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PREDICTION OF BODY WEIGHT FROM LINEAR BODY MEASUREMENTS IN TWO TURKEY BREEDS



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ABSTRACT

This study was conducted to predict the body weight of Nigerian local and exotic turkeys using linear body measurements (LBM). A total of two hundred (200) birds (exotic: n=100; local: n=100) were managed from day-old to fifteen weeks under a uniform environmental conditions. Live bodyweight (LBW) and LBM of all the turkeys were taken on weekly basis. LBM considered include body length, body girth (BG), shank length, thigh length, keel length, neck length, drumstick length and wing length. Data collected were subjected to multiple regression analysis. The results of the experiment revealed different best predictors of LBW in local and exotic turkeys at similar age. It was also detected that coefficients of determination (R^2) for the two breeds were generally poor (less than 40%) for young poults (1-4 weeks). The highest R^2 for local turkeys (73.21%) and exotic turkeys (94.90%) were obtained at weeks 12 and 10 respectively. Body girth was the most consistent significant predictor of LBW in the two breeds. It is therefore concluded that BG should be given more preference than other body parts if LBW evaluation of turkeys is to be based on LBM.

Keywords: Body weight, breed, linear measurement, predictors, regression

INTRODUCTION

One of the primary targets of animal breeding is to improve traits of economic importance, among which body weight remains unchallengeable particularly in meat purpose livestock. Ibe (2012) mentioned that the first approach in livestock characterization apart from evaluation of its production performance is the evaluation of body size and conformation. Body weight and body dimensions have been used as parameters for selection by local sellers and for research (Olowofeso, 2009). According to Ojedapo and Amao (2015), market price of some poultry species is normally adjudged using body size and body conformation or type. Similarly, Ogah (2011) reported that studies on growth traits and more especially linear body measurements are

useful to livestock farmers and particularly geneticists in improving the market quality of breedingstocks.

Kotowska *et al.*, (2005) had earlier reported that the domestic turkey has been intensively bred for weight and body composition while information on its body weight prediction is limited. Ojedapo and Amao (2015) reported turkey rearing as one of the poultry ventures currently gaining popularity in Nigeria with few number of farms beginning to rear the bird at commercial level so as complement chicken meat.

A wide variation in body weight and body measurements within a species and within or between breeds or strains had been established. Thus, morphometric characteristics have been a recurring interest to livestock production either to

supplement body weight as a measure of productivity or as predictors of some less visible characteristics (Supriyanton *et al.*, 2012; Adeoye and Oladepo, 2019). The estimation of body weight using morphometric measurements becomes very useful in smallholder livestock and poultry producers who rarely keep birth or hatch records. Assessment of body weight and linear body measurements have been found useful in quantifying body size and shape (Ilori *et al.*, 2010; Adeoye, *et al.*, 2018). These measurements provide important evidences for the growth of the breed and the properties that change with environmental effects and feeding factors. In addition, body measurements are important data sources in terms of reflecting the breed standards (Riva *et al.* 2012) and are also important in giving information about the morphological structure and development ability of the animals. Linear body measurements have also been used to predict live weight in some poultry species including turkeys (Saatci and Tülkü, 2007; Ogah, 2011; Adeoye and Ojedapo, 2019; Ologbose *et al.*, 2020). However, the environment in which livestock specie is reared may inform variation in the prediction models. Thus, this study was carried out to predict body weight of local and exotic turkeys at different ages using linear body measurements.

MATERIALS AND METHODS

Experimental site: This study was carried out in the University of Ilorin Research farm. University of Ilorin is located in Ilorin, Kwara State which lies approximately within latitude 7° and 8° 27' E in the humid tropical lowland region.

Experimental Animals and their management: A total of 200 birds (100 exotic and 100 local turkeys) were used in

this experiment. They were housed using a deep litter system and fed based on the nutrient requirements of the National Research Council (NRC, 1984). All the birds were given access to water *ad libitum*.

Data collection: Live body weight (LBW) and Linear Body Measurements (LBMs) were taken on weekly basis for a period of fifteen weeks. The LBW of all the turkeys was determined weekly throughout the period of the study using a digital platform weighing scale. All the LBMs were taken as suggested by Ojedapo and Amao (2015). The LBMs focuses are Wing Length (WL), Shank Length (SL), Thigh Length (TL), Drumstick length (DL), Body Length (BL), Breast girth (BG), Keel length (KL) and Neck length (NL).

