

Problems of the Protection of Flora in Chechen Republic

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Abstract - The reduction of plant biodiversity occurs for various reasons. Particular attention should be paid to the territory of the reserves and reserves, especially after the war, their restoration, which takes place at a slow pace. The main condition for preserving the biodiversity of Chechnya is the optimization of its economic development, bringing it in line with the ecological capacity of ecosystems, the introduction of environmentally friendly technologies. Now the second issue of the Red Book of the Chechen Republic is being prepared for publication, according to preliminary data, 215 species of higher vascular plants and dozens of spore and fungi will enter. Chechnya has great advantages in preserving species in natural cenoses. Steps are being taken to protect plants in artificial conditions - in mini-botanical gardens, in private plots. Introductory study of rare species of Chechnya is 5%. Many species are resistant to culture. Reserve and insurance funds (lists) of these types are created. Methodological aspects of reintroduction, various methods of transferring plants to natural locations, methodological observations and monitoring of the state and restoration of the number of natural populations are being developed. An important aspect is the activities on environmental education and public education. Effective solution of biodiversity conservation issues is possible with an integrated and systemic approach.

Key words - biological diversity, rare and endangered species, plant, Red Book, Botanical Garden, introduction, sustainability, reintroduction, education.

I. INTRODUCTION

Biological diversity plays role of the basis for the maintenance of ecological conditions of existence and economic development of human society, therefore, it is a world heritage. The need to develop and implement effective measures for the protection of the global plant biodiversity is obvious.

The great practical importance of this problem requires research at all the levels of the organization of the living environment and in various methodological aspects. The degree of stability of the flora depends entirely on the circumstances that violate the natural course of genesis, the consequence of which is the extinction of species that are not resistant to the activity of various artificial (anthropogenic) or natural factors affecting individual plants, their populations and communities. The anthropogenic influence is very diverse and does not always have a purposeful activity; often it is only indirect, but not less harmful.

The reduction in the number of individual species may occur due to historical reasons. In the course of evolution, some species have always been replaced by others. The analysis of the flora of specific areas can provide a lot of additional materials in order to understand what changes are taking place in certain conditions, what measures need to be taken in order to increase biodiversity, improve or support plant populations in the republic.

The nature of the Chechen Republic climatic conditions is peculiar and the imbalance between its components can lead to disastrous consequences, and the natural situation is restoring extremely slowly. Some species of animals and plants live on the edge of their range and are few in numbers, the life cycle of plants is stretched, and the formation of vegetation cover has a slower rate. Therefore, the main condition for the protection of biodiversity in the Chechen Republic is the optimization of its economic development, bringing it in line with the ecological capacity of ecosystems, the introduction of environmentally friendly technologies in industry and agriculture.

The purpose of our research is to analyze the current state of the issue of the protection of flora biodiversity in the Chechen Republic, and the approaches to its preservation.

II. MATERIAL AND METHODOLOGY

The objects of the analysis were presented by rare and endangered species of the flora of the Chechen Republic. On the basis of our own research and available literature material, the analysis of the areas being implemented for the preservation of the republic's plant biodiversity, plant coverage with measures of protection, and effectiveness of actions taken was made.

III. RESULTS AND DISCUSSION

The Chechen Republic is one of the most poorly investigated regions of the North Caucasus in the floristic context. In the recent past, many large industrial enterprises concentrated in a limited area were located on the territory of the republic, continuous plowing of all areas suitable for cultivation was carried out, and in semi-desert lands the grapes were grown. This fact had a profound effect on the state of the natural environment of The Chechen Republic.

The problem of the protection of biological diversity of natural communities in the republic has become more crucial. Nevertheless, the republic until recently did not have a list of rare and endangered species of plants and animals that need the protection within its limits. The main reason for this was the lack of information due to poor knowledge of groups of plants and animals in the republic.

The "Red Book of the Chechen Republic", established by the Decree of the Government of the Republic on October 31, 2005 No. 131 and currently preparing for the publication a new book, includes 215 species of vascular plants. In fact, the number of plant species in need of protection is much larger.

A list of these species was recently published by the authors of this research [1]. However, for the period that has passed since its compilation, the new data were obtained on

the distribution of a number of rare species in the republic, which resulted in the need to make some changes and additions to the previous list.

The revised version of this list, which includes 215 species (about 9.27% of the flora of the republic, is given below. The species in the list are divided into categories recommended by IUCN and generally accepted when compiling the Red Books of various ranks:

0 (Ex) – the species, presumably extinct, whose presence in the region has not been confirmed over the past few decades. These are the species whose location is indicated in the literature or there are charges in a single copy. The example is *Cypripedium calceolus*.

