

EFFECTS OF LOCATIONS ON PHENOTYPIC CHARACTERISTICS OF TIV CHICKEN ECOTYPE

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Abstract

The experiment was conducted to determine the effect of locations on phenotypic characteristics of Tiv local chicken. Five hundred (500) matured birds from 5 different locations (100 each per location) were used for the experiment. Data were collected on body linear measurements (BLM) and egg quality characteristics (EQC). The BLMs (body length, shank length, wing length, beak length and breast girth) were determined using all the 500 birds however, 250 eggs (50 per location) were used to determine EQC. Data collected were analyzed using Analysis of Variance (ANOVA) and correlation procedure of SPSS Statistical software version 21. The result obtained revealed that location had significant ($P < 0.05$) effects on body parameters measured except on body length and wing length. Birds from locations 1, 2 and 5 had significantly ($P < 0.05$) higher body weight compared to birds in locations 3 and 4. For the egg quality characteristics, location had significant ($P < 0.05$) effect only on egg weight. Bird from location 4 had significantly ($P < 0.05$) higher egg weight (46.48 ± 1.05 g) compared to other locations. From the findings of this research it was recommended that selection of Tiv chicken ecotype should be location driven.

Keywords: body length, correlation, egg weight, egg shape index, shank length, wing length

INTRODUCTION

Indigenous chickens are widely distributed in the rural areas of tropical and sub-tropical countries where they are kept by the majority of the rural poor. Chickens largely dominate flock composition and make up about 98% (Gwaza *et al.*, 2015) of the total poultry numbers (chickens, ducks and turkeys) kept in Africa. Chickens in Africa, particularly in Nigeria are generally hardy, adaptive to rural environments, survive on little or no inputs and adjust to fluctuations in feed availability. In Nigeria, indigenous chickens were characterized along genetic lines of feather and plumage colour (such as normal or frizzled feathered), body structure (such as naked neck, dwarf types and colour variants (such as black, white, brown, mottled etc.). Classification has also been on the basis of agro-ecological zone (Momoh, 2007). Most of the classification base on the different agro ecological zones considered chicken from the same zone irrespective of locations within the zone as one and the same. The objective of the study was therefore to investigate the effects of locations on phenotypic characteristics of Tiv chicken ecotypes.

MATERIALS AND METHODS

The experiment was carried out in five randomly selected locations namely: Cohor, Daudu, Yelwata, Uikpan and Kadarko. Five hundred birds (that is 250 cocks and 250 hens) were randomly selected from each location and used to determine body linear measurements such as body length, shank length, wing length, beak length and breast girth were measured from the birds using measuring tape. However, for the egg quality characteristics, 250 (50 per location) eggs were collected from the five locations and assessed for internal and external characteristics. The external egg quality characteristics such as egg length and egg width were determined using venial caliper, shell weight were determined using sensitive electronic scale while shell thickness was determined using micrometer screw gauge. The internal egg quality characteristics were determined using destructive techniques method as described by Yakubu *et al.* (2008). By this method, eggs were gently broken and poured on a flat container. Vernial caliper was used to determined albumen length, albumin height, yolk height and yolk width.

Experimental Design and Data Analysis

The design of the experiment was Completely Randomized Design (CRD). Stratified random sampling technique was employed for the sourcing of the experimental birds. Data collected on all the parameters of body linear measurement egg quality characteristics were analyzed using Analysis of Variance (ANOVA) and correlation procedure of SPSS Statistical software version 21 (SPSS, 2011).

RESULTS

The effects of locations on body weight and body linear measurements of Tiv chicken ecotype are presented in Table 1. Locations had significant ($P < 0.05$) effects on body parameters measured except on body length and wing length. Birds from locations 1, 2 and 5 had significantly ($P < 0.05$) higher body weight compared to birds in locations 3 and 4. Birds from location 5 had significantly ($P < 0.05$) higher value for shank length while birds from location 1 had the best for breast girth and tail length. Birds from locations 3 and 4 had significantly ($P < 0.05$) higher beak length compared to other locations.

Table 2 present the effects of locations on external and internal egg characteristics. Location had significant ($P < 0.05$) effect on external and internal egg characteristics except on egg weight which was significant. Bird from location 4 had significantly ($P < 0.05$) higher egg weight compared to other locations. This was followed by birds from locations 3 and 5 while birds from location 1 had the least value for egg weight.

