

1           EFFECT OF BREED AND SEX ON BODY  
2           WEIGHT AND LINEAR BODY  
3           MEASUREMENTS OF TURKEYS (*Meleagris*  
4                                   *gallopavo*)  
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7   **ABSTRACTS**

8   **Aim:** This study was conducted to investigate the effect of breed and sex on body weight and  
9   linear body measurements of 100 Turkeys which comprised of 50 Norfolk breed and 50  
10   Mammoth breed.

11   **Study Design and Duration:** The experiment lasted for 20 weeks during which the  
12   performance parameters were monitored in 100 Turkeys using completely randomized  
13   design.

14   **Methodology:** The body weight and linear measurements were taken at interval of two  
15   weeks (i.e. day 1, 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 weeks respectively). Parameters  
16   monitored were shank length (cm), back length (cm), chest girth (cm), neck length (cm),  
17   thigh length, and wing length and body weight.

18   **Results:** Result obtained showed that there was significant differences ( $P<0.05$ ) in body  
19   weight across the breed with Norfolk having  $2.70\pm 0.04$  and Mammoth  $2.55\pm 0.04$ . The linear  
20   measurements studied (body length, neck length, back length, shank length, thigh length,  
21   wing length, and chest girth) showed that the Norfolk had superiority over the Mammoth  
22   breed.

23   **Conclusion:** The analyses on the effect of sex on linear body measurements, the results from  
24   this research revealed that male turkeys showed remarkable and better growth performance  
25   than their female counterparts for all traits and ages. These results also revealed that males  
26   generally had higher values in linear body parameters.

27   **Introduction:**

28   Turkey (*Meleagris gallopavo*) is a source of protein and one of the world most demanded  
29   poultry products and it is also consumed in large quantities in Nigeria. Turkey has been found  
30   to contribute to the economic and social life of Nigerians in that they are used during festive  
31   period (Smith, 1990). Despite the increase in demand for turkey consumption, there are no  
32   large scales commercial turkey farms in Nigeria to meet the ever increasing demand (Ogah,  
33   2011). Growth is defined as the increase in the numbers of cell of the body. The exact time at  
34   which the animal is ready for slaughter can be accessed on the basis of body weight and  
35   general development (Kabir *et al.*, 2006).  
36

37 Adeniji and Ayorinde (1990) reported that establishment of relationship between body weight  
38 and conformation traits such as shank length, thigh length, breast width, neck length and back  
39 length makes the work of breeders easier and faster as efforts can be concentrated on those  
40 traits that are easier to be measured. Ibe and Ezekwe (1994) reported that body weight and  
41 linear body measurements have been documented and found useful in qualifying body size  
42 and shape.

43

#### 44 **OBJECTIVES:**

45 The objectives of the study were to determine:

- 46 1. The effect of breeds of turkey (Norfolk-black and Mammoth-bronze) on body weight  
47 and linear body measurements.
- 48 2. The effect of sex of the birds on body weight and linear body measurement of two  
49 different breeds of turkey (Norfolk-black and Mammoth-bronze).

#### 50 **Materials and Methods:**

##### 51 **Experimental site:**

52 This research was carried out at Poultry Unit of the Department of Animal Science, Faculty  
53 of Agriculture, Ahmadu Bello University, Zaria. Zaria is Located within the Northern Guinea  
54 Savannah Zone of Nigeria, on the latitude 11<sup>0</sup>9' 45" N and longitude 7<sup>0</sup> 38' 8" E, at an  
55 altitude of 610m above sea level (Ovimaps, 2012).

##### 56 **Source of experimental birds:**

57 Day old Poults of two breeds of Turkey were purchased from ZARTECH Farms Ltd, Ibadan,  
58 Oyo State of Nigeria. A total of 100 day old Poults of Turkey comprising of 50 Norfolk-black  
59 and 50 Mammoth-bronze were used for this study. The experiment lasted for 20 weeks

##### 60 **Experimental design:**

61 The study was 2-way factorial arrangement with breed and sex in 2 × 2 factorial in  
62 Completely Randomized Design (CRD), each breed was replicated five times with ten birds  
63 per replicate.

##### 64 **Body weight (kg):**

65 The body weight of an individual bird was taken with a weighing scale in the morning before  
66 feeding at the interval of two weeks (i.e. day 1, 2 weeks, 4 weeks, 6weeks, 8 weeks, 10weeks,  
67 12 weeks, 14 weeks, 16weeks, 18 weeks and 20 weeks). All birds were weighed and the  
68 mean body weight was calculated for each breed.

