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NATURAL FEATURES OF THE ORCHID REFUGIUM ON THE TERRITORY OF THE NATURAL PARK «SAMAROVSKY CHUGAS»

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The article discusses the natural conditions and biological resources, landscape features of the key territory of the natural park "Samarovsky Chugas", located within the city of Khanty-Mansiysk. An overview of geographical studies of the natural park is given. The main components that influence the formation of natural complexes of a specially protected natural area are characterized. Special attention is paid to the characteristics of vegetation and the processes of anthropogenic changes in the landscapes of this key area. The main ways of vegetation transformation caused by economic activity and changes in the nature of surface runoff are highlighted. The ecological and geographical conditions of the orchid refugium are characterized. The article substantiates the need to allocate the study area as a zone with a protected regime within the territory of the natural park.

Keywords. Refugium, family *Orchidaceae*, flora, landscapes, specially protected natural areas, anthropogenic transformation of vegetation.

INTRODUCTION

The ecological situation in Ugra which is the main oil-producing region of Russia is characterized by a high level of anthropogenic and technogenic impact on the environment and low indicators of environmental health, as well as the intensive development of degradation processes of natural ecological systems. Khanty-Mansiysk is the capital of the Khanty-Mansiysk Autonomous Region, Ugra. A natural park "Samarovsky Chugas" is placed on its territory. The park is subjected to intensive residential and tourist-recreational impact. Therefore, the main purpose of the study was to identify areas with reserve status in relation to certain ecological and geographical niches (refugium) of orchid growth.

The species of the family *Orchidaceae* are both the most interesting and the most vulnerable part of the flora. Most orchids are rare species. The main reason for the decline in the population of species of the family *Orchidaceae* on the territory of the Khanty-Mansiysk Autonomous Region is the fact of growing industrial development primarily associated with oil and gas production, the development of local infrastructure and the rapid population growth of cities and settlements in the region. It causes changes in natural biocenoses which can lead to a decrease in the resistance of rare species. Therefore, the issues of searching for new habitats, assessing the stability of populations and identifying factors that limit them in the conditions of the northern regions are relevant [Shepeleva L.F., Lukyanenko D.N., 2009].

Most of the species of the family *Orchidaceae* in Russia are rare species that require protection. 25 species from 16 genera of the family *Orchidaceae* grow on the territory of the Khanty-Mansiysk Autonomous Region. Of these, 18 species (72.2%) are listed in the Red List of Threatened Species of the Khanty-Mansiysk Autonomous Region, 7 species (10.6%) in the Red List of Threatened Species of the Russian Federation (RF) [Determinant, 2006; Red Book, 2013; Red Book, 2008].

The nature Park "Samarovsky Chugas" is located on the territories of the municipal settlements: Khanty-Mansiysk region and the city of Khanty-Mansiysk. The following 6 species of the Orchid family were noted previously on the "Samarovsky Chugas" territory: *Goodyera repens* (L.) R.Br., *Dactylorhiza hebridensis* (Billmot) Aver, *Cypripedium guttatum* Sw., *Coeloglossum viride* (L.) C. Hartm., *Herminium monorchis* (L.) R. Br., *Mycrostylis monophyllos* (L.) Lindley [Chronicle, 2017]. Of these, 4 species are listed in the Red List of Threatened Species of the Khanty-Mansiysk Autonomous Region: *Cypripedium guttatum* Sw., *Coeloglossum viride* (L.) C. Hartm., *Herminium monorchis* (L.) R. Br., *Mycrostylis monophyllos* (L). Lindley.

Cypripedium guttatum Sw., Coeloglossum viride (L.) C. Hartm., Mycrostylis monophyllos (L.) Lindley are classified in category 3 (rare species) of the rarity scale in the Red List of Threatened Species (RF). Herminium monorchis (L.) R. Br. is classified in category 0 (probably disappeared spe-

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cies but the possibility of their preservation cannot be excluded) [Determinant, 2006].

A decrease in the populations of species of the family *Orchidaceae* is observed both on the whole region territory and in particular on the territory of the natural park. Commonly, the general environmental resistances in this region for these representatives of the family *Orchidaceae* are the following: low competitive ability, small populations, weak renewal by seed, habitat disturbance due to increased anthropogenic load (logging, fires, deer grazing, soil reclamation and peat harvests, recreation, collecting for bunches and for medicinal purposes, digging for the purpose of introduction [Determinant, 2006; Red List, 2013; Red List, 2008]. On the Ugra territory we have insufficient information about the distribution of representatives of the family *Orchidaceae*. The occurrence of different species of orchids was evaluated in the territories of the reserve "Malaya Sosva", the natural park "Kondinsky Lakes" of the Sovetsky region, the reserve "Yugansky" in the Surgut region and in the interstream area between 2 rivers: the Big Salym and the Irtysh.

