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Influence of birth weight and nutrient supply before and after weaning on the performance of rabbit does to age of the first mating

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Abstract

The objective of the study was to determine the effect of birth weight and the influence of nutrient supply during nursing and after weaning on the performance of suckling and growing rabbits ($n=182$). The experiment was set-up using a $3\times2\times2$ factorial arrangement. Newborn female rabbits were divided on the basis of their birth weight in 3 classes: low /L/=35–45 g, medium /M/=53–58 g and high /H/=65–70 g. Half of the litters were nursed by one (O) doe and the other half by two does (T). Kits were weaned at 3 weeks of age. From the age of 4 weeks half of the rabbits were fed ad libitum (AL), while the other half were reared on a restricted feeding regime (R) corresponding to 80–85% of the ad libitum feed intake level.

Birth weight had a significant effect on the body weight up to the end of the experiment (18 weeks of age). H kits attained higher body weight at all ages (3772 g at 18 weeks of age compared to 3565 g and 3373 g for L and M rabbits, respectively). Significant differences were found in feed intake between 3 and 15 weeks of age, in feed conversion between 9 and 12 weeks of age and in weight gain between 3 and 4 and 12 and 15 weeks of age, in the majority of cases in favour of the H rabbits.

Nursing by one or two does exerted the most pronounced effect on the body weight. T kits had significantly higher body weight than O kits up to 15 weeks of age (3306 vs. 3108 g). Differences in feed intake, feed conversion and body weight were only periodically demonstrable between the groups O and T.

The feeding regime exerted a significant influence on the feed intake, weight gain and body weight of kits. Significant differences in the feed conversion were found, however, only between 15 and 18 weeks of age. Although AL rabbits achieved better feed conversion at all ages except the period between 9 and 12 weeks of age.

It seems that the three factors (birth weight, number of nursing does and feeding regime), especially the feed restriction, could influence the production of does.

Keywords: Rabbits; Birth weight; Milk supply; Restricted feeding; Weight

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1. Introduction

Does kept on intensive rabbit farms have a short useful life span. The 120–130% annual renewal rate shows that does remain in production for less than 1 year on average (Guerder, 2001). A possible approach to prolonging the life span and increasing the life performance of does may be the elaboration of a better rearing method. Birth weight and nutrient supply during nursing and after weaning and, in association with this, the age and body condition at the first insemination may also play a role.

Previous studies have focused on the effect of a single factor and, less often, on the combined influence of two factors. The birth weight may have an impact on the performance of does (Poigner et al., 2000b). Milk supply of suckling rabbits exerts an influence on the growth of suckling and growing rabbits, and also on the reproductive performance of does (Babile and Matheron, 1980; Szendrő et al., 1989; Tudela et al., 1998; Rommers et al., 2001a). According to Rommers et al. (2001b), feed restriction during rearing results in similar puberty characteristics compared to ad lib fed rabbits but prevents excessive fat deposition. The relationship between the rearing conditions and the performance of does may be associated with ideal nutrient supply at specific life stages.

The objective of this experiment was to study the effects of nutrient supply during specific life stages. In the first part of the work, we studied the influence of the birth weight, milk supply status (nursing by one or two does) and, in the second part, the feeding regime after weaning (ad libitum or restricted feeding) on the growth performance and other production traits of future does, to determine how these factors affect the body condition up to the age of first mating.

2. Materials and methods

The experiments were carried out at the experimental farm of the University of Kaposvár with 182 Pannon White female rabbits born between September 2001 and April 2003. The animals were kept in flat-deck cages made of spot-welded wire, in a closed rabbit house. The house was heated in the winter, and a minimum temperature of 16 °C was provided. In the summer, there was no air conditioning and, thus, the temperature occasionally reached 28 °C. The lighting period was 16L/8D.

Most of the does kindled on day 31, and the remaining does were treated with oxytocin (5 IU/doe) to induce kindling on the same day. After kindling and the first nursing the nest-boxes were closed, and the kits were weighed individually the following morning, before suckling. The sex of the kits was determined, and only female kits were marked with ear-tags.

The experiment was set-up using a 3 (birth weight) × 2 (milk intake) × 2 (post weaning feeding regime) factorial arrangement. The female kits were divided into three groups on the basis of their birth weight (low /L/ = 35–45 g, medium /M/ = 53–58 g and high /H/ = 65–70 g). Kits of the same birth weight were randomly divided into litters of eight rabbits.

In order to study the effects of different milk supply status, half of the litters were nursed by one doe /O/ according to the traditional method, while the other half were nursed by two does /T/ as described by Szendrő et al. (2002). At 17 days of age, the creep-hole of the nest box was opened to allow solid feed intake. Kits were weaned at 21 days of age.

Rabbits were housed with two in each 330 × 500 × 300 mm fattening cage. In the week following weaning, the rabbits were fed ad libitum. Subsequently, all six groups were split at random, and half of the rabbits continued to receive ad libitum feeding during the whole rearing period, while the other half were given a restricted feeding regime. Restricted feeding, which was planned to correspond to 80–85% of the ad libitum feed intake, was achieved–as described by Szendrő et al. (2001a)–by reducing the time available for eating: 10 h/day (between 8 am and 6 pm) at 4–6 weeks of age, 9 h/day (between 8 am and 5 pm) at 6–9 weeks of age, 8 h/day (between 8 am and 4 pm) at 9–12 weeks of age, 7 h/day (between 8 am and 3 pm) at 12–15 weeks of age, and 6 h/day (between 8 am and 2 pm) at 15–18 weeks of age. The feeders were closed outside the feeding time. All rabbits received a medicated diet (crude protein = 16%, energy = 10.3 MJ DE/kg, crude fibre = 15.5%, supplemental medication: 195 mg/kg zinc bacitracin, 390 mg/kg oxytetracycline, 1 mg/kg diclazuril). Half of the females were mated at 15.5 weeks of age, and the other half at 18.5 weeks.