

second litter the accuracy of estimation depends to higher degree on the total number of young born to female than on the number of litters. In general however the coincidence between the number of young and the numbers of placental scars is of high order and the method may prove helpful in studies concerned with reproduction of wild mouse and, possibly other closely related species.

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#### THE EFFECT OF PRE-BAITING ON CAPTURES OF RODENTS \*

##### WPLYW PRZYNECANIA NA WYLÓW GRYZONI

Four series of catches were made at two localities in Poland, on previously pre-baited and on unbaited study areas. Numbers of rodents caught were estimated from linear regression equation and compared using the Student's test. It was stated that pre-baiting does affect the results of catches.

#### I. INTRODUCTION

The investigations were aimed at ascertaining the effect of pre-baiting on the rate of removal of rodents when the Standard Minimum method is used (Grodziński, Pucek & Ryszkowski, 1966), and in particular whether more rodents are caught in a pre-baited than in an unbaited area, whether numbers assessed on the basis of captures are greater in a pre-baited than in an unbaited area.

The experiments were carried out in connection with the opinion expressed by Dr. Pelikán at the IBP symposium held at Jabłonna (1966), during which he stated that if mice are pre-baited in a certain area there may be more of them there in comparison with an area which had not been pre-baited (Pelikán, 1968). This may be due to greater immigration than emigration in the pre-baited area. The rodents may therefore tend to be more settled in a pre-baited area.

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## II. METHODS

The investigations were made in four series: two at Dziekanów Leśny near Warsaw in August and December 1966, and two at Ispina near Kraków in July and September 1967. The study area at Dziekanów Leśny was covered by the following plant associations: *Vaccinio uliginosi-Pinetum*, *Pino-Quercetum* variant with *Carpinus betulus*, *Scerzonera humilis*, *Carici elongatae-Alnetum deschampsietosum*, and at Ispina *Tilio-Carpinetum*. The species caught were mainly *Clethrionomys glareolus* (Schreber, 1780), *Apodemus flavicollis* (Melchior, 1834) and *Apodemus agrarius* (Pallas, 1771), the percentages of individuals of the various species being similar in all the experiments.

The study area of each series consisted of four squares in each of which there were 100 trapping points arranged in a grid 15 m × 15 m. The distance between the squares amounted about 50 m (Fig. 1). Both series were made in the same areas at Dziekanów and at Ispina.

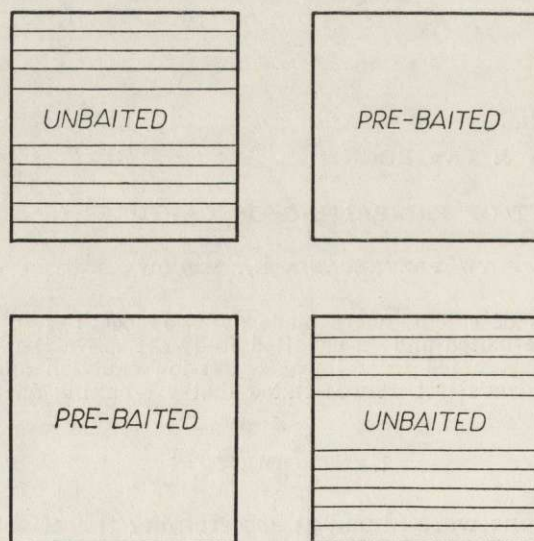


Fig. 1. Plan of the study area.

Captures in these squares were made by the Standard-Minimum method (Grodziński *et al.* 1966), pre-baiting being carried out in two squares in each series.

The pre-baited and unbaited squares lay diagonally on the field composed of four squares (Fig. 1) to eliminate any differences in the natural density of the animals.

Oats laid out on the papers used for the Standard-Minimum method were used as bait during the pre-baiting period. Cheese, wick fried in oil and bread were used alternately as bait in snap-traps. Two snap-traps were set on each pre-baiting point at Dziekanów, but three traps were used on each point at Ispina, on account of the great density of rodents there.

