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Quantitative Differentiation of Two Populations of Indigenous Chickens in a Derived Savannah Zone of Nigeria Using Morphometric Traits

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Abstract: *The study was conducted to evaluate two populationsof local chickens (Yoruba and Fulani Ecotypes Chicken) based on some selected morphometric traits. Traits measured were Chest Circumference (CHCC), Comb Thickness (CMBTK), Wing Span (WNSP), Spur Length (SPLT), Tail Length (TALT), Beak Length (BKLT), Femur Length (FELT), Crus Length (CRLT), Tarsometatarsus Length (TMTLT), and Body Length (BDLT). Data collected was analysed using SAS statistical package. Result showed that mean values of CHCC was higher significantly (P <0.05) in Fulani ecotype chickens (10.93 ±0.10cm – 11.13 ± 0.09cm) thanYoruba Ecotype chickens (10.57 ± 0.06cm – 11.88 ± 0.11cm)in most of the flocks. Similar trend was observed forWing Span, Tail Length, Beak Length, Crus Length, Tarsometatarsus Length and Body length. There was no significant differences (P>0.05) between mean values of comb thickness, spur length between the two populations studied. It can therefore be concluded that Fulani Ecotypes Chicken are superior to Yoruba Ecotypes counterpart under traditional Animal Husbandry system. Further study should be conducted under improved management system.*

1. INTRODUCTION

Village chickens contribute significantly towards rural communities in Nigeria, providing scarce animal protein in the form of meat and eggs as well as source of income to meet domestic demands by rural farmers.Despite the important roles of these chickens, their productivity is hampered by a number of challenges.Currently, village chicken production is characterized by low productivity and is generallydescribed as low-input low-output (Aboe*et al.,* 2006). The low productivity is caused by anumber of factors, such as sub-optimal management, lack of supplementary feed, low geneticpotential, predation and health challenges (Goromela*et al.,* 2006; Mungube*et al.,* 2008). Development of village chicken production can be a sustainable way of helping to meet thewelfare needs of rural populations and raise their living standards (Sonaiya, 2007; Mapiye*et al.,* 2008; Gillespie and Flanders, 2009). Although there are ongoing researches with the objective of improving their productivity which has been conducted in other part of the country, on characterization at morphological and molecular level and breeding systems of village chicken production, there is, dearth of information in the derived savannah zone on Nigeria on these areas of research. It is therefore imperative to conduct a specific investigation relevant to the zone because of the fact that village production varies from place to place depending on the socio-economic, cultural and biological factors.

Morphometric characteristics (linear body measurements) 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 (Supriyantono et al., 2012). Measurements of various morphometric traits are of value in estimating body weight and carcass parameters in livestock and poultry production and because of the relative ease in measurements they can be used as an indirect method of predictingbody weight and carcass parameters. These will provide good information on performance, productivity and carcass characteristics of livestock and poultry.Morphometric measurements such as length and height are related to bone growth and are closely related to body weight of growing animals (Essien and Adesope, 2003).Morphometric

measurements may differ within breeds or strains within the same species, Apart from the breed or strain differences in linear body measurements, body measurements may be influenced by the type of management of specific populations. This study is therefore designed to document the effect of Ecotype on somebody measurements in Local chickens in derived savannah zone.

2. MATERIALS AND METHOD

2.1. Location of the Study and Animal Management

The study was conducted in five villages of Ogbomoso under derived savannah zone. The climate and vegetation of the area has been previously described (Ige *et al*, 2014). The chickens were maintained under traditional Animal Husbandry with little or no shelter.

2.2. Data Collection

Data collected from of two thousand and forty-one adult indigenous chickencomprising one thousand two hundred and seventy four (1274) Yoruba Ecotype Chicken (Plates 3 &4)and seven hundred and sixty seven (767) Fulani Ecotype Chicken(Plates1 & 2) were used for the study.Data were recorded according to ecotype, location and sex on eleven zoometrical variables . They include: Chest Circumference (CHCC), Comb Thickness (CMBTK), Wing Span (WNSP), Spur Length (SPLT), Tail Length (TALT), Beak Length (BKLT), Femur Length (FELT), Crus Length (CRLT), Tarsometatarsus Length (TMTLT), and Body Length (BDLT).

2.3. Reference Points for Body Measurements

Chest circumference (CHCC): Measured as the circumference of the chest taken at the top of the pectus (hind breast).

Comb thickness (CMBTK): Measured as the thickest part of the comb.

Wing span (SPLT): Measured as the distance between the tip of one wing and the tip of the other wing when spead out.

Spur Length (SPLT): Measured as the total length of the spur.

Tail Length (TALT): Measured as the total length of the tail.

Beak Length (BKLT): Measured as the distance between the base of the beak to the tip of the beak.

Femur length (FELT): Measured as the length between the mid region of coax (hip bone) and that of the Genu (knee).

Crus length (CRLT): Taken as the length between the mid region of the Genu and that of the Regiotarsalis.

Tarsometatarsus Length (TMTLT): Measured as the length between the mid region of the Regiotarsalis and the outset of the Digituspedis IV.

Body length (BDLT): Measured asdistance from the tip of the beak over the head through body trunk to the tail.

3. STATISTICAL ANALYSIS

Data generated were subjected to General Linear Model of SAS 1990 to generate means for and each of the Linear Body Measurements with respect to sex and ecotype. Significant means were separated by Duncan's Multiple Range

Model adopted are as stated below:

