

## ABG -13

### Effect of Interaction Between Different Genotypes of Domestic Rabbits and Two Feeding Regimes on Some Growth Traits

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#### Abstract

Data on 24 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 24 weaner rabbits were grouped into two feeding regimes (4 weaner rabbits from each genotype, making a total of 12 in each feeding regime). The feeding regimes consist of *ad libitum* feeding (A) and 14 hours feed restriction/day (B). 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 growth 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) and height at withers (HTW). Data collected were subjected to Analysis of Variance Procedure of SAS (SAS, version 8.0, 2004) and a fixed effect model was used and genotype x feed regime was determined then the significant means were separated using Duncan Multiple Range Test. The results obtained show significant ( $p<0.05$ ) differences across the genotypes while body weights and linear body measurements (LBMs) in groups A and B were not far from each other down the group. It can be concluded that rabbits can be restricted for 14 hours per day without much difference in terms of body weight and LBMs.

**Keywords:** Different genotypes, feeding regimes, growth traits, interaction

#### Introduction

Variations exist in the growth performance of different genotypes of rabbit. These variations are attributed to genetic and environmental factors. Post-weaning growth is important in the economics of rabbit production, since it influences the rate of attainment of market weight. Recent phenomenal rise in the cost of feeds and feeding stuffs in most parts of the tropics has 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). Reports from the temperate regions have indicated that feed restriction reduces post-weaning digestive disorders and improves feed efficiency (Boisot *et al.*, 2003). The productivity of an animal is therefore, largely determined by the interaction between genotype and environment (Chineke and Owosangba, 1999).

This study was aimed at determining the effect of interaction between different genotypes of rabbit and two feeding regimes on growth traits of rabbits.

#### 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 at latitude 11° 33' N and longitude 12° 33'E (Ovimaps, 2016).

**Management, feeding regimes and experimental design:** The weaner rabbits were fed concentrate ration (16% crude protein and 2504 Kcals/kg metabolizable energy) and forage legume. Forage legume (*Digitaria mutssi*) was chopped and mixed with the formulated feed before feeding. Group A was fed *ad libitum* (free choice) while groups B was restricted for 14 hours/day. Water was given *ad libitum* to all experimental rabbits. Routine management operations such as regular cleaning of the cages and feeders were carried out throughout the research period. There were six genotypes and two feeding regimes. A total of 24 weaners rabbits from the six genotypes were used. Four (4) weaner rabbits from each of the genotype were randomly assigned to two feeding regimes with 12 weaner rabbits in each of the feeding regime. The rabbits were housed in individual row cages made of metal and wire-gauze of 60 × 44 × 50 cm<sup>3</sup>.

**Traits measured/ data collection:** 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 balance; and height at withers was measured

with a metre rule 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.

**Statistical analysis:** Data collected were subjected to Analysis of Variance Procedure of SAS (SAS, version 8.0, 2004); a fixed effect model was used and the interaction between genotype x feed regime was determined; significant means were separated using Duncan Multiple Range Test.

## Results and Discussion

Table 1 shows the interaction between genotypes and two feeding regimes. The results observed across the genotypes shows that CH x CH had higher body weight (1049.00 ± 121.01 g) in feeding regime A compared to other genotypes ( $p < 0.05$ ). Similar trend was observed in feeding regime B with CH x CH having higher body weight (889.20 ± 98.24 g) than the other genotypes ( $p < 0.05$ ). Similarly, CHxCH had higher values in most of the growth traits measured than the other genotypes. These findings are similar with the report of Obike and Ibe (2010) who reported a higher body weight in CHxCH (546.00 g) than that of NZ x NZ, Du x DU, NZ x CH, NZ x DU and CH x DU genotypes. This result disagreed with the report of Onyiro *et al.* (2008) who reported non-significant interaction between feeding regime and genotypes. The reason for this variation could be due to the fact that the authors restricted feed based on the percent (%) inclusion of concentrate and forage, while in this study the restriction was based on hours.

