Lepidoptera of the Taymyr peninsula, northwestern Siberia

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The annotated list of 155 species of Lepidoptera, in addition to five records on unidentified species with known generic affinity, from the Taymyr national district is the first comprehensive account from this area. It is based on the results of the collecting trip of 2002, and on old materials collected by different researchers, and all published records collected by intensive bibliographic search and through consultations with colleagues. Four species erroneously reported from Taymyr are excluded from the list; 65 species are new for this district, including *Clepsis mehli* that is new to Russia and East Palaearctic, and *Argyroploce mengelana* reported from Asia for the first time. Records of 32 species are based exclusively on earlier publications; occurrence of other species is confirmed by the investigated material (listed in the paper). We expect that some hundreds of species are still yet to be discovered in Taymyr. The fauna of moths and butterflies of Taymyr is clearly more similar to that of East Palaearctic or Polar Ural than to that of northwestern Europe. In an European perspective, this fauna looks quite exotic and may resemble one that existed in Europe during the ice ages.

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1. Introduction

Although the first butterflies have been collected in Taymyr (frequently misspelled as "Taimyr") already by A. T. Middendorff, who visited this region during his expedition in 1842–1845 (Ménétriès 1851), the territory of Taymyr peninsula so far remains almost unexplored but faunistically most interesting spot for an entomologist. According to Pagenstecher (1901), only one publication from the 19th century (Trybom 1878) contained data from this arctic region that was thus much less explored than the territories both west (Yamal and Gydan Peninsula) and east of it (Yakutia). This fact is partially explained by the inaccessibility of this area, especially before 1930. For example, the so-called "Arctic collections" of moths and butterflies by N. Y. Kusnezov (some 50 large insect drawers kept in the Zoological Institute of the Russian Academy of Sciences in St. Petersburg) contained only 53 specimens of nine species collected in Taymyr before 1930,

mainly during the expedition in 1928 led by A. I. Tolmachev.

Entomological results of several expeditions arranged between late 1920s and early 1930s have not been published, and the systematic exploration of the insect fauna of the Taymyr peninsula started in early 1970s. Several species of butterflies and moths are mentioned in ecologically oriented studies (Chernov 1973, 1978), but more or less comprehensive species lists exist only for butterflies (Korshunov *et al.* 1982, 1985). Also several species of geometrid moths (Vasilenko 1990, 1995, Viidalepp 2001), tiger moths (Dubatolov & Zolotarenko 1990, Dubatolov *et al.* 1997) and noctuids (Zolotarenko 1970, 1990, Klyuchko 1985, 1988, Kononenko 1985, 1997, Lafontaine *et al.* 1983, 1986, 1987a, 1987b) have been reported from this area, while almost no data were published on other groups.

One of the authors (MVK) visited Noril'sk in July–August of 2002, and in association with environmental assessment of pollution impact on terrestrial ecosystems collected some moths and butterflies. Keeping in mind the scarcity of the faunistic data from the extreme north of Siberia, especially the shortage of information on microlepidopterans, we decided to publish the detailed list of the Lepidoptera so far recorded in Taymyr. One of our goals was to summarize the information published in Russian and make it available to international scientific community.

2. Study area and collections

2.1. Localities

We restricted our list to an administrative unit called "Taymyrskij (Dolgano-Nenetskij) nazional'nyi okrug" that forms the northernmost part of the Krasnoyarskij kraj (= district) of the Russian Federation. This territory (Fig. 1) is bordered by approx. 80º E from the West and 112º E from the East, and 67–69º N from the South, and includes also Severnaya Zemlya archipelago (up to 81º N; not shown in Fig. 1).

Although we performed detailed search for locality information also by using historical (pre-Soviet) maps, some of the records containing incomplete information could not be attributed to reasonably small areas. These records are indicated by the question mark; it is possible that some of the unidentified localities are even outside of the study region. Whenever possible, we accounted for changes in place names and used the most recent versions; however, for some of the old localities we found no correspondence on recent maps, and these localities are marked as "old name". Some toponyms were found twice in Taymyr, which makes the situation even more problematic. In particular, there were two villages called "Zaostrovskaya": one on Yenisey, opposite to the mouth of Malaya Kheta river, and another far North of the Pyasino lake. Keeping in mind the extremely low accessibility of sites that are far from Yenisey, we arbitrarily decided to consider the village on the riverside as the collecting locality by Wuorentaus. We use a new toponym "Eremin's hut" (which cannot be found even on the most recent maps) to designate the collecting locality on Southern shore of Lama lake, 120 km E of Noril'sk.

Spelling of locality names follows The Times Atlas of the World (Times 2003); if the locality is absent in this atlas, we transliterated the most recent version of the Russian name (Noril'sk 1999) following the rules accepted by The Times.

2.2. Nomenclature and distribution

The order of families and nomenclature of most of the groups follow Karsholt & Razowski (1996). We feel it necessary to comment on the use of subspecific names in our paper, especially for butterflies where a huge amount of subspecific and infraspecific names has been (and is still being) introduced by some researchers. We use the subspecific names only in cases where the populations are disjunct and determinable. However, we include references to subspecific affinities along with the names of persons responsible for this determination.

We use square brackets for species that have been reported from Taymyr, but their occurrence in this region is doubtful. Any species whose description does not contain reference(s) to earlier publications is classified as new for the region.

For the zoogeographical analysis, we classified each species according to their occurrence in

