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Phenotypic Characterization of Local Chickens in Dekina

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Abstract: The study was conducted to characterize Local chickens of Dekina based on some phenotypic traits. A total of two thousand four hundred and twenty (2, 420) mature scavenging local chickens were covered. The most predominant plumage colour, shank colour and comb type were brown (41.75%), yellow (40.50%) and single (51%), respectively. Mean bodyweight of mature males (1.32 ± 0.02 kg) was significantly ($p < 0.05$) heavier than the mean of mature females (1.05 ± 0.01 kg). Males were also superior to females in other body parameters measured. Mean egg weight was (28.95 ± 1.21 g). Mean clutch size (7.20 ± 0.20), clutches per hen per year (3.10 ± 0.10) and hatchability of $69.30 \pm 1.60\%$ were recorded. Positive and significant ($p < 0.05$) correlation were found between body weight and egg weight and body weight and clutch size. The study showed that the local chickens in Dekina are of the light ecotype class that can be improved by selection and other breeding strategies.

Key words: Dekina, native chickens, characterization, improvement

INTRODUCTION

All over the developing countries, poultry production has been divided into commercial and traditional sub-sectors (Mbugua, 1990). Each of them has its own peculiarities that make them special to the national food security. The traditional sub-sector consists of Local or native chickens which has not been classified into breeds, although there are many ecotypes.

The local chicken constitutes 80% of the 120 million poultry birds found in Nigeria. They contribute substantially to annual egg and meat production (up to 90%) for family consumption and for sale (Nwakpu *et al.*, 1999; Fayeye *et al.*, 2005). The Local chicken manifest a great deal of variation which is due to genetic and environmental factors (Olori and Sonaiya, 1992), hence they are reservoirs of genetic materials for genetic studies, improvement, preservation and conservation. Studies have been conducted on Local chickens in some parts of Nigeria (Sonaiya *et al.*, 1998; Mbap and Zakar, 2000). However, no attempt has ever been made to study the local chicken populations in remote areas of Dekina, Nigeria. It is believed that in remote areas, genetic originality may still be found.

The aim of this study was to characterize the local chicken of Dekina based on some phenotypic traits.

MATERIALS AND METHODS

The study was conducted in Dekina Local Government Area of Kogi State, Nigeria. Dekina is on Long. $7^{\circ} 0' 6''$ N, Lat. $6^{\circ} 43' E$ in the Southern guinea Savannah ecological zone of Nigeria. The location lies within the warm humid climate of the North Central zone with a clear distinctive dry and wet season dichotomy. It has an average annual temperature of $27^{\circ}C$ with high level of uniformity

throughout the year. Annual temperature does not exceed $38^{\circ}C$, while annual rainfall of 1260 mm is common with peaks in the month of July and September. Dekina, which occupies a total land area of about 5,091 square kilometers is probably the largest local government area in Nigeria. It is made up of 3 districts (Biraidu, Okura and Dekina) with 10 council wards.

Animals used for the study were scavenging local chickens kept by the farmers in the study area. One hundred farm families who kept local chicken were randomly selected and their birds studied. A total of two thousand four hundred and twenty (2, 420) mature local chickens were covered in the study. The data captured body parameters such as plumage colour, shank colour, comb type, body weight, body length, breast length, breast girth, shank length, beak length, comb length and egg parameters like clutch size, clutches/hen year, egg weight, egg length, egg width and hatchability of eggs. Data were analyzed by descriptive statistics and Pearson correlation using SPSS 14 (2004).

RESULTS

Colour variation of plumage and shank with comb type is shown in Table 1. Brown (41.75%), Brown/black (35.50%), Black (10.25%), Black/white (6.50%), Brwn/black/white (3.25%) and white (2.75%) were the possible plumage colour of local chickens available in Dekina. The shank colours varied from white (8.5%), black (13.75%), Black/yellow (37.25%) to yellow (40.50%). The predominant comb type was single (51.00%), followed by pea (28.00%) and then Rose comb (21.00%).

Table 1: Colour variation of plumage and shank with comb type of Local chicken of Dekina

Characteristic	Percentage
Plumage colour	
Brown/black	35.50
Brown	41.75
White	2.75
Black/white	6.50
Black	10.25
Brown/back/white	3.25
Shank colour	
Black	13.75
Yellow	40.50
Black/yellow	37.25
White	8.50
Comb type	
Pea	28.00
Single	51.00
Rose	21.00

Table 2: Mean phenotypic variants in body measurements of local chicken of Dekina

Parameter	Male	Female	Overall
Bodyweight (kg)	1.32±0.02 ^a	1.05±0.01 ^b	1.18±0.01
Body length (cm)	38.45±0.50 ^a	33.87±0.45 ^b	33.80±0.50
Breast length (cm)	15.20±0.15 ^a	13.49±0.12 ^b	14.30±0.11
Breast girth (cm)	32.37±0.50 ^a	28.06±0.32 ^b	31.50±0.33
Shank length (cm)	6.23±0.13 ^a	4.89±0.12 ^b	5.50±0.10
Beak length (cm)	2.21±0.07 ^a	1.65±0.04 ^b	1.95±0.05
Comb length (cm)	2.46±0.10 ^a	1.71±0.08 ^b	2.08±0.03

a,b = Means within rows with different superscripts are significantly (p<0.05) different

Table 3: Mean performance of egg traits in local chickens of Dekina

Characteristic	Estimate
Egg weight (g)	28.95±1.21
Egg length (cm)	7.10±0.04
Egg width (cm)	5.70±0.07
Clutch size	7.20±0.20
Clutches/hen/year	3.10±0.10
Hatchability of all eggs (%)	69.30±1.60

Table 2 presents the mean phenotypic variants in body measurement of the local chickens of Dekina. The mean body weight for males was 1.32±0.02 kg, while that of females was 1.05±0.01 kg. Males were significantly (p<0.05) heavier than females. Male local chickens were also significantly (p<0.05) superior to females in all the body measurements considered.

