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REFERENCE STUDY ON LOCAL IRAQI CATTLE BREEDS

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Abstract:

There are four main local cattle breeds in Iraq, namely the AL-Janoubi , Rastaki, Sharabi and Karadi. These breeds belong to the cows of the hot regions and are found in two races, the first contains a hump. The pulp is clear in males and less clear in females as in the AL-Janoubi, Rastaki and Sharabi breeds, and the second race in which the cows are straight-backed and do not contain a hump and their pulp is very small as in the Karadi breed of cows. Iraqi local cattle breeds differ in their morphological and productive characteristics such as color, size, weight, horn shape, udder size, body dimensions and other morphological productive characteristics. The Iraqi local cattle are divided into four groups according to their geographical distribution, where the AL-Janoubi cattle breed is present in southern and central Iraq with a percentage of 42. The Rastaki cattle breed is found in central Iraq with a rate of 8.5%, which is the least numerous and largest Iraqi cattle and is at risk of extinction, while the Sharabi cattle breed is found in northern Iraq with a percentage of 6.5%, and the Karadi breed is found in northeastern Iraq with a percentage of 25.5%, which is the smallest and least productive Iraqi cattle. The number of local Iraqi cows has declined compared to the 1970s, when it reached more than two million cows at that time. Local Iraqi dairy breeds are considered dual-purpose by terminology due to their low production efficiency, whether for milk production or meat production when compared to pure specialized international cows, but they are characterized by their high genetic diversity as well as their ability to withstand harsh Iraqi environmental conditions, especially high temperatures and their resistance to diseases and parasites endemic to Iraq, which no specialized international dairy breed can resist these conditions and produce in them, as they have acquired this ability in their genetics over thousands of years. These breeds have not undergone any valuable genetic improvements, especially through selection. These cows are raised in non-specialized herds in villages and countryside with few holdings, as well as in herds scattered around cities.

Keywords: Local Cows; AL-Janoubi ; Karadi

INTERACTION

Cows belong to the bovine family (Bovidae) genus Bos and here the cattle are divided into two parts, the first Bos Taurus, to which the European cattle belong, and the second Bos indicus. which includes Indian cattle (Zebu), which is characterized by the presence of a hump and the pulp (Dewlap) is large, the ear is large, horns are long and the size is relatively small and tolerance to high temperatures (Al-Qudsi et al., 2010). Zebu cows are characterized by natural immunity against diseases and parasites, thick skin that is difficult to puncture by insects, and a high thermal tolerance coefficient (Al-Jalili et al., 1985). Zebu cows are characterized by their abundant and efficient sweat glands, low basal heat, high heat tolerance coefficient and low water requirement compared to European cattle (Al-Khafafaf, 1992).

Many animal breeds, including cattle, have advantages acquired over hundreds of years of adaptation to the surrounding environmental conditions, such as resistance to endemic diseases and tolerance of difficult climatic conditions, and there were more than 7616 animal breeds, 20% of which are in danger of extinction and 62 breeds have become extinct due to the marginalization of traditional production systems that include local breeds and focus on a few highly productive breeds within intensive production, droughts, floods and other factors (FOA, 2007). Al-Qudsi and Elia (2010) pointed out that there are more than 700 breeds of cattle around the world, whose numbers have decreased to 380 breeds as a result of the development of hybrid breeds through hybridization. The total number of agricultural ruminants in Iraq in 2008 (12093063) amounted to.

