



Plumage Characteristics of Indigenous Chickens in Borno State, North East Nigeria

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Abstract

Plumage characteristics were studied on 600 indigenous chickens in Borno State, Nigeria. The plumage colours were ash, black, black with white stripes, brown, brown red, multicolour, red, white, white with black stripes, yellow and others. Their respective frequency distribution were 6.8 %, 10.7 %, 8.2 %, 7.5 %, 3.8%, 31.3 %, 4.0 %, 12.5 %, 3.3%, 2.7 % and 9.2%. The feather characteristics studied in the chickens were normal feather, naked neck, frizzle feather, silky and feather crestedness. Their frequencies were 43.0 %, 16.0 %, 24.3 % and 16.7 %, respectively. Chickens without crest and with crest had 78.0 % and 22.0 %, respectively. Plumage colour distribution of indigenous chickens in Borno State is highly variable. Multicolour birds were most frequent. Aside, white birds abound in the Central part contrary to the Southern part with abundant black birds. Large variation in feather colour revealed much genetic dilutions within the indigenous chickens. Normal feathered birds were predominant while frizzle feathered, silky and naked neck were scanty. The normal feathered and naked neck had more cocks while more frizzle hens were in abundant. Silky had 50 – 50 for both sexes. Larger percentages of the birds were without crest while the crested birds were abundant in the southern part. Most likely, the scale of preference weighed heavily against chickens with these features.

Key words: indigenous chickens, plumage colour, normal feathered chickens, naked neck, frizzle feathered chickens

Introduction

Indigenous chicken constitutes about 50 percent of the 120 million poultry birds found in Nigeria (FOS, 1996). They are known for adaptation superiority in terms of resistance to diseases and other harsh environmental conditions (Obioha *et al.*, 1983). There are large variations in morphological appearances of indigenous chickens. These large variations in plumage colour in indigenous chickens may be attributed to geographical situation of a region, isolation, natural and artificial selections and variations of qualitative genes in the indigenous chicken gene pool of a flock (Mengesha and Tsega, 2011). In some parts of the world, the names of indigenous chickens designated based on their plumage colours. In Ethiopia for instance, Tikur, Nech, Key, were chickens with black, white and red plumage colours (Mengesha and Tsega, 2011). As a result, some indigenous chickens were characterized, and the names are mostly designated from their niche areas. Commonly observed plumage colours of indigenous chickens are red, white, black, multicolour, black with red strips, white with red strips and red-brownish.

Despite the fact that these qualitative traits have less economic values for the other segment of the society, socio-cultural believes of most rural community have been highly attracted by these variations in plumage colours (Mengesha and Tsega, 2011). According to Mammo *et al.* (2008), the influences of morphological appearances, particularly plumage colour, are significantly important for price variations of the marketable birds of various ecotypes especially in Ethiopia (Nigussie, *et al.*, 2010a). The authors further reported that those marketable mature birds endowed



with red or white plumage have always 15 to 35 % exceeded price values than birds of different colour. Additionally, both producer-sellers and intermediary traders attached less preference for naked neck chickens. This reason made normal feathered indigenous chickens the most prominent whereas the naked neck and frizzle feathered are rare and almost becoming endangered (Ajayi, 2010). This study therefore was designed to assess the plumage resource characteristics of indigenous chickens of the Central and Southern parts of Borno State, North East Nigeria.

Materials and Methods

Borno State lies between Latitudes 10⁰-13⁰ N and Longitudes 12⁰ – 15⁰ E. This State could be divided into broad relief regions; hilly/mountainous area of generally over 600 m above sea level, which cover the south and southeastern parts of the state; and plains of generally less than 600 m above sea level which dominate much of the central and northern parts of the State. The rainfall varies from 700 to 1000 mm in the southern part and 300 to 500 mm in the north (Ayuba *et al.*, 2003). Three seasons can be identified in the State: the cool dry season (October to March); the hot dry season (April - June); and rainy season (July - September). The hot season mean temperature ranges between 39⁰ and 40⁰ C. Two vegetation zones identified are Sudan and Sahel Savanna. Agriculture of both crops and animals is the mainstay of the economy (Mohammad and Ahmad, 2014).

Data collection

Data were collected on 600 indigenous chickens in both the Central and Southern parts of Borno State. Three Local Government Areas were selected from each of the Central and Southern parts of the State. Qualitative traits colour variations were determined by visual appraisal.

Statistical analysis

Data collected on the qualitative traits were analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. Chi-square was adopted to determine the variation between the observed and expected frequencies.

