

# **On Farm Study of Breeding and Production Systems Characterization of Turkeys (*Meleagris gallopavo*) in Oyo Metropolis, Oyo State, Nigeria**

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## **Abstracts**

The on farm study of breeding and production systems characterization of Turkeys (*Meleagris gallopavo*) birds in Oyo metropolis of Oyo State, Nigeria was evaluated with 120 selected farmers. One hundred and twenty structured questionnaires were randomly administered to turkey farmers to collate some relevant information on the breeding and production systems characterization of Turkey birds. The data collected were to describe background information of the farmers, some reproductive trails of turkeys, breeding characterization of turkeys and management practices adopted in this district area. The results showed that majority (71.4%) of the farmers were within the age group of 24-29 years. Turkey rearing in the study area was mainly a business for the males, accounting for about 60.0%. The educational background of the farmers showed that 70.0% had formal and tertiary education. However, the results revealed that most turkey (60.0%) attained sexual maturity at the age of 8-9 months. 60.0% of farmers bred turkeys at 12 month old and 60.0% of them adopted artificial brooding method in raising poults while 70.0% farmers reared birds artificially. The results also showed that half of farmers incubate eggs (naturally or artificially). The clutch size at hatching was highest between 6 and 10 eggs at the 28-32 day incubation period. The hatching ability of the turkey in a year was highest (50%) a year. Farmers mostly keep 50-100 birds (60%) as their flock size with majority of the farmers (50%) raised imported turkeys and (40%). 73.33% of the farmers made provision for housing and mostly under semi intensive system (50%) of management with good supplementary feeding to intensive kept birds. Majority of the farmers had access to veterinary care (70.00%) with obtainable highest poults, mortality at the period of (0-3 weeks). The study concluded that turkey had low reproductive performance, which was due to non-monitored breeding, lower genetic make- up and poor management practices. It's therefore, suggested that for meaningful turkey farming in Oyo metropolis, special attention must be given to these constrains to enable turkey fully express their genetic potential.

## **Keywords**

Poultry Production, Management Practices, Reproductive Traits, Nigeria

## 1. Introduction

The turkey market is growing market both on the table egg as well as on the meat side. Production has grown steadily in the past decades. According to the FAO database, table egg production in 1990 accounted for almost 385 thousand tonnes. This figure had grown to over 824 thousand tonnes in 2008. On the meat side, Turkey produced 405 thousand tonnes in 1990 and this figures increased to 905 thousand tonnes in 2008 “[1]”.

Turkey production is another promising branch of poultry with great potentials like large body size “[2]” fast growth rate, high fecundity and excellent meat quality which is found to be of higher percentage protein than the carcass of chicken “[3]”. The breeds kept by rural producers in the tropics usually have black feathers, as distinct from the white-feathered breeds that are raised intensively. Where there are no geese and ostriches, they are the largest birds in the farming system. Body weight ranges from 7 to 8 kg in males and from 4 to 5 kg in hens. They have good meat conformation, produce about 90 eggs per year and have medium to high hatchability. They are more susceptible to diseases than either chicken or ducks “[4]”.

The types of poultry that are commonly reared in Nigeria are chickens, ducks, guinea fowls, turkeys, pigeons and more recently ostriches. However, those of commercial or economic importance given the trade in poultry are chickens, guinea fowls and turkeys, amongst which chickens predominate. There are two distinct poultry production systems in Nigeria, as in most developing countries of Africa and Asia. The two systems are conventionally referred to as commercial poultry production and rural poultry production. The commercial system is industrial in nature and therefore based on large, dense and uniform stocks of modern poultry hybrids. It is capital and labour intensive and demands a high level of inputs and technology. On the other hand, rural poultry production is by convention a subsistence system which comprises of stocks of non-standard breeds or mixed strains, types and ages. It is generally small-scale, associated with household or grass-root tenure and with little or no veterinary inputs. The rural poultry sector is therefore in its original sense, a village-based, household or individual holding and occupation which has however been extended to non-village settings in peri-urban localities, mainly by the middle class “[5]”.

