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On-farm studies on breeding characteristics of turkeys (*Meleagris gallopavo*) in parts of Jos Plateau, Nigeria

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ABSTRACT

The study was conducted in parts of Jos Plateau to investigate on-farm breeding characteristics of turkeys (February – November, 2008). The results showed that most turkeys (63.3%) attained sexual maturity at the age of 8 – 9 months. About 56.7% of the farmers bred turkeys at 12-month old, and 56.7% of them employed artificial brooding method in raising poults. There were 66.7% farmers reared birds artificially and few others (33.3%) using the free-range system. The results also showed that most farmers (53.3%) do not incubate eggs. The clutch size at hatching was mostly between 6 and 10 eggs at the 28-day incubation period. Hens hatching 0 - 5 and 11 – 15 eggs were 30.0 and 23.3%, respectively. The percentages of hens hatching eggs once, twice and thrice per year were 13.4, 33.3 and 53.3%, respectively. Farmers obtained their breeding/ replacement stock through other farms (20.0%) and purchase (20.0%). Most farms (53.3%) made provision for housing and did give supplementary feeding (96.7%) to their birds. About 73.3% of the farmers had access to veterinary care. The period (4- 6 weeks) recorded highest cases of poult morbidity/ mortality. This study concludes that the turkeys had lowered reproductive performance, which was attributed to uncontrolled breeding, low genetic material and poor management practices. It is, therefore, suggested that for successful turkey farming on the Plateau special considerations must be given to these constraints so as to enable the birds to fully express their genetic make-up.

Key words: Turkeys, breeding, tropics.

INTRODUCTION

In Nigeria, there is hardly any household in the rural and peri-urban areas that does not keep one form of poultry or the other. Animal protein consumption varies from country to country. It has been reported that protein intake in developing countries is only between 12 and 20 grams or 2 to 3 times lower than the developed countries[1]. Nigeria is animal protein deficient nation. There

is the need to rapidly increase animal protein production in the country to meet the demand of the ever-increasing human population. Any other means of achieving this goal must be through breeding of animals with shorter generation interval. Nigerians have many varieties of poultry including turkeys. It is reported that poultry ranks highest in number on the farms; mostly 80 – 90% owned by small scale farmers [2]. Therefore, this numerical advantage of the poultry species can be maximally exploited to serve as the avenue for the rapid transformation of animal protein production in the country.

In Nigeria, poultry production is increasing very rapidly and the consumption is increasing faster than that of other kinds of meat beside beef [3]. Several studies have been conducted in Nigeria using poultry ranging from species/breed type, adaptation to thermal stress, diseases and parasites, to issues of feed and feed resources on their productivity [4, 5, 6, 7, 8, 2]. It is estimated that about 825 million chicks, guinea fowl keats and ducklings are lost annually in Africa due to diseases and predators [6]. It has been assessed the management of mixed infections in poultry birds kept by small-holders in middle-belt of Nigeria [9]. This attributed the low performance of the local birds to over-burdening tasks on the chickens such as brooding, rearing chicks and variability in quality and quantity of feed, all of which give the chickens little or no time for productive purposes [10]. However, most of the research works on poultry in the country were on chickens, and there is paucity of information on other types of poultry, especially the turkeys. It is therefore necessary to understand and improve the reproductive performance of the turkeys in order to form a basis for rapid breeding programmes in the country. Characterized the semen of two turkey breeds in Bauchi; a part of southern guinea savannah ecological zone of Nigeria [11]. These workers reported that breed differences exist with respect to frequency of ejaculation, and sperm concentration declined progressively with increase in frequency of ejaculation. An on–farm study on the breeding characteristics of turkeys in the country is practically non-existent in literature. This study was therefore designed to model the breeding characteristics of turkeys in parts of Jos Plateau, with the hope of suggesting areas for breed improvement.