Table 1: Interaction between genotypes and two feeding regimes

		GENOTYPES					
F.R.	TRAITS	NZxNZ	CHxCH	DUxDU	NZxCH	NZxDU	CHxDU
A	BW(g)	592.00±111.40 <sup>b</sup>	1049.00±121.01 <sup>a</sup>	637.00±117.30 <sup>b</sup>	784.00±119.44 <sup>b</sup>	782.00±110.50 <sup>b</sup>	792.00±101.11 <sup>b</sup>
	BL(cm)	22.40±2.02 <sup>b</sup>	26.14±1.39 <sup>a</sup>	22.90±3.03 <sup>ab</sup>	23.54±1.45.00 <sup>a</sup>	24.14±2.34 <sup>ab</sup>	22.54±1.26 <sup>b</sup>
	CG(cm)	14.24±0.92 <sup>c</sup>	16.36±1.09 <sup>ab</sup>	14.80±1.03 <sup>bc</sup>	15.00±1.07 <sup>bc</sup>	16.92±1.10 <sup>a</sup>	16.2±1.12 <sup>ab</sup>
	HS(cm)	10.84±0.78 <sup>d</sup>	14.76±0.89 <sup>a</sup>	11.08±0.70 <sup>cd</sup>	12.78±0.67 <sup>bc</sup>	12.06±0.81 <sup>bcd</sup>	13.36±0.72 <sup>ab</sup>
	LHL(cm)	18.28±1.20 <sup>c</sup>	23.0±1.35 <sup>a</sup>	21.48±1.24 <sup>ab</sup>	19.94±1.33 <sup>bc</sup>	21.141±1.09 <sup>ab</sup>	19.42±1.00 <sup>bc</sup>
	EL(cm)	7.72±0.41 <sup>c</sup>	10.26±0.53 <sup>a</sup>	8.60±0.27 <sup>bc</sup>	8.52±0.32 <sup>bc</sup>	8.84±0.37 <sup>b</sup>	8.7±0.39 <sup>b</sup>
	ST(cm)	28.58±2.07 <sup>b</sup>	35.92±2.10 <sup>a</sup>	31.18±2.09 <sup>ab</sup>	31.90±2.09 <sup>ab</sup>	31.10±2.08 <sup>ab</sup>	31.74±2.12 <sup>ab</sup>
	HTW (cm)	7.72±0.50 <sup>b</sup>	9.98±0.71 <sup>a</sup>	9.02±0.55 <sup>a</sup>	8.90±0.54 <sup>a</sup>	9.66±0.69 <sup>a</sup>	9.06±0.53 <sup>a</sup>
B	BW(g)	580.00±96.55 <sup>b</sup>	889.20±98.24 <sup>a</sup>	606.00±95.01 <sup>b</sup>	679.00±96.89 <sup>ab</sup>	638.00±97.57 <sup>b</sup>	739.5±97.08 <sup>ab</sup>
	BL(cm)	22.84±1.21 <sup>a</sup>	24.20±1.31 <sup>a</sup>	22.20±1.42 <sup>a</sup>	23.12±1.34 <sup>a</sup>	23.86±1.55 <sup>a</sup>	21.88±1.60 <sup>a</sup>
	CG(cm)	14.66±0.55 <sup>b</sup>	16.20±0.35 <sup>ab</sup>	15.12±0.43 <sup>ab</sup>	15.02±0.57 <sup>ab</sup>	16.56±0.80 <sup>a</sup>	15.96±0.69 <sup>ab</sup>
	HS(cm)	11.48±0.59 <sup>b</sup>	14.36±1.02 <sup>a</sup>	11.74±0.86 <sup>b</sup>	12.72±0.93 <sup>ab</sup>	13.34±1.10 <sup>ab</sup>	13.20±1.01 <sup>ab</sup>
	LHL(cm)	19.52±0.89 <sup>b</sup>	22.16±1.15 <sup>a</sup>	20.62±1.13 <sup>ab</sup>	20.46±1.11 <sup>ab</sup>	19.76±0.99 <sup>b</sup>	19.32±0.97 <sup>b</sup>
	EL(cm)	8.18±0.33 <sup>b</sup>	9.76±0.35 <sup>a</sup>	8.18±0.36 <sup>b</sup>	8.44±0.25 <sup>b</sup>	8.38±0.25 <sup>b</sup>	8.74±0.29 <sup>b</sup>
	ST(cm)	28.94±2.06 <sup>b</sup>	34.86±2.19 <sup>a</sup>	29.58±1.64 <sup>b</sup>	30.48±2.12 <sup>b</sup>	29.36±1.18 <sup>b</sup>	30.44±1.55 <sup>b</sup>
	HTW(cm)	8.52±0.52 <sup>a</sup>	9.50±0.72 <sup>a</sup>	8.78±0.65 <sup>a</sup>	9.02±0.68 <sup>a</sup>	9.28±0.47 <sup>a</sup>	8.74±0.66 <sup>a</sup>