Data Analysis: The data collected was subjected to linear multiple regression analysis to identify the best predictor variables for estimating the body weight. Body weight and regression equation were compared based on coefficient of determination. The regression model utilized is written as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_nX_n + e$$

Where: Y = Live body weight; a = Constant; b_1 = Regression coefficient of the independent variable X_1 ; b_2 = Regression coefficient of the independent variable X_2 ; b_n = Regression coefficient of the independent variable X_n ; e = error term

Where: X_1 = body length; X_2 = neck length, X_3 = breast girth, X_4 = wing length, X_5 = shank length X_6 = thigh length, X_7 = Drumstick length, X_8 = Keel length).

RESULTS AND DISCUSSION

The regression models for live body weight using LBM of exotic and Nigeria local turkeys from weeks 1 - 3 is presented in presented in Table 1. The coefficient of determination (R^2) for the two breeds during the first three weeks were generally

low (23.47 – 36.98%). The predictors of live body weight (LBW) in the two breeds exhibited similar trend of slight increase in R^2 value as the age of the birds increases, though with higher value in exotic breed than local (Local - 23.47%, 26.11% and 29.07%; Exotic: 28.17, 32.89 and 36.98%). Neck length, body girth, and keel length were the most consistent significant ($p < 0.01$; $p < 0.05$; $p < 0.1$) predictors of LBW of both local and exotic turkeys within the first three weeks while BL was consistent in only Exotic turkeys within this period. The number of significant ($p < 0.01$; $p < 0.05$; $p < 0.1$) predictors of LBW in Local turkeys in week 1 was observed to be five (NL, BG, WL, DS and KL), while three common predictors (NL, BG and SL) were identified in the predictive equations for both weeks 2 and 3. In addition to these three common variables, TL and KL had significant contribution to the predictive models for local turkeys in week 2 and weeks 3 respectively. The predictive equations of LBW in Exotic turkey for weeks 1 and 2 exhibited four common significant variables (BL, NL, BG and KL) and, WL and KL in weeks 1 and 2 respectively. The significant predictive variables for LBW of Exotic turkeys in the third week were BL, WL and KL. Regression model for LBW from weeks 4 to 6 using LBM is presented in Table 2. The R^2 values for the predictive models of both local and exotic turkeys ascended with age (Local: 33.5 – 64.3%; Exotic: 33.2 – 68.47%). The BG was among the significant contributors to the regression equation for prediction of LBW in weeks 5 and 6 for exotic turkey while WL, TL and SL were the significant contributors to the regression equation for prediction of LBW in the 5th and 6th weeks of local turkeys. Only about 48.32% of the change in the LBW of local turkey and 67% of exotic turkey was accounted for by the explanatory variables in their fifth

week. In the sixth week, the result revealed R^2 value of 64.30 for local turkey and 68.47 for exotic turkey. This result indicated that about 64% and 68% of the LBW of local and exotic turkey respectively were explained by the eight explanatory variables with neck length, wing length, shank length, thigh length and drum stick being the significant contributors in the local turkey. There was no any significant predictor of LBW of exotic turkeys in week 4. The regression models for LBW in local and exotic turkeys for weeks 7, 8 and 9 are presented in Table 3. The coefficient of R^2 values ranged between 49.06% and 62.99% in Local turkey and between 43.52% and 84.10% in Exotic turkey: In addition to other meaningful predictors ($p < 0.01$) of LBW in local turkey, SL had a meaningful ($p < 0.01$) contribution to the LBW of the two breeds in week 7, while WL was common to the two breeds in weeks 8. The two breeds exhibited no common highly significant ($p < 0.01$) contribution to the prediction of the body weight in week 9. Prediction models for LBW of local and exotic turkeys from weeks 10 to 12 is presented in Table 4. The increase in R^2 value was consistent for local turkey within this period while the exotic turkey exhibited a decrease in R^2 value by 46.92% at 11th week from 94.90% in week 10. The predictors that contributed significantly ($p < 5\%$) to the LBW of the two breeds were SL, KL and DG. The BG is also among the significant predictors ($p < 5\%$) of LBW of Local turkey at weeks 11 and 12, while there was no common predictor of body weight in exotic turkey at weeks 11 and 12. Regression models for weeks 13 to 15 for the two turkey genotypes are presented in Table 5. The R^2 ranges from 43.58% to 67.58% in local while R^2 for the exotic ranged from 52.73% to 68.99%. The R^2 gradually declines as the age increases from 13th week in the two breeds.

