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Egg Production Potentials of Muscovy Ducks (*Cairina moschata*) Raised Under Three Management Systems in the Humid Tropics

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Target Audience: Poultry farmers, Extension agents, Marketers, Animal Scientist

Abstract

Egg production potentials of Muscovy duck was evaluated in three management systems; semi-intensive management system (SI), intensive management system with wallow (IW) and intensive management system without wallow (IO). Sixty female Muscovy ducks were divided into three groups of 20 each on weight equalization basis. The groups were randomly assigned to three management systems in a completely randomized design (CRD) experiment. Each group was replicated and raised in deep litter compartments. Ducks in IW and IO were fed ad libitum while those in SI were fed same quantity and quality of feed on a restricted basis [morning (07.00 – 08.00hours) and evening (16.00 – 18.00hours)]. Ducks in intensive management systems came into lay significantly (P<0.05) earlier, (IO, 203 days and IW, 207 days) than ducks in semi-intensive management system (248 days). Eggs from ducks in IO and IW were significantly (P<0.05) heavier (76.35 and 76.27g, respectively) than eggs from those in SI. Clutch sizes were significantly (P<0.05) larger IO and IW (19 and 18.73 eggs, respectively) than SI (16.23 eggs). There was however, no significant difference (P>0.05) between ducks in IO and IW in all the parameters measured. Ducks in the intensive management systems (IO and IW) appear to exhibit better egg laying potentials than those on Semi intensive management system.

Key words: Muscovy duck, intensive, semi intensive, management systems, egg

Description of Problem

Ducks are primarily raised for meat and eggs but they provide other materials of economic value such as feathers and

manure. Although ducks are not as popular as chicken in poultry products supply, in some countries it is regarded as a major source of meat and eggs after chicken among small-scale producers (1Ngapongora *et al.,* 2001). Its acceptability in Nigeria is low due to the stigma that they are dirty and hence, their products will be dirty too (2Izunobi, 2002).

Etuk and Abasiekong (32005) observed that consumers believe that duck eggs are less tasty than turkey and chicken eggs. Some rural dwellers have however, adopted it as a source of animal protein. In Taraba State, Nigeria, for instance, Tuleun and Dong (42000) reported that 67% of respondents interviewed preferred duck eggs to eggs from other poultry species.

Information on egg production potentials of ducks in Nigeria is however scanty. Ola (52000) reported that Muscovy ducks under semi-intensive management system come into lay at 47 weeks (11-12 months). However, Izunobi (22002) reported 6 months of age for sexual maturity. This study was therefore aimed at establishing baseline information on egg production potentials of this species under three management regimes in the humid tropics.

Materials and Methods

Study Area:

This study was conducted at the Teaching and Research Farm, Akwa Ibom State College of Agriculture, Obio Akpa in the southeastern Agro-ecological zone of Nigeria. Akwa Ibom State is located in the Niger Delta region of the South-South coastal part of Nigeria,lying between latitudes $4°32^{1}$ and $5°33^{1}$ North, and longitudes $7°25^{1}$ and $8°25^{1}$ East (3Wikipedia, 2010). Climatic data at the Akwa Ibom State College of Agriculture, Obio Akpa geographical and meteorological station over the period of the study indicated annual rainfall of between 1770 - 2400mm, relative humidity range of 55 - 86%, and temperature range of 18 – 27^{0}C minimum and 24 - 36^{0}C maximum.

Experimental Design and Management of Birds:

One hundred and fifty ducklings that were one week old, and were hatched naturally within a seven day period, were collected from 34 local farmers. They were raised in deep litter under intensive system for 4 weeks and fed duck starter mash (Table 1). Sixty (60) female ducks were thereafter selected and divided into 3 groups of 20 birds each on weight equalization basis. Each group was randomly assigned to the three management systems in a completely randomized design (CRD) experiment. Each treatment group was replicated with 10 ducks per replicate.

The treatment groups were as follows;

Treatment 1- Semi intensive management system (SI)
Treatment 2- Intensive management system with wallow (IW)
Treatment 3 - Intensive system without wallow (IO).
Ducks in all the treatment groups were fed duck starter mash for another 4 weeks, followed by duck grower mash (Table 1) up to point of lay at week 30-32. Thereafter, duck layers mash (table 1) was offered. Ducks reared under IW and IO systems were fed *ad libitum.* Quantity of feed offered to ducks in IO and IW was recorded. This quantity was given to ducks in SI in two installments daily [morning (07.00 – 08.00 hours) and evening (16.00 – 18.00 hours)] on a restricted regime. In addition, ducks in SI were allowed to scavenge between 08.00 and 16.00 hours daily within a $50m^2$ fenced ranges.

Well-cushioned nest boxes were provided for ducks in all replicates. Eggs were collected three times daily (morning, afternoon and evening). Clutch sizes, egg weight, egg mass, hen-day production and hen-housed production were determined. Results from 3 clutches were considered in arriving at the means of these parameters. Data obtained were subjected to analysis of variance (6) and least significant difference (LSD) was used to separate significantly different means at 5% confident interval where any existed (7).

Results and Discussion

Average hen-day and hen-house production were similar (P>0.05) among birds in IW and IO. Adeyinka and Mamman (9) advised that for ascertaining the cost of egg production, hen-housed production is a better measure compared to hen-day production since it includes both egg production as well as flock mortality.

