

New habitats of three rare orchid species in the Altai Republic (upper Biya River basin)

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Many species of Orchidaceae Juss. are known as beautifully flowering plants, having medicinal, food, decorative, and other qualities. All this draws attention to orchids and promotes their extermination. The expansion of the tourism and recreational development of the Altai Republic and the economic activity of the population aggravate the processes of reduction of rare species of the Orchidaceae Juss. In this sense, the search for new orchid locations is relevant. The purpose of this work is to supplement the database on habitats of rare orchid species in the Altai Republic. Five new habitats of three orchid species were established in the northeast Altai in the basin of the upper Biya River. *Cypripedium guttatum* Sw. *Cypripedium macranthon* Sw., and *Dactylorhiza fuchsii* (Druce) Soo (*Orchis fuchsii* (Druce), information that is missing in the third edition of the Altai Republic Regional Red Book. Two orchid locations were found in the lower reaches of the Tuloy River valley, a third was found in the lower reaches of the Tondoshka River, the fourth was registered near the Turochak village and the fifth was observed on the left bank of the Biya River near the village Verkh-Biysk. All new habitats were registered in the Turochaksky district of the Altai Republic.

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Introduction

The Altai Republic belongs to the tourist and recreationally developed regions of Russia, there is mining and widely developed distant-pasture cattle breeding, all this negatively affects the flora

and vegetation. We definitely cannot ignore the numerous fires that occur mainly with human involvement.

Over many decades, economic activities have contributed to the transformation of the original flora into transformed anthropogenic fractions, including synanthropic fractions. In spite of this, even under such conditions, the nature of the Altai Republic preserves a rich floristic diversity. Various forms of protection of natural ecosystems contribute to this, one of which is the inclusion of certain plant species in the regional Red Data Book, where the last edition lists 118 species of overgrown or flowering plants in need of priority protection (Red Data Book 2017).

Orchids because of their beautiful and highly visible flowers bring landscape diversity to landscapes. However, local habitats are subject to the negative impact of recreationalists collecting orchids in bouquets, amateur florists, and collectors of exotic species; orchids are put up for illegal sale, and in mass they are collected for medicinal and other purposes. Therefore, the identification of new habitats for rare species of Orchidaceae Juss. is essential and crucial. The improvement of measures of their protection is urgent (Silantieva et al. 2017).

The purpose of the present work is to supplement current data on the habitats of separate representatives of orchids in the northeast of the Altai Republic.

Material and methods

The study of rare species of Orchidaceae Juss. was carried out on the basis of generally accepted methods (Bychenko 2008; Artaev et al. 2014). To get an idea of the distribution of orchids in the Northeast Altai, we analyzed available sources, including materials from the Altai Republic Red Book (2017), as well as some results of our field expeditions in 2016-2022.

Results

There are 30 species in the Orchidaceae Juss. in the Altai Republic (out of 45 known in Siberia). Most orchids in the republic (25 species) are under the protection of specially protected natural areas. Eleven species are rare and protected (Gerasimovich 2004).

The soil, landscape, and phytocenotic features of the Altai Mountains contribute to the concentration of orchid species diversity in the northeast of the republic; 25 orchid species grow in the Altai State Nature Reserve (Gerasimovich 2004).

It should be noted that the vast administrative territories that border the Republic of Altai (Gerasimovich 2004) are large. For example, 27 species of Orchidaceae Juss. are known in Altai Krai, which exceeds the territory of the Altai Republic almost two times (Vazhov, Vazhov 2015).

New information on five habitats of three orchid species, *Cypripedium guttatum* Sw., *Cypripedium macranthon* Sw., and *Dactylorhiza fuchsii* (Druce) Soo (*Orchis fuchsii* (Druce), whose habitats are missing in the third edition of the regional Red Data Book (2017), is provided for Northeast Altai. All new habitats (Fig. 1) were established in the Turochaksky district of the Altai Republic.