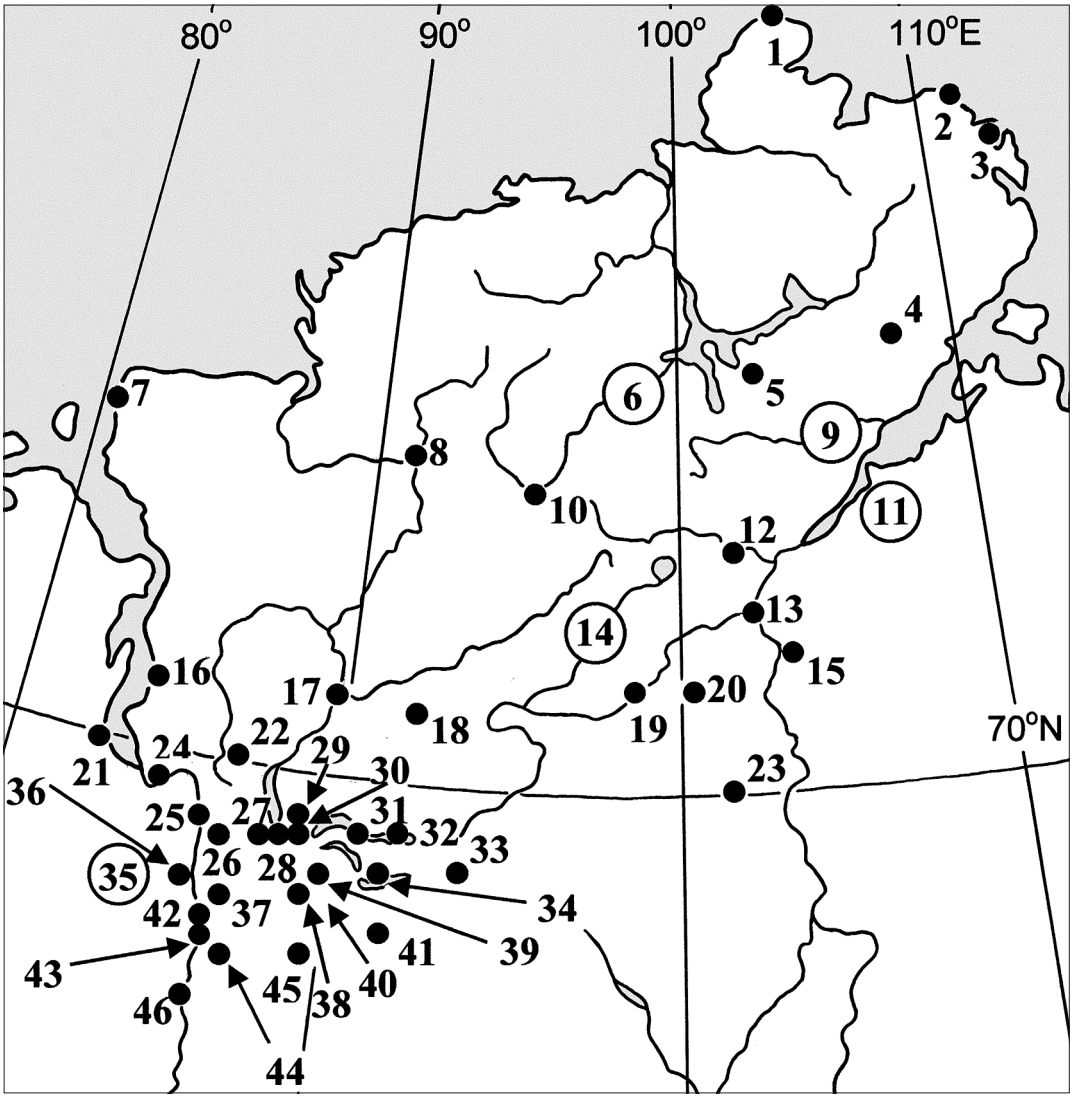

Fig. 1. Collecting localities mentioned in the text. Solid dots = exact locality position; hollow circles = exact position unknown (approximate position provided). Location names (values in parentheses indicate the number of species reported from a given locality): 1 – Chelyuskin cape (1); 2 – Svyatogo Pavla Is. (1); 3 – Dika Bay (1); 4 – Portnyagino lake (2) and Gusikha river (2); 5 – Yamutarida river (1); 6 – Verkhnyaya Taymyra river, low flow (7); 7 – Meduza Bay, 18 km S of Dikson (10); 8 – Tareya (31); 9 – Bol'shaya Balakhnya (1); 10 – Gorbita river mouth (2); 11 – Popigay river (9), Anabarka river (1) and Kunzhalak lake (2); 12 – Ary-Mas, sometimes referred as Novaya river (26); 13 – Khatanga (4); 14 – Boganida river (5); 15 – 25 km S of Kayak (4); 16 – Baikalovsk (1); 17 – Kresty, abandoned village (3); 18 – Chopko river (12); 19 – Bol'shaja Romanikha river (1); 20 – Maymecha river, lower flow (4); 21 – Nosok (9); 22 – Nizhnyaya Agapa river (20); 23 – Maymecha river, upper flow (4); 24 – Zaostrovskaya, abandoned village (4); 25 – Dudinka (25); 26 – Vershininskoe, abandoned village (1); 27 – Kayyerkan (5); 28 – Noril'sk (33); 29 – Talnakh (55); 30 – Valek (2); 31 – Eremin's hut, 120 km E of Noril'sk (22); 32 – Lama tourist centre (27); 33 – Ayan lake, mouth of Ayan river (2); 34 – Sobach'e lake (8); 35 – Pairgakta river (2) and Sokholka lake (1); 36 – Potapovo village (5); 37 – Fokina river, middle flow (5); 38 – Rybnaya river, middle flow (21); 39 – Ketairbe, 20 km from Keta lake (9); 40 – Keta lake (5); 41 – Kutaramakan river, middle flow (7); 42 – Uboinaya river (2); 43 – Khantayka river (17); 44 – Snezhnogorsk (10); 45 – Khantayskoe lake (7); 46 – Igarka (outside Taymyr peninsula).

three large regions: West and East Palaearctic (separated by the Ural mountains; abbreviated as WP and EP, respectively) and Nearctic. Species recorded in all three regions are classified as holarctic (HA); recorded in both West and East Palaearctic as Palaearctic (PA); recorded in East Palaearctic and Nearctic as Beringian (BE).

2.3. Material

Since the data form Taymyr are scarce, we provide the (abbreviated) label information for every investigated specimen, sometimes in a modified form to make the text uniform and easily understandable. In particular, we pooled records from three localities referred by Zolotarenko (1970, 1990) as Talnakh, Listvyanka river and Kharaerlakh river, because the mentioned rivers are within 10 km from Talnakh and the precise location of the collecting sites cannot be recovered. Similarly, records from Oganer (an eastern suburb of Noril'sk, ca. 8–10 km from the city center) were attributed to Noril'sk. Collecting dates are sometimes pooled in such a way that only the first and the last collecting day are mentioned. Order of localities within each species follows the order given in Fig. 1, e.g. from North to South, and – within approximately the same latitude – from West to East.

Collectors are abbreviated as follows: C – Y. I. Chernov; G – G. A. Grigorjev; K – M. V. Kozlov and V. E. Zverev; Kh – O. A. Khruleva; M – V. V. Mikhailov; M&B – O. L. Makarova and A. B. Babenko; P – Polovinkina; S – J. Sahlberg; W – Y. Wuorentaus; and Z – G. S. Zolotarenko.

2.4. Depositories

Material collected by M. Kozlov is deposited in the Natural History Museum in London. We included data from specimens deposited in Zoological Institute in St. Petersburg, Siberian Zoological Museum in Novosibirsk, the Museum of Natural History of the University of Helsinki and in private collections of G. A. Grigorjev and B. A. Khramov (St. Petersburg). We also investigated samples collected in Taymyr by researchers of A. N. Severtsov Institute of Ecology and Evolution, Moscow. Although we are aware on materials deposited in the Zoological Museum of the Moscow State University, we were unable either to get access to these collections or agree with the Moscow scientists about the joint publication of the data.

3. List of species

Eriocraniidae

Eriocrania sangii (Wood) – Dudinka: 2♂ 4.VII.1980 (Savenkov). PA.

Eriocrania sp. – Noril'sk; Lama: mines on *Betula* spp., infrequent (K).

Hepialidae

Pharmacis fuscoargenteus (Bang-Haas) – Talnakh: 1♂ 2.VIII.1964 (Z). HA.

Incurvariidae

Incurvaria circulella (Zett.) – Nizhnyaya Agapa r.: 1♂ 7.VII.2001 (Kh). The northernmost record; from Eastern Palaearctic so far was known from Khamar-Daban Mts. in Siberia (Kozlov 1996). PA.

Prodoxidae

Greya variabilis Davis & Pellmyr – Meduza Bay: 1♂ 1♀ 15.VII.1998 (Kh); Nizhnyaya Agapa r., 40 km from the headwater: 1♂ 23.VII.1973 (Zherikhin). The westernmost records of the species described from North America in 1992 and later on reported from the Chukchi Peninsula (Kozlov 1996). BE.

Tineidae

Monopis weaverella (Scott) – Lama: 1♀ 26.–28.VII.2002 (K). Cosmopolitan.

Gracillariidae

Phyllonorycter sp. – Lama: mines on the underside of *Alnus fruticosa* leaves; rare (K).

Plutellidae

Plutella xylostella (L.) – Meduza Bay: 4♂ 2♀ 20.VI.–15.VII.2000 (Kh); Noril'sk: 14♂ 1♀ 21.–29.VII.2002 (K); Talnakh: 1♂ 29.VII. 2002 (K); Eremin's hut: 3♂ 7♀ 28.VII.2002 (K); Lama: 7♂ 26.–28.VII.2002 (K); So-

bach'e lake: 1♀ 27.VII.–13.VIII.1996 (M&B). Cosmopolitan.

Plutella hyperboreella Strand – Nizhnyaya Agapa r.: 1♂ 14.VII.2001 (Kh). HA.

Oecophoridae

Schiffermuelleria stipella (L.) – Lama: 3♂ 26.–28.VII.2002 (K). PA.

Coleophoridae

Coleophora murinella Tengstr. – Lama: 3♂ 26.–28.VII.2002 (K). PA.

Coleophora virgaureae Stt. – Talnakh: 1♀ 29.VII.2002 (K). PA.

Momphidae

Mompha polaris Sinev – Noril'sk: 2♂ 21.–25.VII.2002 (K); Ayan: 3♂ 20.VII.1983 (Eskov). Although S. Sinev now considers this species as a synonym of *M. idaei* (Z.), one of us (JK) believes that at least in Europe these two taxa are clearly separable, especially by external characters. Furthermore, larvae of *M. polaris* fed on *Epilobium latifolium*, while larvae of *M. idaei* fed on *E. angustifolium*. *M. polaris* was found in Polar Ural in 1994 (J. Kullberg, pers. obs.). BE.

Mompha conturbatella (Hb.) – Noril'sk: 13♂ 1♀ 21.–25.VII.2002 (K), by sweep-netting from *Epilobium* sp. on wastelands near the city. HA.

Scythrididae

Scythris cf. *obscurella* (Scop.) – Noril'sk: 1♂ 21.–25.VII.2002 (K). The species, although closely related to *S. obscurella*, clearly differs from it in the male genitalia structure. The same taxon was found in Polar Ural (J. Kullberg, pers. obs.); the shortage of the available material does not allow determination or description of this species. EP.

Gelechiidae

Bryotropha galbanella (Z.) – Nizhnyaya Agapa r.: 1♂ 4.VII.2001 (Kh). HA.

Chionodes lugubrellus (F.) – Lama: 1♂ 1♀ 26.–28.VII.2002 (K). HA.

Chionodes viduellus (F.) – Zaostrovskaya: 1♂ 1915 (W). HA.

Acompsia subpunctella Svenss. – Lama: 1♂ 26.–28.VII.2002 (K). PA.

Tortricidae

Aethes deutschiana (Zett.) – Nizhnyaya Agapa r.: 1♂ 5.VII.2001 (Kh); Khantayka: 1♂ 18.VII. 1876 (S). HA.

Eana osseana (Scop.) – Noril'sk: 2♂ 21.–25.VII. 2002 (K); Nizhnyaya Agapa r.: 1♀ 7.VII. 2001 (Kh). HA.

Aphelia septentrionalis Obraztsov – Talnakh: 1♂ 3.VIII.1964 (Z); Noril'sk: 5♂ 2♀ 21.–25.VII. 2002 (K). BE.

Clepsis moeschleriana (Wck.) – Talnakh: 1♂ 3.VIII.1964 (Z); Nizhnyaya Agapa r.: 2♂ 2♀ 13.–16.VII.2001 (Kh). BE.

Eulia ministrana (L.) – Lama: 1♂1♀ 26.–28.VII. 2002 (K). HA.

Sparganothis rubicundana (Den. et Schiff.) – Dudinka: 1♂ 26.VII.1876 (S); Noril'sk: 2♂ 1♀ 21.–25.VII.2002 (K); Talnakh: 2♂ 29.VII.2002 (K); Eremin's hut: 1♂ 28.VII. 2002 (K); Lama: 3♂ 1♀ 26.–28.VII.2002 (K). HA.

Tia enervana (Erschoff) – Lama: 3♀ 26.–28.VII. 2002 (K). BE.

Argyroploce mengelana (Fernald) – Meduza Bay: 1♂ 31.VII.2000 (Kh). For identity and distribution in Nearctic consult Miller & Jalava (2000). Recently reported from Novaya Zemlya (Aarvik 2004). New to East Palearctic. HA.

