polyommatus semiargus semiargus* (Rottemburg, 1775)): **OK**: Sarymsakty River valley at Katon-Karagai, 29 VI 2012; Bukhtarma River valley between Archaty and Ust'-Chindagatuy, 28 VII 2010; Ust'-Chindagatuy env., 3 VII 2012; Lake Bukhtarminskoe, 29 VII 2010. **AG**: Tarbagatai Range, Verkhnee Zimovye cordon, 4–6 VII 2006; Kara-Koba River valley, Bauyrkora cordon, 4 VII 2006; Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 25 V 2006; 15-20 VII 2007.
SK: the Kara-Koba River upper reaches, 28-29 VI 2016.
62. *Polyommatus thersites* (Cantener, [1835])
Toropov & Zhdanko, 2015 [27] (as *Plebicula thersites* (Cantener, [1835]) ssp. *orientis* (Sheljuzhko, 1928)): Sarym-Sakty Mt. R., Tautekeli.
63. *Polyommatus amandus amandus* (Schneider, 1792)
Kardakoff, 1913 [9] (as *Lycaena amanda* Schn.): Katon-Karagai and Altaiskaya stanitsa.
Lavrov, 1930 [15] (as *Lycaena amanda amanda* Schn.): Katon-Karagai, 28 VII – 1 VIII 1925.
Tshikolovets et al., 2016 [29] (as *Polyommatus amandus amandus* (Schneider, 1792)): **OK**: Sarymsakty River valley at Katon-Karagai, 29 VI 2012. **AG**: Sogornoe village env., 23 VI 2006.
64. *Polyommatus icarus fuchsi* (Sheljuzhko, 1928)
Lavrov, 1930 [15] (as *Lycaena icarus* Rott. ? subsp. *fuchsi* Shel.): Katon-Karagai, 28 VII – 1 VIII 1925.
Kosterin, 1994 [12] (as *Polyommatus icarus* (Rottemburg, 1775)): Yazovka [Yazevka village].
Toropov & Zhdanko, 2015 [27] (as *Polyommatus icarus* (Rottemburg, 1775) ssp. *fuchsi* (Sheljuzhko, 1928)): Sarym-Sakty Mt. R., Katon-Karagai.
Tshikolovets et al., 2016 [29] (as *Polyommatus icarus icarus* (Rottemburg, 1775)): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010; Sarymsakty River valley at Katon-Karagai, 29 VI 2012; Ust'-Chindagatuy env., 3 VII 2012. **AG**: Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya

Yama terrain, 29 IX 2005; Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005; Katon-Karagai env., Bukhtarma River left bank, 22 VIII 2006.

SK: the Kara-Koba River upper reaches, 28-29 VI 2016.

65. *Polyommatus eros erotides* (Staudinger, 1892)

Toropov & Zhdanko, 2015 [27] (as *Polyommatus eros* Latreille, 1804.): Sarym-Sakty Mt. R., Tautekeli River.

Toropov & Zhdanko, 2015 [27] (as *Polyommatus erotides* (Staudinger, 1892) ssp. *erotides*): Sarym-Sakty Mt. R., Burkhat Pass; Sarym-Sakty Mt. R., Tautekeli River.

Tshikolovets et al., 2016 [29] (as *Polyommatus eros erotides* (Staudinger, 1892)): **OK:** Ust'-Chindagatuy env., 3 VII 2012. **AG:** Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 25 VII 2006.

66. *Polyommatus damon* ([Denis & Schiffermüller], 1775)

Kardakoff, 1913 [9] (as *Lycaena damon* Schitt. <!>): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Lycaena damon damon* Schiff.): Katon-Karagai, 1 VIII 1925.

Toropov & Zhdanko, 2015 [27] (as *Agrodiaetus damon* ([Denis & Schiffermüller, 1775]) ssp. *mongolensis* Koçak, 1980): Sarym-Sakty Mt. R., Tautekeli River; Sarym-Sakty Mt. R., Belkaragai; Sarym-Sakty Mt. R., Katon-Karagai).

Tshikolovets et al., 2016 [29] (as *Polyommatus damon damon* ([Denis & Schiffermüller], 1775)): **OK:** NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010.

NYMPHALIDAE

67. *Limenitis populi* (Linnaeus, 1758)

Toropov & Zhdanko, 2015 [27] (as *Limenitis populi* (Linnaeus, 1758) ssp. *eumenius* Fruhstorfer, 1908): Bukhtarma River valley, Katon-Karagai.

Tshikolovets et al., 2016 [29] (as *Limenitis populi populi* (Linnaeus, 1758)): **S.V. Starikov** leg.: Bukhtarma River left bank Ust'-Sobachye terrain, 26 VI 2007.

AG: Budkeev Farm, 22 VI 2021.

68. *Limenitis helmanni helmanni* Lederer, 1853

Lavrov, 1930 [15] (as *Limenitis helmanni* Led. trans. ad. subsp. *duplicata* Stgr.):? Katon-Karagai.

Tshikolovets et al., 2016 [29] (as *Limenitis helmanni helmanni* Lederer, 1853): **OK:** Katon-Karagai, 29 VI 2012.

69. *Neptis rivularis magnata* (Heyne in Rühl, 1895)

Kardakoff, 1913 [9] (as *Neptis lucilla* v. *ludmilla* Hs.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (*Neptis coenobita coenobita* Stoll.): hills closest to Katon-Karagai, 23 VII 1925; Altayskaya stanitsa, 16 VII 1925

Kosterin, 1994 [12] (as *Neptis rivularis* (Scopoli, 1763)): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Tshikolovets et al., 2016 [29] (as *Neptis rivularis rivularis* (Scopoli, 1763)): **OK:** Ust'-Chindagatuy env., 30 VI, 3 VII 2012. **AG:** Sogornoe village env., 23 VI 2006; East Kazakhstan Prov., 2-3 km N of Katon-Karagai, Bukhtarminskie Mts. spurs, Bayyrman terrain, 4 VII 2005. **SK:** the Kara-Koba River upper reaches, 28-29 VI 2016.

AG: Katon-Karagai environs, bogged forest ('sogra'), 21 V 2021 (G.A. Bolbotov et V.M. Vorobyev leg.); Budkeev Farm, 22 VI 2021.

70. *Polygonia c-album kultukensis* Kleinschmidt, 1929

Lavrov, 1930 [15] (as *Polygonia c-album c-album* L.): S. Altai: Katon-Karagai, the Sarymsak River bank.

Kosterin, 1994 [12] (as *Polygonia c-album* (Linnaeus, 1758)): Yazovaya valley.

Toropov & Zhdanko, 2015 [27] (as *Polygonia c-album* (Linnaeus, 1758) ssp. *c-album*): Sarym-Sakty Mt. R., Katon-Karagai.

Tshikolovets et al., 2016 [29] (as *Polygonia c-album c-album* (Linnaeus, 1758)): **AG:** Lineyskiy Range, Chernaya Uba cordon, 4 V 2005; Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005; Sogornoe village env., 23 VI 2006.

Remark. For some reason Toropov & Zhdanko [26] presented a photo from Katon Karagai to illustrate a habitat of a very similar species *Polygonia interposita interposita* (Staudinger, 1881), while the relevant point is absent from their map. Katon-Karagai. Actually *P. interposita* occurs only in more southern and western(?) ranges of Altai Mts.

71. *Nymphalis vaualbum vaualbum* ([Denis & Schiffermüller], 1775)

Tshikolovets et al., 2016 [29] (as *Nymphalis vaualbum vaualbum* ([Denis & Schiffermüller], 1775)): **AG:** East Kazakhstan Prov., Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005.

72. *Nymphalis xanthomelas* ([Denis & Schiffermüller], 1775)

Toropov & Zhdanko, 2015 [27] (as *Nymphalis xanthomelas* (Esper, [1781]) ssp. *xanthomelas*): Bukhtarma River, Zhanaulge [this locality is mentioned only at a habitat photo; the locality map has no dot at Zhanaulgi village, which is east of Katon-Karagai, but instead there is a dot just west of Katon-Karagai is present. We assume this as a mapping error and include this quite common species into the list].

73. *Nymphalis antiopa antiopa* (Linnaeus, 1758)

Toropov & Zhdanko, 2015 [27] (as *Nymphalis antiopa* (Linnaeus, 1758)

ssp. *antiopa*): Bukhtarma River valley, Chingiztai; Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Nymphalis antiopa antiopa* (Linnaeus, 1758)): **OK**: Katon-Karagai village, Sarymsakty River bank, 31 VII 2010. **AG**: Fadikha village env., 6 IX 2005; East Kazakhstan Prov., Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005.

74. *Inachis io io* (Linnaeus, 1758)

Kardakoff, 1913 [9] (as *Vanesso* <sic!> *Io* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Vanessa jo jo* L.): Katon-Karagai, 16 VII 1925..

Toropov & Zhdanko, 2015 [27] (as *Aglais io* (Linnaeus, 1758) ssp. *io*): Bukhtarma River, Chingiztai.

Tshikolovets et al., 2016 [29] (as *Inachis io io* (Linnaeus, 1758)): **AG**: Sarymsakty Range, 10 km SW of Katon-Karagai, Solonechnaya terrain, 15 V 2006.

75. *Aglais urticae urticae* (Linnaeus, 1758)

Meinhard, 1913 [20] (as *Vanessa urticae* L.): Rakhmanovskie Klyuchi: 3 VII 1909.

Kardakoff, 1913 [9] (as *Vanesso* <sic!> *urticae* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Vanessa urticae urticae* L.): Katon-Karagai, 2 VIII 1925; Altaiskaya stanitsa, a damp meadow, 16 VII 1925.

Toropov & Zhdanko, 2015 [27] (as *Aglais urticae* (Linnaeus, 1758) ssp. *urticae*): Bukhtarma River valley, Chingiztai; Sarym-Sakty Mt. R, Burkhat; Sarym-Sakty Mt. R., Tautekeli River valley.

Tshikolovets et al., 2016 [29] (as *Aglais urticae urticae* (Linnaeus, 1758)): **VZ**: Sarymsakry Range, Sarymsakty River headwaters, 29 VIII 1990. **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012; Sarymsakty River valley at Katon-Karagai, 29 VI 2012; Bukhtarma River valley between Archaty and Ust'-Chindagatuy, 28 VII 2010; Ust'-Chindagatuy env., 3 VII 2012; Lake Bukhtarminskoe, 29 VII 2010; 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012. **AG**: Burkhat Pass, 2141 m, 5 VII 2006; Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 29 IX 2005, 23 V 2006; 2-3 km N of Katon-Karagai, Bukhtarminskie Mts. spurs, Bayyrman terrain, 4 VII 2005; Katon-Karagai env., Bukhtarma River left bank, 22 VIII 2006; East Kazakhstan Prov., Sogornoe village env., 23 VI 2006.

