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*MICROTUS ARVALIS* (PALLAS 1778) IN THE BIAŁOWIEŻA GLADE

*MICROTUS ARVALIS* (PALLAS 1778) NA POLANIE BIAŁOWIESKIEJ

Investigations on mammals of the Białowieża Glade are a theme of great interest, because of the specific conditions in which certain typical field species live there. The Glade is surrounded by a closed ring of forest, 12—34 km. wide, which isolates nearly completely the fauna of mammals from greater areas of cultivated fields beyond the Białowieża Primeval Forest. The only, rather long ways of communication (a minimum of 15 km.) for this population can be: the railway tract, the highroad Białowieża—Hajnówka and the valley of the river Narewka, covered with meadows.

The soil of the Białowieża Glade is composed of sand and clay, slightly permeable. Cultivated fields, divided into narrow ridges (2.5—3 m.), separated from each other by deep furrows, cover the major part of the entire surface of about 1600 ha. In spring they are partly under water for a long period. Two parks, the Botanic Park, English in type, about 50 ha in surface, with numerous groups of old trees and thickets of ornamental shrubs — and the Park belonging to the Technical School of Forestry, much smaller (25 ha) but of a similar character, are situated approximately in the centre of the Glade.

The climate of the Glade is temperate, with distinct continental influences. The mean temperature of the air for the past ten years is +17.93°C in July and —3.65°C in January. The autumn is long and sunny, winter starts relatively late — at the end of November or in December. Morning frosts, sometimes amounting to —15°C are common in autumn and spring. Snowfall is usually abundant. The mean of atmospheric downfall for the last ten years is of 580.11 mm.

Small mammals were captured from July 17 to September 30, 1954 by means of 5 small permanent ditches (50 m. long, 10 cm. wide and 5—7 cm. deep). In each one 10 metal cylinders were placed. The ditches were situated: 1. in the Botanic Park, 2. on the borders of the Park and the fields, 3 and 4. in the fields, and 5. in the National Park, 20 m. from the field border, in a *Querceto Carpinetum* biotope. Capturing was also carried out around colonies of *M. arvalis*.

Among the other mammals 236 specimens of *Microtus arvalis* (Pallas 1778) were captured. The material, being numerous, gives a sufficient picture of the variability of this species in the Białowieża Glade.

Ranges of variability, as well as the arithmetical averages of body and skull dimensions, are presented in table 1. No significant differences in the

dimensions of the skull were stated between adult males and females. Among young voles however, it was noticed that the body length, the tail length and, in a lesser degree, the condylobasal length of the males, are slightly greater than in females.

The length of the maxillary teeth row, and especially the interorbital breadth, do not change

**Table 1.**

Dimensions of body and skull of *M. arvalis* from the Białowieża Glade.

| Measurement                | N   | juvenales |       |       | adultes |        |                  |
|----------------------------|-----|-----------|-------|-------|---------|--------|------------------|
|                            |     | min.      | avg.  | max.  | min.    | avg.   | max.             |
| Head & body                | 250 | 60.0      | 7.80  | 114.0 | 88.0    | 105.10 | 126.0            |
| Tail                       | 246 | 20.0      | 29.30 | 43.0  | 27.0    | 34.00  | 43.0             |
| Cb. - lenght               | 118 | 20.0      | 22.25 | 24.9  | 22.0    | 24.24  | 26.4             |
| Zygomatic breadth          | 34  | 11.4      | 12.54 | 13.6  | 12.9    | 13.69  | 14.5             |
| Occipital breadth          | 120 | 9.5       | 10.38 | 11.2  | 11.2    | 11.00  | 12.1             |
| Height of skull per bullae | 109 | 7.8       | 8.43  | 9.0   | 8.2     | 8.79   | 9.6              |
| Depth of brain - case      | 119 | 6.3       | 6.79  | 7.5   | 6.3     | 7.01   | 7.9              |
| Interorbital constriction  | 66  | 3.2       | 3.49  | 3.9   | 3.3     | 3.51   | 3.8              |
| Maxillary tooth - row.     | 121 | -         | -     | -     | 5.0     | 5.64   | 6.5 <sup>y</sup> |

1) for the entire material (young + adult)

**Table 2.**

Comparison of some body and skull dimensions of *M. arvalis* from Białowieża and other terrains.

