A C T A T H E R I O L O G I C A

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A Population of *Clethrionomys glareolus pirinus* on the Vitosha Mountain, Bulgaria. III. Individual Growth Curve

[With 1 Table & 1 Fig.]

Weights of bank voles caught in spring and autumn of 1967 and 1968 on Vitosha Mountain and data from captive animals were used to plot a growth curve for *Clethrionomys glareolus* 3 to 420 days old. This curve was compared with a similar curve for Polish *C. glareolus*.

1. INTRODUCTION, MATERIAL AND METHODS

Growth curves are essential for calculating the population productivity of a species. Individual growth curves for wild and captive *Clethrionomys glareolus* have been described (Sviridenko, 1959; Petrov & Airapetyans, 1961; Bergstedt, 1965; Ilyenko & Zubchaninova, 1965; Bujalska & Gliwicz, 1968). The curve presented here is for *C. g. pirinus* Wolf, 1940, from Bulgarian mountains.

The data used to construct the curve were obtained from 16 captive-born voles 3 to 60 days old and from individuals live-trapped on Vitosha Mountain in the spring and autumn of 1967 and 1968 (Markov *et al.*, 1972). Only male weights were used as most wild females were pregnant. Data from individuals of the same age, whether born in spring or autumn, were pooled since Bujalska & Gliwicz (1969) reported no seasonal weight gain differences in males. Age was determined from the length of M_1 roots in wild voles by the method of Pucek & Zejda (1968). Captive-born voles were weighed daily.

2. RESULTS

The growth curve plotted included weights of individuals from day 3 to 420 days, derived from 3 to 11 animals. Very young voles with

small weights were least numerous (Table 1). Body weight increase is expressed by the equation

$$y = -4.44 + 5.31 \ln x$$

where y is weight at a given age and x is age in days (Fig. 1).

Table 1

Growth curve data.

Age in days (X)	No individuals (n)	Mean weight ($\bar{w}$)	Theoretical weight (y)
3	3	3.6	2.6
10	3	7.9	7.8
20	3	11.6	11.4
30	3	14.7	13.5
40	3	16.2	15.1
50	3	15.9	16.3
60	3	17.2	17.3
70	3	15.5	18.0
80	3	15.7	18.8
90	3	16.4	19.4
100	3	16.4	20.0
120	4	19.2	21.0
150	11	21.2	22.2
300	4	27.0	25.8
360	7	27.8	26.8
390	8	28.6	27.2
420	9	30.0	27.6

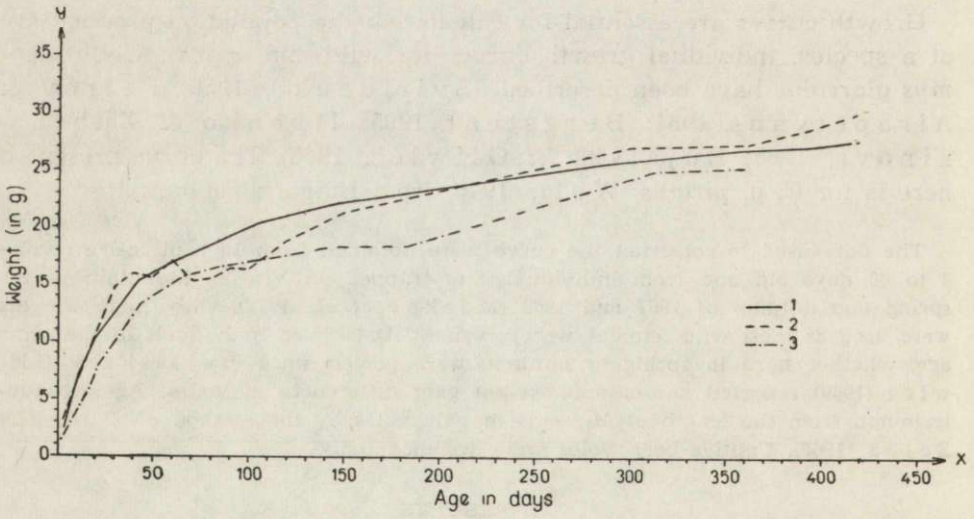

Fig. 1. Individual growth curve for *Clethrionomys glareolus pirinus*. 1 — Curve of function $y = -4.44 + 5.31 \ln x$, 2 — Empirical data, 3 — Growth curve for *C. g. glareolus* in Poland, after Bujalska & Gliwicz, 1968.

This curve indicates intensive body weight gain from about 2 g at birth to 16 g on day 50. Growth then decreases and after 22.2 g at 5 months, it is minimal. Males of this subspecies become sexually mature at 19 g (Stefanov & Vasilev, 1963), or about 3 months of age on our curve. They grow only very slowly after that. Male *C. g. pirinus* are heavier than *C. g. glareolus* from Poland (Bujalska & Gliwicz, 1968), the difference being greatest (about 5 g) at 5—6 months (Fig. 1). These differences later decrease and at 1 year differ by only 1 g. The growth rate of the two subspecies is similar, periods of rapid and slower growth fully coinciding.

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POPULACJA *CLETHRIONOMYS GLAREOLUS PIRINUS* W LESIE ŚWIERKOWYM MASYWU WITOSZA W BUŁGARII. III. KRZYWA WZROSTU OSOBNICZEGO

Streszczenie

W oparciu o dane o ciężarze osobników hodowanych w laboratorium od urodzenia do 2 miesięcy życia i o materiał pochodzący z badań terenowych wg metodyki Standard Minimum przeprowadzonych wiosną i jesienią 1967 i 1968 roku na Witosza, wykreślono krzywą wzrostu *Clethrionomys glareolus pirinus* — podgatunku zamieszkującego Bułgarię (Fig. 1). Do wykreślenia krzywej użyto wyłącznie ciężary samców.

Krzywa ta odpowiada funkcji:

$$y = -4.44 + 5.31 \ln x$$

gdzie y — ciężar osobników w danym wieku, x — wiek osobników w dniach.

Porównując krzywą wzrostu bułgarskiego podgatunku nornicy rudej z krzywą wzrostu *C. g. glareolus* z Polski (Bujalska i Gliwicz 1968) stwierdzono, że nornica zamieszkująca Bułgarię jest nieco większa, lecz charakter tempa wzrostu obu podgatunków jest podobny.