

AGES AND BODY WEIGHTS AT PUBERTY OF FOUR STRAINS OF TURKEYS REARED IN NIGERIA

C. C. Nwoga, N. S. Machebe, H. M. N. Foleng & S. O. C. Ugwu

Department of Animal Science, Faculty of Agriculture, University of Nigeria, Nsukka.

Corresponding author: C.C. Nwoga; E-mail: cornelius.nwoga@unn.edu.ng; Tel: +2348039307202

ABSTRACT

A study was conducted to investigate the ages and body weights at puberty of four strains of turkeys reared in Nigeria. The four strains comprised 1 exotic strain (White Nicholas, WN) and 3 local strains (White, black and silver plumage colours). A total of eighty (80) turkeys were used comprising 10 toms and 10 hens each of White Nicholas turkeys, White Local turkeys, Silver Local turkeys and Black Local turkeys. All the animals were fed 5% of their live body weights and water was given *ad libitum*. The age at puberty for the toms was determined as when first ejaculate containing viable sperm cells while that for hens was the age at first lay of egg. The trial was done in a completely randomized design (CRD). Data collected were subjected to analysis of variance. The results of the study showed that there were significant ($P < 0.05$) strain effect on average daily weight gain, feed intake, feed conversion ratio and ages at puberty in both toms and hens. It was concluded that strain differences with respect to growth performance and age at puberty exist. It was concluded that strain differences affected age and body weights of toms and hens at puberty.

Keywords: Age, body weight, strain, puberty, turkeys

INTRODUCTION

Puberty in animals is sex dependent. Most definitions of puberty capture the female animal more than the male animal. However, it can be defined, in the male, as the time when fertile spermatozoa are in the ejaculate (Bearden and Fuquay, 1997) and in the female as the age at the first oviposition. The age at puberty is influenced *inter alia* by breed, genetic selection, nutrition, season of birth, as well as body size (Jafari and Hashemi, 2014). Thus, determining the age at puberty of male and female turkey genotypes commonly reared in Nigeria will facilitate adequate planning of breeding/multiplication of the various types for meat production.

Turkeys commonly reared in developing countries can be classified by their genotype or plumage colours (Thears, 2007). Several plumage colours of turkey genotype exists which include black, bronze, brown, red and white (Schoger, 1964) with black, bronze and white predominantly existing in the tropical environment (Okoro, *et al.*, 2012). Commercial turkey production in Nigeria is still rudimentary. The reason for this apparent low production seems to be lack of appreciation of its potential role in animal protein generation (Abeke and Ubani, 2008). Nevertheless, the full potentials in turkey cannot be harnessed until we come to terms with their reproductive capacities which include age at puberty.

The assessment of the semen quality characteristics of the poultry species gives an excellent indicator of their reproductive potentials and it is a *sine qua non* to effective artificial insemination programme (Zahraddeen *et al.*, 2005).

The study aimed at evaluating the ages and body weights at puberty of four strains of turkeys reared in Nigeria.

MATERIALS AND METHODS

The study was conducted at the Poultry Unit of the Department of Animal Science Teaching and Research Farm, University of Nigeria, Nsukka. A total of eighty (80) turkeys were used comprising 20 White Nicholas turkeys (10 toms and 10 hens), 20 White Local turkeys (10 toms and 10 hens), 20 Silver Local turkeys (10 toms and 10 hens), and 20 Black Local turkeys (10 toms and 10 hens). Initial body weight values were taken and subsequent weights were taken with a weighing scale and recorded every four weeks till the age at puberty. The age at puberty for the toms was determined as when first ejaculate containing viable sperm cells were collected while that for hens was the age at first lay of egg. The training of toms for semen collection started at twenty weeks of age and their responses were monitored. Semen quality evaluation to determine semen volume and progressive motility were carried out immediately the toms reached puberty. Semen samples were collected from the 10 toms in each of the strains and pooled for analysis. Semen was collected by using the

abdominal massage technique as described by Burrows and Quinn (1937) which was slightly modified in this experiment by tying the two legs with a rope and pegging the rope to the wall to enable one collector in the process as opposed to two persons in the method described by Burrows and Quinn (1937). In Burrows and Quinn's method, two collectors are involved. One is the massager who places the tom on his laps and the other is the collector who grabs the legs of the tom and scoops the semen with the centrifuge tube when it flows. The modification here uses one man for collection as opposed to two-man method by excluding the holder and collector. With this, the massaging, holding and collection can be done by a single person and it saves the cost of paying the second person. Semen quality traits with respect to volume and motility evaluated. This experiment was carried out using a completely randomized design (CRD) with the model below;

$$Y_{ij} = \mu + T_i + e_{ij}$$

Where;

Y_{ij} = Individual observation;

μ = Population mean;

T_i = Treatment effect, and;

e_{ij} = Experimental error associated with observation.

The data collected on body weights, ages at puberty and semen quality traits were subjected to Analysis of Variance (ANOVA) using the Statistical Package for Social Sciences (SPSS, 2010). Significantly different means were separated using Duncan's New Multiple Range Test (DNMRT) (Duncan, 1955).