| Locality & author                     | Head & Body          | Tail              | Cb.                    | Zyg. - Zyg.            |
|---------------------------------------|----------------------|-------------------|------------------------|------------------------|
| Polana Białowieńska /♂♂ + ♀♀ ad./     | 88 - 126<br>/105.1/  | 27 - 43<br>/34.0/ | 22.0 - 26.4<br>/24.24/ | 12.9 - 14.5<br>/13.69/ |
| Est1 Reinwaldt, 1927                  | 100 - 123            | 31 - 38           | 22.3 - 26.9            | 12.3 - 15.0            |
| Polesie i Wileńszczyzna, Dehnel, 1946 | 100 - 130            | 32 - 46           | 23.2 - 26.8            | 13.3 - 15.8            |
| South - west. BSRR, Ognev, 1950       | 105 - 135            | 40 - 50           | 24.2 - 26.9<br>/25.70/ | 13.7 - 15.0<br>/14.32/ |
| Mazury, Miller, 1912                  | 105 - 120<br>/111.3/ | 31 - 41<br>/35.5/ | 24.8 - 25.4            | 14.0 - 14.4            |

Table 2 presents the comparison of measurements of adult Common voles from Białowieża Glade and of *M. arvalis duplicatus* from other areas. It can be seen that the Common voles living in the area of the Białowieża Glade have slightly smaller dimensions of the body and of the skull. This can be explained mostly by life conditions, pessimal for this species. Sowing of secondary crops, before and after the principal harvest, does not take place here. Corn is carefully reaped and does not remain in stacks, but is immediately transported to barns. Cattle graze on stubble-fields till late in autumn.

And, lastly, vegetation starts growing relatively late in the Białowieża conditions ( $\mp$  2 weeks later than in central Poland) and ends much earlier, owing to the autumn frosts. These conditions can exert some influence upon the general condition and dimensions of the voles in this area. We do not suppose that these changes have a genetic foundation. It is very likely that these voles, transported into optimal condition, would attain greater dimensions.

On the other hand, some dimensions in the investigated population are slightly bigger than those characteristic for the subspecies *M. a. duplicatus*, as given by Ognev (1950). Differences of that type can depend, however, on the season of the year and developmental phase of the population from which the greater part of the material was collected.

In spite of this, the assumption that the Białowieża population of *M. arvalis* belongs to the subspecies *Microtus arvalis duplicatus* (Rörig & Börner 1905) can be adopted.

Biological observation. A seasonal migration of the voles was noticed during the period of investigations. During and immediately after the harvest season a mass migration of voles took place, from cultivated fields mostly, to the area of the Botanic Park (having large expanses of grass vegetation). At the end of September, when ploughing had been terminated, a return migration was noticed.

When investigating nests and burrows, we have found that the length of corridors amounts approximately to 100—150 cm. in sum, 300 cm. in extreme cases. The nests and runs were situated relatively shallow, usually at a depth of 35 cm., probably owing to a low level of ground water. The nests were usually composed of two habitable chambers, with 2—3, (sometimes 5) outlets. The chambers were approximately 15 cm. in diameter and 7—12 cm. in height.

In October 1954 we marked all the burrows situated on 1 ha. The majority (85%) were still being used when a second control took place in February 1955. The entrances on the top of the ridges were not used, but new ones appeared in the furrows where a thick layer of snow was gathered, driven in by the wind from more elevated parts of the field. This might suggest that the population of *M. arvalis* is settled during late autumn and winter.

In 1954, an increase in the number of Common voles on the terrain of the Białowieża Glade was noticed. It was not, however, a mass appearance in the full meaning of the word. Such a phenomenon has not been observed yet in this area.

#### REFERENCES

- Dehnel, A., 1946: Contribution à la connaissance des représentants du genre *Microtus* Schrank dans les régions de Polesie et de Wilno. *Fragm. Faun. Mus. Zool. Pol.* 5, 1:1—24. Warszawa. Miller, G. S., 1912: Catalogue of the Mammals of Western Europe. 1—1019. London. (Ognev, S. I.), Огнев, С. И., 1950: Звери СССР и прилежащих стран. 7:1—706. Москва—Ленинград. Reinwaldt, E., 1927: Beiträge zur Muriden-Fauna Estlands mit Berücksichtigung der Nachbargebiete. *Acta et Comm. Univ. Tartu.*, Tartu. Polish Academy of Sciences, Mammals Research Institute in Białowieża.