Argyroploce lediana (L.) – Nizhnyaya Agapa r.: 1♂ 3.VII.2001 (Kh); Lama: 1♂ 26.–28.VII. 2002 (K). PA.

Phiaris obsoletana (Zett.) – Dudinka: 1♂ 1.–12.VII.1915 (W); Zaostrovskaya: 1♂ 1915 (W); Khantayka: 1♂ 20.VII.1876 (S); Noril'sk: 1♀ 21.–25.VII.2002 (K); Eremin's hut: 1♂ 28.VII.2002 (K); Lama: 11♂ 2♀ 26.–28.VII.2002 (K); Sobach'e lake: 1♂ 27.VII.–13.VIII.1996 (M&B). PA.

Phiaris turfosana (Zett.) – Khantayka: 2♂ 16.VII.1876 (S). HA.

Phiaris dissolutana (Stange) – Noril'sk: 1♀ 21.–25.VII.2002 (K); Eremin's hut: 1♀ 28.VII. 2002 (K); Lama: 4♂ 26.–28.VII.2002 (K). PA.

Phiaris heinrichana (McDonnough) – Eremin's hut: 2♂ 28.VII.2002 (K); Lama: 1♀ 26.–28.VII.2002 (K). HA.

Phiaris inquietana (Walk.) – Ary-Mas: 2♂ 20.–28.VII.1983 (P); Tareya (Chernov 1973,

1978); Nizhnyaya Agapa r.: 2♀ 12.–14.VII.2001 (Kh). BE.

Selenodes sp. – Meduza Bay: 5♂ 3♀ 8.–15.VII.1998 (Kh.).

Zeiraphera diniana (Gn.) – Tareya: migrants from taiga zone (Chernov 1978); Noril'sk: 2♂ 1♀ 21.–25.VII.2002 (K); Talnakh: 1♂ 1♀ 29.VII.2002 (K); Eremin's hut: 2♂ 1♀ 28.VII.2002 (K); Lama: 2♂ 2♀ 26.–28.VII.2002 (K). PA.

Eucosma guentheri (Tengstr.) – Tareya (Chernov 1973, 1978). PA.

Eucosma tetraplana Möschler – Meduza Bay: 1♀ 8.VII.1998 (Kh). EP.

Eucosma ommatoptera Falk. – Meduza Bay: 1♀ 8.VII.1998 (Kh). EP.

Dichrorampha montanana Dup. – Talnakh: 5♂ 1♀ 29.VII.2002 (K). PA.

Dichrorampha flavidorsana Knaggs. – Noril'sk: 1♀ 21.–25.VII.2002 (K). PA.

Gypsonoma parryana Curt. – Nizhnyaya Agapa r.: 1♂ 4.VII.2001 (Kh). BE.

Clepsis mehli (Opheim) – Nizhnyaya Agapa r.: 2♂ 8.–16.VII.2001 (Kh). The species was so far reported from northern Norway only; new to Russia and East Palearctic. PA.

Pterophoridae

Platyptilia calodactyla (Den. et Schiff.) – Noril'sk: 1♀ 21.–25.VII.2002 (K); Talnakh: 1♀ 29.VII.2002 (K); Nizhnyaya Agapa r.: 1♂ 1♀ 7.–16.VII.2001 (Kh). PA.

Paraplatyptilia sibirica (Zag.) – Tareya: 5♂ 1♀ 20.VII.1969 [paratypes: Zagulajev (1983)]; Nizhnyaya Agapa r.: 2♂ 4.–16.VII.2001 (Kh). EP.

Paraplatyptilia sahlbergi (Poppius) – Dudinka: 1♂ 16.VII.1876 (S) (paralectotype); Nizhnyaya Agapa r.: 1♀ 20.VII.1999 (M&B), 2♂3♀ 4.–16.VII.2001 (Kh). EP, in the west to the Kanin peninsula.

Paraplatyptilia terminalis (Erschoff) – Khantayka: 1♂ 1876 (S). EP.

Stenoptilia veronicae Karv. – Noril'sk: 1♀ 21.–25.VII.2002 (K). PA.

Hellinsia tephradactyla (Hb.) – Noril'sk: 1♀ 21.–25.VII.2002 (K). PA.

Hellinsia mongolica Zag. & Pen. – Nizhnyaya Agapa r.: 2♂ 1♀ 5.–15.VII.2001 (Kh). EP.

Pyralidae

Catoptria maculalis (Zett.) – Zaostrovskaya: 1♂ 1915 (W); Lama: 1♂ 26.–28.VII.2002 (K). HA.

Catoptria trichostoma (Chr.) – Dudinka: 3♂2♀ 1.–12.VII.1915 (W); Nizhnyaya Agapa r.: 1♂ 3♀ 5.–16.VII.2001 (Kh). BE.

Pediasia zellerella (Stgr.) – Khantayka: 2 exx. 18.VII.1876 (S); Dudinka: 1 ex. 1.–12.VII. 1915 (W); Lama: 1♀ 26.–28.VII.2002 (K). BE.

Crambus hamellus (Thnbg.) – Sobach'e lake: 1♀ 3.VIII.1996 (M&B). HA.

Gesneria centuriella (Den. et Schiff.) – Talnakh: 1♂ 29.VII.2002 (K). HA.

Eudonia alpina (Curt.) – Eremin's hut: 2♀ 28.VII.2002 (K); Lama: 1♂ 26.–28.VII.2002 (K); Nizhnyaya Agapa r.: 2♂ 5.–7.VII.2001 (Kh). The record of *Scoparia* sp. from Tareya (Chernov 1973) most likely concerns this species. PA.

Udea inquinatalis (Lienig et Z.) – Noril'sk: 1♂ 21.–25.VII.2002 (K); Eremin's hut: 2♀ 28.VII.2002 (K). HA.

Udea torvalis Möschler – Meduza Bay: 6♂ 7♀ 7.–17.VII.1998 (Kh). BE.

Udea cretacea Fil. – Talnakh: 2♂ 3♀ 29.VII.2002 (K). EP.

Hesperiidae

Pyrgus centaureae (Rbr.) – Maymecha r., lower flow: 1♂ 1982 (Zakharzhevskii); Maymecha r., upper flow: 1♂ 9.VIII.1982 (Zakharzhevskii); Potapovo: 25.VII.1876 (Trybom 1878); Rybnaya r.: 1♂ 12.VII.1976 (Korshunov *et al.* 1982); Khantayka: 15.VII.1876 (Trybom 1878). HA.

Carterocephalus palaemon (Pall.) – Chopko r.: 1♂ 15.VII.1976 (Chernenko); Rybnaya r.: 1♂ 18.VII.1976 (Pupavkin); Snezhnogorsk: 1♂ 22.VII.1980 (Korshunov *et al.* 1982). HA.

Carterocephalus silvicola (Meig.) – Valek: 1♂ 6.VII.1977 (Korshunov *et al.* 1982); Eremin's hut: 1♂ 28.VII.2002 (K); Rybnaya r.: 1♂ 18.VII.1976, 1♂2♀ 19.–22.VII.1978 (Korshunov *et al.* 1982); Snezhnogorsk: 1♀ 25.VII.1980 (Korshunov *et al.* 1982). PA.

Papilionidae

Parnassius phoebus (F.) – Talnakh: 2♂ 1♀

30.VII.1985 (M), 7♂ 2♀ 13.–20.VII.2001 (G); Fokina r.: 1♀ early VII.1978 (Godovikova) (Korshunov *et al.* 1982). HA.

Papilio machaon L. – Ary-Mas (Murzin 1982a); Dudinka: 26.VII.1876 (Trybom 1878); Talnakh: several exx. observed on 13.–20.VII.2001 (G), 1♂ 23.VII. 1964 (Korshunov *et al.* 1985); Keta lake: 3♂ 1♀ 22.VII. 1982 (Korshunov *et al.* 1985); Kutaramakan r.: 1♂ 1♀ 12.VIII.1980 (Korshunov *et al.* 1982). PA.

Pieridae

Aporia crataegi (L.) – 'Taymyr' (Antonova *et al.* 1976); Ary-Mas (Lvovsky 1984); 25 km S of Kayak (Lvovsky 1984). PA.

Euchloe creusa kurentzovi Beljaev – Keta lake: 1♂ 22.VII.1982 [Korshunov *et al.* (1985), as ssp. *orientalis* Brem.]; Khantayskoe lake: 1♂ 15.VII.1974 (M). BE.

Euchloe ochracea Trybom – Ary-Mas: 1♂ VI.1983 [Korshunov *et al.* (1985), as *E. ausonia*]; Kayyerkan: 1♂ 26.VI.1970 [Korshunov *et al.* (1982), as *E. creusa orientalis*]; Talnakh: 5♂ 4♀ 13.–18.VII.2001 (G); Rybnaya r.: 6♂ 3♀ 12.–22.VII.1978 [Korshunov *et al.* (1982), as *E. creusa orientalis*]; Ketairbe r.: 17♂ 12♀ 18.–22.VII.1982 [Korshunov *et al.* (1985), as *E. ausonia*]; Kutaramakan r.: 1♀ 12.VIII.1980 [Korshunov *et al.* (1982), as *E. creusa orientalis*]; Snezhnogorsk: 1♀ 12.VII.1989 [Korshunov *et al.* 1982, as *E. creusa orientalis*]; Khantayskoe lake: 1♂ 15.VII.1974 (M). EP.