SK: Burkhat Pass, 27-28 VI 2016.

AG: Zhanaulga bridge, 21 X 2020.

76. *Vanessa cardui* (Linnaeus, 1758)

Lavrov, 1930 [15] (as *Pyrameis cardui cardui* L.): Katon-Karagai, 31 VII 1925.

Tshikolovets et al., 2016 [29] (as *Vanessa cardui cardui* (Linnaeus, 1758)): **VZ**: Sarymsakty Range, Sarymsakty River headwaters, 29 VIII 1990. **OK**: 6 km NW Verkhnee Zimovye cordon, Tarbagatai River valley, an ancient dead glacier moraine, ca. 2100 m, 27 VII 2010.

77. *Araschnia levana levana* (Linnaeus, 1758)

Kosterin, 1994 [12] (as *Araschnia levana* (Linnaeus, 1758)): 60 (Yazovka [Yazevka village], Waterfall [at Yazovaya River downstream of Yazovoe lake]).

AG: Katon-Karagai, 10 VI 2021.

78. *Euphydryas maturna staudingeri* (Wnukowsky, 1929)

Lavrov, 1930 [15] (*Melitaea maturna altaica* A. B.-Haas et forma *uralensis* Stgr): Katon-Karagai, 16 VII 1925.

Kosterin, 1994 [12] (as *Euphydryas maturna* (Linnaeus, 1758): Yazovka [Yazevka village].

Tshikolovets et al., 2016 [29] (as *Euphydryas maturna staudingeri* (Wnukowsky, 1929)): **AG**: Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 22 VI 2006; 2 km S of Katon-Karagai, Sad terrain, 13 VI 2006.

SK: the Kara-Koba River upper reaches, 28-29 VI 2016.

79. *Euphydryas intermedia* (Ménétriès, 1859)

Kosterin, 1994 [12] (as *Euphydryas intermedia* (Ménétriès, 1859)): Waterfall [at Yazovaya River downstream of of Yazovoe lake].

Toropov & Zhdanko, 2015 [27] (as *Euphydryas intermedia* Ménétriès, 1859 ssp. *altaiana* (Wnukowsky, 1929)): Sarym-Sakty Mt. Range, Sarym-Sakty River.

Tshikolovets et al., 2016 [29] (as *Euphydryas intermedia intermedia* (Ménétriès, 1859)): **VZ**: Burkhat Pass, 24 VI 1997; E. Kazakhstan, Rakhmanovskie Klyuchi, 26 VI, 26–28 VII 1997. **OK**: Ust'-Chindagatuy env., 3 VII 2012; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI – 2 VII 2012.

80. *Euphydryas iduna sajana* Higgins, 1950

Toropov & Zhdanko, 2015 [27] (as *Euphydryas iduna* (Dalman, 1816) ssp. *sajana* Higgins, 1950): Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Tautekeli.

SK: the Kara-Koba River upper reaches, 28-29 VI 2016.

81a. *Euphydryas aurinia laeta* (Christoph, 1893)

Kosterin, 1994 [12] (as *Euphydryas aurinia* (Rottemburg, 1775)): Yazovka [Yazevka village].

Toropov & Zhdanko, 2015 [27] (*Euphydryas aurinia* (Rottemburg, 1775) ssp. *calima* Bolshakov & Korb, 2912): Kamenukha; Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Euphydryas aurinia laeta* (Christoph, 1893)): **AG:** East Kazakhstan Prov., Kara-Koba River valley, Bauyrkora cordon, 4 VII 2006.

AG: the Bukhtarma left bank, 49°16' N, 85°18' E, 3 VI 2021; Ust'-Sobachye terrain, the Bukhtarma left bank, 49°17' N, 85°15' E, 3 VI 2021.

81b. *Euphydryas aurinia banghaasi* (Seitz, 1908)

Tshikolovets et al., 2016 [29] (as *Euphydryas aurinia banghaasi* (Seitz, 1908)): **OK:** 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI – 2 VII 2012. **AG:** Burkhat Pass, 2141 m, 5 VII 2006.

SK: Burkhat Pass, 27-28 VI 2016.

Remark: *E. aurinia banghaasi* is a small, more greyish than orange butterfly occurring in highlands (tundras, alpine meadows) of the most elevated ranges of Altai-Sayan Mountain system while *E. aurinia laeta* is a larger, in general orange butterfly occurring in meadows at low elevations. Such altitudinal elevation does not fit well to the subspecies concept but considering them as subspecies seems to be a tolerable temporal solution [29].

82. *Melitaea athalia reticulata* Higgins, 1995

?Meinhard, 1910 [19] (as *Melitaea minerva* Stgr.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Kardakoff, 1913 [9] (as *Melitaea athalia* Rott.): Katon-Karagai and Altaiskaya stanitsa.

Kosterin, 1994 [12] (as *Mellicta athalia* (Rottemburg, 1775)): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2015 [27] (as *Mellicta athalia* (Rottemburg, 1775) ssp. *reticulata* Higgins, 1955): Sarym-Sakty Mt. R., Tautekeli River.

SK: the Kara-Koba River upper reaches, 28-29 VI 2016.

83. *Melitaea britomartis amurensis* Staudinger, 1892

Kosterin, 1994 [12] (as *Mellicta britomartis* (Assman, 1847)): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2015 [27] (as *Mellicta britomartis* (Assmann, 1847) ssp. *frigidaltaica* (Verity, 1940)): Sarym-Sakty Mt. R., Tautekeli.

84. *Melitaea aurelia centralasiae* Wnukowsky, 1929

Toropov & Zhdanko, 2015 [27] (as *Mellicta menetriesi* (Caradja, 1895) ssp. *centralasiae* (Wnukowsky, 1929)): Sarym-Sakty Mt. R., Tautekeli River;

Sarym-Sakty Mt. R., Baiberdy.

Tshikolovets et al., 2016 [29] (as *Melitaea aurelia centralasiae* Wnukowsky, 1929): **OK:** Lake Bukhtarminskoe, 4 VII 2012; 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012.

AG: Alatau station, 10 VII 2021 (S.A. Kurumova leg.).

Remark. For substantiation of the treatment of the *aurelia*-group as one polytypic species see [7].

85. *Melitaea diamina hebe* (Borkhausen, 1793)

Toropov & Zhdanko, 2015 [27] (as *Melitaea diamina* (H.G. Lang, 1789) ssp. *hebe* (Borkhausen, 1793)): Sarym-Sakty Mt. Range, Tautekeli; Sarym-Sakty Mt. Range, Burkhat [these localities are mentioned only in captions to photos of a habitat and larval foodplants, but the relevant dots are present in the locality map, so we found it possible to include this species].

86. *Melitaea latonigena* Eversmann, 1847

Kardakoff, 1913 [9] (as *Melitaea didyma* O.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Melitaea didyma neera* Fisch.-Wald.): Katon-Karagai, a floodeable meadow at the Sarymsak River, 31 VII 1925.

Kosterin, 1994 [12] (as *Melitaea latonigena* Eversmann, 1847): Yazovka [Yazevka village], (Waterfall [at Yazovaya River downstream of of Yazovoe lake]).

Toropov & Zhdanko, 2015 [27] (as *Melitaea latonigena* Fabricius, 1847 ssp. *altaica* Grun-Grshimailo, 1893): Sarym-Sakty Mt. Range, Tautekeli River; Sarym-Sakty Mt. Range, Baiberdy,

Tshikolovets et al., 2016 [29] (as *Melitaea latonigena latonigena* Eversmann, 1847): **VZ:** Rakhmanovskie Klyuchi, 26-28 VII 1997. **OK:** Ust'-Chindagatuy env., 30 VI, 3 VII 2012 (Fig. 5); Lake Bukhtarminskoe, 4 VII 2012. **AG:** Tarbagatai Range, Verkhnee Zimovye cordon, 4–6 VII 2006; 2–3 km N of Katon-Karagai, Bukhtarminsk Mts. spurs, Bayyrman terrain, 4 VII 2005.

87. *Melitaea phoebe phoebe* ([Denis & Schiffermüller], 1775)

Kardakoff, 1913 [9] (as *Melitaea phoebe* Knoch): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Melitaea phoebe* Kn. subsp. ? *saturata* Stgr.): Katon-Karagai, 20 and 24 VII 1925.

AG: Medvedskiy pitomnik, 30 V 2021 (G.A. Bolbotov leg.)

88. *Melitaea cinxia* (Linnaeus, 1758)

Lavrov, 1930 [15] (as *Melitaea cinxia cinxia* L.): Katon-Karagai, 28 and 31 VII 1925.

Kosterin, 1994 [12] (as *Melitaea cinxia* (Linnaeus, 1758)): Yazovka

[Yazevka village].

Toropov & Zhdanko, 2015 [27] (as *Melitaea cinxia* (Linnaeus, 1758) ssp. *tschujaca* Seitz, 1909): Sarym-Sakty Mt. R., Tautekeli; Sarym-Sakty Mt. R., Baiberdy.

Tshikolovets et al., 2016 [29] (as *Melitaea cinxia cinxia* (Linnaeus, 1758)): **OK:** Ust'-Chindagatuy env., 3 VII 2012; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012.

AG: Medvedskiy pitomnik, 30 V 2021 (G.A. Bolbotov leg.)

89. *Melitaea arcesia arcesia* Bremer, 1861

Toropov & Zhdanko, 2015 [27] (as *Melitaea arcesia* (Bremer, 1861) ssp. *minor* Elwes, 1899): Sarym-Sakty Mt. R., Sarym-Sakty River; Sarym-Sakty Mt. R., Ushkungei.

Tshikolovets et al., 2016 [29] (as *Melitaea arcesia arcesia* Bremer, 1861): **OK:** Lake Bukhtarminskoe, 4 VII 2012; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012.

90. *Pandoriana pandora* ([Denis & Schiffermüller], 1775)

Lavrov, 1930 [15] (as *Argynnis pandora pandora* Schiff.): Katon-Karagai and Altayskaya stanitsa, 16 VII – 1 VIII 1925.

91. *Argynnis paphia* (Linnaeus, 1758)

Lavrov, 1930 [15] (as *Argynnis paphia paphia* L.): Altayskaya stanitsa, 16 VII 1925.

Tshikolovets et al., 2016 [29] (as *Argynnis paphia paphia* (Linnaeus, 1758)): **AG:** Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005.

92. *Fabriciana niobe barkhatovi* P. Gorbunov, 2001

Meinhard, 1910 [19] (as *Argynnis niobe* L. ab. *eris* Meig.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Meinhard, 1913 [20] (as *Argynnis niobe* L. var. *eris* Meig.): Rakhmanovskie klyuchi, 3 VII 1909.

