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национальный природный парк»

**Катонқарағай мемлекеттік ұлттық
табиғи паркінің еңбектері**

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

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Катонқарағай мемлекеттік ұлттық табиғи паркінің еңбектері
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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.

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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-

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КАТОНҚАРАҒАЙ ҰЛТТЫҚ ПАРКІНІҢ (ШЫҒЫС ҚАЗАҚСТАН) ЕРІНАЯҚТЫ КӨПАЯҚТЫЛАРДЫ (MYRIAPODA: CHILOPODA) ЗЕРТТЕУ ТАРИХЫ

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Аннотация. Катонқарағай ұлттық табиғи паркінің Chilopoda зерттеу тарихы қарастырылады және 4 тұқымдас, 4 туыс және 2 отрядтың 11 түрден тұратын фауналық тізімі келтіріледі.

REVIEW THE HISTORY OF STUDY OF CENTIPEDES (MYRIAPODA: CHILOPODA) IN THE KATON-KARAGAI NATIONAL PARK (EAST KAZAKHSTAN)

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Abstract. The article reviews the history of the study of Chilopoda of the Katon-Karagay National Nature Park. It gives the faunal list including 11 species from 4 genera, 4 families and 2 orders.

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DATA ON DRAGONFLIES AND DAMSELFLIES (ODONATA) OF THE KATON-KARAGAI NATIONAL NATURE PARK, ALTAI MTS, KAZAKHSTAN

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Abstract. Katon-Karagay State National Nature Park is situated in the most elevated part of the Altai Mts so its territory is in general hostile for Odonata. Fifteen species of those were registered on three author's week-long trips to the Park in 1987, 2010 and 2012. Of them, findings of *Sympetrum meridionale* were remarkable as this species occurs in the most elevated part of Altai Mts but for some reason was not found in low levels, as well as on the plains of Siberia. Three more species are known from the park territory from literature, with the record of *Somatochlora exuberata* currently being the westernmost one of the species.

Introduction

The Altai Mountains, with their considerable elevations, fast cold rivers in narrow gorges and scanty of stagnant water, are generally hostile for Odonata. This is especially true for the Katon-Karagay State National Nature Park, which is situated in the most elevated part of the mountains in the easternmost territory of Kazakhstan, occupying the upper Bukhtarma River basin including its sources, 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) from south to north [2, 9]. Hypsometrically its lowest point is ca 550 m a.s.l., at the place where the Bukhtarma River leaves the Park territory near Ust'-Yazovaya village, while the highest point is the Belukha Mountain top of 4,509 m a.s.l. The Odonata fauna of the Park was poorly studied (see below).

The author made three short visits to the Park on 1 and 14–18 VII 1987, 26–31 VII 2010 and 28 VI–6 VII 2012, focused mostly on butterflies. Nevertheless some observations and collections of Odonata were made along. Since the Odonata habitats examined were quite localised, these data are published below in a locality-wise manner

Data from literature

German odonatologists Klaus Reinhardt and Jörg Samietz shortly visited the park in 1999 [7-8]. Unfortunately the geographical coordinates in their paper [8] are corrupted. For instance, the longitude for localities 9 and 10 are indicated as impossible values 85°69' E and 85°68' E, respectively. (It could be supposed that the figures obtained in decimal degree format were erroneously presented as if in the degrees and minutes format. However, locality 10 is said to be a bay in Markakol Lake with the latitude of 49°19' N while the northernmost tip of that lake is at 48°49' N, the difference of 30' being about 55 km, while the above mentioned format confusion would make it even greater). Hence the correct values cannot be reconstructed from that paper, while the descriptions of 7 of 21 localities (enumerated without geographical or temporal regularity) did not refer to any toponym and the coordinates were intended the sole way of their identifications. To overcome this difficulty, Klaus Reinhardt (pers. comm.) kindly made efforts to reconstruct correct coordinates for some of their localities. In spite of the above mentioned complications, combined data from both sources, an informal report including road impressions and mentioned particular Odonata species [7], and formal paper [8] still allow to reconstruct their route, which was confirmed by K. Reinhardt. They entered the park territory through the 'Austrian road' in the Kara-Koba River valley (loc. 17) on 11 VI 1999, examined supposedly the pond called Standart at Chingistay village (loc. 11) on 12 VI 1999; on 13 and 14 VII 1999 examined two unnamed cattle ponds the exact location of which K. Reinhardt also could not reconstruct (locs 12–13); examined the Bukhtarma River bank on 16 VI 1999 (loc 14) and then left the park territory by a raft. They found the following Odonata:

