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MORPHOMETRIC TRAITS IN AMERICAN STANDARD CHINCHILLA RABBITS

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ABSTRACT

Data on body weight and linear body measurements collected from one hundred (100) American Standard Chinchilla rabbits comprised 61 females and 39 males at 8 weeks were used to predict the live body weight of the rabbits, correlations among the growth traits and to determine the effect of sex on the growth traits. The estimates were statistically ($p<0.05$) higher in the female compare with male in virtually all the traits considered except in fore arm length. The values for body weight, body length, ear length, tail length, fore arm length, heart girth and abdominal circumference for females were 1.19 kg, 31.97 cm, 10.67 cm, 9.89 cm, 15.61 cm, 21.61 cm and 23.75 cm respectively, while the corresponding values for males were 0.88 kg, 28.00 cm, 10.44 cm, 8.95 cm, 14.74 cm, 19.62 cm and 21.67 cm. The correlations between body weight and the linear body measurements were positive, significant ($p<0.05$ and $p<0.001$) and range between 0.301 and 0.951 in males, and between -0.235 and 0.681 in females. Coefficient of determination was highest (0.858) when body length was fitted in the model, followed by abdominal circumference (0.735). The best predictor of live body weight at eight week in American Standard Chinchilla rabbits was body length.

Key words: Body weight, Body length, Abdominal circumference, Ear length, Fore arm length

INTRODUCTION

Linear body measurements provide good report on performance, productivity and carcass quality of animals (Ige, *et al*., 2006). Linear body measurements allow comparisons of growth in different parts of the body. The various body constituent parts develop at different rates and these determine the shape, conformation and body proportion of the animal with a specific period of time. Therefore, the objectives of this study are to determine the effects of sex on body weight and other growth traits, and phenotypic correlations between body weight and linear body measurements.

MATERIALS AND METHODS

One- hundred American standard rabbits at eight weeks of age comprising sixty-one (61) females and thirty nine (39) males were used for this study at Rolax farm in Ibadan, Oyo State, Nigeria. The animals were housed in individual cages in a well-ventilated rabbit building. The cages were large enough for free movement. Each cage was fitted with a stainless feeder and drinker. The animals were fed with pelleted feed (grower's marsh containing 16.80% Crude protein, 2823 Kcal/kg Metabolizable energy) and clean drinking water daily. Feeders and drinkers were cleaned daily with soap and water. The cages were cleaned every day from food particles, faeces and other wastes. Data on body weight (BW) in kg using a

weighing scale and five other linear body measurements in cm were taken using measuring tape as follows:

- Body Length (BL): Diagonal distance from the point of the shoulder to the pin bone
- Tail Length (TL): Measured from the base of the tail to the tip.
- Ear Length (EL): the distance from the base of attachment of the ear to the head to the tip of the ear.
- Fore arm Length (FL): is the length from the attachment of the fore arm
- Heart Girth (HG): measured as body circumference just behind the fore leg.
- Abdominal Circumference (AC): measured as body circumference at the middle of the animal (Ojediran,2010)

Statistical Analysis

The data collected were subjected to analysis of variance to determine the summary statistics and sex effect on the growth traits using SAS® (2001). Pearson correlation procedure was used to determine the correlation coefficients among the traits on sex basis. Stepwise multiple regression analysis was used by including the different linear measurements individually and collectively, to identify the best predictor variables for estimating the body weight. Body weight and regression equation were compared based on coefficient of determination.

The full regression model of the measurements (all the six linear body measurements) was defined as:

$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6$

Where, Y = dependent variable (body weight), a = intercept, b's = regression coefficients, X's = independent variables (BL, TL, , EL, FL , HG AND AC).