Lavrov, 1930 [15] (as *Argynnis niobe niobe* L. ab. *cydippe* L.): Katon-Karagai.

Kosterin, 1994 [12] (as *Fabriciana niobe* (Linnaeus, 1758)): Katunskii Mountain Ridge: bank of Lake Yazovoe.

Toropov & Zhdanko, 2015 [27] (as *Fabriciana niobe* (Linnaeus, 1758) ssp. *barkhatovi* P. Gorbunov, 2001): Sarym-Sakty Mt. R., Tautekeli River; Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Baiberdy.

Tshikolovets et al., 2016 [29] (as *Argynnis niobe niobe* (Linnaeus, 1758)): **OK:** East Kazakhstan Prov., Tarbagatai Range, env. of Verkhnee Zimovye cordon, 26–27 VII 2010; Bukhtarma River valley between Archaty and

Ust'-Chindagatuy, 28 VII 2010; Lake Bukhtarminskoe, 29 VII 2010. **AG:** Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 29 IX 2005.

Remark. The taxonomy of the *niobe*-group in North Asia is confused [6]; ssp. *barkhatovi* is close to the nominotypical subspecies.

93. *Fabriciana adippe adippe* ([Denis & Schiffermüller], 1775)

Meinhard, 1910 [19] (as *Argynnis adippe* L. ab. *Cleodoxa* O.): Lake Bukhtarminskoe left bank: 17 VII 1905.

Meinhard, 1913 [20] (as *Argynnis adippe* L.): Rakhmanovskie klyuchi.

Kardakoff, 1913 [9] (as *Argynnis adippe* L.): Katon-Karagai and Altayskaya stanitsa.

Lavrov, 1930 [15] (as *Argynnis esperi esperi* Ver. (= *adippe adippe* auct. plur., non L.)): Katon-Karagai.

Toropov & Zhdanko, 2015 [27] (as *Fabriciana adippe* (Linnaeus, 1758) ssp. *zarewna* (Fruhstorfer, 1912.)): Sarym-Sakty Mt. R., Tautekeli; Sarym-Sakty Mt. R., Burkhat.

Tshikolovets et al., 2016 [29] (as *Argynnis adippe adippe* ([Denis & Schiffermüller], 1775)): **OK:** Sarymsakty River valley at Katon-Karagai, 29 VI 2012; **AG:** Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 29 IX 2005; 2 km S of Katon-Karagai, Sad terrain, 13 VI 2006; Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005.

AG: Alatay station, 10 VII 2021 (S.A. Kurumova leg.).

94. *Speyeria aglaja* (Linnaeus, 1758)

Meinhard, 1910 [19] (as *Argynnis aglaja* L.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Kardakoff, 1913 [9] (as *Argynnis aglaja* L.): Katon-Karagai and Altayskaya stanitsa.

Lavrov, 1930 [15] (as *Argynnis aglaja aglaja* L.): Katon-Karagai and Altayskaya stanitsa, 16 VI – 1 VIII 1925.

Kosterin, 1994 [12] (as *Mesoacidalia aglaja* (Linnaeus, 1758)): Yazovka [Yazevka village].

Toropov & Zhdanko, 2015 [27] (as *Speyeria aglaja* (Linnaeus, 1758) ssp. *aglaja*): Sarym-Sakty Mt. R., Burkhat Pass; Sarym-Sakty Mt. R., Tautekeli; Sarym-Sakty Mt. R., Ushkingei).

Tshikolovets et al., 2016 [29] (as *Argynnis adippe adippe* ([Denis & Schiffermüller], 1775)): **OK:** East Kazakhstan Prov., Tarbagatai Range, env. of Verkhnee Zimovye cordon, 26–27 VII 2010; Ust'-Chindagatuy env., 30 VI, 3 VII 2012; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012. **AG:** Burkhat Pass, 2141 m, 5 VII 2006; East Kazakhstan Prov., Kara-Koba River valley, Bauyrkora cordon,

4 VII 2006; Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 23 V 2006, 15–20 VII 2007.

95. *Issoria lathonia* (Linnaeus, 1758)

Kosterin, 1994 [12] (as *Issoria lathonia* (Linnaeus, 1758)): the bank of Lake Yazovoe.

Lavrov, 1930 [15] (as *Argynnis lathonia lathonia* L.): Katon-Karagai, 28 VII 1925.

Toropov & Zhdanko, 2015 [27] (as *Issoria lathonia* (Linnaeus, 1758) ssp. *lathonia*): Sarym-Sakty Mt. R., Burkhat.

Tshikolovets et al., 2016 [29] (as *Issoria lathonia* (Linnaeus, 1758)): **VZ**: Katon-Karagai District, Sarymsakty Range, Sarymsakty River headwaters, 29 VIII 1990. **OK**: East Kazakhstan Prov., Tarbagatai Range, env. of Verkhnee Zimovye cordon, 26–27 VII 2010. **AG**: Burkhat Pass, 2141 m, 5 VII 2006; Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 29 IX 2005.

SK: Burkhat Pass, 27-28 VI 2016.

96. *Issoria eugenia* (Eversmann, 1847)

Kosterin, 1994 [12] (as *Issoria eugenia* (Eversmann, 1847)): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Tshikolovets et al., 2016 [29] (as *Issoria eugenia eugenia* (Eversmann, 1847)): **VZ**: Burkhat Pass, ~2150 m, 3 VII 1997. **OK**: East Kazakhstan Prov., Lake Bukhtarminskoe, 29 VII 2010.

97. *Brenthis hecate* ([Denis & Schihhermüller], 1775)

Kardakoff, 1913 [9] (as *Argynnis hecate* v. *caucasica* Stgr.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Brenthis hecate hecate* Esp.): S. Altai: Katon-Karagai.

Toropov & Zhdanko, 2015 [27] (as *Brenthis hecate* (Denis et Schiffermüller, 1775) ssp. *warreni* Kudrna, 1974.): 71 (Sarym-Sakty Mt. R., Tautekeli).

Tshikolovets et al., 2016 [29] (as *Brenthis hecate hecate* ([Denis & Schihhermüller], 1775)): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012; Sarymsakty River valley at Katon-Karagai, 29 VI 2012. **AG**: Sogornoe village env., 23 VI 2006; 2–3 km N of Katon-Karagai, Bukhtarminskies Mts. spurs, Bayyrman terrain, 4 VII 2005.

98. *Brenthis ino ino* (Rottemburg, 1775)

Kardakoff, 1913 [9] (as *Argynnis ino* Rott.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Brenthis ino paidicus* Fruhst.): Katon-Karagai and Altaiskaya stanitsa, 16 VII – 1 VIII 1925.

Kosterin, 1994 [12] (as *Brenthis ino* (Rottemburg, 1775)): Yazovka [Yazevka village], Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2015 [27] (as *Brenthis ino* (Rottemburg, 1775) ssp. *paidicus* (Fruhstorfer, 1907.)): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Brenthis ino ino* (Rottemburg, 1775)): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010, 28 VI 2012; Tarbagatai Range, env. of Verkhnee Zimovye cordon, 26–27 VII 2010; Ust'-Chindagatuy env., 3 VII 2012. **AG**: 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 15–20 VII 2007.

AG: Budkeev Farm, 22 VI 2021.

99. *Clossiana eunomia acidalia* (Böber, 1809)

Meinhard, 1910 [19] (as *Argynnis apherape* Hb.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Lavrov, 1930 [15] (*Brenthis apherape ossianus* Hbst.): Katon-Karagai, 31 VII – 1 VIII 1925.

Toropov & Zhdanko, 2015 [27] (*Procllossiana eunomia* Reuss, 1926 ssp. *acidalia* (Böber, 1809)): Sarym-Sakty River; Sarym-Sakty Mt. R., Ushkungei.

Tshikolovets et al., 2016 [29] (as *Clossiana eunomia asiatica* (Staudinger, 1901)): **VZ**: Burkhat Pass, ~2150 m, 23 VI 1997; **OK**: Ust'-Chindagatuy env., 3 VII 2012; Lake Bukhtarminskoe, 29 VII 2010, 4 VII 2012; 15 km ESE of Ust'-Chindagatuy, Muzdy-Bulak lower valley, 30 VI–2 VII 2012.

100. *Clossiana selene selene* ([Denis & Schiffermüller], 1775)

Meinhard, 1910 [19] (as *Argynnis selene* L.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Kosterin, 1994 [12] (as *Clossiana selene* (Denis et Schiffermüller, 1775)): Yazovka [Yazevka village].

Toropov & Zhdanko, 2015 [27] (as *Clossiana selene* ([Denis et Schiffermüller], 1775) ssp. *selene*): Sarym-Sakty Mt. R., Tautekeli River.

Tshikolovets et al., 2016 [29] (as *Clossiana selene selene* ([Denis & Schiffermüller], 1775)): **OK**: 6 km NW Verkhnee Zimovye cordon, Tarbagatai River valley, an ancient dead glacier moraine, ca. 2100 m, 27 VII 2010; Lake Bukhtarminskoe, 29 VII 2010; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012. **AG**: Katon-Karagai env., Shirokiy Log terrain, 15 VII 2005.

SK: Burkhat Pass, 27-28 VI 2016; the Kara-Koba River upper reaches, 28-29 VI 2016.

AG: Ukok Pass, 14 VII 2021 (G.A. Bolbotov leg.).

101. *Clossiana euphrosyne euphrosyne* (Linnaeus, 1758)

Kosterin, 1994 [12] (as *Clossiana euphrosyne* (Linnaeus, 1758)): Yazovka [Yazevka village], Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2015 [27] (as *Clossiana euphrosyne* (Linnaeus, 1758) ssp. *orphanoides* Huang & Murayama, 1992): Sarym-Sakty Mt. R., Sarym-Sakty River; Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Ushkungei; Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Clossiana euphrosyne euphrosyne* (Linnaeus, 1758)): **VZ**: Burkhat Pass, ~2150 m, 23 VI 1997. **OK**: 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012. **AG**: Chernovaya village env., Tyoplyy Klyuch River left bank, 20 VI 2007.

SK: Burkhat Pass, 27–28 VI 2016.

102. *Clossiana thore hypercalca* (Fruhstorfer, 1907)

Kosterin, 1994 [12] (as *Clossiana thore* (Hübner, 1803)): Yazovaya valley.

Tshikolovets et al., 2016 [29] (as *Clossiana thore borealis* (Staudinger, 1861)): **VZ**: E. Kazakhstan, Rakhmanovskie Klyuchi, 26–28 VII 1997.

103. *Clossiana selenis sibirica* (Erschoff, 1870)

Toropov & Zhdanko, 2015 [27] (as *Clossiana selenis* (Eversmann, 1837) ssp. *sibirica* (Erschoff, 1870)): 88–89 (Sarym-Sakty Mt. R., Tautekeli).