3.1. General Linear Model Fitted to the Data

$Y_{ijk} = \mu + c_i + di + e_{ij}$

Where Y_{ij} is estimated value for body weight or body measurement

μ is Population mean

$c_i$is fixed effect of sex

di is fixed effect of ecotype

$e_{ij}$is residual error

Fulani Ecotype

Plate 1: *Female*

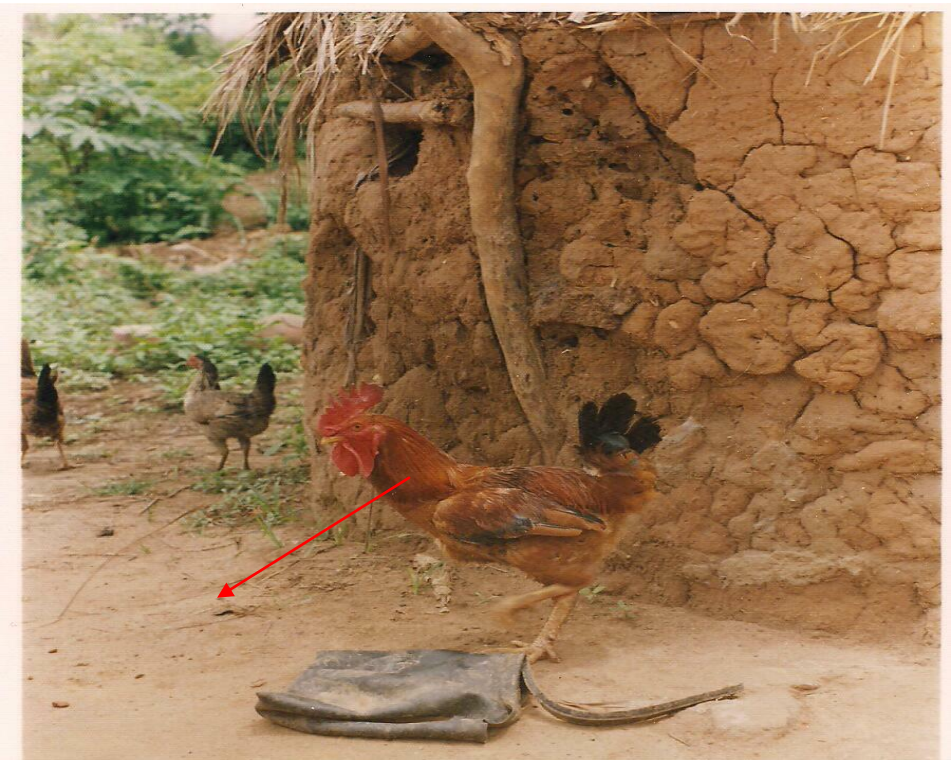

Plate 2: *Male*

Yoruba Ecotype

Plate 3: *Female*

Plate 4. *Male*

4. RESULT

4.1. Chest Circumference

Table 1 summarises the descriptive statistics of chest circumference of Yoruba ecotype and Fulani ecotype indigenous chickens. Pooled mean values obtained for Yoruba ecotypes range from 10.57 ± 0.06cm – 11.88 ± 0.11cm, with males having values of 10.47 ± 0.08cm – 12.75 ± 0.08cm and females with the values of 10.17± 0.11cm to 11.24 ± 0.08cm. There was a significant ($P<0.05$) differences in favour of males.The pooled coefficient of variation were within the range of 8.51% - 15.26% with males 7.48% - 15.68% and females with 7.21% -18.79%.

The pooled means of the chest circumference of Fulani ecotype were within the range of 10.93 ±0.10cm – 11.13 ± 0.09cm; the male values ranged from 11.10 ± 0.13 – 11.64 ± 0.13 with female

values of 10.53 ± 0.10 to 10.93 ± 0.09. Male value were significantly (P<0.05) different from female (Table 11). The overall pooled Coefficient of variation was between 9.32% and 15.33% while male values ranged from 9.63% - 17.95% and female values of 7.67% - 11.61%. Fulani ecotype were significantly (p<0.05) superior to Yoruba Ecotype in terms of Chest Circumference all the flocks.

Table 1. *Least Square Mean ($\overline{X}$), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Chest Circumference of Yoruba and Fulani Ecotype Chickens*

		Yoruba Ecotype			Fulani Ecotype		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	122	253	78	80	158
	$\overline{X}$ (cm)	11.00	10.17	10.62	11.64	10.53	11.13.
	S. D.	1.73	1.18	1.40	1.12	0.89	1.16
	S. E.	0.15	0.11	0.09	0.13	0.10	0.09
	C. V.	15.68	11.62	13.22	9.63	8.42	10.39
Iluju	N	130	123	253	80	75	155
	$\overline{X}$ (cm)	12.26	11.24	11.73	11.29	10.77	11.02
	S. D.	1.48	0.89	1.48	1.41	0.86	1.21
	S. E.	0.13	0.08	0.09	0.16	0.01	0.10
	C. V.	12.10	7.95	12.61	12.48	8.02	10.94
Iresaadu	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	12.75	10.96	11.88	11.49	10.84	11.10
	S. D.	0.95	2.06	1.81	2.06	1.26	1.70
	S. E.	0.08	0.19	0.11	0.24	0.15	0.14
	C. V.	7.48	18.79	15.26	17.95	11.61	15.33
Onipaanu	N	126	123	249	76	73	149
	$\overline{X}$ (cm)	11.27	10.59	10.90	11.11	10.78	10.93
	S. D.	1.55	0.76	1.28	1.39	1.02	1.24
	S. E.	0.44	0.07	0.08	0.16	0.12	0.10
	C. V.	13.79	7.21	11.72	12.53	9.46	11.55
Ibaiyaoje	N	144	125	265	80	79	159
	$\overline{X}$ (cm)	10.47	10.37	10.57	11.10	10.93	11.05
	S. D.	0.96	0.78	0.90	1.18	0.84	1.03
	S. E.	0.08	0.07	0.06	0.13	0.09	0.08
	C. V.	8.93	7.49	8.51	10.65	7.67	9.32

4.2. Comb Thickness

Summary statistics of comb thickness of Fulani and Yoruba Ecotype Chickens are presented in Table 2. The pooled means of Yoruba ranged from 0.18 ± 0.01mm to 0.29 ± 0.01mm, with male values of 0.22 ± 0.1mm – 0.40 ± 0.01mm and female values of 0.14 ± 0.01 – 0.48 ± 0.07mm. The significant differences (P<0.05) in the comb thickness was in favour of male. The pooled coefficient of variation ranged from 46.90% -74.46 with female values of 32.98% -83.35% and 26.75% -65.60% for male. Females were generally variable in all the flocks.

Table 2. *Least Square Mean ($\overline{X}$), Standard Deviation (S.D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Comb Thickness of Yoruba and Fulani Ecotype Chicken*

		Yoruba Ecotype			Fulani Ecotype		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	122	253	78	80	158
	$\overline{X}$ (mm)	0.22	0.14	0.18	0.38	0.21	0.30
	S. D.	0.10	0.06	0.09	0.23	0.09	0.20
	S. E.	0.01	0.07	0.01	0.03	0.01	0.02
	C. V.	45.12	45.00	50.44	60.01	45.21	67.35
Iluju	N	130	123	253	80	75	155
	$\overline{X}$ (mm)	0.35	0.19	0.27	0.25	0.18	0.22
	S. D.	0.12	0.06	0.13	0.18	0.09	0.15
	S. E.	0.07	0.07	0.07	0.02	0.01	0.07
	C. V.	35.28	32.98	46.90	70.37	49.29	66.56
Iresaadu	N	127	123	250	75	71	146
	$\overline{X}$ (mm)	0.40	0.17	0.29	0.24	0.20	0.22

	S. D.	0.11	0.07	0.15	0.17	0.13	0.15
	S. E.	0.07	0.01	0.01	0.21	0.02	0.07
	C. V.	26.75	40.20	50.81	72.58	65.61	69.11
Onipaanu	N	126	123	249	76	73	149
	$\overline{X}$ (mm)	0.28	0.14	0.21	0.23	0.17	0.20
	S. D.	0.13	0.06	0.12	0.15	0.07	0.12
	S. E.	0.07	0.07	0.01	0.02	0.01	0.01
	C. V.	47.27	44.45	59.55	64.41	38.94	59.70
Ibaiyaoje	N	144	125	269	80	79	159
	$\overline{X}$ (mm)	0.23	0.48	0.20	0.22	0.17	0.19
	S. D.	0.15	0.15	0.15	0.14	0.09	0.10
	S. E.	0.07	0.07	0.01	0.02	0.01	0.01
	C. V.	65.60	83.35	74.46	60.62	54.98	55.43