abc Means in the same row with different superscripts are significantly different ( $p < 0.05$ ); NZ=New Zealand White, CH=Chinchilla, DU=Dutch, F.R.=Feeding regimes, A=*ad libitum* feeding, B=14hours restriction, BW=Body weight, BL=Body length, CG=Chest girth, HS=Head-to-shoulder, LHL=Length of hind leg, HTW=Height at wither, EL=Ear length, ST=Shoulder-to-tail drop.

The results obtained down the group in all the genotypes shows that body weight and LBMs obtained in the feeding regimes A and B were not far from each other except for CH x CH where body weight of feeding regime A (1049.00 ± 121.01 g) was far from that of group B (889.20 ± 98.24 g). The slight differences observed between feeding regimes A and B in terms of body weight and some LBMs imply that the different feeding regimes did not have any differential effects on the different genotypes with respect to the growth traits studied. The significance of this result in practical rabbit production is that commercial rabbit farmers or keepers in the study area may restrict concentrate and forage intake of any of the genotypes up to 14 hours/day without compromising significant growth of the animals. We suggest that this could lead to a decrease in production cost and increased economic returns. The differences observed in the interaction between genotypes and the two feeding regimes contradicts the results obtained by Yakubu *et al.* (2007) who reported no significant difference in the final body weight of rabbits fed *ad libitum* (454.94 g) compared to rabbits fed 8 hours/day (356.36g) and skip-a-day feeding (331.48 g). The variation in body

weight in this current study from other authors can be attributed to breed differences, age in which the rabbits were restricted, intensity of restriction and other environmental factors.

### Conclusion

The interaction between genotypes and feeding regimes showed significant differences across the genotypes while the body weights and LBMs in the feeding regime A and that of feeding regime B suggests that weaner rabbits with good growth characteristics can be raised even when feed intake of the animal is restricted, irrespective of the genotype. This is practically useful considering the highly exorbitant prices of conventional energy and protein feedstuffs in today's market, which tend to force rabbits farmers or keepers out of production.

### References

- Boisot, P., Licois, D. and Gidenne, T. (2003). Feed restriction reduces the sanitary impact of an experimental reproduction of Epizootic Rabbit Enteropathy syndrome (ERE) in the growing rabbit. *Proceedings of the 10th French Rabbit Days*, November. 19-20, 2003, Institut Technique de l'Aviculture publications, Paris, France: 267-270.
- Chineke, C.A. and Owosangba, J.O. (1999). Phenotypic correlation among some body physiological characteristics in Yankasa sheep at pre-and post-weaning ages. In: *Proceedings of the Nigerian Society for Animal Production (NSAP) 26<sup>th</sup> Annual Conference*, 21-25 March, 1999, Pp: 302-304.
- Obike, O.M. and Ibe, S.N. (2010). Effect of genotype on pre-weaning growth performance of the domestic rabbit in a humid tropical environment. *Journal of Global Veterinaria*, 4(4):388-393.
- Onyiro, O.M., Ibe S.N. and, Anigbogu N.M. (2008). Influence of genotype x environment interaction on post-weaning growth performance of the domestic rabbits. *Research Journal of Agriculture and Biological Science*, 4(6):676-684.
- Ovilocation map; ovi earth imaginery. Dated July, 2016.
- SAS Institute, (2004). SAS/STAT User's Guide version 8.0 edition: Statistics, SAS Institute Incorporation, Cary, NC.
- Yakubu, A., Salako, A.E., Ladokun, A.O., Adua, M.M. and Bature, T.U.K. (2007). Effects of feed restriction on performance, carcass yield, relative organ weights and some linear body measurements of weaner rabbits. *Pakistan Journal of Nutrition*, 6:391-396.