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Ground beetles (Coleoptera, Carabidae) of the central part of the Badzhal Range, Khabarovskii Krai, Russia

Жужелицы (Coleoptera, Carabidae) центральной части Баджальского хребта, Хабаровский край

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Ключевые слова: Carabidae, фауна, Баджальский хребет, Дальний Восток России.

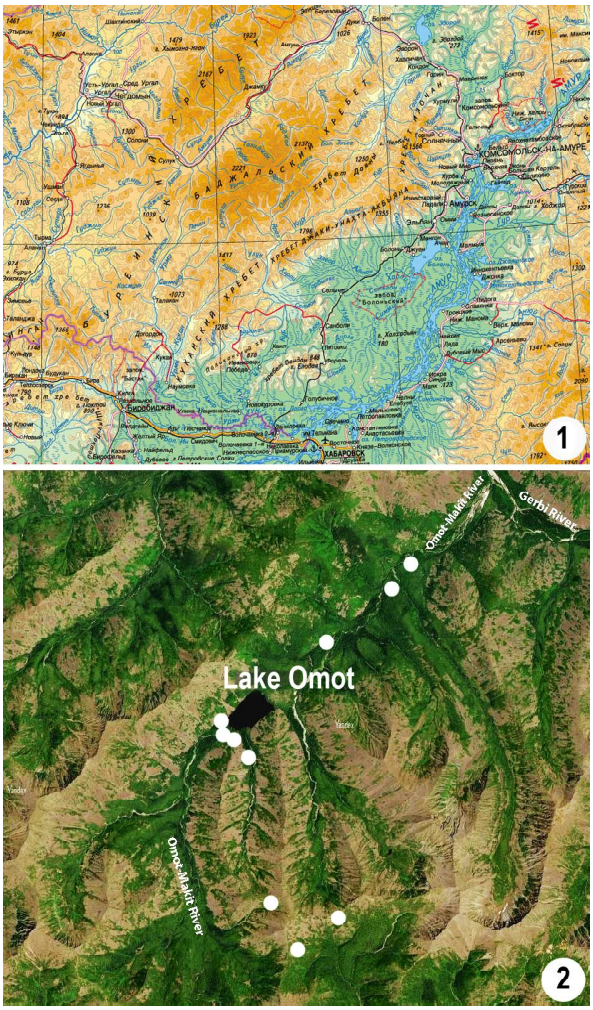
Abstract. A list of 76 Carabidae species from 21 genera is presented for the central part of the Badzhal Range, Khabarovskii Krai, Russia on the basis of an examination of c. 2000 specimens. The altitudinal-zonal distribution of ground beetle populations along the Omot-Makit River basin in central part of the ridge is analyzed. Representatives of the genera *Pterostichus* and *Carabus* are predominate in the zonal biotopes. The fauna of carabid beetles of the Badzhal Range is characterized as «Arctic-montane» according to the generic composition, with a high number of East Asian boreal-montane endemic species.

Резюме. На основании литературных данных и изучении более 2 тысяч экземпляров, впервые составлен список Carabidae Баджальского хребта, включающий 76 видов из 21 рода. Проанализировано высотно-поясное население жужелиц в бассейне р. Омот-Макит (центральная часть хребта). Показано, что численно в зональных биотопах этой реки доминируют представители родов *Pterostichus* и *Carabus*. Таксономический анализ показывает, что на уровне родовых групп карабидофауна Баджальского хребта имеет ярко выраженные черты арктомонтанной фауны, обогащенной значительной долей восточноазиатских бореомонтанных эндемиков видового уровня.

Introduction

The Badzhal Range is one of the southern and highest ridges of the Amur Region [Gvozdecki, Golubchikov, 1987], located in the interfluve of the Amur and Amgun rivers, 200–220 km to the north of Khabarovsk (Fig. 1). Its length from the southwest to the northeast is about 220 km, and the maximum heights exceed 2000 m altitude (Mt. Korol, 2263 m; Mt. Ulun, 2221 m; Mt. Koroleva, 2219 m). According to one of the floristic zoning schemes, along the southern foothills of the Badzhal Radge there is a border between the Manchurian province of the East Asian floristic region and the Okhotsk-Kamchatka province of the Circumboreal floristic region [Mishina, 2003].

Despite the fact that in the second half of the 20th century and the beginning of the 21st century, the collection of ground beetles on the Badzhal Range was quite active, there are almost no publications on the collected material. For example, we know that in the foothills of the Badzhal Range and the Amgun River valley small collections of ground beetles were made by A.I. Kurentsov and D.G. Kononov in 1957, O.G. Gamerova, A.S. Pleshanov, A.V. Tokmakov and V.I. Epova in 1983, M.E. Cherniakhovsky in 1984 and A.A. Kuzmin in 1995. Interesting materials on Carabidae were collected in the highlands of the ridge by the famous geologist and entomologist O.N. Kabakov (1965) and ornithologist A.A. Nazarenko (1978 and 1979). The fruitful year for studying the fauna of Badzhal Range was 1997, when five coleopterologists worked at once on its territory: A.E. Brinev, V.A. Komarov and theriologist S.V. Kruskop (the Mogdy River basin in the western part of the ridge) and D.E. Lomakin, A.V. Plutenko and Yu.N. Sundukov (Gerbi River basin in the central part). In our century, the highlands of this ridge were visited by entomologists E.V. Novomodnyi (2001), D.N. Kochetkov (2007), A.E. Brinev and P.V. Budilov (2014). However, according to literary data from the Badzhalsky Range and the Amgun River valley only 20 species from 10 genera of the family Carabidae were indicated, and 6 of them were described as new taxa [Lafer, 1978, 1989; Shilenkov, 1987; Obydov, 1999, 2005; Brinev, Shilenkov, 2001; Zamotajlov, Lafer, 2001; Plutenko, 2004; Sundukov, 2005, 2011, 2013, 2019; Zamotajlov, 2005, 2017; Dudko, 2006; Brinev, Budilov, 2007; Koshkin et al., 2016; Deuve, Reuter, 2019].