DISCUSSION

Body weight and body linear measurements

The observed significant ($P < 0.05$) effects of location on body parameters measured strongly agrees with the report of (Gwaza *et al.*, 2015) who observed that there are variations within and between ecotypes for fertility, embryonic mortality, chick mortality and hatchability. The mean value observed in this research for matured body weight strongly agree 1375g and range of 1310g to 1760g reported by Ukwu *et al.* (2017). Body length observed in this study is higher than 23.97cm with a range of 22.66cm to 25.85cm reported by Mbap and Zakar (2000) as body length for indigenous chicken in Yobe State. The significant ($P < 0.05$) effects of location on shank length in this study disagree with the report of Halima (2007) who reported a non-significant effect of location on shank length. However, the mean value for shank length strongly agree with the value of 8.58 ± 0.12 cm and 10.31 ± 0.16 cm reported by Ukwu *et al.* (2017) for chicken in North Central Nigeria. Wing length obtained in this study is far higher than 14.20 ± 0.21 and 16.36 ± 0.25 cm reported by Ukwu *et al.* (2017). The significant variation in tail length observed in this study strongly agree with the report of Badubi *et al.* (2006) who reported that tail length was significantly ($P \leq 0.05$) different among three locations in Botswana. The tail length obtained in this study is very similar to 17.9 ± 8.7 cm, 12.7 ± 10.1 cm and 22.1 ± 9.2 cm for cocks but higher than 13.3 ± 3.9 cm, 11.4 ± 5.6 cm and 14.3 ± 2.2 cm for hens as reported for Central, Moun and Western regions of Botswana (Badubi *et al.*, 2006).

External and internal egg quality

The mean egg weights obtained in this study strongly agree with the value of 41.6 g reported by (Msoffe *et al.*, 2001). Egg weight is largely affected by environmental factors, feeding, chicken ecotype, age, genetic makeup and parental average body weight. The mean egg length obtained in the present study strongly agree the value (5.15) reported by Yakubu *et al.* (2008) in Nigerian local chicken but higher than 4.83cm reported for Bangladesh indigenous chicken (Saiful and Ripon, 2010). The mean value of egg width obtained in this study is slightly lower than the value (4.10 ± 0.01) reported by Kgwatalala *et al.* (2016) for Botswana indigenous chicken. The egg shape index in this study is slightly higher than 72.60% reported by Yakubu *et al.* (2008) for normal feathered indigenous chickens in Nigeria. The mean value of egg shell weight obtained in this study is slightly lesser than the value of 5.8 ± 20.16 reported by Kgwatalala *et al.* (2016). The slightly lower shell weight recorded in this study could probably be due to the efficacy of the weighing scale used, weight of the eggs and/or the method/period of drying of the shell. The mean value of albumen height in this current

study strongly agrees with the value of 0.651cm reported by Bobbo *et al.* (2013). Also, the mean value of albumen width in this current study is slightly lower than the value (6.25) reported by Bobbo *et al.* (2013) for egg quality characteristics of three phenotypes of local chickens in Adamawa State of Nigeria. Variation in internal characteristics of egg could be due to the freshness of the eggs and the type of feed given

Table 1: The effect of location on the body weight and linear body characteristics of Tiv local chicken ecotype

L	BWT	BL	SL	BG	WL	BKL	TL
1	1625.00±45.14 ^a	50.31±0.97	9.13±0.26 ^{ab}	11.31±0.28 ^a	30.25±0.51	2.76±0.03 ^b	18.06±0.92 ^a
2	1566.67±52.70 ^a	51.38±0.96	9.17±0.18 ^{ab}	10.54±0.15 ^c	30.75±0.45	2.85±0.05 ^{ab}	17.25±0.44 ^{ab}
3	1311.11±42.81 ^b	51.06±1.04	9.00±0.22 ^b	10.44±0.23 ^c	29.67±0.63	2.97±0.05 ^a	16.39±0.48 ^{ab}
4	1330.00±49.86 ^b	50.80±0.91	8.95±0.15 ^b	11.10±0.18 ^{ab}	29.65±0.50	2.98±0.06 ^a	15.60±0.48 ^b
5	1610.00±36.62 ^a	50.25±0.95	9.68±0.14 ^a	10.75±0.09 ^b	29.70±0.70	2.99±0.04 ^a	15.85±0.63 ^b
LOS	*	NS	*	*	NS	*	*

LOS = level of significant, * = significant at 5 percent probability, L = location, BWT = body weight, BL = body length, SL = shank length, WL = wing length, BG = breast girth, BKT = beak length and TL = tail length.

Table 2: Effect of location on the internal and external egg characteristic of Tiv local chicken ecotype