Tshikolovets et al., 2016 [29] (as *Clossiana selenis sibirica* (Erschoff, 1870)): **VZ**: Burkhat Pass, ~2150 m, 23 VI 1997; **OK**: 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012. **AG**: Burkhat Pass, 2141 m, 5 VII 2006.

104. *Clossiana titania staudingeri* (Wnukowsky, 1929)

Kosterin, 1994 [12] (as *Clossiana titania* (Esper, 1793)): Yazovaya River valley.

Tshikolovets et al., 2016 [29] (as *Clossiana titania staudingeri* (Wnukowsky, 1929)): **OK**: 6 km NW Verkhnee Zimovye cordon, Tarbagatai River valley, an ancient dead glacier moraine, ca. 2100 m, 27 VII 2010.

105. *Clossiana freija pallida* (Elwes, 1899)

Tshikolovets et al., 2016 [29] (as *Clossiana freija pallida* (Elwes, 1899)): **OK**: 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 1 VII 2012.

106. *Clossiana frigga alpestris* (Elwes, 1899)

Lavrov, 1930 [15] (as *Brenthis frigga alpestris* Elw.): Katon-Karagai., 31 VII 1925.

Churkin & Tuzov, 2005 [2] (as *Clossiana frigga famula* ssp. n.): S. Altai, Sarym-Sakty Mts., Sarym-Sakty R. (upper stream).

Toropov & Zhdanko, 2015 [27] (as *Clossiana frigga* (Thunberg & Becklin, 1791) ssp. *famula* Churkin & Tuzov, 2005.): Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Ushkungey.

Tshikolovets et al., 2016 [29] (as *Clossiana frigga alpestris* (Elwes, 1899)):

VZ: Burkhat Pass, ~2150 m, 3. VII. 1997.

107. *Clossiana dia alpina* (Elwes, 1899)

Meinhard, 1910 [19] (as *Argynnis dia* L. var. *alpina* Elw.): the Bukhtarma River valley: 9 VIII 1905 (the date incorrect (see [23]), the record dubious).

Lavrov, 1930 [15] (as *Brenthis dia dia* L.): Katon-Karagai, 1 VIII 1925; Altayskaya stanitsa, wheat fields, 7 VII 1925.

Toropov & Zhdanko, 2015 [27] (as *Boloria dia* (Linnaeus, 1767) ssp. *alpina* (Elwes, 1899)): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Clossiana dia dia* (Linnaeus, 1767)): **VZ**: Sarymsakty Range, Sarymsakty River headwaters, 29 VIII 1990. **OK**: Ust'-Chindagatuy env., 3 VII 2012; 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 30 VI–2 VII 2012. **AG**: 2 km S of Katon-Karagai, Sad terrain, 13 VI

SK: Burkhat Pass, 27–28 VI 2016.

AG: Barlyk (Pechi) village environs, 4 V 2021 (P.M. Vorobyev leg.); Sukhaya Rechka terrain, 21 V 2021 (V.M. Vorobyev leg.); Medvedskiy pitomnik, 30 V 2021 (G.A. Bolbotov leg.); Ukok Pass, 14 VII 2021 (G.A. Bolbotov leg.).

108. *Boloria napaea altaica* (Grum-Grshimailo, 1893)

Meinhard, 1913 [20] (as *Argynnis pales* Schiff.): Altai: Rakhmanovskie klyuchi.

Toropov & Zhdanko, 2015 [27] (as *Boloria altaica* (Grum-Grshimailo, 1893): Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Tautekeli; Sarym-Sakty Mt. R., Baiberdy; Sarym-Sakty Mt. R., Sarym-Sakty River valley.

Tshikolovets et al., 2016 [29] (as *Boloria napaea altaica* (Grum-Grshimailo, 1893)): **VZ**: Burkhat Pass, ~2150 m, 22 VI 1997. **OK**: 6 km NW Verkhnee Zimovye cordon, Tarbagatai River valley, an ancient dead glacier moraine, ca. 2100 m, 27 VII 2010; Lake Bukhtarminskoe, 29 VII 2010, 7 VII 2012; 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 30 VI–2 VII 2012 (Fig. 6).

AG: Ukok Pass, 14 VII 2021 (G.A. Bolbotov leg.).

109. *Boloria frigidalis* Warren, 1944

Tshikolovets et al., 2016 [29] (as *Boloria frigidalis* Warren, 1944): **VZ**: Katon-Karagai Dirst., junction of Sarymsakty and Tarbagatay Ranges, ~2150 m, 3 VII 1997, 27 VIII 1990. **OK**: 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400–2800 m, 30 VII 2010 (Fig. 7)

110. *Boloria aquilonaris roddi* Kosterin, 2000

Kosterin, 1994 [12] (as *Boloria (pales* Denis et Schiffermüller, 1775)) sp.):

Berel [Belaya Berel River valley at 1700 m above sea level].

Kosterin, 2000 [13] (as *Boloria pales roddi* Kosterin, ssp. n.): “East Kazakhstan Prov., Katon-Karagai Distr., Altai Mts., Katunskii Mt. Range, valley of the Belaya Berel’ River”; “East Kazakhstan Prov., Katon-Karagai Distr., Altai Mts., Katunskii Range, bog in the valley of a brook falling into Yazovoe Lake”; [Kazakhstan]”).

Korshunov, 2002 [10] (as *Boloria roddi* Kosterin, 2000): Katon-Karagai [seems to be a very rough generalisation; most probably the Katon Karagai District was implied].

Tshikolovets et al., 2016 [29] (as *Boloria aquilonaris roddi* Kosterin, 2000): **OK:** East Kazakhstan Prov., Lake Bukhtarminskoe, 29 VII 2010, 7 VII 2012.

111. *Lopinga achine* (Scopoli, 1763)

Kardakoff, 1913 [9] (as *Pararge achine* Sc.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Pararge achine achine* Scop.): Katon-Karagai, 17 and 23 VIII 1925.

Toropov & Zhdanko, 2015 [27] (as *Lopinga achine* (Scopoli, 1763)): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Lopinga achine achine* (Scopoli, 1763)): **OK:** Sarymsakty River bank at Katon-Karagai, 29 VI 2012.

AG: Budkeev Farm, 22 VI 2021.

112. *Lasiommata petropolitana* (Fabricius, 1787)

Tshikolovets et al., 2016 [29] (as *Lasiommata petropolitana petropolitana* (Fabricius, 1787)): **AG:** Katon-Karagai, 4 VII 2005.

113. *Lasiommata maera maera* (Linnaeus, 1758)

Tshikolovets et al., 2016 [29] (as *Lasiommata maera maera* (Linnaeus, 1758)): **OK:** Sarymsakty River bank at Katon-Karagai, 29 VI 2012.

AG: Katon-Karagai, 25 VI 2021 (G.A. Bolbotov leg.)

114. *Melanargia russiae russiae* (Esper, [1783])

Kardakoff, 1913 [9] (as *Melanargia japygia* v. *cleanthe* B.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Melanargia suwarowius* Hbst.): Altaiskaya stanitsa, 16 VII 1925; fields and long fallow lands at Katon-Karagai, 18–26 VII 1925; .

Tshikolovets et al., 2016 [29] (as *Melanargia russiae russiae* (Esper, [1783])): **OK:** NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012; Sarymsakty River valley at Katon-Karagai, 29 VI 2012; Tarbagatai Range, env. of Verkhnee Zimovye cordon, 26–27 VII 2010. **AG:** 2–3 km N of Katon-Karagai, Bukhtarminskii Mts. spurs, Bayyrman terrain, 4 VII 2005.

115. *Coenonympha pamphilus* (Linnaeus, 1758)

Lavrov, 1930 [15] (as *Coenonympha pamphilus pamphilus* L.): a damp

meadow at the Sarymsak River at Katon-Karagai, 1 VIII 1925; hill slopes at Altaiskaya stanitsa, 16 VII 1925.

Tshikolovets et al., 2016 [29] (as *Coenonympha pamphilus* (Linnaeus, 1758)): **OK:** NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010.

AG: Medvedskiy pitomnik, 49°11'N, 85°20' E, 30 V 2021 (G.A. Bolbotov leg.); Katon-Karagai environs, bogged forest (‘sogra’), 21 V 2021 (G.A. Bolbotov et V.M. Vorobyev leg.); Budkeev Farm, 22 VI 2021.

116. *Coenonympha tullia subcaeca* Heyne, [1895]

Meinhard, 1910 [19] (as *Coenonympha tiphon* Rott. var. *subcaeca* <sic!> Heyne): Lake Bukhtarminskoe: 7 VII 1905.

Lavrov, 1930 [15] (as *Coenonympha tiphon subcaeca* Heyne-Rühl.): Katon-Karagai, 16, 18 and 21 VII 1925 (no mountain mentioned, although the species is said to be of the high mountains).

Toropov & Zhdanko, 2013 [26] (as *Coenonympha tullia* (Muller, 1764) ssp. *elwesi* Davenport, 1941): Sarym-Sakty Mt. R., Burkhat Pass; Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Coenonympha tullia subcaeca* Heyne, [1895]): **OK:** Sarymsakty Range E end, Tarbagatai River valley, 27 VII 2010; 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; Lake Bukhtarminskoe, 4 VII 2012 (Fig. 8); 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012.

AG: Ukok Pass, 14 VII 2021 (G.A. Bolbotov leg.).

117. *Coenonympha glycerion iphicles* (Staudinger, 1892)

Meinhard, 1910 [19] (as *Coenonympha iphis* Schiff. var. *iphicles* Stgr.): Berel'skoe village env.: 21 VII 1905; Lake Bukhtarminskoe: 17 VII 1905.

Meinhard, 1913 [20] (as *Coenonympha iphis* Schiff. var. *iphicles* Stgr.): Altai: Rakhmanovskie klyuchi: 3 VII 1909.

Lavrov, 1930 [15] (as *Coenonympha iphis iphicles* Stgr.): Katon-Karagai, 31 VII – 1 VIII 1925; Altaiskaya stanitsa, 16 VII 1925.

Toropov & Zhdanko, 2013 [26] (as *Coenonympha glycerion* (Borkhausen, 1788) ssp. *iphicles* Staudinger, 1892): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Coenonympha glycerion iphicles* (Staudinger, 1892)): **OK:** NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010, 28 VI 2012; Bukhtarma River valley between Archaty and Ust'-Chindagatuy, 28 VII 2010; Lake Bukhtarminskoe, 29 VII 2010, 4 VII 2012; East Kazakhstan Prov., Ust'-Chindagatuy env., 3 VII 2012. **AG:** Tarbagatai Range, Verkhnee Zimovye cordon, 4–6 VII 2006; Kara-Koba River valley, Bauyrkora cordon, 4 VII 2006; Sogornoe village env., 23 VI 2006.