1 (E) – endangered species found in single specimens, known from one, two, or several places, which are under immediate threat of extinction. There are 12 of them: *Apterigia pumila*, *Dianthus arenarius*, *Diedropetala punicea*, *Drosera rotundifolia*, *Marsilea quadrifolia*, *Melampyrum cristatum*, *Myosurus minimus*, *Papaver bracteatum*, *Potentilla alexeenkoi*, *Psephellus andinus*, *Sternbergia colchiciflora*, *Tulipa gesneriana*.

2 (V) – vulnerable species, the number of individuals in populations of which is reduced for natural reasons or under the influence of changes (destruction) of the habitat and other anthropogenic factors. These species are found either in small numbers or in limited territories and in specific ecological niches - 79 species.

Among them there are *Adoxa moschatellina*, *Allium oreophilum*, *Anemonoides blanda*, *Astragalus karakugensis*, *Campanula andina*, *Cerasus incana*, *Eremosparton aphyllum*, *Erysimum subniveale*, *Fritillaria orientalis*, *Gentiana grossheimii*, *Helleborus caucasicus*, *Iris notha* etc.

3 (R) – decreasing species, the distribution of which is limited to small areas, or abstractedly distributed over large areas, which are not currently threatened with extinction, but nonetheless their numbers are decreasing. These are such species as *Alchemilla chlorosericea*, *Allium paradoxum*, *Alyssum andinum*, *Atropa caucasica*, *Cladochaeta candidissima*, *Crambe gibberosa*, *Festuca daghestanica*, *Fumana procumbens*, *Iris pseudacorus*, *Merendera trigyna*, *Orchis militaris* etc. – total amount is 109 species.

4 (I) – indefinite species, about the state of the populations of which there is currently no information, having any of the statuses already listed.

There are 8 of such species: *Butomus umbellatus*, *Calamagrostis caucasica*, *Equisetum fluviatile*, *Hieracium gudergomiense*, *Hieracium laevigatum*, *Orchis tridentata*, *Paeonia biebersteiniana*, *Saxifraga ruprechtiana*.

5 (Res) – restorable and recovering species; these are taxa, the number and area of distribution of which under the influence of natural causes or as a result of the measures taken, the protection began to recover and are approaching to the state when they will not need special measures for the protection and restoration.

They are *Capparis herbacea*, *Cucubalus baccifer*, *Linnaea borealis*, *Tithymalus condylocarpus*.

The ratio of the protection categories and status of species is given in Table 1. The most important in terms of the preservation of the genetic fond, belonging to the categories of I and II, in the studied flora are 106 species, which is 49.7% of all is proposed for the protection. For these species, planned monitoring of the state of populations is necessary in order to detect new habitats, elucidate the features of biology and ecology. In addition planned monitoring will give the opportunity to identify trends of reduction or increase in population, and determine the possibility of introduction and study in culture and other activities.

TABLE 1 THE RATIO OF PROTECTION CATEGORIES AND SPECIES STATUS OF FLORA IN THE CHECHEN REPUBLIC IN NEED OF THE PROTECTION

Category	I	II	III	IV	V	
The amount of species	5	101	60	17	32	
%	2.3	47.4	27.7	8.0	14.6	
Status	0	1	2	3	4	5
The amount of species	1	12	79	111	8	4
%	0.5	5.6	37.1	51.2	3.8	2.3

According to the state of the populations, the largest number of species is attributed to the third status (51.2%), the second largest group is the group of species that has the second status (37.1%). Species, the state of populations of which are in a threatened position (0 and 1 status), are relatively few (6.1%).

One of the most important and most effective ways to protect rare plant species is their preservation in natural habitats by completely or partially removing certain territories from economic activity and giving them protected status, which ensures the preservation of the entire flora genetic fond and is considered the main task of plant protection [2-4].

Over the past few decades, botanists have made recommendations on the allocation of protected areas in the republic. Such territories for the protection were offered by Professor A.I. Galushko, the well-known researcher of the flora of the North Caucasus.