As a rule, the general environmental resistances in this region for these representatives of the Orchid family are the following: low competitive ability, small populations and habitat disturbance due to increased anthropogenic pressure (logging, fires, deer grazing, recreation).

An accessory factor for specie *Cypripedium guttatum* Sw. is collection for bouquets and for medical purposes, digging for the purpose of introduction and weak seed regeneration.

The environmental resistance for *Mycrostylis monophyllos* (L.) Lindley is economic development of the territory, soil reclamation and peat harvests [Red List, 2013].

The search for new habitats, description of physical and geographical conditions of growth, and identification of the environmental resistances for the representatives of the family *Orchidaceae* in the northern regions are very relevant and therefore presented as the objectives of our research.

MATERIALS AND METHODS

The research area (Fig. 1) is located to the north-east of a residential part of the city Khanty-Mansiysk and south-west of the international airport and is part of the natural park "Samarovsky Chugas". The north-western border of the site is a Bypass Road (azimuth 247°), the north-eastern border is a bicycle path (azimuth 336°), the south – eastern border is the highway "Khanty-Mansiysk – Surgut" (azimuth 57°), the south-western border is the land – use territory of the Ugra Research Institute of Information Technologies (azimuth 152°). The configuration of the study area resembles a trapezoid elongated in a north-easterly direction. The study area is 10.23 hectares. Coordinates of the extreme points of the area: northwest corner – 61°01 '18,4206" and 69°05'09,3148", northeast corner – 61°01 '21,1525" and 69°05'34,9610", southeast corner – 61°01'10,3365" and 69°05'18,0438", southwest corner – 61°01'16,5119"and 69°05'38,3599".

The researches were aimed at studying the floral richness of the site, laying reconnaissance routes with photographing flora species, conducting geobotanical and geomorphological profiles, describing characteristic landscapes, performing landscape mapping, and characterizing the relief of the key site.

The survey of the territory was carried out by the route – eye sketching method. Stations with a complete geobotanical reference description were made every 250 meters. Geobotanical profiles with a width of 5 m were laid at the intersection of the terrain. On the territory of the key site, 4 profiles were laid and 18 descriptions of plant communities were made.

The ontogenetic states of the representatives of the family *Orchidaceae* were identified according to standard methods (Plant coenopopulations, 1988), taking into account the peculiarities of the description of the orchids ontogenesis (Vakhrameeva et al., 1991). In population-ontogenetic studies, an bion is accepted as a counting unit of orchids with a stem-rooted tuberoid, and for rhizomatous species – a partial shoot (Plant Cenopopulations, 1988). The age structure of species populations of the family *Orchidaceae* has not been studied in detail. The bions of the generative and pregenerative states were counted.

The origin of a natural park and the study of its natural conditions and resources

In order to preserve the unique natural complexes and in accordance with the Federal Law "On Specially Protected Natural Territories", Order No. 375 of the Presidium of the Government of the Khanty-Mansiysk Region of October 17, 2000, the establishment of the "Khanty-Mansiysk Hills" Nature Park is being created. In January 2001, the Park acquired the status of a state institution and its final name-the Nature Park of regional significance "Samarovsky Chugas". In March 2013, the decree of the Government of the Khanty-Mansiysk Autonomous Region – Ugra No. 65 approved the title document "On the formation of the natural park "Samarovsky Chugas".