Distribution of Plumage Colours of Indigenous Chickens In Borno State

Plumage colour distribution of indigenous chickens in Borno State is highly variable (Table 1). Out of the 600 birds investigated, birds with multicolour had highest population (31.3 %). In both the central and southern parts, birds with multicolour abound (34.3 %, 28.35, respectively). However, there were more white (17 %) in the central part. Conversely, birds with black (14.7 %) were in abundant in the southern part. There were equal numbers for brown colour birds (8 %, 7 %) in both parts, respectively. There was significant difference ($p < 0.001$) between the observed number of chickens in the central and southern parts of the state. Although no significant difference was observed in the values observed for the sexes (cocks and hens), there were however more birds with multicolour (32 %) among the hens than the cocks. In contrary, birds with white colour (13.4 %) abound among the cocks.

The plumage colour is second in importance to live weight in affecting market preference of indigenous chickens (Nguissie *et al.*, 2010a). In Northern Ethiopia, both product sellers and intermediary traders attached the highest preference for plumage colours (Mengesha and Tsega, 2011). Such large variation in feather colours revealed that much genetic dilutions have occurred with the indigenous chickens. The highly variable shades of plumage colour observed in this study had earlier been reported by other authors (Orheruata *et al.*, 2004). The predominance of multicolour reported in this study is in line with the works of Orheruata *et al.* (2004). This result is however contrary to the report of Dunya (2011) who reported black (18 %) as the predominant plumage colour for indigenous chickens in some part of Borno state, Nigeria. The differences in



the result of this study and those of other authors may be attributed to genetics, geographical locations as well as system of management of the birds.

Distribution of Feather Characteristics of Indigenous Chickens in Borno State

The frequency distribution of feather characteristics of indigenous chickens in Borno State was presented in Table 2. Normal feather was the predominant birds (43 %). This is followed by the frizzle feathered (24 %), silky (16.7 %) and naked neck (16 %). There was significant difference ($p < 0.001$) between the observed values for birds in the central (61.7 %) and southern (24.3 %) parts. More naked neck (18.3 %), frizzle (28 %) and silky (29.3 %) were observed in the southern part than their respective values in the central part (13.7 %, 20.7 % and 3.0 %, respectively). More cocks were observed among the normal

Table 1: Frequency distribution of plumage colour of indigenous chickens in Borno State

	Central part	Southern part	Total	Male	Female
Observation	300	300	600	322	278
	$X^2 = 113.95^{***}$			$X^2 = 6.93^{ns}$	
Plumage					
Ash	12(4)	29(9.7)	41(6.8)	19(5.9)	22(7.9)
Black	20(6.7)	44(14.7)	64(10.7)	28(8.7)	36(12.9)
BWS	10(3.3)	39(13.0)	49(8.2)	27(8.4)	22(7.9)
Brown	24(8)	21(7.0)	45(7.5)	24(7.5)	21(7.6)
Brown red	8(2.7)	15(5)	23(3.8)	14(4.3)	9(3.2)
Multicolour	103(34.3)	85(28.3)	188(31.3)	99(30.7)	89(32.0)
Red	17(5.7)	7(2.3)	24(4)	14(4.3)	10(3.6)
White	51(17)	24(8)	75(12.5)	43(13.4)	32(11.5)
WWBS	13(4.3)	7(2.3)	20(3.3)	11(3.4)	9(3.2)
Yellow	9(3)	7(2.3)	16(2.7)	8(2.5)	8(2.9)
Others	33(11)	22(7.3)	55(9.2)	35(10.9)	20(7.2)

ns = not significant, *** $p < 0.001$, X^2 = Chi-square

Numbers in parentheses are in percentages

BWS=black with white stripes, WWBS=white with black stripes

Frequency distribution of feather characteristics of indigenous chickens in Borno State

	Central part	Southern part	Total	Male	Female
Observation	300	300	600	322	278
	$X^2 = 152.9^{**}$			$X^2 = 22.13^{***}$	
Feather characteristics					
Normal	185(61.7)	73(24.3)	258(43.0)	140(43.5)	118(42.5)
Naked neck	41(13.7)	55(18.3)	96(16)	69(21.4)	27(9.7)
Frizzle feathered	62(20.7)	84(28)	146(24.3)	60(18.6)	88(31.7)
Silky	9(3.0)	88(29.3)	100(16.7)	53(16.5)	47(16.9)
Crestedness					
Normal	272(90.7)	196(65.3)	468(78)	299(92.9)	69(60.8)



