

EFFECTS OF BREED ON GROWTH AND HAEMATOLOGICAL PARAMETERS OF WEANER RABBITS

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ABSTRACT

This study was aimed at evaluating breed effects on the growth and haematology in weaner rabbits. Forty-eight weaner rabbits, 6-7 weeks old that comprised pure strains of Californian (CL), Rex hybrid (RX) and locally adapted breeds (LAB) were used at sixteen rabbits per breed in a completely randomized design.

A feeding trial was conducted for eight weeks using formulated diet after an initial adaptability period of two weeks. Throughout the feeding trial, individual feed intake was recorded twice daily to determine daily feed intake while the body weights were taken weekly to determine weekly weight gain. At the end of the feeding trial, blood samples were collected from the ear vein for haematology and serum biochemical studies. Data collected were subjected to analysis of variance using SPSS IBM version 26.0 while means were separated using Tukey's honestly significant difference Test at the probability level of 5% ($p < 0.05$).

Results obtained showed no significant differences ($P > 0.05$) in total feed consumed, total weight gain and feed conversion ratio among the breeds. There were also no significant differences ($P > 0.05$) in the haematological indices except in the monocytes and eosinophils ($P < 0.05$). The serum biochemistry composition showed no significant differences ($P > 0.05$) except for triglyceride and urea which showed significant differences ($P < 0.05$). From the results, breed plays no significant role in growth and haematology composition of rabbits raised under the same climatic and management conditions. Therefore, efforts should be made to improve on other factors that are determinants of rabbit growth and welfare.

Keywords: breed, feed conversion ratio, haematology, serum biochemistry, weight gain

INTRODUCTION

The production of high-quality animal protein for the expanding populations of a developing nation like Nigeria appears to be most cost-effective and sustainable when done with the rabbit (*Oryctolagus cuniculus*), often referred to as a micro-livestock species (Para *et al.*, 2015). Lean and abundant in biologically valuable proteins, rabbit meat is known for having a high concentration of essential amino acids (Dalle Zotte, 2002). Additionally, it is a significant source of readily assimilated micronutrients such as vitamins and minerals. Given the growing world population and diminishing natural resources, it is firmly accepted that there will be 75% increase in meat demand by 2050. (Khan *et al.*, 2016). The majority of this rise will occur in undeveloped and developing nations (OECD, 2017). Lately, the domestic rabbit (*Oryctolagus cuniculus*) has been emerging as a potential alternate meat source throughout the world in general, and specifically in developing countries (Belabbas *et al.*, 2019). The prime reasons for navigating rabbits as potential meat source are their better meat quality attributes, ease of maintenance, high prolificacy and fecundity, earlier sexual maturity, and short generation cycles (Ali *et al.*, 2018).

The breed of rabbit is one of the variables that can affect its performance, particularly its growth performance. A study by Chineke (2006) determined the breed effect on pre-weaning body weights and showed significant differences among the breeds evaluated. Production characteristics such as diet have also been linked to specific haematological factors like packed cell volume and hemoglobin (Abdel-Hamid and Dawod, 2020; Ayo-Ajasa *et al.*, 2020), thereby giving the chance to examine its physiological, dietary, and pathological status of animal blood in order to aid in the diagnosis of dietary and/or environmental stress (Doyle, 2006). This study therefore aims at investigating the effect of breeds on growth and haematology parameters of weaner rabbits.

MATERIALS AND METHODS

This study was conducted at the Rabbit Unit of the Teaching and Research Farm, Department of Animal Production and Health, Federal University Oye, Ekiti state with coordinates 7.7983°N, 5.5145°E between February and April 2022. A total of forty-eight weaner rabbits aged 6 and 7 weeks were sourced from a reputable commercial rabbitry in Osun state. These comprised sixteen animals each of the breeds: Californian (CL), Rex hybrid (RX) and locally adapted breeds (LAB). They were grouped by breed in a completely randomized design and subjected to the same management and housing conditions. Formulated diet was supplied twice daily and water given *ad libitum*. The formulated diet contained 96.80% DM, 17.20% CP, 9.95% EE, 10.75% CF, 11.13% ash, and 47.77% NFE.

Following an acclimatization period of two weeks, the animals were subjected to a feeding trial for eight weeks, during which daily feed intake and weekly body weight gain were measured and recorded using an SF-400 electronic scale of 5kg capacity with 0.01kg precision. At the end of the 8th week, 5mls of blood was drawn from the ear vein for haematology and serum analysis using a 20G needle.

Data collected were subjected to analysis of variance using SPSS IBM version 26.0 while means were separated using Tukey's honestly significant difference Test at $p < 0.05$.

RESULTS AND DISCUSSION

The mean values for growth parameters are shown in Table 1. There were no significant differences ($p > 0.05$) in total feed consumed, total weight gain and feed conversion ratio among the breeds studied showing that breed has no significant effect on growth in weaner rabbits. This is similar to a report by Olawumi (2014) that breed had no significant effect on body weight. However, Awe and Chineke (2016) had contrary results in a study where reports showed significant effects of breeds on individual body weight in pure bred 28-day old rabbit kits. These reported differences among the authors may be due to the number of animals used for their respective studies.