Table 1: Regression analysis for body weight using linear body measurements of local and exotic turkeys between weeks 1 and 3

Variables	Week 1				Week 2				Week 3			
	Local		Exotic		Local		Exotic		Local		Exotic	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
BL	0.00042	-0.34	0.00263	1.69*	0.00007	1.68	0.00180	2.13**	0.00011	-0.06	0.00869	4.20***
NL	0.00903	4.15***	0.00629	2.15**	0.00012	2.15**	0.00527	-3.40***	0.00074	-2.30**	0.00015	0.45
BG	0.00278	2.71***	0.00303	2.84***	0.00007	-2.28**	0.00187	2.12**	0.00503	-2.49***	0.00139	0.60
WL	0.00288	-2.05**	0.00561	-3.34***	0.00008	0.05	0.00074	-0.73	0.00072	-0.38	0.00689	-3.04***
SL	0.00258	-0.88	0.00078	-0.44	0.00763	-2.12**	0.00243	-1.36	0.00978	2.49***	0.00140	-0.31
TL	0.00071	-0.41	0.00029	-0.12	0.01261	4.28***	0.00269	-1.94*	0.00387	1.16	0.00049	-1.55
DS	0.00444	1.85*	0.00191	-0.77	0.00271	-0.76	0.00070	-0.49	0.00199	0.52	0.00268	-0.74
KL	0.00576	-1.80*	0.00931	3.16***	0.00365	0.89	0.00418	2.42**	0.01098	2.70***	0.00616	-2.44**
Constant	0.04667	3.61***	0.06796	3.16***	0.09141	4.61***	0.12721	7.47***	0.15306	5.00***	0.19986	4.62***
R ² =	0.2347		0.2817		0.2611		0.3289		0.2907		0.3698	

*** significant at 1%, ** significant at 5% and * significant at 10%; BL = Body Length NL= Neck Length BG= Breast Girth WL= Wing Length
SL= Shank Length TL= Thigh Length DS= Drumstick KL= Keel Length

Table 2: Regression analysis for body weight using linear body measurements of local and exotic turkeys between weeks 4 and 6

Variables	Week 4				Week 5				Week 6			
	Local		Exotic		Local		Exotic		Local		Exotic	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
BL	0.00022	-0.12	0.00005	-0.03	0.00016	-0.03	0.00954	2.38**	0.00091	-0.26	0.00216	0.42
NL	0.00479	-1.70	0.00410	-1.14	0.00764	-0.68	0.01357	1.46	0.02057	-2.93***	0.01009	-1.49
BG	0.00026	3.11	0.00079	0.67	0.00960	-2.05**	0.00699	2.75***	0.00491	1.35	0.01459	3.39***
WL	0.00255	-1.05	0.00004	-0.02	0.01933	3.01***	0.01373	2.76***	0.00953	2.54***	0.00109	0.23
SL	0.01386	3.15***	0.00081	-0.29	0.01459	0.87	0.00093	-0.11	0.04013	3.17***	0.04082	3.03***
TL	0.00755	2.34**	0.00113	0.27	0.04056	2.73***	0.01309	1.50	0.02490	2.71***	0.00538	-0.82
DS	0.00207	-0.48	0.00155	0.54	0.02979	2.39**	0.00397	1.54	0.01921	2.57***	0.02060	4.15***
KL	0.01558	4.23***	0.00129	0.26	0.01474	0.72	0.00451	-0.41	0.01069	1.95	0.01519	1.41
Constant	.1312727	3.26***	.2541469	7.63***	-.3945724	-3.15***	-.3106648	-4.99***	-.3047652	-3.42***	-.2848956	-3.66***
R ² =	0.3355		0.3327		0.4832		0.6679		0.6430		0.6847	

*** significant at 1%, ** significant at 5% and * significant at 10%; BL = Body Length NL= Neck Length BG= Breast Girth WL= Wing Length TL= Thigh Length DS= Drumstick KL= Keel Length

Table 3: Regression analysis for body weight using linear body measurements of local and exotic turkeys between weeks 7 and 9

