PRELIMINARY APPRAISAL OF EGG QUALITY INDICES OF NIGERIAN LOCALLY ADAPTED CHICKENS IN OYO METROPOLIS, SOUTHERN GUINEA SAVANNA ZONE OF NIGERIA

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Abstract

Four hundred and eighty freshly laid eggs comprises of one hundred and twenty eggs of each of Fulani ecotype, naked neck, fizzled and normal feathers eggs were used in evaluating the preliminary appraisal of egg quality indices of Nigerian locally adapted chickens eggs in Oyo metropolis, southern guinea savanna zone of Nigeria for twelve weeks. Data were collated on Egg weight (EW), Egg length (EL), Egg width (EWT), Shell weight (SH), Shell thickness (ST), Yolk weight (YW), Yolk height (YH), Yolk length (YL), Albumen height (AH), Albumen weight (AW) and Haugh unit. Eggs from Fulani ecotype were significant differed in respect to external egg quality of EW (49.44g), EL (60.90mm), EWT (38.53mm) and ST (0.87mm) followed by naked neck eggs with least values obtained for normal feather eggs. However, significant ($P<0.05$) effect of internal egg quality favoured Fulani ecotype eggs of YH (14.89mm), AH (20.08mm), AL (70.20mm) and AW (25.23mm) followed by eggs from naked neck, frizzled with least values of observation for normal feather eggs. It can be concluded that eggs from the four genotypes had good quality characteristics and further improvement might be through crossbreeding of these genotypes especially as Fulani ecotype and naked neck for more productive eggs.

INTRODUCTION

Egg is one of the most essential cheap sources of protein in human diet. Egg is also an essential economic trait generating income instantly through sell of eggs and chickens (Monira *et al.*, 2003; Jones and Musgrove, 2005). In fact, quality of an egg ascertains the success of a poultry business because it is associated with the acceptability among the consumers. Based on consumer needs and likings, the eggs are categorized with respect to shell, albumen and yolk information. Similarly, quality of the eggs from Sudanese indigenous chicken (Mohammed *et al.*, 2005) and Nigerian indigenous chicken (Yakubu *et al.*, 2008) have been already assessed in different locations. Generally, popularity of eggs from native hens is improved among the consumers recent times because they are better in taste and flavor (Mohammed *et al.*, 2005; Dorji *et al.*, 2011) and these eggs fetch higher market prices compared to commercial layer eggs (Mube *et al.*, 2014). Nevertheless, the overall quality of the chicken egg is determined by the external and internal qualities. Both of them are of paramount importance to the egg industry (Roberts, 2004). The appearance of the egg is important for consumer appeal. In fact, egg specific gravity is based on egg size, shell colour, shell breaking strength, shell weight, and shell thickness. For table eggs, shells must be strong enough to prevent failure during packing and/or transportation (Narushin *et al.*, 2004).The external and internal quality of eggs is influenced by a broad range of factors. This is because egg quality criteria includes such diverse and important aspects as safety, nutritional and organoleptic properties or technological properties for cooking, all of which must be controlled from farm to fork (Nys, 2014). Therefore, the aim of the study is to examine the egg quality indices of normal feather, frizzled feather, naked neck and Fulani ecotype chickens in Oyo metropolis, southern guinea savanna environment of Nigeria.

MATERIALS AND METHODS.

Experimental site.

The study was carried out at the Agricultural Education Laboratory unit of Emmanuel Alayande College of Education, Oyo. Oyo State. Oyo lies on the longitude 3° 7' East of Greenwich meridian and Latitude 7°5'North of the equator. It is about 5 kilometers north-eastward from Ibadan the capital of Oyo state. The altitude is between 300 and 600 meters above sea level. The mean annual temperature and rainfall are 27°C and 1247mm respectively (Amao *et al.*, 2013a). This

vegetation is southern guinea savanna zone of Nigeria.

Eggs used

Freshly laid eggs of normal feather, naked neck, frizzle feather and Fulani ecotype were obtained from some backyard rearers and villages around the study area. Ten eggs were obtained from each species weekly for twelve weeks and totaling one hundred and twenty eggs for each species and four hundred and eighty eggs for all the experiment. These fresh eggs are used to evaluate the external and internal egg quality traits.

Collection of Data

The traits that are investigated on weekly bases for ten weeks are; Egg weight (g), Egg length (mm), Egg width (mm), Shell weight (g), Shell thickness (mm), Yolk weight (g), Yolk height (mm), Yolk length (mm), Albumen height (mm), Albumen weight (g) and Haugh unit using the below procedures; Eggs were measured for weight, width and length by digital electronic weighing machine and vernier caliper respectively. The height and length of the albumen and yolk was measured according to Adedeji *et al.* (2015) procedure by spherometer and vernier caliper respectively. The weight and thickness of the shell was determined as it was described by Amao *et al.* (2013b). Haugh unit (HU) for individual egg was estimated by Monira *et al.* (2003): HU= 100 log (H + 7.6 -1.7$W^{0.37}$), Where: HU: is Haugh unit, H: is height of albumen (mm), W: is weight of egg (gm).