##### 69 **Linear body measurements:**

70 Linear measurements were taken at interval of two weeks (i.e. day 1, 2, 4, 6, 8, 10, 12, 14, 16,  
71 18 and 20 weeks respectively) and they included shank length (cm), back length (cm), chest  
72 girth (cm), neck length (cm), thigh length, and wing length. All measurement was done with  
73 a tailor's tape rule calibrated in centimetre.

74 *Shank length (SH):* The bones of tarso- metatarsus were measured from hock joint to the base  
75 of three toes that make the shank.

76 *Back length (BL):* The back was measured from the base of the neck to the uropygial gland  
77 at the base of the tail.

78 *Chest girth (CG)*: The measurement were across the keel bone from left armpit to the right  
79 armpit

80 *Thigh length (TL)*: The measurement was taken from the hock joint to the hinge joint.

81 *Neck length (NL)*: The neck was gently straightened out and the length was measured.

82 *Wing length (WL)*: The wing was measured from the shoulder joint to the extremity of  
83 terminal phalanges.

84 **Statistical Analysis:**

85 The data generated were subjected to General Linear Model (GLM) procedure of SAS  
86 (2002). Difference among the breeds in terms of body weight, linear body measurements and  
87 carcass traits were compared using Duncan Multiple Range Test (DMRT) Duncan, (1955).

88 **Model for the experiment:**  $Y_{ijk} = \mu + B_i + S_j + (B \times S)_{ij} + e_{ijk}$

89 Where:  $Y_{ijk}$  = Observations,  $\mu$  = Overall population mean,

90  $B_i$  = the effect of  $i^{\text{th}}$  breed ( $i$  = Norfolk-black, Mammoth-bronze)

91  $S_j$  = the effect of  $k^{\text{th}}$  sex ( $k$ = male, female),  $B \times S_{ij}$  = interaction of breed and sex

92  $e_{ijk}$  = random error term

93 **RESULTS AND DISCUSSION**

94 **Table 1: least square means ( $\pm$ SE) of breed effect of Turkey at 20 weeks**

	LSM $\pm$ SE	
Traits	Norfolk	Mammoth
BW	2.70 $\pm$ 0.04 <sup>a</sup>	2.55 $\pm$ 0.04 <sup>b</sup>
NL	28.04 $\pm$ 0.08 <sup>a</sup>	26.44 $\pm$ 0.08 <sup>b</sup>
BL	31.54 $\pm$ 0.11 <sup>a</sup>	31.34 $\pm$ 0.11 <sup>b</sup>
TL	18.63 $\pm$ 0.11 <sup>a</sup>	18.90 $\pm$ 0.11 <sup>b</sup>
SL	15.47 $\pm$ 0.11 <sup>a</sup>	14.88 $\pm$ 0.11 <sup>b</sup>
CG	44.65 $\pm$ 0.17 <sup>a</sup>	42.65 $\pm$ 0.17 <sup>b</sup>
WL	31.55 $\pm$ 0.11 <sup>a</sup>	30.84 $\pm$ 0.11 <sup>b</sup>

104 ab means with different subscripts on the same row are significantly different ( $p < 0.05$ ). BW= body weight; NL=Neck length; BL=Back  
105 length; TL= Thigh length; SL= Shank length, CG= Chest Girth, WL= Wing length.

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110 **Table 2: least square means ( $\pm$ SE) of sex effect of Turkey at 20 weeks**

111 LSM $\pm$ SE		
112 Traits	Male	Female
113 BW	2.94 $\pm$ 0.03 <sup>a</sup>	2.23 $\pm$ 0.03 <sup>b</sup>
114 NL	28.27 $\pm$ 0.09 <sup>a</sup>	26.19 $\pm$ 0.09 <sup>b</sup>
115 BL	32.97 $\pm$ 0.09 <sup>a</sup>	29.94 $\pm$ 0.09 <sup>b</sup>
116 TL	20.29 $\pm$ 0.09 <sup>a</sup>	17.23 $\pm$ 0.09 <sup>b</sup>
117 SL	16.34 $\pm$ 0.09 <sup>a</sup>	14.01 $\pm$ 0.09 <sup>b</sup>
118 CG	45.59 $\pm$ 0.15 <sup>a</sup>	41.69 $\pm$ 0.15 <sup>b</sup>
119 WL	32.48 $\pm$ 0.09 <sup>a</sup>	29.90 $\pm$ 0.09 <sup>b</sup>

120 ab means with different subscripts on the same row are significantly different ( $p < 0.05$ ). BW= body weight; NL=Neck length; BL=Back  
 121 length; TL= Thigh length; SL= Shank length, CG= Chest Girth, WL= Wing length.

