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Some Phenotypic Characteristics of the Fulani Ecotype Chicken in
three Selected Local Government Areas of Osun State, Nigeria

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ABSTRACT

Improvement of the domestic chicken has dominated efforts of indigenous breeders in recent times. Three hundred and fifty-seven (357) Fulani ecotype chickens in Osun State were surveyed and assessed for their phenotypic and productive characteristics. Plumage pattern, thigh and shank colour, mature weight (kg), comb size, wattle size, breast length, breast width, leg length (all in cm); egg weight (gm) and clutch size were examined. Plumage pattern was more heterogeneous in hens, which presented a darker colour than cocks. Cream shank was most common in both sexes, while yellow and cream coloured thigh and beak were prevalent in cocks and hens. Mean mature live weight values (kg) were 2.29 and 1.44 for cocks and hens respectively. The comb size, wattle size, breast length, breast width and leg length were 5.17 and 1.65; 4.87 and 1.48; 19.92 and 17.37; 15.10 and 14.13, and 21.01 and 12.06 for cocks and hens respectively. The mean egg weight of the hen was 38.18g with an average clutch size of 6.93. A high level of variability was observed in comb size, wattle size, leg length, egg weight and clutch size as shown by their CV respectively.

Keywords: Egg-production, Fulani-ecotype chicken, Mature-weight, Morphology, Settlement.

INTRODUCTION

A survey (Aphca news, 2006) reported the population of backyard poultry in Nigeria to be 84 million, which amounts to about 60% of the total poultry population in Nigeria. These chickens are largely unimproved and uncharacterized. Their management is simple and free-range.

There are three chicken ecotypes in Nigeria namely the Fulani, the Eastern and the Yoruba. The Fulani ecotype is prevalent in the middle and northern parts of the country but there are pockets of this ecotype among the Fulani descendants in the rural villages of Osun. Various studies on growth (Ibe, 1993; Sola-Ojo and Ayorinde, 2009); egg traits, fertility and hatchability (Peters *et al.*, 2004; Fayeye and Oketoyin, 2006) and phenotypic variations (Mancha *et al.*, 2006; Ajayi and Agaviezor, 2009) have been reported for Nigerian chickens.

Currently, there is paucity of information on the physical characteristics of this ecotype in Osun State. In order to facilitate their efficient utilization, this study attempts to increase current knowledge and database on the phenotypic variations within the indigenous Fulani chicken population in Nigeria.

MATERIALS AND METHODS

The survey was conducted in five settlements namely, Gaa Baba-Bayo, Gaa Abu, and Aba Aro in Orolu; Gaa Koko in Ire and Gaa Powerline in Osogbo. Three hundred and fifty-seven (357) mature chickens in ratio 3 females to one male were assessed. Birds were examined with the help of

owner-farmers early in the mornings before they were released for scavenging. Body measurements taken were Comb Size, Wattle Size, Breast Length, Breast Width, Leg Length (all in cm), Number of Digits, Egg Weight (gm), Mature Weight (kg) and Number of Eggs per Clutch per hen.

Qualitative traits recorded were Shank, Thigh and Beak Colours; and Plumage Pattern. Data analysis was conducted using the SPSS software procedures of ANOVA, descriptive statistics ($p < 0.05$) version 10.0 of 2001.

RESULTS

Table 1 shows the shank, thigh and beak colour characteristics of Fulani chickens in the three selected areas of the state. Cream shank was observed most (57.1% and 54.5%), followed by Yellow (28.6% and 27.3%) and White (14.3% and 11.4%) shank in the cocks and hens respectively. There was no black shank among cocks surveyed.

Thigh presents a different trend as Yellow (71.4%) was most prevalent, followed by Cream (21.4%) and White (7.1%) among cocks. Among the hens however, Cream (40.9%) was most abundant, followed by Yellow (36.4%), White (11.4%) and Black (11.4%) thigh respectively.