Statistical analysis

The data collected were subjected to General linear model analysis of variance procedure of SAS (2009), and means was separated using Duncan procedure of same software. The data were analyzed using the model specified below:

$Y_{ij} = \mu + \alpha_i + e_{ij}$

Where, Y_{ij} = individual observation on eggs

μ = Overall mean

α_i = fixed effect of i^{th} genotype eggs (1, 2, 3, 4)

e_{ij} = Residual random error

Results and Discussion

Table 1 shows the mean values of external egg quality indices of Nigerian local chicken. There are significant ($P<0.05$) differences between the variables measured and the eggs from different genotypes. Fulani ecotype eggs obtained highest values for egg weight, egg length, egg width, shell weight and shell thickness, followed by the naked neck eggs while the least values for all the measured parameters were noted for normal feather eggs. This documentation was in agreement with the reports of Fayeye *et al.* (2005). The authors obtained similar range of values for external egg quality traits for Fulani ecotype. The range of values noticed for the external egg quality indices in this present study was not in line with the findings of Mube *et al.* (2014) who reported lower values for all their variables for local hen eggs in

Table 1: Mean values of external egg quality indices of Nigerian local chicken.

Variables	Fulani ecotype	Naked neck	Frizzled	Normal Feather
EW(g)	49.44±0.44^{a}	45.01±0.37^{b}	43.51±0.37^{c}	41.50±0.41^{d}
EL(mm)	60.09±0.40^{a}	57.65±0.33^{bc}	58.40±0.37^{b}	57.03±0.30^{c}
EWT(mm)	38.53±0.43^{a}	39.08±0.84^{a}	38.50±0.25^{a}	32.72±1.15^{b}
SW(g)	3.23±0.06^{b}	3.45±0.06^{a}	3.01±0.08^{c}	2.92±0.06^{c}
ST (mm)	0.87±0.39^{a}	0.52±0.01^{b}	0.51±0.01^{b}	0.51±0.01^{b}

^{a,b,c,d}Means along the same row with different superscripts are significantly ($P < 0.05$) differed

EW= Egg weight, EL =Egg length, EWT = Egg width, SW = Shell weight, ST = Shell thickness.

Table 2: Mean values of internal egg quality indices of Nigerian local chicken.

Variables	Fulani ecotype	Naked neck	Frizzled	Normal Feather
YH(mm)	14.89±0.13^{a}	13.98±0.16^{b}	14.89±0.13^{a}	13.57±0.14^{c}
YL(mm)	43.46±3.74^{b}	44.80±0.32^{ab}	46.69±0.35^{a}	42.13±0.39^{c}
YW(g)	17.01±0.47^{b}	20.23±0.47^{a}	16.51±0.25^{a}	14.63±0.15^{c}
AH(mm)	20.08±0.78^{a}	10.56±0.02^{c}	19.31±0.08^{a}	11.28±0.75^{b}
AL (mm)	70.20±0.95^{a}	68.09±0.65^{b}	69.52±0.98^{b}	67.83±0.97^{c}
AW (mm)	25.23±0.40^{a}	21.67±0.21^{bc}	22.45±0.36^{b}	20.95±0.91^{c}
HU	103.01±3.99^{b}	111.08±2.25^{a}	103.01±2.47^{b}	104.96±1.26^{b}

^{a,b,c}Means along the same row with different superscripts are significantly ($P < 0.05$) differed.

YH = Yolk height, YL = Yolk length, YW = Yolk weight, AH = Albumen height, AL = Albumen length, AW = Albumen weight, HU= Haugh unit

Cameroon and this might due to the fact of different genotypes and location of the birds. However, the large variation within different egg trait suggests a wide individual variation as may be expected in an unselected flock (Fayeye *et al.*, 2005). The values of external egg quality traits for naked neck, normal feather and frizzle feather in this current study was in accordance to the observation of Udoh *et al.* (2012) for egg quality parameters in three varieties (naked neck, frizzled feather and normal feathered) of local chickens in Akwa Ibom State. Table 2 revealed the internal egg quality indices of Nigerian locally chicken. Significant ($P< 0.05$) effect was observed among the genotype eggs and the variables measured. Eggs from Fulani ecotype had highest values for yolk height, albumen height, albumen length and albumen weight while yolk length was highest for frizzle eggs and yolk weight and haugh unit was better for naked neck eggs with least values for most of the parameters was noted for normal feather eggs. Interestingly, the above observation about internal egg quality indices for local hen in Nigeria was similar to the findings of Udoh *et al.* (2012) for naked neck, frizzled feather and normal feather eggs. Also, Yakubu *et al.* (2008) documented the same ranged of values for naked neck and normal feather eggs while the range of values for Fulani ecotype eggs for internal egg quality traits falls within the ranges noted by Adedeji *et al.* (2015) for local hens in derived savanna zone of Nigeria.

Conclusion

The results of this study revealed that Nigerian local chicken varieties produce egg with varying proportions of variables measured. Fulani ecotype eggs had least total defects score, followed by naked neck, frizzled feather and the highest by normal feathered. Eggs from the four genotypes had good quality characteristics and further improvement might be through crossbreeding of these genotypes especially as Fulani ecotype and naked neck for more productive eggs.

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