Crested	28(9.3)	104(34.7)	132(22)	23(7.1)	109(39.2)
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** P<0.01, *** P<0.001, X²= Chi-square

feather (43.5 %) and naked neck (21.4 %) than their corresponding hen counterparts (42.5 %, 9.7 %). The higher observed number of frizzle was in favour of the hens (31.7 %) against the cocks (18.6 %). Silky on the other hand was 50 – 50 for both the cock and hen (16.5 %, 16.9 %). There was significant difference (p<0.001) between the value for the two sexes. Larger percentage of the birds (78 %) were normal (without crest) against the birds with crest (22 %). In both the central and southern parts, birds without crest abound (90.7 %, 75.3 %). However, the observed values for birds with crest were more in the southern part (37.7 %) than in the central part (9.3 %). There were more crestless birds in cocks (92.9 %) than hens (60.8 %). The crestedness however was in favour of the hens (39.2 %).

The predominant population of normal feathered birds in this study has equally been reported by other authors (Ajayi, 2010). There were fewer numbers of naked neck, frizzle feathered and silky feathered birds compared with their normal feathered counterparts. The total frequency of chickens carrying the naked neck gene in the population studied was higher than 6 % reported by Gueye (1998). An important reason for this low frequency is that the farmers did not prefer naked neck chickens because of its unthrifty appearance (Akilu, 2007). The frizzle feathered being next to the normal feathered in proportion can be justified by the fact that frizzle and normal chickens are closely related as they share a more recent common ancestor than either shares with any other strains on the phylogenetic tree (Adeleke *et al.* 2011).

Conclusion

Plumage colour distribution of indigenous chickens in Borno State is highly variable. Multicolour birds were most frequent. Aside, white birds abound in the central part contrary to the southern part with abundant black birds. Most hens were multicoloured while the cocks were full of white birds. Normal feathered birds were predominant while frizzle feathered, silky and naked neck were scanty. The normal feathered and naked neck had more cocks while more frizzle hens were in abundant. Silky had 50 – 50 for both sexes. Larger percentages of the birds were without crest while the crested birds were abundant in the southern part. Crestedness favoured the hens.

References

- Adeleke, M.A, Peters, S.A., Ozoje, M.O., Ikeobi, C.P.N., Adebambo, A.O., Olowofeso, O., Bamgbose, A.M. and Adebambo, O.A. (2011). A preliminary screening of genetic lineage of Nigerian local chickens based on blood protein polymorphisms. *Animal Genetic Resources and International Journal* 48:23-28.
- Ajayi, F.O. (2010). Nigerian indigenous chicken: A valuable genetic resource for meat and egg production. *Asian Journal of Poultry Science* 4:164-172.
- Ayuba, H. K., Aji, Y. M. and Msheliza, D. S. (2003). *Cultural Dynamics in Resources Utilization, Conservation and Management among Rural Communities in Borno State*. Salone Psycho-Educational Services, Maiduguri, Borno State, Nigeria pp98.
- Dunya, M. A. (2011). Phenotypic characterization of indigenous chickens in Borno state, Nigeria in relation to agro-climatic variation and management practices. Masters Degree Dissertation, Department of Animal Science, University of Maiduguri, Nigeria.
- FOS, 1996). Federal Office of Statistics annual abstract of statistics. FOS Lagos, Nigeria



- Gueye, e.f., Ndiaye, A. and Branckaret, R.D.S. (1998). Prediction of body weight on the basis of body measurements in mature indigenous chickens in Senegal. *Livestock research for rural Development* 10:3.
- Mammo, M., Berhan, T. Tadella, D.(2008). Village chicken characteristics and their seasonal production situation in Jamma District, South Wollo, Ethiopia. *Livestock Research for Rural Development* 20-126.
- Mengesha, M. and Tsega, W. (2011). Phenotypic and genotypic characteristics of indigenous chickens in Ethiopia: A review. *African Journal of Agricultural Research* 6(4):5398-5404.
- Mohammad, D. T. and Ahmed, F. F. (2014). The effect of insurgency on Borno State economy (2008-Oct. 2014). *Journal of Economics and Sustainable Development*, 6(16): 94-102.
- Nigussie, D., Liebeth, H., Van der, W., Tadella, D., Johan, A.M., Van, A. 2010a). Production objectives and traits preferences of village poultry village producers of Ethiopia: implications for designing breeding schemes utilizing indigenous chicken genetic resources. *Tropical Animal Health Production* 42(7):1519-1529.
- Obioha. L.A, Orheruata, F.C., Nwosu, C.C., Gowen, F., Etim, D.B., Obanu, Z., Themelandi, E. and Onuara, G.I. (1983). Comparative meat yield and arthropometric indices of the Nigerian native chicken and an exotic strain. *World Review of Animal Production* 19(1):58-64.