Among males Yellow beak was most (57.1%) frequent, followed by Cream, White and Black in equal proportions (14.3%) respectively; while Cream beak (43.2%) was most common among hens, followed by Yellow (31.8%), Black (18.2%) and White (6.8%) respectively. The proportion (14.3-



57.1%) of Cream and Yellow Beak shows that Fulani ecotype is light in beak colour.

Table 2 shows the plumage pattern, by sex and L.G.A. In Orolu, Brown and Red plumage variants occurred most (33.3%) among cocks while Brown and Black colour types were more predominant (44.4 and 33.3 %) among hens respectively. In Ire, Grey and Brown (66.6% and 33.3%) plumage variants were mostly observed among cocks while Brown and Grey (37.5% and 25.0%) plumage were more common among hens. In Osogbo, all observed cocks were Brown in plumage (100%) while Black was most abundant (66.6%) among hens.

Table 3 shows some morphological and productive characteristics of Fulani ecotype chickens in surveyed areas in Osun. ANOVA ($p < 0.05$) shows that cocks are significantly different from hens in all parameters measured. Among cocks, Ire sub-type had the longest breast (23.1 cm), the Orolu and Osogbo sub-types showed the widest breast (15.5 cm and 15.2%) while Osogbo cocks exhibited the longest legs (29.3 cm). Among hens, Osogbo sub-type had the longest breast (18.1 cm) and legs (13.2 cm); and a wider breast (14.2 cm).

Settlements showed significant difference ($p \leq 0.05$) in egg weight, as Orolu and Osogbo sub-types had the heaviest eggs (39.0 and 37.9 gm), followed by Ire (35.6 gm) sub-type respectively. Mean mature weight was 2.29 and 1.44 kg for cocks and hens respectively while Osogbo subtype cocks and hens displayed the heaviest mature weights of 2.40 and 1.50 kg respectively. The hens revealed egg-clutch ranges of either 2 to 6 or 7 to 12 eggs per hen. Each L.G.A. had birds in both clutch ranges. Ire hens gave the highest egg clutch ranges of 4-6 (62.5%) and 9-12 (37.5%) eggs per hen, Ifon hens exhibited 2-6 (44.4%) and 7-12 (55.6%) eggs per clutch, and Osogbo hens showed 2-6 (55.6%) and 7-10 (44.4%) eggs per clutch. The fairly high standard deviation (16.9) observed in egg weight indicate that the ecotype could still be subject to improvement in the trait.

DISCUSSION

Result implies that Fulani chickens are predominantly light in skin colour among chicken ecotypes in Nigeria. This is probably an adaptive feature to the environment of northern parts of Nigeria with high altitude and intense insolation, as against the southern Nigerian chickens that are more adapted to the rain-forest environment and therefore darker in skin colour.

The colour frequency observed on shank and thigh corroborates the report of Mancha, *et al.* (2006) as black predominated among the shank and foot

colouration in hens (10.2%) than cocks (5.8%); although the black shank observed was in minority in the hen population. Similarly, White Shank and Thigh in this survey was lower in proportion (Cocks: 7.1-14.3% and Hens: 11.4%) compared to White Shank and foot (24.3-28.5%) coloration of the northern chicken, while Yellow Shank and Thigh's occurrence was higher (27.3-71.4%) in this survey than for Yellow shank and foot in the northern Fulani chicken (7.9-18.4%) reported by Mancha *et al.* (2006). The cocks were predominantly Greyish and Reddish in plumage (35.7% and 21.4%) and thus light, as there was no black plumage type in areas surveyed. The hens present a mixture of plumage types and therefore more heterogeneous in plumage pattern with Brown (36.3%), White mixed with Black (22.7%), Grey (11.4%) and Red (6.9%) along with their combination with other colours.

