



## EFFECTS OF SEX AND GENOTYPE ON MORPHOMETRIC TRAITS OF RABBIT

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### ABSTRACTS

A total of one hundred (100) matured rabbit of 4 – 6 month of age comprising of New Zealand White (NZW) and Dutch (DUT) breeds were used in the study. They comprised of forty nine (49) New Zealand White, thirteen (13) males and thirty six (36) females, Fifty one (51) Dutch breed comprising of twenty one (21) males and thirty (30) females. The experiment was conducted at the Livestock Teaching and Research Farm, University of Maiduguri, Borno State, Maiduguri. The management system used was intensive system and semi intensive system. By housing them in a cage based on breed and sex. Each rabbit is housed in a cage measuring 33cm x 38cm x 45cm and the cages were tagged for easy identification, measurement and weighing. The cages were slightly raised above the ground for cross ventilation and to facilitate cleaning. Body weight was measured with a digital weighing scale in kilograms and the body measurements were measured using tailor tape calibrated in centimeters. The data measured are body weight (BW), body length (BL), nose to shoulder length (NSL), heart girth (HG), height at withers (HW), ear length (EL), leg length (LL), tail length (TL) and height of the rabbit (HR). Results obtained showed that sex had no significant effect on all the morphometric data measured. Significant effect of genotypes on morphometric traits were observed on NSL, HG, HW, EL and TL with their corresponding values of 10.83, 13.57, 13.37, 14.73, 10.95 in Dutch breed and corresponding values in New Zealand White were 10.34, 12.90, 14.30, 13.22 and 9.98 respectively. The results of the study also revealed that Dutch breed performed better than the New Zealand White in the study area.

**KEY WORDS:** Body Weight, Genotype, Morphometric, Sex and Traits

### INTRODUCTION

Rabbits can be considered as one of the several species quite suitable for meat production. They are characterized by quality protein (20 - 21% crude protein) with high biological value amino acids, meat low in calories and fat, prolificacy, short gestation length, initial capital outlay is minimal, great genetic flexibility, lipids are highly unsaturated (60% of the total fatty acids), valuable animal model for biomedical research, low sodium and cholesterol level and it is considered a delicacy for health food products (Dalle, 2002).

There are numerous breeds and varieties of rabbit all over the world varying in types of coat colors and sizes. A breed name depends on location or place of origin, color of coat, breeder nomenclature or size (Aduku and Olukosi, 2000). Medium and heavy breeds weigh about 4.1 – 5.5 kg and 5.9 – 7.3 kg respectively while small breeds weigh about 1.4 – 1.8 kg at maturity (Aduku and Olukosi, 2006). Common breeds of rabbits found in Nigeria are New Zealand white, Californian white, and chinchilla. However, almost all of the rabbits found in Nigeria are crosses, among these, the most common exotic and next common exotic breeds in Nigeria are New Zealand White and chinchilla Aduku and Olukosi, (2006) other breeds not common in Nigeria according to Ekpenyong, (2008) are

champagne D Argent, Dutch, Checkered giant, Florida white and white pearl.

The male progenies recorded highest values of BW (359.09+72.69) and they also recorded the highest values for morphometric body measurements. Generally, at 4 weeks Cross bred DUT X NZW recorded the highest value of BW and Ologbose *et al.* (2017) reported the mean standard error of Dutch(DUT)New Zealand White (NZW) and Dutch X New Zealand White (DUT X NZW). Female progenies from DUT X NZW recorded the highest body weight (BW) (347.92+67.81) and likewise for all the morphometric body measurements (MMBs) while, MBMs while NZW recorded least values of BW (234.09+77.68) and MBMs. The cross bred (DUT X NZW) indicated superiority over the pure bred at the pre-weaning ages, this observation was in line with the reports of Odubote and Somade (2008) and Chineke *et al.* (2000) that pre-weaning growth performance of crossbred rabbits were significantly higher than those of purebreds. Body measurements provide good report on performance, productivity and carcass quality of animals (Ige *et al.* 2006). Biometric measurements allow comparisons of growth in different parts of the body (Abdullah *et al.* 2003). Morphometric measurements have been found useful in contrasting size and shape of animals (Ajayi *et al.*,

2008). The objective of the study is to evaluate the effects of sex and genotype on the morphometric traits of rabbit.