Pieris napi (L.) – Tareya: 2♂ 3♀ 17.–21.VII. 1975 (Korshunov *et al.* 1985); Baikalovsk: 13.–18.IX.1876 [Trybom (1878), as *P. napi bryoniae*]; Nosok: 2♂ 1♀ 22. & 28.VII. & 7.VIII.1977 (Korshunov *et al.* 1982); Dudinka: 30.VII.–4.VIII.1876 [Trybom (1878), as *P. napi bryoniae*], 10♂ 23.VII. 1955, 2♂ 11.VII.1977 (Korshunov *et al.* 1982); Valek: 2♂ 4♀ 6.VII.1977 (Korshunov *et al.* 1982); Talnakh: 2♂ 1♀ 29.VII.2002 (K), 4♂ 4♀ 20.–23.VII.1964, 1♂ 1♀ 21.VII.1964, 2♂ 1♀ 4.–5.VIII.1964 (Korshunov *et al.* 1982); Eremin's hut: 2♂ 3♀ 28.VII.2002 (K); Lama: 4♂ 1♀ 26.–28.VII.2002 (K); Potapovo: 25.VII.1876 [Trybom (1878), as *P. napi bryoniae*]; Pairgakta r.: 1♀ 1.VIII.1966 (Korshunov *et al.* 1982); Sokholka lake: 3♂ 14.–15.VII.1966, 1♂ 1♀ 16.–17.VII.1966 (Korshunov *et al.* 1982); Fokina r.: 2♀ early VII.1978 (Korshunov *et al.* 1982); Rybnaya r.: 7♂ 5♀ 13.–21.VII.1978 (Korshunov *et al.* 1982); Ketairbe r.: 1♂ 27.VII.1982 [Korshunov *et al.* (1985), as ssp. *intermedia* Krul.]; Snezhnogorsk: 2♂ 10.VIII.1965, 10♂ 6♀ 22.–25.VII.1980 (Korshunov *et al.* 1982); Khantayskoe lake: 4♂ VIII.1980 (Korshunov *et al.* 1982). HA.

Pontia callidice nelsoni Edwards – Talnakh: 1♀ 13.VII.2001 (G), 1♀ 5.VIII.1964 (Korshunov *et al.* 1982); Potapovo: 1♀ 25.VII.1876 (Trybom 1878); Kutaramakan r.: 1♂ 12.VIII. 1980 (Korshunov *et al.* 1982); Ketairbe r.: 4♂ 1♀ 18.–22.VII.1982 (Korshunov *et al.* 1985); Keta lake: 8♂ 5♀ 28.VII.1980 (Korshunov *et al.* 1982); Khantayskoe lake: 1♂ VIII.1980 (Korshunov *et al.* 1982). HA.

Colias palaeno orientalis Stgr. – Verkhnyaya Taymyra r.: 1♂ 17.VIII.1983 (Korshunov *et al.* 1985); Tareya: 4♀ 23.VII.1975 (Korshunov *et al.* 1985); Anabarka r.: 1♂ 8.VIII.1967 (Korshunov *et al.* 1982); Popigay r., low flow: 1♂ 18.VII.1967, 1♂ 1♀ 27.VII.–1.VIII.1968 (Korshunov *et al.* 1982); Ary-Mas: 2♂ 3♀ VII.1983 (Korshunov *et al.* 1985); Boganida r. (Ménétriès 1851); Nosok: 6♂ 3♀ 22.–28.VII.1977, 2♂ 16.–20.VIII. 1977 (Korshunov *et al.* 1982); Zaostrovskaya: 1♂ 1915 (W); Noril'sk: 2♂1♀ 21.–25.VII.2002 (K); Talnakh: 1♂ 4.VIII.1964 (Korshunov *et al.* 1982), 6♂ 7♀ 13.–20.VII.2001 (G), 1♀ 29.VII.2002 (K); Eremin's hut: 3♂ 1♀ 28.VII.2002 (K); Lama: 2♂ 26.VII.–3.VIII.2001 (G), 2♂ 2♀ 26.–28.VII.2002 (K); Pairgakta r., headwater: 1♀ 4.VIII.1966 (Korshunov *et al.* 1982); Rybnaya r.: 2♂ 2♀ 4.–18.VI.1976, 10♂ 1♀ 15.–23.VII.1978 (Korshunov *et al.* 1982); Ketairbe r.: 2♂ 27.VII.1982 (Korshunov *et al.* 1985); Kutaramakan r.: 2♂ 1♀ 10.VIII.1980 (Korshunov *et al.* 1982); Khantayka: 1♂ 18.VII.1901 (S); Khantayskoe lake: 3♂ 1♀ VIII.1980 (Korshunov *et al.* 1982). Exact positions of four localities given by Murzin (1982b) cannot be recovered. HA.

Colias tyche herzi Stgr. – 'In tundras of Taymyr':

20♂ 34♀ VII.–VIII.1974/1975 [Korshunov *et al.* (1985), as *C. nastes werdandi* Zett.]; Pyasina r. (?): Korshunov *et al.* (1985), as *C. nastes werdandi* Zett.; Verkhnyaya Taymyra r.: 1♀ 24.VII.1983, 1♂ 6.VIII.1983 [Korshunov *et al.* (1985), as *C. nastes werdandi* Zett.]; Chopko r.: 1♂ 12.VII.1976 [Korshunov *et al.* (1982), as *C. nastes werdandi* Zett.]; Talnakh: Chernov (1978), as *C. nastes*; 1♂ 3♀ 13.–18.VII.2001 (G). PA.

Colias hyperborea Gr.-Grsh. – Verkhnyaya Taymyra r.: 1♀ 24.VII. 1983, 1♂ 6.VIII.1983 (Korshunov *et al.* 1985); Talnakh: 1♂1♀ 9.–26.VII.1964 (Korshunov *et al.* 1982), 9♂ 14♀ 13.–20.VII.2001 (G); Rybnaya r.: 2♂ 22.–27.VII.1978 (Korshunov *et al.* 1982). EP.

Colias hecla Lef. – Tareya: 1♂ 3♀ 18.–24.VII.1969 [Korshunov *et al.* (1982), as ssp. *sulitelma* Auriv.; record mentioned by Chernov (1973, 1978)]; Kunzhalak lake: 2♀ 22.VII.1967 [Korshunov *et al.* (1982), as ssp. *sulitelma* Auriv.]; Popigay r., low flow: 2♂ 3♀ 19.VII.1967, 2♂ 1.–9.VIII.1968 [Korshunov *et al.* (1982), as ssp. *sulitelma* Auriv.]; Ary-Mas: 3♂ 4♀ VII.1983 [Korshunov *et al.* (1985), as ssp. *sulitelma* Auriv.); Chopko r.: 1♂ 14.VII.1976 [Korshunov *et al.* (1982), as ssp. *sulitelma* Auriv.]; Zaostrovskaya: 5♂ 3♀ 1915 (W); Dudinka: 1♂ 1901 (S); Talnakh: 11♂ 2♀ 13.–17.VII.2001 (G) (determined as ssp. *orientis* Wnk. by B. Khramov). The taxonomy of *Colias hecla* species group is obscure (Gorbunov 2001), and therefore we consider the records of *C. aquilonaris* Gr.-Grsh. from Maymecha r. [Korshunov & Gorbunov (1995), as *Colias viluiensis*; Korshunov (1998, 2000)] as belonging to *C. hecla*. HA.

Lycaenidae

[*Lycaena helle* (Den. et Schiff.)] – This species was erroneously mentioned from Taymyr by Korshunov *et al.* (1982); however, the northernmost record of this species [Yenisey valley, 65°35' N; Trybom (1878)] is far from Taymyr.

Lycaena phlaeas (L.) – Talnakh: 1♂ 5.VIII.1964 [Korshunov *et al.* (1982), as ssp. *hypophlaeas* Bsd.]. HA.

Vacciniina optilete (Knoch.) – Popigay r., low flow: 1♂ 16.VII.1967, 1♂ 1.VIII.1968 (Korshunov *et al.* 1982); Nosok: 5♂ 1♀ 21.–28.VII.1977 (Korshunov *et al.* 1982); Dudinka: 25.VII.1876 [Trybom (1878), as ssp. *cyparissus* Hb.], 5♂ 2♀ 1.–12.VII.1915 (W), 1♂ 23.VII.2002 (K); Vershininskoe: 26.VII.1876 [Trybom (1878), as ssp. *cyparissus* Hb.]; Kayyerkan: 1♀ 26.VII.1970 (Korshunov *et al.* 1982); Noril'sk: 2♂ 2♀ 21.–25.VII.2002 (K); Talnakh: 1♂ 2♀ 29.VII.2002 (K), 2♂ 14.VII.2001 (G), 3♂ 1. & 5.VIII.1964 (Korshunov *et al.* 1982); Eremin's hut: 7♂ 5♀ 28.VII.2002 (K); Lama: 3♀ 26.–28.VII.2002 (K); Potapovo: 25.VII. 1876 [Trybom (1878), as ssp. *cyparissus* Hb.]; Snezhnogorsk: 1♂ 25.VII.1980 (Korshunov *et al.* 1982); Rybnaya r.: 7♂ 12.–23.VII.1978 (Korshunov *et al.* 1982); Keta lake: 1♂ 22.VII.1980 (Korshunov *et al.* 1982); Khantayskoe lake: 1♂ VIII.1980 (Korshunov *et al.* 1982). Korshunov *et al.* (1982) classified all records from Taymyr as ssp. *cyparissus* Hb. HA.

Polyommatus icarus (L.) – Talnakh: 3♂ 2♀ 4.–5.VIII.1964 (Korshunov *et al.* 1982). PA.