118. *Coenonympha oedippus magna* Heyne, 1895

AG: 1 km N of Korobikha village, the Bukhtarma River right bank at D.

Budkeev's bee farm, 49°27' N, 85°04' E, 22 VI 2021 (3 males).

119. *Coenonympha amaryllis amaryllis* (Stoll in Cramer, 1782)
 Meinhard, 1910 [19] (as *Coenonympha amaryllis* L.): the Bukhtarma River valley: 21 VII 1905 (at Berel'skoe village [23]).
 Kardakoff, 1913 [9] (*Caenonympha* <sic!> *amaryllis* Cr.): Katon-Karagai and Altaiskaya stanitsa.
 Lavrov, 1930 [15] (as *Coenonympha amaryllis* Cr. trans. ad. subsp. *rinda* Mén.): Katon-Karagai, the second half of July.
 Tshikolovets et al., 2016 [29] (as *Coenonympha amaryllis amaryllis* (Stoll in Cramer, 1782)): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 31 VII 2010, 28 VI 2012; Sarymsakty River bank at Katon-Karagai, 29 VI 2012. **AG**: 2–3 km N of Katon-Karagai, Bukhtarminskies Mts. spurs, Bayyrman terrain, 4 VII 2005.

120. *Coenonympha hero perseis* Lederer, 1853
 Kardakoff, 1913 [9] (as *Caenonympha* <sic!> *hero* v. *perseis*): Katon-Karagai and Altaiskaya stanitsa..
 Lavrov, 1930 [15] (as *Coenonympha hero perseis* Led.): Katon-Karagai, 28 VII 1925.
 Kosterin, 1994 [12] (as *Coenonympha hero* (Linnaeus, 1761)): Waterfall [at Yazovaya River downstream of of Yazovoe lake].
 Tshikolovets et al., 2016 [29] (as *Coenonympha hero perseis* Lederer, 1853): **OK**: Sarymsakty River bank at Katon-Karagai, 29 VI 2012. **AG**: Chernovaya village env., Tyoplyy Klyuch River left bank, 20 VI 2007; 2 km S of Katon-Karagai, Sad terrain, 13 VI 2006.

121. *Triphysa nervosa glacialis* A. Bang-Haas, 1912
 Toropov & Zhdanko, 2013 [26] (as *Triphysa dohrnii* Zeller, 1850): Sarym-Sakty Mt. R., Burkhat Pass.

122. *Aphantopus hyperantus sibiricus* Obratzsov, 1936
 Kardakoff, 1913 [9] (as *Aphantopus hyperantus* L.): Katon-Karagai and Altaiskaya stanitsa.
 Lavrov, 1930 [15] (as *Aphantopus hyperantus hyperantus* L.): Katon-Karagai and Altaiskaya stanitsa, 16 VII 1925.
 Tshikolovets et al., 2016 [29] (as *Aphantopus hyperantus hyperantus* (Linnaeus, 1758)): **OK**: Sarymsakty River bank at Katon-Karagai, 29 VI 2012. **AG**: Chernovaya village env., Tyoplyy Klyuch River left bank, 20 VI 2007; Katon-Karagai env., Shirokiy Log terrain, 15 VII 2005.
AG: Katon-Karagai, 3 VII 2021, V.M. Vorobyov leg.

123. *Maniola jurtina* (Linnaeus, 1758)
 Lavrov, 1930 [15] (as *Epinephele jurtina jurtina* L.): Katon-Karagai, 16 VII 1925.

Korshunov & Gorbunov, 1995 (as *Maniola jurtina* (Linnaeus, 1758)): SW. Altai (... Katon-Karagai [based on the above report]).

124. *Hyponephele lupina* (Costa, [1836])
 Tshikolovets et al., 2016 [29] (as *Hyponephele lupina intermedia* (Staudinger, 1886)): **OK**: Bukhtarma River valley between Archaty and Ust'-Chindagatuy, 28 VII 2010.
 125. *Hyponephele lycaon lycaon* (Rottemburg, 1775)
 Meinhard, 1910 [19] (as *Epinephele lycaon* Rott.): Berel'skoe village env.: 21 VII 1905.
 Kardakoff, 1913 [9] (as *Epinephele lycaon* Rott.): Katon-Karagai and Altaiskaya stanitsa.
 Lavrov, 1930 [15] (as *Epinephele lycaon lycaon* Rott.): Katon-Karagai, 23 VII – 1 VIII 1925.
 Tshikolovets et al., 2016 [29] (as *Hyponephele lycaon lycaon* (Rottemburg, 1775)): **OK**: NE env. of Katon-Karagai, Bayyrman terrain, 28 VI 2012; (*Hyponephele narica* (Hübner, [1813]))
 Lavrov, 1930 [15] (as *Epinephele narica narica* Hbn): Katon-Karagai, 31 VII 1925 (most probably it was a mislabelling or misidentification).
 Korshunov, 2002 [10] (as *Hyponephele huebneri* Kocak, 1980 (= *narica* Hübner, 1808–1813)): S. Altai (Katon-Karagai) [based on the above report].
 Remark: This species is pertained to sandy deserts and their patches, which are completely absent from the territory considered, hence there is no doubt that its report by S.D. Lavrov [15] resulted from some confusion.

126. *Davidina tarpeia tarpeia* (Pallas, 1771)
 Tshikolovets et al., 2016 [29] (as *Oeneis tarpeia tarpeia* (Pallas, 1771)): **AG**: Tarbagatai Range, Verkhnee Zimovye cordon, 4–6 VII 2006; Shyngystay village env., Lake Standart, Kubentau terrain, 30 V 2006.

127. *Davidina sculda sculda* (Eversmann, 1851)
 Lavrov, 1930 [15] (as *Oeneis sculda sculda* Ev.): the Saralka River at Berkut-su Glacier, 21 VII 1925.
 Toropov & Zhdanko, 2013 [26] (as *Oeneis sculda* (Eversmann, 1851) ssp. *sculda*): Sarym-Sakty Mt. R., Ushkungei Pass.
 Tshikolovets et al., 2016 [29] (as *Oeneis sculda sculda* (Eversmann, 1851)): **OK**: 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 1 VII 2012.

128. *Oeneis norna altaica* Elwes, 1899
 Lavrov, 1930 [15] (as *Oeneis norna altaica* Elw.): Katon-Karagai (the author mentioned that the only specimen looked more like the next species).
 Toropov & Zhdanko, 2013 [26] (*Oeneis altaica* Elwes, 1899.): Sarym-Sakty Mt. R., Burkhat Pass; Sarym-Sakty Mt. R., Sarym-Sakty River.

Tshikolovets et al., 2016 [29] (as *Oeneis norna altaica* Elwes, 1899): **OK**: Altai, Katunskiy Range southern slope, Katun' River right bank at Rassypnaya Rivulet mouth, 9 VII 1987; East Kazakhstan Prov., 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 30 VI – 2 VII 2012 (Fig. 9).

129. *Oeneis ammon ammon* Elwes, 1899

Toropov & Zhdanko, 2013 [26] (as *Oeneis ammon* (Elwes, 1899)): Sarym-Sakty Mt. R., Baiberdy Pass; Sarym-Sakty Mt. R., Burkhat.

130. *Oeneis magna dubia* Elwes, 1899

?Meinhard, 1910 [19] (as *Oeneis jutta* Hb.): the Bukhtarma River valley: 21 VII 1905 (at this date V.V. Sapozhnikov was at Berel'skoe village [23]).

Kosterin, 2007 [14] (as *Oeneis magna dubia* Elwes, 1899): WATERFALL [the Yazovaya River bank at the waterfall below Lake Yazovoe, the junction of Katunskii and Listvyaga Ranges, C Altai, E Kazakhstan].

Gorbunov & Kosterin, 2007 [6] (as *Oeneis magna dubia* Elwes, 1899): the Yazovaya River bank at the waterfall below Lake Yazovoe, the junction of Katunskii and Listvyaga Ranges, C Altai, E Kazakhstan.

Tshikolovets et al., 2016 [29] (as *Oeneis magna dubia* Elwes, 1899): **VZ**: Burkhat Pass, 24 VI 1997.

131. *Hipparchia autonoe autonoe* (Esper, [1783])

Kardakoff, 1913 [9] (as *Satyrus autoñoë* Esp. v. *sibirica*): : Katon-Karagai and Altaiskaya stanitsa..

Tshikolovets et al., 2016 [29] (as *Hipparchia autonoe autonoe* (Esper, [1783])): **VZ**: Burkhat Pass, 24 VI 1997. **OK**: NE env. of Katon-Karagai, Bayrman terrain, 31 VII 2010.

132. *Pseudochazara hippolyte hippolyte* (Esper, [1784])

Meinhard, 1910 [19] (as *Satyrus hippolyte* Esp.): the Bukhtarma River valley: VII 1905.

Tshikolovets et al., 2016 [29] (as *Pseudochazara hippolyte hippolyte* (Esper, [1784])): **OK**: Katon-Karagai, 29 VI 2012 (Fig. 10); 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012.

133. *Chazara briseis ianthe* (Pallas, 1771)

Kardakoff, 1913 [9] (as *Satyrus briseis* L.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Satyrus briseis* L. subsp. ? *magna* Stgr.): Katon-Karagai, 8 VII – 1 VIII 1925.

134. *Chazara heydenreichi* (Lederer, 1853)

Kardakoff, 1913 [9] (as *Satyrus heydenreichi* Ld.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Satyrus heydenreichi heydenreichi* Led.): Katon-Karagai, 1 VIII 1925.

Tshikolovets et al., 2016 [29] (as *Chazara heydenreichi heydenreichi* (Lederer, 1853)):

E. Rodd: 18 VII 1919. **OK**: NE env. of Katon-Karagai, Bayrman terrain, 31 VII 2010. **AG**: Katon-Karagai env., Bukhtarma River left bank, 22 VIII 2006.

135. *Minois dryas dryas* (Scopoli, 1763)

Meinhard, 1910 [19] (as *Satyrus dryas* Sc.): Berel'skoe village env.: 21 VII 1905.

Kardakoff, 1913 [9] (as *Satyrus dryas* Sc.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Satyrus dryas* Sc. et ab. *sibirica* Stgr.): Katon-Karagai and Altaiskaya stanitsa, 1 VIII 1925.

136. *Satyrus ferula altaica* Grum-Grshimailo, 1893

Tshikolovets et al., 2016 [29] (as *Satyrus ferula altaica* Grum-Grshimailo, 1893): **AG**: 2–3 km N of Katon-Karagai, Bukhtarminskies Mts. spurs, Bayrman terrain, 4 VII 2005.