Variables	Week 7						Week 8						Week 9					
	Local			Exotic			Local			Exotic			Local			Exotic		
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
BL	0.00237	-0.74	0.01080	1.27	0.00239	0.56	0.02489	2.99***	0.00915	1.47	0.03829	3.02***						
NL	0.02710	-3.84***	0.00138	0.10	-0.00652	-0.67	0.00632	0.49	-0.04154	-5.00***	0.02667	1.70*						
BG	0.00383	0.79	-0.00003	-0.00	0.00485	0.72	0.01839	1.58	0.00935	1.66*	0.04894	3.87***						
WL	0.01649	3.04***	-0.01010	-1.16	0.02049	3.36***	0.03853	4.15***	0.00504	1.02	0.02720	2.45**						
SL	0.04324	3.33***	0.06712	3.01***	-0.00630	-0.36	0.02668	1.05	0.07961	5.00***	-0.04824	-1.59						
TL	0.015513	1.69*	0.00115	0.10	0.01275	1.04	-0.01456	-1.10	-0.02194	-1.32	-0.01511	-0.36						
DS	0.01833	2.82***	0.02137	2.25**	0.00892	1.16	-0.000545	-0.05	0.02257	2.28**	-0.04000	-1.52						
KL	0.01306	1.24	0.03767	1.80*	0.02813	2.08**	0.0621462	2.21**	0.02440	1.92*	0.06625	2.53***						
Constant	-0.2792	-2.86***	-0.094397	-0.54	-0.238868	-2.00**	-1.519861	-6.34	-0.2853013	-2.30**	-1.666242	-5.63***						
R ² =	0.6290		0.4352		0.4906		0.8410		0.6299		0.8263							

*** significant at 1%, ** significant at 5% and * significant at 10% BL = Body Length NL = Neck Length BG = Breast Girth WL = Wing Length SL = Shank Length
TL = Thigh Length DS = Drumstick KL = Keel Length

Table 4 : Regression analysis for body weight using linear body measurements of local and exotic turkeys between weeks 10 and 12

Variables	Week 10						Week 11						Week 12					
	Local		Exotic		Local		Exotic		Local		Exotic		Local		Exotic		Local	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
BL	-0.00269	-0.48	0.00815	0.96	0.02203	3.19***	0.02806	1.89*	0.00809	0.98	-0.01756	-0.94	0.00809	0.98	-0.01756	-0.94	0.00809	0.98
NL	-0.03436	-4.69***	0.02326	1.09	0.00988	1.07	0.00061	0.02	-0.01642	-1.70*	0.07464	2.90***	-0.01642	-1.70*	0.07464	2.90***	-0.01642	-1.70*
BG	0.01582	2.46**	0.02681	2.22**	0.01061	2.43**	-0.00377	-0.24	0.04126	5.14***	0.00270	0.28	0.04126	5.14***	0.00270	0.28	0.04126	5.14***
WL	-0.00572	-1.03	0.03028	2.26**	0.00912	1.43	0.03242	1.97**	0.00082	0.09	0.03519	1.30	0.00082	0.09	0.03519	1.30	0.00082	0.09
SL	0.04796	2.82***	0.05751	2.41**	-0.02469	-1.53	-0.00687	-0.12	0.03556	1.40	0.08425	3.51***	0.03556	1.40	0.08425	3.51***	0.03556	1.40
TL	-0.02511	-1.42	0.00231	0.11	-0.02911	-1.64	0.00771	0.23	-0.01483	-0.85	0.04275	2.09**	-0.01483	-0.85	0.04275	2.09**	-0.01483	-0.85
DS	0.02400	2.37**	0.03367	1.81	0.01057	0.71	0.02556	0.90	0.01198	0.81	0.02853	0.91	0.01198	0.81	0.02853	0.91	0.01198	0.81
KL	0.03735	2.83***	0.04809	2.02**	0.03789	2.44**	0.04579	0.68	0.00169	0.10	0.01262	0.78	0.00169	0.10	0.01262	0.78	0.00169	0.10
Constant	0.13081	1.11	-2.08349	-11.25***	-0.0859992	-0.48	-0.705826	-1.23	-0.2164725	-1.37	-1.587255	-3.64***	-0.2164725	-1.37	-1.587255	-3.64***	-0.2164725	-1.37
R ² =	0.4804		0.9490		0.5798		0.4798		0.7321		0.7811		0.7321		0.7811		0.7321	

Note: *** significant at 1%, ** significant at 5% and * significant at 10% BL = Body Length NL = Neck Length BG = Breast Girth h WL = Wing Length SL = Shank Length TL = Thigh Length DS = Drumstick KL = Keel Length

Table 5: Regression analysis for body weight using linear body measurements of local and exotic turkeys between weeks 13 and 15