The following organizations took part in the development of the natural park project:

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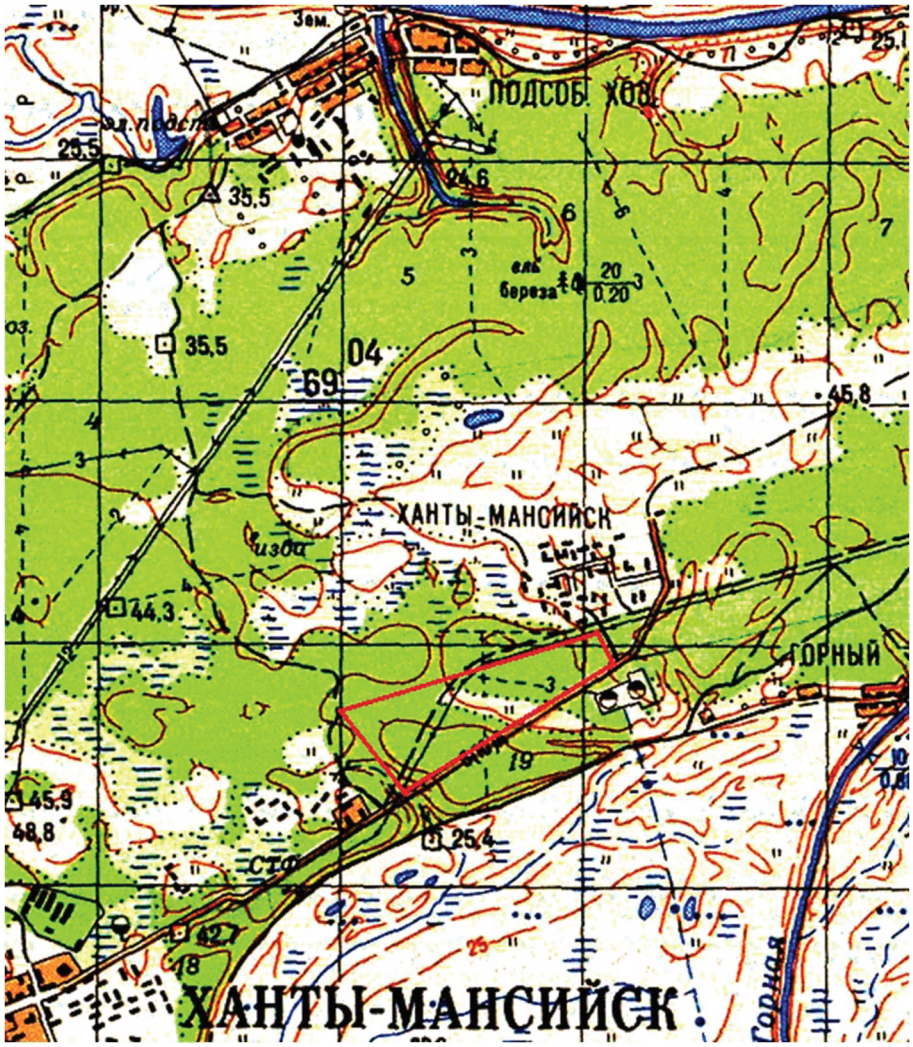

Fig. 1. Geographical location of the researched area

Zapsiblesproekt (General Contractor), the West Siberian State Unitary Forest Management Enterprise, the West Siberian Branch of the Federal State Budgetary Scientific Institution "All-Russian Research Institute of Hunting and Animal Husbandry named after professor B.M. Zhitkov", the Ural State Forestry University, the Institute of Soil Science and Agrochemistry of the Siberian Branch of the Russian Academy of Sciences, the Central Siberian Botanical Garden of the Siberian Branch of the Russian Academy of Sciences, the Tyumen Forest Experimental Station of the All-Russian Research Institute of Forestry and Forestry Mechanization.

The nature in the park's territory has been studied by many authors. The geological structure and relief of the Khanty-Mansiysk territory was considered in the joint monograph [Volkov I.A., Volkova V.S., Gurtovaya E.E., 1973]. In this monograph the question of the upland origin was raised for the first time. Subsequent works consider two hypotheses of the upland origin – tectonic and glacial [Krapivnera R.B., 1979]. Further geological and geomorphological studies were supplemented by drilling data which indicate that both alluvial and glacial deposits are found in the thickness of the upland rocks [Report, 1985]. The detailed origin of the erosional outlier and the influence of exogenous geological processes on it are considered in a number of works [Kuskovsky V.S., 2002; Bolshanik P.V., 2017]. The climatic parameters of the studied area were characterized on the basis of data from the Khanty-Mansiysk weather station and summarized according to the explanatory note to the Atlas of the Khanty-Mansiysk Autonomous Region – Ugra [Atlas, 2004]. The characteristics of the soil and vegetation cover and the animal world were studied on the territory of the natural park "Samarovsky Chugas", as well as on the territory of other protected areas of the region [Antipov A.M., 2001; Baykalova A.S., Zvyagina E.A., 2020].