Figs 1–2. 1 — Badzhal Range on the map of the Amur Region; 2 — Map of the Omot-Makit River basin. White circles indicate the location of soil traps. The map was received from the site https://yandex.ru/maps/.

Рис. 1–2. 1 — Баджальский хребет на карте Приамурья; 2 — карта бассейна р. Омот-Макит. Белые кружки указывают расположение почвенных ловушек. Карта получена с сайта https://yandex.ru/maps/.

Unfortunately, we are not able to study all the material collected by the listed collectors. But, given the scarce information on the carabid fauna of the Badzhal Range (as a whole for the mountains of the Northern Amur region), we consider it to be useful to publish a list of ground beetles of this region, based on literature data and materials studied by the first author to date.

Research area

The studies were conducted in 1997 in the Gerbi River basin, located in the central, highest part of the Badzhal Range (Fig. 1, 8). Since the main collection of ground beetles were made in the Omot-Makit River basin, the following is the description of the natural conditions of this region only (Figs 2–7).

The vertical zonation in the central part of Badzhal Range is well defined. In the Omot-Makit River basin two high-altitude zones of vegetation - mountain-forest and mountain-tundra are clearly distinguished.

The mountain forest zone (900–1600 m alt.) occupies the valleys of the Omot-Makit River and its tributaries, as well as the adjacent slopes. It is represented by three main formations: 1) floodplain spruce forests with the addition of fir and poplar (900–1300 m alt.); 2) swampy valley larch forests rising along streams to 1500–1600 m alt.; 3) mountain larch forests on the slopes, sometimes reaching a heigh of 1700 m altitude.

The mountain-tundra zone occupies the upper part of the watersheds and plateau above 1700–1800 m altitude and is represented by small sections of the Arctic-Alpine shrubbery or moss-lichen tundra with significant participation of dwarf stone pine. From the foot of the slopes to the watersheds, large areas are occupied by placer stones, the development of which is associated with the influence of systematic wild fires [Man'ko, 1961].

In the middle course of Omot-Makit River, at an altitude of 1155 m, there is a fairly big Lake Omot, an area of about 0.3 km^2 (Figs 4, 7). It is believed that the lake arose as a result of a powerful seismic collapse of the mountain slope.

Material and methods

The collection of the first author that was made July 2–4, 1997 in the lower and middle reaches of Gerbi River and July 5–21 of the same year — in the basin of its left tributary, Omot-Makit River was the basis for this work (Fig. 2). During this time, 1964 specimens of adults of ground beetles belonging to 71 species from 17 genera and 13 tribes were collected and studied. The bulk of this material is stored in the collection of the Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok (FEB). In addition, the materials of E.V. Novomodnyi (collected in 2001 in Omot-Makit River basin), D.N. Kochetkov (in 2007, at the source of Omot River) and a few specimens from the collections of the FEB, Moscow State Pedagogical University and Zoological Institute of the Russian Academy of Sciences, St. Petersburg (a total 49 specimens of 19 species). Taking into account the literature data, the general list of ground beetles of Badzhal Range in this work includes 76 species from 21 genera and 15 tribes.

In the study of ground beetles, we used the most affordable methods: manual collection, collection using an exhauster and trapping in soil traps. As soil traps, 200 ml plastic glasses filled with a 2–4 % aqueous solution of acetic acid were used.

The taxonomic sequence of subfamilies and tribes in the list is given according to their position in the catalogue of the ground beetles of Sikhote-Alin [Sundukov, 2013], and genera, subgenera within the genus and species within the subgenus, in alphabetical order.

The frequently cited collector name of Yu. Sundukov in the labels for the material is abbreviated as YS.

List of species

Carabidae Latreille, 1802

Cicindelinae Latreille, 1802

Cicindelini Latreille, 1802

Cicindela (*Cicindela*) *restricta* Fischer von Waldheim, 1828

Cicindela (*Cicindela*) *restricta* Fischer von Waldheim, 1828: Lafer, 1978: 9–10 (Badzhal River; Amgun River near Duki; Amgun River near Pupok Mt.).

Material. Omot-Makit River, h~900–1000 m, 24–25.VI.2001, E. Novomodnyi leg., 3 ex.; source of Omot River (Urmi River basin), h~2000 m, tundra, 10–13.VII.2007, D. Kochetkov leg., 3 ex.

Cicindela (*Cicindela*) *transbaicalica* Motschulsky, 1844

Cicindela (*Cicindela*) *transbaicalica* Motschulsky, 1844: Lafer, 1978: 14 (Amgun River near Pupok Mt.).

Nebriinae Laporte, 1834

Nebriini Laporte, 1834

Leistus (*Leistus*) *niger* Gebler, 1847

Leistus (*Leistus*) *niger* Gebler, 1847: Sundukov, 2013: 48 (Badzhal Range).