Variables	Week 13				Week 14				Week 15			
	Local		Exotic		Local		Exotic		Local		Exotic	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
BL	0.01137	1.43	0.03241	0.97	-0.00585	-0.39	0.02876	0.71	-0.00350	-0.22	0.01992	0.90
NL	0.00493	0.48	0.03946	0.76	0.00660	0.40	0.02403	0.57	0.01728	0.81	0.03478	0.70
BG	0.03499	4.78***	0.03017	1.69*	0.03299	3.84***	0.05175	2.72***	0.02798	2.95***	0.05459	2.47**
WL	-0.00193	-0.19	-0.00102	-0.04	-0.01112	-0.84	0.10522	2.74***	0.00607	0.40	-0.01046	0.47
SL	0.03433	2.26**	0.04807	0.54	0.00979	0.27	-0.13149	-1.81	-0.04965	-1.31	0.11219	1.56
TL	-0.03305	-1.66*	0.07952	1.54	-0.02204	-0.98	0.05955	0.94	-0.00089	-0.03	-0.04675	0.64
DS	0.02781	1.99**	0.00274	0.08	0.05858	2.28**	0.07983	1.03	0.04315	1.75*	0.02452	0.80
KL	-0.01923	-1.06	0.09643	0.96	-0.01124	-0.47	-0.02911	-0.43	0.00558	0.20	-0.01292	-0.17
Constant	-0.0586522	-0.25	-2.893051	-3.42***	.3396177	1.10	-3.222733	-2.94***	.410577	1.02	-.9141635	-0.71
R ² =	0.6758		0.6899		0.5465		0.6671		0.4358		0.5273	

Note: *** significant at 1%, ** significant at 5% and * significant at 10% BL = Body Length NL = Neck Length BG = Breast Girth WL = Wing Length SL = Shank Length TL = Thigh Length DS = Drumstick KL = Keel Length

The BG remains consistent as a highly significantly predictor of LBW in local turkey from weeks 13 to 15 while the exotic turkey maintained this similar trend from week 14 to 15. The DS of Local turkey had significant ($p < 0.05$; $p < 0.10$) contribution to the LBW of local turkey at weeks 14 and 15. Live body weight of livestock is crucial to animal breeders as it plays several roles in their breeding, selection, medication and feeding (Machila *et al.*, 2008). Thus, accurate prediction of body weight in turkey can be instrumental to the betterment of their management and improvement. The current study observed a non-uniform variation trend (increase and decrease) in the R^2 values as the ages of the birds increase. This aligns with the observation reported on Nigeria local turkey by Durasaro *et al.*, 2013 who focused on the 4th, 8th and 12th week of the birds. Although, the range of R^2 values for local turkeys in the current study (23.45% - 73.21%) was slightly lower than what was reported by Durasaro *et al.*, 2013. This might be due to regression analysis approach employed in their study, and the variation in turkey lines. A generally low R^2 at lower ages of the birds in this study suggests that a reduced proportion of the data set of predictors (LBMs) were captured in the models at this stages (Cheng *et al.*, 2014). The relatively higher R^2 for local turkey at week 12 (73.21%) and for exotic at week 10 (94.90%) indicate that the estimates obtained in those ages were more reliable with BG (in local turkey) and BG, WL, SL and KL (in exotic turkey) being the most significant contributor to body weight increases at these stages (Ologbose *et al.*, 2020). Contrary to Durasaro *et al.* (2013) who reported 8th week as the best prediction accuracy stage (81%) for the body weight of the Nigeria local Turkey, the current study observed this in the 12th

week at 73% accuracy. This difference might be due to environmental factors and regression analytical procedures. The preponderance of BG as a significant contributor to the prediction equation of LBW in the two turkey varieties was comparatively more than other predictors across the ages considered. This corroborates the earlier report on exotic turkey by Adeoye and Ojedapo (2019) who obtained breast girth to have the highest R^2 among other predictors. However, the significance of BL as the next to BG in the prediction LBW exotic turkey (Adeoye and Ojedapo (2019) contradicts the current study wherein WL ranked next to BG across the weeks. Differences in the ages at which the data for prediction model were taken could lead to this variation. Similarly, the current study also align with some earlier authors (Saatci and Tülkü, 2007; Raji *et al.*, 2009; Ibe, 2012) that reported that chest or breast related measurements had more significance in the prediction of some poultry species rather than other measurement. The presence of bones as well as dense muscles in this region could account for this observation (Duclos *et al.*, 2007). Another study by Ogah (2011) also confirmed that accuracy of LBW prediction in Nigeria local turkey can be improved if chest circumference is included among other few predictors.

