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Study the Effect of Local vs. Imported Heavy and Light Turkey Strains on Muscles and Bones Conformation of the Drum-Sticks

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Abstract: The Experiment was conducted at the Laboratories of Animal Resources Department, College Agriculture and Forestry, Mosul University, using drum-stick part of a slaughtered body of local Iraqi and imported American Heavy and Light of drum-sticks Turkey bird's strains. Anatomies of each drum-stick were done to study muscles and bones conformations such as weight, length, width and thickness of muscles and weight, length, width and thickness of the dressed drum-sticks bones (Nazarian bones). The results yielded highly significant ($p \leq 0.01$) strain differences in drum-stick weight, width and thickness for the heavy vs. light and local strains, which reflected the same results on the same traits of flesh dressed meat of the drum-sticks and on tibia, fibula and Nazarian bones traits also. Number of muscles and Nazarian bones in the three strains showed highly significant ($p \leq 0.01$) differences (14, 7 and 9) muscles between the local vs. light and heavy strains and (18, 10 and 16) bone for the local vs. light but not with Heavy strains. The results of the present study revealed that the Nazarian bone shapes showed different bone shapes, some of them were replicated in the three different strains.

Key words: Turkey strains, drum-sticks muscles, drum-sticks bones, Nazarian bones

INTRODUCTION

The demand on turkey meat was increased during the last few years, especially in some of the Middle East countries, scheduled with propagation of the new modern food supermarkets that delivered many kinds of imported food, one of them was Turkey meats and their ready to cook turkey parts (breast and drum-sticks). Brenoe and Kolstad (2000) mentioned that this part industry demands larger pieces than does the traditional turkey market, which leads to a specialized turkey production to satisfy different markets by utilizing the biological diversity within turkeys, they studied the development of muscles and bones using 4-12 wk old, two commercial strains of turkey (BUT-9 and Nicholas). They indicated that meat proportion while bone percentage decreased significantly throughout the experimental period of both strains. BUT-9 tend to have a higher percentage of meat than did Nicholas, while Nicolas strain of turkey showed lower bone percentage than BUT-9. Nestor *et al*. (2001) mentioned that genetic variation in carcass traits and body shape in turkey had received little attention, they reciprocally crossed pure line (F) of turkey with two commercial Large-bodies lines (A and B) breeders. They noticed that drum-stick muscles and tibia tarsal bones came more from the F line. Relative to commercial lines the (F) had less leg muscling and larger leg bones. However, drum-stick muscles and bones conformations were studied by Taha and Farran (2009), They used local Lebanese strain and the imported BUT-9 strain in their experiment, they concluded that the imported BUT-9 strain had significantly higher number of drum-stick muscles (17.75) as compared with the local Lebanese strain (14.00), with no Nazarian bones found in the imported BUT-9 drum-stick strain, while the local Lebanese one had (18) of the Nazarian-bones. The objective of the current research is to study the strain effect on muscles and bones conformation of the drum-sticks of turkey and to personification shapes of Nazarian bones.

MATERIALS AND METHODS

The Experiment was conducted at the Laboratories of Animal Resources Department, College Agriculture and Forestry, Mosul University, using drum-stick part of a slaughtered body of local Iraqi and commercial American Heavy and light of turkey drum-sticks as described by the sticker found on the purchased case, belonged to American food company (Swift Eckrich, Inc.), with four replicate for each strain. Anatomies of each drum-stick were done to study some of muscles and bones conformations traits, such as weight, length, width and thickness of each muscle and dressed drum-sticks bones including the Nazarian bones also, using a very sensitive and accurate electronic balance for weight measurements and a fernier instrument and micrometer fernier to measure length, width and thickness of the studied traits of bones and muscles.

The collected data statistically analyzed using complete randomized design, to study strain effect on the studied traits, using the Computerized Statistical Analyzing System (SAS), (SAS, 2002) and means significance differences were done using Duncan Multiple Range test at level of ($p \leq 0.01$) of significance, standard error of means were done also.