## MATERIALS AND METHODS

### EXPERIMENTAL SITE

The experiment was conducted at the Livestock Teaching and Research Farm, University of Maiduguri, Borno State. Maiduguri, the state capital is located within the sahelian (semi - arid) region of West Africa on latitude 11° 50' North and longitude 13°09' East and at altitude of 354m above sea level.

### MANAGEMENT OF EXPERIMENTAL STOCK

A total of one hundred (100) matured rabbits of 4 - 6 months of age comprising of New Zealand White (NZW) and Dutch (DUT) were used for the study. The Dutch are fifty one (51) with twenty one (21) male and thirty (30) females while the New Zealand White are forty nine (49) with thirteen (13) males and thirty six (36) females. The rabbits were sourced from two different places: one from University of Maiduguri Livestock Teaching and Research Farm Borno State and the other one were sourced from a reputable small holder's farm within Maiduguri Metropolitan council. The rabbits in the Livestock Teaching and Research Farm were managed intensively by housing them based on breed and sex. Each rabbit is housed in a cage measuring 33cm x 38cm x 45cm and the cages were tagged for easy identification, measurement and weighing. The cages were slightly raised above the ground for cross ventilation and to facilitate cleaning. Plastic drinkers (cups) and metallic feeding troughs were provided in each cage. The feeds and fresh clean water were provided ad - libitum including fresh grasses as well as fresh vegetables were used during the study. The other rabbits sourced from reputable farmers were managed under semi intensive management system. This may be as a result of feeding to reduce cost of feeding.

### DATA COLLECTION

Data were collected on body weight (BW), body length (BL), nose to shoulder length (NSL), heart girth (HG), height at Withers (HW), ear length (EL), leg length (LL), tail length (TL) and height of rabbit (HR). Body weight was measured with a digital weighing scale in kilograms and the body measurements were measured using tailor tape calibrated in centimeters.

- Body length: This was measured as the distance between the anterior part of the shoulder to the

junction between the hip and the tail that is the pin bone.

- Nose to shoulder length: This was measured as the distance from nose to the point of shoulder.
- Heart girth: This was measured as the circumferential measurement taken around the chest region behind the front legs.
- Height at wither: This was measured as the distance from the toe to the highest point of the shoulder using graduated measuring stick.
- Ear length: This was measured from the tip of the ear to the base of the ear.
- Leg length: This was measured from the ball socket joint of the pelvic girdle to the shank and the toe of the hind legs.
- Tail length: This was measured from the base of the tail to the end of the tail.
- Height of the rabbit: This was measured as the distance from the ground to the back bone by using graduated measuring stick.

### STATISTICAL ANALYSIS

The data collected were subjected to analysis of variance and the means separation was done using Duncan's multiple range tests. The statistical tool used was SAS version 2000. Pearson's correlation was used to analyze the association between body weight and the morphometric traits

### RESULT AND DISCUSSION

#### EFFECT OF SEX ON MORPHOMETRIC MEASUREMENTS OF TWO BREEDS OF RABBIT

The effect of sex on morphometric measurement is presented in table 1. The result of the study indicated that there was non - significant different ( $p > 0.05$ ) between sex on morphometric traits studied. The present study findings do not agree with the investigation obtained by Odubote and Somade (2008), Chineke *et al.* (2000) and Sam *et al.* (2020) who reported a significant ( $p < 0.05$ ) different between sex and morphometric measurements of rabbits. These may be due to heterosis, which is an indication of non-additive genes for growth traits. Abdullah *et al.* (2003) reported superior performance of male New Zealand White over females of other breeds, and observed that the difference could be partly attributed to the possession of major genes that improved growth.