Loc. 17, a small water body 0.5–1 m deep with rich emerging and water vegetation and inundated peat moss, formed by glacier melting at 1800 m a.s.l., in the Tarbagatay River valley; with the coordinates approximately reconstructed by K. Reinhardt as 49°05–06' N, 85°57–58' E: 2 larvae of 'Aeshna cyanea' (an error, actually *Aeshna caerulea*, see 'Discussion').

Loc. 11, An oval, sinkless pond, most probably Pond Standart, at Chingistay; ca 300 × 100 m (Pond Standart is actually 60 × 30 m and there is no larger pond nearby), just 10–20 cm deep, with ca 95% of water surface occupied by emerging spikerush with floating *Polygonum amphibium*: *Sympecma paedisca* (Brauer, 1882) (3 males), *Lestes barbarus* (Vabricius, 1798) (thousands emerging), *Ischnura pumilio* (Charpentier, 1825) (1 male and 10 copulae), *Sympetrum flaveolum* (Linnaeus, 1758) (2 females, 2 exuviae).

Loc. 12, a heavily trampled cattle pond 50 × 20 m, up to 2 m deep with emerging herbage, ca 0.5 m rim of grassy *Potamogeton* and a carpet of algae:

no Odonata

Loc. 13, similar to the above and 500 m apart of it but without water and with only sparse vegetation: *S. paedisca* (2 males), *Coenagrion hastulatum* (Charpentier, 1825) (3 males), *Enallagma cyathigerum risi* Schmidt, 1951 (1 male, 1 larva) (since this pond was without water and the previous one had it, it may be supposed that these odonates, including a larva, were actually found at the former pond).

Loc. 14, the Bukhtarma River bank at Korobikha, with stumps from inundated forest (ca 49°27' N, 85°04' E, 590 m a.s.l.) : *Somatochlora metallica* (Vander Linden, 1825) (1 exuvia); *Libellula depressa* Linnaeus, 1758 (2 exuviae)

In total they found 9 species. Their scanty is explained by June being too early for most Odonata at high elevations of Altai.

In her manuscript Ph. D. thesis, I. Chaplina [1] reported a male of *Somatochlora exuberata* Bartenev, 1910 from Lake Bol'shoe Rakhmanovskoe at Rakhmanovskie Klyuchi village [7]. This was the westernmost locality of the species, previously known not westerly of the Todzha Depression in Tuva.

Data by the author

1. A small lake in the Katun'–Belaya Berel' interfluvium

A small lake situated at the border of Russia and Kazakhstan (49°36'43" N, 86°24'52" E, 1680 m a.s.l.) in the rather flat interfluvium of the upper reaches of the Katun' and Belaya Berel' River descending from the Belukha Mt., ca 200×50 m, with an outlet of the Altyn-Bulak brook flowing to the Katun River; the banks rimmed with a floating bog and surrounded with larch forest with the dwarf birch ground layer. Examined on 23 and 26 VII 1987. Odonata were as follows:

Coenagrion hylas (Trybom, 1889) – numerous.

Coenagrion hastulatum – few individuals.

Aeshna juncea (Linnaeus, 1758) – numerous.

Cordulia aenea (Linnaeus, 1758) – few individuals

Somatochlora arctica (Zetterstedt, 1840) – numerous, ovipositing females observed.

Somatochlora graeseri Selys, 1887 – numerous, ovipositing females observed.

Leucorrhinia orientalis Selys, 1887 – numerous, including copulae.

Sympetrum meridionale (Selys, 1841) – an immature female collected on 26 VII 1987.

These data were already published before in [3].

Besides, in July 1987, individuals of *S. arctica* and *S. graeseri* were often observed, roughly in equal quantities, in the nearby taigous upper reaches of the Yazovaya and Belaya Berel' Rivers and Lake Yazovoe [3], while many

individuals of *C. hylas* were found in herbage in the Yaxovaya River valley in Yazevka village.