The share of cattle is 2552113 head, accounting for 21.10% (Ministry of Agriculture, 2008). Cows in Iraq are raised for the purpose of producing milk and meat, so they are dual-purpose livestock by convention. The total production of red meat and milk in Iraq reached 228 thousand tons 287640 tons, and the contribution of cows in the amount of meat amounted to 148.4 tons (65.1%) and milk 287640 tons (67.22%), thus ranking first in production, followed by sheep and buffalo (Agricultural Statistical Atlas, 2011). In Iraq, there are four main local cattle breeds, namely the AL-Janoubi , Sharabi, Rastaki and Karadi, in addition to very small numbers of Dashti and Shami cows, which have low productivity of meat and milk compared to international cattle breeds specialized for milk or meat production (Saleh et al., 1989; Magid et al., 2003). The local Iraqi cows are divided into two races, the cows of the AL-Janoubi and central region that contain the hump and the pulp, which belong to the Asian race and are of moderate bodies and varying colors, and the cows raised in the mountains and northern Iraq are mostly black in color, have a small body, a flat back and low milk production (Ministry of Agriculture, 2008). Oweid (2019) pointed out that the phylogenetic tree showed that the local Iraqi cattle breeds have a different origin from the rest of the cattle breeds in the world. Al-Jubori and Senkal (2023a) showed the existence of high genetic diversity among Iraqi local cattle breeds and emphasized the existence of a common origin between them and Brahma cows through the UPGMA tree. Their number previously reached 1.5 million cows and their milk production is very low, ranging between 600-1000 kg for a season of 305 days and their production period ranged between 220-250 days, and these cows have high genetic resistance against endemic diseases and parasites as well as the harsh environment, especially high temperatures, and no proper characterization of these breeds and little research and studies related to them (Saleh et al., 1989; Magid et al., 2003; Ministry of Agriculture, 2008). Mahdi (2023) indicated that the daily milk yield of AL-Janoubi , Rastaki and Sharabi cows ranged between 5-6 kg, the length of the milking season was 250 days, and their weights ranged from 250-350 kg. The reasons for the low production efficiency of these cows include the lack of genetic improvement and through the selection process they did not receive sufficient research attention from research centres and institutions in the Ministry of Agriculture and agricultural colleges. as well as the backwardness of production methods, the low level of knowledge of dairy farmers in all processes related to dairy management and care, the lack of pastures and the lack of green fodder in the required quantities and the absence of associations for each breed (Al-Saegh et al., 1987; Al-Qudsi and Elia, 2010; Al-Qudsi et al., 2012): Hadi and Naji, 2015). Iraq is considered one of the five countries vulnerable to climate change according to the United Nations reports, and this change causes an increase in temperature rates and the occurrence of long heat waves, in addition to the decrease in rainfall, drought, increase in the area of desertification, dust and sand storms, and the decrease in water resources and their quality, Therefore, local breeds adapted to the Iraqi environment are the basis for facing climate change and its challenges due to their high temperature tolerance factors and resistance to diseases and parasites endemic in their genes over thousands of years (Baghdasar, 1980; Al-Shawi et al., 2017). Therefore, the preservation of animal genetic resources and their biological functioning enables animal breeders to face the challenges of climate change and improve the ability to resist transient diseases and epidemics (FAO, 2007b).

The study aims to identify the phenotypic, productive and reproductive traits of local Iraqi cattle breeds, as well as their numbers, percentages, geographical distribution and locations by presenting and analyzing a set of research and studies that have been conducted on them.

Number and prevalence

The number of cows in Iraq in the decade of the seventies of the last century amounted to more than two million cows, most of them local cows, and according to the 1976 census, the central region of Iraq ranked first in terms of the number of cows raised by 49% and amounted to 970,000 head, followed by the northern region by 30.77% with 631,000 head, and the third rank of the AL-Janoubi region by 20.25% with 450,000 head. According to the National Livestock Survey for the year 2008, the central region also ranked first with 1547080 thousand head and 60.61%, followed by the northern region with 605470 thousand head and 23.72%, and finally the AL-Janoubi region with 15.67% and 399963 thousand head, and the total number of cows during the 2008 survey (2552513) thousand head (Ghazal et al., 1979; Al-Jalili et al., 1985; National Livestock Survey, 2008).

Al-Asadi (2008) indicated that the total number of cows in Iraq amounted to (1232147) head, and the number of local cows reached (1126898) head (91.46%), and Wasit ranks first in the number of local cows with (136463) head (12.1%), and ranked first in the number of foreign cows with (8453) head (37%). 6%, where their total number in Iraq amounted to (22474) and constituted 1.8% of Iraq's cows, while Babylon governorate ranked first in the number

of cows on strike, which amounted to (23149) head and 27.9%, out of the total number of cows on strike (827761) head, which constitutes 6.7% of Iraqi cows.