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CHARACTERISTICS OF NATURAL RECREATIONAL RESOURCES

Geological aspects and relief

The formation of the recent relief occurred in the Late Quaternary and was caused by the development of lateral erosion of water flows and permafrost processes. Numerous rivers meandered through the low-lying plains and thus vast alluvial surfaces were formed. The age of these plains (modern above-floodplain terraces) including the subglacial plain is 13–20 thousand years [Volkov I.A., Volkova V.S., Gurtovaya E.E., 1973].

The recent rivers floodplains were formed in the Holocene. These floodplains have a significant width in conditions of flat terrain and small elevation differences, although they are inferior to the alluvial plains of the Pleistocene.

The flat part of the "Samarovsky Chugas" belongs to the three above-floodplain terraces of the Ob River. The relative height of the third above-floodplain terrace is 45–60 m, the first-up to 25 m [Kuskovsky V.S., 2002].

The relief of the research area is represented by the hollow-arching surface of the second above-floodplain terrace between the Ob and Irtysh rivers. The terrace is erosive and accumulative located at altitudes from 33 to 45 m. The terrace is composed mainly of sandy loam with a thickness of more than 3 meters. Also, it has sandy clay lenses and fine-grained sand, the alternation of which gives the profile a layered appearance. The terrace surface is cut through by the valley of a temporary stream. The above-floodplain terraces have the ridge-and-kettle mesorelief creating a variety of vegetation and soil cover.

After the Bypass Road construction in 2004, the conditions of land runoff changed and a pond with a small island was formed in a valley of the small stream (Fig. 2). An anthropogenic element of the terrain is the embankment of the Bypass road and the drainage ditch with depth of 2 m running along it.

Climate and hydrography

The climate of the researched area reflects the main patterns of climate formation in the Khanty-Mansiysk Autonomous Region – Ugra. It is correct to use data from long-term observations of the meteorological observing station of Khanty-Mansiysk to characterize the bioclimatic resources of researched area due to its location and small area.

Fig. 2. The pond within the key area

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The temperature behavior. In general terms, a temperature regime of any territory is determined by the amount of incoming solar radiation and its further distribution.

The thermal-energy resources of the Natural Park territory include the following indicators. The average annual air temperature is −1.1°C. The winter months are characterized by stable low temperatures. The coldest month is January with an average temperature of −19.8°C (Table 1).

These data allow us to characterize the bioclimatic resources of the Natural Park area as insufficiently provided with heat, with very cold and severe winter and cold summer. Uncomfortable conditions during winter months are primarily associated with severe hypothermia for all biological objects. The thermal conditions during summer season indicate a short growing season.

Humidification conditions. Atmospheric precipitation is the main source of moisture for the territory of the natural park «Samarovsky Chugas». The average annual precipitation is 494 mm (Table 2). The humidity factor (according to N.N. Ivanov) is 1.2, therefore, the moisture conditions can be characterized as excessively wet.

The seasonal distribution of precipitation is uneven. The maximum precipitation amount is recorded during period from April to October (75–83%), especially in July and August. In winter, the amount of precipitation is 17–20% of the annual amount due to the beginning of an anticyclonic climate regime and period of low temperatures. Thus, maximum precipitation amount for the growing season (from May to September) is up to two-thirds of the annual precipitation. The autumn transition of the daily average temperature through 0°C is timed to the first decade of October. At the same time, the formation of snow cover begins. A stable snowpack is formed by November. It reaches its maximum depth in March. At this time, its average height is 57 cm, the maximum height is 90 cm [Atlas, 2004]. Based on all of the above, the study area can be attributed to the zone of excessive moisture and insufficient heat supply.

The most important bioclimatic indexes from an ecological point of view are shown in table 3.

After the construction of highway and access roads to it which go from the airport to Khanty-Mansiysk, an increase in flooding of landscapes is recorded. It often leads to the death of stands from rising ground water levels. The bypass road is an extended low-pressure dam (barrage) at the landscape. The micro landscapes which are both intensively flooded and intensively drained are formed along the road despite being equipped with culverts. On soils with permafrost, the situation is aggravated by thermokarst processes. An example of such flooding in the study area is the formation of a pond in the drain hollow and a swamp in the flat-curved water-collecting top of the valley of a small watercourse.

