

DATA ON SPATIAL-TEMPORAL STRUCTURE OF *APODEMUS URALENSIS* PALL. (RODENTIA: MURIDAE) POPULATIONS IN AGROCOENOSES

CEMIRTAN Nelli, MUNTEANU Andrei, SAVIN Anatol,
NISTREANU Victoria, LARION Alina

Abstract. The spatial structure of the population is one of the forms of its existence. It allows animals to better utilize the resources of the habitat, to reduce competition for food, shelter and breeding place, it is an important factor in the regulation of the population density etc. The aim of the work was to study the spatial structure of the populations of small mammals in different phases of reproductive and population cycles. As model species, *Apodemus uralensis* has been chosen - one of the most common rodent species in agricultural lands of Moldova. As a result of the research conducted in the spring-summer-autumn period, there was revealed a complex, dynamic character of the spatial-temporal structure of the population of this species: change in the degree of territoriality and aggregation of individuals in different seasons, phases of the reproductive and population cycles.

Keywords: population structure, *Apodemus uralensis*, agrocoenoses.

Rezumat. Date despre structura temporal-spațială a populațiilor de *Apodemus uralensis* PALL. (Rodentia: Muridae) în agrocoenoze. Structura spațială a populației este una din formele existenței sale. Această structură le permite animalelor să utilizeze mai eficient resursele de habitat, pentru a reduce concurența pentru hrană, adăpost și loc de reproducere, este un factor important în reglarea densității populației etc. Scopul lucrării a fost studierea structurii spațiale a populațiilor de mamifere mici în diferite faze ale ciclurilor populaționale și de reproducere. Ca model a fost luată specia *Apodemus uralensis* - una dintre cele mai comune specii de rozătoare din agrocoenozele Republica Moldova. Ca urmare a cercetărilor efectuate în perioada de primăvară-vară-toamnă, a fost stabilit caracterul complex, dinamic al structurii spațio-temporale a populației acestei specii: schimbări în gradul de teritorialitate și de agregare a indivizilor în diferite anotimpuri, fazele ciclurilor reproductive și populaționale.

Cuvinte cheie: structura populației, *Apodemus uralensis*, agrocoenoze.

MATERIAL AND METHODS

Investigations were carried out within two years of the pilot test site "Sochiteni" in the central part of the country from May to October. Ten days each month, animals were trapped, their species and sex were determined, location, physiological state, age were registered. The behavior of adult animals in open field (the reaction to the new situation) and competitive behavior in pairs were studied, after which the animals were returned to the catching places, not to disrupt the structure of the population.

Using the open field method (HALL, 1936), several parameters were registered: horizontal and vertical activity, emotionality, the number and duration of grooming and freezing reactions of the animal, the latent period of exit from the portable cage in the open field. 80 animals were tested.

Pair interactions on a neutral field (COIRNS & SCHOLZ, 1973) were used to determine the status of the individual, the nature of intraspecific contacts in different periods of the study. Pairs were selected according to weight, age, sex (same-sex and opposite sex), location. The behavioral elements, according to their functional significance and emotional nuance, revealed during the experiments have been classified as follows: introducing, aggressive, protective, conflict, and friendly behavior. A total of 54 pair interactions were studied.

RESULTS AND DISCUSSIONS

In the population of *Apodemus uralensis* in spring and early summer, two types of "family groups" have been identified.

The groups of type 1 consisted of 2-3 "territorial" females and one "mobile" male. In this case, the inhabiting territories of the females are very small (up to 400 m²), while male-controlled territories have significant sizes (800-1,200 m²).

The groups of type 2 consisted of 1-2 "territorial" females and one "territorial" male. In this case, the family inhabiting territories have a larger area (up to 480 m²) than those of the female family groups of type 1.

Relations between the animals within groups and between members of different groups in May were friendly, as proved by the very low level of aggressive contacts during encounters between the males and their absence in the encounters between females and between males and females. In June, the contacts between males (territorial + mobile, territorial + territorial, territorial or mobile + migrant) have revealed a high level of aggressiveness (3-5 attacks and 6-9 strikes by average per one contact). Apparently, this is due to stiff competition for male participation in reproduction, because during this period the number of "free" females of the population has drastically decreased.

In the middle of the summer (July-August), there was a change in the population structure: there was no identified family groups of 1st nor 2nd types, in catches the females dominated. Most of the captured females were pregnant or lactating, or this year's brood, which have not reached reproductive age. The lactating females had strictly

territorial way of life; their habitats territories were very small. The inhabiting territories of pregnant females were larger than of lactating ones, and could overlap. The contacts between females in pair encounters remained friendly. They were characterized by high levels of olfactory and exploratory activities and alo-grooming. The number of sexually mature males in this period was very low, which is apparently associated with generation changes in cohorts (wintering individuals disappeared from the population and the young just appeared), therefore it was not possible to reveal the nature of their relationships.

By autumn, the population number significantly increased and its structure changed. For example, in September, the population consisted of pregnant and lactating females, adult males and females, as well as young animals that have not reached reproductive age. During this time, no lactating or pregnant females had well-defined individual plots, the adult and young animals did not have such plots either. The distribution of animals in the population was of a random character. Apparently, the need to maintain the territoriality was no longer necessary due to the intensification of dispersion process of individuals in metapopulations, as well as due to the abundant food resources available at this time, which led to a change in the degree of aggregation of individuals in the population. The relationships of animals in the community were characterized by low levels of agonistic interactions among males (0-1 attacks or fight per contact) and the absence of these interactions between the females.

In October, there was a further change in the population structure: in the catches, pregnant and lactating females were not recorded, but there were a lot of young animals – the population completely renewed. The young animals "acquired" small-sized individual plots and formed groups of zero level (after classification from 0 to 3). The relationships between males of *A. uralensis* became harder: the number of agonistic interactions at the meetings on neutral territory increased by 1.5-2 times compared to September. Contacts between females and between females and males remained, still, friendly.

Based on above-mentioned data, we conclude that the population of *A. uralensis* has a dynamic structure, capable to develop and modify, depending on the needs of the population, therefore the dynamicity of population structure represent its temporal and spatial adaptation.

CONCLUSIONS

The population is a complex dynamic mechanism, quickly responding to the changes of internal and external environment by modifying its structure.

In the period of intensive reproduction the basis of *A. uralensis* population were the family groups, allowing the population to quickly restore its number.

In the period of maximum number of animals (early autumn), and abundance of trophic resources modification of population structure occurred from the aggregated state with a pronounced territoriality to individual one with random distribution in space.

The territoriality acquired by adult animals of *A. uralensis* in the late autumn before population entering in winter, apparently, is also an adaptive mechanism, contributing to the rational use of trophic resources and more successful survival of unfavorable winter conditions.

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Cemirtan Nelli, Munteanu Andrei, Savin Anatol, Nistoreanu Victoria, Larion Alina
Institute of Zoology of A.S.M, str. Academiei 1, Chisinau, Republic of Moldova
E-mail: vicnistoreanu@gmail.com

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