RESULTS AND DISCUSSION

The results on ages and body weights of toms and hens and semen volume and sperm motility of toms in four strains of turkeys are presented in Tables 1, 2 and 3.

Table 1: Ages and body weights at puberty of the toms

Parameters/Strains	WN	Black	White	Silver	SEM
Age (days)	189.00±1.41 ^a	183.00±1.41 ^c	161.00±1.41 ^d	175.00±1.41 ^b	3.98
Body weight at puberty (kg)	15.00±0.00 ^a	6.81±0.00 ^c	6.19±0.00 ^b	6.15±0.00 ^d	1.42

a, b, c, d means with different superscripts in rows for different traits are significant ($P < 0.05$). WN=White Nicholas.

Age at puberty of toms

The mean age at puberty for the four strains of toms ranged from 161.00±1.41 days – 189.00±1.41 days. White local toms were the first to attain puberty while the WN toms were the last to attain puberty. The results of this study disagree with the findings of Eaton (1992) that toms breed at 10 months of age (280 days). The White local toms with least mean age at puberty is advantageous as it breeds earlier. The reason for this may be because in both animals and humans, the age at puberty appears to be related more to body weight at maturity than to chronological age (Baker, 1985).

Body weight of toms at puberty

The mean body weights of toms at puberty showed significant ($P < 0.05$) differences among all the strains and ranged from 6.15±0.00 kg – 15.04±0.00 kg. The highest mean weight of 15.04±0.00 kg was recorded in WN toms and the least mean value of 6.15±0.00 kg was recorded in Silver local toms. This may imply that body weight at puberty is influenced by the genetic background of the animal with more genetically endowed individuals reaching puberty at higher body weight (Bearden *et al.*, 2004).

Table 2: Ages and body weights at puberty of the hens

Parameters/Strains	WN	Black	White	Silver	SEM
Age (days)	195.00±1.41 ^a	192.00±1.41 ^a	188.00±1.41 ^b	176.00±1.41 ^c	2.76
Body weight at puberty (kg)	9.52±0.00 ^a	4.15±0.00 ^b	3.41±0.00 ^d	3.57±0.00 ^c	0.96

a, b, c, d means with different superscripts in rows for different traits are significant (P<0.05). WN=White Nicholas.

Age of hens at puberty

The mean ages of hens at puberty showed significant (P<0.05) differences with the range being 176.00±1.41 – 195.00±1.41 days. The highest mean value of 195.00±1.41 days was recorded in WN hens with the least mean value of 176.00±1.41 days recorded in Silver local hens. The results of this study agrees with the findings of Siopes (2010) who reported the age at lay for hens to be within the range of 24-30 weeks (168-210 days). However, the results disagree with the findings of Eaton (1992) that hens lay eggs at 10 months of age (280 days or 40 weeks). The Silver local hens that commenced laying earlier than others may imply that whether for breeding or for table egg production, they may give more profitable returns to the farmer than other strains. This trait is of considerable economic advantage and should be selected for in a planned genetic improvement of the local turkey.

Body weight of hens at puberty

The mean body weight values for hens ranged from 3.41±0.01kg – 9.52±0.00kg with significant (P<0.05) differences occurring among the strains. The highest mean value of 9.52±0.00 kg was recorded in WN hens and the least mean value of 3.41±0.01kg was recorded in White local hens. This may imply that for meat production, WN hens are more efficient than other strains. It is important to note that the highest body weight attained by the indigenous strains was obtained in Black local hens (4.5 kg). The range of body of body weights at puberty in local strains (3.41 – 4.15 kg) are generally lower and suggest that they are in the light ecotype category of turkeys.

Table 3: Semen volume and progressive motility of the toms at puberty

Parameters/Strains	WN	Black	White	Silver	SEM
Semen Volume (ml)	0.43±0.04 ^a	0.28±0.04 ^b	0.23±0.04 ^b	0.43±0.04 ^a	0.04
Progressive Motility (%)	85.00±7.07	85.00±7.07	95.00±7.07	85.00±7.07	0.50

a, b means with different superscripts in rows for different traits are significant (P<0.05). WN=White Nicholas.

Semen volume

The mean semen volumes in the local strains and WN strain studied ranged from 0.23±0.04 – 0.43±0.04 ml. The highest mean volume of 0.43±0.04 ml was recorded in WN toms and Silver local toms and the least mean volume of 0.23±0.04 ml was recorded in White local toms. The results recorded in Black and Silver local toms were in tandem with the results of Zahraddeen *et al.* (2005) and Ogbu *et al.* (2016) who found the ranges of 0.17-0.32 ml in local and exotic strains of turkeys and 0.21-0.38 ml in local toms fed zinc and selenium supplemented diets. However, the 0.43 ml recorded in WN and Silver local toms disagrees with the findings of the above researchers. Ogbu *et al.* (2016) did not consider WN toms in their work and both researchers considered local strains collectively as local breed.

CONCLUSION AND RECOMMENDATIONS

It was concluded that strain differences affected age and body weights of toms and hens at puberty. For meat production in Nigeria, WN turkeys are recommended while for breeding, white local toms and silver local hens are recommended.

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