These territories are as follows: the Kissyk tract (30 km north of the station Chervlenaya with *Pyrus salicifolia*), the tract the Chubutly river (8 km north of the station Kargalinskaya with *Salsola dendroides*); Malgobek-Achaluskaya mesophilic steppe (two isolated areas on the Sunzhensky and Tersky ridges); the southern slope of the Terek Range in the region of Grozny; the eastern part of the Terek Range; floodplain forest of the Sunzha river (near the city of Grozny); forest neighborhoods of Novogrozny [3]; Gekhinskaya yew grove of 25 km above Roshni-Chu; Itum-Kalya arid basin with a complex of shrub cenoses; The Bragunsky section of the Terek Range with a *Paliurus* ridge; floodplain forest in the area of the station Znamenskaya and

Ishcherskaya according to the Terek as a typical floodplain oak forest [4].

Floristic complexes with dominants of the representatives of dendroflora were proposed for the protection: groups from *Astracantha denudata*, found in Chanty-Argun (v. Ushkaloy), which were actively destroyed by shepherds who burned down the slopes in order to get a thrifty undergrowth; Shhiblyak from *Rhamnus pallasii*, *Spiraea hypericifolia*, *Paliurus spinachristi*, *Berberis vulgaris*, etc., developed in the vicinity of the village Ushkaloy and in the Itum-Kalinsk arid basin; the oak forests of their *Quercus petraea*, preserved on the left bank of the Chanty-Argun valley; pine forests from *Pinus sosnowskyi* in the upper reaches of the Chanty-Argun [5]; Shiblyak with the dominance of *Pyrus salicifolia* in the Kissyk tract [6], as well as thickets of *Rhododendron caucasicum* in the town of Khalguli in the area of the Rocky ridge on the border with Ingushetia [7,8].

At present, there is the State natural reserve of federal subordination "Sovetsky" (former name is Chechen-Ingush) on the territory of the republic, created on June 11, 1986 by the Order of the Russian SFSR No. 234.

From 1993 to 2000 it did not function. Its activity was restarted in 2001 (Order of the Ministry of Agriculture of the Russian Federation No. 662 of April 21, 2003 "On Approval of Regulations on State Natural Reserves of Federal Importance." The reserve is located in the Shatoy district of the Chechen Republic, on the northern macro slope of the Greater Caucasus. The reserve is 100,500 of hectares.

Based on the analysis of the flora, especially on the analysis of endemism and relictism, it should be considered that this protected area alone is not enough to preserve the whole diversity of the flora of rare plants, it is necessary to identify new territories, including those mentioned above. There is a legislative basis for the identification of such protected areas. This is, first of all, the Constitution of the Chechen Republic, in which (section 1, chapter 1, article 9, paragraph 2) it is written that "the land and other natural resources are used and protected in the Chechen Republic as the basis of the life and activity of the peoples living on the territory of the Chechen Republic". On this basis, it is necessary to develop proposals for the legislative and executive authorities on the allocation of territories with different protection status - natural monuments, reserves etc.

In addition to the species mentioned in the list that deserve priority protection measures, there are still a number of species that are often and quite widespread in the republic with rapidly decreasing numbers due to the destruction of natural habitats or the collection as a food, medicinal or ornamental plants.

Such species are subject to observations of their number and the state of their populations.

The problem of the preservation of biological diversity of flora is solved most effectively in specially protected natural areas of the Chechen Republic - wildlife reserves.

Currently, there are 8 state biological reserves and many botanical monuments of nature in the republic.

A. Vedenskiy reserve.

It was organized in the mountainous and high-mountainous part of the Vedenskiy administrative region in 1963. Its area is 43.7 thousand hectares, including 18 thousand hectares of forest land, 20 thousand hectares of subalpine and alpine meadows, 5.7 thousand hectares of stonemasons and talus.

B. Urus-Martan reserve.

It was organized in the mountain forest zone of the Urus-Martan and the part of the Shatoy administrative districts in 1970 with the aim of reproducing game animals. The reserve area is 31 thousand hectares, including 29 thousand hectares of forest land, 2 thousand hectares of fields, pastures and hayfields.

C. Shali hunting reserve.

It was organized in 1977 in the foothills and mountainous part of the area. The reserve area is 26.3 thousand hectares, including 16.7 thousand hectares of forest land, 9.6 thousand hectares of fields, hay fields and pastures.

D. Argun Hunting Reserve.

It was organized in 1977 in the suburban floodplain forests of the Sunzha, Argun and Dzhalka rivers in the Grozny and Gudermessky districts of the Chechen Republic. The area of the reserve is 15 thousand hectares, including 8.7 thousand hectares of forest land, 6.3 thousand hectares of gardens, fields, gardens, pastures, hay fields. The forests are assigned to the first group of water protection and partly included in the green zone of Grozny.