It is noticeable from Table 1 that there is a variation in the number of cows in Iraq and a decrease in their number in general and local cows in particular, as statistics indicate a decrease in their number in the 1990s compared to the 1970s. where their number reached more than two million cows in that period, mostly from local Iraqi breeds, and this is due to several reasons including excessive slaughter, lack of control over slaughterhouses, droughts, lack of pastures, lack of fodder and high prices, as well as the result of mixing and hybridization with other breeds, especially the Friesian, as well as the unnatural conditions experienced by Iraq, (Abdulkarim, 1985; FAO, 2003; Al-Qudsi and Elia, 2010; Al-Qudsi et al., 2012). In addition, the ratio between urban and rural areas in Iraq is imbalanced, as the urban percentage was 30% and the rural percentage was more than 60% in 1955, and in 2009 the urban percentage was 59% and the rural percentage was 31% (Ministry of Agriculture, 2008). This indicates the lack of people engaged in agriculture and animal husbandry, including cows, in addition to the events and wars that Iraq went through from the eighties and nineties. which included the drying of the marshes and the migration of the population, as well as the unjust blockade through the decade of the twentieth and its accompanying climate change factors that caused a change in the rates of temperature and the increase in long heat waves. Temperatures, long heat waves, heat retention, lack of rainfall, drought, lack of water resources, dust and sand storms, increase in the area of desertified lands at the expense of agricultural lands, and the occurrence of waves of epidemics and diseases that killed livestock, such as hemorrhagic fever disease.

There are four local breeds of cattle in Iraq, namely the AL-Janoubi cows and central Iraq with a presence of 42.5%, the Rastaki cattle in central Iraq with 8.5%, which is the least numerous and at risk of extinction, the Sharabi cattle in northern Iraq with 6.5% and the Karadi in northeastern Iraq with 25.5% (Azal et al., 1979; Al-Saegh et al., 1987; Al-Rawi et al., 1998; Al-Qudsi and Elia, 2010; Al-Bayatti et al., 2018).

These cows are raised in the form of non-specialized herds in villages and countryside with a small size of possession and are fed on the remains of crops, grasses and bushes located on the banks of rivers and waterways and are not given concentrated feed except in rare cases such as childbirth and milk production and are considered secondary and used to produce milk for the family and produce surplus calves to sell them. The second form is herds scattered around the cities and raised to produce milk and its derivatives and sell to the neighboring population and fed on concentrated feed in the degree that consists of barley and bread crumbs collected from the neighboring population and restaurants and these cows are bought in the last month of pregnancy or at the beginning of their production and sold after the end of the milk season and their numbers are few at the breeder, The predominant breeding system is 85% mixed, in which cows are raised around cities and subsist on the remains of crops (Saleh et al., 1989; Al-Bayatti et al. 2018).

Table (1) Development of the number of cattle in Iraq 1971-2008 (thousand heads)

YEAR	The breed	Number (thousand heads)	Percentage%	Total number (thousand heads)	Source
1971	Local Mixed Foreign	1171915 20466 8500	97.6 1.7 0.7	1200881	(1998) Al-Rawi et al
1978	Local Mixed Foreign	--------	----------	1698	(1998) Al-Rawi et al
1986	Local Mixed Foreign	1342100 204400 32000	85 13 2	1578500	(1998) Al-Rawi et al
1989	Local Mixed Foreign	----------	----------	1578	(1998) Al-Rawi et al
1990	Local Mixed Foreign	----------	--------	1521	Al-Rawi et al., (1998)
1991	Local Mixed Foreign	----------	----------	1872	Al-Rawi et al., (1998)
1992	Local Mixed Foreign	----------	----------	1120	Al-Rawi et al., (1998)
1997	Local	---------	---------	1170	Al-Rawi et al.,

	Mixed Foreign				(1998)
1998	Local Mixed Foreign	23000	1.60	1438	Magid et al.,(2003) FAO(2004)
2001	Local Mixed Foreign	-------	---------	1232147	Central Statistical Agency(2007)
2003	Local Mixed Foreign	1395.00 --------- 30.00	97.89 2.11	1425	Arab Organization for Agricultural Development (2007)
2004	Local Mixed Foreign	1516.00 -------- --------	---------	--------	Arab Organization for Agricultural Development (2007)
2005	Local Mixed Foreign	164800 --------- ---------	--------	---------	Arab Organization for Agricultural Development (2007)
2006	Local Mixed Foreign	1130.0	----------	----------	Arab Organization for Agricultural Development (2007)
2008	Local Mixed Foreign	---------	------	2552513	National Livestock Survey (2008)

