SOME QUALITATIVE AND QUANTITATIVE TRAITS OF JENOUBI CATTLE BREED WITHIN PASTORAL SYSTEM

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ABSTRACT

Phenotypic characterization is critical in breed improvement and conservation programs. To determine some of the essential morphological features of Jenoubi cattle breed living at its natural habitat in south east Iraq under pastoral system, data from 98 adult cows and 12 adult bulls collected during the summer of 2018. Twenty-one qualitative and quantitative morphological features studied in addition to the nature of its productive system and environment. Depending on the mean, the qualitative features of typical Jenoubi breed are; short hair (2 cm) which is also straight and bristly are predominant, yellow in cows and compound (the body brown while the neck is black) in bulls. Straight face of 45 cm with laterally oriented ears of 21cm, black short horns 7cm, the muzzle, eyelids and the hoofs also black, the tail long, the dewlap small and that goes to both sexes, while the hump which is the most significant trait of Jenoubi is predominant only in bulls. The quantitative traits revealed that the average body measurements in cows and bulls respectively are; body length 81.28 ±11. 6cm, 74.83 ±8. 5cm; hearth girth 141.54 ±11.6cm, 134.16 ±12.1 cm; height at withers 114.61 ±7.9 cm, 110 ±9.1 cm; pelvic widths 37.30 ±4.4 cm , 37. 4 ±7.7 cm ; muzzle circumference 43.31 ±4.9 cm, 44.33 ±7.4 cm and foot under hock circumference 15.95 ±4 cm, 15.91 ±2.5 cm. Average daily milk yield was 3.29 ±1.3Kg , with lactation length of 3.5 ±1.1 months and the age at first to birth was 29.5 ±2.6 months. Net body weight of bulls was 107.5 ±2.5 Kg. At last, the animal is docile; tolerate to heat stress, endemic disease and parasites. We conclude that the breed has humble productive characteristics but, very high adaptation qualities.

INTRODUCTION

Animal breeds variety is the result of both natural and directed selection by breeders throughout the world over many generations, those variety provide diverse stream of benefits to the environment and humanity (10). The recent advances in genetic engineering and technologies facilitate genetic structure and diversity studies and enabled genes isolation and transfer to other breeds; this fixated the contentment in indigenous breed importance, those breeds that possess adaptation genes, which acquired it through thousands of years and by interactions with environment deserve to be conserve. Understanding breed phenotypic and genetic characteristics helps wise utilization, management and conservation of its genetic resources.

Many breeds worldwide have unique characteristics or combinations of characteristics, for instance disease resistance, tolerance of climatic extremes or supply of specialized products (9). However, evidence suggests that there is ongoing and probably accelerating erosion of the genetic resources base, which put livestock genetic diversity under threat (9). The reported rate of breed

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extinctions is of great concern, but of even greater concern is the unrecorded genetic resources which being lost before their characteristics recorded and their potentials evaluated (9), especially indigenous livestock breeds of developing countries which are scantily documented (16).

In this regard, Magid, *et al*. (14) observed that proper breed characterization was not conducted for any Iraqi local cattle breeds and studies are very rare and sporadic. Phenotypic characterization of an indigenous livestock breeds is critical in breed improvement and conservation (12). This is why we conducted the current study to investigate main morphological features and body measurements of Jenoubi cattle breed which lives south-east Iraq, specifically in Misan province under pastoral system. Jenoubi cattle are well known by local people of its high quality delicious meat. Alshawi, *et al*. (7) genetic study showed that it has high tolerance to high temperature which known of Iraqi summers. Some reference mentioned that it is originated from Basrah which is a province south Iraq (4), but this never been proved. Jenoubi importance to local people comes from its low management and feed requirements thus rearing it costs very little. The breed currently well preserved by their holding community; however this status is fragile and not sustained. Many threats are on the horizon either to community life style one of them maybe "expansion urbanization" or to the breed itself like artificial insemination, which may reach their remote area and change it genetic structure. This prompted us to study and conserve the breed and this study is the first step in this regard.

MATERIALS AND METHODS

Study area and sampling procedure

The study used a descriptive survey designed by the Food and Agriculture Organization of the United Nations (FAO) (11) includes detailed questionnaire on 1) animal nature and habitat 2) morphological (qualitative) characters, 3) body measures (quantitative) characters. This study was carried out on Jenoubi cattle breed living on its natural habitat in Misan province and specifically those depending on grazing natural pasture in desert area east Misan during the summer season of 2018.

