ABG -05

Influence of Feed Restriction on Post-Weaning Growth Performance and Mortality Rate in Weaner Rabbits

[1]Mallam, I., [2]Nwagu, B.I., [1]Kabir, M., [2]Achi, N.P. and [1]Achi, J.N.
[1]Department of Animal Science, Ahmadu Bello University, Zaria; [2]National Animal Production Research Institute/Ahmadu Bello University, Shika-Zaria, Nigeria
Corresponding author: E-mail: mallamiliya2011@gmail.com. Phone: +2348188146452

Abstract
Data on 48 weaner rabbits from six different genotypes were used for this study. The genotypes were New Zealand White × New Zealand White (NZ×NZ), Chinchilla × Chinchilla (CH × CH), Dutch × Dutch (DU×DU), New Zealand White × Chinchilla (NZ×CH), New Zealand White × Dutch (NZ×DU) and Chinchilla × Dutch (CH×DU). The 48 weaner rabbits were grouped into four feeding regimes (2 weaner rabbits from each genotype, making a total of 12 in each feeding regime). The feeding regimes consist of *ad libitum* feeding (A), 14 hours feed restriction/day (B), 10 hours feed restriction/day (C) and 6 hours feed restriction/day (D). The experiment was conducted at the Skills Acquisition and Entrepreneurship Development Centre of National Agricultural Extension Research and Liaison Services (NAERLS), Ahmadu Bello University, Zaria-Nigeria. The traits studied were body weight (BW), body length (BL), chest girth (CG), head-to-shoulder(HS), shoulder-to-tail drop (ST), length of hind leg (LHL), ear length (EL), height at withers (HTW) and the mortality rate was also recorded and transformed into logarithms. Data collected were subjected to Analysis of Variance Procedure of SAS and a fixed effect model was used with significant means separated using Duncan Multiple Range Test. The mean body weights obtained were 772.67±38.72 g, 688.62±32.16 g, 730.75±35.24 g and 705.37±33.45 g for feeding regime A, B, C and D respectively which were not significantly different ($p>0.05$). It can be concluded that any of the feeding regimes can be adopted.

Keywords: Domestic rabbits, feed restriction, post-weaning growth traits, mortality rate

Introduction

Rabbits are conventionally fed *ad libitum* (concentrate and forage) to enhance their growth and reproductive performance (Bawa *et al*., 2007). Forages, on the other hand, are scarce and lignified during dry seasons leading to fluctuations in body weight of forage fed animals including rabbits and can influence their growth rates at such times. The recent phenomenal rise in the cost of feeds and feeding stuffs in most parts of the humid tropics have forced farmers to now engage in indiscriminate feed restriction programmes, aimed majorly at reducing cost of production and consequently increasing profitability (Boisot *et al*., 2003). These unguided practices could further deteriorate this situation especially in the tropics. Reports from the temperate regions have indicated that feed restriction reduces post-weaning digestive disorders and improves feed efficiency (Boisot *et al*., 2003; Gidenne *et al*., 2003).

A study to investigate whether or not feed restriction could influence growth traits of rabbits in the tropics is then necessary.

Materials and Methods

Description of experimental site: The study was conducted at the Skills Acquisition and Entrepreneurship Development Centre of National Agricultural Extension Research and Liaison Services (NAERLS), Ahmadu Bello University, Zaria, Kaduna State, Nigeria. Zaria is located within the Northern Guinea Savannah Zone of Nigeria between latitude 11^0 33' N and longitude 12^0 33'E (Ovimaps, 2016).

Management and feeding regimes: The weaner rabbits were fed concentrate ration (16% crude protein and 2504 Kcal/kg metabolizable energy) and forage legume. Forage legume (*Digitaria smutssi*) was chopped and mixed with the formulated feed before feeding. Group A was fed *ad libitum (*free choice) while groups B, C and D were restricted for 14, 10 and 6 hours/day, respectively. Water was given *ad libitum* to all experimental rabbits. The rabbits were housed in individual row cages made of metal and wire-gauze of 60×44×50cm^3. Routine management operations such as regular cleaning of the cages and feeders were carried out throughout the research period.

Traits measurement: The traits measured were body weights (BW) and linear body measurements (LBMs) namely body length (BL), chest girth (CG), head-to-shoulder (HS), shoulder-to-tail (ST), length of hind limb (LHL), ear length (EL) and height at withers (HTW). Body weight was taken in grams using a weighing scale (Dimensions: 56 × 47× 37 cm, Model KFC, Yongkang Huaying, China) and height at withers with a ruler in centimeters. Measurements were done on a bi-weekly basis for 5 weeks (6, 8, 10, 12 and 14 weeks). All the traits, except for body weight and height at withers were measured using measuring tape in centimeters. Mortality record was transformed into logarithms as seen in table 1.