AL-Janoubi cows

They are found in AL-Janoubi cows and central Iraq and are used for milk production and their males are fattened for meat production (Ghazal et al., 1979; Al-Jalili et al., 1985; Al-Sayegh et al., 1987). The local names for this breed are Zubair, Fao, Maamir and Gibi (Magid et al., 2003). Table (2,3,4,5,6,7) shows the phenotypic, productive and reproductive traits of local Iraqi cattle breeds.

Appearance characteristics

The color is dark red tending to light brown in males and females tends to light yellow, the hump is clear on the end of the shoulders and has a large pulp in males and in females it is less clear, the skin is smooth and smooth, the horns are short in both sexes and their size is small, the legs are long, thin and disproportionate to their narrow chest and abdomen, the palm is short and slopes back, and the head varies It is thin, long and wide in some individuals, while in others the eyes are large, the color of the cilia is black or reddish brown, the color of the snout is either black, red or pink, the ears are long and erect, the tail is long with a white or reddish brown pigtail, the udder is small, the nipples are small and symmetrical, the area of attachment of the udder to the body is narrow, and the texture of the udder tends to greasy instead of spongy.

(Ghazal and Khron, 1979; Al-Jalili et al., 1985; Saleh et al., 1989; Al-Qudsi and Elia, 2010). While Al-Sayegh et al. (1987) indicated that they have multiple colors, the most famous of which are dark brick in males and females are distinguished by their light color. Magid et al. (2003) indicated that the predominant color is red to golden or light golden and that the horns are small and present in both sexes. While Essa et al., (2020) indicated that the color of the males is brown and the neck is black and the females are yellow in color, the hair is straight and 2 cm long, the presence of the hump is a predominant feature in males and reaches a height of 30 cm, the pulp is small and present in both sexes, the face is straight and 45 cm long, the ear is erect laterally with an average length of 21 cm, the horns are short and black in both sexes with an average length of 7 cm, and the dominant color of the snout, hoof and eye lid is black, and the tail is long in both sexes. The body dimensions of AL-Janoubi cows at the government station were body length 123 cm, body height 133 cm and chest circumference 172 cm, and at breeders the body length, height and chest circumference of females at breeders (107, 113, 136) cm and in males the body dimensions were (105, 125, 142) cm, respectively (Ghazal et al., 1979). While Magid et al. (2003) indicated that the body height in males reached 125 cm and in females 123 cm. Essa et al. (2020) showed that the body length in males was 81.28 cm and in females 74.83 cm, body height in males 114.6 cm and in females 110 cm, chest circumference in males 141.61 cm and in females 134.16 cm, pelvic capacity in males 37.30 cm and females 37.40 cm.

Productive traits of AL-Janoubi er cows

The average breed weight, birth weight, daily weight gain, feed conversion rate and carcass ratio of Al-Janoubi cows (350-400 kg, 35 kg, 689-889 g, 7.57 kg, 51-58.21%) (Ghazal et al., 1979; Al-Jalili et al., 1985). Al-Saegh et al. (1987) showed that the average weight of the breed was 390 kg and the daily weight gain was 500 g. Saleh et al. (1989) and Al-Qudsi and Elia (2010) indicated that the average weight of the breed ranged between 300-360 kg and the weight at birth ranged between 20-21 kg. While Magid et al. (2003) confirmed that the average weight of the breed was 309-325 kg, the average birth weight ranged from 20.7-21.8 kg, the average daily weight gain was 557 g, and the nutritional conversion rate was 7.6 kg.

The total milk yield at the government station was 1250-1350 kg for a 200-day season with an average dry period of 146 days (Ghazal et al., 1979; Al-Jalili et al., 1985; Saleh et al., 1989; Al-Qudsi and Elia, 2010). Magid et al. (2003) indicated that the total amount of kidney amounted to1400 kg for a season of 240 days. Al-Anbari et al. (2012) reported a yield of 936.4 kg for a season of 185.87 days. Jameel et al. (2012) reported a yield of 350 kg for a season of 300 days. Essa et al. (2020) confirmed that its daily production amounted to 3.29 kg and its total production amounted to 345.45 kg for a season of 105 days.