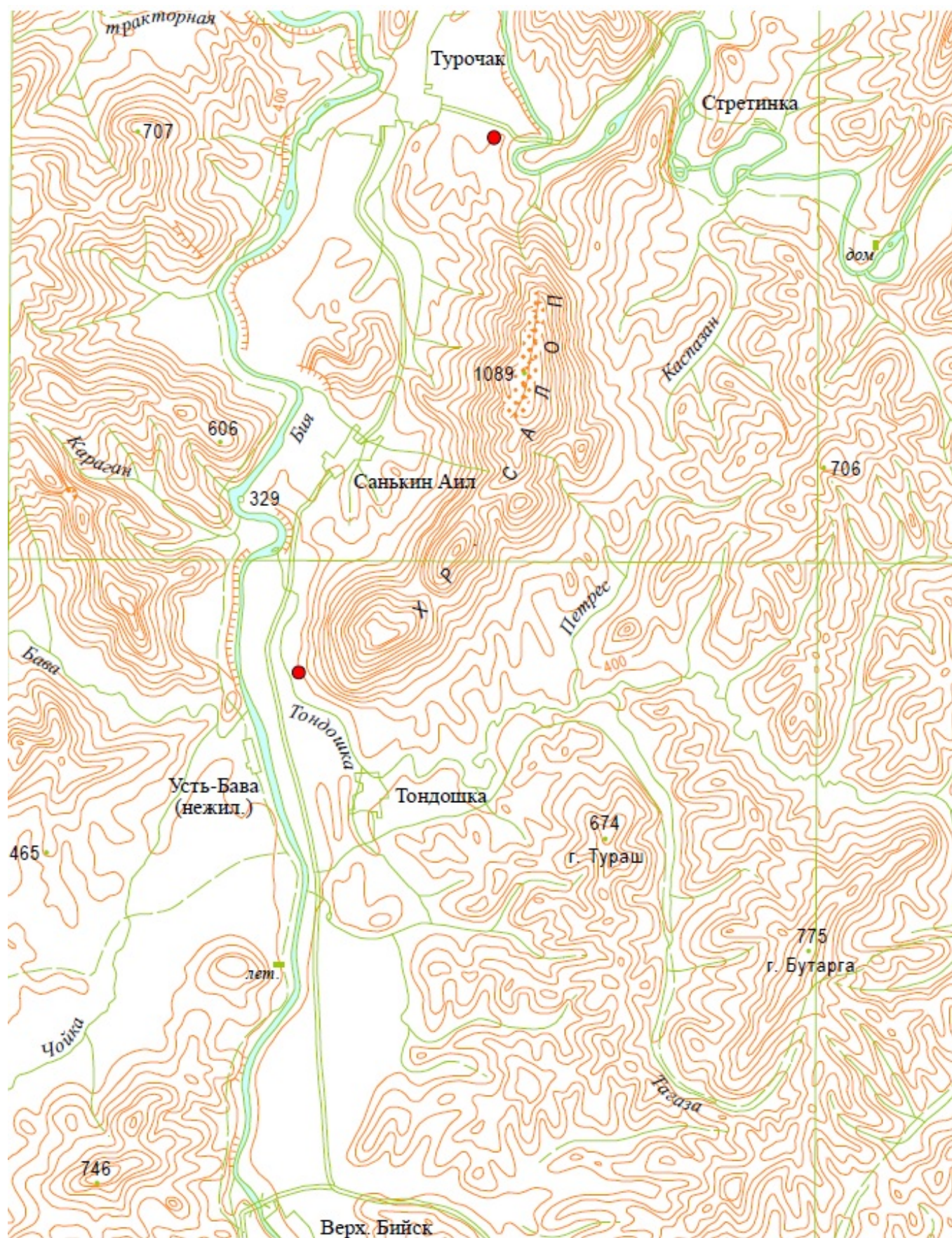


Figure 1. New orchid habitats in the North-East Altai (Republic of Altai, Turochaksky region).

We found two orchid locations in the lower reaches of the Tuloy River valley on 8 June 2022, one more location was found in the lower reaches of the Tondoshka River on 10 June 2022, and the fourth was near the village of Turochak. Turochak and the fifth, on the left bank of the Biya River near Verkh-Biysk village.

Spotted lady's slipper (*Cypripedium guttatum* Sw.), included in the Altai Republic Red Data Book (2017) with status 3. Rare species (Maneev 2017a). There are 28 known locations for this orchid in the Republic (Gerasimovich 2004). Populations are small (Maneev 2017a). The species is protected on the territory of the Altai State Reserve and the Sumultinskiy Republican Complex Sanctuary (Zolotukhin 2017; Red Data Book, 2020).

Cypripedium macranthon Sw., the large-flowered cypripedium. It is included in the Altai Republic Red Data Book (2017) with status 2 - vulnerable, declining species (Zolotukhin 2017; Maneev 2017b)). It is protected in the Altai State Reserve (Zolotukhin 2017).

Dactylorhiza fuchsii (Druce) Soo *Orchis fuchsii* (Druce), family Orchidaceae. Included in the Altai Republic Red Data Book (2017) with Status 3 - rare species (Maneev 2017b).

The characteristic for five habitats of these orchid species is given below.