Material. Middle course of Gerbi River, h~700–800 m, 3–4.VII.1997, YS, 13 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 4 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 4 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 5 ex.; Omot-Makit River from Omot Lake to the upper reaches, h~1170–1400 m, 7–9.VII.1997, YS, 1 ex.; the upper reaches of Urmi River, h~1500 m, VI.1978, A. Nazarenko leg., 1 ex.

Nebria (*Boreonebria*) *biseriata* Lutshnik, 1915

Material. Lake Omot, h~1170 m, valley coniferous forest, 8–13.VII.1997, YS, 2 ex.; ibid, 9–15.VII.1997, YS, 7 ex.; ibid, 13–20.VII.1997, YS, 43 ex.; ibid, 25.VI.2001, E. Novomodnyi leg., 2 ex.; the upper reaches of Omot-Makit River, h~1180–1400 m, dark coniferous forest, 7–9.VII.1997, YS, 10 ex.; Badzhal Range, h~1800–2000 m, anonymous, 1 ex.

Nebria (*Boreonebria*) *frigida* R.F. Sahlberg, 1844

Material. Middle course of Gerbi River, h~700–900 m, 3–4.VII.1997, YS, 17 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 31 ex.; Omot-Makit River 3 km below Lake Omot, h~1050 m, 6.VII.1997, YS, 4 ex.; ibid, 12.VII.1997, YS, 2 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 4 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 152 ex.; ibid, 13–20.VII.1997, YS, 23 ex.; source of Omot River, h~1800–2000 m, mountain tundra, 7–19.VII.1997, YS, 1 ex.; tundra, 25.VI 2001, E. Novomodnyi leg., 1 ex.

Nebria (*Boreonebria*) *gyllenhali* (Schönherr, 1806)

Material. Middle course of Gerbi River, h~700–800 m, 3–4.VII.1997, YS, 8 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 6.VII.1997, YS, 3 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 5 ex.

Nebria (*Boreonebria*) *nivalis* (Paykull, 1790)

Material. Middle course of Gerbi River, h~700–800 m, bank of the river, 3–4.VII.1997, YS, 2 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, 5.VII.1997, YS, 6 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 12.VII.1997, YS, 10 ex.; Lake Omot, h~1180 m, on the bank of a stream, 9–15.VII.1997, YS, 1 ex.; the upper reaches of Omot-Makit River, h~1200–1500 m, bank of the river, 7.VII.1997, YS, 1 ex.; source of Omot River, h~2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 19 ex.; the upper reaches of Urmi River, h~1700–2000 m, anonymous, 1 ex.

Nebria (*Boreonebria*) *subdilatata* Motschulsky, 1844

Material. Middle course of Gerbi River, h~700–800 m, pebble bank of river, 3–4.VII.1997, YS, 4 ex.; Omot-Makit River 3 km below Lake Omot, h~1050 m, 6.VII.1997, YS, 1 ex.; ibid, 12.VII.1997, YS, 2 ex.

Nebria (*Catonebria*) *baicalopacifica* Dudko et Shilenkov, 2006

Nebria (*Catonebria*) *baicalopacifica* Dudko et Shilenkov, sp.n.: Dudko, 2006: 26 (the upper reaches of the Omot-Makit River).

Material. Middle course of Gerbi River, h~800 m, pebble bank of river, 4.VII.1997, YS, 1 ex.; source of Omot River, tundra, 25.VI.2001, E. Novomodnyi leg., 2 ex.

Nebria (*Catonebria*) *catenulata* Fischer von Waldheim, 1820

Nebria (*Catonebria*) *catenulata* Fischer von Waldheim, 1820: Dudko, 2006: 21 (Gerbi River 12 km SE of Gerbi; lower course of the Omot-Makit River; Dzhamku River).

Material. Middle course of Gerbi River, h~800 m, pebble bank of river, 4.VII.1997, YS, 3 ex.; lower course of Omot-Makit River, h~900–1000 m, 5.VII.1997, YS, 5 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 12.VII.1997, YS, 1 ex.

Nebria (*Reductonebria*) *ochotica* R.F. Sahlberg, 1844

Material. Middle course of Gerbi River, h~700–800 m, pebble bank of river, 3–4.VII.1997, YS, 8 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, bank of the river, 15–21.VII.1997, YS, 9 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 12.VII.1997, YS, 22 ex.; Omot-Makit River from Omot Lake to the upper reaches, h~1170–1400 m, 7–9.VII.1997, YS, 7 ex.

Notiophilini Motschulsky, 1850

Notiophilus fasciatus Mäklin, 1855

Material. 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 1 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 6.VII.1997, YS, 2 ex.; ibid, 12.VII.1997, YS, 1 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 17 ex.; Lake Omot, h~1180 m, larch forest at the foot of the slope, 8–13.VII.1997, YS, 12 ex.; ibid, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 22 ex.; ibid, 13–20.VII.1997, YS, 11 ex.; Omot-Makit River from Omot Lake

Figs 3–8. Habitats of Carabidae in Badzhal range. 3 — The source of the Omot River; 4 — View of the Lake Omot from the watershed of the Omot and Omot-Makit rivers; 5 — Placer stones in the foreground — the habitat of *Pterostichus orion*, *Pt. longipes* and *Pt.* (*Cryobius*) sp. 4; 6 — View of the Ulun Mt., 2221 m alt.; 7 — The Lake Omot; 8 — The Gerbi River in the middle reaches. Photos by A.V. Plutenko.