Yosief et al. (2023) indicated that their daily production amounted to 4.17 kg and their total production amounted to 1039.56 kg for a season of 305 days. The daily milk yield of some of its good individuals reaches 10-15 kg/day, as confirmed by Raoof (2018), who showed that the average daily milk yield of local cows reached 11.85 kg and the highest average daily milk yield of some individuals reached 16 kg.

Sukri et al. (1981) indicated that the percentage of fat, protein, lactose, ash, total solids and water

(4.85, 3.62, 0.72, 0.72, 14.05, 85.95) in the milk of AL-Janoubi cows, respectively. Majid et al. (2003) confirmed that the percentage of fat in the milk of AL-Janoubi cows amounted to 4.1%. Jameel et al. (2015) indicated that the percentage of fat in the milk of AL-Janoubi cows was 2.5%, while the percentage of fat, protein, lactose and non-fat solids in the milk of AL-Janoubi cows was 3.92%, 2.2%0, 4.18% and 6.39% (Yousief et al., 2023). Age at first calving was 29.5-30 months, calving interval was 381-414 days and age at first insemination was 20 months (Ghazal et al., 1979; Al-Jalili et al., 1987; Al-Saigh et al., 1987; Saleh et al., 1989; Al-Qudsi and Elia, 2010; Jamil et al., 2015; Essa et al., 2020).

Al-Restaki cows

They are found in the central region of Iraq and part of the AL-Janoubi region and are considered the largest and least numerous Iraqi cows, and the percentage of their presence is 8.5% (Al-Rawi et al., 1998; Al-Qudsi and Elia, 2010). It has local names such as Areeb and Al-Bayatti, and is threatened with extinction (Al-Bayatti et al., 2018). Based on the International Union for Conservation of Nature (IUCN) classification, the breed is categorized as critically endangered (Frankham et al., 2007).

Phenotypic characteristics of Rastaki cows

The color is dark reddish-brown and there are some individuals that are white, grayish or creamy, and the size and length are close to the AL-Janoubi cows, but they are slightly longer and deeper, the legs are shorter, the head is medium-sized, the horns are short and present in both sexes, and the udder is medium-sized and its teats are long and thick (Ghazal et al., 1979; Al-Jalili et al., 1985; Al-Saegh et al., 1987; Saleh et al., 1989; Qudsi and Ilya, 2010). Al-Bayatti et al, (2018) indicated that their color is black and the length of the hair is 2-3 cm, and the color of the skin is black to gray unspotted, as well as the snout, horns and hooves, and the face is straight with a length of 45 cm in females and in males, the face is shorter and slightly wider towards the ear outward at right angles to the head, and the average length is 20 cm in females and 18 cm in males, and the horns are short and arched in both sexes, The tail in females is long and lion-colored, which is a dominant trait, and in males it is black with a white end, and females are straight-backed, which is also a dominant trait, and males have a hump less than 15 cm high above the shoulder, and the pulp is small in both sexes, and the body length in males amounted to 114. 12 cm and in females 109.52 cm, the body height in males was 124 cm and in females 120.87 cm, the chest circumference for males was 156.26 cm and in females 155.47 cm, and the pelvic width in males was 32.54 cm and in females 38.68 cm.

Production traits of Rastaki cows

The average weight of the breed was 450-500 kg, the average daily milk yield was 3-4 kg, 3-5 kg, and the total milk yield ranged from 1200-1300 kg/season, and the yield of good individuals reached 10 kg/day and the length of the milk season ranged from 180-240 days (Ghazal et al., 1979; Al-Jalili et al., 1985; Al-Saegh et al., 1987; Saleh et al., 1989; Al-Qudsi and Elia, 2010). Majid et al. (2003) indicated that its production amounted to 1200 kg for a 210-day season. Jamil et al. confirmed that their production reached 1300 kg for a season of 180-240 days. Al-Qudsi et al. (2012) indicated that their production ranged from 720-1200 kg/season. Al-Bayatti et al. (2018) reported an average daily production of 7.32 kg and a total production of 1537.2 kg for a 210-day season. While Al-Jubori and Senkal