2. A small lake at Verkhnee Zimovye Stationary.

A lake situated in the broad Kara-Koba River valley 1.5 km NE of Verkhnee Zimovye Stationary (49°03'59"–04'12" N, 86°02'31–52" E, 1633 m a.s.l.), ca 500×300 m, irregular in shape, surrounded by rich herbage meadows (Fig. 1), with water exchanging by an influx and an outflux brooks, the surface is partly covered with *Persicaria amphibia*, flowering at the moment of examination, there were *Ceratophyllum demersum* and *Potamogeton perfoliatus* in water, the banks rimmed with a stripe of tall sedge of an uneven width. A pair of ruddy shelducks and a black stork were noticed. Examined on 26 VII 2020. Odonata were as follows:

Lestes sponsa (Hansemann, 1923) – 1 relatively small male.

Sympetma paedisca – 1 overwintered female, with the body pattern obscured.

Enallagma cyathigerum risi – numerous, including tandems.

Aeshna juncea – numerous, including patrolling males, females overwintered to sedge, one hatching female (Fig. 2).

3. Ancient dead glacier moraine in the Tarbagatai River middle reaches.

Situated 5.5-6.5 km NW of Verkhnee Zimovye Stationary (49°05'07"–57" N, 85°56'47"–57'50" E) at 2,050-2,100 m a.s.l. The moraine has the characteristic hill-and-basin topography as formed by a melted dead glacier, that is missed the contacts with its sources and lost mobility. The elevated parts are occupied by larch taiga with the dwarf birch bushy layer, the depressions by either swamps/small lakes or sedge/cottongrass (Fig. 3), or peat moss bogs replacing the former swamps, or meadows with *Veratrum lobelianum*, *Potentilla fruticosa* and an aspect of *Bupleurum scorzoniferolium*. The Tarbagatai River flows along the moraine at its middle. I examined the left part of the moraine on 27 VII 2010. Most of the swamps had quite a firm bottom, banks with tussock sedge (*Carex ?cespitosa*), large areas of medium-dense sedge (*Carex rostrata*) emerging from water, and open water areas of different size, or water with emerging *Hippuris vulgaris*. The largest water bodies also had *Persicaria amphibia*, *Eleocharis* sp., *Juncus* sp. and aquatic moss in the water. One of the swamp 28 x 8 m had peat-moss banks with sedge. In each swamp there were tadpoles of *Rana arvalis* approached metamorphoses or underyearlings which already passed it. Odonata:

Coenagrion hastulatum – males numerous on swamps without peat moss, solitary females and tandems. On the largest swamp an aberrant male was found with a continuous black dorsal stripe along the abdomen.

Aeshna juncea – patrolling males and females ovipositing in sedge were

common at the largest swamp; some males were met on glades among larches.

Aeshna caerulea (Stroem, 1783) – two males patrolled a peat moss swamp 28 × 8 m (Fig. 4), a female (Fig. 5) was found at the large swamp (with the previous species predominating at water), both species met among larches far from water. Territorial males of this species are perchers rather than fliers like other species of this genus, as discussed in [5], including these observations. According to observations made at the mentioned peat moss swamp made in 11:30-12:30 a.m., the males mostly sat on sun-heated boulders (Fig. 4) by the water and take off only for chasing another male or other dragonfly flying by. After that they slowly patrol the water surface or the bank line for half minute to minute and land on the closest stone, without perch fidelity.

Sympetrum danae (Sulzer, 1776) – a mass emerging (dozens of specimens) at the largest swamps and on a small (ca 20 m in diameter) sedge swamp.

Sympetrum flaveolum – a male at a small sedge swamp without water.

Sympetrum meridionale – an immature female (Fig. 6) found (and collected) among larches (collected) and two immature individuals sighted nearby and on a meadow below the moraine. Could be migrants from lower levels.

Leucorrhinia rubicunda (Linnaeus, 1758) – common on the largest water bodies. The males perched on the inflorescences of *Persicaria amphibia* at open water or on stones nearby (Fig. 7); females occurred at larch grove margins far from water, resting on branches and trunks.