Soils

The parent rocks on the territory of the Natural Park "Samarovsky Chugas" are Upper Quaternary covering small-depth sandy loams, underlain by sand or buried moraine. Another type of parent rocks at this territory are alluvial layered sandy deposits [Krapivnera R.B., 1979].

The formation of the upper layer of Quaternary sediments on the Khanty-Mansiysk Autonomous Region territory is associated with the underground glacial lake existence at this territory during the Upper Pleistocene. Here, the absolute water marks reach about 120 m. After the disappearance of the lake, four glaciolacustrine terraces were formed with absolute marks of the rear seam of 120, 80, 60 and 40 m. After the lake descent, the formation stage of the valleys of recent rivers began (9–8 thousand years ago) [Volkov I.A., Volkova V.S., Gurtovaya E.E., 1973].

Table 1

The air temperature, °C (according to data from the Khanty-Mansiysk meteorological observing station)

Monthly mean						Annual mean	Duration of period with daily average temperature ≤ 0°C, days	Duration of period with daily average temperature ≤ 10°C, days
I	V	VI	VII	IX	X			
-19.8	6.6	14.3	17.5	8.4	-0.7	+1.4	187	98

Table 2

Average monthly and annual precipitation amounts (mm) (according to data from the Khanty-Mansiysk meteorological observing station)

Monthly mean						Annual mean
I	V	VI	VII	IX	X	
23	48	55	67	54	48	494

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Table 3

The main climate indexes of the territory of Natural park "Samarovsky Chugas" according to data from the Khanty-Mansiysk meteorological observing station)

Climatic indexes	
1. Yearly average temperature, °C	–1.4
2. Average yearly precipitation amount, mm	494
3. Thermoenergetic resources per year, kcal/cm^2	30
4. The summery of internal equivalent for growth temperatures, °C	1400
5. The average of growing season duration, days	98
6. Average yearly humidity factor (according to N.N. Ivanov)	1.2

In general, there are flattened and drained watershed divides in the study area. This contributes to the formation of both automorphic soils and soils with varying degrees of hydromorphism.

The soil cover is characterized by a great variety and noticeable mosaic which reflects the result of the interaction of bioclimatic and lithological-geomorphological conditions.

On the riverine parts of basin divides, ridge tops, kettle backs and ancient terraces where ground-water table is deep, under dark coniferous and light coniferous plantations with moss and moss-shrub ground cover, soil formation is of the podzolic type. However, the extent of the podzol formation process is not the same. It is determined by the water permeability of the soil layer which depends mainly on the mechanical composition of the parent rocks [Atlas, 2004].

Podzolic soils are the predominant on the territory of the natural park and are formed on elevated well-drained features with deep ground-water table, under a dark coniferous forest. The process of podzol formation is less prominent at the territories where parent rocks are characterized by reduced water permeability. The soil cover is represented by podzolic gleic soils with signs of shallow, intraprofile and deep gley.

The waterlogging appears on poorly drained central parts of flat watershed divides, ancient terraces and on smooth hillsides which means in locations where weakened surface water flow is characteristic. The excessive moistening contributes to the occurrence of the marsh process and the formation of swampy-podzolic soils.

In depressions across the ridges and closed basins, ground waters which table is shallow has a certain influence on soil formation. This enhances the development of the marsh process of soil formation regardless of lithology of the rocks on which marsh soils are formed.

Thus, two main soil processes can be distinguished at the research area: podzolic and bogginess, which determine the development of automorphic, semi-hydromorphic and hydromorphic soils.

RESULTS

Flora of the researched area. Anthropogenic influence

The bioclimatic conditions of pedogenic process which are characteristic of the middle taiga are aggravated by the "warming" influence of the floodplain ecosystems of the Ob and Irtysh. As a result, fir, mountain ash, juniper, elderberry which are characteristic of the subzone of the southern taiga, are found in the vegetation. The appearance of sod-podzolic soils in the soil cover is also associated with the nature of the vegetation cover (increased ash content of litter).

On the basis of the conjugate analysis of soil, geobotanical and forest taxing data on the interrelation between forest types and soils the forest-growing characteristics of soils were given (Table 4).

Distribution. On the territory of the natural park «Samarovsky Chugas» *Goodyera repens (L.) R.Br.* grows in dark coniferous forests (rarely), *Cypripedium guttatum Sw.* grows in mixed and deciduous forests (rarely), *Coeloglossum viride (L.) C. Hartm.* pedogenic in dark coniferous forests and near streams (rarely). The locations of *Herminium monorchis (L.) R. Br.* and *Mycrostylis monophyllos (L.) Lindley* require confirmation [Shepeleva L.F., Lukyanenko D.N., 2009].