Pooled mean values for Fulani ecotype ranged from 0.30 ± 0.02mm - 0.17±0.01mm while mean values of 0.17 ± 0.01mm – 0.21 ± 0.01mm was recorded for female and 0.22 ± 0.02mm – 0.38 ± 0.03mm was obtained for male. There was significant differences ($P<0.05$) in the sex regarding comb thickness and this was in favour of males. The pooled coefficients of variation are within the range of 55.42% - 69. 11% with female values of 38.94% - 65.61% and male value of 60.01% - 72.58%. In Fulani Ecotype Chickens, the highest and lowest mean values were found in Ikoyi and Onipaanu respectively. However, Iresaadu and Onipaanu had the highest and lowest means values respectively in the Yoruba Ecotype Chickens. There was no significant differences ($P>0.05$) between mean value of comb thickness in the two population studied.

4.3. Wing Span

The result of summary statistics of Wing Span in Yoruba and Fulani Ecotype indigenous chickens are presented in Table 3. In Yoruba ecotype population, pooled value ranged from 11.19 ± 0.07cm – 11.43 – 0.07cm, with male value of 11.29 ± 0.09cm – 11.49 ± 0.10cm and female value of 11.11 ± 0.10cm – 11.45 ± 0.10cm. Highest and lowest values of Wing Span were observed in Ikoyi and Ibaiyaoje respectively. Significant ($P<0.05$) difference was observed between sexes (Table 16).

Table 3. *Least Square Mean ($\overline{X}$), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Wing Span of Yoruba and Fulani Ecotype Chicken.*

		Yoruba Ecotype			**Fulani Ecotype**		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	122	253	78	80	158
	$\overline{X}$ (cm)	11.49	11.31	11.43	12.29	12.35	12.35
	S. D.	1.10	1.19	1.15	2.15	1.43	1.84
	S. E.	0.10	0.12	0.07	0.24	0.16	0.15
	C. V.	9.57	10.52	10.06	17.52	11.58	14.91
Iluju	N	130	123	253	80	75	155
	$\overline{X}$ (cm)	11.49	11.35	11.41	11.92	11.61	11.72
	S. D.	1.16	1.14	1.15	1.52	1.50	1.50
	S. E.	0.10	0.10	0.07	0.17	0.17	0.12
	C. V.	10.08	10.03	10.07	12.76	12.49	12.83
Iresaadu	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	11.37	11.30	11.34	10.90	10.83	10.98
	S. D.	1.12	1.17	1.13	1.78	2.36	2.08
	S. E.	0.10	0.11	0.07	0.21	0.28	0.17
	C. V.	9.80	10.34	9.99	16.31	21.82	18.49
Onipaanu	N	126	123	249	76	73	149
	$\overline{X}$ (cm)	11.37	11.45	11.41	11.04	11.40	11.14
	S. D.	1.19	1.12	1.15	0.99	1.30	1.16
	S. E.	0.11	0.10	0.07	0.11	0.15	0.09
	C. V.	10.48	9.82	10.08	8.99	11.44	10.41
Ibaiyaoje	N	144	125	269	80	79	159
	$\overline{X}$ (cm)	11.29	11.11	11.19	11.51	11.39	11.49
	S. D.	1.05	1.14	1.09	1.46	1.33	1.38
	S. E.	0.09	0.10	0.07	0.16	0.15	0.11
	C. V.	9.27	10.23	9.78	12.69	11.674	12.02

In the Fulani Ecotype population, pooled value of the Wing Span ranged from 10.98 ± 0.17cm to 12.35 ± 0.15cm with female value of 10.83 ± 0.28cm to 12.35 ± 0.16. and male value of 10.90 ± 0.21cm – 12.29 ± 0.24 cm . Significant ($P<0.05$) differences were found between sexes (Table 16). Highest values of 12. 35±0.16cm was found in Ikoyi and lowest value of 10.83±0.28 was found in Iresaadu. The pooled coefficient of variation in the Yoruba Ecotype Chicken population ranged from 9.78% - 10.07% with female values of 9.82% - 10.52% and male value of 9.27% - 10.48%. However, in the Fulani Ecotype Chicken, the pooled coefficient of variation ranged from 10.41% to 18.49% while female value ranged from 11.44% to 21.82% and male values ranged from 8.99% to 17.52%. Significant differences ($P<0.05$) were observed between means of the two ecotypes and this was in favour Fulani ecotype population (Table 11), also they are generally variable than Yoruba Ecotype Chicken.

4.4. Spur Length

Mean values of Spur Length in Yoruba andFulani ecotype populations were presented in Table 4. The result showed that in Yoruba Ecotype population, the value ranged from 1.07 ± 0.01cm to 1.10 ± 0.01cm (Pooled) ,1.07 ± 0.02cm to 1.10cm ± 0.22cm and 1.05 ± 0.02cm to 1.10 ± 0.02cm for female and male respectively. No significant differences were observed between sexes ($P > 0.05$). Coefficient of variation for pooled, male and female are within the range of 18.75% - 20.12%, 18.96% - 20.56% and 18.14% - 19.90% respectively.In the Fulani Ecotype Chickens, the result revealed that Spur Length were within the range of 1.08 ± 0.02cm to 1.12 ± 0.02cm for pooled, 1.06 ± 0.02cm to 1.14 ± 0.02cm for female, 1.06 ± 0.03cm to 1.10 ± 0.02cm for male. No significant differences ($P > 0.05$) were observed between sexes (Table 16). Coefficient of variation ranged from 18.95% - 20.71%, for pooled, 17.09% - 20.77% for female and 19.19% - 21.31% for male. Comparatively, no significant difference ($P > 0.05$) was observed between the two populations studied (Table 11).