L	EWT (g)	EL (cm)	EW (cm)	ESI (%)	ESW (g)	EST (mm)
1	41.58±0.88 ^c	5.11±0.06	3.86±0.05	75.58±1.11	4.04±0.15	29.38±0.63
2	42.91±0.91 ^{bc}	5.12±0.05	3.85±0.06	75.04±1.15	4.14±0.15	29.14±0.68
3	44.52±1.12 ^{ab}	5.11±0.08	3.81±0.03	74.65±0.85	4.11±0.14	29.19±0.57
4	46.48±1.05 ^a	5.05±0.05	3.86±0.05	76.57±0.96	4.09±0.15	29.48±0.62
5	44.85±0.69 ^{ab}	5.012±0.05	3.77±0.03	75.27±0.97	3.95±0.17	29.00±0.64
LOS	*	NS	NS	NS	NS	NS
L	AL (cm)	AH (cm)	AW (cm)	YH (cm)	YW (cm)	YI (%)
1	7.90±0.21	0.62±0.03	5.41±0.15	1.50±0.03	3.70±0.04	40.610.69
2	7.95±0.21	0.65±0.03	5.50±0.15	1.50±0.03	3.72±0.05	40.560.84
3	7.98±0.19	0.63±0.03	5.49±0.14	1.51±0.03	3.71±0.04	40.640.71
4	7.90±0.21	0.64±0.03	5.43±0.16	1.49±0.03	3.70±0.05	40.220.79
5	7.92±0.20	0.63±0.03	5.47±0.17	1.51±0.03	3.680.05	40.940.78
LOS	NS	NS	NS	NS	NS	NS

LOS = level of significant, * = significant at 5 percent probability, NS = non-significant, L = location, EWT = egg weight, EL = egg length, EW = egg width, ESI = egg shape index, ESW = egg shell weight, EST egg shell thickness, AL = albumen length, AH = albumen height, AW = albumen width, YH = York height, YW = York width and YI = York index.

CONCLUSION AND RECOMMENDATION

The study revealed that location had significant ($P<0.05$) effects on body weight and body linear measurements. However, location had no significant ($P>0.05$) effect on internal and external egg quality characteristics except on egg weight which was significant ($P<0.05$). From the findings of this study, it was concluded that, selection of Tiv chicken should be location driven.

REFERENCES

Badubi, S. S., Rakereng, M. and Maramo, M. (2006). Morphological Characteristics and Feed resources available for indigenous chickens in Botswana. *Livestock Research for Rural Development*. 18(1) <http://www.cipav.org.co/rd/rrd18/1/badu> 18003.html.

5. Bobbo, A. G., Yahaya, M. S. and Baba, S. S. (2013). Comparative assessment of fertility and hatchability traits of three phenotypes of local chickens. *IOSR Journal of Agriculture and Veterinary Science (IOSRJAVS)*, 4 (2): 22-28.
6. Gwaza, D. S., Dim, N. I. and Momoh, O. M. (2015). Morphology and genetic resources of Nigerian local chicken, 1st edition. Lap Lambert Academic Publishers, Deutschland, Germany, 169 pp.
- Halima, H. (2007). Phenotypic and genetic characterization of local chicken population in North West Ethiopia. PhD thesis, University of the Free State. Bloemfontein, South Africa. 175 pp
- Kgwatalala, P. M., Molapisi, M. Thutwa, K., Sekgopi, B., Selemoge, T. P., Nsoso, S. J. (2016). Egg quality characteristics and phenotypic correlations among egg quality traits in the necked neck, normal and dwarf strains of Tswana chickens raised under intensive management system. *International Journal of environmental and Agricultural research (IJOEAR)* 2(8) ISSN 2454-1850
- Mbap, S. T. and Zakar, H. (2000). Characterization of local chickens in Yobe state, Nigeria. In: the role of agriculture in poverty alleviation. (Editors: Abubakar, M.M., Adegbola, T.N. and Butswa, I.S.R) Proceedings of the 34th Annual Conference of the Agricultural Society of Nigeria (ASN) October 15-19, 2000, Bauchi. PP 126 131.
7. Momoh, O. M., Ehiobu, N. G. and Nwosu, C. C. (2007). Egg production of two Nigerian local chicken ecotypes under improved management. Proceedings 32nd Annual conference of Nigerian Society for Animal Production, March 18-22, University of Calabar, Nigeria, pp. 278- 281.
- Msoffe, P. L. M., Minga, U. M., Olsen, J. E., Yongolo, M. G., Juulmadesen, H. R., Gwakisa, P.S. and Mtambo, M. M. A. (2001). Phenotypes including immunocompetence in scavenging local chickens' genotypes in Tanzania. *Tropical Animal Health and Production*. 33: 341-354.
- Saiful, I. M. and Ripon, K. D. (2010). Egg Quality Traits of Indigenous, Exotic and Crossbreed Chickens (*Gallus domesticus L*) in Rajshahi, Bangladesh. *Journal Life Earth Science*, 5:63-67.
- SPSS, (Statistical Package for Social science) (2011). SPSS Inc., (14) 444 Michigan Avenue, Chicago, IL 6061, 2004.
- Ukwu, H. O., Tarhamba, F. and Nosike, R. J. (2017). Comparative study of indigenous chickens in South East and North Central Nigeria: body weight and linear body measurements. *Journal Animal. Production Research*. 29(1):01-08
- Yakubu, A., Ogah, D. M. and Barde, R. E. (2008). Productivity and Egg Quality Characteristics of Free Range Naked Neck and Normal feathered Nigerian indigenous Chickens. *International Journal of Poultry Science*, 7 (6): 579-588.