Dactylorhiza hebridensis is common in dark coniferous forests. However, our observations show that this species is represented by small isolated populations. In the forests within the city of Khanty-Mansiysk, the number of locations of this species is decreasing.

On the territory of the key site, we found a large population of *Dactylorhiza hebridensis* (Table 5). It is located in two habitats (Table 6). The first is confined to a drainage ditch running along the bypass road. 307 plants of *Dactylorhiza hebridensis*

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Table 4

The interrelation of forest types and soils at the key area

Type of forest	Soils	Location	Type of moisturizing
Pine, birch and ledum- clusterberry forests	Podzolic typical gley illuvial ferruginous	The underneath parts of the slopes of drained watersheds on sandy rocks	Hydromorphic
Dwarf pine, spruce and fir forests with green mosses and berrying ground	Podzolic	The elevated sites of watersheds, tops of ridge-shaped hump of floodplain terraces on sandy rocks	Automorphic semihydromorphic
Dwarf pine, spruce and fir forests with green mosses and small grasses	Podzolic alpha-gley soil illuvial ferruginous	The elevated parts of watersheds and floodplain terraces on sandy loam rocks	Semihydromorphic

were found on this territory. The plants are concentrated in three groups (the total length of this habitat is 1087 meters long, 3 to 6 meters wide). The extreme eastern point of this habitat has coordinates 61°01'19,9924'' N and 69°05'24,9961'' E, the extreme western point has coordinates 61001'14.9400" N and 69004 '35.7893" E. The population of *Dactylorhiza hebridensis* (Fig. 3) is mixed with the population of *Dactylorhiza incarnata* (Fig. 4). In total about 10 of them were found.

The second habitat is located under the canopy of coniferous forest with an admixture of parvifoliate species. The forest grows on the hollow-bored basin of the drainage funnel lying in the upper reaches of the drain valley. The *Dactylorhiza hebridensis* and the *Corallorhiza trifida* can be found. The coordinates are the following: 61°01'14,5283'' N and 69°05'30,0172'' E (Fig. 5).

Outside the key area but within the boundaries of the natural park, there is another orchid habitat (coordinates: 61°01'14,5283'' N and 69°05'30,0172'' E) with similar physical and geographical conditions. It is characterized by the following rare and protected plants: *Dactylorhiza hebridensis* – 50 plants and *Anemone nemorosa* – 9 plants (Fig. 6).

A separate habitat is formed by the cenopopulations of *Dactylorhiza hebridensis* and *Dactylorhiza incarnata* located at a distance from the borders of the natural park (coordinates: 61°00'47,7282'' N and 68°59'50,2049'' E). However, similar features of physical and geographical conditions are characteristic of this site. On the one hand, the area is protected by the embankment of the bypass road, from which there is additional runoff moisture. On the other hand, the forest wall is a protective barrier. All areas are well illuminated by the sun in the evening and there is a reservoir nearby.

Fig. 3. *Dactylorhíza maculáta*

Fig. 4. *Dactylorhiza incarnata*

Fig. 5. *Corallorhíza trífida*

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Fig. 6. *Anemone sylvestris* L.

The geography of protected plants distribution on the territory of the key site is shown in Fig. 7.

The fauna of the key area is represented by ducks living in the pond (*Bucephala clangula* and *Aythya fuligula*) [Antipov A.M., 2001] and forest mammals (*Sciurus vulgaris*, *Tamias sibiricus*).

The anthropogenic impact on the site is manifested in winter due to the clearing of the bike path, when part of the snow is raked into the pond.It is necessary to install a barrier on the second side of the bike path to eliminate the negative impact of melted snow on the site vegetation. It will also serve as additional protection from erosion processes. The slope of the bypass road in the pond area exceeds 45°. In the summer, grass is mowed in the drainage ditch which can also affect the number of orchids.

The anthropogenic impact considered in this paper as an exogenous geological factor acts in relation to the flora in a similar way to other natural conditions. Human impact leads to the formation of new habitats in which some plant species find refuge, while others become extinct. Drainage ditches have become such habitats on the territory of the natural park: the ditches play the key role in microclimatic and hydrological conditions favorable for the growth and development of orchids.