In Nigeria, several studies have been interested many poultry species or breeds, adaptation to thermal stress, diseases and parasites, to effect of feed, feed resources on productivity and management practices “[6], [7], [8]”. However, most of the researches on poultry in this district were on chickens and there is scarcity of information on other types of poultry, especially on turkeys. It is therefore necessary to understand the production systems and to emphasize the reproductive performance of turkeys in order to form a basis for rapid breeding programme and good production systems in the district. The aim of the study is to have a baseline for the breeding and production systems

characterization of turkeys in Oyo metropolis, Oyo State, Nigeria, with the hope of suggesting areas for breed and production improvement.

## 2. Materials and Methods

### 2.1. Study Site

The study was conducted on-farm in four Local Government Areas (Oyo West, Oyo East, Atiba and Afijio) of Oyo metropolis, Oyo State, Nigeria. Oyo lies on the longitudes 3° 57' east of the Greenwich meridian and latitude 7° 5' North of the equator, it is about 55 kilometers north eastwards from Ibadan, the Capital of Oyo State. The altitude is between 300 and 600 meters above sea level. The mean annual temperature is about 27°C while that of rainfall is 1165mm. The vegetation of the area is Guinea savanna zone “[9]”.

### 2.2. Sample Size

A total of 120 turkey farmers comprises of 30 farmers each from the four local government areas were visited in this district. On - farm visit was paid to these farmers, and each farm was visited thrice. The study lasted over a period of a year, commencing from September 2015 to August 2016.

### 2.3. Data Collection Techniques

A hundred and twenty structural questionnaires were randomly distributed and used in collecting data on breeding and production systems characterization of turkeys. The questionnaire has four sections. Section A was designed to obtain Socio-economic background of respondent such as name of the fanner, age, sex, marital status, educational level while Section B display some reproductive traits such as age at sexual maturity, brooding method, incubation traits, clutch size at hatching, hatch rate, number of hatching per year. Section C was evaluated with respect to breed types, stage of rearing, adoption of artificial insemination method, cross breeding techniques, determination of sex ratio, source of breeding stock, flock size (breeding aspect). Section D was on the management practices such as management system, provision of housing, provision of supplementary feeding, veterinary services and high mortality age.

### 2.4. Data Analysis

The data generated from this study were subjected to one way descriptive statistical analysis of “[10]”. Descriptive statistical analysis involved the use of statistical tool like frequency distribution and percentage.

## 3. Results

Table 1 shows the background information of the selected farmers in Oyo metropolis of Oyo State. The table reveals that 60% are male and 70% married farmers embarking on the rearing of the birds. Forty percent of the farmers were at 24-29 years of age with 70% had post- secondary school education.

**Table 1.** Background information of the farmers in Oyo Metropolis, Nigeria.

Variables	Frequency	Percentage%
Sex		
Male	72	60
Female	48	40
Marital Status		
Single	36	30
Married	84	70
Age (years)		
18 – 23	24	20
24 – 29	48	40
30 – 35	24	20
36 and Above	24	20
Level of Education		
Primary school	00	00
Secondary school	36	30
Post-secondary school	84	70

Source: Author's Computation 2016

Table 2 reveals some reproductive traits of turkeys raised in the studied area. The results showed that most turkeys (60%) attained sexual maturity at the age of 8-9 months while 20% had early sexual maturity at age of 6-7 months and 20% above 10 months. Most turkey farmers (60%) employed artificial brooding method in raising poults. There were 70% farmers who reared their turkeys intensively while 30% adopting the free range method. The results also showed that half of the selected farmers (50%) incubate eggs laid on their farms. The clutch size at hatching was mostly between 6 and 10 eggs at the 28-32 day incubation period. However, half of the eggs laid were hatched and the hatching eggs for one year were at highest at thrice in a year (50%).

