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TRAPPABILITY OF TRAP-PRONE AND TRAP-SHY BANK VOLES

ŁOWNOSC CZĘSTO I RZADKO ŁOWIĄCYCH SIĘ OSOBNIKÓW NORNICY RUDEJ

Fifteen individuals exhibiting maximum trappability were chosen from a population of *Clethrionomys glareolus* inhabiting a 4-ha island in a lake. Rodents were caught in the home ranges of these individuals on one permanent trapping site and alternately on a trapping place situated at random in a different place each time. It was found that both trap-prone and trap-shy individuals are more frequently caught on permanent trapping sites than in places chosen at random. Trap-shy individuals are caught more rarely than trap-prone rodents and the percentage of trap-prone individuals being greater in captures on permanent sites.

1. PROBLEM, STUDY AREA, METHOD AND MATERIAL

The causes of differences in the trappability of different individuals in a given population of small rodents were considered from two aspects: 1) as the result of individual tendency to either to enter or not to enter traps (individuals frequently trapped — trap-prone and rarely trapped — trap-shy) (Kikkawa, 1964; Andrzejewski, Petrusewicz & Waszkiewicz-Gliwicz, 1967 and others) or 2) as the result of the interactions of individuals, some of which visit traps at will and others are prevented from entering traps by the first individuals (Andrzejewski, Petrusewicz & Walkowa, 1959; Calhoun, 1959; Crowcroft & Jeffers, 1961; Andrzejewski, Petrusewicz & Waszkiewicz-Gliwicz, 1967; Gliwicz, 1970). The second point of view thus reduces differences in the trappability of individuals in a population to domination phenomena, where dominants exhibit high trappability and individuals subordinate to them — low trappability.

The purpose of the experiment was to obtain an answer to the question: whether an individual with high trappability attains this trappability by domination over a given permanent trapping site (on which live-traps containing bait are placed), which it frequently visits and consequently moves about less over the remainder of its home range; or whether the given individual attains high trappability by intensive pe-

netration of the whole of its home range? Comparison was also made of the trappability of trap-shy individuals under the conditions formed by permanent trapping sites with traps and bait dominated by trap-prone individuals, with the trappability of these first individuals in other places in the home range of trap-prone individuals.

Studies were made of a population of *Clethrionomys glareolus* (Schreber, 1780) inhabiting a 4-hectare island in a lake in northern Poland ($\varphi = 53°40'$ N, $\lambda = 21°35'$ E). No other small rodents occurred in this area apart from the study species. The island was covered by tree stands belonging to the following associations: *Salici-Franguletum* Malc. 1929, *Tilio-Carpinetum typicum* Traczyk 1962, *Tilio-Carpinetum stachyetosum silvaticae* Traczyk 1962, *Circaeo-Alnetum* Oberdorfer 1953.

The experiment consisted of two trapping series. The first series lasted 10 days (from July 22nd to July 31st 1969). During this time rodents were caught using the *CMR* method, individually numbering the animals caught on 159 trapping sites arranged chequerwise every 15 m over the whole island. Three live-traps were placed on each site and inspected twice daily, at 7,00 and 19,00.

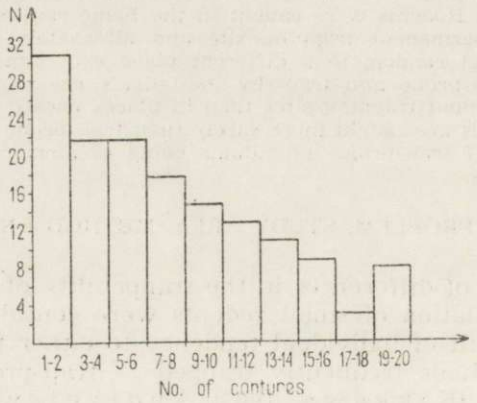

Fig. 1. Distribution of individuals with given trappability in first trapping series.

After completing this trapping series the number of captures for all the individuals and the distribution of individuals according to the number of captures were determined (Fig. 1). Fifteen individuals were chosen from among those with the greatest number of captures (more than 12 captures per 20 trap inspections) and the places on which they were captured recorded. The extent of the home range of these individuals was determined in this way, and then the sites with maximum trappability of each of these individuals were marked in them.

The second series of captures was made only within the home range area of the 15 individuals chosen. Trapping was carried out alternately on the sites of most frequent captures in the first series and in places chosen at random each time, within the home range of the given individuals but not coinciding with any of the trapping sites of the first series. In the case of individuals with very large home-ranges two sites

were chosen for each of the two alternatives. Three traps were placed side on the trapping sites.

When trapping took place on a random site the same bait was left on the permanent trapping site as was used in traps (oat grains). This maintained the domination by a given rodent of the most frequently visited trapping site and its possible domination there over other individuals.

The second trapping series in the home ranges of most trappable individuals lasted from August 5th to August 30th 1969; traps were inspected three times a day, at 7,00, 15,00 and 23,00. During inspection a record was kept of the capture place and the number and sex of the animal caught.