Community based sampling procedure was followed, on this base 4 districts were included which was Al-Musharah (n=44), Al-Bazerkan (n=23), Al-Teeb (n=30) and Al-Kahlaa (n=13).

Survey design, experimental animals and tools

Depending on the few references that described Jenoubi breed (4, 5, 14), a questionnaire was applied on 110 adult animals; 98 cows and 12 bulls aged 2- 5 years according to FAO guidelines (11) by which data on body measures, morphological features and some cow's reproductive parameters were collected.

Calibrated tapes to measure the quantitative physical characteristics such as heart girth (HG) and body length (BL) were used as shown in (Figure 1).

Camera to photograph the animals and its habitat also been used.

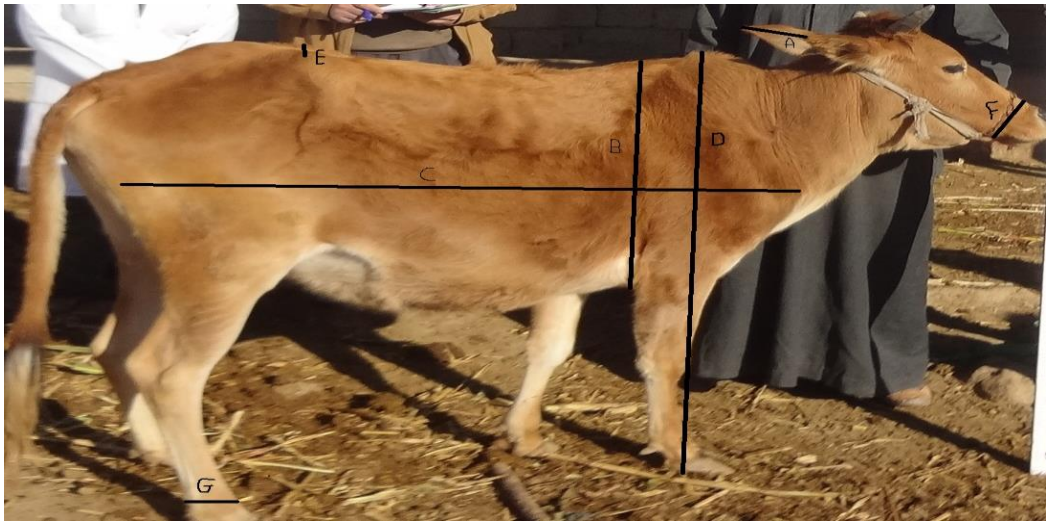
Data analysis

We mainly used the mean of each trait to express the breed general characteristics, the variance and the standard deviation to measure the spread of each value from the mean. The used equations are as follows:-

$$\boldsymbol{\sigma^2} = \frac{\sum (\times - \mu)^2}{\mathbf{n}} \qquad \boldsymbol{\sigma} = \sqrt{\boldsymbol{\sigma^2}}$$

$\mu =$ **the mean**, $\boldsymbol{\sigma^2} =$ **the variance and** $\boldsymbol{\sigma} =$ **standard deviation**

The significance test for the difference between cow and bulls quantitative traits was calculated according to (6).



A=Ear length, B=Heart girth, C= Body length, D=Height at wither, E= Pelvic width, F=Muzzle circumference and G= Foot circumference

Figure 2. Some measurements performed on Jenoubi cow.

RESULTS AND DISCUSSION

ANIMAL NATURE AND HABITAT

As general the breed is docile and very submissive, you can see the herd go to their grazing area without big effort from their cowpuncher and come back even by itself (Photo. 1).

The study covered mostly, the desert area of east Misan till the border with Iran. The climate there has a typical desert climate with dry hot summers and cooler winters. In summers, high temperatures easily reach over 40º C. Rainfall is concentrated in winter months with average 177 mm yearly*. The breeding system is the traditional transhumant system in which cows are grazed extensively on whatever natural vegetation are available in the pasture. Unlike the nomadic system, the movement of the herds in this system is restricted to closed zones compared to the wide range movement of the nomadic herds where cover long distances following the availability of pasture and water according to seasons (14). However we noticed that it is able to walk long distances and drink salt water to some extent.