CONCLUSION

A disturbed ecotope was found on the territory of the "Samarovsky Chugas" where representatives of the *Orchidaceae* family grow. This ecotope is formed by a drainage ditch along the Bypass Road. The growth of *D. incarnata* and *D. hebridensis* in this location is facilitated by the absence of species competition, favorable microclimatic and hydrological conditions. The ability of these species to populate anthropogenically altered landscapes should be considered as a manifestation of the explerent component of the ecological and phytocenotic strategy. Data on the growth of representatives of the *Orchidaceae* family in technogenically altered ecotopes present in different regions of Russia. It is proposed to consider such places as refugiums for rare plant species (Egorova, 2018; Mishagina, 2018).

Thus, the anthropogenic impact on landscapes is manifested both in negative features (the extinction or decrease in the number of species) and in the creation of new habitats that are shelters for rare plants (positive features).

Fig. 7. The location of rare plants within the researched area on the aerial photograph (red stars — *Corallorhíza trífida*, orange stars — *Dactylorhíza maculáta*, yellow stars — *Dactylorhiza incarnata*, white star — *Cotoneaster melanocarpus*)

Table 5

Rare species of orchids at the researched areas

Title	Status	Ecology and biology aspects	Limiting factors	Protection measures	Location in the researched area
Dactylorhiza incarnata (L.) Soó	The third category. Rare species. It is included in Annex II of the International Convention CITES	Meadow-bog species. On the Ugra territory, it grows on sedge and moss lowland and transitional bogs, sedge and buck-bean hypnaceous bogs; once it was found on a sandy fill overgrown with willow. Seed reproduction. Blooms in June – July.	The ecological amplitude narrowness of the species, the violation of natural habitats during the economic development of the territory.	It is necessary to identify new habitats, monitoring the populations status	It occurs along the northern border of the key site with three isolated cenopopulation locuses. The total quantity is about 10.
Dactylorhiza hebridensis (Wilmott) Aver.	The fourth category. The species with undefined status. It is included in Annex II of the International Convention CITES	Meadow-bog species. Distributed mainly in wet and boggy meadows, transitional and low-lying bogs, on the outskirts of sphagnum bogs, in boggy coniferous and deciduous forests, thickets of shrubs, sometimes along the banks of reservoirs, along streams, along river valleys as well as in anthropogenic disturbed habitats – on overgrown cuttings, roadsides, etc. It is propagated mainly by seeds. Blooms in late June – July.	The violation of natural habitats during the economic development of the territory, marshland reclamation, low competitive ability.	It is necessary to identify new habitats, specifying the location of population and monitoring the populations status	It occurs along the northern border of the key area as a continuous strip with small breakages, along the drainage ditch along the bypass road. The total number of discovered plants is about 300
Corallorhiza trifida Chatel	The second category. The species which is declining in number. It is found in the natural park “Numto” in Ugra.	A perennial herbaceous plant devoid of chlorophyll (saprotroph). It blooms in late May-June, bears fruit in August. Often, it leads an underground lifestyle for several years. It grows in damp forests, meadows, bogs, among shrubs, on open peatlands. It prefers well-moistened areas, it is not very demanding to the high fertility of the soil and its reaction	It suffers the most from deforestation, drainage of waterlogged habitats as well as trampling down of growing areas.	Included in Annex II to the CITES Convention	It was found in the amount of 4 specimens in the catchment basin of the upper reaches small watercourse valley