137. *Erebia ligea eumonia* Ménériès, 1859

Lavrov, 1930 [15] (as *Erebia ligea ligea* L.): Katon-Karagai. 17 VII – 1 VIII 1925.

Kosterin, 1994 [12] (as *Erebia ligea* (Linnaeus, 1758)): Waterfall [at Yazovaya River downstream of of Yazovoe lake].

Toropov & Zhdanko, 2013 [26] (as *Erebia ligea* Staudinger, 1881 ssp. *shebalina* Goltz, 1939): Sarym-Sakty Mt. R., Burkhat; Sarym-Sakty Mt. R., Tautekeli.

138. *Erebia jeniseiensis* Trybom, [1878]

Kosterin, 1994 [12] (as *Erebia jeniseiensis* Trybom, 1877.): Waterfall [at Yazovaya River downstream of Yazovoe lake].

Toropov & Zhdanko, 2013 [26] (as *Erebia jeniseiensis* Trybom, 1877 ssp. *fasciola* Warren, 1931): Sarym-Sakty Mt. R., Sarym-Sakty River; Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Erebia jeniseiensis jeniseiensis* Trybom, [1878]): **VZ**: Rakhmanovskie Klyuchi, 24 VII 1997; Burkhat Pass, ~2150 m, 23 VI 1997. **OK**: Lake Bukhtarminskoe, 4 VII 2012. **AG**: Katon-Karagai env., Shirokiy Log terrain, 15 VII 2005.

SK: Burkhat Pass, 27-28 VI 2016; the Kara-Koba River upper reaches, 28-29 VI 2016.

AG: Ukok Pass, 14 VII 2021 (G.A. Bolbotov leg.).

139. *Erebia aethiops* (Esper, [1777])

Meinhard, 1910 [19] (as *Erebia aethiops* Esp.): the Bukhtarma River valley: 21 VII 1905 (at Berel'skloe village [23]).

Kardakoff, 1913 [9] (as *Erebia aethiops* Esp.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Erebia aethiops aethiops* Esp.): at Katon-Karagai, 21 VII – 1 VIII 1925.

Kosterin, 1994 [12] (as *Erebia aethiops* (Esper, 1777)): Yazovaya valley.

Toropov & Zhdanko, 2013 [26] (as *Erebia jeniseiensis* Trybom, 1877 ssp. *fasciola* Warren, 1931): Sarm-Sakty Mt. R., Chingiztai.

Tshikolovets et al., 2016 [29] (as *Erebia aethiops aethiops* (Esper, [1777])): **VZ:** Sarymsakry Range, Sarymsakty River headwaters, 22 VIII 1990. **AG:** Pechi village env., Karantin terrain, Bobrovka River, 16 VIII 2005; 2 km S of Katon-Karagai, Sad terrain, 3 VIII 2006; Katon-Karagai env., Bukhtarma River left bank, 22 VIII 2006.

140. *Erebia rossii* ero Bremer, 1861

Toropov & Zhdanko, 2013 [26] (as *Erebia rossii* (Curtis in Ross, 1834) ssp. *ero* Bremer, 1861): Sarym-Sakty Mt. R., Burkhat Pass; Sarym-Sakty Mt. R., Ushkungei.

141. *Erebia kindermanni* Staudinger, 1881

Lavrov, 1930 [15] (as *Erebia kindermanni kindermanni* Stgr.): stanitsa Altayakaya, 16 VII 1925; Katon-Karagai, 21 and 28 VII 1925 (no mountains mentioned for this highland species).

Lukhtanov, 1990 [16] (as *Erebia kindermanni sarytavica* Lukhtanov ssp. n.): S. Altai, Sarym-Sakty Mts., Sarym-Sakty river.

Toropov & Zhdanko, 2013 [26] (as *Erebia kindermanni* Staudinger, 1881 ssp. *sarytavica* Lukhtanov, 1990.): Sarym-Sakty Mt. R., Tautekeli River.

Tshikolovets et al., 2016 [29] (as *Erebia kindermanni kindermanni* Staudinger, 1881): **VZ:** Rakhmanovskie Klyuchi, 24 VII 1997; Katon-Karagai Dirst., junction of Sarymsakty and Tarbagatay Ranges, Kurguma, 2150 m, 3 VII. 1997. **OK:** 7 km WNW of Ust'-Chindagatuy, Karashongal Mt., 2400 m, 30 VII 2010; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012 (Fig. 11).

142. *Erebia maurisius* (Esper, [1803])

Churkin, 2005 [1] (as *Erebia maurisius elwesi*): South Altai (E. Kazakhstan), Sarym-Sakty Mts., upper stream of Sarym-Sakty R., 10 km S Katon-Karagai.

Tshikolovets et al., 2016 [29] (as *Erebia maurisius maurisius* (Esper, [1803])): **VZ:** Burkhat Pass, ~2150 m, 23 VI 1997

143. *Erebia stubbendorffii* Ménétériès, 1847 ssp.

Suvortzev, 1894 [25] (as *Erebia theano*, Mén. Ab. *stubbendorffii*, Mén.): Tau-tekele.

144. *Erebia theano theano* (Tauscher, 1806)

Meinhard, 1910 [19] (as *Erebia maurisius* Esp. ab. *thano* Tausch.): Lake Bukhtarminskoe: 17 VII 1905.

Kardakoff, 1913 [9] (as *Erebia maurisius* v. *thano* Tausch.): Katon-Karagai and Altaiskaya stanitsa.

Lavrov, 1930 [15] (as *Erebia maurisius theano* Tausch.): Altaiskaya stanitsa, 16 VII 1925; Berkut-Su Mt., 'central plot' at snow, 2,300 m a.s.l., 28 VII 1925; Katon-Karagai, the Sarymsak River bank, 31 VII 1925.

Kosterin, 1994 [12] (as *Erebia theano* (Tauscher, 1806)): Waterfall [at Yazovaya River downstream of of Yazovoe lake].

Toropov & Zhdanko, 2013 [26] (as *Erebia theano* (Tauscher <sic>, 1806 ssp. *thano*): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Erebia theano theano* (Tauscher, 1806)): **OK:** 6 km NW Verkhnee Zimovye cordon, Tarbagatai River valley, an ancient dead glacier moraine, ca. 2100 m, 27 VII 2010; Ust'-Chindagatuy env., 3 VII 2012; Lake Bukhtarminskoe, 29 VII 2010, 4 VII 2012; 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI – 2 VII 2012. **AG:** Kara-Koba River valley, Bauyrkora cordon, 4 VII 2006; Sarymsakty Range, 5 km SE of Katon-Karagai, Izvestkovaya Yama terrain, 25 V 2006; Sogornoe village env., 23 VI 2006. **SK:** the Kara-Koba River upper reaches, 28-29 VI 2016.

145. *Erebia callias altajana* Staudinger, 1901

Meinhard, 1910 [19] (as *Erebia tyndarus* Esp. v. *altajana* Stgr.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Lavrov, 1930 [15] (as *Erebia tyndarus* Esp. subsp. *altajana* Stgr.): 'belok' (a high mountain, surely Berkut-su([at] Katon-Karagai, 21-28 VII 1925.

Toropov & Zhdanko, 2013 [26] (as *Erebia callias* Edwards, 1871 ssp. *altajana* Staudinger, 1901): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Erebia callias altajana* Staudinger, 1901): **VZ:** Burkhat Pass, ~2150 m, 23 VI 1997. **OK:** 15 km ESE of Ust'-Chindagatuy, Ukok Plateau S foot, Muzdy-Bulak lower valley, 2280 m, 30 VI–2 VII 2012.

AG: Takyrt Mt., highlands, 48°57'59" N, 85°28'49' E, 2,450 m a.s.l., 7-8 VII 2021 (V.M. Vorobyov leg.).

146. *Erebia pandrose narymica* Cupedo, 2007

Meinhard, 1910 [19] (as *Erebia lappona* Esp.): the Bukhtarma River valley: 17 VII 1905 (at this date V.V. Sapozhnikov was at Lake Bukhtarminskoe [23]).

Toropov & Zhdanko, 2013 [26] (as *Erebia pandrose* (Borkhausen, 1788) ssp. *narymica* Cupedo, 2007): Sarym-Sakty Mt. R., Tautekeli.

Tshikolovets et al., 2016 [29] (as *Erebia pandrose narymica* Cupedo, 2007):

VZ: Burkhat Pass, 23 VI 1997 (V. Zinchenko); upper reaches of Sarymsakty riv., 2 VII 1997.

Association with habitats

Although butterfly species can be divided into groups with respect to their habitats, this classification will not work well in the territory of the Katon-Karagai National Park because its orographic complexity and mosaicism with respect to its conditions. The ecological groups and subgroups recognised below take into account habitat preferences of butterfly species, or in some cases subspecies, in Altai Mts, which in some cases may be not the same as elsewhere. This approximate classification is mostly based on observation by OK made in the Katon-Karagai National Nature Park on his 1987, 2010 and 2012 expeditions, updated with those made in the adjacent Russian part of the Katunskiy Mountain Range [12, 14].

1) Steppe species, occurring at expositional stony steppe patches on southern mountain slopes. These are *C. alceae*, *H. comma*, *L. juvernica* (prefers meadow steppes in Novosibirsk Province, habitat preference in the territory considered not studied), *P. chloridice*, *C. chrysotheme elena* (occurs in highland steppe versions close to tree line), *M. arion*, *G. cyane*, *P. eros*, *P. damon*, *E. aurelia*, *M. latonigena*, *B. hecate*, *M. russiae*, *C. amaryllis*, *H. lupina*, *H. lycaon*, *D. tarpeia*, *H. autonoe*, *P. hippolyte*, *C. briseis*, *C. heidenreichi*, *S. ferula*. In total 22 species (15.1% of the fauna).

1a) Petrophylic species associated with petrophyte plants growing on rock outcrops on steppe southern slopes and so occurring mostly in steppen habitats as well: *P. apollo*, *P. nomion*, *S. orion* (associated with *Sedum hybridum*), *T. fischeri* (associated with *Orostachys spinosa*), *A. glandon* (associated with *Saxifraga* spp). *P. ariadne* is another petrophylic species but specifically associated with steep stone screes within the forest-steppe and forest belts, where its larval foodplant, *Corydalis nobilis*, grows. In total 6 species (4.1%).

1b) Species preferring open habitats and developing on bushes: *L. helmanni* (on *Lonicera*), *N. rivularis* (on *Spiraea*), or on nettle: *A. urticae*, *I. io*. Since those bushes often grow on or near steppe slopes, while nettle grows in neighbouring gullies, these butterflies most frequently are found in expositional stony steppe habitats on southern slopes as well, although may be found elsewhere. In total 4 species (2,7%).

