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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

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Carcass and Organ Characteristics of Muscovy Ducks Reared under Three Management Systems in South Eastern Nigeria

I.F. Etuk, S.F. Abasiekong, G.S. Ojewola and S.C. Akomas
Department of Non-Ruminant Animal Production, College of Animal Science And Animal Health,
P.M.B. 7267, Michael Okpara University of Agriculture, Umudike, Umuahia, Abia State, Nigeria

Abstract: An experiment was conducted to evaluate carcass parameters of muscovy ducks reared under semi intensive system (SI), intensive system with wallow (IW) and intensive system without wallow (IO) in a randomized complete block design (RCBD). Thirty six ducks (18 males and 18 females) were slaughtered from the three treatments comprising 3 males and three females from each of two replicates of a treatment selected randomly at the age of 20 weeks. Carcass yield, thigh muscle weight and breast muscle weight of ducks under intensive systems were significantly higher ($P<0.05$) than those of ducks in semi intensive management system. The dressing percentage of male (Drakes) were also numerically higher (72.01 - 74.90) than that of the females (Ducks; 69.09 - 70.98). Ducks and or Drakes raised under the intensive management system (IW, and IO) had a significantly superior dressing percentage (74.94- IW; 72.48- IO) compared with those reared under semi-intensive management system. Weights of thigh muscles and breast muscles of Ducks and or Drakes followed similar trend. Liver weight ranged between 63g- 65.25g (males) and 51g-53g (females), gizzard weights were in the range of 79g-80.50g (males) and 56g-57g (females), while heart weights ranged between 24g-27.50g (males) and 17g-19g (females). No significant differences ($P>0.05$) were observed in these parameters that can be attributed to management systems. In conclusion, rearing Muscovy ducks under intensive system of management produced better carcass yield.

Key words: Muscovy ducks, carcass yield, organ characteristics, management systems

Introduction

Ducks are primarily raised for meat and eggs, although, they provide other materials of economic value such as feathers. Duck meat contains about 20% crude protein and 2% fat (Szasz and Bogenfurst, 1998). Muscovy ducks in particular is a heavy breed mainly used for meat production, since the meat has an appealing look with yellow creamy skin and is firm. Szasz (2003) reported that muscovy is popular due to its red gamy and attractively marbled meat which makes for special delicacy. For many years, ducks has been selected for higher meat yield and lower fat (Baeza *et al*., 2002), and there is relatively moderate effect of selection on meat quality of this species. Earlier study (Carew *et al*., 1998), found that dressing percentage of ducks was about 65%. Ola (2000) observed carcass yield of between 66% and 68% in muscovy ducks bred under semi-intensive system in South western Nigeria. Despite the favourable amino acid profile in duck meat, people of South Eastern Nigeria tend to shy away from duck meat because they feed on dirty materials and are dirty too (Etuk and Abasiekong, 2005). This is as a result of the management system adopted by duck farmers which is mostly extensive. Under such system, ducks are left to scavenge in waste places and to wallow in dirty water as well as eat worms, millipedes and other materials that the people considered dirty. There are certainly no records of growth performance under this system and

Table 1: Experimental Diet used in the Trial

Ingredients	Composition kg/ton
Maize	300
Soya beans	120
Wheat offals	143
Palm kernel cake	110
Brewers dried grain	190
Fish-meal	90
Oyster shell	28
Bone meal	12.3
Salt	2.5
DL-methionine	0.8
Lysine	0.9
Vitamin/Mineral Premix*	2.5
Total	1000.00
Chemical Composition (% of DM)	
Crude Protein	17.00
Crud Fibre	3.81
Ether Extract	8.60
Calcium	0.64
Phosphorus	0.70
ME Kcal/kg	2848.90
Dry Matter (%)	84.81

* Each 2.5 kg contains:Vit. A, 10,000,000 IU; Vit. D3, 2,000,000 IU; Vit. E, 20,000 IU; Vit. K, 2,000 mg; Thiamine (B1), 2,400 mg; Ribfolavin (B2), 4,800 mg; Pyridoxine (B6) 4,800 mg; Niacin, 32,000 mg; Vit. B12, 20 mg; Pantothenic Acid, 8,000 mg; Folic Acid, 800 mg; Biotin 64 mg; Choline chloride, 600 mg; Antioxidant, 125 g; Manganese, 100 g; Zinc, 40 g; Iron, 36 g; Copper, 4 g; Iodine, 1.2 g; Selenium, 200 mg; Cobalt, 200 mg