The mean egg performance traits of local chickens are shown in Table 3. The mean egg weight, egg length, egg width, clutch size, clutches/hen/year and hatchability were 28.95±1.21 g, 7.10±0.04 cm, 5.70±0.07 cm, 7.20±0.20, 3.10±0.10 and 69.30±1.60%, respectively.

Table 4 presents the correlation between body measurements of the local chickens in Dekina. Bodyweight was significantly correlated with body length (0.596*), breast girth (0.704**), shank length (0.641**) and comb length (0.753***). Positively significant correlation was also found between body length and

Table 4: Correlation between body measurements in Local chickens of Dekina

	Body weight	Body length	Breast length	Breast girth	Shank length	Beak length
Body length	0.596*					
Beak length	0.103	0.039				
Breast girth	0.704**	0.101	0.467*			
Shank length	0.641**	0.568*	-0.232	0.249		
Beak length	0.088	0.204	-0.125	0.051	-0.312	
Comb length	0.753***	0.506*	0.135	0.436	0.744***	

*(p<0.05); **(p<0.01); ***(p<0.001)

Table 5: Correlation between egg and body parameters in Local chickens of Dekina

	Egg weight	Egg length	Egg width	Clutch size
Body weight	0.172*	0.116*	-0.080*	0.311*
Body length	0.168*	0.206*	-0.014	0.438*
Breast length	0.016	0.098	0.012	0.115
Breast girth	0.019	-0.012	-0.104	-0.054
Shank length	0.008	0.061	0.073	0.018
Beak length	0.071	0.202	0.101	0.096
Comb length	-0.103	-0.083	-0.036	-0.112

*(p<0.05)

shank length (0.568*), Body length and comb length (0.506*), Breast girth and Breast length (0.467*), shank length and comb length (0.744***).

The correlation between egg and body parameters are shown in Table 5. Generally, there was very weak association between the egg and body parameters measured. However, significant (p<0.05) correlation was found between egg weight and body weight, egg weight and body length, clutch size and body weight, clutch size and body length.

DISCUSSION

In the current study, very diverse plumage colouration was observed among the local chickens of Dekina. Nwosu *et al.* (1985) attributed this to the lack of selection of breeding programme directed towards choice of plumage colour. The commonest comb type was single. This observation agrees with the findings of Smith (2001) and Ikeobi *et al.* (2001) who reported that among the rose, walnut and pea, single is the most common comb type in Nigeria. The high variation in plumage and shank colour and comb type reported in this study is consistent with the findings of MC Ainslie *et al.* (2004) who stated that variation in phenotype is exactly what characterizes local chickens. They further stated that this is probably an expression of high variability at genotype level.

The mean body weight for both sexes combined falls within the range of 0.9-1.8 kg reported by Williamson and Payne (1982). The bodyweight obtained in this study also showed that the local chickens in the study area are of the light ecotype class, as described by Atteh (1990). The study further revealed that the local chickens of Dekina have not undergone appreciable gene mixing

with the exotic breeds, otherwise their body weight could have been high. Sexual dimorphism with respect to body weight was also expected due to differential growth rates of the males and females. The other mean body parameters reported in this study do not agree with the findings of several authors (Ikeobi *et al.*, 1996; Mbap and Zakar, 2000; Fayeye *et al.*, 2006). The most probable reason is that apart from genetic make-up, the environment plays a crucial role in the differences in phenotypic appearance of the chickens.

The mean egg weight reported in this study is close to the 29.37 g reported by Mbap and Zakar (2000). The small egg weight might be due to the effect of breed/strain and environment. With a mean clutch size of 7.20 and number of clutches per year put at 3.10, the average total egg production for the Local chicken of Dekina would be 22 eggs per year. This value is below the range of 30-80 eggs per hen per year reported by Sonaiya (2000). The low egg production could be due to long pauses, periodic broodiness in addition to feed and management limitations (Valle *et al.*, 1988; Sonaiya, 2000). The percentage hatchability ($69.30 \pm 1.60\%$) reported in this study is an indication of good reproductive performance of the local chickens of Dekina.

The positive and significant correlation between body weight with body length, breast girth, shank length and comb length suggests that selection for any of these body parameters will cause direct improvement in body weight. Similar result have been reported by Mbap and Zakar (2000) and Okpeku *et al.* (2003). The significant correlation between body weight and egg weight indicates that egg weight increases with body weight. This report agrees with the findings Ayorinde *et al.* (1998) and Chineke (2001). The positive and significant correlation between body weight and clutch size agrees with the report of Okoh *et al.* (2009). The significant correlation between live weight and egg weight, live weight and clutch size, body length and egg weight and body length and clutch size further reveals some useful indicators of improvement. The implication is that selecting hens with high bodyweight and body length could lead to bigger eggs and higher clutch sizes.

Conclusion: The local chickens of Dekina, although small in size when compared to the exotic breeds have their place in contributing to the genetic pool because of their hardiness and ability to survive and produce under rural, low input conditions. It is possible to improve the local chickens through selection and other relevant breeding strategies, thereby increasing the productivity of the birds. Finally, as a genetic resource, it is inevitably necessary for the local chickens of Dekina to be conserved. This is to preserve and hold in trust the good adaptability genes of the local chickens for the future.

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