Table 4. *Least Square Mean ($\overline{X}$), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficients of Variation (C. V.) of Spur Length of Yoruba and Fulani Ecotype Chickens*

		Yoruba Ecotype			Fulani Ecotype		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	122	253	78	80	158
	$\overline{X}$ (cm)	1.05	1.10	1.07	1.09	1.06	1.08
	S. D.	0.00	0.22	0.21	0.23	0.022	0.22
	S. E.	0.02	0.02	0.01	0.03	0.02	0.02
	C. V.	19.15	19.90	19.83	20.72	20.77	20.41
Iluju	N	130	123	253	80	75	155
	$\overline{X}$ (cm)	1.09	1.07	1.09	1.10	1.09	1.08
	S. D.	0.22	0.20	0.21	0.22	0.21	0.22
	S. E.	0.02	0.02	0.01	0.02	0.02	0.02
	C. V.	20.04	18.86	19.32	19.98	19.54	20.22
Iresaadu	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	1.07	1.07	1.07	1.09	1.11	1.11
	S. D.	0.021	0.21	0.21	0.21	0.21	0.21
	S. E.	0.02	0.02	0.01	0.02	0.03	0.02
	C. V.	19.68	19.46	19.33	19.19	19.09	19.21
Onipaanu	N	126	125	249	76	73	149
	$\overline{X}$ (cm)	1.10	1.10	1.10	1.06	1.04	1.05
	S. D.	0.23	0.20	0.22	0.22	0.22	0.22
	S. E.	0.02	0.02	0.01	0.03	0.03	0.02
	C. V.	20.56	18.14	20.12	20.74	20.65	20.71
Ibaiyaoje	N	144	125	269	80	78	159
	$\overline{X}$ (cm)	1.09	1.10	1.09	1.10	1.14	1.12
	S. D.	0.21	0.20	0.20	0.23	0.19	0.21
	S. E.	0.02	0.02	0.01	0.03	0.02	0.02
	C. V.	18.96	18.14	18.75	21.31	17.09	18.95

4.5. Tail Length

Table 5 showed the descriptive statistics of Tail Length of Yoruba and Fulani Ecotype populations. Mean values of Yoruba ecotype ranged from 12.91 ± 0.10cm to 13.20 ± 0.10cm for pooled, 12.83 ± 0.14cm – 13.25 ± 0.14cm for female and 12.85 ± 0.13cm to 13.27 ± 0.14cm for male. No significant (P>0.05) differences were observed between sexes (Table 16). Coefficient of variation ranged from 12.29% - 12.72% for pooled, 12.33% - 13.39% for female and 11.71% - 13.13% for male.

The mean value of Fulani ecotype ranged from 11.79 ± 0.17cm to 13.38 ± 0.11cm for pooled, 11.59± 0.26cm to 13.39 ± 0.15cm for female and 12.05 ± 0.23cm to 13.29 ± 0.17cm for male. No significant (P>0.05) differences were observed between sexes (Table 16) . Coefficient of variation were within the range of 10.28% -18.13% for pooled, 9.82% - 19.71% for female and 11.24% - 17.17% for male.

Significant differences were observed between the two population studied (Table 11) in favour of Fulani Ecotype in all the flocks.

Table 5. *Least Square Mean ($\overline{X}$), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Tail Length of Yoruba and Fulani Ecotype Chickens*

		Yoruba Ecotype			Fulani Ecotype		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	122	253	78	80	158
	$\overline{X}$ (cm)	13.00	12.83	12.91	13.29	13.39	13.38
	S. D.	1.05	1.57	1.63	1.49	1.31	1.41
	S. E.	0.14	0.14	0.10	0.17	0.15	0.11
	C. V.	12.68	12.26	12.62	11.24	9.82	10.58
Iluju	N	130	123	253	80	75	155
	$\overline{X}$ (cm)	13.27	13.17	13.20	12.05	11.59	11.79
	S. D.	1.04	1.66	1.62	2.03	2.28	2.14
	S. E.	0.14	0.15	0.10	0.23	0.26	0.17
	C. V.	12.35	12.63	12.29	16.87	19.71	18.13
Iresaadu	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	12.85	12.98	12.91	12.72	12.85	12.84
	S. D.	1.50	1.74	1.63	1.97	2.04	2.00
	S. E.	0.13	0.16	0.10	0.23	0.24	0.16
	C. V.	11.71	13.39	12.59	15.45	15.89	15.57
Onipaanu	N	126	123	249	76	73	149
	$\overline{X}$ (cm)	13.25	13.04	13.06	12.70.	12.30	12.33
	S. D.	1.59	1.64	1.66	1.89	2.29	2.22
	S. E.	0.14	0.15	0.10	0.22	0.27	0.18
	C. V.	12.00	12.55	12.72	14.90	18.60	17.99
Ibaiyaoje	N	144	125	269	80	79	159
	$\overline{X}$ (cm)	12.91	13.25	13.19	12.31	12.93	12.75
	S. D.	1.70	1.63	1.63	2.11	1.39	1.60
	S. E.	0.14	0.14	0.10	0.24	0.16	0.13
	C. V.	13.13	12.33	12.35	17.17	10.78	12.55

4.6. Beak Length

Descriptive statistics of beak length are presented in Table 6 for the two ecotypes studied. Pooled mean values for Yoruba ecotype ranged from 1.27 ± 0.02cm – 1.51 ± 0.03, with female having 1.31 ± 0.03cm – 1.50 ± 0.04cm and male value of 1.28 ± 0.03cm – 150 ±0.04cm. No significant (P>0.05) differences were observed between sexes. Coefficient of variation ranged from 22.56% - 27.86% (male), 25.47% -31.44% (female) and 21.82% - 30.25% (pooled).

In the Fulani Ecotype Chicken, the mean values of Beak Length ranged from 1.53 ± 0.05cm – 1.56 ± 0.05cm, 1.45 ± 0.05cm – 1.58 ± 0.04cm, 1.45 ± 0.03cm – 1.69 ± 0.05cm for male, female and pooled respectively. Coefficient of variation ranged from 26.86% -30.46% for male, 23.82% - 33.61% for female and 26.88% - 30.17% for pooled. No significant differences (P>0.05) was observed between sexes (Table 11).

There was a significant differences ($P< 0.05$) in the beak length of the two ecotypes with Fulani Ecotype Chicken recording the higher value.

Table 6. *Least Square Mean(X), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Beak Length of Yoruba and Fulani Ecotype Chickens*

		Yoruba Ecotype			Fulani Ecotype		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	122	253	78	80	158
	$\overline{X}$ (cm)	1.35	1.39	1.37	1.54	1.56	1.55
	S. D.	0.37	0.37	0.37	0.42	0.41	0.42
	S. E.	0.03	0.03	0.02	0.05	0.05	0.03
	C. V.	27.62	26.80	27.21	27.04	26.60	27.10
Iluju	N	130	123	253	80	75	155
	$\overline{X}$ (cm)	1.42	1.44	1.45	1.56	1.57	1.56
	S. D.	0.36	0.37	0.38	0.43	0.47	0.45
	S. E.	0.03	0.03	0.02	0.05	0.05	0.04
	C. V.	25.49	25.47	26.45	27.48	30.13	28.57
Iresaadu	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	1.28	1.31	1.27	1.53	1.58	1.56
	S. D.	0.30	0.33	0.28	0.47	0.38	0.42
	S. E.	0.03	0.03	0.02	0.05	0.04	0.03
	C. V.	22.56	25.47	21.82	30.41	23.82	26.88
Onipaanu	N	126	123	249	76	73	149
	$\overline{X}$ (cm)	1.50	1.50	1.51	1.66	1.66	1.69
	S. D.	0.42	0.42	0.41	0.44	0.56	0.51
	S. E.	0.04	0.04	0.03	0.05	0.07	0.04
	C. V.	27.86	27.95	27.47	26.86	33.61	30.17
Ibaiyaoje	N	144	125	269	80	79	159
	$\overline{X}$ (cm)	1.44	1.43	1.44	1.53	1.45	1.45
	S. D.	0.42	0.45	0.43	0.47	0.42	0.42
	S. E.	0.03	0.04	0.03	0.05	0.05	0.03
	C. V.	28.74	31.44	30.25	30.46	28.68	28.60