Table 1. Effect of breeds on growth of weaner rabbits

Breeds	Parameters						
	TFC (g)	ADFC (g)	IWG (g)	FWG (g)	ADWG (g)	TWG (g)	FCR
CL	3220.83	65.73	868.33	1354.80	9.93	468.50	468.50
LAB	2999.50	61.21	867.00	1381.10	10.49	514.17	514.17
RX	3467.00	70.76	834.83	1306.30	9.62	471.50	471.50
SEM±	134.90	2.75	54.54	58.79	0.50	24.73	0.35

NB: CL, California; LAB, locally adapted breed, RX; Rex, SEM; standard error of mean, TFC; total feed consumed, ADFC; average daily feed consumed, IWG; initial weight gain, FWG; final weight gain, ADWG; average daily weight gain, TWG; total weight gain, FCR; feed conversion ratio

Table 2 shows the haematology composition among the breeds. Of all the parameters monitored, eosinophils and monocytes were significantly different ($P < 0.05$) across the breeds. Californian had significantly highest ($P < 0.05$) eosinophil count of 63.66% while LAB and RX had the lowest (52% and 58.33% respectively). The high eosinophil count may be an indicator of stress thus showing that LAB has the highest tolerance to stress (Melillo, 2007). Locally adapted breeds had the highest monocyte count of 7.00% which was significantly different ($P < 0.05$) from that of Californian and Rex (2.33% and 3.00% respectively).

Table 2. Effect of breeds on the haematology of weaner rabbits

Breeds	Parameters											
	PCV (%)	RBC (x10 ⁶ /L)	MCV (μ ³)	MCH (PG/CELL)	MCHC (g/dL)	WBC (x10 ³ /L)	PLAT (cell/uL)	NEUTRO (%)	EOSINO (%)	BASO (%)	MONOCY (%)	LYMPHO (%)
CL	34.00	12.01	28.31	195.60	70.10	35.57	9100.00	44.632	63.66 ^a	0.67	2.33 ^b	7.67
LAB	33.33	11.77	28.35	180.33	63.96	35.22	5233.33	50.03	52.00 ^b	1.33	7.00 ^a	9.00
REX	33.67	11.70	28.61	171.22	59.76	34.90	7617.60	47.51	58.33 ^{ab}	1.00	3.00 ^b	8.33
SEM±	0.91	0.39	0.10	13.95	5.65	0.36	898.18	3.11	1.85	0.24	0.77	0.29

*Means with different superscripts within columns differ at ($P \leq 0.05$).

N.B.: CL, California; LAB, locally adapted breed, RX; Rex, SEM; standard error of mean, PCV; Packed cell volume; RBC, Red blood cells; MCV, mean corpuscular volume; MCH mean corpuscular Haemoglobin, MCHC, mean corpuscular haemoglobin concentration; WBC, white blood cells; PLAT, platelets; NEUTRO, neutrophils, EOSINO; eosinophils; BASO, basophils; MONOCY, monocytes; LYMPHO, lymphocytes

Table 3 shows the serum biochemistry composition of the three breeds. Significant differences were recorded for triglycerides and urea only. Locally adapted breed had the significantly lowest triglyceride value of 108.20mg/dL while CL and Rx had values which were not significantly different (232.43mg/dL and 135.53mg/dL respectively). There were significant differences in urea levels between Californian and Rex (67.87mg/dL and 28.26mg/dL respectively) while the urea value in LAB was not significantly different from that of the others. These differences may be due to responses of the respective breeds to dehydration (Melillo, 2007).

Table 3. Effects of breeds on serum biochemical composition of weaner rabbits

Breeds	Parameters										
	ALP (u/L)	ALT (u/L)	AST (u/L)	ALBUMIN (g/L)	Total protein (g/L)	Trigly (mg/dL)	Chol. (mg/dL)	HDL (mg/dL)	Bilirubin (mg/dL)	Urea (mg/dL)	Creatinine (μ mol/L)
CL	60.59	23.37	158.92	256.48	532.45	232.43 ^a	164.01	75.00	323.12	67.87 ^a	169.63
LAB	63.73	19.53	183.71	205.84	475.47	108.20 ^b	141.30	63.19	234.61	53.16 ^{ab}	140.12
REX	82.81	26.76	146.21	239.26	552.83	135.53 ^a	127.05	58.33	313.93	28.26 ^{ab}	196.67
SEM±	6.40	3.32	21.24	18.65	28.00	21.23	10.57	8.87	34.93	7.31	12.68

* Means with different superscripts within columns differ at (P ≤ 0.05)

N.B; CL, California; LAB, locally adapted breed, RX; Rex, SEM; standard error of mean, ALP; alkaline phosphate, ALT; Alanine amino Transferase, AST; Aspartate amino Transferase TRIGLY; triglyceride, HDL; high density lipoprotein

CONCLUSION

It may be concluded from this study that breed has no effect on the growth and haematology of rabbits raised under the same climatic and management conditions. However, further studies may be conducted to investigate the effect of breed when in interaction with other factors affecting growth and haematology in rabbits.

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