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EFFECT OF CONCENTRATE SUPPLEMENTATION ON GROWTH AND REPRODUCTIVE PERFORMANCE OF RABBIT UNDER RURAL CONDITION

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ABSTRACT

Crossbred New Zealand White meat type 8 male and 16 female rabbits aged 3.5 to 4.5 months weighing 9.5 to 13.0 kg were used in a 128 day trial to study the effects of concentrate supplementation on growth and reproductive performance of rabbit under rural condition. Rabbits were divided according to live weight into two treatment groups, i.e. T_1 (conventional diet) and T_2 (conventional diet + concentrate 75 g/d per rabbit) with four replications per treatment in a Complete Randomized Design (CRD). All animals had free access to locally available green grasses. Results showed that, average daily live weight gain was significantly ($p<0.01$) higher in T_2 (13.02 ± 0.43 g/d) than T_1 (5.30 ± 0.43 g/d) group. Litter weight at birth was better ($p<0.05$) in T_2 (180.38 ± 16.37g) than T_1 (137.19 ± 16.37g) group. Litter size at weaning differed ($p<0.05$) and the mean values were 1.37 ± 0.30 for T_1 and 2.37 ± 0.27 for T_2 group. Kit weight at weaning was superior ($p<0.01$) in T_2 (408.12 ± 3.85g) than T_1 (310.62 ± 3.56g) group. Kit mortality up to weaning was higher ($p<0.01$) in T_1 (45.0 ± 10.07 %) than T_2 (26.92 ± 10.7 %) group. These results indicate that, supplementation of concentrate in addition to conventional feeding may improve growth and reproductive performance of rabbit under rural condition.

Key words: Crossbred, New Zealand White rabbit, reproductive performance, growth, concentrate

INTRODUCTION

Bangladesh is an overpopulated country of south Asia. Of all the problems of Bangladesh acute crisis of human food particularly animal protein tops the list. Due to higher density of population the country is suffering from severe shortage of livestock products like meat, milk and egg. At present meat produced by cattle, buffalo, goat, sheep and poultry is quite insufficient to meet up the growing demand of animal protein. So, now it is important to explore some alternative sources of animal protein to minimize the deficiency of protein. Rabbit an important microlivestock (Vietmeyer, 1985) may be considered as a promising and potential alternative source of protein in this regard. Recently small scale rabbit projects are gaining international attention day by day as a means of alleviating poverty threat (FAO, 1996). Agro-climatic condition, religious point of view, social practices and technological aspects support the prospects and potentials of raising rabbit (MIDAS, 1992). Rabbit meat is low in fat and cholesterol (Jones, 1990). Skin of rabbit may be used in toy, crafts and cottage industry. Moreover, rabbit occupies a vital midway between ruminants and monogastric animals. Rabbit can effectively utilize cellulose rich feed with ration containing less than 20% grain. Simple biological characteristics, short breeding cycle, high prolificacy and better feed conversion efficiency logically place rabbit just below poultry.

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Rabbit production system practiced in the rural areas under traditional condition is mainly forage-based. The poor and unbalanced quality of grasses is a major constraint, which limits the successful production of rabbits. Cheeke and Raharjo (1988) concluded from a review of rabbit production on tropical feed resources that tropical grasses were unsuitable as the sole feed for rabbits due to their low digestibility (less than 10 %). However, rabbits can successfully be raised on diets that are low in grains and high in roughage (Cheeke, 1986). Growing rabbits can be maintained satisfactorily on diets consisting of 100 to 200g green roughage and 40 to 60g concentrate mixtures for maximum production (Ranjhan, 1980). Limited works have been done for overall improvement of rabbit. Therefore, present research was undertaken to observe the effect of concentrate supplementation on growth and reproductive performance of rabbit under rural condition.

MATERIALS AND METHODS

The experiment was conducted for a period of 90 days from January 01 to March 31, 2002 at farmers homestead Lokkhikhola village in Muktagacha Upazila of Mymensingh district, Bangladesh, with the help of a local NGO "Jalal Nagar Development Project (JNDP)". Crossbred New Zealand White meat type 8 male and 16 female rabbits aged between 3.5 to 4.5 months weighing 9.5 to 13.0 kg were used in a 128 day trial to study the effects of concentrate supplementation on growth and reproductive performance of rabbit under rural condition. The rabbits were divided into two treatment groups, i.e. T_1 (conventional diet) and T_2 (conventional diet + concentrate 75 g/d per rabbit) with four replications, i.e. R_1, R_2, R_3, and R_4 per treatment in a Complete Randomized Design (CRD). All rabbits were housed individually in locally made cases measuring 40 x 20 x 60 cubic cm. Each cage was equipped with a nest box at the time of parturition. For feeding and watering, farmers used earthen pot as feeder and drinker. Concentrate mixture was prepared following the guideline of NRC with 16.7 g/100g crude protein and 2700 Kcal ME/kg DM. The diet was fortified with vitamin mineral premix. Animals were fed in two groups. Each rabbit of T_1 group was fed boiled rice, road side grass, banana leaf, cabbage, cauliflower and radish while T_2 group was supplemented with additional concentrate @ 75 g/d per rabbit. Feeds were analyzed in the Animal Nutrition Laboratory, Bangladesh Agricultural University, Mymensingh, Bangladesh followed by AOAC (1984). Data were analyzed following Steel and Torrie (1980). Differences among treatment were determined using t-test. Contrast comparison was applied (SAS, 1996) to test the significance of the treatment effects.

