

Analysis of the Dynamics of the Number of Dominating Species of Rodent Desert Ecosystems of the Aral Sea

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Abstract: *The article presents the results of a study of the dynamics of the number of dominant rodent species in the desert landscapes of the southern Aral Sea region. It was shown that the dynamics of the number of dominant rodent species (*Rhombomys optimus*, *Meriones meridianus*) is distinguished by the frequency of population cycles and the large amplitude of changes in population density.*

Keywords: Southern Aral Sea region, population dynamics, rodents, populations, density

1. Introduction

In recent years, one of the most important problems of modern ecology is the study of the state and functioning of ecosystems under continuous anthropogenic impact [1].

The largest Aral ecological disaster on the planet aggravated the negative processes of destruction of centuries-old stable ecosystems, leading to the destruction of highly productive unique natural complexes and environmental destabilization of the natural environment. In this regard, studies of the elucidation of the ecological mechanisms of the evolutionary process and contributing to the development of ways of rational use and management of biological resources acquire especially important scientific and practical value [2].

Small mammals, being an important component of natural ecosystems, are traditionally widely used as model objects in zoological and environmental studies, including those that affect the problems of anthropogenic transformation of landscapes.

The study of the dynamics of the number of rodent fauna in the southern Aral Sea region is of great theoretical and practical interest. First of all, it is necessary to know the basic laws of the effects of desertification and aridization processes on the natural communities of small mammals, contributing to the acceleration of evolutionary processes in anthropogenic ecosystems [2, 3].

2. Results and discussion

The large gerbil (*Rhombomys optimus*) is a very common and important component of arid biogeocenoses. Changes in its abundance are reflected in the composition and structure of soils, vegetation, and also affect the abundance of other animal species. In the southern Aral Sea region, a large gerbil inhabits the sandy and clay massifs of the Northwest Kyzylkum, Zaunguz Karakum and Ustyurt. Due to its

burrowing activity, a large gerbil destroys sand-strengthening plants and promotes the movement of sand masses, causing significant damage to pastures. According to experts [3, 4, 5], the large gerbil in the northwestern part of Kyzylkum is distributed almost everywhere and is numerous. An analysis of the long-term dynamics of the abundance of large gerbils shows their certain asynchrony in violation of the former cyclicity.

Based on the analysis of the age structure of the population, it was found that in the early spring period the settlements of the large gerbil consist of overwintered individuals aged 6-8 months and up to more than 1 year. According to researchers [3, 4, 5], in April, the share of overwintered individuals averaged 86.0-96.0%, and in May-June - 46.0-49.0%. Midday gerbil (*Meriones meridianus*) is a typical inhabitant of the sand deserts of the Aral Sea region. It is very common on sandy areas of the oasis of the lower Amu Darya, along the chinks of Ustyurt and the sands of Kyzylkum. The most preferred habitats are fine-hilly alluvial sands and the margins of sand massifs near oases (5-10 individuals per ha). Ustyurt is widespread on the plateau, but not everywhere. Often found in sands in the vicinity of the Barsakelmes basin, in the saxaul forests Kosbulak, Churuk (5-10 individuals per 1 ha). Along the Ustyurt chink on sandy and friable areas it is usual. In the northwestern part of Kyzylkum, it is sporadically distributed. The most preferred habitats are fine-hilly alluvial sands and the outskirts of sand massifs near oases (5-10 individuals per 1 ha). Breeding lasts from early March to late September - early October; the most intense breeding was observed in May-June. The number of midday gerbils during the years of depression (2011-2013) were extremely low. Particularly noticeable was the widespread increase in the number of midday gerbils in Kyzylkum in 2013 and 2014 to 10-15% of falling into 100 trap nights. A high abundance of midday gerbils was noted everywhere in Kyzylkum and the average abundance in landscape - epizootological sites was 5.1% in

the spring, 7.6% in the autumn of this year.region (1962-2010)

