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PRODUCTION DUE TO REPRODUCTION AND TO BODY GROWTH IN A CONFINED MOUSE POPULATION*

Calculation was made in respect of 10 confined populations of white mice that production of newborn mice is about 19.4%, production due to reproduction, i. e. production of young during the time when they are fed solely by their mothers — 39.0% of total production of the population. The error consisting in including newborn mice twice in production (as newborn young and as embryos) is about 3.9% of total production.

In research on production it is possible to distinguish production due to reproduction (P_r) and production due to growth of individuals (P_g) (Petrusewicz 1967, Phillipson 1967). Calculation of production (P) of free-living populations of small rodents, expressed in live weight, may be carried out by estimating increase in body weight of individuals in the population (P_g) and adding to this the body weights of newborn mice as was done by Golley (1960). The empirical basis of calculation of production due to body growth (P_g) is most often the standing crop — biomass at the time of sampling. The standing crop of the population may contain the body weights of pregnant females, and thus also the weight of embryos, that is, part of the production of offspring. In this way the possibility of making an error is created, consisting in including in production the weights of the same individuals twice, once as embryos and once as newborn mice. Attention is drawn to this danger by Petrusewicz (1967).

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Contribution of production due to reproduction (P_r) (weight of newborns (P_b) and their production during weaning) in total production (P) of confined mouse population

Tab. I

Production		No. of population										Average
		1	4	5	8	9	11	14	18	28	39	
P (in g)		3,177	5,146	4,490	4,300	3,575	4,170	4,791	3,570	4,921	6,463	4,460
Percentage of P	P_b	22.3	22.7	19.3	20.2	21.9	16.7	19.2	17.5	16.2	18.3	19.4
	P_r	41.5	45.1	41.8	40.5	38.9	39.3	35.8	34.2	36.0	37.3	39.0
	artificial surplus of production due to twice weighing of mice (newborns and embryos)	5.7	3.3	3.1	3.7	6.2	3.4	4.0	4.6	2.4	2.7	3.9

The aim of the present study is to attempt to assess the surplus production caused by double inclusion of the weight of the same individuals (once as embryos and once as newborn mice) in population production and the percentage of P_r in population production (P), using model laboratory populations as illustrations.

Ten confined populations of white mice were used for this purpose. Each of these populations was at the start composed of 3 males and 6 females, which reproduced freely, forming the populations large and varied in number. The mice were kept in wooden cages measuring 160 × 40 × 10 cm. Food of full value and water were supplied in surplus during the whole period of investigation.

All mice older than 4–5 weeks were marked with individual numbers and weighed every two weeks, each separately. The younger individuals were weighed twice a week. The number and weight of newborn and dead individuals were recorded every day. All the mice born on the same day were weighed together. This made it possible to assess fairly accurately the population production in grammes of live weight. The populations were kept in the cages for 70 weeks.

Production (P) was calculated on the basis of totalling up the body weights of newborn mice and their increases and increase in body weight of all adult individuals. These data are given in Table I. The percentage of production of newborn mice (P_b), otherwise the percentage of sum total of their body weights is on an average 19.4% of total population production, and varies from 16.2 to 22.7%.

In order to estimate the weight of embryos, which is included with the weight of pregnant females at the moment of measurement of the mice, the day of development of the embryos was determined when weighing the females (their "age" from the moment of the female's fertilization) which was possible to do as the newborn mice were recorded daily. The curve of growth of mouse embryos was taken after the data of MacDowell, Allen and MacDowell (after Grünberg 1952, p. 16). According to these data the embryo weighs only 0.03 g eight days before birth. This is so small a weight that it can be overlooked altogether. On this account only the weights of embryos, which at the time of weighing the whole population were over the age of 12 days of embryonic development, were taken into consideration in calculations of the excess which might be caused by double weighing of individuals (as embryos and as newborn mice). Knowing their weight (from the curve of embryonic development) and age (from author's estimation) calculation was made of the weight of each embryo on the day of measurement the whole population, and then the weight of all the embryos.

The percentage of weight of the embryos in total population production

is very small, not exceeding 6.2%, and therefore it may be practically ignored in production investigation. Greater superaddition to production may occur when very frequent measurements are made (more often than once a week), as each embryo will then be included several times.

Assessment of production due to reproduction (P_r) in mammals gives rise to some doubts. When calculating P_r in *Oniscus asellus* L., Phillipson (1967) counted egg production. In the case of mammals P_r could be counted as the weight of all newborn young (presented above as P_b) or as Petrusewicz (1967) considers, the production of young individuals as long as nursed by their mothers, that is, consumption from the habitat through the mother. In the case of mice the young individuals consume no other food except their mother's milk up to about the 14th day of life (Grünberg 1952), then gradually change over to solid food. It is very difficult to calculate how much of their food at this time is obtained independently and how much obtained from the mother, and therefore P_r was calculated for individuals aged up to 14 days of life, and is on the average 39.0% (Tab. I).

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UWAGI O PRODUKCJI POPULACJI BIAŁYCH MYSZY W ZWIĄZKU Z REPRODUKCJĄ I WZROSTEM WAGI CIAŁA OSOBNIKÓW

Streszczenie

Zbadano 10 zamkniętych populacji białych myszy. Obliczono, że produkcja noworodków wynosi 19,4% a produkcja młodych w okresie gdy są karmione wyłącznie mlekiem – 39,0% ogólnej produkcji populacji. Błąd, polegający na podwójnym wliczaniu nowo urodzonych myszy do produkcji (jako noworodków i jako embrionów), wynosi 3,9% produkcji. Szczegółowe dane przedstawiono w tabeli I.

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