

ECOLOGICAL FEATURES OF GENETIC POLYMORPHISM OF THREE SPECIES OF MICE (*APODEMUS URALENSIS* PALLAS, 1811; *APODEMUS AGRARIUS* PALLAS, 1771; *APODEMUS FLAVICOLLIS* MELCHIOR, 1834) IN THE MIDDLE VOLGA REGION (BY EXAMPLE OF THE ULYANOVSK REGION)

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Abstract. *Background.* The study of morphological, genetic and environmental factors explaining the subdivided (metapopulational) structure of habitats is a new and methodologically poorly developed scientific field. An important part of such research is the study of the genetic structure of animal populations. This scientific field is aimed at solving fundamental biological problems: the integrity of the biological species, microevolution and intraspecific differentiation, and population dynamics. The purpose of the work is to study the ecological characteristics of genetic polymorphism of Herb Field Mouse (*Apodemus uralensis* Pallas, 1811), Striped Field Mouse (*Apodemus agrarius* Pallas, 1771) and Yellow-necked Field Mouse (*Apodemus flavicollis* Melchior, 1834) mice in the Middle Volga region on the example of the Ulyanovsk region. *Materials and methods.* The genetic material for the work was collected in the Ulyanovsk region during field work over the period from 2014 to 2018. A total of 33 sequences (699 bp) of wood mice, 14 sequences (623 bp) of field mice and 9 sequences (700 bp) of yellow-necked mice were analyzed. For this, the MEGA 7.0.21 and DnaSP 5.10 software packages were used (Librado and Rozas, 2009; Tamura et al., 2012). In order to identify the environmental patterns of the distribution in the Ulyanovsk region of populations of the studied species of mouse-like rodents, except population groups obtained from data on their geographical proximity, we used two variants of zoning of the region under study- floristic and ecological-landscape. *Results.* The highest level of variability of mitochondrial D-loop fragments was detected in *A. flavicollis* ($2.4 \pm 0.3\%$), while this indicator for *A. uralensis* and *A. agrarius* had average values ($0.8 \pm 0.2\%$ and $0.7 \pm 0.2\%$, respectively). Analysis of sequence samples by geographically selected population groupings did not reveal the corresponding genetic differentiation. Distribution of the identified mitotypes by population groupings does not have any pattern. Mitotypes found only in one of the groupings are present in the samples, and for this reason they are specific. The same results were obtained when analyzing the distribution of the identified mitotypes by floristic zoning of the Ulyanovsk region. The distribution of the identified mitotypes by landscape-ecological regions reflects the ecological requirements of the studied species of mouse-like rodents. *Conclusion.* The results obtained indicate a good resolving power of the developed primer systems for amplifying D-loop and studying populational polymorphism of natural populations, as well as for grouping geographically separated populations of mouse-like rodents. The study of the distribution of the identified mitotypes of all three species of mouse-like rodents according to the floristic regions of the Ulyanovsk region did not reveal any connection between the floristic specificity of the territories and the distribution of these rodents in the region. This is probably due to the fact that the criteria for floristic zoning do not correlate with the biotopic preferences of the studied species. The distribution of the identified mitotypes by landscape-ecological regions, on the contrary, is in good agreement with the environmental requirements of the three species of mouse-like rodents. The D Tajima test for three species of mice in the Ulyanovsk Region indicates a possible increase in the number of their populations after going through the “bottleneck” during the period of population decline. This synchronization of demographic processes in populations of these species of mouse-like rodents is probably associated with a strong fragmentation of the habitat observed in the Ulyanovsk region, and high degree of subdivision of local populations of rodents.

Keywords: mouse-like rodents, mtDNA, population polymorphism, population groupings, floristic and landscape-ecological zoning, the Ulyanovsk region.

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