**Table 2.** Some reproductive traits of Turkeys raised in Oyo metropolis, Nigeria.

Variables	Frequency	Percentage%
Age at Maturity (Months)		
6- 7	24	20
8 – 9	72	60
>10	24	20
Artificial brooding		
Yes	72	60
No	48	40
High survival brooding method		
Free range	36	30
Intensive rearing	84	70
Incubation of eggs		
Yes	60	50
No	60	50
Clutch size at hatching		
0 – 5	40	33.33
6 – 10	48	40.00
11 – 15	32	26.67
Hatch rate		
Yes	36	30
No	60	50
Not sure	24	20
Hatching in One year		
Once	12	10
Twice	48	40
Thrice	60	50

Source: Author's Computation 2016

Breeding characterization of turkeys was shown in table 3. Fifty percent of the farmers depend on the local breeds, 30% embarked on exotic breeds while 20% of the farmers raised both local and exotic breeds. Most turkey farmers (60%) reared their animals when they are young (poults), other farmers rear their birds at grower and adult stage. There were 63.3% who had interest in adopting artificial breeding program. Most farms (70%) chose cross breed with the other improved turkey breeds. About 60% of the farms maintained sex ratio of 1:2 or 4 while other maintained a higher ratio of up to 1:5 or 8. The farmers mostly obtained their breeding stock through other farms (40%) or purchased from market (40%). Most farmers kept 50-100 birds (60%) while few farmers kept animals ranging from 100 – 150 and above.

**Table 3.** Breeding characterization of turkeys reared in Oyo Metropolis, Nigeria.

Variables	Frequency	Percentage%
Breeds		
Local	60	50
Exotic	36	30
Both	24	20
Stage of rearing		
Young	72	60
Grower	36	30
Adult	12	10
Interest in Artificial Insemination		
Yes	76	63.33
No	44	36.67
Cross breeding with improved breed		
Yes	84	70
No	36	30
Sex ratio		
1:2 or 4	72	60
1:5 or 8	48	40
Source of breeding stock		
Other farmers	48	40
Purchase/market	48	40
Descendant	24	20
Flock size		
50 – 100	72	60
100 – 150	24	20
> 150	24	20

Source: Author's Computation 2016

Management practices adopted by farmers in the studied area are shown in Table 4. Most farmers adopted on semi intensive system (50%) followed by intensive (40%) with the least management observed for extensive system (10%). Most farmers (90%) made provision for housing and supplementary feeding (73.33%) to the turkeys. About 70% of the farmers had access to veterinary health care. The highest cases of poults mortality occurred between 0-3 weeks (50%) followed closely by 4 -6 weeks of age.

**Table 4.** Management practices adopted by the farmers in Oyo Metropolis, Nigeria.

Variables	Frequency	Percentage%
Management system		
Intensive	48	40
Semi-intensive	60	50
Extensive	12	10
Provision of Housing		
Yes	108	90
No	36	10
Provision of supplementary feeding		
Yes	88	73.33
No	32	26.67
Veterinary services		
Yes	84	70
No	36	30
Age of high mortality (days, weeks, months)		
0-3	60	50
4-6	36	40
7-12	12	10

Source: Author's Computation 2016

## 4. Discussion

### 4.1. Demographics of the Farmers

The pattern of information regarding to farmers information in these metropolis are in line with the studies of “[11], [12], [13], [14], [15]” reported that men, adults, married and educated farmers are mostly involved in the rearing of poultry.