Рис. 3–8. Местообитания жужелиц Баджальского хребта. 3 — Исток р. Омот-Макит; 4 — вид на оз. Омот с водораздела рек Омот и Омот-Макит; 5 — каменные россыпи на переднем плане — биотоп *Pterostichus orion*, *Pt. longipes* and *Pt.* (*Cryobius*) sp. 4; 6 — вид на гору Улун, 2221 м н.у.м.; 7 — оз. Омот; 8 — р. Герби в среднем течении. Фото А.В. Плутенко.

to the upper reaches, h-1170–1400 m, 7–9.VII.1997, YS, 1 ex.; source of Omot River, h-2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 24 ex.

Carabinae Latreille, 1802
Carabini Latreille, 1802
Carabus (*Aulonocarabus*) *canaliculatus sichotensis* Born, 1914

Carabus (*Aulonocarabus*) *canaliculatus sichotensis* Born, 1914: Sundukov, 2013: 55 (Badzhal Range).

Material. Middle course of Gerbi River, h-700–750 m, floodplain poplar forest, 3.VII.1997, YS, 1 ex.; 3 km above the mouth of Omot-Makit River, h-1000 m, dark coniferous valley forest, 5.VII.1997, YS, 13 ex.; Omot-Makit River 2 km below Lake Omot, h-1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 19 ex.; Lake Omot, h-1180 m, larch forest at the foot of the slope, 8–13.VII.1997, YS, 4 ex.; ibid, h-1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 26 ex.; ibid, 13–20.VII.1997, YS, 3 ex.; source of Omot River, h-2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 3 ex.

Carabus (*Aulonocarabus*) *gaschkewitschii gaschkewitschii* Motschulsky, 1859

Carabus (*Aulonocarabus*) *gaschkewitchi gaschkewitchi* Motschulsky, 1859: Brinev, Budilov, 2007: 29 (Badzhal Range). Deuve, Reuter, 2019: 6 (Badzhal Range).

Material. Source of Omot River, h~2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 24 ex.; ibid, h~1800–2000 m, mountain tundra, 14–19.VII.1997, YS, 90 ex.; source of Omot River (Urmi River basin), h~2000 m, tundra, 10–13.VII.2007, D. Kochetkov leg., 7 ex.

Carabus (*Aulonocarabus*) *kabakovi* Lafer, 1989

Carabus kabakovi: Lafer, 1989: 119 (the upper reaches of the Dariya River; Talijak Plateau; the upper reaches of the Urmi River).

Carabus (*Aulonocarabus*) *kabakovi* Lafer, 1989: Koshkin et al., 2016: 313 (Badzhal Range).

Material. Source of Omot River, h~2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 2 ex.; ibid, h~1800–2000 m, mountain tundra, 14–19.VII.1997, YS, 9 ex.; the upper reaches of Dariya River, VIII 1965, O. Kabakov leg., 1 ex.; the upper reaches of Urmi River, h~1700–2000 m, mountain tundra, 18.VI.1979, A. Nazarenko leg., 1 ex.

Carabus (*Hemicarabus*) *macleayi* Dejean, 1826

Carabus (*Hemicarabus*) *macleayi* Dej.: Shilenkov, 1987: 8 (Amgun station).

Material. Middle course of Gerbi River, h~700 m, bank of the river, 3.VII.1997, YS, 1 ex.

Carabus (*Megodontus*) *vietinghoffii fulgidus* Fischer von Waldheim, 1828

Carabus (*Megodontus*) *vietinghoffi bureianus* Shilenkov, 1996: Obydov, 1999: 92 (Lake Omot), 2005: 23 (Lake Omot).

Material. Middle course of Gerbi River, h~800 m, floodplain forest, 4.VII.1997, YS, 1 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 1 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 15 ex.; Lake Omot, h~1180 m, larch forest at the foot of the slope, 8–13.VII.1997, YS, 12 ex.; ibid, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 3 ex.; source of Omot River, h~2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 16 ex.; source of Omot River (Urmi River basin), h~2000 m, mountain tundra, 10–13.VII.2007, D. Kochetkov leg., 1 ex.

Carabus (*Tomocarabus*) *aurocinctus* Motschulsky, 1844

Material. 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 9 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 13 ex.

Elaphrinae Latreille, 1802
Elaphrini Latreille, 1802
Blethisa multipunctata (Linnaeus, 1758)

Material. Lower course of Gerbi River, h~650 m, sphagnum swamp, 2–3.VII.1997, YS, 3 ex.

Elaphrus (*Elaphroterus*) *angusticollis* R.F. Sahlberg, 1844

Material. Middle course of Gerbi River, h~800 m, coniferous forest, 3.VII.1997, YS, 4 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, bank of a forest stream, 5.VII.1997, YS, 9 ex.

Elaphrus (*Elaphrus*) *riparius* (Linnaeus, 1758)

Material. Lake Omot, h~1170 m, silted shore, 8–13.VII.1997, YS, 1 ex.; ibid, 13–20.VII.1997, YS, 2 ex.; ibid, small lake among dwarf stone pine, 25.VI 2001, E. Novomodnyi leg., 1 ex.

Elaphrus (*Neoelaphrus*) *sibiricus* Motschulsky, 1844

Material. Lake Omot, h~1170 m, silted shore, 13–20.VII.1997, YS, 2 ex.

Broscinae Hope, 1838
Broscini Hope, 1838
Miscodera arctica (Paykull, 1798)

Material. Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, bank of the river, 6.VII.1997, YS, 1 ex.