2) The largest but vague ecological group is meadow species, usually having a broad ecological amplitude and occurring also in other habitats, e.g. in meadow steppe or forest glades and margins. These are *M. tessellum*, *P. malvae*, *P. alveus*, *S. orbifer*, *T. lineola*, *O. sylvanus*, *H. morpheus*, *P. machaon*, *L. sinapis*, *E. ochracea* (in the Katunskiy Range prefers subalpine meadows, preference in the territory considered unclear), *C. hyale*, *T. alciphron*, *H.*

virgaureae, *C. minimus*, *G. alexis*, *M.alcon*, *M. teleius*, *M. nausithous* (the two latter species are associated with forest meadows), *P. argyrognomon mongolicus*, *P. idas uiguricus* (prefers steppeified meadows), *P. argus*, *E. eumedon*, *A. artaxerxes*, *A. nicias*, *A. orbitulus* (tends to higher elevations), *C. semiargus*, *P. thersites*, *P. amandus*, *P. icarus* (also occurs in ruderal habitats). *V. cardui* (an active migrant hardly associated with any specific habitat), *E. maturna*, *E. aurinia laeta*, *M. athalia*, *M. britomartis*, *M. diamina* (habitat preference unclear, maybe more connected with stony steppe), *M. phoebe*, *M. cinxia* (in Altai tends to highlands), *P. pandora* (most probably a rare migrant with no certain habitat preference in the territory), *F. niobe*, *F. adippe*, *S. aglaja*, *I. lathonia* (quite eurytopic, occurs also in ruderal habitats but in the park tends to highlands), *B. ino*, *L. maera* (tends to stony places), *C. pamphilus*, *C. glycerion*, *C. oedippus*, *C. hero*, *A. hyperantus*, *M. jurtina*, *M. dryas*, *E. aethiops*. In total 51 species (34.9%) (different subspecies of *P. idas* and *E. aurinia* have different habitats and are counted here in group 4 as half a species for each)

2a) Two (1.4%) synantropic species: *P. daplidice*, *P. rapae*. (The synantropic sinusia is participated also by some species from the above mentioned groups: *C. hyale*, *P. icarus*, *A. urticae*, *I. io*, *I. lathonia*.)

3) Another vague ecological group, not well differentiated from meadow species, is forest species occurring at forest margins, glades and sparse tree stand. These are *C. palaemon*, *C. silvicola*, *P. tenedius* (prefers disturbed land), *L. morsei*, *A. cardamines*, *P. napi*, *A. crataegi*, *G. rhamnii*, *T. betulae*, *C. rubi*, *L. helle*, *L. populi*, *P. c-album*, *N. vualbum*, *N. xanthomelas*, *N. antiopa*, *A. levana*, *E. intermedia*, *A. paphia*, *C. selene*, *C. euphrosyne*, *C. thore*, *C. selenis*, *C. titania*, *L. petropolitana* (the four last species are associated with coniferous forests), *L. achine*, *E. ligea*, *E. jennisseiensis* (prefers taiga), *E. theano* (tends to higher elevations, flourishes in the subalpine belt), *O. magna dubia* (confined to subalpine tree stands). In total 30 species (20.5%).

3a) *A. optilete* is a species inhabiting boggy versions of coniferous (in the territory considered considered larch) forests with the peat moss ground layer. One species (0.7%).

4) Highland species occurring at and above the tree line. Most of them can be found in alpine meadows with abundant flowering plants: *P. phoebus*, *P. stubbendorffii*, *P. eversmanni*, *P. callidice*, *C. tyche*, *P. idas sailjugemicus*, *E. iduna*, *B. napaea*, *C. tullia subcaeca*, *D. sculda*, *O. norna altaica*, *O. ammon*, *E. rossii*, *E. maurisius*, *E. stubbendorffii*, *E. pandrose*. Such butterflies as *P. hippothoe*, *E. kindermanni* and *E. creusa emiorientalis* are confined to highest alpine meadows and were found on the territory considered only above 2,300 m a.s.l., while *B. frigidalis* observed only at patches of the uppermost alpine

meadows of the Karashongal Mountain at ca 2,500 m a.s.l., being the most highland butterfly species in the local fauna. Some species are more common in mountain tundras: *P. sibiricus*, *E. aurinia banghaasi*, *M. arcesia*, *I. eugenia*, *E. eunomia* (enters boggy taiga), *C. freja*, *C. dia alpina*, *T. nervosa*, *E. callias*. In total 28 species (19.2%) (two subspecies counted as half a species as said above).

4a) Hygrophylic highland species: *C. frigga* associated with bogs, *B. aquilonaris roddi* associated with damp meadows with *Pentaphylloides fruticosa* bushes in broad river valleys, in both cases at and above tree line. Two species (1.4%).

An interesting observation was abundance of the usually rare *Euchloe creusa* at alpine meadows at the Muzdy-Bulak brook (data by OK).

Discussion

The up to date revealed butterfly fauna of the Katon Karagai National Park is quite rich as including 146 species (with *Spialia orbifer* and *Coenonymphs oedippus* being herewith reported for its territory for the first time.) The number of records per each species can help in roughly estimating their relative commonness/rarity. Actually this fauna is typical for the mountains of South Siberia and includes only one species, *Chazara heidenreichi*, which does not occur (at least not yet found) in the territory of Russia. It is noteworthy that 11 species have not been recorded by the authors of this paper and are listed here as based on reports in literature, mostly by Toropov & Zhdanko [26–27].

Thersamolycaena violacea (Staudinger, 1992) was repeatedly mentioned in literature as inhabiting the Sarym-Sakty Mt. Range but the only known Altai locality, which is the type locality of *Thersamonolycaena naryma* (Zhdanko, [2015]) is actually the Terekty River valley in Narym Mt. Range [27], which is situated much westerly of the territory considered. (The locality Tautekeli was mentioned for this species in [29] with a reference to [27] in error.)

There is only a historical record of *Maniola jurtina* by [15]. In spite of that, in mid-late XX century this species was considered absent in Siberia and most of Kazakhstan except for its western part. However it started expanding from Europe to West Siberia and in 2019 reached as far east as Novosibirsk [8]. It may be supposed that presence of *M. jurtina* in East Kazakhstan and West Siberia undergoes large-scale fluctuations, which could be regular or irregular. At the same time, the same S.D. Lavrov [15] reported from Katon-Karagai an obligatory sand desert species *Hyponphele narica*, which could not inhabit this area throughout historical time; hence his data were not free of some errors of unknown origin.

However rich the revealed fauna be, as many as 33 expected species occurring in more western ranges of West Altai with similar natural conditions

(such as the Narymskiy, western part of Listvyaga, Kholzun and Ul'binskiy Ranges etc.) [17–18, 28] have not yet been recorded in the Katon Karagai National Park. These are *Erynnis tages* (Linnaeus, 1758), *Carcharodus flocciferus* (Zeller, 1847), *Muschampia cribrellum* (Eversmann, 1841), *Pyrgus serratalae* (Rambur, [1839]), *Iphiclides podalirius* (Linnaeus, 1758), *Leptidea amurensis* (Ménétriès, 1859), *Pieris brassicae* (Linnaeus, 1758), *Colias erate* (Esper, [1805]), *C. thisoa* Ménétriès, 1832, *C. heos* (Herbst, 1792), *Satyrrium pruni* (Linnaeus, 1758), *S. prunoides* (Staudinger, 1887), *Callophrys frivaldszkyi* (Lederer, 1855), *Lycaena phlaeas* (Linnaeus, 1761), *Thersamonia thersamon* (Esper, [1784]), *Thersamolycaena dispar* (Haworth, 1803), *T. violacea*, *Heodes tityrus* (Poda, 1761), *Celastrina argiolus* (Linnaeus, 1758), *Everes argiades* (Pallas, 1771), *Everes alcetas* (Hoffmannsegg, 1804), *Cupido osiris* (Meigen, [1829]), *Pseudophilotes vicrama* (Moore, 1865), *Kretania pylaon* (Fischer von Waldheim, 1832), *Patricius lucifer* (Staudinger, 1867), *Polyommatus damone* (Eversmann, 1841), *Polyommatus ripartii* (Freyer, 1830), *Limnitis sydyi* Lederer, 1853, *Vanessa atalanta* (Linnaeus, 1758), *Oeneis aktashi* Lukhtanov, 1984, *Arethusana arethusana* ([Denis & Schiffermüller], [1775]), *Erebia cyclopius* (Eversmann, 1844). Note that this list does not include numerous more southern and xerophylic species appearing e.g. in the Kurchumskiy Mountain Range [26–27, 28]. It should be noted that for as many as 14 of these species (*I. podalirius*, *C. erate*, *C. thisoa*, *S. prunoides*, *L. phlaeas*, *T. dispar*, *H. tityrus*, *C. argiolus*, *C. osiris*, *L. sydyi*, *V. atalanta*, *C. oedippus*, *A. arethusana*, *E. cyclopius*) there are dots referring to the Katon Karagai National Park territory in the small scale locality maps by Toropov & Zhdanko [26–27]. However, taking into account some above mentioned cases of unprecise mapping we cannot consider these species as reported for this territory without textual mentions of localities. Also for some species (*P. tenedius*, *T. betulae*, *A. nicias*, *N. xanthomelas*, *M. diamina*) which we included into the list based on combination of exact localities under photos illustrating their habitat or larval foodplant and relevant dots indicated in the locality maps in Toropov & Zhdanko [26–27], registration of specimens from the National Park territory is still needed (especially this concerns a generally rare and charismatic *P. tenedius*). Anyway, the absence of such 12 species common in Altai Mts as *M. cribrellum*, *P. brassicae* (synanthropic), *S. pruni*, *S. prunoides*, *C. frivaldszkyi*, *L. phlaeas*, *T. dispar*, *E. argiades*, *P. lucifer*, *P. damone*, *C. oedippus*, *A. arethusana* in our materials or their reliable reports is striking. No doubt, the butterfly fauna of the Katon-Karagai National Park utmostly demands further study. Perhaps this appears the main inference from the present work, although not so expected.