4.7. Femur Length

Mean femur length of FEC and YEC studied are shown in table 7. The value ranged from 11.05 ± 0.08cm – 11.19 ± 0.08cm for pooled, 10.92 ± 0.14cm – 11.19 ± 0.12cm for female and for male; 10.95 ± 0.11cm – 11.26 ± 0.12cm in Yoruba ecotype population. No significant differences ($p>0.05$) was observed between sexes (Table 16) subjectively however males were longer than female in the population. Coefficient of variation ranges from 12.08 % -14.22 cm in male, 11.57% - 13.84% in female and pooled value; 11.92 % - 13.25%

In Fulani Ecotype population, mean value ranged from 10.99 ± 0.19cm – 11.44 ± 0.19cm for male, 10.84 ± 0.20cm – 11.28 ± 0.17cm for female and 10.91 ± 0.14cm – 11.32 ± 0.12cm for pooled. Males were significantly ($P< 0.05$) longer than female (Table 16). Coefficient of variation ranges from 11.22% - 15.50% for male, 10.86% - 16.60% for female and 10.87% - 16.23% for pooled.

Significant differences ($P<0.05$) were observed between the population studied to the advantage of Fulani ecotype chicken (Table 11)

Table 7. *Least SquareMean ($\overline{X}$), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Femur Length of Yoruba and Fulani Ecotype Chickens*

		Yoruba Ecotype			Fulani Ecotype		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	122	253	78	80	158
	$\overline{X}$ (cm)	11.26	11.06	11.19	10.99	10.84	10.91
	S. D.	1.36	1.31	1.33	1.70	1.80	1.77
	S. E.	0.12	0.12	0.08	0.19	0.20	0.14
	C. V.	12.08	11.84	11.92	15.50	16.60	16.23
Iluju	N	130	123	253	80	75	155

	$\overline{X}$ (cm)	10.95	10.92	10.95	11.36	10.94	11.12
	S. D.	1.28	1.51	1.37	1.35	1.57	1.48
	S. E.	0.11	0.14	0.09	0.15	0.18	0.12
	C. V.	11.69	13.84	12.50	11.89	14.39	13.31
	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	11.06	11.15	11.10	11.20	11.28	11.32
Iresaadu	S. D.	1.57	1.32	1.47	1.44	1.45	1.42
	S. E.	0.14	0.12	0.06	0.17	0.17	0.12
	C. V.	14.22	11.83	13.25	12.84	12.87	12.58
	N	126	123	249	76	73	149
	$\overline{X}$ (cm)	10.97	11.15	11.05	11.26	11.25	11.22
Onipaanu	S. D.	1.35	1.35	1.34	1.26	1.22	1.22
	S. E.	0.12	0.12	0.08	0.14	0.14	0.10
	C. V.	12.26	12.12	12.14	11.22	10.86	10.87
	N	144	125	269	80	79	159
	$\overline{X}$ (cm)	11.07	11.19	11.11	11.44	11.04	11.23
Ibaiyaoje	S. D.	1.35	1.29	1.34	1.69	1.60	1.67
	S. E.	0.11	0.12	0.08	0.19	0.18	0.13
	C. V.	12.24	11.57	12.05	14.79	14.52	14.89

4.8. Crus Length

Table 8 represents the descriptive statistics of crus length of Yoruba and Fulani Ecotype Chicken. The value ranged from 1.41 ± 0.02cm – 1.47 ± 0.02cm in male, 1.45 ± 0.02cm -1.49 ± 0.02cm in female and 1.44 ± 0.02cm to 1.47 ± 0.02cm for pooled in the Yoruba Ecotype Chicken. No significant differences (P>0.05) was observed between sexes (Table 16). Males were generally variable than female.

In Fulani Ecotype Chicken, mean value ranged from 1.48 ± 0.04cm – 1.60 ± 0.03cm for male, 1.45 ± 0.03cm – 1.58 ± 0.03cm for female and 1.51 ± 0.03cm – 1.59 ± 0.02cm for the pooled. There was no significant difference (P > 0.05) observed between sexes (Table 16) and coefficients of variation were higher in female than male.

Fulani ecotype chickens were significantly (P < 0.05) longer than their Yoruba counterpart (Table 11) .Yoruba ecotype are more variable than Fulani ecotype chickens.

Table 8. *Least Square Mean ($\overline{X}$), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Crus Length of Yoruba and Fulani Ecotype Chickens*

		Yoruba Ecotype			**Fulani Ecotype**		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
	N	131	122	253	78	80	158
	$\overline{X}$ (cm)	1.41	1.48	1.44	1.48	1.45	1.51
Ikoyi	S. D.	0.27	0.25	0.26	0.31	0.31	0.31
	S. E.	0.02	0.02	0.02	0.04	0.03	0.03
	C. V.	19.41	16.76	18.19	21.09	20.00	20.82
	N	130	123	253	80	75	155
	$\overline{X}$ (cm)	1.46	1.48	1.47	1.55	1.56	1.56
Iluju	S. D.	0.23	0.25	0.25	0.30	0.27	0.29
	S. E.	0.02	0.02	0.02	0.03	0.03	0.02
	C. V.	16.05	17.11	17.02	19.59	17.59	18.64
	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	1.47	1.45	1.47	1.60	1.58	1.59
Iresaadu	S. D.	0.23	0.27	0.25	0.24	0.25	0.24
	S. E.	0.01	0.02	0.02	0.03	0.03	0.02
	C. V.	15.74	18.66	16.78	15.33	15.80	15.08
	N	126	123	249	76	73	149
	$\overline{X}$ (cm)	1.43	1.47	1.46	1.55	1.56	1.54
Onipaanu	S. D.	0.25	0.27	0.26	0.28	0.31	0.29
	S. E.	0.02	0.02	0.02	0.03	0.04	0.02
	C. V.	17.60	18.34	17.91	18.34	19.765	19.04
	N	144	125	269	80	79	159
	$\overline{X}$ (cm)	1.47	1.49	1.47	1.58	1.55	1.56
Ibaiyaoje	S. D.	0.23	0.24	0.24	0.24	0.27	0.26
	S. E.	0.02	0.02	0.01	0.03	0.03	0.02
	C. V.	15.75	16.27	16.06	15.08	17.61	16.40

4.9. Tarsometatarsus Length

Summary of descriptive statistics for tarsometatasus length of the two population studied are presented in Table 9. In the Yoruba Ecotype Chicken, the pooled values ranged from 1.48 ± 0.02cm – 1.49 ± 0.02cm with 1.46 ± 0.02cm-1.49 ± 0.02cm for male and 1.46 ± 0.02 – 1.51 ± 0.02cm for female. The coefficient of variation for male ranged from 16.91%-18.85%, and for female; 15.39% - 17.58%. No significant differences (P > 0.05) were observed between sexes of the Yoruba Ecotype Chickens (Table 12).

