

On-farm evaluation of the growth of Muscovies under free-range and confinement in south-eastern Nigeria

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Abstract

A 13-week on-farm study was conducted to determine the growth performance of Muscovies under free-range and confinement in south-eastern Nigeria. Forty-five (45) ducklings from 4 mothers were subjected to free-range system of production while another group of 45 ducklings from another 4 mothers was raised under confinement. At 13 weeks of age, the ducklings raised under confinement weighed on the average 3.25kg which was significantly ($P<0.05$) heavier than 2.65kg weighed by those under free-range system. The males and females of those under confinement also has significantly ($P<0.05$) heavier weights than their counterparts under free-range system. Breast, thigh and back weights of the ducks raised under confinement were also significantly ($P<0.05$) heavier. Weights of the internal organs (liver, gizzard, heart and kidney) were not affected by the treatments ($P>0.05$). the ducklings under confinement consumed on the average 123.6gm of feed daily with feed conversion ratio of 3.96. those under free range system recorded 31% mortality as against 11% recorded by those under confinement.

Key words: Muscovies production, free-range, confinement, southeastern Nigeria.

Introduction

Domestic ducks, like fowls, are raised throughout the tropics, but they are most numerous in regions of high rainfall, riverine areas, in deltas and in costal districts (Payne, 19990). Indigenous ducks therefore abound in south-eastern Nigeria in view of the favourable climate conditions of the region. However, duck keeping in the region, unlike the fowls, generally follows the traditional lines devoid of innovations which modern scientific endeavours have introduced in poultry production. Thus, under this system, they are characterized by low rate of growth and low productivity (Oluyemi, 1982).

Different breeds of ducks exist. Gillespie (1981) tried to categorize them into two: those for meat

production and those for egg production, with White Pekin, Aylebury, Muscovy, Cayuga and Rouen as meat type while Khaki, Campbell and Indian Runner belong to egg type. The ducks of south-eastern Nigeria are, however, native non-descript types with differing phenotypes, and as Oluyemi (1982) observed, they are generally Muscovies. They have great potentials as sources of animal protein in view of the fact that they lay more and large eggs than the local chickens; they grow to greater size; they are excellent foragers and are less susceptible to diseases (Oluyemi, 1982).

Like in India (Mahanta *et al.*, 2001; Islam *et al.*, 2002), they lay, incubate and hatch eggs in the months of April to July. The ducklings are

allowed to roam with their mothers right from the time of hatching. As a result, mortality is usually high, particularly within their first 2 weeks of life (Payne, 1990).

Increased domestic duck production seems likely to offer, in part, a solution to the poor animal protein intake in Nigeria. However, little or no research work has been done on their potentials as source of animal protein in the country. The study herein reported was therefore designed to determine on-farm the productive performance of the indigenous ducks in south-eastern Nigeria under free-range and intensive systems of production, so as to formulate practical recommendations on which system is better suited for subsistence livestock farmers in the region.

Materials and Methods

Project site:

The study was carried out at a privately owned livestock farm at Owerri-Imo State in Southeastern Nigeria. The farm belonged to one Alhaji A.M. Ahmed, an Owerri-based public servant who keeps livestock as a part-time business. At the time of the trial, he had 50 local chickens, 120 ducks, 15 sheep and 5 cattle. The cattle were kept in a pen while the sheep, ducks and chickens were on a free range but occasionally supplied with soybean and maize offals. He graciously allowed the farm to be used for the study.

Experimental procedure

The trial was done on-farm. Two treatments were applied, using systems of management (intensive and free-range systems) as treatments. Eight groups of ducklings hatched within 3 days intervals were used. Four different groups of ducklings (that is ducklings from 4 different mothers) were subjected to free-range system while 4 groups were subjected to intensive system. The ducks were non-descript. The free-range system groups (FSG) were made up of 14, 12, 10 and 9 ducklings, respectively, giving a total of 45 ducklings. The confined groups (CSG)

were made up of 13, 12, 10 and 10 ducklings, respectively, also giving a total of 45 ducklings. The groups on free-range system were allowed to roam about with their mothers and followed the routine practice of the owner who occasionally dropped wet soybean and maize offals for them. The ducklings were weighed at hatching and rounded up every week thereafter and weighed. At 5 weeks of age when they started to show tendency to roam without their mothers, they were marked by tying small red cloths to their wings as identity to differentiate them from other ducklings around. The 4 confined groups were kept in 4 separate pens with their mothers. Before they were hatched, the pens, 2m X 3m in size, were thoroughly cleaned and disinfected. The floors were then covered with dry wood shavings. Like the free-range groups, the ducklings were weighed at hatching and weekly thereafter. A starter diet was made and fed to them in wet form *ad libitum* until they were separated from their mothers at 5 weeks when the diet was changed to finisher type. The ingredient and nutrient compositions of the diets are shown in Table 1. Water was also provided *ad libitum*.

