International Journal of Animal and Veterinary Advances 4(3): 181-183, 2012
ISSN: 2041-2908
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Submitted: March 08, 2012 Accepted: April 08, 2012 Published: June 15, 2012

Correlation Between Body Weight and Body Conformation of two Broiler Strains Under the Same Dietery Treatment

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Abstract: The objective of this study is to estimate the correlation between body weight and body conformation of two broiler strains. A total of 200 broiler chickens comprising of 100 Hubbard and 100 Arboracre strains were used in the determination of their correlation between body weight and body conformation from day old to 8 weeks (0-8 weeks) of age. Weekly body weight and body conformations like shank length, keel length, breast width, back length and neck length were taken thrice in a week and the correlation between body weight and the body conformations were computed at the 8th week of the experiment for both strains. Hubbard broiler strain had the correlation of 0. 9416, 0.894, 0.861, 0.897 and 0.963 between body weight and other body conformation while for Arboracre strain, the correlation of 0.967, 0.974, 0.882, 2.935,0.981 and 0.969 were obtained between body weight and back length, shank length, thigh length, keel length, breast width and back length respectively. The correlation between other body conformations range between 0.977 and 0.795, all indicating strong positive correlations. Hence, there is a strong linear relationship between body weight, neck length, shank length, thigh length, keel length, breast width and back length for both Hubbard and Arboracre strains.

Keywords: Broiler chickens, body conformation, body weight, correlation

INTRODUCTION

Acute shortage of meat protein has been one of the major nutritional problems facing African countries. Breeders of meat type chicken have become interested in adult body weight, the trend being towards a big-bodied weight at early age in order to attract better price at marketing (Malilk *et al.*, 1997). They further reported that increased body weight is highly correlated with feed consumption, when selecting for rapid growth under *ad-libitum* feeding showing that more energy is available for growth over the maintenance requirement of the chickens. A number of conformation traits are known to be good indicators of body growth and market value of broiler apart from body weight (Edward, 2000). Poultry breeders have tried to establish the relationship that exist between body weight and body conformations such as shank length, breast width, keel length, neck length, back length and thigh length as this information reflect on the feed efficiency as well as the performance of the broiler birds. Besides, this will help the breeders to organize the breeding programme in order to achieve an optimum combination of body weights and good conformation for maximum economic return (Okon *et al*., 1997). They also reported that inter-relationships among body measurement can be applied speedily in the selection and breeding.

MATERIALS AND METHODS

The experiment was conducted at the poultry section of Department of Applied Science, Tudun Wada Kaduna South Local Government Area, Kaduna state, Nigeria, between February and March, 2010. Kaduna state is located between latitude 9º03′N and 11º 32′N of the equator and longitude 6º 05′E and 8º 83′E of the Green Witch Meridian. The climate is tropical comprising of dry harmattan, hot humid and raining seasons. The seasons vary with cool to hot season being longer them the raining seasons (Adeyinka *et al*., 2006).

Experimental plan: A total of two hundred day old broiler chicks comprising of one hundred Hubbard and one hundred Arboracre strain used in this study were purchased from a local distributor in kaduna. The birds were individually weighed and wing tagged for ease of identification in subsequent body measurements.

The two broiler strains were allocated to separate pens and reared on deep litter system. The birds were fed *adlibitum* with the commercial broiler starter ration containing 23% crude protein for the first five weeks of experiment. This was followed by the finisher mash containing 20% crude protein.

Water was made available constantly. Routine medication was administered at the appropriate time.

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Table 1: Correlation between body weight and linear body measurement for hubbard strain

		Average weekly neck length (cm)	Average weekly shank length (cm)	Average weekly thing length (cm)	Average weekly keel length (cm)	Average weekly breast width (cm)	Average weekly back length (cm)
Body weight (Kg)	1	0.967	0.974	0.882	0.935	0.981	0.969
Average weekly neck length (cm)	0.967	1	0.970	0.900	0.905	0.974	0.977
Average weekly shank length (cm)	0.974	0.970	1	0.873	0.902	0.973	0.968
Average weekly thigh length (cm)	0.882	0.900	0.873	1	0.844	0.886	0.891
Average weekly keel length (cm)	0.935	0.905	0.902	0.844	1	0.932	0.911
Average weekly breast width (cm)	0.981	0.974	0.973	0.886	0.932	1	0.959
Average weekly back length (cm)	0.969	0.977	0.968	0.891	0.911	0.959	1

Table 2: Correlation between body weight and linear body measurement for aboracre strain