In Fulani Ecotype Chicken value for male ranged from 2.43 ± 0.03cm -2.53 ± 0.03cm, Female; 2.44 ± 0.04cm -2.54 ± 0.03cm. No significant differences (P > 0.05) was observed between sexes (Table 11). Coefficient of variation ranged from 10.95% - 13.58% in male and 11.79% -17.61% in female. Female are generally variable than male in Tarsometatarsus Length.

Significant differences (P > 0.05) existed between means of the two ecotypes population (Table 11) with Fulani Ecotype Chicken being superior to Yoruba Ecotype Chicken.

Table 9. *Least Square Mean ($\overline{X}$), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Tarsometatarsus Length of Yoruba and Fulani Ecotype Chickens*

		Yoruba Ecotype			Fulani Ecotype		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	127	253	78	80	158
	$\overline{X}$ (cm)	1.46	1.51	1.48	2.49	2.48	2.49
	S. D.	0.28	0.23	0.26	0.32	0.32	0.33
	S. E.	0.02	0.02	0.02	0.04	0.04	0.03
	C. V.	18.85	15.39	17.24	12.79	12.99	13.08
Iluju	N	130	123	253	80	75	155
	$\overline{X}$ (cm)	1.50	1.46	1.49	2.46	2.48	2.47
	S. D.	0.27	0.25	0.26	0.33	0.29	0.31
	S. E.	0.02	0.02	0.02	0.04	0.03	0.03
	C. V.	18.25	16.79	17.29	13.58	11.79	12.72
Iresaadu	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	1.48	1.50	1.48	2.43	2.48	2.46
	S. D.	0.25	0.25	0.26	0.29	0.35	0.02
	S. E.	0.02	0.02	0.02	0.03	0.04	0.03
	C. V.	16.91	16.85	17.30	11.90	14.18	12.89
Onipaanu	N	126	123	249	76	73	149
	$\overline{X}$ (cm)	1.47	1.48	1.48	2.53	2.44	2.48
	S. D.	0.25	0.26	0.25	0.28	0.31	0.31
	S. E.	0.02	0.02	0.02	0.03	0.04	0.03
	C. V.	17.26	17.58	17.09	10.95	12.89	12.50
Ibaiyaoje	N	144	125	269	80	79	159
	$\overline{X}$ (cm)	1.49	1.51	1.49	2.52	2.54	2.54
	S. D.	0.26	0.24	0.26	0.33	0.23	0.27
	S. E.	0.02	0.02	0.02	0.04	0.03	0.02
	C. V.	17.69	15.97	17.08	12.96	17.61	10.65

4.10. Body Length

Means of Body Length of Yoruba and Fulani Ecotype Chicken are shown in Table 10. The value ranged from 16.30 ± 0.16cm – 16.72 ± 0.17cm in male and 16.15 ± 0.18 – 16.65 ± 0.18cm in female of YEC population. Coefficient of variation ranged from 10.99% – 12.08% and 10.92% – 12.47% in male and female respectively. Significant differences (P< 0.05) were observed between mean sexes of the population in terms of body length (table 16). In the Fulani Ecotype Chicken the mean value ranged from 19.29 ± 0.29cm – 18.90 ± 0.26cm in male and 18.63 ± 0.24cm – 19.14 ±0.29cm in female. Significant differences (P< 0.05) was also observed between sexes in favour of male Fulani Ecotype Chicken in all the flocks studied (Table 11). Coefficient of variation ranges from 12.28% - 13.56% in male and 11.41% - 13.73% in female. Significant differences (P<0.05) observed between the mean values of the two population studied was in favour of FEC.

Table 10. *Least Square Mean ($\overline{X}$), Standard Deviation (S. D.), Standard Error (S. E.) and Coefficient of Variation (C. V.) of Body Length of Yoruba and Fulani Ecotype Chickens*

		Yoruba Ecotype			Fulani Ecotype		
Population		**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Ikoyi	N	131	121	253	78	80	158
	$\overline{X}$ (cm)	16.30	16.65	16.43	19.29	18.63	18.98
	S. D.	1.88	1.96	1.91	2.60	2.12	2.41
	S. E.	0.16	0.18	0.12	0.29	0.24	0.19
	C. V.	11.56	11.77	11.65	13.46	11.41	12.70
Iluju	N	130	123	253	80	75	155
	$\overline{X}$ (cm)	16.68	16.15	16.45	18.90	18.97	18.95
	S. D.	1.83	2.01	1.94	2.33	2.60	2.46
	S. E.	0.16	0.18	0.12	0.26	0.30	0.20
	C. V.	10.99	12.47	11.80	12.34	13.73	12.97
Iresaadu	N	127	123	250	75	71	146
	$\overline{X}$ (cm)	16.43	16.54	16.46	18.97	19.14	18.96
	S. D.	1.98	1.88	1.94	2.33	2.42	2.42
	S. E.	0.18	0.17	0.12	0.27	0.29	0.20
	C. V.	12.08	11.38	11.79	12.28	12.63	12.78
Onipaanu	N	126	123	249	76	73	149
	$\overline{X}$ (cm)	16.72	16.40	16.55	19.01	18.98	18.97
	S. D.	1.89	1.99	1.92	2.41	2.48	2.42
	S. E.	0.17	0.18	0.12	0.28	0.27	0.20
	C. V.	11.28	12.10	11.62	12.69	13.07	12.74
Ibaiyaoje	N	144	125	269	80	79	159
	$\overline{X}$ (cm)	16.53	16.53	16.57	18.90	18.56	18.95
	S. D.	1.82	1.81	1.81	2.56	2.36	2.41
	S. E.	0.15	0.16	0.11	0.29	0.27	0.19
	C. V.	11.04	10.92	10.98	13.56	12.51	12.69