RESULTS AND DISCUSSION

Table 1 shows the effect of sex on the body weight and the linear body measurements. The estimates were statistically ($p<0.05$) higher in the female compared with male in virtually all the traits considered except fore arm length. The values for body weight, body length, ear length, tail length, fore arm length, heart girth and abdominal circumference for female were 1.19 ± 0.02, 31.97 ± 0.25, 10.67 ± 0.13, 9.89 ± 0.19, 15.61 ± 0.14, 21.61 ± 0.17 and 23.75 ± 0.14 Cm respectively, while the corresponding values for male rabbits are 0.88 ± 0.04, 28.00 ± 0.37, 10.44 ± 0.25, 8.95 ± 0.14, 14.74 ± 0.17, 19.62± 0.20 and 21.67 ± 0.29 Cm.

Table 1: Effect of sex on body weight and linear body measurement at 8weeks in chinchilla rabbits

Variables	Male	Female	Overall
BW (kg)	0.88^b ± 0.04	1.19^a ± 0.02	1.07 ± 0.03
BL (cm)	28.00^b ± 0.37	31.97^a ± 0.25	30.42 ± 0.29
EL (cm)	10.44^a ± 0.25	10.67^a ± 0.13	10.58 ± 0.13
TL (cm)	8.95^b ± 0.14	9.89^a ± 0.19	9.52 ± 0.13
FL (cm)	14.74^b ± 0.17	15.61^a ± 0.14	15.27± 0.11
HG (cm)	19.62^b ± 0.20	21.61^a ± 0.17	20.83 ± 0.16
AC (cm)	21.67^b ± 0.29	23.75^a ± 0.14	22.94 ± 0.17

Bw-body weight; Bl-boy length; El-ear length Tl-tail length; Fl-fore arm length; Hg-heart girth; Ac-abdominal circumference

The significant effect ($p<0.05$) observed in virtually all the variables considered in this study was in favour of female rabbits which indicates sexual dimorphism. This is in line with the observation of Ologbose *et al.*(2017) who reported that at eight weeks, female New Zealand White, Dutch and their

crosses were higher in body weight and linear body measurements compared to the males. The body weight of 1.19 Kg observed for female in this study is higher to what was reported (856.25 g and 544.64 g) for Dutch and New Zealand White female rabbit by Ologbose *et al*.(2017). This could be attributed to differences in breed. Similar trend was observed in male body weight and all other variables considered. The overall abdominal circumference (22.94 cm) observed in this study is lower when compared to the report of Hassan *et al*. (2012) at twenty weeks of age (23.59 cm). The overall estimates for all the parameters considered are lower when compared to the reports of Udeh, (2013) for the same breed. Table 2 shows that the phenotypic correlation coefficients between body weight and the linear body measurements in males are all significant, positive and moderate to high correlation This observation is similar to the report Orheruata *et al*., (2006). Similar trends were also observed in females.

Table 2: Phenotypic correlation coefficients among the body weight and linear body measurements of male and female Chinchilla

	BW	**BL**	**EL**	**TL**	**FL**	**HG**	**AC**
BW	1.000	0.951***	0.884***	0.301*	0.930***	0.648***	0.851***
BL	*0.831***	1.000	*0.892***	*0.108*	*0.874***	*0.674***	*0.851***
EL	-0.156	0.163	1.000	0.411**	0.895***	0.748***	0.856***
TL	*0.184*	*0.530***	*0.483***	*1.000*	*0.341**	*0.396**	*0.288*
FL	-0.011	0.505**	0.627***	0.681***	1.000	0.638***	0.816***
HG	*0.788***	*0.570***	*-0.046*	*0.086*	*-0.086*	*1.000*	*0.870***
AC	0.719***	0.489**	-0.235	0.024	-0.216	0.877***	1.000

Bw-body weight; Bl-boy length; El-ear length Tl-tail length; Fl-fore arm length; Hg-heart girth; Ac-abdominal circumference

CONCLUSION

It could be concluded that at eight weeks of age, female Chinchilla rabbit performed better in growth traits compared to the male counterparts and bod weight was positively correlated to other growth traits.

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