This survey reveals there are more chickens with Brown plumage in Jos (43.0% and 37.9%, Mancha, *et al.*; 2006) than Osun in the present study (7.10% and 36.3%). Osun however has more of White chickens (7.10% and 13.6%) than Jos (4.7% and 6.5%). Black hens predominate in Osun (20.5%) than Jos (7.7%). The mean egg weight of 38.2 gm among Osun Fulani hens is higher than 34.4 gm obtained from central Mali hen (Wilson *et al.*, 1987). These body weights are higher than those of southern (Bayelsan) cocks (1.50 kg) and hens (1.23 kg) reported by Ajayi and Agaviezor (2009); Tanzanian cocks (1.95 kg) and hens (1.35 kg) reported by Goromela *et al.* (2009), and Central Mali adult cocks (1.60 kg) and hens (1.02 kg) as reported by Wilson *et al.* (1987). The proportion of hens in both clutch groups were equal, but about 26.8% of the hens layed less than 6 eggs per clutch while about 56.3% layed 7-12 eggs per clutch in Jos chickens (Mancha *et al.*, 2006). The 7-12 clutch size observed in this study is comparable to the mean eggs per clutch (12) reported in the Tanzanian village hen by Goromela *et al.*, (2009). The mean clutch size of 6.93 obtained in this survey is lower than 8.8 eggs/hen reported for the Malian hen by Wilson *et al.* (1987).

CONCLUSION

The Fulani chicken population surveyed was predominantly lighter in skin and beak colour than the Yoruba ecotype, while the study also showed that black hens are numerous among this ecotype in Osun than Jos. Cocks and hens demonstrated sexual dimorphism in body parameters with cocks showing the higher mature weight. The clutch size in this survey was lower than that for Malian hens while the standard deviation suggested that hens could be selected for higher egg weight through breeding.



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Table 1: Body and colour characteristics (%) of Fulani ecotype chickens on free-range management in three selected Local Government Areas of Osun State, Nigeria

Body part	Sex	Settlement	Black	White	Yellow	Cream	Total
Shank	Cocks	Orolu	-	22.2	11.1	66.7	
		Ire	-	-	100	-	
		Osogbo	-	-	-	100	
		Total (%)	-	14.3	28.6	57.1	100
	Hens	Orolu	11.1	14.8	18.5	55.6	
		Ire	-	-	75.0	25.0	
		Osogbo	-	11.1	11.1	77.8	
		Total (%)	6.8	11.4	27.3	54.5	100
Thigh	Cocks	Orolu	-	11.1	77.8	11.1	
		Ire	-	-	100	-	
		Osogbo	-	-	-	100	
		Total (%)	-	7.10	71.4	21.4	100
	Hens	Orolu	14.8	11.1	37.0	37.0	
		Ire	-	12.5	62.5	25.0	
		Osogbo	11.1	11.1	11.1	66.7	
		Total (%)	11.4	11.4	36.4	40.9	100
Beak	Cocks	Orolu	11.1	22.2	66.7	-	
		Ire	33.3	-	66.7	-	
		Osogbo	-	-	-	100	
		Total (%)	14.3	14.3	57.1	14.3	100
	Hens	Orolu	25.9	-	37.0	37.0	
		Ire	-	25.0	50.0	25.0	
		Osogbo	11.1	11.1	-	77.8	
		Total (%)	18.2	6.8	31.8	43.2	100

Notes: Settlements were Gaa Baba Bayo, Gaa Abu and Aba Aro (Orolu); Gaa Koko (Ire) and Gaa Power-line (Osogbo)



Table 2: Plumage pattern of Fulani ecotype chickens on free-range management in three selected Local Government Areas of Osun State, Nigeria