Table 11. *Summary of T – Test of Mean Difference between Sexes and Ecotype*

		YORUBA		FULANI		POOLED	
BODY PARAMETER	**FLOCK**	**MALE**	**FEMALE**	**MALE**	**FEMALE**	**YORUBA**	**FULANI**
CHEST CIRCUMFERENCE	Ikoyi	11.00 [a]	10.17 [b]	11.64 [a]	10.53 [b]	10.62 [a]	11.13 [b]
	Iluju	12.26 [a]	11.24 [b]	11.29 [a]	10.77 [b]	11.73 [a]	11.02 [b]
	Iresaadu	12.75 [a]	10.96 [b]	11.49 [a]	10.84 [b]	11.88 [a]	11.10 [b]
	Onipaanu	11.27 [a]	10.59 [b]	11.11 [a]	10.78 [b]	10.90 [a]	10.93 [b]
	Ibaiyaoje	10.74 [a]	10.37 [b]	11.10 [a]	10.93 [b]	10.57 [a]	11.05 [b]
COMB THICKNESS	Ikoyi	0.22 [a]	0.14 [b]	0.38 [a]	0.21 [b]	0.18 [a]	0.30 [a]
	Iluju	0.35 [a]	0.19 [b]	0.25 [a]	0.18 [b]	0.27 [a]	0.22 [a]
	Iresaadu	0.40 [a]	0.17 [b]	0.24 [a]	0.20 [b]	0.29 [a]	0.22 [a]
	Onipaanu	0.28 [a]	0.14 [b]	0.23 [a]	0.17 [b]	0.21 [a]	0.20 [a]
	Ibaiyaoje	0.23 [a]	0.18 [b]	0.22 [a]	0.17 [b]	0.20 [a]	0.19 [a]
WING SPAN	Ikoyi	11.49 [a]	11.31 [b]	12.29 [a]	12.35 [b]	11.43 [a]	12.35 [b]
	Iluju	11.49 [a]	11.35 [b]	11.92 [a]	11.61 [b]	11.41 [a]	11.72 [b]
	Iresaadu	11.38 [a]	11.30 [b]	10.90 [a]	10.83 [b]	11.34 [a]	10.99 [b]
	Onipaanu	11.37 [a]	11.45 [b]	11.04 [a]	11.40 [b]	11.41 [a]	11.14 [b]
	Ibaiyaoje	11.29 [a]	11.11 [b]	11.51 [a]	11.39 [b]	11.19 [a]	11.49 [b]
SPUR LENGTH	Ikoyi	1.05 [a]	1.10 [a]	1.09 [a]	1.06 [a]	1.07 [a]	1.08 [a]
	Iluju	1.09 [a]	1.07 [a]	1.10 [a]	1.09 [a]	1.09 [a]	1.08 [a]
	Iresaadu	1.07 [a]	1.07 [a]	1.09 [a]	1.11 [a]	1.07 [a]	1.11 [a]
	Onipaanu	1.10 [a]	1.09 [a]	1.06 [a]	1.04 [a]	1.10 [a]	1.05 [a]
	Ibaiyaoje	1.09 [a]	1.10 [a]	1.10 [a]	1.14 [a]	1.09 [a]	1.12 [a]
TAIL LENGTH	Ikoyi	13.00 [a]	12.83 [a]	13.29 [a]	13.39 [a]	12.91 [a]	13.38 [b]
	Iluju	13.27 [a]	13.17 [a]	12.05 [a]	11.59 [a]	13.20 [a]	11.79 [b]
	Iresaadu	12.85 [a]	12.98 [a]	12.72 [a]	12.85 [a]	12.91 [a]	12.84 [b]
	Onipaanu	13.25 [a]	13.04 [a]	12.70 [a]	12.30 [a]	13.06 [a]	12.33 [b]
	Ibaiyaoje	12.91 [a]	13.25 [a]	12.31 [a]	12.93 [a]	13.19 [a]	12.75 [b]
BEAK LENGTH	Ikoyi	1.35 [a]	1.39 [a]	1.54 [a]	1.56 [a]	1.37 [a]	1.55 [b]

	Iluju	1.42 [a]	1.44 [a]	1.56 [a]	1.57 [a]	1.45 [a]	1.56 [b]
	Iresaadu	1.28 [a]	1.31 [a]	1.53 [a]	1.58 [a]	1.27 [a]	1.56 [b]
	Onipaanu	1.50 [a]	1.50 [a]	1.66 [a]	1.66 [a]	1.51 [a]	1.69 [b]
	Ibaiyaoje	1.44 [a]	1.43 [a]	1.45 [a]	1.45 [a]	1.44 [a]	1.45 [b]
FEMUR LENGTH	Ikoyi	11.26 [a]	11.06 [a]	10.99 [a]	10.84 [b]	11.19 [a]	10.91 [b]
	Iluju	10.95 [a]	10.92 [a]	11.36 [a]	10.94 [b]	10.95 [a]	11.12 [b]
	Iresaadu	11.06 [a]	11.15 [a]	11.20 [a]	11.28 [b]	11.10 [a]	11.32 [b]
	Onipaanu	10.97 [a]	11.15 [a]	11.26 [a]	11.25 [b]	11.05 [a]	11.22 [b]
	Ibaiyaoje	11.07 [a]	11.19 [a]	11.44 [a]	11.04 [b]	11.11 [a]	11.23 [b]

Means with the same superscript along the same row within ecotype and body parameters are not significantly different (p>0.05).

Table 11Contd. *Summary of T – Test of Mean Difference Between Sexes And Ecotype*

		YORUBA		FULANI		POOLED	
BODY PARAMETER	**FLOCK**	**MALE**	**FEMALE**	**MALE**	**FEMALE**	**YORUBA**	**FULANI**
CRUS LENGTH	Ikoyi	1.41 [a]	1.48 [a]	1.48 [a]	1.54 [a]	1.44 [a]	1.51 [b]
	Iluju	1.46 [a]	1.48 [a]	1.55 [a]	1.56 [a]	1.47 [a]	1.56 [b]
	Iresaadu	1.47 [a]	1.45 [a]	1.60 [a]	1.58 [a]	1.47 [a]	1.59 [b]
	Onipaanu	1.43 [a]	1.47 [a]	1.55 [a]	1.55 [a]	1.46 [a]	1.54 [b]
	Ibaiyaoje	1.47 [a]	1.49 [a]	1.58 [a]	1.55 [a]	1.47 [a]	1.56 [b]
TARSOME-TATARSUS LENGTH	Ikoyi	1.46 [a]	1.51 [a]	2.49 [a]	2.48 [a]	1.48 [a]	2.49 [b]
	Iluju	1.50 [a]	1.46 [a]	2.46 [a]	2.48 [a]	1.49 [a]	2.47 [b]
	Iresaadu	1.48 [a]	1.50 [a]	2.43 [a]	2.48 [a]	1.48 [a]	2.46 [b]
	Onipaanu	1.47 [a]	1.48 [a]	2.53 [a]	2.44 [a]	1.48 [a]	2.48 [b]
	Ibaiyaoje	1.49 [a]	1.51 [a]	2.52 [a]	2.54 [a]	1.49 [a]	2.54 [b]
BODY LENGTH	Ikoyi	16.30 [a]	16.65 [b]	19.29 [a]	16.63 [b]	16.43 [a]	18.98 [b]
	Iluju	16.68 [a]	16.15 [b]	18.90 [a]	18.97 [b]	16.45 [a]	18.95 [b]
	Iresaadu	16.43 [a]	16.54 [b]	18.97 [a]	19.14 [b]	16.46 [a]	18.96 [b]
	Onipaanu	16.72 [a]	16.40 [b]	19.01 [a]	18.98 [b]	16.55 [a]	18.97 [b]
	Ibaiyaoje	16.63 [a]	16.53 [b`]	18.90 [a]	18.86 [b]	16.57 [a]	18.95 [b]