CONCLUSION

Base on the findings of this study, it is concluded that the prediction equation model for the body weight of Nigeria local turkey and exotic turkey vary at similar age. It is also concluded that the best body weight prediction age for local and exotic turkeys are 12th and 10th week, respectively.

REFERENCES

- Adeoye, A.A., and Oladepo, A.D (2019). Prediction of live body weight in exotic turkey (*Meleagris*

- gallopavo) using linear body measurements in South-West Nigeria. *Journal of Animal and Plant Sciences*, 39 (3): 6495-6500
- Adeoye, A.A., Rotimi, E.A. and Oluyode, M.O. (2018). Biometric Differentiation of Local and Exotic Turkeys (Meleagris gallopavo) in Southwest Nigeria. *Applied Tropical Agriculture*, 22(2): 63-66
- Cheng, C.L., Shalabh, Garg, G. (2014). Coefficient of determination for multiple measurement error models. *Journal of Multivariate Analysis*, 126: 137 – 152.
- Duclos, M. J., Berri C., Le Bihan-Duval, E. (2007). Muscle growth and meat quality. *Journal of Applied Poultry Research*, 16:107-112
- Duroṣaro, S.O. Oyetade, M.S., Ilori, B.M., Adenaike, A.S., Olowofeso, O., Wheto, M., Amusan, S.A., Osho, S.O. and Ozoje, M.O. (2013). Estimation of Body Weight of Nigerian Local Turkeys from Zoometrical Measurements at 4, 8 and 12 Weeks of Age. *Global Journal of Science Frontier Research Bio-Tech and Genetics*, 13 (1)
- Ibe, S. N. (2012). Measurement of size and conformation in commercial broilers. *Journal of Animal Breed and Genetics*, (106): 461-469.
- Ilori, B.M., Peters, S.O., Ikeobi, C.O.N., Bamgboṣe, A.M., Isidahomen, C.E. and Ozoje, M.O. (2010). Comparative Assessment of Growth in Pure and Crossbred Turkeys in a Humid Tropical Environment. *International Journal Poultry Science*, 9 (4): 368-375.
- Kotłowska, M., Glogowski, J., Dietrich, G.J., Kozłowski, K., Faruga, A., Jankowski, J. and Ciereszko, A. (2005). Biochemical characteristics and Sperm Production of Turkey Semen in Relation to Strain and Age of the Males. *Journal of Poultry Science*, 84:1763-1768
- Machila N, Fèvre EM, Maudlin I, Eisler MC. (2008). Farmer estimation of live body weight of cattle: implications for veterinary drug dosing in East Africa. *Preventive Veterinary Medicine*, 87:394-403.
- NRC, 2007. Nutrient requirements of small ruminants. National Academy of Sciences, Washington, DC.
- Ogah, D. M. (2011). Assessing size and conformation of the body of Nigerian indigenous turkey. *Slovak Journal of Animal Science*, 44(1): 21-27
- Ojedapo, L. O and Amao, S. R. (2015). Genetic Variation and Phenotypic Correlations of an Exotic Turkey Reared in Savanna Region of Nigeria. *International Journal of Agriculture Innovations and Research*, 4(2): 376-380
- Ologboṣe, F. I., Benneth, H. N. and Ajayi, F. O. (2020). Breeds influence on growth ability and predicting body weight from linear body measurements of ducks at various ages. *World News of Natural Sciences*, 29(3): 282-289.
- Olowofeso, O. (2009). Phenotypic correlations and prediction of body weight and body size parameters in broiler chickens. *Journal of Applied Agricultural Research*, 1: 71-76.
- Raji A. O., Igwebuike, J. U. and Usman, M. T. (2009). Zoometrical body measurements and their relation with live weight in matured local Muscovy ducks in Borno State Nigeria. *ARP Journal of*

Agricultural and Biological Science, 4(3): 58 – 62.

Riva, J., Rizzi, R., Marelli, S and Cavalchini, G. (2012). Body Measurements in Bergamasca Sheep, *Small Ruminant Research*, 221-227

Saatci M and M. Tülkü. 2007 . Zoometrical Body Measurements and Their Relation with Live

weight in Native Turkish Geese. *Turkish Journal of Veterinary and Animal Science*, 31(1): 47- 53.

Supriyanton A., Hakim L., Suyadi, H. and Ismudiono, U. (2011). Breeding programme development of Bali cattle at Bali breeding centre, *Animal Production*, 13 (1): 45-51