

LIVE WEIGHT, SERUM BIOCHEMICAL INDICES AND HORMONAL PROFILES OF YEARLING MUSCOVY DRAKES (*CAIRINA MOSCHATA*) IN MAIDUGURI, BORNO STATE, NIGERIA

***Saleh, B., Iliyasu, S.H. & Zoaka, E. M.**

Department of Animal Science, Faculty of Agriculture, University of Maiduguri, Maiduguri, Borno State

**Corresponding Author: Saleh, B. Mobile – 08185927245, email - bbsaleh@unimaid.edu.ng*

ABSTRACT

A study was carried out to determine live weight, serum biochemical indices and hormonal profiles of Muscovy drakes in Maiduguri, Borno state. Fifteen (15) one year old drakes were dewormed and quarantined for a period of two weeks during which they were fed a commercial layer diet (16%CP) and water *ad libitum*. The live weight of each drake was taken before blood collection. Blood samples for serum biochemical analysis and hormonal assay was collected from the wing-vein by means of a sterile disposable (21-gauge) syringe and needle and placed in anticoagulant free samples bottles to obtain serum. Total protein, albumin, globulin, sodium, potassium, chlorine, testosterone, luteinizing hormone (LH) and follicle stimulating hormone (FSH) levels were recorded. Live weight of the drakes ranged from 1800-3900g with an average of 2766.67 ± 139.71 g. The mean levels of total protein, albumin and globulin were 48.67g/l, 17.00g/l and 31.53g/l respectively. Testosterone level of 3.79 ± 0.45 ng/mol, Follicle stimulating hormone (FSH) range of 0.10-1.40mmol/ml with a mean of 0.51mmol/l and mean Luteinizing hormone (LH) of 2.93 ± 0.44 mmol/ml were recorded. A positive relationship was noted between body weight and luteinizing hormone levels while serum protein was negatively related to body weight. It was concluded that the sex hormones levels (testosterone, FSH and LH), testicular morphology and serum biochemical profiles of Muscovy ducks in the semi-arid zones of Nigeria are similar to those reported in literature.

Key Words: Ducks, Serum biochemistry, Testosterone, Follicle stimulating hormone

INTRODUCTION

Ducks have the potential to play an important role with respect to food production and security in Nigeria. With an estimated population of about 9,553,911, ducks are the third most populous poultry in Nigeria (National Bureau of Statistics, 2012). Ducks lay many and large eggs and have rapid growth rate and high dressed weight (Duru *et al.*, 2006). Yakubu (2013) opined that increased duck rearing would be a great addition to total poultry output since they do not interfere with chicken production due to different rearing and scavenging venues. Yakubu (2013) further noted that the morphological, meat and egg attributes of the Muscovy duck readily make it the waterfowl of choice for Nigerian poultry farmers. He concluded that Nigeria needs to take advantage of the economic and nutritional benefits from duck rearing to improve the shortage in the animal protein supply in the family diet. Pym *et al.* (2002) also noted that keeping ducks is one of the possible means of breaking out of the poverty trap for resource poor small holder families in low income countries. Small scale duck farming has not only been proved to be beneficial occupation for small, marginal and landless farmers, but also a potential source of self-employment (Jabber, 2004).

The domestic duck in Borno and elsewhere in Nigeria is the Muscovy duck, of South American origin. It was probably introduced on the sea-coast by the Portuguese and spread inland. Ducks are kept sporadically throughout northeast Nigeria, especially in riverine areas (Blench, 1995). Duck farming is still carried out under extensive management in the form of small family flocks. Low fertility is a major problem in such flocks and the role of drakes in this problem has not been sufficiently studied. Information on blood parameters and reproductive hormone levels of the Muscovy drakes can be used to serve as baseline data to be used in clinical evaluation and improvement in fertility of local stock. This study was therefore designed to determine the relationship among reproductive hormonal profile and serum biochemical parameters of Muscovy drakes in Maiduguri, Borno state.