The first habitat of *C. guttatum* Sw.: 52°00'40"N, 87°09'47"E. The absolute elevation is 395 m. The population is located on a steep shaded slope of the northeastern exposition of the left bank of the Tuloy River, 1175 m southeast of the bridge on the Turochak - Artybash highway at azimuth 151, there were 15 flowering specimens (08.06.2022) (Fig. 2).



Figure 2. *Cypripedium guttatum* Sw. – spotted lady's slipper. Altai Republic, Turochaksky district. 8 June 2022 (Photo by G.G. Rusanov).

The second habitat: a population of *C. guttatum* Sw. was found in the lower reaches of the Tondoshka River, which enters the valley of the Biya River near the northwestern outskirts of the village of Tondoshka and runs about 7 km to the mouth along the right bank of the latter river at 345 m, 5 specimens were found, flowering (10.06.2022) (Fig.3).



Figure 3. *Cypripedium guttatum* Sw. – spotted lady's slipper. Altai Republic, Turochaksky district. June 10, 2022 (Photo by O.M. Popova).

Third location: 52°00'19N, 87°09'58E. Absolute altitude 390 m. A population of *C. macranthon* Sw. with coverage 4×70 m was found on top of a narrow mane descending to the Chinchek (left tributary of Tuloy), 1950 m southeast of the bridge over the Tuloy river on the Turochak - Artybash highway. Shaded grub, overgrown with dense forests and shrubs, more than 300 specimens, flowering (8 June 2022) (Fig. 4).



Figure 4. *Cyripedium macranthon* Sw. – the large-flowered cypripedium, Altai Republic, Turochaksky district. 8 June 2022 (Photo by G.G. Rusanov).

Habitat 4: 52°14'58N, 87°09'11E. A population of *D. fuchsii* (Druce) Soo (*Orchisfuchsii* (Druce), a common spotted orchid, is found in the vicinity of the village. Turochak. At 1100 m southeast of the old cemetery on the road to Tashtagol, there is a small abandoned clay pit on its right. An old overgrown, in some places swampy road runs from it in a south-west direction along the foot of the slope horizontally 325 m. On both sides of this road for 600 m, more than 200 flowering specimens scattered over the territory, concentrated one to two plants, not forming clusters in one place, were found on 14 June 2022 (Fig. 5).



Figure 5. *Dactylorhiza fuchsii* (Druce) Soo (*Orchis fuchsia* (Druce)) – common spotted orchid, Altai Republic, Turochak

district. June 8, 2022 (Photo by G.G. Rusanov).

Fifth locality: 52°01'55N, 87°04'25E. A population of *D. fuchsii* (Druce) Soo (*Orchis fuchsia* (Druce)) was registered on the left bank of the Biya River opposite the village Verkh-Biysk. The Gorno-Altai-Artybash highway runs along the surface of the first terrace above the floodplain, and here there is a turn-off to the Kuzenskaya Zaimka camping site. From this turnoff on a 375 m along the road to Kuzenskaya Zaimka, at least 100 flowering specimens were found on 15 June 2022, also growing one or two at a time.

We recently published data on nine previously unknown nearby habitats of *C. macranthon* Sw. in the southeast part of Altai Krai, located at a distance of 96 km (on a straight line from Kivda to the southeastern edge of Turochak village): four habitats (Vazhov et al. 2017) were found from 10 to 18 June 2016 in the Tselinny District in the upper reaches of the Angurep River and five more (Vahov et al. 2020) were found from 9 June 2019 to 8 June 2020. In the Tselinnoe area at the confluence of the Chumonikha brook into the Chumysh; in the Yeltsovskoe area between the villages of Yeltsovka and Cheremshanka at the confluence of the Cheremshanka river into the Chumysh; in the same area in the log on the left bank of the river valley. Yeltsovka in the vicinity of the district center Yeltsovka; in the Solton district 5.5 km to the northeast from Kivda; also in this area on the southeast slope of Kivda on the border with the Tselinny district.

Conclusions

Five new habitats for three orchid species were established in the Northeast Altai in the upper Biya River basin. *C. guttatum* Sw., *C. macranthon* Sw., and *D. fuchsii* (Druce) Soo (*Orchisfuchsii* (Druce)). Two orchid locations were found in the lower reaches of the Tuloy River valley, one more was found in the lower reaches of the Tondoshka River, the fourth was registered near Turochak village, and the fifth was noted on the left bank of the Biya near Verkh-Biysk village. New data on orchid habitats in the northeastern Altai will supplement current distribution and abundance data to improve protective measures.

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