Feed intake of the ducklings was determined during the period that they were with their mothers as follows. The feed intake of the mother was determined on the first 2 days after hatching when the feed intake of the ducklings was very negligible. This initial figure was then subtracted from the total feed intake of the group (ducklings and mother). The difference was then regarded as the feed intake of the ducklings. Feed offered was weighed dry and then wetted before feeding. The left-over was dried before weighing. The trial lasted 13 weeks. Records were kept on feed intake, growth performance and mortality.

At the end of the 13th week, eight ducklings (4 males and 4 females) were randomly selected from each treatment, deprived of feed but not water for a day and then slaughtered for carcass evaluation. Carcass characterization was done

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according to the procedure of Aduku and Olukosi (1991).

Data analysis

The data collected on body weight changes and carcass characterization were subjected to one-

way Analysis of Variance according to Snedecor and Cochran (1967). Where Analysis of Variance indicated significant treatment effects, means were compared using Least significant difference, according to Snedecor and Cochran (1967).

Table 1: *Ingredient and chemical composition of the starter and finisher diets*

Ingredients (%)	Starter Diet	Finisher Diet
Maize	50.00	55.00
Soybean meal	19.50	15.00
Palm kernel cake	8.00	8.00
Blood meal	3.00	2.00
Fish meal	3.00	2.00
Wheat offal	12.00	14.00
Bone meal	4.00	3.50
Common salt	0.25	0.25
Vitamin/Mineral Premix*	0.25	0.25
Calculated Analysis		
Crude protein (% of DM)	22.32	19.30
Crude fiber (% of DM)	3.77	3.82
Ether extract (% of DM)	4.26	3.59
Metabolizable Energy (Kcal/gm)	2.82	3.06

*To provide the following per kg of feed: Vit. A, 10,000,000 iu; Vit. D₃, 2,000,000 iu; Vit B₁, 0.079g; Vit B₂, 5g; Nicotinic acid, 25g; Calcium panthothenate, 12.5g; Vit. B₁₂, 0.015g; Vit. K₃, 2.5g; Vit E, 25g; Biotin, 0.05g; Folic acid, 1g; Choline chloride, 250g; Cobalt, 0.4g; Copper, 8g; Manganese, 64g; Iron, 32g; Zinc, 40g; Iodine, 0.8g; Falvomycin, 100g; Spiromycin, 5g; DL-Methionine, 50g; Selenium, 0.16g; L-Lysine, 120g; BHT, 5g.

Results and Discussion

The growth performance of the experimental indigenous ducks under the 2 systems of management is presented in Table 2. Average day-old weight of 42.5gm was recorded for both groups. This is much lower than day-old weight of 73.4gm reported for Khaki Campbell in the Far East and South Pacific by Chen (1991). At 13th week of age, the group under the intensive system of management weighed 3.25kg on the average, which was significantly ($P<0.05$) higher than 2.65kg weighed by the group under the free-range system. At the same age, the males and females of the group raised under intensive system of management also has significantly ($P<0.05$) higher body weights than their

counterparts raised under free-range system (3.65kg vs 2.85kg and 2.97kg vs 2.34kg, respectively). The growth performance of the group seemed to be in conformity with that of known breeds such as Muscovy and White Pekin raised under similar system (Warren, 1972). Oluyemi (1982) had earlier observed that Nigerian local ducks resemble the Muscovy.

The average daily feed intake of the intensively managed group of 123.6gm and the feed conversion ratio of 3.96 closely agreed with the values reported for the Muscovy by Chen (1991). This also tends to further confirm the observation of Oluyemi (1982) that Nigerian local ducks generally resemble the Muscovy. It also confirms the report that ducks require up to 11/2 times as

much feed for rearing and egg production as do chicken (Sainsbury, 2000).