MATERIALS AND METHODS

The study was conducted at the poultry unit of the Teaching and Research Farm of the Department of Animal Science, Faculty of Agriculture, University of Maiduguri, Borno state – Nigeria. Maiduguri is located between latitude 11° 15 and 12 ° north, longitude 30° 05 and 14° east and at an altitude of 345m above sea level (Raji *et al.*, 2014).

A total of fifteen (15) one year old drakes were purchased from households in Maiduguri and used for the experiment. The drakes were dewormed and quarantined for a period of two weeks during which they were fed a commercial diet (16%CP) and water *ad libitum*.

The live weight of each drake was taken before blood collection using a manual weighing balance to the nearest 50g. To obtain blood samples for sera analyses, the drakes were fasted overnight and 5ml of blood was collected from the wing-vein by means of a sterile disposable (21-gauge) syringe and needle and placed in anticoagulant free samples bottles to obtain serum for serum biochemical analysis and hormonal assay measurements. Total protein, albumin, globulin, sodium, potassium and chlorine levels were estimated through calorimetric method using Digital Vas Ultraviolet Spectrophotometer while testosterone, luteinizing hormone (LH) and follicle stimulating hormone (FSH) were estimated using ELISA kits by a solid phase enzyme immuno-assay. The blood biochemical analysis and hormonal assay were done at the haematology laboratory of the University of Maiduguri Teaching Hospital.

RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics for live weight, serum biochemical indices and hormonal profiles of Muscovy drakes in Maiduguri, a semi-arid environment. The live weight of the drakes ranged from 1800-3900g with an average of 2766.67±139.71g which is similar to the 2.73 kg and 2.2 kg reported for Muscovy drakes in Nigeria by Yakubu (2013) and Ikani (2003) respectively.

The mean levels of total protein, albumin and globulin were 48.67g/l, 17.00g/l and 31.53g/l respectively which were similar to those reported by Olayemi *et al.* (2006) in adult Nigerian ducks. The means for serum sodium and potassium observed in this study was similar to the means (140.00±1.00 mmol/l and 3.77±0.15) observed by Okeudo *et al.* (2008) for Muscovy drakes in southeastern Nigeria.

The testosterone level of 3.79±0.45ng/mol was similar to values reported by Snapir *et al.* (1998) for healthy Muscovy drakes. FSH range of 0.10-1.40mmol/ml with a mean of 0.51mmol/l and LH level of 2.93±0.44 mmol/ml were obtained in this study.

Table 2 shows the correlation between live weight, reproductive hormone levels and serum biochemical profiles of Muscovy drakes. Live weight of the drakes was highly correlated ($r = 0.59$) with LH levels but negatively correlated with total protein ($r = -0.56$) and globulin ($r = -0.57$). A moderate but negative relationship existed between albumin and the total protein. There was a high and positive relationship between globulin and total protein, whereas it was strong but negative between globulin and albumin. This is an expected trend since albumin and globulin are components of total protein. A moderate but negative correlation between sodium and total protein, sodium and albumin were observed. There was a low but positive relationship between potassium and sodium and a moderate but negative relationship between potassium and chlorine.

Table 1: Live weight, Serum Biochemical Indices and Hormonal Profiles of Yearling Muscovy Drakes in Maiduguri

Parameter	Minimum	Maximum	Mean	±SEM
Live weight (g)	1800.00	3900.00	2766.67	139.61
Total protein (g/l)	39.00	69.00	48.67	1.98
Albumin (g/l)	10.00	22.00	17.00	0.84
Globulin (g/l)	17.00	56.00	31.53	2.54
Sodium (mmol/l)	129.00	152.00	141.47	1.88
Chlorine (mmol/l)	89.00	106.00	97.33	1.58
Potassium (mmol/l)	3.20	6.20	4.42	0.25
Testosterone (ng/mol)	1.00	6.60	3.79	0.45
FSH (mmol/ml)	0.10	1.40	0.51	0.09
LH (mmol/ml)	0.10	6.90	2.93	0.44

FSH – Follicle stimulating hormone; LH – Luteinizing hormone

Table 2: Correlation of Some Serum Biochemical Indices and Hormonal Profile of yearling Muscovy Drakes in Maiduguri