Photo 1. Jenoubi herd in their way theto pasture.

The breed is widely recognized by their ability to tolerate heat stress, endemic diseases and parasite (14). The animal can live and reproduce even under the hottest days of the summer where the temperature reaches over 50ºC. This trait was recognized before by Baghdasar & Essa (8) when they found that the native cattle percentage of heat tolerant factor was 87%, which was higher significantly than their hybrid peers who reached 73 %. The recent genomic analysis study of two Iraqi cattle breeds (Jenoubi and Rustaqi) identified 220 candidate genes including those related to innate and acquired immunity responses, different environmental selection pressures (e.g. tick resistance and heat stress tolerance), and genes of commercial interest (e.g. marbling score) (7).

The breed at this area known by other native nomenclature "Dishti" investigating the origin of this name revealed that it is a Persian ward means the "plain land" which refer to the Jenoubi as the "plain land cattle", if we consider that the area of the study near the border with Iran we can expect that people there have some culture and language exchange easily with their Iranian neighbors.

Finally, we noticed that the breed did not subjected to any genetic improvement or selection, and it used for both milk and meat but the major use is as investment to cater some living requirements.

Qualitative (Morphological) Characteristics

The few previous references described Jenoubi breed refers to it small size, red dark to brown colour especially in bulls, yellow in cows and that the breed has clear hump and dewlaps especially in bulls, short horns, large eyes, long legs and tail in both sexes and small udder and low milk and meat productivity as general (1, 2, 4, 5 & 14). To the best of our knowledge, the current status of Jenoubi cattle breed which been rearing in Misan province under pastoral system never been previously described, and thus we conducted our study, and (table 1) illustrates the results.

Table (1): Qualitative characteristics of Jenoubi cows & bulls according to the percentages of seen recorded

The trait	Sex	The dominant trait	Percentage of dominance
Hair colour, length and texture	♀	yellow	39.79%
		short (2cm)	52.87%
		straight and bristly	100%
	♂	brown with black neck	41.66%
		short (2cm)	58.33%
		straight and bristly	100%
Face length and shape	♀	Average length	45.48cm
		Straight	100%
	♂	Average length	44. 25 cm
		Straight	100%
Ear length and shape	♀	Average length	20.19cm
		Laterally oriented in a way that form right angle with the head	100%
	♂	Average length	21 cm
			100%
Horns length, shape and colour	♀	Short straight	100%
		Average length	7.74cm
		Black	73.33%
	♂	Short straight	100%
		Average length	7.25cm
		Black	75%
Muzzle colour	♀	Black	92.85%
		Black surrounded with white line	38.77%
	♂	Black	100%
		Black surrounded with white line	58,33%
Eyelids colour	♀	Black eyelids	92.85%
		Black surrounded with white line	38.77%
	♂	Black eyelids	100%
		Black surrounded with white line	41,66%
Hump presence and shape	♀	No hump	93.877%
	♂	Small hump over shoulder and Round in shape	91.66%
		Average size	30 cm
Back shape	♀	Straight	100%
	♂	Straight	100%
Dewlap	♀	Small dewlap	88.77%
	♂	Small dewlap	83.33%
Hoofs colour	♀	Black	88.77%
	♂	Black	91.66%
The tail	♀	Long (under hock joint)	75%
	♂	Long (under hock joint)	75%

Quantitative characterisstics

Our results showed that different degree of red coat colour from light yellow which is predominant in 39.79% in cows to the dark red (brown) which is predominant in bulls in 41.66% are the common trait of this breed. (Photo 1) illustrate the common coat colour of the breed and found how the coat colour concordant with the terrain colour. This is because of the environmental effects on the breed, an effect which was noticed before by (17 & 18) who noticed that variation in coat colour in cattle depends upon geographical and climatic features. Other colours in less percentage like black or gray or multicolored also could be found, and this is typical in natural populations where single and less

