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Comparative study of the conformational parameters head and neck traits in Holstein and local breeds of dairy cattle

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Abstract

The objective of this study was to compare the morphological traits of the head and neck in Holstein and local breeds cows which carried out in AL- Diwaniyah city, to assess these traits of the head and neck in both Holstein and local breed cows; 140 animals were selected from each breed aged about (48 ± 4), to investigate the difference in measurements between them in the following parameters; the head length (HL), the line between medial canthi of the eyes (BE), the head side length (SL), head-neck collar (HNC), neck-body collar (NBC), neck length (NL) and mandibular width (MW). The results revealed showed that the Holstein breed cows had the superiority and increment significantly ($p \leq 0.05$) in all traits which had been measured (HL, BE, SL, HNC, NBC and MW) in Holstein cows when compared with local breeds. As followed 58.94±0.15; 50.27±0.11, 22.87±0.08; 19.6±0.09, 62.92±0.08 ; 46.5±0.08, 92.3±0.13 ; 59.58±0.07, 130.78±0.12 ; 120.35±0.12 and 23.23± 0.08; 22.76±0.08 (cm) respectively. Except the (NL) parameter which had the significantly ($p \leq 0.05$) and superiority in the local breed cows when compared with Holstein breed 44.0.7±0.09 and 42.64±0.11 (cm) respectively.

Key words: head, neck, conformation, Holstein, local.

Introduction:

Approximately 70 percent of the world's rural poor depend on livestock as an important component of their livelihoods (1). Most breeding programs select for a combination of production and nonproduction traits, for example, body conformation and behavior. Therefore breeds programs in cattle and other livestock species aim at selecting animals with the highest combined economic value for the next generation. In cattle, body conformation traits such as stature and body depth affect feed intake and thus milk production (2). Today's classification program focuses on a comprehensive set of descriptive traits that describe the animal's strengths and weaknesses and that collectively depict overall functionality. Since conformation traits are heritable and have been shown to be linked with functionality, selection for conformational traits is an effective tool to increase milk yield and facilitate genetic improvement of dairy cattle in functionality (3). Different body measurements, which represents the size of the cow is one of the important criteria in selection of elite animals. There is an urgent need to describe the body conformation by recording a minimum number of body measurements/biometric traits which reduce the cost, labor and time (4). There are variations in body dimensions of farm animals according to breed types and one of the ways of differentiating breeds is to evaluate their morphostructural characteristics (5). Body measurements are also important in giving information about the morphological structure and development ability of animals, (6). The body measurements and indices estimated from

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different combinations of different body traits produced a superior guide to weight and were also used as an indicator of type and function in domestic animals (7). The exploitation of body dimensions could be achieved by grouping them more meaningfully. Significant differences in different body biometric traits may be due to age and sex was reported by many workers in different breeds and species (8). A study of Holstein crossbreds in a commercial herd also showed that some crossbreds may be more profitable than Holsteins. Data from the larger numbers of crossbred and purebred dairy cows in commercial herds may provide more current or more accurate estimates of heterosis for recorded traits and include more breeds than previous designed studies (9.10).

Materials and Methods:

This study was carried out at Taj AL-Nahrain Company for dairy cattle and local breed lived in AL- Diwaniyah city farms from October 2016 to February 2017.

Animals

The animal model choose for this study was (140) Holstein Friesian breed and 140 of local breed cows, their ages was (48±4) months.

Figure (1): Shows the parameters traits (HL: head length; BE: line between the medial canthi of the eyes; SL: the head side length; HNC: head-neck collar; NBC: neck-body collar; NL: neck length; MW: mandibular width).

Conformational Measurements

The body condition score was a subjected measured of the head and neck by plastic measure tape were recorded as the following:

1. HL: head length, the line from the poll of the head to the muzzle end.
2. BE: the line between the medial canthi of the eyes.
3. SL: the head side length, the line from the poll of the head to the lateral end.
4. HNC: head-neck collar, the circumference of the attached part of the neck with the head.
5. NBC: neck-body collar, the circumference of the attached part of the neck with the body.
6. NL: neck length, the line between the base of skull and the neck-body collar.
7. MW: mandibular width, measure the width of lower jaw (lateral to lateral).

The results were analyzed with (student T-tests) at the level of (P≤0.05).