Trechinae Bonelli, 1810
Trechini Bonelli, 1810
Trechus (*Trechus*) *badzhalicus* Plutenko, 2004

Trechus badzhalicus: Plutenko, 2004: 33 (environs of the Lake Omot).

Trechus (*Trechus*) *badzhalensis* Plutenko, 2004: Sundukov, 2019: 1051 (Badzhal Range).

Tachyini Motschulsky, 1862
Tachyta (*Tachyta*) *nana* (Gyllenhal, 1810)

Material. Omot-Makit River 2 km below Lake Omot, h~1100 m, 5.VII.1997, YS, 6 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 6.VII.1997, YS, 15 ex.; ibid, 12.VII.1997, YS, 13 ex.

Bembidiini Stephens, 1827
Bembidion (*Bembidion*) *mandli* Netolitzky, 1932

Material. Lake Omot, h~1170 m, coastal glades, 13–20.VII.1997, YS, 4 ex.

Bembidion (*Blepharoplataphus*) *hastii* C.R. Sahlberg, 1827

Material. Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, pebble bank of river, 6.VII.1997, YS, 4 ex.

Bembidion (*Diplocampa*) *transparens prostratum* (Motschulsky, 1844)

Material. Lower course of Gerbi River, h~600 m, swampy puddles on the road, 2.VII.1997, YS, 2 ex.

Bembidion (*Eupetedromus*) *sibiricum* Dejean, 1831

Material. Lower course of Gerbi River, h~600 m, swampy puddles on the road, 2.VII.1997, YS, 4 ex.; Lake Omot, h~1170 m, silted shore, 13–20.VII.1997, YS, 13 ex.

Bembidion (*Melomalus*) *altaicum* (Gebler, 1833)

Material. Middle course of Gerbi River, h~700–900 m, pebble bank of river, 3–4.VII.1997, YS, 11 ex.

Bembidion (*Notaphus*) *obliquum* Sturm, 1825

Material. Lake Omot, h~1170 m, silted shore, 9–15.VII.1997, YS, 26 ex.; ibid, 13–20.VII.1997, YS, 23 ex.; ibid, small lake among dwarf stone pine, 25.VI 2001, E. Novomodnyi leg., 4 ex.

Bembidion (*Plataphodes*) cf. *crenulatum*
R.F. Sahlberg, 1844

Material. Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, bank of the river, 5–12.VII.1997, YS, 2 ex.

Comment. Preliminary determination. 2 females were collected. The structure of the pronotum and other characters make it possible to define them as *B. crenulatum*, but a distinct, slightly transverse microsculpture of the elytra brings them closer to *B. fellmanni* (Mannerheim, 1823).

Bembidion (*Plataphodes*) *difficile*
(Motschulsky, 1844)

Material. Source of Omot River, h~1800 m, snowfield edge on gravelly tundra, 14.VII.1997, YS, 7 ex.; the upper reaches of Urmi River, h~1700–2000 m, anonymous, 1 ex.

Bembidion (*Plataphus*) cf. *asiaticum*
Jedlička, 1965

Material. Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, bank of the river, 12.VII.1997, YS, 17 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, bank of the river, 15–21.VII.1997, YS, 31 ex.

Comment. The definition was carried out according to the description of A. Jedlička [1965], since *B. asiaticum* is unknown to us.

Bembidion (*Plataphus*) *gebleri persuasum*
Netolitzky, 1938

Material. Middle course of Gerbi River, h~700–900 m, pebble bank of river, 3–4.VII.1997, YS, 39 ex.; mouth of Omot-Makit River, h~900 m, pebble bank of river, 12.VII.1997, YS, 12 ex.

Bembidion (*Plataphus*) *infuscatipenne*
Netolitzky, 1938

Material. Mouth of Omot-Makit River, h~900 m, pebble bank of river, 12.VII.1997, YS, 22 ex.

Bembidion (*Plataphus*) *prasinum*
(Duftschmid, 1812)

Material. Mouth of Omot-Makit River, h~900 m, pebble bank of river, 12.VII.1997, YS, 5 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, pebble bank of river, 6.VII.1997, YS, 7 ex.

Bembidion (*Terminophanes*) *mckinleyi scandicum* Lindroth, 1943

Material. Omot-Makit River 2 km below Lake Omot, h~1100 m, bank of the river, 21.VII.1997, YS, 4 ex.; source of Omot-Makit River from Lake Omot, h~1170 m, 13.VII.1997, YS, 2 ex.

Patrobini Kirby, 1837
Diplous (*Platidius*) *depressus* (Gebler, 1830)

Diplous (*Platidius*) *dolini*: Zamotajlov, 2005: 50 (environs of Dzhamku).

Diplous (*Platidius*) *depressus* (Gebler, 1829): Sundukov, 2013: 59 (Badzhal Range).

Material. Middle course of Gerbi River, h~700–900 m, pebble bank of river, 3–4.VII.1997, YS, 14 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 6.VII.1997, YS, 6 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, pebble bank of river, 15–21.VII.1997, YS, 16 ex.; Omot-Makit River from Omot Lake to the upper reaches, h~1170–1400 m, 7–9.VII.1997, YS, 1 ex.

Patrobus cinctus Motschulsky, 1860

Material. Omot-Makit River upstream of Omot Lake, h~1200–1250 m, bank of the river, 7.VII.1997, YS, 1 ex.

Platidiolus brinevi
Zamotajlov et Lafer, 2001

Platidiolus brinevi: Zamotajlov, Lafer, 2001: 432 (40 km south of Mogdy, h~1800 m, alpica);

Zamotajlov, 2017: 465 (Badzhal Range).