During the first trapping series a total of 9540 trap settings and a total number of 1212 captures of 151 individuals were made. Analysis of frequency of captures showed that the maximum number of captures was 20 and minimum 1 (Fig. 1).

2. ANALYSIS OF MATERIAL

The number and percentage of captures on permanent trapping sites and in places chosen at random, and the number and percentage of captures of individuals to which the home ranges belonged and of other individuals with a small number of captures, are given in Table 1. In

Table 1

Number of individuals, number of captures and percentage of captures made on different trapping sites.

Individuals	No. of individuals	No. of captures	Trapping sites	
			Permanent, %	Random, %
Trap-prone	15	364	56	44
Trap-shy	83	734	70	30

the first trapping series the average number of captures of selected individuals with high trappability was 15.73 ± 0.83 and of the remainder 6.70 ± 0.44.

Calculation was made of the percentage of captures of trap-prone individuals on the permanent trapping sites (where bait had been laid out) and on places within the home range of the given individual chosen at random from among all the captures relating to trap-prone individuals in the second trapping series (number of times traps were set as the same on both types of sites). This figure was respectively 56% for permanent trapping sites and 44% for places chosen at random (Table 1). The difference between these percentages is statistically significant (Student's test) although not very considerable ($0.001 < P < 0.01$). This means, therefore, that trap-prone individuals move about over the permanent trapping site only slightly more frequently than over a place chosen at random in the area.

In turn a similar analysis was made of the trappability of trap-shy individuals on permanent trapping sites of trap-prone individuals and on places chosen at random within their home range. The percentage of captures of trap-shy individuals on permanent trapping sites is 70%, but only 30% on places chosen at random (difference also statistically significant — $P < 0.001$).

Finally comparison was made of the percentage of captures of trap--prone and trap-shy individuals on permanent trapping sites. This also showed a statistically significant difference ($P < 0.001$), the trap-prone individuals being caught on these sites relatively less frequently than trap-shy individuals ($P < 0.001$).

As a defined period elapsed between the first and subsequent trapping series and the attitude of different individuals to the traps might have undergone changes, the difference was assessed between the average number of captures of trap-prone (24.27 ± 2.93) and trap-shy (8.84 ± 1.16) individuals taking place in the second trapping series. Comparison of frequency of captures of the two groups would not appear to differ greatly from the first trapping series, and thus the division of individuals into trap-prone and trap-shy defined in the first series is maintained in the second.

3. DISCUSSION

The persistence of the high trappability of trap-prone individuals on both the permanent trapping sites and in places chosen at random points to the high degree of penetration and domination over the whole of their home ranges.

The greater trappability of trap-prone individuals on the permanent trapping sites in relation to places chosen at random for setting traps can be interpreted in two ways. Either the animals, by coming constantly in contact with a permanent object in the form of a trap (or bait) on this site more readily enter it, or move about the area of this site more often, the second hypothesis appearing more likely. When comparing the results of trapping on permanent sites and random places attention must be paid to a certain lack of uniformity in the value of trappings on these two sites. While in the case of trapping on permanent sites the animals had no other place in which bait was laid out within their home range, with trapping in random places bait was also laid outside the traps on the permanent trapping site. This bait might therefore have partly attracted the rodents away from penetrating the whole of the home range, and consequently have reduced trappability in places chosen at random and caused the slight difference observed in trappability between these two types of site.

The predominance of captures on permanent trapping sites over random places in the case of trap-shy animals indicates that these animals also visit these sites more frequently than the remainder of their home range. The fact that they are caught relatively more rarely in places chosen at random than on permanent trapping sites may point to less intensive penetration of the area by these individuals than by trap-prone animals. The small number of traps occupied by individuals caught in

relation to the possibility of captures being made (number of trap-settings) rules out reduction of trappability of trap-shy individuals due to blockage of traps by trap-prone individuals caught in them.

The results given therefore show that: 1) trap-prone individuals intensively penetrate the whole area of their home range, 2) if the trap-shy characteristic is formed under the influence of the domination of trap-prone individuals, then the effect exerted by the latter applies to the whole of their home range, 3) captures on sites with bait laid out on them increases the percentage of trap-shy individuals in the results in relation to results which would be obtained by trappings on places chosen at random.

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COMPOSITION OF MILK OF EUROPEAN BEAVERS, *CASTOR FIBER* LINNAEUS, 1758

SKŁAD MLEKA BOBRÓW EUROPEJSKICH, *CASTOR FIBER* LINNAEUS, 1758

Seven samples of milk were collected from 4 beaver females during various stages of lactation. The application of tranquiline and oxytocin significantly facilitated milk sampling. The beaver milk is characterized by a high dry matter (24.1%) fat (11.7%) and total protein (8.9) contents, and hence shows a high nutritive value. Marked differences in the milk composition were observed depending on the period of lactation.

The necessity of artificial nursing or additional feeding of beaver kits repeatedly occurs during farm breeding of beavers. The kits are born in well advanced stages of development, covered with fur, and a few