Polyommatus kamtschadalis (Shelj.) – 'Taymyr': Antonova (1976), as *P. eros*; Talnakh: 1♂ 15.VII.2001 (G), 1♂1♀ 29.VII.2002 (K), 4♂ 1♀ 4.–5.VIII.1964 (Korshunov *et al.* 1985); Rybnaya r.: 10♂ 2♀ 27.VII.1978 [Korshunov *et al.* (1982), as *P. eros taimyrensis* Korsh.]; Keta lake: 2♂ 22.VII. 1980, 1♂ 28.VII.1980 [Korshunov *et al.* (1982), as *P. eros taimyrensis* Korsh.]. Subspecies *taimyrensis* was transferred to *P. kamtschadalus* by Korshunov & Gorbunov (1995). EP.

Agriades glandon wosnesenskii Mén. – Popigay r.: 1♀ 19.VII.1967, 1♀ 30.VII.1968 [Korshunov *et al.* (1982), as *A. aquilo wosnesenskii* Mén.]; Chopko r.: 1♀ 12.VII.1976 [Korshunov *et al.* (1982), as *A. aquilo wosnesenskii* Mén.]; Noril'sk: 3♀ 21.–25.VII.2002 (K); Talnakh: 2♂ 14.VII.2001 (G). HA.

Nymphalidae

Nymphalis xanthomelas (Esper) – Verkhnyaya Taymyra r.: 1♂ 17.VIII.1983 (Korshunov *et al.* 1985); Dudinka: 1 ex. 1.–12.VII.1915 (W); Talnakh: 5.–6.VIII.2001 (G); Eremin's

hut: 1♀ 28.VII.2002 (K); Rybnaya r.: 1♀ 12.VII.1976 (Korshunov *et al.* 1982). PA.

Vanessa cardui (L.) – Tareya (Chernov 1978); Rybnaya r.: 1♂ 12.VII.1978 (Korshunov *et al.* 1982). Cosmopolitan.

Euphydryas iduna (Dalm.) – Dudinka: 1♀ 11.VII.1977 (Korshunov *et al.* 1982); Kayyerkan: 1♂ 26.VII.1970 (Korshunov *et al.* 1982); Rybnaya r.: 1♂ 23.VII.1978 (Korshunov *et al.* 1982). PA.

Boloria eunomia (Esper) – Tareya: 2♂ 2♀ 31.VII.–3.VIII.1975 (Korshunov *et al.* 1985); Popigay r., low flow: 2♂ 1♀ 16.–19.VII. 1967, 1♂ 30.VII.1968 (Korshunov *et al.* 1982); Ary-Mas: 2♀ 29.VII.1981, 2♂ VII.1983 (Korshunov *et al.* 1985); Boganida r. [Ménétriès (1851), as *Argynnis aphirape*]; Chopko r.: 1♂ 12.VII.1976 (Korshunov *et al.* 1982); Zaostrovskaya: 3 exx. 1915 (W); Nosok: 8♂ 8♀ 17.–22.VII.1977 (Korshunov *et al.* 1982); Dudinka: 13 exx. 1.–12.VII.1915 (W), 1♂ 11.VII.1977 (Korshunov *et al.* 1982); Noril'sk: 1♂ 6.VII. 1977 (Korshunov *et al.* 1982); Talnakh: 1♂ 1♀ 23.VII.1964, 1♂ 1♀ 29.VII.1964, 1♂ 31.VII.1964, 1♂ 4.VIII.1964 (Korshunov *et al.* 1964), 2♂ 16.–17.VII.2001 (G); Rybnaya r.: 1♂ 4.VII.1976, 24♂ 3♀ 12.–22.VII.1978 (Korshunov *et al.* 1982); Ketairbe r.: 1♂ 1♀ 15.VII.1982 (Korshunov *et al.* 1985); Kutaramakan r.: 1♂ 12.VIII.1980 (Korshunov *et al.* 1982); Khantayka: 15.VII.1876 [Trybom (1878), as ssp. *ossianus* Herbst]. HA.

[*Boloria euphrosyne* L.] – Dudinka: 29.VII.1876 (Trybom 1878). This is the only record of this species from Taymyr. Trybom (1878) mentioned that the specimens are old and worn, and that therefore it is impossible to be sure that they belong to this species. Korshunov *et al.* (1982) considered this record doubtful.

Boloria selene (Den. & Schiff.) – Khantayka: 20.VII.1876 [Trybom (1878), as ssp. *hela* Stgr.]; Snezhnogorsk: 3♂ 22.–25.VII.1980 [Korshunov *et al.* (1982), as ssp. *thalis* Hb]. PA.

Boloria frigga (Thunbg.) – Tareya: 1♀ 18.VII. 1969, 1♀ 24.VII.1969 (Chernov 1973, 1978; Korshunov *et al.* 1982), 6♂ 17♀ 1975 (Korshunov *et al.* 1985); Popigay r., low flow: 3♂ 17. & 19.VII.1967, 1♀ 23.VII.1968 (Korshunov *et al.* 1982); Ary-Mas: 2♂ 2♀ VII.1983 (Korshunov *et al.* 1985); Boganida r. (Ménétriès 1851); Dudinka: 25.VII.1876 (Trybom 1878), 1 ex. 1.–12.VII.1915 (W), 1♀ 11.VII.1977 (Korshunov *et al.* 1982); Rybnaya r.: 1♂ 5.VII.1978 (Korshunov *et al.* 1982); Khantayka: 19.VII.1876 (Trybom 1878). HA.

Boloria improba (Butl.) – Tareya: infrequent in 1975 (Korshunov *et al.* 1985); Ary-Mas: 1 ex. VII.1983 (Korshunov *et al.* 1985). HA.

Boloria thore borealis (Stgr.) – Chopko r.: 1♂ 10.VII.1976 (Korshunov *et al.* 1982); Talnakh: 1♂ 15.VI.1964, 1♂ 3♀ 4.–6.VIII. 1964, 1♂ 31.VII.1964 (Korshunov *et al.* 1982), 2♂ 2♀ 14.–15.VII.2001 (G), 1♀ 29.VII.2002 (K); Eremin's hut: 1♂ 1♀ 28.VII.2002 (K); Lama: 1♂ 26.–28.VII.2002 (K); Snezhnogorsk: 9♂ 4♀ 22.–25.VII.1980 (Korshunov *et al.* 1982); Potapovo: 23.VII. 1876 (Trybom 1878); Rybnaya r.: 1♂ 18.VII.1976, 1♂ 19.VII.1978 (Korshunov *et al.* 1982); Kutaramakan r.: 1♂ 12.VIII.1980 (Korshunov *et al.* 1982); Khantayka: 19.VII. 1876 (Trybom 1878), 1♀ 29.VII.1965 (Korshunov *et al.* 1982). HA.

Boloria angarensis (Erschoff) – Ary-Mas: 1♂ VII.1983 (Korshunov *et al.* 1985); Chopko r.: 1♀ 5.VII.1976, 1♀ 14.VII.1976 (Korshunov *et al.* 1982); Nosok: 1♂ 28.VII.1977 (Korshunov *et al.* 1982); Talnakh: 1♂ 1♀ 23.–24.VII.1964, 1♀ 26.VII.1964, 1♀ 5.VIII. 1964 (Korshunov *et al.* 1982), 4♂ 1♀ 13.–20.VII.2001 (G); Eremin's hut: 2♂ 2♀ 28.VII.2002 (K); Rybnaya r.: 1♂ 18.VII. 1976, 1♂ 3♀ 15.–22.VII.1978 (Korshunov *et al.* 1982); Kutaramakan r., middle flow: 1♂ 12.VIII.1980 (Korshunov *et al.* 1982). EP.

Boloria selenis (Ev.) – Talnakh: 6♂ 13.–17.VII.2001 (G). EP.

Boloria chariclea (Schneider) – Tareya: 3♂ 1♀ 30.VII.–4.VIII.1975 [Korshunov *et al.* (1985), as ssp. *arctica* Zett.]; Talnakh: 1♂ 1.VIII.1964 [Korshunov *et al.* (1982), as ssp. *boisduvali* [sic!] Dup.]; Khantayka: 19.VII. 1876 [Trybom (1878), as aber. *boisduvalii* Dup.]. HA.

Boloria tritonia machati Korsh. – 'Taymyr': Antonova (1976), as *Clossiana erda* Chr.; Talnakh: 1♂ 11.VII.1964 [Korshunov *et al.*

(1982), as *C. erda* Chr.], 2♂ 4♀ 13.–20.VII.2001 (G) (determined as *C. distincta machati* Korsh. by B. Khramov); Ketairbe r.: 1♂ 18.VII.1981 [Korshunov *et al.* (1985), as *C. distincta* Gibs.; Korshunov (1987), as *C. distincta machati*; Gorbunov (2001), as *Boloria tritonia machati*]. Although *erda* Chr. is the junior synonym of *polaris* Boisd. (Gorbunov 2001), we attribute the earlier records of *erda* to *B. tritonia*. BE.

Boloria polaris (Boisd.) – Meduza Bay (Syroechkovskij *et al.* 2000); Portnyagino lake: 3♂ 8.–10.VIII.1933; Yamutarida r.: 7♂ 6♀ 6.–16.VII.1928 (Tolmachev); Verkhnyaya Taymyra r.: 1♂ 17.VII.1983 (Korshunov *et al.* 1985); Tareya: Chernov (1978), 2♂ 9.VII.1969 (Korshunov *et al.* 1982), 41♂ 32♀ VII.–VIII.1974/1975 (Korshunov *et al.* 1985); Gorbita r.: 1♂ 14.VII.1929 (Makarjin); Popigay r., middle flow: 1♀ 8.VII.1968 (Korshunov *et al.* 1982); Ary-Mas: 1♂1♀ VII.1983 (Korshunov *et al.* 1985); Boganida r. (Ménétriès 1851); Shaitan mt. (old name), 72º N (?) (Lewaski 1887); Byrranga mts., 75º N (Lewaski 1887); Nosok: 1♂ 17.VII.1977 (Korshunov *et al.* 1982); Dudinka: 1♂ 22.VII.1928 (Tolstoj). HA.