**Table 1: Effects of Sex on Morphometric Measurement of two Breeds Rabbit.**

Parameters	Male	Female	P. Value
BW (kg)	1.88	1.85 <sup>NS</sup>	0.49
BL (cm)	31.07	30.97 <sup>NS</sup>	0.85
NSL (cm)	10.43	10.67 <sup>NS</sup>	0.25
HG (cm)	13.28	13.22 <sup>NS</sup>	0.84

HW (cm)	13.53	13.98 <sup>NS</sup>	0.12
EL (cm)	10.16	10.03 <sup>NS</sup>	0.37
LL (cm)	14.28	13.84 <sup>NS</sup>	0.13
TL (cm)	10.63	10.39 <sup>NS</sup>	0.23
HR (cm)	13.68	13.67 <sup>NS</sup>	0.97

Where BW=Body Weight, BL = Body Length, NSL = Nose to Shoulder Length, HG = Heart girth, HW= Height at wither, EL= ear Length, LL= Leg length, TL= Tail length, HR= Height of the Rabbit. NS = Non significant ( $p>0.05$ )

### EFFECT OF GENOTYPE ON THE MORPHOMETRIC TRAITS OF TWO BREEDS OF RABBIT

The effect of breed on morphometric measurements of rabbit is presented in table 2. Highly significant ( $p<0.001$ ) different was observed for NSL, HG, HW, LL and TL (10.83 – 10.34, 13.57 – 12.90, 13.37 – 14.30, 14.73 – 13.22 and 10.95 – 9.90) respectively between Dutch and New Zealand White breeds. This implies that, variation of some morphometric traits among

different genotypic groups influence growth rate and body weight. Similar result was reported by Sam *et al.* (2020) who observed significant ( $p<0.001$ ) different between morphometric measurements and genetic groups (chinchilla and New Zealand White). The non – significant different ( $p>0.05$ ) obtained for BW (1.86 – 1.87), BL (31.41 – 30.58), EL (10.10 – 10.05) and HR (13.67 – 13.67) may be due to closeness of genetic group of the rabbit. This was in line with the report of (Oke *et al.*, 2011, Obasi *et al.*, 2019 and Sam *et al.*, 2020).

**Table 2: Effect of Genotype on Morphometric Measurement of two Breeds of Rabbit**

Parameters	Dutch breed	New Zealand white	Probab. Value
BW (kg)	1.86	1.87 <sup>NS</sup>	0.82
BL (cm)	31.41	30.58 <sup>NS</sup>	0.11
NSL (cm)	10.83 <sup>a</sup>	10.34 <sup>b</sup>	0.01
HG (cm)	13.57 <sup>a</sup>	12.90 <sup>b</sup>	0.01
HW (cm)	13.37 <sup>b</sup>	14.30 <sup>a</sup>	0.0005
EL (cm)	10.10	10.05 <sup>NS</sup>	0.74
LL (cm)	14.73 <sup>a</sup>	13.22 <sup>b</sup>	<.0001
TL (cm)	10.95 <sup>a</sup>	9.98 <sup>b</sup>	<.0001
HR (cm)	13.67	13.67 <sup>NS</sup>	0.98

Where BW=Body Weight, BL = Body Length, NSL = Nose to Shoulder Length, HG = Heart girth, HW= Height at wither, EL= ear Length, LL= Leg length, TL= Tail length, HR= Height of the Rabbit. The a and b show significant different ( $p<0.01$ ), while NS shows non-significant different.

### CONCLUSIONS

The results of the present study revealed non significant ( $p>0.05$ ) different observed between sex and morphometric measurements. The non – significant difference in traits between both sexes may be as a result of tandem. But there is significant ( $p<0.001$ ) variation among breeds and morphometric traits studied. Variation among different genetic groups may be due to the genetic makeup of rabbits that influence the growth rate and may translate into higher body weight in one breed than the other.

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