

Ecological Features of Small Mammal Populations in the Lower Reaches of the Amu Darya

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Annotation. The structural-temporal organization of the community of mouse-like rodents in the conditions of the lower reaches of the Amu Darya has been studied. It is shown that the long-term dynamics of community diversity indices is more associated with a change in the structure of dominance than with the dynamics of the number of species.

Key words: Communities, ecological structure, diversity index, model species, small mammals, lower reaches of the Amu Darya.

In recent years, the existing transformations of the natural environment in the Aral Sea region, due to the drying up of the Aral Sea, the widespread aridization and desertification of the delta, the formation of vast sandy areas of the drained seabed have led to significant changes in flora and fauna, a decrease in biodiversity. , small mammals are a model object for scientific research [1, pp. 60-66; 3, pp. 120-143].

Small mammals, due to their high abundance, species diversity and ecological lability, show an active response to natural and anthropogenic changes [3, pp. 97-102], so it is quite natural to use them as bioindicators in determining and assessing changes occurring in natural communities and ecosystems.

The range, abundance and species composition of rodents have changed, the proportion of rare and endangered species most vulnerable to anthropogenic influences, mainly mesophilic and narrowly areal, has increased. Due to the reduction of tugai and reed thickets, the intensification of land use and other negative factors, the territory of distribution and the number of mesophilic species are sharply reduced. The most important for understanding population processes is the ecological approach in the study of the relationship of the population as the integrity of the ecosystem with external factors, the dynamics of the sex-age structure and mechanisms of adaptation in time and space and the processes of interfacing the morphophysiological parameters of the population with changing habitat conditions [1, pp.60-66].

1. As is known, the community of cohabiting species has certain spatio-temporal relationships that depend on the complex of external influences, the nature of interspecific interactions and the structure of the population of individual species [2, pp.828-836]. The intensity of the impact of environmental factors, along with other indicators, quite intensively affects the dynamics of the number and population structure of representatives of the mammalian fauna living in the moist territories of the Aral Sea region - the lower reaches of the Amu Darya.

Population processes are closely related to the conditions of the habitat and the biological characteristics of the population itself, its needs and capabilities. Nevertheless, the question of which changes in the population are associated with the manifestation of intrapopulation regulatory mechanisms, and which are due to the direct action of external factors, remains debatable [3, pp. 114-121; 4, p.612-621; 5, S. 123-126; 6, S. 35-48].

Currently, there are three biotopes in the lower reaches of the Amu Darya: reed thickets and reservoirs, tugai and agricultural lands. The similarity of the species composition of the communities of small mammals of the wetlands is relatively large. The main changes in the reaction of communities to the anthropogenic impact of the valley and delta of the Amu Darya are found in the ratio of the number and composition of species. In the reed thickets and reservoirs of the lower reaches of the Amu Darya there are 16 species of mammals: *Canis lupus*, *Canis aureus*, *Vulpes vulpes*, *Mustela nivalis*, *Vormela peregusna*, *Meles meles*, *Ondatra zibethica*, *Mus musculus*, *Nesokia indica*, *Lepus tolai*, wild boar, etc. [5, S. 123-126; 6, 33-64].

The Tugai biotope is one of the richest habitats and is abundantly populated by a variety of animals. According to experts [5, p.123-126, 6, p.95] there are 24 species of mammals (*Lepus tolai*, *Canis aureus*,

Vulpes vulpes, *Meriones tamariscinus* and *Meriones meridianus*, *Microtus illaeus*, *Citellus fulvus*, *Nesokia indica*, etc.) . On the territory of such a biotope as irrigated and agricultural land I live 31 species of mammals (*Canis aureus*, *Vulpes vulpes*, *Vormela peregusna*, *Meles meles*, *Allactagulus acontion*, *Meriones meridianus* and *Meriones erthrourus*, etc.). It is established that the dominant and background species for all biotopes of the lower reaches of the Amu Darya are *Mus musculus* and *Nesokia indica*.

The study of the territorial distribution of small mammals shows a close connection with this area, characterized by a complex of orographic, floristic, microclimatic and biocenotic conditions [2, p. 828-836, 3, p.246].

The results of the calculation of the structural-temporal organization showed that the number of species that prefer the transformed territories is five, only synanthropes can be attributed to the number of those who prefer the most. The nature of the dynamics of the number of synanthropic species is largely synchronous. Analyzing the collected factual data for the period from 2018-2020, the range of temporal organization of peak abundance, recessions and relative rises occurred two years later in the third (every three years). Annual levels of abundance were similarly manifested in transformed and natural landscapes. Using calculations according to Zhivotovsky (1980), the natural variation in total abundance associated with the spatio-temporal heterogeneity of the population of small mammals of moist ecosystems of the lower reaches of the Amu Darya is about 32%, and about 60% of the variation in abundance is caused by the impact of factors of anthropogenic transformation of landscapes (desertification and aridization). With a maximum abundance, the anthropogenic impact of 19% determines the variability of the relative abundance indicator, with a low level of number - by 51%.

The amplitude of the dynamics of the abundance of the population of animals of the transformed territories compared to the natural ones is increased (except for *Microtus illaeus*), which emphasizes the imbalance in the conditions of existence of most mesophilic species. It is especially enhanced in depressions of the number and leads to an increase in the amplitude of fluctuations. The population structure is characterized by a significant participation of synanthropic species (*Mus musculus*, *Nesokia indica*). The number of animals in the territories of anthropogenic successions in the lower reaches of the Amu Darya is comparable, and in some habitats significantly exceeds that in undisturbed natural landscapes.

Our data confirm the well-known proposition that in the ecological center (optimum) of the range, the population density is not only higher, but also more stable, while not in the periphery it fluctuates in a larger range [1, pp. 60-66, 4, pp. 612-621]. In the conditions of pessimism, the population is very sparse, does not have a sufficiently effective population control and its number is limited mainly by external factors.

Thus, as a result of research, it was revealed that the response of small mammal communities to desertification depends on their specificity, which, in turn, is determined by the ecological specificity of species. When succession of desertification and aridization of the territory of the lower reaches of the Amu Darya on the site of the initially species-rich intrazonal biotopes of floodplain complexes, the species diversity and total abundance of animals decrease, whereas with transformations of comparatively impoverished tugai communities are increasing.

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