MATERIALS AND METHODS

Study area

The study was conducted on-farm in three Local Government Areas (Jos South, Jos North and Barkin Ladi) of Jos Plateau. Jos has an altitude of 128 meters above sea level and lies on longitude 8^{o} $45^{'}$ east and latitude 9^{o} $43^{'}$ north [12]. The mean relative humidity ranges from 49 to 85% while evaporation ranges from 14 to 298 mm; with minimum and maximum evaporations recorded in August and March, respectively. The mean air temperatures varied little from 19.5 to 23.5^{o}C, while the daily minimum and maximum air temperatures ranged from 12.0 to 17.0^{o}C and 24 – 31^{o}C, respectively. The climate shows a characteristic cold spell common to high altitudes and subtropical regions. The climate has therefore been described as subtropical with montane vegetation [12].

Data collection

Thirty (30) questionnaires were randomly distributed to 30 sampled turkey farmers in Jos Plateau. The farmers sampled were residing in Jos South, Jos North and Barkin Ladi Local Government Areas of the Plateau. On-farm visits were paid to these farmers, and each farm was visited thrice. The study lasted over a period of ten (10) months commencing from February to November, 2008. Breeding characteristics of turkeys were evaluated with respect to age at sexual maturity, age at breeding, brooding method, incubation traits, adoption of artificial insemination

technique, cross breeding techniques, determination of sex ratio and other relevant information regarding the breeding of these animals were recorded.

Data analysis

The data generated from this study were subjected to simple descriptive statistics to describe the breeding characteristics of these birds. Other relevant information was also analysed, as previously described by [13].

RESULTS

Data on some reproductive traits of turkeys raised on Jos Plateau are presented in Table 1. The results showed that most turkeys (63.3%) attained sexual maturity at the age of 8 – 9 months.

Table 1: Some reproductive traits of turkeys raised on Jos Plateau, Nigeria

Item	Number of respondents	Percentage
Age at maturity (months)		
6 – 7	9	30.0
8 – 9	19	63.3
≥ 10	2	6.7
Age at breeding (months)		
12	17	56.7
13	10	33.3
≥ 4	3	10.0
Artificial brooding		
Yes	17	56.7
No	13	43.3
High survival brooding method		
Free ranging	10	33.3
Artificial rearing	20	66.7
Incubation of eggs		
Yes	14	46.7
No	16	53.3
Clutch size at hatching		
0 – 5	9	30.0
6 – 10	14	46.7
11 - 15	7	23.3
Ability to hatch all eggs		
Yes	1	3.3
No	19	63.4
Not sure	10	33.3
Hatching in one year		
Once	4	13.4
Twice	10	33.3
Thrice	16	53.3

There were 30.0% of the turkeys attained maturity at slightly shorter period (6 – 7 months), with few others (6.7%) reaching sexual maturity at a much longer period (≥ 10 months). Most turkey

farmers (56.7%) bred their animals when they were12-month old. Other farmers bred turkeys at the age of 13 months and above. About 56.7% of the farmers employed artificial brooding method in raising poults. There were 66.7% farmers who reared their turkeys artificially, with few others (33.3%) adopting the extensive system. The results also showed that most farmers (53.3%) do not incubate eggs laid on their farms. The clutch size at hatching was mostly between 6 and 10 eggs at the 28-day incubation period. Hens hatching 0 -5 and 11 – 15 eggs were 30.0 and 23.3%, respectively. However, most of the eggs laid (63.4%) were not hatched. The percentages of hens hatching eggs once, twice and thrice per year were 13.4, 33.3 and 53.3%, respectively as shown in Table 1.