(2023) indicated that her average daily milk production ranged from 3.5-4.5 kg and her total production ranged from 603.75-787 kg for a season ranging from 172.5-175 days. The average fat content in the milk of Rastaki cows ranged from 3.5-4% (Jamil et al., 2012). The average age at first calving was 31 months (Jameel et al., 2012). Al-Bayatti et al. (2018) indicated that the average age at first calving ranged from 24-36 months. The average interval between two births was 326.66-337.56 days and the number of inseminations required for fertilization was 1.16 (Al-Jubori and Senkal, 2023). The average daily weight gain was 688g, the feed conversion rate was 8.45-8.5 kg and the clearance rate was 54.21% (Ghazal et al., 1979; Al-Jalili et al., 1985). While Magid et al. (2003) confirmed that the average weight of the breed ranged between 400-450 kg, the daily weight gain was 688 g and the feed conversion rate ranged between 7.39-8.45 kg.

Al-Sharabi cows

This species is abundant in northern Iraq around the Tigris River and in Nineveh Governorate, Zamar district and its villages and extends to Dohuk and its neighboring villages and is believed to have been brought from Anatolia and the percentage of its presence reached 6.5% (Al-Sayegh et al., 1987; Al-Rawi et al., 1998; Al-Qudsi and Elia, 2010).

Phenotypic characteristics

The color is black on both sides with a white line along the abdomen, chest and back, black color on both sides with a white line along the back down to the bottom of the animal dividing it into two halves, and the color of some cows is speckled with black or white dotted with black, and their color resembles Normandy cows, The hump and pulp are clear in males and less clear in females, and the back is not straight, and the horns are small and present in both sexes, and the head is large and short, the neck is short and wide, the legs are short, the body is deep and relatively long and gives a shape similar to meat cows, the udder is large compared to other local cows and not drooping, and the teats are long and suitable for mechanical milking (Ghazal et al., 1979; Al-Saegh et al., 1987; Saleh et al., 1989; Qudsi and Elia, 2010).

Magid et al. (2003) indicated that they have a small hump in males and horns are present in both sexes and their body height reached 119 cm.

Production traits of Sharabi cows

The average weight of the breed was 450-500 kg. The average daily weight gain was 600-633 g and the clearance percentage ranged from 52-52.7% (Ghazal et al., 1979; Al-Jalili et al., 1985; Al-Sayegh et al., 1987). Saleh et al. (1989) and Al-Qudsi and Elia (2010) indicated that the average weight of the breed was 305-468 kg and the average birth weight ranged from 18.6-19 kg. While Magid et al. (2003) confirmed that the average weight of the breed ranged from 295-400 kg, the average birth weight was 18.5-19.98 kg, the average daily weight gain was 633 g, and the nutritional conversion rate was 8.23 kg. Al-Qudsi et al (2012) showed that the average weight of the breed was 420-450 kg and the average weight at birth was 19 kg. Their daily milk yield ranged from 6-7 kg and the milk season is short (Ghazal et al., 1979; Al-Jalili et al., 1985; Al-Saegh et al., 1987). Saleh et al. (1989) and Al-Qudsi and Elia (2010) indicated that their daily milk production ranged between 6-7 kg and reached 1030 kg in a short milking season of 216 days (Ghazal et al., 1979; Al-Jalili et al., 1985; Al-Saegh et al., 1987). While Magid et al. (2003) reported that her milk production amounted to 1140 kg and the length of the milk season was 197 days. Nasser et al. (2009) reported a daily milk yield of 9.1 kg and 9.7 kg on the standard and experimental treatments. Farhan and Sami (2014) indicated that her daily milk yield was 7.83 kg. The fat content of Sharabi cows' milk was 3.3-5.2% (Saleh et al., 1989; Al-Qudsi and Elia, 2010; Jameel et al., 2012). Magid et al. (2003) showed that the average fat content of Sharabi cows' milk was 4.8%. While Nasser et al. (2009) showed that the percentage of fat, protein, lactose and non-fat solids when fed on the standard feed were (3.5, 3, 4.9, 9.2) respectively and when fed on the experimental feed the average percentages were (3.3, 3.5, 4.3, 8.8) respectively. The average percentage of fat, protein, lactose and non-fat solids in the milk of Sharabi cows were (4.89, 3.23, 4.79 and 8.74) respectively (Farhan and Sami, 2014). The average age at first calving was 30 months, the interval between two births was 405 days, the interval between calving and fertilization was 130 days, and the number of inseminations needed for fertilization was 1.8 (Saleh et al., 1989; Al-Qudsi and Elia, 2010). While Magid et al. (2003) showed that the average number of inseminations needed for fertilization was 1.74-1.83 inseminations.

