EFFECT OF AGE ON VISCERAL ORGANS OF NORMAL FEATHERED MALE INDIGENOUS NIGERIA CHICKENS

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ABSTRACT
Male indigenous chickens are more genetically diverse than their female counter parts and age affects the growth, development, anatomy and physiology of animals' internal organs which could as well affect the performance of the farm animals. Evaluating effect of age on visceral organs of normal feathered Nigeria indigenous male chickens could help in selecting those males that can be used or maintained in breeding programmes to assist in achieving sustainable meat and egg production in Nigeria. Thus, this research was aimed to determine the relative weights and sizes of the visceral organs of the normal feathered spurred and non-spurred male Nigeria indigenous chickens. A total number of 40 (20 spurred/ between 1 and 2 years and 20 non-spurred/ below 1 year) normal feathered male indigenous Nigeria chickens were used for the experiment. The results showed a significant ($P<0.05$) difference in the relative weight of large intestine, whole gizzard and stratified squamous epithelial layer of gizzard between the treatments (spurred and non-spurred) with non spurred having the highest relative weight of large intestine, whole gizzard and stratified squamous epithelial layer of gizzard.
Keywords: Indigenous, chicken, spurred, non-spurred, visceral

INTRODUCTION

The indigenous poultry chickens represent valuable resources for livestock development especially in the rural poor; this is because of their extensive genetic diversity which allows for rearing of poultry under varied environmental conditions. (Ajayi, 2010). More than 70% of the family poultry population in Africa is made up of the indigenous chicken types kept in low-input low-output production systems (Kitalyi, 1999). Family poultry is well integrated into most village farming systems, producing 40 to 70 percent of the national meat and egg supply in most tropical countries (Horst, 1988; FAO, 2000). Indigenous chickens possess unique adaptive traits that permit them to survive and reproduce under harsh climatic, nutritional and management conditions typically associated with low input–output production systems (Mwacharo *et al.,* 2007). Local birds are kept by rural smallholders, landless farmers and industrial labourers, because of their scavenging adaptability, production ability and low maintenance cost (Kitalyi, 1998). There are various ecotypes of the indigenous chickens in the different agro ecological zones of Nigeria of which the normal feathered are considered to be the most prominent, where as the naked neck and frizzled feathered are rare and almost becoming endangered and the gene pool they represent may be lost if not characterised and conserved. Among the major advantages of native chickens is general hardiness, ability to adapt to harsh environments, capable to survive on little or no inputs, in terms of feed, medications, shelter (Ajayi, 2010). Native chickens are generally self-reliant, hardy, capable to withstand the harsh climate, minimal management, and inadequate nutrition (Apuno *et al.,* 2011). They survive largely on grasses, seeds, insects and other kitchen and farm wastes (Vietmeyer *et al.,* 1991). Information on the comparisons of growth, carcass and carcass portions in scavenging chickens are limited (Tadelle *et al.,* 2000). Such comparisons may enable policymakers and development agencies to develop informed strategies of improving smallholder poultry production systems.Genetic improvement of farm animals may rely on the use of limited number of males either for natural mating or in artificial insemination programmes. Male indigenous chickens are more genetically diverse than their female counter parts. The male chicken sex chromosomes are ZZ while the female has the ZW chromosomes and the Z chromosome carries more genes than the W chromosome. Though there are breed differences in the development of spurs in male chickens, in general age or maturity of the chicken determines the development of spurs (Mc Bride, 1930). Spur is one of the morphological traits found in indigenous Nigerian chickens. Ijaiya *et al*. (2010) reported that the gene controlling the trait is recessive to its wild allele. Mancha *et al.* (2006) reported 54% occurrence of spur in chickens in

Plateau state, Nigeria while Oguntunji and Ayorinde (2009) reported 37.15% occurrence of spur in Indigenous chickens in Oyo State. Both authors also reported 100 and 70.73% occurrence of spur, respectively in Nigerian male indigenous chickens. Male indigenous chickens usually have developed spurs from the age of one year. It is also a well known fact that age affects the growth, development, anatomy and physiology of animals' internal organs which could as well affect the performance of the farm animals. Therefore evaluation of the internal organs anatomy of the Nigerian indigenous male chickens will help in selecting those males that could be used or maintained in breeding programmes to achieve sustainable meat and egg production in Nigeria. The objective of the study was therefore aimed to determine the relative weights and sizes of the visceral organs of the normal feathered spurred and non-spurred male Nigerian indigenous chickens.