Table 2: Carcass Composition of muscovy drakes and ducks under three management systems

		SI	IW	IO
Dressing percentage (%)	Male (Drake)	72.01^{b}±0.68	74.90^{a}±0.93	74.68^{a}±0.72
	Female (Duck)	69.09^{b}±0.49	70.98^{a}±0.51	70.28^{a}±0.54
	Mean	70.53^{b}±0.67	74.94^{a}±0.89	72.48^{a}±0.93
Thigh muscle (g)	Male (Drake)	215.50^{b}±6.36	247.50^{a}±8.97	251.00^{a}±4.90
	Female(Duck)	144.50^{b}±4.05	176.75^{a}±6.22	154.75^{b}±4.13
	Mean	180.00^{b}±13.86	212.13^{a}±14.29	202.88^{a}±18.42
Breast muscle (g)	Male(Drake)	269.00^{b}±19.27	341.50^{a}±7.67	325.75^{a}±19.30
	Female (Duck)	160.75^{c}±9.35	229.50^{a}±12.18	201.75^{b}±1.93
	Mean	214.88^{c}±22.72	285.50^{a}±22.18	263.75^{b}±25.08

^{abc}Treatment means with different superscripts along the same row are significantly different (P<0.05)

Table 3: Visceral Organs of Ducks and Drakes under Three Management Systems

Parameters		SI	IW	IO
Liver (g)	Male	63.00±0.71	65.25±0.95	65.00±1.47
	Female	51.00±0.82	52.25±1.18	53.00±1.35
	Mean	57.00±2.32	58.75±2.55	59.00±2.45
Gizzard (g)	Male	80.50±1.56	74.00±2.68	77.00±1.96
	Female	57.75±0.75	56.50±1.19	56.75±1.32
	Mean	69.13±4.37	65.25±3.57	66.88±3.98
Heart (g)	Male	24.00±1.29	26.25±0.85	27.50±0.65
	Female	17.25±1.11	18.50±1.44	19.00±1.23
	Mean	20.63±1.50	22.38±1.66	23.25±1.73
Length of small Intestine (cm)	Male	186.50±2.10	178.00±1.68	182.00±2.45
	Female	169.75±1.65	166.75±0.75	167.00±0.87
	Mean	178.13±3.40	172.38±2.29	174.75±2.99
Length of large Intestine (cm)	Male	13.50±0.50	13.00±0.41	13.00±0.41
	Female	11.75±0.25	11.50±0.50	11.50±0.29
	Mean	12.63±0.42	12.25±0.41	12.25±0.32
Length of Caecum(cm)	Male	33.25±0.48	32.50±0.50	33.25±0.63
	Female	22.50±1.19	22.25±1.65	21.25±0.95
	Mean	27.86±2.16	27.38±2.09	27.25±2.33

^{abc}Treatment means with different superscripts along the same row are significantly different (P<0.05)

duck meat tend to be harder, possibly because, they are often kept for a very long time before they are slaughtered for consumption.

This experiment was thus conducted to assess the carcass and organ characteristics of Nigerian native muscovy ducks under three management systems.

Materials and Methods

This experiment was conducted at the poultry unit of Akwa Ibom State College of Agriculture,Obio Akpa, Nigeria. Randomized complete block design (RCBD) was used with two factors (sex and management systems). Three management systems were considered: Semi intensive system (SI), intensive system with wallow (IW) and intensive system without wallow (IO). Each treatment was sub-divided into two replicates containing same number of male and female ducks. Four weeks-old ducklings were fed diet containing 17% CP and 2848.9 Kcal/kg of energy (Table 1) till they attain 20 weeks of age.

Ducks reared under the intensive management system were fed *ad libitum* while those reared under semi intensive system were fed the compounded feed twice daily (morning and evening). Ducks reared under semi intensive system were allowed to scavange within a range between 08:00 hours and 17:00 hours daily. One group reared under the intensive management system was supplied with wallow; but all ducks were on deep litter.