	Body weight(kg)	Average weekly neck length (cm)	Average weekly shank length (cm)	Average weekly thing length (cm)	Average weekly keel length (cm)	Average weekly breast width (cm)	Average weekly back length (cm)
Body weight (Kg)	1	0.916	0.894	0.861	0.897	0.977	0.963
Average weekly neck length (cm)	0.916	1	0.849	0.847	0.821	0.922	0.939
Average weekly shank length (cm)	0.894	0.849	1	0.795	0.815	0.886	0.895
Average weekly thigh length (cm)	0.861	0.847	0.795	1	0.780	0.876	0.877
Average weekly keel length (cm)	0.897	0.821	0.815	0.780	1	0.889	0.863
Average weekly breast width (cm)	0.977	0.922	0.886	0.876	0.889	1	0.966
Average weekly back length (cm)	0.963	0.939	0.895	0.877	0.863	0.966	1

Data collection: Body weight and linear body measurements were obtained from each bird on a weekly basis. The linear body measurements taken were keel length, thigh length, shank length, neck length, breast width and back length. Body weights were taken using manual scale calibrated in grams. While the linear body measurements were taken using a tape rule calibrated in centimeter.

Statistical analysis: The data collected from the experiment were subjected to a statistical analysis using statistical package for the social science SPSS version 15.0 and the correlation between body weight and body linear measurement was determined using the independent sample test by Pearson (1956).

RESULTS AND DISCUSSION

Correlation between body weight and other traits in respect of Hubbard and Arboracre strain are shown in Table 1 and 2. The tables indicate that a strong relationship exist between the traits, revealing that an improvement in one parameter could lead to an improvement in others.

Correlation of 0.916, 0.894, 0.861, 0.897, 0.977 and 0.963 (Table 1) were obtained between body weight and neck length, shank length, thigh length, keel length, breast width and back length for Hubbard strain, while for Arboracre strain the correlation values of 0.967, 0.974, 0.882, 0.935, 0.981 and 0.969 (Table 2), respectively was obtained between body weight and neck length, shank length, thigh length, keel length breast width and back length all indicating a strong positive relationship. This means that an improvement in the body weight might lead to an improvement in other parameter. The correlation obtained in this study were higher than those obtained by Adeyinka *et al.* (2006) using Anak strain. This may be attributed to strain differences.

Between neck length and shank length, thigh length, keel length, breast width and back length a correlation values of 0.849, 0.847, 0.821, 0.922 and 0.939 (Table 1) were obtained for Hubbard strain while for Aboracre strain, the values were 0.970, 0.900, 0.905, 0.974 and 0.977 respectively (Table 2) all indicate a strong positive correlation which means that an improvement in neck length could lead to an improvement in other parameter. This result is higher than those obtained by Bello (2009) using Marshall Strain.

High positive correlation values of 0.795, 0.815, 0.88 and 0.895 (Table 1) was obtained between shank length and thigh length keel length, breast width and back length for Hubbard strain, while for Arboracre strain the correlation values were 0.873, 0.902, 0.973 and 0.968 (Table 2). The relatively higher correlation obtained for

both shank length could lead to an improvement in other parameters. This may be a good indicator of body conformation. The result is in line with the finding of Adeyinka *et al.* (2006) using Anak strain.

Positive and high correlation values of 0.780, 0.876 and 0.877 (Table 1) were obtained between thigh length and keel length, breast width and back length for Hubbard strain, while for Arboracre strain, the value were 0.844, 0.886 and 0.968 (Table 2). This indicates that an improvement in thigh length could lead to an improvement in other parameters. This result is higher than the finding of Bello (2009) and Adeyinka *et al*. (2006) using Anak and Marshall strain. This may be attributed to strain differences.

Correlation values of 0.932 was obtained between keel length and breast width and between keel length and back length the value of 0.911 (Table 1) was obtained for Arboracre strain, while for Hubbard strain it was 0.889 and 0.863 (Table 2). These were all positive correlations indicating that an improvement in keel length could lead to an improvement in other parameters. This agrees with the finding of Bello (2009).

For Hubbard strain, the correlation between breast width and back length was 0.966 (Table 1) while for Arboracre strain, the value was 0.959 (Table 2). All indicate a strong positive correlation which means that an improvement in back length could leads to an improvement breast width.

CONCLUSION

In conclusion, the high positive correlation obtained in this study indicate that an improvement in body weight might lead to an improvement in other linear body measurements. This is a good indicator of body conformation and may be used in selection programme.

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