Table 1: Means ± standard error of drum-stick traits and it's content of muscles and bones in turkey strains

	Drum-stick's traits							
Turkey strains	Weight (gm.)	Length (cm.)	Width (cm.)	Thickness (cm.)	Muscles No	Nazarian bones No.	Nazarian bones weight (gm.)	Nazarian bones (%)
Local	289.38±05.42c	21.88±0.68b	8.36±0.13c	3.75±0.08c	14.00a	18.00a	8.40±0.14C	2.90±0.003c
Light	341.38±12.02b	18.75±0.32c	21.63±0.90b	8.25±0.25b	7.00c	10.00b	16.47±1.14B	4.82±0.095a
Heavy	979.10±16.92a	25.48±0.38a	30.93±0.58a	9.31±0.28a	9.00b	16.00a	34.68±0.65A	3.54±0.003b
Level of sig.	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Sig. = Significance

Table 2: Means ± standard error of drum-stick large bones (Tibia and Fibula) in turkey strains

Turkey strains	Tibia bone length (cm.)	Tibia bone thickness (cm.)	Tibia + Fibula bones weight (gm.)	Tibia + Fibula bones percent (%)	Bones percent (%)	Dressed meat weight (gm.)	Dressed meat percent (%)
Local	19.50±0.65B	0.92±0.03c	54.90±1.81c	18.97±0.13C	21.87±0.21c	225.85±3.71C	78.13±0.21a
Light	16.50±0.29C	1.09±0.04b	67.25±1.71b	23.24±0.24a	24.57±0.35a	257.39±9.89B	75.43±0.35c
Heavy	23.00±0.41A	1.43±0.04a	187.08±3.09a	19.11±0.05b	22.66±0.04b	757.06±13.29a	77.34±0.04b
Level of significance	0.01	0.01	0.01	0.01	0.01	0.01	0.01

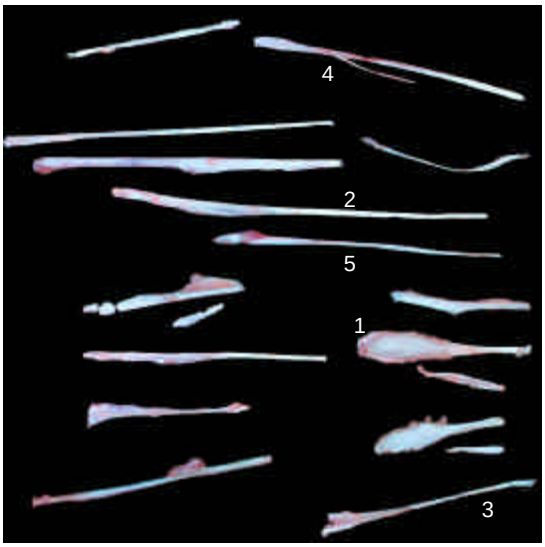
RESULTS AND DISCUSSION

The results of Table 1 showed great differential with the mean weights of drum-sticks of the three studied strains at marketing age, commercial Heavy strain had the highest mean weight (979.10) gm which significantly different ($p \leq 0.01$) of that in commercial Light strain (341.38) gm, which intern differed significantly ($p \leq 0.01$) from local strain (289.38). The same status were noticed with drum-stick width and thickness traits, (30.93, 21.63 and 8.36) cm for the width trait and (9.31, 8.25 and 3.75) cm for thickness trait for imported commercial heavy and light and local strains respectively. However, drum-stick length was significantly different ($p \leq 0.01$) of that in local strain, which intern differ significantly ($p \leq 0.01$) of that in commercial Light strain, the drum-sticks length were (25.48, 18.75 and 21.88) cm for commercial imported heavy, commercial Light and local strains for thickness trait respectively.