predominant variation could be found. Our results for coat colour agreed with all previous studies (1, 2, 4, 5 & 14). The hair is 100% straight, bristly and short in both sexes, with average length 2cm in more of 50% of the population (Table 1). Straight and long face are common trait in both sexes with mean of 45.48 cm in cows, 44.25cm in bulls which found to be slightly shorter and wider. This trait never studied before. Ears laterally oriented in both sexes with mean of 20.19 cm and 21 cm in cows and bulls respectively. Previous studies never measured its length but Abdul Kareem (1) observed that its of medium to long size, while ACSAD (2) noticed that it is long semi- erected, but never really measured it. Horns are present in both sexes, its predominant shape are black, short and straight with average size 7cm. There is also the gray but in less percentage. Abdul Kareem (1) also noticed that it is short while Magid *et al*., (14) mentioned that it is either quite short or moderate but both never measured it nor studied it colour. Black muzzle, eyelids and hoofs are predominant in both sexes (Table 1). Back shape straight also predominant in both sexes and this agreed with what was noticed by Abdul Kareem (1).

For the tail was found that its length ranged from 55- 117cm and 87. 67% were found to be long (over75cm) in cows and 82-102cm in bulls with 74.48% were found to be long in bulls, which mean that long tail, is predominant trait in both sexes. For the hump and dewlap, as most of the previous studies showed (1, 2, 4, 5 & 14) the breed has a clear hump and dewlap especially in bulls and that agreed with what this study (Table 1). When compared the above morphological characteristics of Januobi with other indigenous Iraqi cattle breed (Rustaqi), was found that the two breed are similar for most of the traits with the exception of the hair coat colour and the presence of the hump which is more predominant and larger in Janoubi (3) and this is may be due to the common environmental conditions or the cross breed or may be both.

The study covered body measurements; body length (BL), heart girth (HG), height at withers (HW), pelvic widths (PW), muzzle circumference(MC) and foot under hock circumference (FC) and for both bulls and cows. The means (μ) for body measurements are shown in Table (2) and from this table also we can see that the standard deviations (δ) for all measurements are rather small and for both bulls and cows. The highest was 12.15 cm for (HW) in bulls and that is because different size of hump in bulls. In fact male samples was rather difficult to found because the owners do not prefer to keep them, they either kept one for mating or no one at all and when they need to mate their cows they barrow one from elsewhere. As a consequence, it was hard for us to found adult bulls for the study, they was either young or old and this effect the δ of HW. The small δ which was found for body measurements indicate that all animals samples included in the study (males and females) their body measurements are around their means which indicate the resemblance of their size which means also that this body measurements are indeed one of the breed characteristics and identity as FAO definition of breed concept (9) which stated "a sub-specific group of domestic livestock with definable and identifiable external characteristics that enable it to separated by visual appraisal from others". To the best of my knowledge, this is the first time to take Jenoubi breed body measurements at it natural habitat. There is the study of Albayatti (3) which took the other indigenous Iraqi cattle breed (Restaqi) which also measured its body dimensions for the same parameters of Table (2), when was compared both cattle breed was found that Restaqi recorded larger

measurements in cows for all body dimensions (BL, HG, HW, PW, MC & FC), and nearly in bulls also with the exception of PW which was little higher in Jenoubi bulls. This result was expected as previous studies (1 & 4) mentioned that Restaqi is the biggest breed of Iraqi indigenous cattle breeds. The HG, HW, BL & PW of the other Iraqi cattle breed (Sharabi) which were (166.42, 118.50, 130.60 & 45.50) respectively (15) are also larger than that of Jenoubi, but those was for cows that that born and raised under captivity in governmental station which have good feed in contrast of Jenoubi whose feed is the poor vegetation of the natural pasture. There are no sufficient data to from the last Iraqi cattle breed (Al- Karadi) but, according to (2) Its HG (95-100 cm) smaller than that of Jenoubi and that is agreed with others who indicated that Karadi as the smallest indigenous breed of Iraqi cattle (4). According to (2) Jenoubi is smaller than the Friesian. Table (2) also showed that there is no significant difference between cow and bulls for most body measurements except for the (BL) and the (HG) which was in favor of the cows and this is most likely because the large sample size of cows compare to bulls.

As a conclusion Jenoubi still as it was decades ago, no body tried to improve it or studied its genetic potential.