The high mortality of 31.11% recorded for the ducklings under the free-range system of management seemed to be in conformity with the observations of Ositelu (1982) that high mortality is suffered by ducklings in the free-range system as many of them are lost to

predators, [passing vehicles and torrential rains. About 50% of the mortality arising from this study resulted from passing vehicles. The relatively low mortality of 11.11% recorded for the intensive group seemed to agree with the observation of Oluyemi (1982) that unless an epidemic occurs, the mortality can be less than 5% in raising ducklings.

Table 2: *Growth performance of Muscovies under free-range and confinement systems of management*

	FSG*	CSG**	SEM
Number of ducklings	45.00	45.00	-
Day-old body wt (g)	42.52	42.50	1.002
Av. Body wt. at 13 wks (kg)	2.65 ^a	3.25 ^b	0.132
(i) Male	2.85 ^a	3.65 ^b	0.141
(ii) Females	2.34 ^a	2.97 ^b	0.182
Av. Feed intake (g/d)	-	123.6	-
Av. Growth rate (g/d)	25.23 ^a	30.94 ^b	0.112
(i) Male	27.14 ^a	34.76 ^b	0.366
(ii) Females	22.28 ^a	28.28 ^b	0.202
Feed/gain ratio (g feed/g gain)	-	3.96	-
Mortality %	31.00	11.11	-

*FSG-Free range system group

**CSG-Confinement system group

Carcass characteristics

The carcass characteristics of the experimental ducklings are shown in Table 3. the dressed weights of the ducklings intensively raised were significantly ($P<0.05$) higher than those of their counterparts raised under the free-range system. Similar differences were also observed in the sexes. Similarly, the weights of the breast, thigh and back of the carcasses from the ducks raised under confinement were significantly ($P<0.05$) heavier than those of the ducks raised under the free-range system. Weights of the internal organs (liver, gizzard, kidney and heart) were not affected by treatments ($P>0.05$).

Economic consideration

Feed conversion ratio of 3.96 was recorded for the group under confinement. At the cost of ₦ 32/kg of feed, it meant that the cost of feed alone for producing 1 kg of live duck was ₦ 126.72 (one hundred and twenty-six naira, seventy-two kobo). The group on free-range was obviously cheaper to produce even though it grew at slower rate and recorded higher mortality. The ducklings were produced at almost zero cost to the owner and tended to support the recommendation of Oluyemi (1982) and Payne (1980) that for commercial duck production, free-range or semi-intensive system of production may be a better option.

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Table 3: Carcass characteristics of Muscovies under free-range and confinement of systems of management

	FSG	CSG	SEM
Av. Liveweight at 13 wks (kg)	2.64 ^a	3.26 ^b	0.143
(i) Male	2.86 ^a	3.64 ^b	0.067
(ii) Females	2.34 ^a	2.98 ^b	0.046
Av. Dressed wt (kg)	1.98 ^a	2.45 ^b	0.101
(ii) Females	2.15 ^a	2.73 ^b	0.082
(i) Male	1.68 ^a	2.24 ^b	0.152
Av. Breast wt (kg)	0.52	0.59	0.056
(i) Male	0.62	0.69	0.038
(ii) Females	0.52 ^a	0.60 ^b	0.022
Av. Thigh wt (kg)	0.34 ^a	0.45 ^b	0.035
(i) Male	0.39 ^a	0.48 ^b	0.021
(ii) Females	0.30 ^a	0.36 ^b	0.008
Av. Back wt (kg)	0.43 ^a	0.49 ^b	0.010
(i) Male	0.52 ^a	0.58 ^b	0.009
(ii) Females	0.34 ^a	0.40 ^b	0.030
Internal organ wts (g)			
Liver	58.9	59.3	2.33
Gizzard	61.2	62.0	2.40
Kidney	18.6	18.9	1.08
Heart	19.8	20.1	0.26

^{ab} Means within a row with different superscripts are significantly different ($P < 0.05$)

*FSG-Free range system group

*CSG-Confinement system group

Conclusion

The results of this study have shown that free-range system of production of ducks is cheaper than confinement system and is therefore recommended but on the condition that the rearer has ample space within which they can roam and fend for themselves.

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