The commercial Heavy strain had higher tibia bone weight and thickness as compared with the other two strains, with weight of (187.08, 67.25 and 54.90) gm and thickness of (1.43, 1.09 and 0.92) cm for the commercial American heavy, commercial Light and local strains respectively with highly significant differences ($p \leq 0.01$) between them. Same level of significance differences were noticed for the flesh meat weight that dressed out from the drum-sticks and also for the bones weight of tibia and fibula together with the Nazarian bones insides, on which rated (757.06, 257.39 and 225.85) gm for the meat weight and (34.68, 16.47 and 8.40) gm for bones weight for the three strains respectively. However, number of muscles of the drum-stick in local strain (14 muscle) was significantly ($p \leq 0.01$) greater then on that of the commercial Heavy (9 muscles), which intern significantly ($p \leq 0.01$) exceeded that of commercial Light strain (7 muscles) respectively. Also strain effect was highly significant ($p \leq 0.01$) with tibia bone length for the commercial Heavy strain as compared with commercial American and local strains, with average of (23.00, 16.50 and 19.50) cm respectively.

The results presented in Table 1 showed no significance differences in Nazarian bones number for each of the local strain (18 bones) and commercial Heavy strain (16 bones), while both were significantly different ($p \leq 0.01$) with that of the commercial Light strain (10 bones), but for Nazarian bones weight the heavy breed showed significantly ($p \leq 0.01$) more weight as compared with the light and local strain respectively, while the light strain had significantly more Nazarian bone percent as compared with the heavy and local strains. The results of drum-stick's large bones (Tibia and Fibula) were presented in Table 2 showed highly significant differences ($p \leq 0.01$) in tibia bone length and thickness leading that the heavy strain exceeded that of local strain then the light strain respectively, while the heavy strain exceeded both light and local strain in tibia and fibula bones weight but not as bone percent of the whole drum-stick weight. Also the heavy strain had higher dressed meat weight but not as dressed meat percent, on which the local one showed more dressed meat percent as compared with the whole drum-stick weight.

The study of the Nazarian bone shapes declared that there were different bone shapes according to their presence in the different muscles and in different numbers of the drum-stick. Local strain had (14) muscles which characterized by their outside wide and flat muscles, while the inner muscles characterized by their multi fine muscles with several numbers of Nazarian bones embedded inside those muscles to reached (18) bones in each drum-stick (shape 1). In spite of the lower number of muscles in the heavy strain (8 muscles) as compared with local, but the results of statistical analysis showed no difference in Nazarian bones numbers (18 Vs 16 bones) for both mentioned strains, but they had the evenly the same bone shapes



Shape 1: The Nazarian bones that found in Local Turkey's drum stick

Shape 2: The Nazarian bones that found in commercial imported light strain Turkey's drum-stick

(shape 3), as compared with the light strain which characterized by minimum number of muscles (7 muscles) and less Nazarian bones number (10 bones) which were fine, thin and small, but still had the same shapes of some previous strain bones, (shape 2). Finally, bones shapes presented in shape (1) were classified according to their look like shapes as a spoon bone, flat bone, fork bone, hook bone and pin bone. However, some of these results are in agreement with results of Brenoe and Kolstad (2000) who indicated that meat proportion while bone percentage decreased

Shape 3: The Nazarian bones that found in commercial imported heavy strain Turkey's drum-stick

significantly throughout the experimental period of both strains. BUT-9 tend to have a higher percentage of meat than did Nicholas, while Nicolas strain of turkey showed lower bone percentage than BUT-9. Nestor *et al.* (2001) who noticed that drum-stick muscles and tibia tarsal bones came more from their studied F line . Relative to commercial lines the (F) had less leg muscling and larger leg bones and with study of Taha and Farran (2009) who concluded that local Lebanese Turkey had (18) of Nazarian-bones, while disagreed with their result that the imported BUT-9 strain had no Nazarian bones found in their drum-sticks.

Conclusion: According to this study it is concluded that Turkey strains are genetically differ in their drumstick's muscles and Nazarian bones weight and numbers, with different Nazarian bones shapes.

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