Parameter	1	2	3	4	5	6	7	8	9	10
1. Total protein	1									
2. Albumin	-0.49	1								
3. Globulin	0.95**	-0.73*	1							
4. Sodium	-0.35	0.62*	-0.49	1						
5. Chlorine	0.42	0.00	0.31	-0.08	1					
6. Potassium	-0.18	-0.03	-0.12	0.22	-0.30	1				
7. Testosterone	0.13	-0.43	0.26	0.03	-0.37	0.45	1			
8. FSH	0.47	-0.07	0.41	-0.13	0.51	-0.23	0.04	1		
9. LH	-0.41	0.28	-0.45	0.31	-0.17	0.07	0.03	-0.34	1	
10. Live weight (g)	-0.56*	0.31	-0.57*	0.27	-0.02	0.04	0.23	0.04	0.59*	1

*- Correlation is significant at 0.05 level (2 tailed); **- Correlation is significant at 0.01 level (2 tailed)

CONCLUSION AND RECOMMENDATION

It was concluded that the sex hormones levels (testosterone, FSH and LH), testicular morphology and serum biochemical profiles of Muscovy ducks in the semi-arid zones of Nigeria are similar to those reported in literature. A positive relationship was noted between body weight and luteinizing hormone levels while serum protein was negatively related to body weight.

REFERENCES

- Blench, R. M. (1995). A history of domestic animals in North eastern Nigeria. *Cah. Sci. Hum.* 37 (1): 787-237.
- Duru, S., Akpa, G. N., Sai'du, L., Olugbemi, T. S. and Jokthan, G. E. (2006). A preliminary study on duck management under peri-urban system. *Livestock Research for Rural Development* 18: <http://www.lrrd.org/lrrd18/3/duru18036.htm>. Accessed 14th September, 2019.
- Ikani, E. I. (2003). Duck production in Nigeria. National Agricultural Extension and Research Liaison Services, Ahmadu Bello University, Zaria Nigeria. Extension Bulletin No. 133, Poultry Series 7. Pp: 31.
- Jabber, M. A. (2004). Smallholder livestock for poverty alleviation: issues and prospects. Keynote paper presented at BARC, Dhaka.
- National Bureau of Statistics [NBS] (2012). National Bureau of Statistics/Federal Ministry of Agriculture and Rural Development Collaborative Survey on National Agriculture Sample Survey (NASS), 2010/2011-Draft Report. May, 2012.
- Ogah, D. M. and Musa, I. S. (2011). Evaluation of growth and egg production traits between first and second laying cycle in two ecotypes of Muscovy duck. Proceedings of the 18th International Conference, KRMIVA, June 8-10 2011, Croatia.
- Olayemi, F. O., Ojo, E. O. and Fagbohun, O. A. (2006). Comparative study of the hematological and plasma biochemical parameters in the Nigerian duck (*Anas platyrhynchos*) and the Nigerian laughing dove (*Streptopelia senegalensis*). *Veterinary Archives*, 76:145-151.
- Pym, R. A. E., Lanada, E. B. and Morbos, E. Y. (2002). Case studies of family poultry development. 2nd INFPD-FAO, Electronic conference. May 13-July 5, 2002.
- Raji, A.O., Adamu, S.B. and Babangida, S. (2014). Growth performance of the Japanese quail in a semi-arid area of Nigeria. *Africa Journal of Animal and Biomedical Sciences*, 8(1): 1 – 10.
- Snafir, N., Rulf, J., Meltzer, A., Gvaryahu, G., Rozenboim, I. and Robinzon, B. (1998) Testosterone concentrations, testes weight and morphology of mule drakes (Muscovy drake X Khaki Campbell), *British Poultry Science*, 39:4, 572-574, DOI: 10.1080/00071669888791
- Yakubu, A. (2013). Characterisation of the local Muscovy duck in Nigeria and its potential for egg and meat production. *World's Poultry Science Journal*, 69: 931 – 938.