Boloria freija (Thnbg.) – Tareya: 4♂ 3♀ 28.VII.–3.VIII.1975 (Korshunov *et al.* 1985); Ary-Mas: 3♂ VII.1983 (Korshunov *et al.* 1985); Khatanga: 2♂ 4♀ 2.–15.VII.1905 (Tolmachev); Mouth of Yenisey r.: 1 ex. 1901 (S); Dudinka: 1♂ 26.VII.1907 (Tolstoj), 1 ex. 1.–12.VII.1915 (W), 1♂ 30.VI.1977 (Korshunov *et al.* 1982); Kayyerkan: 1♂ 26.VII.1970 (Korshunov *et al.* 1982); Talnakh: 1♂ 17.VII.1964, 2♀ 26.VII.1964 (Korshunov *et al.* 1982), 1♂ 13.VII.2001 (G); Fokina r.: 1♂1♀ early VII.1978 (Korshunov *et al.* 1982); Rybnaya r.: 12 ♂9♀ 12.–22.VII.1978 (Korshunov *et al.* 1982); Ketairbe r.: 1♂ 12.VII.1982 (Korshunov *et al.* 1985); Khantayka: 15.VII.1786 (Trybom 1876), 1 ex. 1901 (S); Monjero, system of Khatanga r. (?): 12♂ V.–VI.1874 (Chekanovskij). HA.

Boloria alaskensis Hld. – Verkhnyaya Taymyra r.: 1♂ VII.1983 (Korshunov *et al.* 1985); Tareya: 10♂ 4♀ 18.–24.VII.1969 [Korshunov *et al.* (1982), as *Boloria aquilonaris* Stich.], 1♂ 26.VII.1974, 2♂ 8♀ 28.VII.–3.VIII.1975 (Korshunov *et al.* 1985); Kunzhalak lake: 1♀ 21.VII.1967 [Korshunov *et al.* (1982), as *Boloria aquilonaris* Stich.]; Popigay r., low flow: 6♂ 17.–19.VII.1967, 2♂ 2♀ 14.–30.VII.1968 [Korshunov *et al.* (1982), as *Boloria aquilonaris* Stich.]; Ary-Mas: 1♂ 29.VII.1981 (Korshunov *et al.* 1985); Zaostrovskaya: 3♂ 1915 (W); Dudinka: 1♂ 1♀ 1.–12.VII.1915 (W); Talnakh: 25♂ 10♀ 14.–20.VII.2001 (G); Khantayka: 1♀ 1901 (S). Most likely the record of '*Boloria pales*' from Tareya (Chernov 1973) belongs to this species. BE.

Boloria aquilonaris (Stich.) – Chopko r.: 2♂ 12.–14.VII.1976 (Korshunov *et al.* 1982); Nosok: 11♂ 3♀ 17.–28.VII.1977, 1♂ 1♀ 25.VII.1977 (Korshunov *et al.* 1982); Rybnaja r.: 13♂ 18.–27.VII.1978 (Korshunov *et al.* 1982). PA.

Issoria eugenia (Ev.) – Dudinka: 1 ex. 3.VII.1876 (Trybom 1878); Noril'sk: 2♂ 2♀ 6.VIII.1964 (Korshunov *et al.* 1982); Talnakh: 1♂ 1♀ 1.–3.VIII.1964 (Korshunov *et al.* 1982), 8♂ 3♀ 17.VII.2001 (G). EP.

Satyridae

Coenonympha tullia (Müll.) – Noril'sk: 1♂2♀ 21.–25.VII.2002 (K), 1♀ 30.VII.200r (K); Snezhnogorsk: 2♂ 25.VII.1980 [Korshunov *et al.* (1982), as ssp. *viluiensis* Mén.]. HA.

Erebia jeniseiensis Trybom – Talnakh: 3♂ 23.–26.VII.1964, 1♀ 5.VIII.1964 (Korshunov *et al.* 1982); Rybnaya r.: 2♂ 3♀ 5.–18.VII.1976, 43♂ 9♀ 12.–27.VII.1978 (Korshunov *et al.* 1982); Khantayka: 16.–19.VII.1876 [Trybom (1878), as *ligea* var. *jeniseiensis*]; Snezhnogorsk: 1♂ 1♀ 22.–25.VII.1980 (Korshunov *et al.* 1982). EP.

Erebia rossii Curt. – Tareya: 1♂ 25.VII.1974, 2♂ 1.VIII.1975 [Korshunov *et al.* (1985), as ssp. *ero* Brem.]; Ary-Mas, Novaya r.: 2♂ VII.1981 (P) [Korshunov (1996), as ssp. *subarctica* Korsh.; Korshunov (2002), as ssp. *yamala* Korsh.]; Chopko r.: 2♂ 8.VII.1976 [Korshunov *et al.* (1982); Korshunov (1996), as ssp. *subarctica* Korsh.; Korshunov (2002), as ssp. *yamala* Korsh.]; Maymecha r.: 1♂ 5♀ 28.VII.–8.VIII.1982 (Zakharzhevskii) [Korshunov (1996), as ssp. *subarctica* Korsh.; Korshunov (2002), as ssp. *yamala* Korsh.];

Nosok: 12♂ 1♀ 25.VII.1977, 1♂ 1♀ 22.VII.1977 (Korshunov *et al.* 1982); Dudinka: 9 exx. 1.–12.VII.1915 (W); Talnakh: 2♂ 13.VII.2001 (G) (determined as ssp. *kuskoquima* Holland by B. Khramov); Khantayka: 19.VII.1876 [Trybom (1878), as *E. ero*]. BE.

Erebia embla Thnbg. – Rybnaya r.: 2♂ 1♀ 4.–5.VII.1976, 2♂ 1♀ 18.–21.VII.1978 (Korshunov *et al.* 1982); Khantayka: 15.–18.VII. 1876 (Trybom 1878). PA.

Erebia disa (Thnbg.) – 'from Vorkuta to East Taymyr' (Chernov 1966); Ary-Mas: 1♂ VII.1983 (Korshunov *et al.* 1985); Chopko r.: 1♂ 4.VII.1976 (Korshunov *et al.* 1982); Dudinka: 13 exx. 1.–12.VII.1915, (W); Kayyerkan: 1♂ 26.VII.1970 (Korshunov *et al.* 1982); Noril'sk: 1♀ 6.VII.1977 (Korshunov *et al.* 1982); Talnakh: 1♂ 11.VII.1964, 1♂ 17.VII.1964 (Korshunov *et al.* 1982); Ketairbe r.: 7♂ 18.VII.1982 (Korshunov *et al.* 1985); Khantayka: 19.VII.1876 (Trybom 1878). HA.

Erebia fasciata semo Gr.-Gr. – Verkhnyaya Taymyra r.: 1♂ 20.VII.1983 (Korshunov *et al.* 1985); Tareya: Chernov (1973, 1978), 56♂ 115♀ VII.–VIII.1974/1975 (Korshunov *et al.* 1985); Popigay r., low flow: 1♂ 3.VII. 1967 (Korshunov *et al.* 1982); Dudinka: 1 ex. 1.–12.VII.1915 (W). Had long been considered as a separate species, *E. semo* (Korshunov & Gorbunov 1995, Korshunov 1996, 1998, 2000, 2002); however Gorbunov (2001) classified *semo* as subspecies of *E. fasciata*. BE.

Erebia discoidalis (Kirby) – Chopko r.: 1♂ 8.VII.1976 (Korshunov *et al.* 1982); Khantayka: 19.VII.1876 (Trybom 1878). BE.

Erebia dabanensis Erschoff – Chopko r.: 1♂ 17.VII.1976 (Korshunov *et al.* 1982); Talnakh: 1♂ 1♀ 15.VII.2001 (G). BE.

Oeneis melissa also (Boisd.) – Tareya: 2♂ 3♀ 25.VII.–1.VIII.1974, 1♂ 9.VIII.1975 (Korshunov *et al.* 1985); Talnakh: 1♀ 30.VII.1985 (M), 2♀ 27.VII.1999 (M), 16♂3♀ 13.–17.VII.2001 (G) (determined as subsp. *karae* Kusn. by B. Khramov); Ketairbe r.: 2♂ 1♀ 18.VIII.1982 (Korshunov *et al.* 1985). BE.

[*Oeneis jutta* Hb.] – Khantayka: 19.VII.1876 (Trybom 1878). This is the only record of this species from Taymyr. Korshunov *et al.* (1982) mentioned this record, but in the next publication (Korshunov *et al.* 1995) no data on *O. jutta* were included for Taymyr.

Oeneis magna Graes. – Talnakh: 1♀ 30.VII.1985 (M) (determined as ssp. *pupavkini* Korsh. et Gorb. by B. Khramov); Rybnaya r.: 2♀ 7.–12.VII.1976, 11♂ 1♀ 12.–27.VII.1978 (Korshunov *et al.* 1982; Korshunov & Gorbunov 1995). Korshunov (2002) refers to *Oeneis pupavkini* and *Oeneis magna magadanica* from Taymyr. EP.