Table 6

MOrchid habitats in the studied areas

The habitat and the coordinates	The type of phytocenosis and its species composition	Biotic and abiotic conditions and anthropogenic impact	Species composition of orchids	The number of each species in a given habitat
The western flat slope of the drainage ditch, from the point with coordinates 61^{0}01'19,9924''N and 69^{0}05'24,9961'' E to the point with coordinates 61^{0}01'14,9400'' N and 69^{0}04'35,7893'' E	A motley grass-grasses association of technogenically altered landscape. (*Calamagrostis epigeios* (L.) Roth, *Equisetum arvense* L. , *Chamaenerion angustifolium* (L.) Scop., *Equisetum sylvaticum* L., *Hieracium umbellatum* L., *Trifolium pratense* L., *Calamagrostis langsdorffii* (Link) Trin., *Agrostis gigantea* Roth ,*Poa angustifolia* L. , *Elytrigia repens* (L.) Nevski, *Poa palustris* L., *Bromopsis inermis* (Leyss.) Holub, *Phleum pratense* L., *Poa pratensis* L., *Crepis tectorum* L., *Rubus idaeus* L., *Festuca pratensis* Huds., *Artemisia vulgaris* L.).	periodic haymaking and snow dumping when cleaning the sidewalk	*D. hebridensis* (Wilmott) Aver *D. incarnata (L.) Soo.*	307 units 10 units
The western hollow-bored slope of the drainage funnel lying in the upper reaches of the drainage valley with coordinates 61^{0}01'14,5283''N and 69^{0}05'30,01'' E	Fir-spruce-birch dwarf pine with blueberries and green mosses; in the grass-shrub layer the most represented are the following species: *Vaccinium myrtillus* L., *Oxalis acetosella* , *Maianthemum bifolium* (L.) F.W.Schmidt, *Pyrola rotundifolia* L., *Vaccinium vitis-idaea* L., *Gymnocarpium dryopteris* (L.) Newn, *Linnaea borealis* L. В редком подлеске *Sorbus sibirica* Hedl., *Rosa majalis* Herrm., *Sambucus sibirica* Nakai.).	no anthropogenic impact	*D. hebridensis* (Wilmott) Aver *C. trifida* Chatel.	28 units 4 units
The western flat slope to the ditch with coordinates 61^{0}01'14,5283''N and 69^{0}05'30,0172'' E	A motley grass-grasses association of technogenically altered landscape. (*Calamagrostis epigeios* (L.) Roth, *Equisetum arvense* L., *Equisetum sylvaticum* L., *Hieracium umbellatum* L., *Tussilago farfara* L., *Trifolium repens* L., *Poa angustifolia* L., *Elytrigia repens* (L.) Nevski, *Poa palustris* L., *Bromopsis inermis* (Leyss.) Holub, *Poa pratensis* L., *Crepis tectorum* L., *Festuca pratensis* Huds., *Geum aleppicum* Jacq., *Prunella vulgaris* L., *Leucanthemum vulgare* Lam. *Ranunculus repens* L., *Taraxacum officinale* (L.) Webb ex F.H.Wigg.	periodic haymaking	*D. hebridensis* (Wilmott) Aver	50 units
The western side of slope of the drainage ditch with coordinates 61^{0}00'47,7282''N and 68^{0}59'50,2049'' E	A motley grass-grasses association of technogenically altered landscape. (*Calamagrostis epigeios* (L.) Roth, *Equisetum arvense* L. , *Achillea millefolium* L., *Chamaenerion angustifolium* (L.) Scop., *Hieracium umbellatum* L., *Trifolium pratense* L., *Trifolium repens* L., *Calamagrostis langsdorffii* (Link) Trin. , *Agrostis gigantea* Roth *Poa angustifolia* L. *Elytrigia repens* (L.) Nevski, *Poa palustris* L., *Bromopsis inermis* (Leyss.) Holub, *Phleum pratense* L., *Poa pratensis* L., *Crepis tectorum* L., *Artemisia vulgaris* L. *Cirsium arvense* (L.) Scop, *Tussilago farfara* L., *Taraxacum officinale* (L.) Webb ex F.H.Wigg., *Potentilla anserina* L.	periodic haymaking	*D. hebridensis* (Wilmott) Aver *D. incarnata (L.) Soo.*	38 units 12 units

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The identified technogenically altered ecotopes have a different parent rock (technogenic soils made of crushed stone and sand), a steep slope of the western exposure, special microclimatic conditions (additional slope moisture, protection from winds). Observation of plant growth in the spring-summer period did not reveal a negative effect of haymaking on the vegetation and flowering of representatives of the *Orchidaceae* family.

Careful status monitoring of the small population *C. trifida* is necessary since this plant probably does not grow every year and therefore finding it causes difficulties.

Thus, the protection measures for orchids are recommended. Their implementation involves the identification of characteristic habitats, monitoring the populations status in nature, protecting biotopes in places where orchids grow, reducing environmental loads, as well as *in vitro* orchids cultivation and their introduction.

An elaborate study of representatives of the *Orchidaceae* family will be surveyed in the future. The studied area will be located both on the "Samarovsky Chugas" territory and in adjacent territories. The discovering territories with orchids which are located outside the boundaries of the natural park allows us to make a proposal to expand the boundaries of protected areas.

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