### 4.2. Reproductive Traits

Variation occurred in the breeding, production and characterization of Turkeys reared in the studied area. It had been observed that, most birds reached sexual maturity at a longer age (8-9 months). This observation disagreed with the documentation of “[16]” who claimed shorter age (7-8 months) at attaining sexual maturity in turkey birds. This difference might have been due to difference in bird's management and breeds. Meanwhile, the low reproduction of turkeys may due be to some factors such as brooding, poult rearing and prevailing rearing system. These facts were earlier indicated by “[11], [17]” that brooding, rearing chicks and variability in quality and quantities of feeds are setbacks on the chickens and resulting to given the birds little or no time for productive purposes. However, the present study affirmed low fertility of turkey eggs in the study area and such trend agreed with the reports obtained by “[18]” but contradicted with the results of “[16]” who noted that fertility and hatchability of fertile turkey eggs were higher in his study area. The current results on low clutch size of the turkeys studied might be connected with the type of breeds reared in terms of genetic material coupled with low management practices. The mortality of the poults recorded in this study were due to the fact that Turkeys reared under unimproved conditions of management generally have lower productivity and such observations had been noticed by

“[19]” who indicated that poults during their early stages of life had highest mortality and this might due to low managerial inputs in rearing birds.

### 4.3. Breeding Characteristics of Turkey

The number of households keeping both local and exotic turkeys indicates the preference and the objective of the farming. Exotic birds are preferred for better performance while local turkeys are characterized by broodiness affecting the production traits “[20]”. The average number for adult and grower birds from the current study were slightly higher than those reported in Muheza district “[21]” for free ranged village chickens.

Meanwhile, the high survival rate under artificial brooding, especially when vaccines and other necessary requirements are provided and the high number of farms showing interest in artificial insemination technique is a reflection that the farmers are willing to adopt modern technologies to improve their poultry species. Thus, observations these were in line with the study of “[18]” and “[22]” who reported that the adoptions of modern technologies are the main strategy for breeding improvement of animals. This probably is the reason why some farmers were making effort to upgrade their turkey through cross breeding with other improved breeds. The low sex ratio on the studied farm is an indication that the breeding system is not controlled and this agreed with the findings of “[23]” who reported that for high fertility to be achieved one tom is to serve 20 hens in a flock of turkeys. It is expected that the sex ratio should be controlled to enhance the fertility of these animals through provision of adequate breeding space. Any natural breeding program that does not take sex ratio into consideration is likely to have a decline effect on the fertility. The resulting effect of such breeding is that some toms may show preference to particular hens in the breeding pen while others are left unmated during the breeding period. This is likely to affect both fertility and hatchability of the turkey eggs.

### 4.4. Management Practices

The present observations on the management practices that favoured semi intensive method of keeping Turkeys was similar to the findings in the Vhembe, Mopane, Kgalagadi and Alfred-Nzo districts also supports that the semi intensive predominates the housing types “[14]”. This result reflects that the farmers are aware on the importance of housing their chicken “[21], [24]”. Respondents also do not have proper storing and disposing method though droppings are used to enrich their field. It may be because of small flock size “[24]”. These results partly inform bird mortalities to predators, thieves and bad weather due to improper housing “[14], [24]”. Therefore, to improve the housing quality through proper education and campaign was suggested. Quantity and quality of feed significantly affect the performance of chicken particularly the chicks “[24]”. Majority of the visited households supplemented the feeds

given to the Turkey with grain and by-products and commercial feed mainly while in South Africa, household wastes was ranked highest feed sources to the chickens including turkey "[14]". Their observations contradicting this study that affirmed that apart from commercial feeds available, turkey birds were still fed on grain and by-products.

## 5. Conclusion

This study on breeding characterization of turkey in Oyo metropolis (Oyo West, Oyo East, Atiba and Afijio local government areas) of Oyo State depicted reduced reproductive performance which implicated factors such as uncontrolled breeding programs, low genetic material of the local stock (which are generally reared in this area) as well as poor management practices. It is therefore suggested that for successful turkey farming in Oyo metropolis of Oyo State, special consideration must be given to these constraints so as to enable the birds to fully express their genetic potential, since the area has favourable weather conditions for rearing turkey.

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