Egg Production:

Results of egg production of Muscovy ducks (*Cairina moschata*) obtained are presented on table 2. Ducks in treatment 3 (IO) point of lay earlier (203 days), while ducks in treatment 1 (SI) took the longest time to lay (249 day). There was no significant difference ($P > 0.05$) between birds on IO and IW in terms of age at first lay (203 vs. 207 days). Birds in IO and IW came into lay significantly ($P < 0.05$) earlier than those in SI. A range of 181 – 279 days was recorded by all treatment groups for first eggs in this study. This corresponds to earlier report of 189 – 223 days (10). This time frame was however, shorter than the 329 days reported by (5) for Muscovy ducks under semi intensive management system.

Table 1: Composition of experimental duck diet (kg/tonne)

Composition	Starter	Grower	Layer
Maize	350.00	250.00	220.00
Soya beans	150.00	120.00	130.00
Wheat offal	100.00	115.00	120.00
Palm kernel cake	100.00	165.00	160.00
Brewers dried grain	150.00	225.00	210.00
Fish meal	100.00	75.00	90.00
Oyster shell	30.00	32.00	50.00
Bone meal	13.20	11.45	13.20
Salt	2.50	2.50	2.50
DL-Methionine	0.80	0.75	0.80
Lysine	1.00	0.80	1.00
Vitamin/mineral premix*	2.50	2.50	2.50
Total	100.00	100.00	100.00
Chemical composition (% DM)			
Crude protein	19.50	16.00	16.00
Crude fibre	5.35	6.11	8.89
Ether extract	3.33	4.05	4.80
Calcium	0.83	1.01	2.98
Phosphorus	1.04	0.49	0.42
Metabolisable Energy (Kcal/kg)	2881.18	2607.98	2713.44
Dry matter	85.15	84.61	82.46

* Each 2.5kg contains; Vit. A, 10,000,000 IU., Vit.D3, 2,000,000 IU., Vit. E, 10,000 IU., K, 2,000mg., Thiamine (B1), 1,500mg., Riboflavin (B2), 4,000 mg., Pyridoxine (B6) 1,500 mg., Niacin, 15,000mg., Vit. B12, 10mg., Pantothenic Acid, 5,000 mg., Folic Acid, 500 mg., Biotin, 20mg., Antioxidant, 125g., Manganese, 800g., Zinc, 50g., Iron, 20g., Copper, 5g., Iodine 1.2g, Selenium, 200mg., Cobalt, 200mg.

Clutch Size:

Mean clutch sizes in the three management systems were 16.23 (SI), 18.73 (IW) and 19.00 (IO) with the average egg weight of 70.80g, 76.27g and 76.35g, respectively. There were no significant differences ($P > 0.05$) between IW and IO with respect to these parameters. However, birds on IW and IO recorded significantly ($P < 0.05$) more eggs per clutch and heavier eggs than those on SI. The disparity in egg weight and clutch sizes might have resulted from stress precipitated due to scavenging by birds in SI. Ola (6) reported 16.28 eggs / clutch in ducks on semi-intensive management system, while (11) reported higher values (75 eggs per year in intensive system, and 63 eggs per year in extensive management systems) with mean clutch size of 25 and 21 eggs in both systems, respectively.

Table 2: Egg production parameters of Muscovy ducks in the humid tropics under three management systems

Parameters	SI	IW	IO
Average body weight at first lay (g)	1978[b]±15.25	2241[a]±28.36	2228[a]±29.02
Age at first lay (days)	249[b]±4.87	207[a]±3.38	203[a]±4.07
Clutch Size (Av. of three clutches)	16.23[b]±0.43	18.73[a]±0.27	19.00[a]±0.56
Egg Weight (g)	70.80[b]±0.35	76.27[a]±0.49	76.35[a]±0.34
Number of Cracked Eggs	0	0	0
Hen-day Production (%)	54.11[b]±1.42	61.79[a]±1.56	62.69[a]±2.50
Hen-house Production (%)	54.11[b]±1.42	61.76[a]±1.56	62.64[a]±2.50
Mortality (%)	0.00	0.00	0.00
Egg Mass	116.46±[b]6.95	139.80[a]±10.62	144.54±7.21

[ab] Treatment means with similar superscripts along the same row are not significantly different (P>0.05)

Egg Weight

Egg weights obtained in this study were within the range of 68.90 – 85.27g (10), and 65.00 – 75.00g (11). The differences (P<0.05) in egg weights observed between ducks on SI and those on IO and IW might be due to the differences in feeding regimes which favour birds fed *ad libitum* in the intensive system against restricted feeding in the semi-intensive group despite the fact that same diet were offered (Table 1). This same reason might have been responsible for ducks in intensive management systems (IW and IO) coming into lay earlier with heavier body weights and egg weights than those on semi-intensive system. Rahn *et al.* (13) reported a direct relationship between the body weight of avian species and the weight of eggs laid. Similarly, Hasnath (14) observed that egg weight of birds fed *ad libitum* were higher than those on restricted feeding.

Conclusion

1. Feeding Muscovy ducks *ad libitum* probably induced earlier laying and larger clutch sizes with heavier eggs in intensive systems than restricted feeding in semi-intensive management system.
2. The practice of *ad libitum* feeding of Muscovy ducks under intensive management system resulted in ducks laying earlier and heavier eggs compared to ducks in semi intensive management system fed same quantity of feed on a restricted regime.
3. The provision of wallow (IW) did not appear to confer any significant advantage on Muscovy ducks.

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