MATERIALS AND METHODS

Experimental Site

Dange-Shuni Local Government Area of Sokoto State, Nigeria was used as the experimental station

Experimental birds

Forty (twenty spurred and twenty non-spurred) normal feathered male indigenous chickens were obtained from eight backyard indigenous chicken farmers within a period of ten weeks. The chickens were managed semi-intensively by the farmers, by which they are normally provided with millet grains, offals from processed grains and kitchen wastes in the morning after been released from their pens and then allowed to extensively scavenge for insects and other palatable materials. The chickens normally return to their provided pens as soon as dusk sets in.The farmers were engaged in a short interactive interview about spur development in Nigerian indigenous chickens of which 100% (all the eight) of the farmers attested to the fact that the spurred chickens were between one and two years (as they hardly keep their chickens above two years), while the non-spurred were below one year of age. Four normal feathered male indigenous chickens comprising of two spurred and two non- spurred were randomly obtained from the eight farmers during each weekly visit.

Data collection and analysis

Measurements of the live body weight (BW) were done using a 20 Kg (Camry Model). mechanical top loading scale with 50 g sensitivity. Internal organs (heart, liver, lungs, kidneys, spleen, total intestines, testes, gall bladder, pancreas and gizzard) weighed. Giblets were heart, liver, lungs, kidneys, spleen and gizzard. Weighing of the internal organs was done using a digital electronic scale with an accuracy of 0.1 g. The length of the intestines was measured using a meter rule. The measurements taken from each organ, except for the body weight (BW) and intestinal length were expressed relative to the live body weight as g/kg BW. The intestinal length was expressed as cm/kg BW. T- test using GenStat (2019) statistical package was used for the analyses of the data. The spurred and non-spurred chickens formed the treatments while the weekly intervals formed the treatment(s) replicates.

RESULTS AND DISCUSSION

The results of relative weights and length of internal organs of the spurred and non-spurred normal feathered Nigeria indigenous male chicken are presented in table 1. There was no significant ($P>0.05$) differences in weight of the proventriculus, gizzard, heart, liver, lungs, gall bladder, pancreas, spleen, kidney, small intestine and testes. Significant ($P<0.05$) difference in weight was observed in the large intestine, stratified squamous epithelial layer and whole gizzard. There was no significant ($P>0.05$) difference between the density of the large and small intestines of spurred and non-spurred indigenous male chickens. Also the large and small intestine lengths do not differ significantly ($P >0.05$).The higher relative weight of the large intestine in the non-spurred male indigenous chicken could mean better absorption of water, electrolytes and enhanced fermentation activity. The lower weights obtained from the whole gizzard and stratified squamous epithelial layer of the gizzard in the spurred chicken may imply lower processing and or grinding of feed materials which could result to lower efficiency of feed utilization. Slightly lower relative weights of the liver and pancrease obtained from the spurred chickens may also imply decreased digestive efficiency of the spurred chickens since liver and pancrease are accessory digestive organs that contribute

immensely to feed digestion and utilization. Slightly lower weight of lungs obtained from the spurred chickens may imply reduced respiratory efficiency of the spurred chickens as a result of ageing.

Table 1: Relative weights and lengths of visceral organs of spurred and non-spurred Nigerian indigenous male chickens

Parameters	Spurred	Non-spurred	P value	LOS
Proventriculus (%)	0.29	0.33	0.72	NS
Large intestine (%)	0.53[b]	0.93[a]	0.02	*
Small intestine (%)	1.78	2.60	0.07	NS
Whole gizzard (%)	1.81[b]	2.59[a]	0.05	*
SSEG (%)	0.16[b]	0.27[a]	0.04	*
Gall bladder (%)	0.05	0.07	0.55	NS
Lungs (%)	0.68	0.96	0.14	NS
Liver (%)	1.77	2.39	0.10	NS
Pancreas (%)	0.13	0.20	0.06	NS
Heart (%)	0.51	0.56	0.23	NS
Spleen (%)	0.24	0.29	0.69	NS
Kidney (%)	0.40	0.40	0.96	NS
Testes (%)	0.77	0.84	0.77	NS
LSI (cm)	128.8	118.8	0.57	NS
LLI (cm)	0.91	0.96	0.83	NS
DSI (g/cm)	0.91	0.96	0.83	NS
DLI (g/cm)	0.22	0.22	0.90	NS

ab: Means values with different superscripts in a row denotes significant ($p<0.05$) difference between means within the same rows. *= significant at 5% level; LOS= level of significance; P= Probability; DLI= density of large intestine; DSI= density of small intestine; LLI= length of large intestine; LSI= length of small intestine; SSEG= stratified squamous epithelial layer of gizzard.

CONCLUSION

Spur development as a result of ageing in Nigerian male indigenous chickens affects relative weights of large intestine, whole gizzard and stratified squamous epithelial layer of gizzard.

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