E. Bragunsky hunting reserve.

It was organized in 1973 in the floodplain forests of the Terek and Sunzha rivers and the forests of the Bragunsky ridge, on the lands of three administrative districts - Grozny, Gudermessky and Shelkovsky. The reserve area is 17 thousand hectares, including 10.2 thousand hectares of forest land, 6.8 thousand hectares of fields, pastures and hayfields.

Parabochevsky hunting reserve.

It was organized in 1963 in the north-eastern part of the republic, in the left-bank floodplain forests of the Terek River, in the territory of the Shelkovsky administrative district. Its area is 12 thousand hectares, including 6 thousand hectares of forest land, 6 thousand hectares of gardens, fields, hay fields and pastures.

Steppe hunting reserve.

It was organized in 1973 in the northeastern part of the republic, in the vast territory of the dry steppes of the Terek-Kuma lowland of the Shelkovsky administrative region, on the area of 52 thousand hectares, including 48 thousand hectares of dry steppes, 3.5 thousand hectares of forest cultures and fields, 0.5 thousand hectares of lakes and marshes.

The flora of the Republic in the XVIII – XIX centuries was investigated by many famous botanists such as I.A. Guldenshtedt, S.G. Gmelin and P.S. Pallas, F. Marshall-Bieberstein, H.H. Steven, K. Ledebour, K.A. Meyer, E. Boissier, as well as N.I. Kuznetsov.

However, the main part of herbarium materials, on which the ideas about the flora of the republic and protected areas were based, were collected in Soviet times by biology students, graduate students and botanists of Chechen State University under the guidance of Associate Professor V.R. Grigoriev and Professor A.I. Galushko. Since 1993, the laboratory "Flora and Fauna of the Chechen Republic and the North Caucasus", of the Academy of Sciences of the Chechen Republic, together with the Department of Botany of the University on herbarium materials and long-term observations in nature, is forming a consolidated list of flora of the republic indicating the altitude and area distribution of species [9,10].

Later this information was summarized in consolidated publications [11-17], in which 2,318 species of vascular plants are indicated for the flora of the Chechen Republic.

Unfortunately, the herbarium materials, on which the list was based, have not been preserved due to the military actions, which make it difficult to verify information about the number of species in the reserves. However, in some cases, based on the general nature of their distribution, it is possible to place in doubt the provisions given by A.I. Galushko on the growth of individual species in protected areas.

In the following years, the employees of the Department of Biology and Ecology of the Academy of Sciences of the Chechen Republic and Kh. Ibragimov Complex Institute of the Russian Academy of Sciences conducted research in the republic and outside. The authors have made significant collections stored in the herbarium of the Scientific Research Institute of the Russian Academy of Sciences, including species that are not previously indicated on our territory. The published additions to the flora of Chechnya and the North Caucasus [18–22], etc. also do not contain some species on which the materials are available from the territory of the republic.

The observation of the collection of flora materials of protected areas stored in the herbariums of the Kh. Ibragimov Complex Institute of the Russian Academy of Sciences and the Chechen State Pedagogical University, as well as the results of our own field of research, made it possible to enlarge the floristic list of species (Taysumov M.A., 2014).

According to currently available data, the flora of the Chechen Republic has 2,318 species. However, the presence of a number of species (especially adventitious), previously mentioned for the flora of the Chechen Republic, needs to be clarified. The compliance and publication of a complete floristic list of all reserves, reflecting the current state of their flora is in urgent need.

Thus, there is a network of natural reserves areas in the Chechen Republic, the total area of which is more than 164,500 hectares. However, some of them are hunting, which does not provide measures for the protection of vegetation. At the same time, the distribution of protected areas in the natural landscape areas of the republic is extremely uneven.

The majority of the protected areas are concentrated in the mountain forest territories, while the communities of the forest-steppe and steppe zones, which are the most intensely anthropogenic and have largely lost their original appearance,

are completely under-protected. In addition, when creating the system of natural reserves in the republic, the tasks of the protection of flora biodiversity were not adequately taken into account, due to the lack of information about the composition of the flora of a given territory and, in particular, about the presence and distribution of rare, endemic, relict and endangered species.

In order to preserve, rational use, the reproduction and protection of natural phyto-diversity and genetic resources of the flora, systematic and deliberate studies of the ecosystems and vegetation cover of all reserves of the republic occupying territories with different orographical and soil-climatic conditions are necessary. This will allow not only raising the functional status of protected areas to a proper level, but also significantly improving the planning and enhancement of their environmental activities.

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