Table 2: Breeding and management characteristics of turkeys on Jos Plateau, Nigeria

Item	Number of respondents	Percentage
Interest in artificial insemination		
Yes	22	73.3
No	8	26.7
Cross breeding with imroved breed		
Yes	6	20.0
No	24	80.0
Sex ratio		
1: 2 or 4	18	60.0
1: 5 or 8	12	40.0
Source of breeding/replacement stock		
Other farmers	12	40.0
Purchase /market	12	40.0
Descendant	6	20.0
Provision of housing		
Yes	16	53.3
No	14	46.7
Provision of supplementary feeding		
Yes	29	96.7
No	1	3.3
Required veterinary assistance		
Yes	22	73.3
No	8	26.7
Age of high morbidity/ mortality(weeks)		
0 – 3	9	30.0
4 – 6	14	46.7
7 - 12	7	23.3

Table 2 depicts information on breeding and management characteristics of turkeys on the Plateau. There were 73.3% who had interest in adopting artificial breeding programme, but there were some farms (20.0%) that cross breed with other improved turkey breeds. About 60.0% of the farms maintained sex ratio of 1: 2 or 4, while others maintaining a higher ratio of up to 1: 5 or 8. The farmers mostly obtained their breeding/ replacement stock through other farms (20.0%) and purchase from market (20.0%). However, most farmers (53.3%) made provision for housing and supplementary feeding (96.7%) to the turkeys. About 73.3% of the farmers had access to veterinary health care. The period (4 - 6 weeks) recorded highest cases of poult morbidity/

mortality. This was also high when the poults were between 0 and 3 weeks of age, as presented in Table 2.

DISCUSSION

Turkeys raised on Jos Plateau exhibited variations in their breeding characteristics. For instance, most birds attained sexual maturity at a longer age (8 - 9 months). This contradicts the findings of [14] who reported shorter age (7 - 8 months) at attainment of sexual maturity in the turkeys. This variation in the two studies might have been partly attributed to difference in bird management, where some farms were practising the extensive system of production. This system requires minimal use of inputs in the production processes. Breed difference may also be partly responsible for the longer sexual maturity, since the breed used in the present study area was mainly the local stock. The local turkeys despite having poor growth performance, the free-range system (being common among farms) might have compounded the effect of growth retardation. This growth effect may be linked with the prolonged age at sexual maturity of these turkeys. This was similarly observed by [15] that the small scale turkey farmers in Africa in general and Nigeria in particular produce bulk number of turkey locally. The increased age at maturity may ultimately affects turkeys' productivity since reproduction is delayed as a result of prolonged age at maturity. However, the reduced reproduction of such turkeys may also be implicated to factors as brooding, poult rearing and the prevailing rearing system. This was similarly reported by [16] that brooding, rearing chicks and variability in quantity and quality of feeds are over-burdening tasks on the chickens, all of which give the birds little or no time for productive purposes.

However, the present investigation observed low fertility of turkey eggs in the study area, as 46.7% of the farms investigated recorded clutch size of only 6 – 10 eggs at hatching. This trend is in disagreement with the values reported by [14] for fertility (83%) and hatchability (84%) of fertile turkey eggs. The low clutch size of the turkeys studied might be associated with the poor genetic material of the local turkeys, coupled with low management practices since some farms were not even housing or providing supplementary feeds to these animals. Turkeys reared under unimproved conditions of management generally have lower productivity [2]. For instance, poults during their early stages of life had high morbidity/ mortality as observed in this study. This is an index of low managerial inputs in rearing this species. It is suggested that high survival rate under artificial brooding, especially when vaccines and other necessary requirements are provided [17].

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. This, probably, is the reason why some farmers were making effort to up grade their turkeys through cross breeding with other improved breeds. Natural mating is a component of cross breeding where turkey hens are served naturally on the farms by the toms. The low sex ratio on the farms studied is an indication that the breeding system is not controlled by the farmers. There were variable sex ratios among farms in the study area (1:2 or 4 and 1: 5 or 8). It is reported that for high fertility to be achieved one tom is to serve 20 hens in a flock of turkeys [18]. 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 programme that does not take sex ratio into consideration is likely to have a deleterious effect on the fertility. The consequence 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.

CONCLUSION

This study on breeding characteristics of turkeys on Jos Plateau showed reduced reproductive performance, which implicated factors such as uncontrolled breeding programmes, low genetic material of the local stock as well as poor management practices. It is, therefore, suggested that for successful turkey farming on the Plateau special considerations must be given to these constraints so as to enable the birds to fully express their genetic make-up, since the area has favourable weather conditions.

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