Table (3), shows some productive parameters of Jenoubi cows and bulls, from it we can see that the daily milk yield is less than 4 liters with lactation period of nearly 4 months and this may be because the poor pasture that the cow graze on, because the data for milk yield and lactation period form Jenoubi under captivity in governmental stations reached nearly 7 liters and for nearly 6 months (1, 2, 4 & 14). And this revealed its genetics great potential for improvement. Previous references (1 & 4) agreed with our results for the age at first birth which is nearly 30 months. The net body weight after slaughter for bulls in our results less than previous studies (1 & 4) and that is also because we collect our data from poor nutritional herds.

In conclusion Jenoubi cattle breed has great potential to be improved and for milk and meat production and it is indeed a unique breed which has many adaptation traits that enable it to live and reproduce even under extreme hot wither and harsh environment.

Table (2): Means (μ) and Standard Deviations (δ) for linear measurements (cm) of six traits of adult Jenoubi cattle

Variable	Sex	μ	δ	Significance at P<0.05
BL	♂	74.83	±8.56	+
	♀	81.28	±11.69	
HG	♂	134.16	±12.15	+
	♀	141.54	±11.61	
HW	♂	110	±9.10	-
	♀	114.61	±7.99	
PW	♂	37.4	±7.79	-
	♀	37.30	±4.46	
MC	♂	44.33	±7.46	-
	♀	43.31	±4.9	
FC	♂	15.91	±2.5	-
	♀	15.95	±4.03	

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Table (3): Mean (μ) and Standard deviation (δ) for some productive parameters of adult Jenoubi cows and bulls

Parameters	μ	δ
Daily milk yield \Kg	3.29	±1.32
Lactation length\ month	3.5	±1.19
Age at first birth \ month	29.5	±2.64
Net body weight in bulls \ kg	107.5	±2.5

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بعض الصفات النوعية والكمية لسلالة الابقار الجنوبية ضمن نظام الرعي

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الملخص

يُعّد التوصيف المظهري ركن اساساً في برامج حفظ وتنمية السلالات الحيوانية. ومن اجل تحديد بعض الصفات الأساس لسلالة الابقار الجنوبية التي تعيش ضمن نظام الرعي في بيئتها الطبيعية جنوب شرق العراق، تم جمع بيانات من 98 بقرة و12 ثوراً مكتملة النمو وذلك في صيف 2018. تمت دراسة احدى وعشرين صفة نوعية وكمية فضلاً عن دراسة البيئة والنظام الإنتاجي. وبالاعتماد على المعدل الحسابي فأن الصفات النوعية لسلالة جنوبي مثالية هي: شعر قصير (2سم) مستقيم وخشن اصفر في الابقار ومركب اللون في الثيران (شعر الجسم بني والرقبة اسود). الوجه مستقيم بمعدل طول 45 سم والاذن منتصبة بشكل جانبي وبمعدل طول 21 سم، كما تمتاز السلالة بقرون قصيرة سوداء يبلغ معدل طولها 7 سم. المخطم وجفن العين والحافر السائد فيها هو اللون الأسود، الذيل طويل واللبب صغير وهذه الصفات تنطبق على كلا الجنسين اما السنام والتي هي الصفة المميزة لهذه السلالة فهي سائدة فقط في الثيران. ظهرت نتائج دراسة الصفات الكمية بأن معدل قياسات الجسم لكل من الأناث والذكور على التوالي هي: طول الجسم 81.28 ±11.6سم، 74.83 ±8.5 سم، محيط الصدر 141.54 ±11.6سم، 134.16 ±12.1سم، الارتفاع عند الحارك 114.61 ±7.9سم، 110 ±9.1سم، سعة الحوض 37.30 ±4.4 سم، 37.4 ±7.7 سم، محيط المخطم 43.31 ±4.9 سم، 44.33 ±7.4 سم ومحيط القدم أسفل مفصل العرقوب 15.95 ±4 سم، 15.91 ±2.5سم. معدل انتاج الحليب اليومي 3.29 ±1.3 كغم مع مدة حلب ثلاثة أشهر ونصف ±1.1 والعمر عند اول ولادة 29.5 ±2.6 شهر. معدل وزن ذبيحة الذكور بلغ 107.5 ±2.5 كغم. أخيراً فأن الحيوان هادئ ومطيع، يتحمل الاجهاد الحراري والامراض والطفيليات المتوطنة. نستنتج من الدراسة بأن السلالة تمتلك صفات إنتاجية متواضعة لكن خصائص التأقلم لديها ممتازة.

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