Harpalinae Bonelli, 1810
Pterostichini Bonelli, 1810
Poecilus (*Poecilus*) *fortipes*
(Chaudoir, 1850)

Poecilus fortipes Chd.: Shilenkov, 1987: 10 (Amgun station).

Material. Lower course of Gerbi River, h~600 m, on the road, 2.VII.1997, YS, 1 ex.

Pterostichus (*Bothriopterus*) *adstrictus*
Eschscholtz, 1823

Material. Middle course of Gerbi River, h~700–900 m, 3–4.VII.1997, YS, 1 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 1 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 6.VII.1997, YS, 1 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 1 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 2 ex.; Omot-Makit River from Omot Lake to the upper reaches, h~1170–1400 m, 7–9.VII.1997, YS, 2 ex.

Pterostichus (*Cryobius*) *amurensis*
(Poppius, 1906)

Material. 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 8 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 8 ex.; Lake Omot, h~1180 m, larch forest at the foot of the slope, 8–13.VII.1997, YS, 10 ex.; ibid, h~1170 m, floodplain dark coniferous forest, 13–20.VII.1997, YS, 54 ex.

Pterostichus (*Cryobius*) cf. *brevicornis* (Kirby, 1837)

Material. Source of Omot-Makit River, h~2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 36 ex.

Comment. Has not been studied in detail. The determination was made according to the publication of P. Erjiomin [1998].

Pterostichus (*Cryobius*) *kurosawai*
Tanaka, 1958

Material. Middle course of Gerbi River at the mouth of Omot-Makit River, h~900 m, 4.VII.1997, YS, 1 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 3 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 39 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 6.VII.1997, YS, 3 ex.; the upper reaches of Omot-Makit River, h~1400 m, 9.VII.1997, YS, 1 ex.

Pterostichus (*Cryobius*) cf. *longipes*
(Poppius, 1906)

Material. Source of Omot-Makit River, h~1800–2000 m, placer stones, 7–19.VII.1997, YS, 19 ex.; the upper reaches of Omot-Makit River, h~1400–1500 m, placer stones, 7.VII.1997, YS, 2 ex.

Comment. Preliminary determination. A detailed comparison with beetles from the Siberian Arctic is required.

Pterostichus (*Cryobius*) *ochoticus* (R.F. Sahlberg, 1844)

Material. 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 7 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 6.VII.1997, YS, 4 ex.; ibid, 12.VII.1997, YS, 4 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 20 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 63 ex.; ibid, 13–20.VII.1997, YS, 15 ex.; source of Omot-Makit River, h~1800–2000 m, mountain tundra, 7–19.VII.1997, YS, 24 ex.

Pterostichus (*Cryobius*) cf. *ventricosus* (Eschscholtz, 1823)

Material. 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 3 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 12.VII.1997, YS, 2 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 41 ex.; ibid, 13–20.VII.1997, YS, 66 ex.

Comment. Preliminary determination. It differs from the nominative form by the structure of the pronotum, microsculpture of the elytra, the color of the palps, the structure of the penis lamella, which is close to the American *Pt. riparius* (Dejean, 1828), as well as its habitat in the forest.

Pterostichus (*Cryobius*) sp. 1

Material. 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 2 ex.; Lake Omot, h~1180 m, larch forest at the foot of the slope, 8–13.VII.1997, YS, 9 ex.

Comment. Perhaps an undescribed species from the «*ochoticus*» species group. Similar to the description of *Pt.* (*Cryobius*) *breviusculus* (R.F. Sahlberg, 1844) [Sahlberg, 1844].

Pterostichus (*Cryobius*) sp. 2

Pterostichus (*Cryobius*) cf. *sojot* Shilenkov, 2000: Sundukov, 2013: 38 (Badzhal Range), 137 (source of the Omot-Makit River).

Material. Source of Omot-Makit River, h~1800–2000 m, mountain tundra, 7–19.VII.1997, YS, 6 ex.; the upper reaches of Omot-Makit River, h~1400–1500 m, placer stones, 7–9.VII.1997, YS, 6 ex.; source of Omot River (Urmi River basin), h~2000 m, tundra, 10–13.VII.2007, D. Kochetkov leg., 2 ex.

Comment. Probably an undescribed species close to the South Siberian *Pt. homalonotus* (Tschitschérine, 1894) or European *Pt. negligens* (Sturm, 1824).

Pterostichus (*Cryobius*) sp. 3

Material. Middle course of Gerbi River, h~700 m, 3.VII.1997, YS, 2 ex.; ibid, mouth of Omot-Makit River, h~900 m, 4.VII.1997, YS, 4 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 3 ex.; Lake Omot, h~1180 m, larch forest at the foot of the slope, 8–13.VII.1997, YS, 9 ex.; ibid, h~1170 m, floodplain dark coniferous forest, 13–20.VII.1997, YS, 1 ex.; Omot-Makit River from Omot Lake to the upper reaches, h~1170–1400 m, 7–9.VII.1997, YS, 3 ex.

Comment. Probably an undescribed species from the «*ochoticus*» species group. It is close to *Pt. kurosawai* Tanaka, 1958, but noticeably smaller (length 6.5–7 mm), with very narrow elytra, heart-shaped pronotum and finely punctured striae of elytra.

Pterostichus (*Cryobius*) sp. 4

Material. Source of Omot-Makit River, h~1800–2000 m, placer stones, 7–19.VII.1997, YS, 9 ex.; the upper reaches of Omot-Makit River, h~1400–1500 m, placer stones, 7.VII.1997, YS, 1 ex.