There is a complex of butterfly species, which may be conventionally called 'Mongolian', more or less connected with peculiar, rather dry highland

'tundra-steppe' communities of *Kobresia myosuroides* which are widespread in the elevated south-eastern part of the Russian part of Altai and north-western part of its Mongolian part. This vague complex includes seven species: *Colias mongola* Alpheraky, 1897, *Plebejus idas sailjugemicus*, *Coenonympha nervosa glacialis*, *Davidina nanna* Ménétériès, 1859, *Erebia callias*, *E. pandrose* and *Boeberia parmenio* (Böber, 1809). Among them *C. mongola* and *E. callias* are most stenotopic and restricted to *Kobresia myosuroides* communities, *P. idas sailjugemicus* and *E. pandrose* extend to alpine meadows and mountain tundras, *B. parmenio* to steppes, while *D. nanna* prefers barren detritous southern slopes amidst *Kobresia* 'tundrosteppe' [5-6]. Of these species only *E. callias* and *E. pandrose* had been repeatedly reported for Kazakhstan for a long time; then Toropov and Zhdanko [26] reported *T. nervosa* (as *T. dohrnii*) and Toropov & Zhdanko [27] supposedly *P. idas sailjugemicus* from the Burkhat Pass. All these seven species were abundant e.g. in the Kuturgun-Bulak River valley on the Yuzhno-Chuyskiy Mt. Range (data by **OK**) and all extend to the Ukok Plateau [28]. Expeditions by **OK** of 2010 and 2012 to the Bukhtarma headwaters were specially focused on the search for these species, and the base of the 2012 expedition, the Muzdy-Bulak brook at the Ukok Plateau southern foot in 3 km from the border of Russia (and 7 km from the border of China), was just 60 km SW from the Kuturgun-Bulak (across the plateau). However, of the mentioned seven species only *E. callias* have been found. Instead, the 2012 expeditions yielded two species seemingly for the first time recorded in Kazakhstan, *Agriades optilete* and *Colias tyche* (both had been reported for this country before vaguely, without any localities and most probably as extrapolations, for the references see [29]). The absence of the large, well flying and not so stenotopic *B. parmenio* was especially striking. Most probably, the three rest 'Mongolian' species associated with *Kobresia* communities, namely *C. mongola*, *D. nanna*, *B. parmenio*, do not penetrate to the Kazakshat territory at all, although extend so close to it in Ukok. This is in accordance with the fact that **OK** also did not observe *Kobresia* communities themselves at Muzdy-Bulak. Absence of these communities and the butterflies associated with them can be explained by a considerable humidity of the Bukhtarma upper valley, which is open to moist air masses coming from the west. As a result, the Bukhtarma headwaters are mostly covered with dwarf birch (*Betula rotundifolia*) tundras, with patches of *Dryas oxyodonta* tundras on drier ridges and alpine meadows in valleys. *Kobresia myosuroides* is a kryoxerophylic plant and forms vast communities on the Ukok Plateau and more north-easterly ranges, which are in the rain shadow formed by the Ukok southern foot (just examined by **OK**) bordering the Bukhtarma headwaters from the north, which hence acquires high precipitation. According to observations by **OK**, *K. myosuroides* occurred at the Muzdy-Bulak valley only in small spots in the patches of *Dryas* tundras on drier top surfaces of the ancient lateral

(left side) moraine of the Bukhtarma River valley. So, differences in the precipitation regime between the Bukhtarma headwaters and the Ukok Plateau top surface appeared more important with respect to their butterfly fauna than their geographic proximity.

There are some more species of diverse ecology occurring at different places of Russian Altai [28] but not yet found in Kazakhstan [29], the occurrence of which in the Katon-Karagai National Park is not excluded although not very probable for most of them. These are, for instance, *Pyrgus centaureae* Rambur, 1839, *Carterocephalus argyrostigma* (Eversmann, 1851), *Colias palaeno* (Linnaeus, 1761), *Argynnis sagana* (Doubleday, 1847), *Glaucopsyche lycormas* (Butler, 1866), *Clossiana angarensis* (Erschoff, 1870), *Lopinga deidamia* (Eversmann, 1851), *Erebia neriene* (Böber, 1809), *E. embla* (Thunberg, 1791) (Tshikolovets et al., 2009). It should be noted that *P. centaureae*, *C. argyrostigma*, *C. mongola*, *C. palaeno*, *L. deidamia* and *E. neriene* were listed in the catalogue of the butterflies of Kazakhstan by A. Zhdanko [30] without supporting data, obviously as extrapolations from the Russian Altai. Of the species mentioned, two ones associated with mountain taiga, *C. palaeno* and *L. deidamia*, have the highest probability to be found in the National Park territory.

The Katon-Karagai National Park territory harbours the type localities of such taxa as *Parnassius eversmanni sarymsaktyensis* Sorimachi, 1999 (the Sarym-Sakty River upper reaches), *Plebeius uiguricus burchati* Zhdanko, 2013 (Burkhat Pass), *Clossiana frigga famula* Churkin & Tuzov, 2005 (the Sarym-Sakty River upper reaches). Besides, from there some paratypes of *Boloria pales roddi* Kosterin, 2000 and *Erebia kindermanni sarytavica* Lukhtanov, 1990 originated. Of these taxa, we assume to be valid only the taxon *roddi* (in the combination *Boloria aquilonaris roddi*).

Acknowledgements. The work by **OK** was partly supported by the project FWNR-2022-0019 by the Ministry of Science and Higher Education of Russian Federation. **OK** is deeply grateful to the late Nurlan Katkenov for a great help in the field and to Vadim Ivonin for providing important literature sources. **SK** expresses gratitude to his companion Vadim Ivonin.

FIGURE LEGENDS



Figure 1. The Bukhtarma River headwaters as viewed from the Karashongal Mountain at Ust'-Chingadatuy village. The slopes of the valley are in Kazakhstan. The surface of Ukok Plateau (in Russia) is seen apart, above which the Nayramdal Mountain is towering, which is the orographic centre of the Altai Mountains and where the borders of Russia, China and Mongolia meet. 30 VII 2010.



Figure 2. *Parnassius nomion korshunovi* on its larval foodplant *Sedum hybridum*, a rocky S slope at Ust'-Chingadatuy environs, 5 VII 2012.



Figure 3. *Colias chrysotheme elena*, a female, a steppe S slope at Ust'-Chingadatuy environs, 6 VII 2012.



Figure 4. *Palaeochrysophanus hippothoe sajana*, a male, an alpine meadow patch at 2,400 m a.s.l. on the Karashongal Mt E slope 7 km WNW of Ust'-Chingadatuy environs, 30 VII 2010.



Figure 5. *Melitaea latonigena*, a male, a steppe S slope at Ust'-Chingadatuy environs, 3 VII 2012.

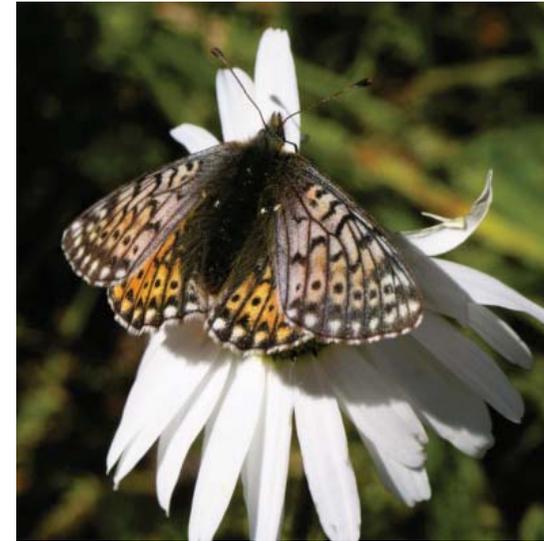


Figure 7. *Boloria frigidalis*, a female, an alpine meadow patch at 2,400 m a.s.l. on the Karashongal Mt E slope 7 km WNW of Ust'-Chingadatuy environs, 30 VII 2010.



Figure 6. *Boloria napaea altaica*, a pair, alpine meadow at Muzdy-Bulak brook 15 km ESE of Ust'-Chindagatuy village, 1 VII 2012.



Figure 8. *Coenonympha tullia subcaeca*, Lake Bukhtarminskoe E bank, 4 VII 2012.



Figure 9. *Oeneis norna altaica*, a male, alpine meadow at Muzdy-Bulak brook 15 km ESE of Ust'-Chindagatuy village, 1 VII 2012.



Figure 10. *Pseudochazara hippolyte hippolyte*, Katon-Karagai village environs, 29 VI 2012.



Figure 11. *Erebia kindermanni*, a male, alpine meadow at Muzdy-Bulak brook 15 km ESE of Ust'-Chindagatuy village, 2 VII 2012.



Figure 12. *Erebia callias altajana*, dwarf birch tundra at Muzdy-Bulak brook 15 km ESE of Ust'-Chindagatuy village, 2 VII 2012.

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КАТОНҚАРАҒАЙ ҰЛТТЫҚ ТАБИҒИ ПАРКІНІҢ КӨБЕЛЕКТЕРІ (LEPIDOPTERA: PAPILIONOIDEA), ҚАЗАҚСТАН

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Аннотация. Катонқарағай мемлекеттік ұлттық табиғи паркі Алтай жотасының ең биік бөлігінде орналасқан және Қазақстан аумағының шығыс шетін алып жатыр. Жеке мәліметтер мен барлық қолданыстағы әдебиеттер негізінде 146 түрден тұратын көбелектер фаунасының сенімді тіркелген тізімі жасалды. *Spialia orbifer* және *Coenonympha oedippus* бұл аумақ үшін алғаш рет тіркелген. *Pyrgus carthami* және *Hyponephele narica*-ның ескі жазбалары биогеографиялық және экологиялық себептерге байланысты қате ретінде алынып тасталды.

Қазақстандағы Алтай жоталарының көбелектер фаунасымен салы-

стыру тізім аяқталмағанын және одан әрі зерттеу қажет екенін көрсетеді. Көбелектер түрлерінің мекендейтін жерлерінің қауымдастығы қысқаша сипатталған. Ресей аумағында парктің шекарасына жақын жерде табылған кейбір «Моңғол» түрлері туралы жазбалардың болмауы Бұқтырма өзенінің жоғарғы алқабындағы ылғалдылықтың жоғарылауымен байланысты деп болжанады.

БАБОЧКИ (LEPIDOPTERA: PAPILIONOIDEA) КАТОН-КАРАГАЙ- СКОГО НАЦИОНАЛЬНОГО ПРИРОДНОГО ПАРКА, КАЗАХСТАН

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Аннотация. Катон-Карагайский государственный национальный природный парк расположен в наиболее возвышенной части Алтайского хребта и занимает восточную оконечность территории Казахстана. На основе собственных данных и всей существующей литературы был составлен контрольный список надежно зарегистрированной фауны бабочек, содержащий 146 видов. *Spialia orbifer* и *Coenonympha oedippus* впервые зарегистрированы для этой территории. Старые записи *Pyrgus carthami* и *Hyponephele narica* были исключены как ошибочные соответственно по биогеографическим и экологическим причинам. Сравнение с фауной бабочек соседних хребтов Алтая в Казахстане показывает, что список далек от завершения и необходимы дальнейшие исследования. Кратко описана ассоциация местообитаний видов бабочек. Предполагается, что отсутствие записей о некоторых «Монгольских» видах, обнаруженных на территории России вблизи границ парка, связано с более высокой влажностью в верхней долине реки Бухтарма.