122 **Table 3: Breed and sex effects on linear body measurement of Turkeys at 20 weeks of**  
 123 **age.**

124 Traits	NORFOLK		MAMMOTH		SEM	LOS
	Male	Female	Male	Female		
BW	4.15 <sup>a</sup>	2.80 <sup>d</sup>	3.70 <sup>b</sup>	3.02 <sup>c</sup>	0.04	*
NL	29.59 <sup>a</sup>	26.49 <sup>c</sup>	26.98 <sup>b</sup>	25.90 <sup>d</sup>	0.10	*
BL	33.38 <sup>a</sup>	29.68 <sup>d</sup>	32.56 <sup>b</sup>	30.20 <sup>c</sup>	0.13	*
TL	20.31 <sup>a</sup>	16.96 <sup>c</sup>	20.29 <sup>a</sup>	17.50 <sup>b</sup>	0.13	*
SL	16.60 <sup>a</sup>	14.33 <sup>c</sup>	16.07 <sup>b</sup>	13.69 <sup>d</sup>	0.13	*
CG	47.57 <sup>a</sup>	41.72 <sup>c</sup>	43.62 <sup>b</sup>	41.68 <sup>c</sup>	0.21	*
WL	33.29 <sup>a</sup>	29.80 <sup>c</sup>	31.67 <sup>b</sup>	30.00 <sup>c</sup>	0.13	*

124 BW=Body weight, NL=Neck length, BL=Back length, TL=Thigh length, SL= Shank length, CG= Chest girth, WL= Wing length.

125  
 126 From the result obtained there was significant differences ( $P < 0.05$ ) in body weight across the  
 127 breed with Norfolk having 2.70 $\pm$ 0.04 and Mammoth 2.55 $\pm$ 0.04, this result is not the same  
 128 with the report of Popescu-Vifor And Puscatu, (1979), this difference may be due to genetic  
 129 makeup of the breed and environmental factors where the birds were raised. The results on  
 130 linear body measurements show that among the two breeds of turkeys growth potentials vary.  
 131 The linear measurements studied (body length, neck length, back length, shank length, thigh  
 132 length, wing length, and chest girth) showed that the Norfolk had superiority over the  
 133 Mammoth breed, the result agreed with that of Gous (1997), who reported that growth is  
 134 normally accompanied by an orderly sequence of maturational changes and involve accretion  
 135 of protein and increase in length and size, not just an increase in body weight.

136  
 137 The analyses on the effect of sex on linear body measurements, the results from this research  
 138 revealed that male turkeys showed remarkable and better growth performance than their  
 139 female counterparts for all traits and ages. These results also revealed that males generally  
 140 had higher values in linear body parameters according to Garcia *et al.* (1991) and Ikeobi *et al.*  
 141 (1995) that sexual dimorphism was in favour of males in the performance of strains of birds

142 studied. Fayeye *et al.* (2006) attributed this difference to genetic effect of sex which arises  
 143 from the male sexual activities. It has also been reported that sex differences were usually  
 144 due to differences in hormonal profile, aggressiveness and dominance especially when both  
 145 sexes are reared together (Ibe and Nwosu, 1999).

146 Result show the interaction effect of breed and sex on body weight and linear body  
 147 measurements of Turkey at 20 weeks of age, there was significant differences ( $P<0.05$ )  
 148 within and across the breed in body weight and linear body measurements of both sexes, this  
 149 result agreed with the report of Ogah (2011) who reported that the body weight and linear  
 150 body measurements of the indigenous turkey by sex were significantly different because the  
 151 sexual dimorphism was in favour of the male ( $P<0.05$ ), as expressed in all traits studied, with  
 152 the males being significantly heavier ( $3.38\pm 0.07$ ) than the females ( $2.65\pm 0.02$ ). But the  
 153 values were lower than those reported by Kodinetz (1940) from Zagorje turkey at 20 weeks  
 154 of age (6.01 kg for male and 3.97 kg for female, respectively). The relatively low body  
 155 weight in the present study compared to the respective traits found in temperate region may  
 156 have been due to the unfavourable environmental conditions such as temperature, feed supply  
 157 and non-selection characteristics of tropical animal genetic resources.

158

### 159 CONCLUSION

160 It is concluded the result from this research revealed that male turkeys showed remarkable  
 161 and better growth performance than their female counterparts for all traits and ages. These  
 162 results also revealed that males generally had higher values in linear body parameters and  
 163 body weight.

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