Comment. Undescribed species from the "*planus*" species group.

Pterostichus (*Eosteropus*) *orientalis* (Motschulsky, 1844)

Material. Shore of Lake Omot at the source of Omot-Makit River, h~1170 m, 12.VII.1997, YS, 2 ex.

Pterostichus (*Lenapterus*) *agonus* G.H. Horn, 1880

Material. Source of Omot-Makit River, h~1800–2000 m, mountain tundra, 7–19.VII.1997, YS, 3 ex.

Pterostichus (*Lenapterus*) *cancellatus* (Motschulsky, 1860)

Pterostichus (*Lenapterus*) *cancellatus* (Motschulsky, 1860): Sundukov, 2005: 813 (Lake Omot; Omot-Makit River; Gerbi River; Dariya River).

Material. Middle course of Gerbi River at the mouth of Omot-Makit River, h~900 m, 4.VII.1997, YS, 2 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 1 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 4 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 22 ex.; ibid, 13–20.VII.1997, YS, 18 ex.; ibid, 26.VI 2001, E. Novomodnyi leg., 5 ex.; ibid, Lake Omot, h~1180 m, larch forest at the foot of the slope, 8–13.VII.1997, YS, 34 ex.; Omot-Makit River from Omot Lake to the upper reaches, h~1170–1400 m, 7–9.VII.1997, YS, 1 ex.; source of Omot-Makit River, h~1800–2000 m, mountain tundra, 7–19.VII.1997, YS, 1 ex.; 30 km south of Mogdy station, h~500 m, larch-birch forest, 10–20.VII.1997, A. Brinev leg., 1 ex.; Dariya River, 7.IX 1965, O. Kabakov leg., 3 ex.

Pterostichus (*Lenapterus*) *saxicola* (Tschitschérine, 1899)

Pterostichus (*Lenapterus*) *saxicola* (Tschitschérine, 1899): Sundukov, 2005: 809 (Lake Omot; Omot-Makit River; Gerbi River).

Material. Middle course of Gerbi River, h~700–900 m, 3–4.VII.1997, YS, 2 ex.; Omot-Makit River 3 km above the mouth, h~1000 m, valley coniferous forest, 5.VII.1997, YS, 2 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 1 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 12 ex.; ibid, 26.VI 2001, E. Novomodnyi leg., 1 ex.; the upper reaches of Omot-Makit River, h~1180–1400 m, dark coniferous forest, 7–9.VII.1997, YS, 2 ex.

Pterostichus (*Metallophilus*) *interruptus* (Dejean, 1828)

Material. Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 3 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, 12.VII.1997, YS, 1 ex.; Lake Omot, h~1170 m, placer stones by the lake, 9–15.VII.1997, YS, 2 ex.; the upper reaches of Omot-Makit River, h~1400 m, 9.VII.1997, YS, 1 ex.; 30 km south of Mogdy station, h~500 m, larch-birch forest, 10–20.VII.1997, A. Brinev leg., 2 ex.

Pterostichus (*Petrophilus*) *eximius*
A. Morawitz, 1862

Material. Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 17 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 38 ex.; ibid, 13–20.VII.1997, YS, 18 ex.; ibid, 25.VI.2001, E. Novomodnyi leg., 2 ex.; Omot-Makit River from Omot Lake to the upper reaches, h~1170–1400 m, 7–9.VII.1997, YS, 4 ex.

Pterostichus (*Phonias*) *kutensis*
Poppius, 1905

Material. Omot-Makit River 3 km above the mouth, h~1000 m, valley coniferous forest, 5.VII.1997, YS, 3 ex.; Lake Omot, h~1180 m, larch forest at the foot of the slope, 8–13.VII.1997, YS, 26 ex.; ibidem, h~1170 m, floodplain dark coniferous forest, 13–20.VII.1997, YS, 4 ex.

Pterostichus (*Pledarus*) *gibbicollis*
(Motschulsky, 1844)

Material. Lower course of Gerbi River, h~600–650 m, forest glade, 2.VII.1997, YS, 1 ex.

Pterostichus (*Tundraphilus*) *orion bureianus*
Brinev, 2001

Pterostichus (*Tundraphilus*) *orion bureianus*: Brinev, Shilenkov, 2001: 804 (source of the Omot-Makit River);
Sundukov, 2013: 130 (Badzhal Range).

Material. The upper reaches of Omot-Makit River, h~1500 m, placer stones, 7.VII.1997, YS, 1 ex.; source of Omot-Makit River, h~1800–2000 m, placer stones, 7–19.VII.1997, YS, 10 ex.

Platynini Bonelli, 1810

Agonum (*Agonum*) *bicolor*
(Dejean, 1828)

Material. Gerbi River valley 2–5 km below the mouth of Omot-Makit River, h~850–900 m, 4.VII.1997, YS, 6 ex.; 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 24 ex.; Omot-Makit River from Lake Omot up to 3 km downstream, h~1050–1170 m, valley coniferous forest, 6.VII.1997, YS, 1 ex.; ibid, 12.VII.1997, YS, 14 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 8 ex.; ibid, 13–20.VII.1997, YS, 1 ex.

Agonum (*Europhilus*) *thoreyi*
Dejean, 1828

Material. Lake Omot, h~1170 m, silted shore, 9–15.VII.1997, YS, 3 ex.