Oeneis crambis Frr. – Tareya: 1♂ VII.1969 (Korshunov *et al.* 1985); Ary-Mas: 1♀ VII.1981, 1♀ VII.1983 [Korshunov *et al.* (1985); Korshunov (2002), as *O. putorana* Korsh. et Nikol.]; Nosok: 21.VII.1977 (P) [Korshunov (2002), as *O. putorana* Korsh. et Nikol.]; Maymecha r., upper flow: 1♀ 21.VII.1982, 1♀ 26.VII.1982, 2♀ 2.VIII.1982 (Zakharzhevskii) [Korshunov (2002), as *O. putorana* Korsh. et Nikol.]. EP.

Oeneis bore (Schn.) – Tareya: 1♀ 3.VIII.1975, 1♀ 4.VIII.1985 (Korshunov *et al.* 1985); Dudinka: 1 ex. 1.–12.VII.1915 (W); Talnakh: 1♂ 30.VII.1985 (M) (determined as f. *ammonoides* Tatarinov et Dolgin by B. Khramov); Rybnaya r.: 1♂ 13.VII.1978 (Korshunov *et al.* 1982); Khantayka: 15.–18.VII.1876 [Trybom (1878), as var. *taygete* Hb.], 1♀ 1901 (S). HA.

Geometridae

Scopula frigidaria (Möschler) – Dika Bay: 3♂ 21.VI.–4.VII.1915 (Starokadomskij); Taymyr Island (missing on Fig. 1; 76º 22' N, 96º 00' E): 1♂ 23.VII.–4.VIII.1901, 1♂ 2.–15.VIII.1901, 1♂ 10.–23.VII.1909 (Birulja); Portnyagino: 1♂ 8.–10.VIII.1933 (Yakovlev); Zaostrowskaya: 1♂ 1♀ 1901 (W); Dudinka: 2♂ 2♀, 1.–12.VII.1901 (W); Noril'sk: 4♂3♀ 21.–29.VII.2001 (K); Talnakh: 3♂ 29.VII. 2002 (K); Eremin's hut: 3♂ 28.VII.2002 (K); Lama: 5♂ 1♀ 26.–28.VII.2002 (K); Sobach'e lake: 1♂ 22.VII.1996 (M&B); Gusikha r.: 1♂ 27.VII.1933 (Yakovlev). HA.

Xanthorhoe decoloraria (Esper) – Noril'sk: 6♂ 1♀ 21.–25.VII.2002 (K); Talnakh: 2♀ 29.VII.2002 (K). HA.

Xanthorhoe ferrugata (Cl.) – Noril'sk: 3♂ 2♀ 21.–25.VII.2001 (K). HA.

Xanthorhoe derzhavini (Djak.) – Ary-Mas: 1♀ VII.1982 (Vasilenko 1995). Nizhnyaya Agapa r.: 1♂ 20.VII.1999 (M&B). The latter specimen may represent subsp. *jakuta* Vasilenko, although the taxonomic affinities of this subspecies remain unclear (V. Mironov, pers. comm.). EP.

Spargania luctuata (Den. et Schiff.) – Noril'sk: 1♂3♀ 21.–25.VII.2001 (K); Talnakh: 1♀ 29.VII.2002 (K). HA.

Rheumaptera hastata (L.) – Cheluskin cape: 1 ex. 2.VII.1934 (parts of wings only); Lama: 2♂ 1♀ 26.–28.VII.2002 (K); Eremin's hut: 7♂ 2♀ 28.VII.2002 (K). HA.

Rheumaptera subhastata (Nolcken) – Noril'sk: 1♂ 21.–25.VII.2001 (K); Talnakh: 2♀ 29.VII.2002 (K); Eremin's hut: 7♂ 5♀ 28.VII.2002 (K); Lama: 1♂ 3♀ 26.–28.VII.2002 (K); Sobach'e lake: 1♀ 22.VII. 1996 (M&B). HA.

Rheumaptera undulata (L.) – Eremin's hut: 1♀ 28.VII.2002 (K). HA.

Psychophora cinderella Viidalepp – N. Taymyr (76º04'30" N, 98º32' W): 2♂ 12.–17.VII. 1991 (Hildén); paratypes: Viidalepp (2001). EP.

Psychophora sabini (Kirby) – Meduza Bay: 1♂ 2♀ 10.–15.VII.1998 (Kh); Sobach'e lake: 1♂ 22.VII.–13.VIII.1996 (M&B). HA.

Entephria punctipes (Curt.) – Ary-Mas: 4♂ 3♀ 27.VI.–16.VIII.1983 (Vasilenko 1990). HA.

Entephria polata (Dup.) – Zaostrowskaya: 1♂ 4♀ 1901 (W); Dudinka: 1♂ 1.–12.VII.1901 (W). It is likely that the record of '*Cidaria polita* Dkp.' [sic!] from Tareya (Chernov 1973) concerns this species. HA.

Aspitates orciferarius Wlk. – Dudinka: 1♀ 1.–12.VII.1915 (W). BE.

Aspitates taylori sibirica Djak. – Khantayka: 1♂ 1♀ 19.VII.1901 (S); Khatanga: 1♂ 1.–14.VII.1905 (Tolmachev); Dudinka: 1♂ 2♀ 1.–12.VII.1915 (W). BE.

Aspitates sp. – Tareya [Chernov (1973), mentioned as '*Aspilates* sp.'].

Lycia lapponaria (Boisd.) – Monjero r., Khatanga system (?): 1♂ V.1874 (Tshekanovskij). PA.

Sphingidae

Hyles gallii (Rott.). – Noril'sk: 1♂ 21.–25.VII. 2002 (K). Numerous larvae have been collected from *Epilobium angustifolium* in the city and on wastelands around it, and several specimens emerged by 5.VIII.2002. HA.

Lymantriidae

Gynaephora rossii (Curt.) – N. Taymyr (76º04'30" N, 98º32' E): 8♂ 5♀ 12.–17.VII.1991 (Hildén); Maymecha r., upper flow, 700 m a.s.l.: 1♀, 1 larva 19.VII.1982 (Zakharzhevskii); Tareya (Chernov 1973); Ary-Mas: 1♀ 5.VIII.1981 (P). BE.

Arctiidae

Dodia albertae eudiopta Tshist. – 25 km S of Kayak: 5♂ 2♀ (Savenkov); Talnakh: 1♂ 23.VII.1964 [both records mentioned by Dubatolov & Zolotarenko (1990) and Dubatolov *et al.* (1997)]. BE.

Acerbia alpina (Quens.) – Bol'shaya Balakhnya r.: 1♀ 25.VII.1934 (Yakovlev) [Sotavalta (1962, 1963) cited this record as River Balakhi; also mentioned by Dubatolov *et al.* (1997)]; Ary-Mas: 1♂ 3.VIII.1981 (P). HA.

Pararctia lapponica Thnbg. – 'Taymyr': Sotavalta (1965), Dubatolov & Zolotarenko (1990); Tareya: 1♂ 5.VIII.1974 (Elshin) [record mentioned by Dubatolov *et al.* (1997) as 'Gnareja' – *lapsus calami*], 1♀ 13.VII.1966, 1♂ 17.VII.1966, 1♂ (*ex pupa*) VII.1966 (C); Khatanga: 1♂ (*ex pupa*) 22.VI.1985 (Detkova). HA.

Pararctia subnebulosa tundrana Tshist. – Svyatovo Pavla [Is.] (old name): Tshistjakov (1990), as *P. tundrana*; mouth of Yenisey 75° N, 85° E (in fact, these coordinates refer to sea far from Yenisey): 1♂ 1914 [Sotavalta (1965), as *Hyphoraria subnebulosa* Dyar]; Tareya: 1♂ VII.1967 (C) [Chernov 1973, as *Hyphoraia subnebulosa* Dyar]; Ary-Mas: 1♂ 5.VIII.1981 (P); Kresty: 1♂ 1♀ 12.VII.1976 (Eskov); Malaya Lagota r., left tributary of Bolshaya Lagota r., right tributary of East Taymyra r.: 1♂ VII.1984 (Chupin); Nizhnyaya Agapa r., 40 km from the headwater: 1♂ 23.VII.1973 (Zherikhin); Noril'sk: 1♂ 13.–18.VII.1967 [Tshistjakov (1990), as *P. tundrana*]. EP.

Eilema vakulenkoi Tshist. – Ary-Mas: 1♂ 15.VII. 1985 (Chupin) (Dubatolov & Zolotarenko 1990). EP.

Noctuidae

[*Euchalcia modestoides* Poole] – 'Taymyr' [Kljuchko (1985), as *E. modesta* Hb.]. The record is doubtful as the northern distribution range of this species lies much more south (see Goater *et al.* 2003).

Syngrapha diasema (Boisd.) – Dudinka (Kljuchko 1988); Eremin's hut: 1♂ 28.VII. 2002 (K). HA.

Syngrapha interrogationis (L.) – Dudinka (Kljuchko 1988); Eremin's hut: 1♂ 28.VII. 2002 (K). HA.

Syngrapha transbaikalensis Stgr. – Dudinka (Kljuchko 1988). EP.

Syngrapha hochenwarthi (Hochw.) – Dudinka: 1♂ 23.VII.1955 [record mentioned by Kljuchko (1988) and Zolotarenko (1990) as *Caloplusia hochenwarthi*]. PA.

Syngrapha parilis (Hb.) – 'Taymyr': Kononenko (1997). HA.

Sympistis heliophila (Payk.) – Talnakh: 1♂ 29.VII.1964, 1♂ 4.VIII.1964 (Z) (Zolotarenko 1990); Eremin's hut: 5♂ 28.VII.2002 (K); Khantayskoe lake: 1♂ 15.VII.1980 (P) (Zolotarenko 1990). HA.

