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FORMATIONAL COMPOSITION OF THE VEGETATION OF THE USTYURT SAND MASSES

Tamambetova Shakhigul Bayratdinovna

Doctor of Philosophy in Biological Sciences (PhD) e-mail:

tamambetovasahigul@gmail.com

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Summary. The article examines the vegetation formations of the Ustyurt sandy masses. During the study, sand massifs were identified in the areas of the Agiin and Barsakelmes depressions, Asaka-Audan, Karatyul, and Ilteje. The sands surrounding the Agiin from the north-east, west, and southwest are characterized by the presence of a large complex of plant communities.

Introduction

The Ustyurt Plateau remains a system of highly productive pastures suitable for use in sheep breeding, horse breeding, and camel breeding. Therefore, Ustyurt is of significant interest to the national economy [4].

Certain parts of this desert and some types of its landscapes have not yet been sufficiently studied. First and foremost, this should be attributed to the sandy massifs of Ustyurt. Areas of sandy desert in Ustyurt are scattered in the form of quite numerous areas, each of which is not very large. However, the significance of this type of landscape for the development of Ustyurt is very great, as it is precisely here that the most valuable pastures suitable for livestock wintering are located, and it is here that the most favorable conditions exist for the formation of local concentrations of shallow-lying fresh or slightly salty waters that can be utilized in creating a network of watering holes. Meanwhile, the sandy massifs of Ustyurt have not been specifically studied due to their fragmentation, as well as the complex working conditions within them [1,2].

During the study, sandy massifs were identified in the areas of the Agiin and Barsakelmes depressions, Assak-Audan, Karatule, and Ilteje.

One of the large systems of sands of this type is the sands lying on the outskirts of Agyin and Barsakelmes. These two interconnected depressions occupy the vast Barsakelmes depression, which constitutes a significant part of the Karakalpak Ustyurt. The predominant type of landscape here is solonchak deserts.

The most sandy part of this unique environment of salt marsh depressions, to the north and northeast of Agyin, is called the Kartpaykum sandy massif. Near the Barsakelmes depression in the northwest lies the small Tabyn-Suu massif; on the remaining periphery of the depression, there are no sands.

Materials and methods

The object of our study was the plant formations of the Ustyurt sandy massif. The route research method was primarily used to study the composition and structure of plant populations through tracking on routes. Botanical descriptions of plants were conducted in



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all communities according to the generally accepted methodology [7]. When identifying plant species, the "Central Asian Plant Identifier" was used [5]. Geobotanical methods were also used during the field research.

Research and Discussion Results

For the sands surrounding Agiin from the northeast, west, and southwest, the presence of a numerous (mainly five-membered) complex of plant communities is characteristic, which is highly unstable in terms of its constituent components. The main formations present here are mixed juzgun, tamarisk, black saxaul, jantac, and sarsazan.

In some places, the complex includes individual communities from the Kuansuyak Formations (Silver Kuansuyak and Karelin), the Kurchavka Formation, the Bush Reomyuria Formation, hypsophilic coppice (Eichwald's coppice, egg-shaped, etc.), and potash.

In the greater part of the area it occupies along the edges of the Agyin and Tyumryuk solonchaks, this complex comes into contact, on one hand, with the sarsazans and bottom sediments of the depression, and on the other, with a unique landscape that has received the name of black-saxaul ridges. This is a rare network of specimens or small groups of black saxaul scattered across the plateau's surface, against the backdrop of biugunniks and white-earth wormwood and biurgu complexes typical of the Ustyurt plains.

He considers black saxaul sediments to be a special formation possessing hydroindicative significance and indicating waters with moderate mineralization, which he observed directly on the sediments lying to the west of the complexes we are describing, which border the western side of Agyin [3].

The landscape structure of the complex is very complex. It is characterized by a motley combination of small-humped sands covered with psammophytes, chocolates with tamariks, groups of black saxaul, small areas of herbaceous phreatophytes in lowlands, and fairly significant areas of solonchaks with typical halophytes.

Typologically, it should be classified as an ecotone landscape, i.e., a landscape occupying an intermediate position between adjacent desert subtypes. This complex of communities varies quite significantly in its character and, especially, in its dominant plant associations. However, the five main components indicated in its name are present throughout. Identifying this subtype of sand massif in the field is not always easy, as it has been heavily damaged by human activity. The reason for this is that, being located on the edge of the sands, areas of this subtype were long ago noticed and valued by livestock breeders, who used them for grazing. As a result, the natural landscape-physiognomic structure has been severely disrupted by the emergence of both thickets of invasive weeds and bare patches, i.e., areas completely trampled by livestock and devoid of vegetation.

Its transitional character is evident in many respects, primarily in the high gypsum content of the sands, which likely resulted from constant salt pulverization from the bottom of the depressions, transforming the sandy substrate into the pseudo-sandy formations they are today. It is also manifested in the combination of ecologically contrasting plant formations—psammophilic, gypsophilic, and halophilic—within a single complex. Finally, the transitional nature of the complex is also reflected in hypotheses about its evolution, as



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there is a viewpoint that the solonchak deserts of endorheic basins are currently undergoing a process of expansion due to the ongoing tectonic subsidence of the depression areas. If this hypothesis is correct, then the gradual dispersal of halophytes across the mounds is one of the indicators of this process, and a further expansion of the area covered by halophilic communities should be expected. All this supports the assertion that, while being a transitional, intermediate ecosystem in its original aspects, this complex has been brought to its current state by human activity and can be defined as an anthropogenic ecotone.

In the second of the listed communities, a yellowish-gray loose mass is exposed at the surface, representing an almost equal mixture of sand and gypsum particles; further down, to a depth of one and a half meters, lies a dense, silty sandy loam containing a gypsum layer up to 5-10 cm thick.

Conclusions

The landscape structure of the complex is characterized by a varied combination of small-hummock sands covered with psammophytes, chokolaks with tamarisks, stands of black saxaul, small patches of herbaceous phreatophytes in depressions, and rather significant areas of solonchaks with typical halophytes.

The vegetation formations of the Ustyurt sandy massif have been severely damaged by human activity, namely their use for livestock grazing. As a result, the natural landscape-physiognomic structure has been severely disrupted by the emergence of both thickets of ruderal weeds and bare patches, i.e., areas completely trampled by livestock and devoid of vegetation.

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