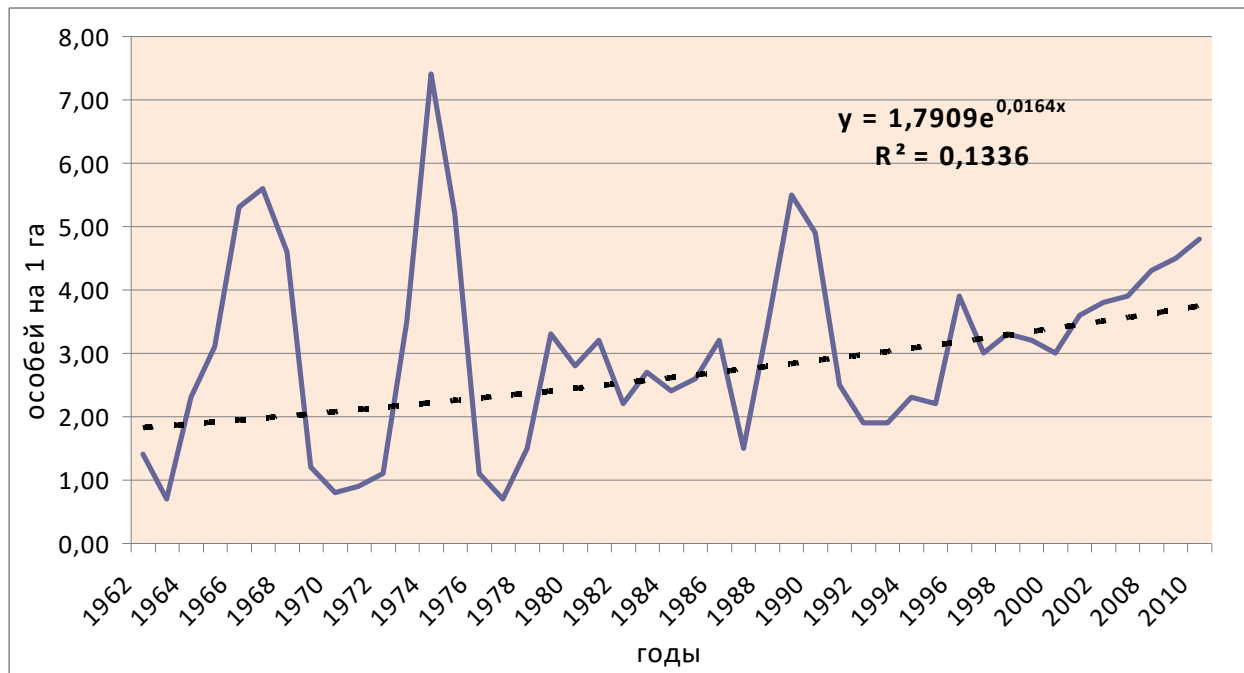


Figure 1: Long-term population dynamics of a large gerbil in the South Aral Sea (1962-2010)

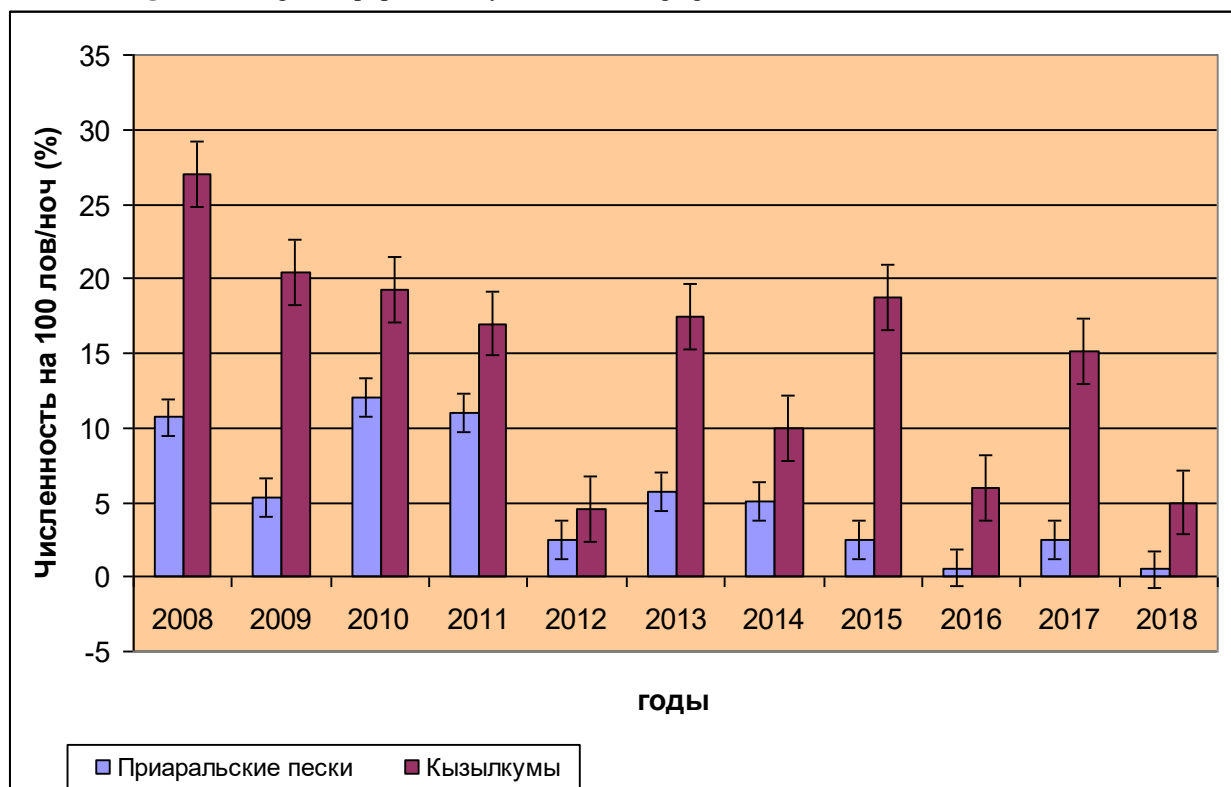


Figure 2: The dynamics of the number of midday gerbils on the territory of the South Aral Sea region (2008-2018)

The intrapopulation connection of the midday gerbil (as well as other rodents) is rather close, the more intense it is, the more favorable the conditions and high population size [1, 2]. A noticeable variation in the number of midday gerbils is observed both by season and by year, apparently, this is due to a change in the state of fodder vegetation and weather conditions. Thus, the studies showed that the dynamics of the number of dominant rodent species (*Rhombomys optimus*, *Meriones meridianus*) of desert ecosystems in the

Southern Aral Sea region is distinguished by a clearly pronounced periodicity of population cycles and a large amplitude of changes in the animal population density. During the years of increase in numbers, mouse-like rodents occupy the majority of available biotopes, and in years of low numbers they remain only in the most favorable stations.

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