Table 1. Ingredient and nutrient composition of the diet

Items	Amount (g / 100 g)
Ingredients	
Maize	35.0
Wheat	25.0
Wheat bran	15.0
Til oil cake	15.0
Soybean meal	9.50
Common salt	0.50
Vitamin mineral premix	0.25
Nutrient composition	
Crude protein	16.7
Metabolizable energy (Kcal/kg)	2698
Calcium	0.37
Phosphorus	0.23

RESULTS AND DISCUSSION

Results showed that initial average live weight of rabbits did not differ significantly ($p>0.05$) and the mean values were 1055.83 ± 59.20 g and 994.98 ± 58.27 g in T_1 and T_2 group respectively (Table 2). However, final average live weight differed significantly ($p<0.01$) and the mean values were 1426.66 ± 63.42 and 1911.66 ± 61.28 g in T_1 and T_2 group respectively. Average daily live weight gain was significantly ($p<0.01$) higher in T_2 (13.02 ± 0.43 g/d) than in T_1 (5.30 ± 0.43 g/d) group. This finding is in close agreement with Farinu (1994) who

found average daily live weight gain of rabbit to be 15.2 g/d using compound diet containing 30 % soybean meal. However, this study does not support the observation of Pote *et al.* (1980) who found growth rate of rabbit to be 25 g/d when fed fresh green clover vegetable leaves with no supplementation. In another study, the highest growth rate on the fish meal supplement was the logical consequence of the superior amino acid balance of this protein source, compared with cottonseed cake and soybean cake (McDonald *et al.*, 1973), but surprisingly this was not reflected in a better feed conversion. In fact, rice bran, cassava root, sweet potato and bananas are available and potential alternatives of cereal grains for rabbits under rural condition.

Table 2. Effect of concentrate supplementation on growth and reproductive performance of rabbit

Parameters	Treatment group		Level of significance
	T_1	T_2	
Initial live weight (g)	1055.83 ± 59.20	994.98 ± 58.27	NS
Final live weight (g)	1426.66^b ± 63.42	1911.66^a ± 61.28	**
Live weight gain (g/d)	5.30^b ± 0.43	13.02^a ± 0.43	**
Conception rate (%)	100	100	NS
Gestation period (d)	32.43 ± 0.49	31.89 ± 0.49	NS
Litter size at birth	2.5 ± 0.29	3.25 ± 0.29	NS
Litter weight at birth (g)	137.19^b ± 16.37	180.38^a ± 16.37	*
Litter size at weaning	1.37^b ± 0.30	2.37^a ± 0.27	*
Kit weight at birth (g)	54.87 ± 0.96	55.5 ± 0.96	NS
Kit weight at weaning (g)	310.62^b ± 3.56	408.12^a ± 3.85	**
Kit mortality up to weaning (%)	45.0^b ± 10.07	26.92^a ± 10.7	**

Reproductive performance of kits of groups T_1 and T_2 fed diets are presented in Table 2. Percentage of does kidded is one of the most important measurement for reproductive performance. In this study percentage of does kidded was 100 % for both T_1 and T_2 group. All does gave birth within the study period. The average gestation period of the rabbit did not differ significantly ($p>0.05$) and the mean values were 32.43 ± 0.49 and 31.89 ± 0.49 days for T_1 and T_2 group respectively. This observation is in close agreement with Yono *et al.* (1986). Ehiobu *et al.* (1997) also found the gestation period of Newzealand White rabbit to be 31.8 ± 0.11 day. Omole (1982) found the gestation period of does to be 31.2 days on 18 % crude protein based diet. However no differences ($p>0.05$) were observed among conception rate (%), gestation period (d) and litter size at birth irrespective of level of feeding.

Litter weight at birth (g) and litter size at weaning differed significantly ($p<0.05$) and the mean values were (137.19 ± 16.37), (1.37 ± 0.30) for T_1 and (180.38 ± 16.37), (2.37 ± 0.27) for T_2 group respectively. Yono *et al.* (1986) and Sanchez *et al.* (1985) found no significant differences ($p>0.05$) in litter size and litter weight of kits at 28 days of weaning. Ayyat *et al.* (1996) reported that does fed 18.4 % crude protein based diet had higher weaning weight than those fed diet containing 16.3 % crude protein. Ayyat *et al.* (1996) also found that supplimentation of does with diet containing 0.1 % lactose increased litter size, litter weight and total milk yield. Kit weight (g) and kit mortality (%) up to weaning were (310.62 ± 3.56) , (45.0 ± 10.07) for T_1 and (408.12 ± 3.85), (26.92 ± 10.7) for T_2 group respectively. Yono *et al.*(1986) also reported less mortality of kits on low protein diet (17.5 % CP). These results indicate that supplementation of concentrate (75 g/d per rabbit) in addition to conventional feeding may improve growth and reproductive performance of rabbit under rural condition.

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