Means with the same superscript along the same row within ecotype and body parameters are not significantly different (p>0.05)

5. DISCUSSION

5.1. Chest Circumference, Comb Thickness and Wing Span

Chest measurements have been reported as a reliable trait in genetic studies of poultry. (Gueye *et al*., 1998, Morathop*et al*., 2007, Fayeye*et al*., 2006, and Raji*et al*., 2009). Male values of Chest Circumference were significantly higher than female values within each ecotypes. The result is in agreement with the reports of Morathop *et al.* (2007) on the ecotype chicken of North of Thailand and Gueye*et al*.(1998)on the mixed population of indigenous chickens of Senegal. In a non-descript population of indigenous chicken in Nigeria, Fayeye*et al.* (2006) reported values of 28.83 ± 3.35 for male and 26.49 ± 2.09cm for female and thus attributed the differences observed to sexual dimorphism that exist in chickens population in favour of male. Similar reports on studies of other poultry species were made in favour of males (Hassan and Adamu, 1997). Raji*et al.* (2009) attributed the differences observed between sexes in Muscovy duck to the more efficient feed conversion of the drake (Male) as reported by Bochno*et al.* (1994). However, value reported for both sexes in this study within each of the ecotype were lower than literature values. Between ecotypes, Fulani were higher than their Yoruba counterpart, this was in agreement with Olawumi*et al.* (2008) and Morathop*et al.* (2007) who also noted differences in chest circumference due to ecotype in their study. Atteh (1990) had earlier observed that Fulani ecotype has a good potential for meat, thus corroborating the observation of this study, as higher Chest Circumference value is an indication of meatiness.

Male values of Comb Thickness were higher than female values within each of the ecotype, this correspond to the findings of Akinokun (1990) and Burke (1994). They attributed the differences to hormonal profile between sexes. No significant differences was observed between ecotype,

however, this contradict the reports of previous studies (Olawumi *et al.,* 2008 and Fayeye *et al.,* 2006) that reported significant differences in favour of Fulani Ecotype.

Fayeye*et al.* (2006) reported 18.80 ± 2.85cm and 16.79 ± 2.75 for wing length of male and female indigenous chicken respectively in a mixed population which is considerably higher than value reported in this study. However, the values reported were very close to the findings of BogaleKilbert (2008) who reported 12.57cm for female and 15.88cm for male. Variation observed between sexes in favour of male within each population was also observed by other workers (Burke, 1994 and Fayeye*et al.,* 2006). They attributed the variation to some occasional practises in some localities where feather are cut at regular intervals to prevents chickens from perching on trees which as resulted to reduced wing growth and consequently made management easy for the rural farmers. Osaiyuwu*et al.* (2010) reported range higher value of Wing Span, than what was obtained in this study, for local chicken ecotypes reared under intensive system of management. Major reason that contributed to the variation observed is the system of management. Birds sampled in this study were maintained under semi extensive system where little or no feed and shelter were provided for the chickens. Several workers have reported that improved system of husbandry led to expression of genetic potential of indigenous chickens (Adebambo*et al.,* 1999 and Msoffe*et al.,* 2002). The superiority of Fulani ecotype in this study contradicts the work of Osaiyuwu*et al.* (2010) that reported higher value for Yoruba ecotype. Raji*et al.* (2009) also reported higher value for wing length in other poultry specie; 31.01 ± 0.10 and 23.99 ± 0.08 for male and female local Muscovy duck respectively.

5.2. Spur Length, Tail Length and Beak Length

Spur Length, Tail Length and Beak Length of Yoruba and Fulani Ecotype Chicken reported in this study are comparable with those reported in literatures (Badubi*et al.,* 2006, BogaleKilbert, 2008 and Morathop*et al.,* 2007). BogaleKilbert (2008) reported lower values of Spur Length of 0.27cm for female and 0.53cm for male. The values of Tail Length as reported by Badubi*et al.* (2006) were similar to the mean values of Yoruba Ecotype Chicken reported in this study and closely related to what obtained in Fulani Ecotype Chickens. There was no significant sex differences observed in this study and this contradicted work of Badubi*et al.* (2006). However, Fulani had higher value of Tail Length than their Yoruba Ecotype chickens counterpart.

The values of Beak length reported for Yoruba and Fulani Chicken Ecotypes were within the range reported by Osaiyuwu*et al.* (2010) for Fulani and Yoruba Ecotype chickens managed under intensive system of husbandry. Beak is a feature of poultry birds that enable them to be more adapted to scavenging under extensive system but generally discouraged under intensive system because of vice habit within the flock.

5.3. Femur Length, Crus Length, Tarsometatarsus Length and Body Length.

Gueye*et al.* (1998) reported 10.40 ± 1.57cm and 9.5 ± 1.15cm as mean femur length for male and female indigenous chickens of Senegal which were comparable to the mean values obtained for Yoruba ecotype in this study. Non significant differences as observed between sexes disagrees with the work of Gueye*et al.* (1998) that observed significant differences between sexes in Femur Length.

Value reported for crus length by Gueye*et al.* (1998) were slightly lower than what was reported in this study for Yoruba and Fulani Ecotype Chickens. Effect of sex was not significant within each of the population for Crus Length as was observed for other parameters. However Fulani ecotype was significantly longer in crus length than Yoruba.

No significant differences were observed in the Tarsometatarsus Length between sexes in each of the population and this contradicts the result of Gueye*et al.* (1998) that noted significant differences in favour of males.

There was a similarity between Botswana indigenous chicken and Nigeria indigenous chicken with reference to Body Length. Badubi*et al.*(2006) reported range of 15.6 ±4.1cm- 19.2 ± 2.7cm and 15.3 ±4.9cm – 20.7 ±4.1cm as body length for female and male indigenous chickens of Botswana which were comparable to values obtained for both sexes in Yoruba and Fulani Ecotype Chickens. There was a significant variation between sexes in each of the population in favour of male. This was consistent with literature reports (Badubi*et al.,* 2006, BogaleKilbert,

2008). However, the values reported were lower than values reported by Fayeye*et al.* (2006), Gueye (1998) and Morathop*et al.*, (2007).Values for Body Length obtained for other poultry species were also higher as Raji*et al.* (2009) reported 59.25 ± 0.16cm for male and 45.51 ± 0.12cm for female. Fulani Ecotype Chickens were significantly longer than their Yoruba counterparts. Morathop*et al.* (2007) reported significant effect of ecotype on body parameters. Conclusively, Fulani Ecotype Chicken is superior to Yoruba Ecotype Chicken with respect to most of the morphometric traits in this study.

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