Sympistis nigrita (Boisd.) – Sobach'e lake: 10♂2♀ 22.VII.–13.VIII.1996 (M&B); 'Taymyr': Chernov (1973, 1978), Kononenko (1997). All records belong to ssp. *zetterstedti* Stgr.]. HA.

Sympistis lapponica (Thnbg.) – 25 km S of Kayak: 2 exx. 29.VII.1980 (Savenkov) (Kononenko 1997); Sobach'e lake: 1♀ 13.VIII. 1996 (M&B). HA.

Hillia iris (Zett.) – Snezhnogorsk: 1♂ 10.VIII. 1965 (Kharinova) (Zolotarenko 1990). HA.

Coranarta carbonaria (Chr.) – 'Taymyr': Kononenko (1997); unidentified locality between Noril'sk and Dudinka [indicated in figure 25 by Lafontaine *et al.* (1987b)]. EP.

Papestra biren (Goeze). – Lama: 1♂ 26.–28.VII. 2002 (K). HA.

Polia richardsoni Zett. – Tareya: 1 ex. VII.1966 (C) (Chernov 1973, 1978, Kononenko 1997); Nizhnyaya Agapa r.: 1 ex. 23.VII.1973 (Zherikhin) (Kononenko 1997); Ami-Neri (?): 1♂ 12.VIII.1928 (Tolmachev). HA.

Lasionycta staudingeri (Möschler) – Khatanga [locality indicated in figure 60 by Lafontaine *et al.* (1986)]; Kresty: 1 ex. 31.VII.1982 (Zherikhin) (Kononenko 1997); Talnakh: 1♂ 30.VIII.1964 [Zolotarenko (1970, 1990); in the last paper the collection date is given as 1.VIII.1964]. HA.

Lasionycta leucocycla albertensis (McDonnough) – Bol'shaya Romanikha r., 11 km from mouth: 2 exx. 11.VII.1977 (Zherikhin) (Kononenko 1997); Maimera r., 3 km from mouth 25.VII.1971 (Ponomarenko) (Kononenko 1997); Bol'shaya Kheta r. near Dudinka: 1♂ 28.VII.1966; 80 km S Khatanga [indicated in figure 59 by Lafontaine *et al.* (1986)]. HA.

Xestia liquidaria (Ev.) – 25 km N of r. Gusikha mouth: 2♂ 27.VII.1933 (Yakovlev); Meduza Bay (Syroechkovskij *et al.* 2000); unidentified locality at 76º N, 110º E [figure 9 in Lafontaine *et al.* (1983)]; Tareya: 1 ex. 9.VII.1966 (C) (Chernov 1973, 1978, Kononenko 1997); Gorbita r.: 9♂ 20.VII.1929 (Makarjin); Ary-Mas: 2♂ VII.1983 (P); Boganida r.: Ménétriés (1851), as *Amphidasis unifasciata* Men.; Uboinaya r.: 30.–31.VII.1984 (Tomkovich) (Kononenko 1997); Malaya Lagota r. mouth: 1♂ 29.VII.1983 (P). BE.

X. aequaeva (Benjamin) – 'Taymyr': 2♂ 12.VII.1946 (Svizhenko); Taymyr Island (missing on Fig. 1; 76º 22' N, 96º 00' E): 1 ex. 26.VII.–10.VIII.1901 (Birulja) (Kononenko 1997); N. Taymyr (76º04'30' N, 98º32' E): 2♀ 12.–17.VII.1991 (Hildén); unidentified locality at 76º N, 110º E [figure 4 in Lafontaine *et al.* (1983)]; Tareya: 1 ex. VII.1966 (C) (Kononenko 1997); Uboinaya r.: 25.VII.1984 (Tomkovich) (Kononenko 1997). BE.

X. speciosa (Hb.) – Talnakh: 5♂ 4.–6.VIII.1964 (Z) (Zolotarenko 1970, 1990). HA.

X. laetabilis (Zett.) – Talnakh: 2♂ 22.VII.1964 (Z) (Zolotarenko 1970, 1990); Noril'sk: 2♂ 4.VIII.1964 (Z) (Zolotarenko 1970). PA.

X. tecta (Hb.) – 'Taymyr': Kononenko (1997); unidentified locality near Taymyr lake [figure 1 in Lafontaine *et al.* (1987a)]; Ary-Mas: 1♀ 3.VIII.1981 (P) (Zolotarenko 1990); Talnakh:

1♀ (*ex pupa*) 20.VII.1964, 2♂ 26.VII.–4.VIII.1964 (Z) (Zolotarenko 1970, 1990). HA.

X. okakensis morandi (Benjamin) – Dudinka: 1.VIII.1878 (S) [Lafontaine *et al.* (1987a), as *X. okakensis okakensis* Packard]. BE.

X. lorezi kongsvoldensis (Grönlien) – Unidentified locality between Noril'sk and Dudinka [indicated in figure 4 by Lafontaine *et al.* (1987a)]; Talnakh: 1 ex. 6.VIII.1964 [Zolotarenko (1990), as *X. sajana*, now considered ssp. of *lorezi*]. HA.

X. fergusoni Lafontaine – Kresty: 1♀ 12.VII. 1976 (Eskov) (Kononenko 1997). BE.

X. quieta (Hb.) – Ary-Mas: 1♂ 5.VIII.1981 (P); 25 km S of Kayak: 2 exx. 19.–27.VII.1980 (Savenkov) (Kononenko 1997); Ayan lake: 1 ex. 15.VII.1983 (Eskov) (Kononenko 1997); Khantayka: 2♂ 15.VII.1876 (Jacobson) (Kononenko 1997); Bai-Mura-Nery Bay (?): 1 ex. 28.VII.1976 (Kononenko 1997). HA.

X. albuncula (Ev.) – Noril'sk: Zolotarenko (1970), as *X. hyperborea* Zett.; Talnakh: 9♂ 2♀ 25.VII.–6.VIII.1964 (Z) [Zolotarenko (1990) mentioned 74 exx. from Talnakh, possibly counting also unpinned materials]. BE.

X. penthima (Erschoff) – 'Taymyr' (Kononenko 1997). EP.

X. innuitica Laf. & Hansel. – Talnakh (Kononenko 2005). BE.

Actebia fennica (Tausch.) – Noril'sk (Zolotarenko 1970). HA.

Trichosilia arctica Kononenko – Ary-Mas: 1♂ 5.VIII.1983 (P) [Zolotarenko (1990), as *T. arctia*]. BE.

Euxoa ochrogaster (Gn.) – Noril'sk [Zolotarenko (1970), as *E. islandica* Stgr.]. HA.

Euxoa churchillensis (McDunnough) – Tareya: 2♂ 1♀ (*ex larva*) 3.–5.VII.1968 (C) (Kononenko *et al.* 1996). BE.

4. Discussion

The distribution of moths and butterflies at the extreme North of Eurasia is documented quite poorly. Among the regions beyond the Polar Circle, comprehensive faunistic lists (including all taxa of Lepidoptera) exist for the Northern Fennoscandia only. Fauna of the Finnish Lapland and the Kola Peninsula amounts around 700 species (Linnaluoto & Koponen 1980, Kozlov & Jalava 1994, Kozlov *et al.* 2000). Some 300 species have been recorded in Polar Ural (J. Kullberg, unpubl.). On the basis of this information we estimate that our list includes approximately 25–35% of the species that can be expected from the Taymyr national district. However, this estimate concerns mainly the southern parts of this region, south of the 70º N; the diversity sharply declines to the north, and only seven specimens of four species of Lepidoptera have been collected during four summers in Severnaya Zemlya archipelago (O. Makarova, pers. comm.).

The present list includes only 56 species of the so-called "microlepidoptera" (36% of the total list), while in the much better studied Kola Peninsula (Kozlov & Jalava 1994, Kozlov *et al.* 2000, unpubl.) this group forms 62% the fauna. However, despite of the fragmentary character of the available material, several biogeographically important species were included. In particular, record of *Greya variabilis* in Taymyr is approx. 3,500 km to the East of the Provideniya Bay, the only locality from where this species had been reported in Palaearctic (Kozlov 1996). *Argyroploce mengelana* is new to East Palearctic region (so far known from North America and Novaya Zemlya), and *Clepsis mehli* was so far known only from Norway. These examples reveal our poor knowledge of the fauna of northern Siberia.

The fauna of Taymyr consists generally of boreal peat-bog and arctic or arctoalpine species, some of which (e.g. *Colias hecla*, *C. tyche*, *Agriades glandon*) have relict populations in Northern Fennoscandia which is separated from the continental arctic continuum by the White Sea. The largest part of Lepidoptera recorded in Taymyr (70 species; 45%) is widely distributed, with 67 species having Holarctic range, and three being cosmopolitan (*Plutella xylostella*, *Monopis weaverella*, *Vanessa cardui)*. Beringian and Palaearctic groups are represented by 30 and 31 species, respectively, and 24 species are restricted to the Eastern Palaearctic. Note that many of the so-called Beringian species are distributed far more to the West than the actual Beringia, which is located around both sides of the Beringian strait. The specialities of Taymyr are several high-arctic relict species restricted to the most

arctic areas, such as *Euxoa churchilliensis*, *Udea torvalis*, *Gynaephora rossii* and *Argyroploce mengelana*. Thus, the fauna of moths and butterflies of Taymyr is clearly more similar to that of the East Palaearctic or even Polar Ural than to that of northwestern Europe. Many of the eastern species reach Urals mountains or the even more western Kanin peninsula. In an European perspective, this fauna looks quite exotic and may resemble the one that existed in Europe during the ice ages.

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