Agonum (*Olisares*) *dolens*
(C.R. Sahlberg, 1827)

Material. Middle course of Gerbi River, h~700–800 m, bank of the river, 3.VII.1997, YS, 2 ex.; Lake Omot, h~1170 m, silted shore, 9–15.VII.1997, YS, 4 ex.

Agonum (*Olisares*) *impressum*
(Panzer, 1796)

Material. Lower course of Gerbi River, h~600–650 m, bank of the river, 2.VII.1997, YS, 1 ex.

Sericoda quadripunctata
(De Geer, 1774)

Material. Source of Omot River (Urmi River basin), h~2000 m, tundra, 10–13.VII.2007, D. Kochetkov leg., 1 ex.

Zabrini Bonelli, 1810

Amara (*Amara*) *anxia* Tschitschérine, 1898

Material. Source of Omot-Makit River, h~1800–2000 m, mountain tundra, 7–13.VII.1997, YS, 4 ex.; ibid, 14–19.VII.1997, YS, 1 ex.

Amara (*Amara*) *communis* (Panzer, 1796)

Material. Lower course of Gerbi River, h~600–650 m, bank of the river, 2.VII.1997, YS, 1 ex.

Amara (*Amara*) *kingdonoides* Hieke, 2002

Material. Omot-Makit River from Omot Lake to the upper reaches, h~1170–1400 m, 7–9.VII.1997, YS, 5 ex.; source of Omot-Makit River, h~2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 3 ex.

Amara (*Amara*) *lunicollis* Schiødte, 1837

Material. Lower course of Gerbi River, h~600–700 m, road in the larch forest, 2.VII.1997, YS, 2 ex.; middle course of Gerbi River, h~700–900 m, bank of the river, 3–4.VII.1997, YS, 3 ex.

Amara (*Celia*) *brunnea* (Gyllenhal, 1810)

Material. 3 km above the mouth of Omot-Makit River, h~1000 m, dark coniferous valley forest, 5.VII.1997, YS, 2 ex.; Omot-Makit River 2 km below Lake Omot, h~1100 m, floodplain dark coniferous forest, 15–21.VII.1997, YS, 9 ex.; Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 7 ex.

Harpalini Bonelli, 1810

Harpalus (*Harpalus*) *affinis* (Schrank, 1781)

Material. Lower course of Gerbi River, h~600–650 m, on the road, 2.VII.1997, YS, 1 ex.

Harpalus (*Harpalus*) *laevipes*
Zetterstedt, 1828

Material. Lake Omot, h~1170 m, floodplain dark coniferous forest, 9–15.VII.1997, YS, 1 ex.; ibid, 13–20.VII.1997, YS, 2 ex.

Lebiini Bonelli, 1810

Cymindis (*Baicalotarus*) *collaris*
Motschulsky, 1844

Cymindis (*Baicalotarus*) *collaris* (Motschulsky, 1844): Sundukov, 2011: 336 (Amgun River near Beresovy).

Material. Lower course of Gerbi River, h~600–650 m, on the road, 2.VII.1997, YS, 1 ex.

Cymindis (*Tarulus*) *vaporariorum*
(Linnaeus, 1758)

Cymindis (*Tarus*) *vaporariorum* (Linnaeus, 1758): Sundukov, 2011: 340 (source of the Omot-Makit River; 30 km south of Mogdy).

Material. Source of Omot-Makit River, h~2000–2100 m, dwarf stone pine tundra, 7–19.VII.1997, YS, 1 ex.; 30 km south of Mogdy station, h~500 m, larch-birch forest, 10–20.VII.1997, A. Brinev leg., 3 ex.

Conclusion

In total, in our article about the Badzhal Range, 76 species, 21 genera, and 15 tribes of Carabidae are indicated. Of them, 68 species from 19 genera and 15 tribes were found directly in the mountains (zones of mountain forests and mountain tundra).

The statistics of our collections in the Omot-Makit River basin (1846 specimens from 63 species, 18 genera, 15 tribes) shows that the tribe Pterostichini (19 species, 734 ex.) clearly dominates in the number of species and specimens both in the forest and in the tundra. Tribes Nebriini (9 species, 391 ex.), Bembidiini (11 species, 173 ex.) and Carabini (5 species, 270 ex.) are also richly represented.

In the mountain forest zone, at altitudes of 900–1600 m, representatives of the genus *Pterostichus* dominate (13 species, 614 ex.). Ground beetles of the genera *Bembidion* (10 species, 176 ex.), *Nebria* (7 species, 353 ex.), *Carabus* (3 species, 118 ex.), *Notiophilus* (1 species, 67 ex.), and *Agonum* (3 species, 61 ex.) are also numerous.

The same situation is observed in the mountain-tundra zone, at altitudes of 1500–2100 m, where the most common species of the genera *Pterostichus* (8 species, 120 ex.), *Carabus* (4 species, 152 ex.), *Nebria* (3 species, 23 ex.) and *Notiophilus* (1 species, 24 ex.).

Moreover, in all zonal biotopes of the Omot-Makit River basin the most numerous are ground beetles of the subgenus *Cryobius* of the genus *Pterostichus*, which make up 22 % of the species diversity and 31 % of the collected specimens in the mountain tundra, 12 % and 25 % in the mountain forests, and in general in the Omot-Makit River basin — 16 % and 26 %, respectively.

Thus, at the level of the tribal groups of the carabidofauna of the Badzhal Range, it has pronounced features of the arctomontane fauna in the understanding of O.L. Makarova et al. [2013], enriched with a significant proportion of East Asian boreomontane endemic species.

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