Three males and three females were then selected from each replicate to give 12 ducks (6 Males and 6 Females) per treatment for carcass evaluation. Birds were starved of feed and water overnight and killed by throats slitting. Carcasses were then plucked by hand, weighed and dissected. Parameters measured were dressing percentage (without subcutaneous fat), weights of thigh muscles, breast muscles, liver, heart and gizzard; as well as length of small intestine, large intestine and caecum.

Data obtained were compared using two-way analysis of variance according to Steel and Torrie (1980) while significantly different means were separated using least significant difference as described by Snedecor and Cochran (1996).

Results and Discussion

Results of dressing percentage, weights of thigh muscles and breast muscles are presented on Table 2.

Table 3: Visceral Organs of Ducks and Drakes under Three Management Systems

Parameters		SI	IW	IO
Liver (g)	Male	63.00±0.71	65.25±0.95	65.00±1.47
	Female	51.00±0.82	52.25±1.18	53.00±1.35
	Mean	57.00±2.32	58.75±2.55	59.00±2.45
Gizzard (g)	Male	80.50±1.56	74.00±2.68	77.00±1.96
	Female	57.75±0.75	56.50±1.19	56.75±1.32
	Mean	69.13±4.37	65.25±3.57	66.88±3.98
Heart (g)	Male	24.00±1.29	26.25±0.85	27.50±0.65
	Female	17.25±1.11	18.50±1.44	19.00±1.23
	Mean	20.63±1.50	22.38±1.66	23.25±1.73
Length of small Intestine (cm)	Male	186.50±2.10	178.00±1.68	182.00±2.45
	Female	169.75±1.65	166.75±0.75	167.00±0.87
	Mean	178.13±3.40	172.38±2.29	174.75±2.99
Length of largeIntestine (cm)	Male	13.50±0.50	13.00±0.41	13.00±0.41
	Female	11.75±0.25	11.50±0.50	11.50±0.29
	Mean	12.63±0.42	12.25±0.41	12.25±0.32
Length of Caecum(cm)	Male	33.25±0.48	32.50±0.50	33.25±0.63
	Female	22.50±1.19	22.25±1.65	21.25±0.95
	Mean	27.86±2.16	27.38±2.09	27.25±2.33

abcTreatment means with different superscripts along the same row are significantly different (P<0.05)

Carcass yields of drakes and ducks in semi intensive system were significantly lower (P<0.05) than those under intensive systems. Values obtained in this trial were also lower than 78.8% (male) and 77.4% (females) observed by Nwachukwu (1998). Dressing percentages observed in this study were, however, higher than those reported by Carew *et al.* (1998) in Lagos metropolis (65%) and Ola (2000) also in South-western Nigeria (66.66%-68.24%).

Weights of thigh muscles and breast muscles of drakes followed similar trend. Indoor systems produced significantly heavier (P<0.05) parts than birds on semi-intensive system. Thigh muscle weight of ducks under SI and IO did not differ significantly (P>0.05), but both treatments differed significantly (P<0.05) from IW. Also, breast muscles of ducks from all treatments varied significantly (P<0.05) in this experiment.

Weights of giblets and other visceral organs obtained from muscovy ducks and drakes under the three management systems are presented in Table 3. Weights of liver, gizzard and heart from ducks and drakes under SI, IW and IO did not differ significantly (P>0.05); but males had higher values than females in all cases. Nwachukwu (1998) observed similar dimorphism in weight of these organs. Gizzards of ducks and drakes in semi intensive system tend to be heavier than those in intensive systems.

This situation, according to Siregar *et al.* (1982) and Duong (1994) may be due to increase consumption of fibrous substances since ducks on SI were allowed to scavenge in addition to the fed experimental diet.

Length of small intestine, large intestine and caecum did not show significant treatment effect (P>0.05) in this trial. Values obtained were similar to previous report (Dong and Ogle, 2000). However, drakes had longer parts than ducks in all parameters. Sexual dimorphism were also found in length of bill, neck and shank of three different breeds of ducks in Jos, Nigeria (Ogah *et al.*, 2005)

The observation of significant differences in some carcass parameters in this experiment contradicts report of Paci *et al.* (1983) that there was no statistical differences between slaughtering traits that could be attributed to breeding Italian strains of muscovy ducks and common ducks under different technologies.

Conclusion: Keeping muscovy ducks under intensive system of management tends to produce better carcass yield than allowing them to run and use up energy in ranges, especially, in localities where breast and thigh muscles are the most cherished meat parts from muscovy ducks.

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