Local Government Area	Plumage pattern	Cocks (%)	Colour Prevalence (%)	Hens (%)	Colour Prevalence (%)
Orolu	Black	-		22.2	
	Black/brown	11.1		7.40	
	Black/cream	-	11.1	3.70	33.3
	Brown	22.2		33.3	
	Brown/black	-		3.70	
	Brown/grey	11.1	33.3	7.40	44.4
	Grey/black	11.1	11.1	7.40	7.40
	Red/black	22.2	-	3.70	
	Red/brown	11.1	33.3	-	3.70
	White	11.1	11.1	2.30	2.30
Ire	Brown	-		12.5	
	Brown/black	-		25.0	
	Brown/grey	33.3	33.3	-	37.5
	Grey/black	33.3		12.5	
	Grey/brown	33.3	66.6	12.5	25.0
	Cream/black	-	-	12.5	12.5
	Red/brown	-	-	12.5	12.5
	White/black	-	-	12.5	12.5
Osogbo	Brown	100.0	100	11.1	11.1
	Black	-	-	22.2	-
	Black/red	-	-	11.1	-
	Black/white	-	-	33.3	66.6
	White	-	-	22.2	22.2
Total	Black	-		18.2	
	Black/cream	-	-	2.30	20.5
	Brown	-		25.0	
	Brown/black	7.10	7.10	11.3	36.3
	Cream/black		-	2.30	2.30
	Grey/black	14.3		6.80	
	Grey/brown	21.4	35.7	4.60	11.4
	Red/black	14.3		2.30	
	Red/brown	7.10	21.4	4.60	6.90
	White	7.10		13.6	
White/black		7.10	9.10	22.7	

Notes: Settlements were Gaa Baba Bayo, Gaa Abu and Aba Aro (Orolu); Gaa Koko (Ire) and Gaa Power-line (Osogbo)



Table 3: Mean of Morphological and productive characteristics of Fulani ecotype chickens on free-range management in three selected Local Government Areas of Osun State, Nigeria

Character	Type	Mean (SE)	CV	Ifon (SD)	Ire (SD)	Osogbo (SD)
Comb Size, cm	Cocks	5.17 (0.23) ^a	15.97	5.84 (1.01)	5.03 (0.00)	5.72(0.18)
	Hens	1.65 (0.09) ^b	34.8	1.48 (0.47) ^b	2.47 (0.18) ^a	1.41 (0.42) ^b
Wattle size, cm	Cocks	4.87 (0.33) ^a	25.4	4.82 (1.40)	4.40 (1.03)	5.72 (0.18)
	Hens	1.48 (0.07) ^b	30.2	1.51 (0.50)	1.33 (0.43)	1.41 (0.42)
Breast length, cm	Cocks	19.9 (0.54) ^a	10.1	19.1 (1.10) ^b	23.1(0.64) ^a	19.1 (0.26) ^b
	Hens	17.4 (0.24) ^b	9.24	17.3 (1.75) ^b	16.7 (0.74) ^b	18.1 (1.55) ^a
Breast width, cm	Cocks	15.1 (0.24) ^a	10.1	15.5 (0.56) ^a	13.7 (0.44) ^b	15.2 (0.46) ^a
	Hens	14.1 (0.23) ^b	10.6	14.6 (1.32) ^a	13.1 (1.86) ^b	13.7 (1.16) ^b
Leg length, cm.	Cocks	21.0 (2.19) ^a	38.9	19.7 (9.38) ^b	19.4 (1.46) ^b	29.3 (0.18) ^a
	Hens	12.1 (0.43) ^b	23.7	11.4 (3.45) ^b	13.1 (1.11) ^a	13.2 (0.34) ^a
No. of digits	Cocks	4.93 (0.07) ^a	5.42	4.89 (0.33)	5.00 (0.00)	5.00 (0.00)
	Hens	4.02 (0.02) ^b	3.74	4.00 (0.00)	4.13 (0.35)	4.00 (0.00)
Mature weight, kg	Cocks	2.29 (0.07) ^a	12.0	2.28 (0.31)	2.27 (0.31)	2.40 (0.14)
	Hens	1.44 (0.03) ^b	12.9	1.43 (0.19)	1.40 (0.21)	1.50 (0.14)
Egg weight, gm	Hens	38.2 (1.81)	31.4	39.0 (14.1) ^a	35.6 (8.63) ^b	37.9 (7.49) ^a
Mean eggs /clutch/hen	Hens	6.93 (0.34)	32.7	7.33 (2.30)	6.25 (2.32)	6.33 (2.06)
Egg clutch Range	Range	2-6 eggs		2-6	4-6	2-6
	%	50		44.4	62.5	55.6
	Range	7-12 eggs		7-12	9-12	7-10
	%	50		55.6	37.5	44.4