Results:

Many studies mentioned the differences between cows belong to Holstein and local breed in Iraq, the present study we thought according to our knowledge it was the first one that documented the major important variations in the conformation of head and neck of these breeds, and the latter has many benefits of phenotypes, which reflected the genotypes of these breeds. Table-1 clarified that (HL) measurement recorded a notice able significant difference (P≤0.05) between Holstein cows and local ones; where the Holstein cows registered 58.94±0.15`when we compared with the local breed which reached to 50.27±0.11. As well as the (BE) parameter revealed in the Holstein cows 22.87±0.08, while in the local breed got 19.6±0,09 with significant difference (P≤0.05).

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Table (1): the mean values ± standard errors of the conformational measurement of head and neck of the experimental cows

No.	Traits	Holstein cows mean ± SE	Local cow mean±SE
1	HL (cm)	58.94 ± 0.15 a	50.27 ± 0.11 b
2	BE (cm)	22.87 ± 0.08 a	19.6 ± 0.09 b
3	SL (cm)	62.92 ± 0.08 a	46.5±0.08 b
4	HNC (cm)	92.3 ± 0.13 a	59.58 ± 0.07 b
5	NBC (cm)	130.78 ± 0.12 a	120.35 ± 0.12 b
6	NL (cm)	42.64 ± 0.11 a	44.07 ± 0.09 b
7	MW (cm)	23.23 ± 0.08 a	22.76 ± 0.08 b

***Similar letters mean non-significant at p≤0.05.**
Different letters mean significant at p≤0.05.

The (SL) scales of the Holstein cows shown a significant difference (P≤0.05) when compared with the local cows with 62.92±0.08 and 46.5±0.08 respectively. The Holstein cows had the obvious superiority and significant differences (P≤0.05) in the measurement of (HNC) which presented as 92.3±0.13 where we the local breeds recorded 59.58±0.07. The parameter (NBC) value of the Holstein had attained a significant difference (P≤0.05) in comparison with local breeds and documented 130.78±0.12 and 120.35±0.12 respectively. Likewise, the (NL) measurements of Holstein and local cows enlisted 42.64±0.11 and 44.07±0.09 respectively, as well as the Holstein breed explicated significant differences (P≤0.05) with local breeds. Correspondingly, the Holstein breeds exhibited the high measurement 23.23 ± 0.08 of the (MW) with significant differences (P≤0.05) when competition with the local cow breeds. The Holstein breeds distinguished with superior values of measurements of the present study with significant differences (P≤0.05) in all studied parameters; these reflected what characteristics they had.

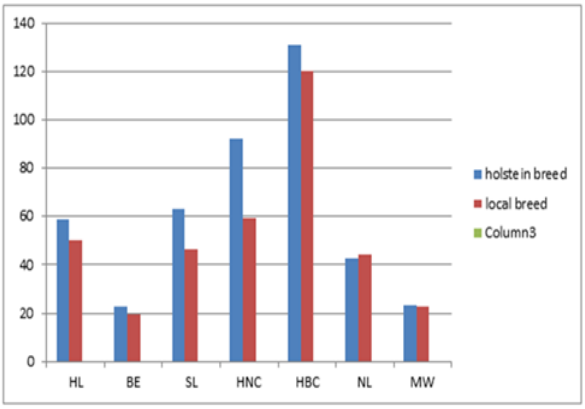

Figure (2): Shows the correlation of the conformational measurements between Holstein and local cows

Discussion:

This study was the first in Iraq that was meant studying morphological traits of Holstein breeds and compared it with the local breeds. The age of animals was 48 months and above, this was accorded with the (4) who reported that to avoid age effect on study, the adult cows 48 months of age and above were considered. Through the study of statistical conformation showed that the Holstein breeds more developments from appearance and genome, this was consistent with (11, 12) demonstrating that a considerable number of genome with effects on body conformation and behavior were still segregating in the Holstein cattle. These traits were of economic importance and had been under phenotypic selection with differing intensity for several generations. Currently, elite Holstein mating's had higher economic merit than elite crossbred mating's because of the Holstein breed's larger population size and greater range of genetic evaluations than the other breeds. This study cleared that There was important in the study the traits conformation at the livestock to selection the breeds higher the production. This result was companionable with (13). Phenotypic characterization is critical in breed improvement and conservation. To the determine of the performance and morphological features of cattle in livestock production systems (LPS). In dairy cattle, the assessment of body parts or conformation related to production, health, and longevity had been widely use to provide the conformation score as an indicator of the

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efficiency of a cow (14). The result of these averages of showed superiority in the head and neck at the dimensions of Holstein were higher than local breeds except for NL (table1). There were limited studies on the conformational traits in cattle. So we recommended to increased interest in this field due to its contributions to the production life of dairy cows.

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