4. Lake Bukhtarminskoe

A large (5×1 km) cold lake surrounded by open larch taiga with dwarf birch understorey (49°16'17"–17'55" N, 86°54'53"–58'36" E, 2,063 m a.s.l.). On the terrace there are also small peat moss bogs, small tussock sedge swamps without open water, and a big and quite deep non-tussock sedge/peat moss swamp. Examined at the left bank at the outflux (Fig. 8) on 29 VII 2010 and 3 VII 2012. Odonata:

1. *Lestes dryas* Kirby, 1890 – both sexes common at the tussock swamp on 29 VII 2010.

2. *Enallagma cyathigerum risi* – a male found on 4 VII 2012 in an open larch taiga at the lake left near its outflux. It was the only odonate found on the 2012 trip! Most probably this individual migrated from low elevations elsewhere, since that large oligotrophic lake unfits Odonata while this species was not found at the above mentioned tiny boglets at its bank where some other Odonata were found in 2010 (but not in 2012).

3. *Aeshna* sp. (supposedly *A. juncea*) – 1 male sighted among sparse larches on 29 VII 2010.

4. *Sympetrum flaveolum* – actively emerging from the sedge swamp on 29 VII 2010/

5. *Sympetrum* sp. (supposedly *S. meridionale*) – an immature individual at the lake bank.

Discussion

The Odonata fauna of the region appeared expectedly poor, with only 18 species registered (*Lestes barbarus*, *L. dryas*, *Sympecma paedisca*, *Coenagrion hastulatum*, *C. hylas*, *Enallagma cyathigerum risi*, *Ischnura pumilio*, *Aeshna caerulea*, *A. juncea*, *Cordulia aenea*, *Somatochlora arctica*, *S. exuberata*, *S. graeseri*, *Leucorrhinia orientalis*, *L. rubicunda*, *Sympetrum danae*, *S. flaveolum*, *S. meridionale*), with seemingly random distribution of species over localities. I did not include in this checklist the larval identifications from [8]: of *A. caerulea* (an obvious error), *S. metallica* (expected, but hardly distinguished from *S. exuberata*) and *L. depressa* (possible, but not as readily as the omnipresent and related *Libellula quadrimaculata* Linnaeus, 1758). During my visit I did not come across three species of the checklist (*L. barbarus*, *I. pumilio*, *S. exuberata*). Such a poverty in Odonata is not surprising since the observations were made at the upper part of the mountain taiga zone and above it, at ca 1600-2100 m a.s.l., that is at the upper limit of Odonata existence. Not so expected was only *S. meridionale*, identified by two young females collected quarter of century one after another. So far, the only reliable records of this species from Siberia, Russia, were from the Katun' River upper reaches near the locality 1 of this paper on 22 VII 1987 [3] and from the Akkem Glacier of the Belukha Mt. being the highest point of the Altai Mts. (obviously migrated there from some lower levels [6]), that is in the same most elevated part of Altai. It is surprising that this species, so common in everywhere in the southern Europe and Kazakhstan, has not been yet reliably reported from the plains of South Siberia, but was recorded at highest altitudes only [6].

S. exuberata was unexpected so westerly. I examined that specimen in the collection of the Institute of Systematics and Ecology of Animals of the Siberian Branch of the Russian Academy of Science and found it in a good condition and correctly identified; the collecting date is 23 VIII 2001. (It was my error in [4] to refer that lake as Bol'shoe Bukhtarminskoe, also that time I did not find the specimen in the collection yet).

K. Reinhardt и J. Samietz [8] visited the Tarbagatay River valley on 11 VI 1999. They mentioned a small peat-moss water body 0.5-1 m deep formed by glacier melting (their loc. 17), which they examined on 11 VII 1999, with surely unprecise coordinates 49°03' N, 85°55' E and elevation of 1,800 m a.s.l.; later K. Reinhardt kindly reconstruct its approximate coordinates as 49°05'–06' N, 85°57'–58' E and the elevation as 2,000–2,1000 m a.s.l. (see above). Their description is very similar to the 28 × 8 m water body examined by me, which is within the presumed range of coordinates. From that water body

they reported the larvae of *Aeshna cyanea* (Müller, 1764), occurrence of which east of the Ural Mts and their foothills is nearly impossible. Klaus Renhardt kindly informed me that identification was made by the Richard Seidenbusch. The latter in turn kindly let me know that he provisionally identified the two medium-age larvae as *Aeshna cyanea* and kindly provided their photos. R. Seidenbusch (pers. comm.) did not consider an option of *A. caerulea* and noted that identification of medium age larvae was not reliable. I tentatively identified the photos of the larval details provided by R. Seidenbusch as *A. caerulea* (Kosterin, Gorbunov, 2010), the species actually found in that locality and known to prefer peat moss habitats, including in highlands.