## III. RESULTS

The experiments showed that slightly more animals are caught in pre-baited than in unbaited areas (Fig. 2 A). The differences in numbers of rodents estimated actually removed in baited and unbaited areas are statistically significant (Student test  $t_{0.05} < t_{emp}$ ) in both the series of investigations made at Dziekanów, but at Ispina the difference is significant only in September. This difference is not however statistically significant for the first series of investigations made at Ispina. The non-significance of the difference can be explained by the unevenness of the original density of mice in the four-square area. Verification of this hypothesis by means of test  $\chi^2$  reveals in this one case that the density of rodents is significantly greater in the north than in the south of the study area. As a result captures in unbaited areas exceed the captures made in analogical pre-baited areas, which confuses the result

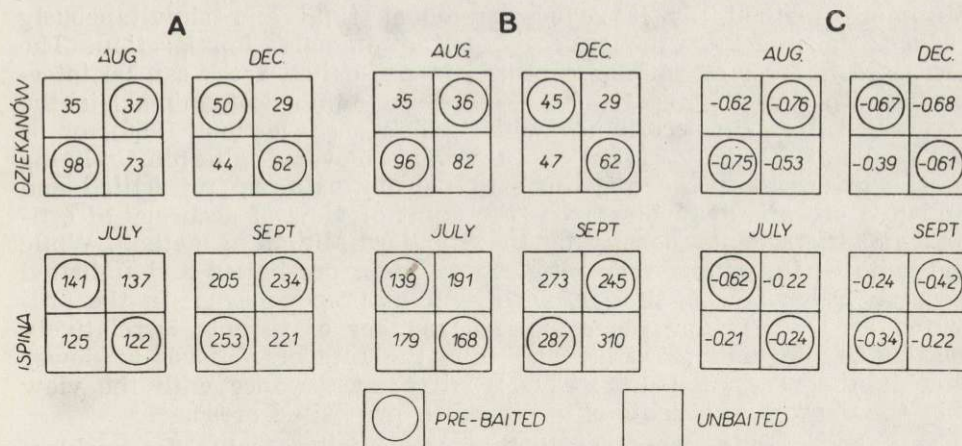


Fig. 2. Number of rodents caught (A), estimated from liner regression equation (B) and coefficients of regression (C) for pre-baited and unbaited study areas.

of the experiment. The estimate of numbers of rodents based on linear regression takes a different form (De Lury, 1947; Pearson, 1954; Grodziński *et al.* 1966) (Fig. 2 B). At Ispina the estimated density of rodents, calculated for five days of capture, is higher in the unbaited than in the baited areas. At Dziekanów, however, where there were far fewer rodents in the whole study area, estimated numbers are slightly greater in pre-baited areas (Fig. 2 B).

In order to check whether there is a difference between baited and unbaited areas in respect of capture rate of rodents comparison was made of regression coefficients. On the level of significance  $\alpha = 0.05$  the difference is statistically significant ( $F_{emp} > F_{0.05}$ ,  $F_{0.05} = 2.33$ ;  $F_{emp} = 59.74$ ). These coefficients are lower for the unbaited than for the baited areas which indicates that capture and removal from unbaited areas is slower than from baited areas (Fig. 2 C).

## IV. DISCUSSION

The investigations made showed that (1) capture of rodents preceded by pre-baiting takes place more quickly, (2) as the result of baiting more individuals are captured from the given areas than from an analogous area in which capture is not preceded by baiting. Estimate of numbers by the standard minimum method differs from this (Grodziński *et al.* 1966) and gives an ambiguous result. While the estimated number of rodents in both the pre-baited and unbaited areas at Dziekanów was very similar to the number of rodents caught, at Ispina higher figures were obtained from assessment than the numbers of animals caught, the estimated number of rodents being greater in unbaited areas than in baited areas.

The increase in removal rate of rodents from the area in which pre-baiting was carried out before capture is favourable from the point of view of the accuracy of numbers of rodents estimated by the Standard-Minimum method, as it reduces removal time and simultaneously reduces the effect of the process of the animals' immigration. The increased number of animals captured in pre-baited areas can be interpreted either as the result of the increased number of animals in the pre-baited area (in accordance with Pelikán's suggestions 1966), or as the result of the more radical capture and removal of all animals living in the given area. The difference in density value in pre-baited and unbaited areas is disturbing from the point of view of accuracy of estimates of the rodents' density by the Standard-Minimum method. While the ratio of the animals' density estimated in pre-baited and unbaited areas at Dziekanów is similar, with a slight preponderance in the pre-baited area, at Ispina the estimated number of rodents is relatively greater in the unbaited area, and thus the rate of removal is slower than in the pre-baited area. This result is at variance with the view that the density of rodents is increased in pre-baited areas.

The above preliminary investigations thus fail to solve the problem put forward by Pelikán (1967). They indicate, however that pre-baiting does affect the results obtained when the Standard-Minimum method is used.

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