Experimental design: A fixed effect model was used for the analysis in which feeding regime was a factor of interest. There were four feeding regimes and each consists of 12 weaner rabbits making a total of 48 rabbits.
The statistical model:
$Y_{ij} = \mu + T_i + e_{ij}$
Where:
Y_{ij}= Single observation on the i^{th} feeding regime.
μ=Overall mean
T_i=Fixed effect of the feeding regime, i= (1, 2, 3 and 4)
e_{ij} =Random error =NIID (0, σ^2), normally, independently and identically distributed with zero mean and constant variance.

Results and Discussion

The effect of feed restriction on growth traits and mortality rate of rabbit is presented in Table 1. The results obtained show that there were no significant (P>0.05) difference among the feeding regimes in all the growth traits (BW, BL, CG, HS, LHL, EL, ST and HTW). The body weight obtained were 772.67±38.72g, 688.62±32.16g, 730.75±35.24g and 705.37±33.45g for feeding regime A, B, C and D respectively. The BL, CG, HS, LHL, EL, ST and HTW ranged between 23.02-23.66cm, 15.59-15.72 cm, 12.48-12.99 cm, 20.31-20.62 cm, 8.61-8.78 cm, 31.19-31.74 cm and 8.80-9.06 cm respectively.

The present result agreed with the findings of Gueye *et al*. (1998) who reported no significant differences among rabbits fed *ad libitum* and those on feed restriction. This also agreed with the report of Yakubu *et al.* (2007) who reported no significant difference in final body weight among weaner rabbits fed *ad libitum* (1338.75 g), those restricted for 8 hrs/day (1248.75 g) and skip-a-day feeding (1165.00g). This could be attributed to the fact that rabbits generally have low maintenance requirement. Rabbits equally utilize feed more efficiently than other animal species through the practice of cecal fermentation and cecotrophy (Yakubu *et al.,* 2007). Additional nutrients resulting from this proper digestion could possibly compensate for the restrictions imposed. This finding indicates that rabbits can be subjected to any of the feeding regimes without any adverse effect on their growth rate and attainment of market weight.

No significant (p>0.05) difference was found in the mortality rates of weaner rabbits in all the feeding regimes. The only mortality recorded was in rabbits fed *ad libitum*.
The finding is in consonance with the report of Gidenne *et al*. (2003) who reported that feed restriction did not affect mortality of rabbits. The reason for zero mortality in the restricted groups could be due the fact that feed restriction reduces the negative impact of epizootic rabbit enteropathy syndrome conditions Boisot *et al*. (2003). The mortality observed in feeding regime A, could be that the weaner rabbits consumed feed more than what their system (digestive system) can handle resulting to metabolic disorders thereby leading to death of the weaner rabbits in the *ad libitum* group.

Conclusion

During scarcity of feed, rabbit farmers or raisers can adopt any of the feeding regimes without any adverse effect on the performance of rabbits. Therefore, any of these feeding regimes can be exploited in the feeding of rabbits, especially in periods of scarcity of commercial feed and forages for rabbit feeding.

Table 1: Effect of feed restriction on post-weaning growth traits and mortality rate of weaner rabbits

F.R.	BW(g)	BL(cm)	CG(cm)	HS(cm)	LHL(cm)	EL(cm)	ST(cm)	HTW(cm)	MORT(log)
A	772.67±38.72	23.61±0.46	15.59±0.25	12.48±0.29	20.54±0.37	8.78±0.16	31.74±0.69	9.06±0.19	0.48
B	688.62±32.16	23.02±0.39	15.59±0.25	12.81±0.30	20.31±0.30	8.61±0.12	30.61±0.62	8.97±0.15	0.00
C	730.75±35.24	23.31±0.38	15.72±0.22	12.99±0.34	20.62±0.33	8.75±0.16	31.19±0.62	8.99±0.14	0.00
D	705.37±33.45	23.66±0.38	15.66±0.29	12.96±0.32	20.41±0.31	8.77±0.13	31.23±0.64	8.80±0.19	0.00

F.R. =Feeding regime, A=*Ad libitum* feeding, B=14 hours/day feed restriction, C=10 hours/day feed restriction, D=6 hours/ day feed restriction, BW=Body weight, BL=Body length, CG=Chest girth, HS= Head-to-shoulder, LHL=Length of hind leg, EL=Ear length, ST=Shoulder-tail drop, HTW=Height at wither, MORT=Mortality

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