Whatever poor be the fauna of Odonata of the Katon-Karagay National Nature Park, no doubt it deserves further studies focused on potentially suitable habitats such as lakes, ponds and bogs at different but mostly low elevations. At least 30-35 species are expected in the territory.

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FIGURE LEGENDS



Figure 1. A lake in the Kara-Koba River valley 1.5 km NE of the Verkhnee Zimovye Stationary, 26 VII 2010.



Figure 2. A female of *Aeshna juncea* hatching from the larva at the lake in the Kara-Koba River valley 1.5 km NE of the Verkhnee Zimovye Stationary, 26 VII 2010.



Figure 3. A swamp in a depression of the moraine left by a dead glacier in the Tarbagatai River valley ca 6 km NW of Verkhnee Zimovye Stationary, 27 VII 2010.



Figure 4. A male of *Aeshna caerulea* perching on a boulder by a peat moss swamp on the moraine in the Tarbagatai River valley ca 6 km NW of Verkhnee Zimovye Stationary, 27 VII 2010.



Figure 5. A female of *Aeshna caerulea* perching on a boulder by a peat moss swamp on the moraine in the Tarbagatai River valley ca 6 km NW of Verkhnee Zimovye Stationary, 27 VII 2010.



Figure 6. An immature female of *Sympetrum meridionale* on the moraine in the Tarbagatai River valley ca 6 km NW of Verkhnee Zimovye Stationary, 27 VII 2010.



Figure 7. A male of *Leucorrhinia rubicunda* perching on a boulder at a swamp on the moraine in the Tarbagatai River valley ca 6 km NW of Verkhnee Zimovye Stationary, 27 VII 2010.



Figure 8. Lake Bukhtarminskoe, a view to its outflux, 29 VII 2010.

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КАТОНҚАРАҒАЙ ҰЛТТЫҚ ТАБИҒИ ПАРКІНІҢ ӘР ТҮРЛІ ҚАНАТТЫ ЖӘНЕ ТЕҢҚАНАТТЫ ИНЕЛІКТЕРІ (ODONATA) ТУРАЛЫ ДЕРЕКТЕР, АЛТАЙ ТАУЛАРЫ, ҚАЗАҚСТАН

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Аннотация. Катонқарағай мемлекеттік ұлттық табиғи паркі Алтайдың

едәуір көтеріңкі бөлігінде бөлігінде орналасқан, және осы себепті әдетте инеліктерге қолайсыз, 1987, 2010 және 2012 жылдары автор паркке үш апталық сапар барысында 15 түрді анықтаған. *Sympetrum meridionale* табылыстары қызықты болып шықты, өйткені бұл түр Алтайдың едәуір көтеріңкі бөлігінде, бірақ белгісіз себептермен төменгі деңгейлерде емес, сонымен қатар Сібірдің жазықтарында кездеседі. Парк аумағынан әдебиеттерден тағы үш түрі белгілі, соның ішінде *Somatochlora exuberata* батысында табылған.

ДАНИЕ О РАЗНОКРЫЛЫХ И РАВНОКРЫЛЫХ СТРЕКОЗАХ (ODONATA) КАТОН-КАРАГАЙСКОГО НАЦИОНАЛЬНОГО ПРИРОДНОГО ПАРКА, АЛТАЙСКИЕ ГОРЫ, КАЗАХСТАН

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Аннотация. Катон-Карагайский государственный национальный природный парк находится в наиболее приподнятой части Алтая и по этой причине в целом неблагоприятен для стрекоз, которых в ходе трех недельной длительности посещений Парка автором в 1987, 2010 и 2012 гг. было выявлено 15 видов. Любопытными оказались находки *Sympetrum meridionale*, так как этот вид обнаруживается в наиболее приподнятой части Алтая, но по неясной причине не на более низких уровнях, равно как и на равнинах Сибири. Еще три вида известны с территории парка из литературы, в том числе самая западная находка *Somatochlora exuberata*.