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Principal Component Analysis of Body Weight and Morphometric Traits of New Zealand Rabbits Raised under Semi-Arid Condition in Nigeria

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Abstract : Context: Rabbits production plays important role in increasing animal protein supply in Nigeria. Rabbit production provides a cheap, affordable, and healthy source of meat. The growth of animals involves an increase in body weight, which can change the conformation of various parts of the body. Live weight and linear measurements are indicators of growth rate in rabbits and other farm animals. Aims: This study aimed to define the body dimensions of New Zealand rabbits and also to investigate the morphometric traits variables that contribute to body conformation by the use of principal component analysis (PCA). Methods: Data were obtained from 80 New Zealand rabbits (40 bucks and 40 does) raised in Livestock Teaching and Research Farm, Federal University Dutsinma. Data were taken on body weight (BWT), body length (BL), ear length (EL), tail length (TL), heart girth (HG) and abdominal circumference (AC). Data collected were subjected to multivariate analysis using SPSS 20.0 statistical package. Key results: The descriptive statistics showed that the mean BWT, BL, EL, TL, HG, and AC were 0.91kg, 27.34cm, 10.24cm, 8.35cm, 19.55cm and 21.30cm respectively. Sex showed significant ($P<0.05$) effect on all the variables examined, with higher values recorded for does. The phenotypic correlation coefficient values (r) between the morphometric traits were all positive and ranged from $r = 0.406$ (between EL and BL) to $r = 0.909$ (between AC and HG). HG is the most correlated with BWT ($r = 0.786$). The principal component analysis with variance maximizing orthogonal rotation was used to extract the components. Two principal components (PCs) from the factor analysis of morphometric traits explained about 80.42% of the total variance. PC1 accounted for 64.46% while PC2 accounted for 15.97% of the total variances. Three variables, representing body conformation, loaded highest in PC1. PC1 had the highest contribution (64.46%) to the total variance, and it is regarded as body conformation traits. Conclusions: This component could be used as selection criteria for improving body weight of rabbits.

Keywords : conformation, multicollinearity, multivariate, rabbits and principal component analysis
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