AL-Karadi cows

They are found in northern Iraq and are considered the main cow in the Kurdistan region and are considered one of the smallest and least productive Iraqi cows, accounting for 25.5% (Al-Rawi et al., 1998; Al-Qudsi and Elia, 2010; Ahmed et al., 2010).

Phenotypic characteristics of Karadi cows

Its color is black, and there are some individuals that are grayish-red, reddish, grayish, or brownish-black in color, The body size is small and the head of the animal is medium-sized and has a slightly medium-sized forehead, the neck is

short and has a small pulp, the back is straight and wide, the chest is narrow, the legs are short, the horns are short and present in both sexes, and in some cows they are long and arched forward, the udder is small in size, the teats are short and very thin, and 77% of the udder shape is either spherical or isolated, and 23% takes the extended form (Ghazal et al., 1979; Al-Saegh et al., 1987; Salih et al., 1989; Jerusalem and Elia, 2010). Issa (1979) indicated that their color is brownish-black in color. While Magid et al. (2003) indicated that the color is black, horns are present in both sexes and the body height is 106 cm.

Production traits of Karadi cows

The average weight of the breed was 300-350 kg, the average daily weight gain was 630-633 g, the nutritional conversion rate was 12.68-12.7 kg and the clearance rate was 54.26% (Ghazal et al., 1979; Al-Jalili et al., 1985). Al-Saegh et al. (1987) indicated that the average weight of the breed reached 300-350 kg and the average daily weight gain amounted to 400 g. Saleh et al. (1989) and Al-Qudsi and Elia (2010) indicated that the average weight of the breed reached 208 kg and the average weight at birth ranged between 14.5-15 kg. Majid et al. (2003) confirmed that the average weight of the breed ranged between 220-300 kg, the birth weight was 14.5 kg, the average daily weight gain was 379 g and the nutritional conversion rate was 12.68 kg. The average daily milk yield was 2-3 kg and the milk season was short (Ghazal et al., 1979; Al-Jalili et al., 1985; Al-Sayegh et al., 1987). Saleh et al. (1989) showed that her daily milk production amounted to 2.15 kg and her total production amounted to 159.745 kg for a season length of 74.3 days. Issa (1979) indicated that her daily milk production amounted to 2.14 kg and her total production amounted to 159.14 kg for a season of 74.34 days. Majid et al. (2003) confirmed that her daily milk yield was 2.18 kg and total yield was 161 kg for a season of 74 days. Ahmed et al. (2010) indicated that the average daily milk yield was 3.25 kg and the total yield was 290.43 kg for a season of 89.38 days. Al-Qudsi et al. (2012) confirmed that her total production amounted to 148 kg/season.

The average fat content of Karadi cows' milk was 3.6-5.6% (Saleh et al., 1989). Majid etal.(2003) indicated that the average fat content of Karadi milk was 4.8%. Jamil et al. (2012) indicated that the average age at first calving in Karadi cows was 30.4 months.

Table (2) Body dimensions of local Iraqi cattle breeds

The breed	Body length(cm)	Body height(cm)	Chest circumference (cm)	Source
AL-Janoubi (Government Station)	123	133	172	Ghazal et al(1979) ,.
AL-Janoubi (breeders)	females-105 107 males	- cm females113 cm males125	females - 142 136 males	Ghazal et al., (1979)
AL-Janoubi	----------	females-125 123 males	----------	Majid et al,(2003)
AL-Janoubi	females 74.83 males81.28	females - 110 114.61 males	females - 134.16 141.54 males	Essa et al.,(2020)
Rustaki	female109.52 male114.12	females - 120.87 124.6 males	females - 155.47 156.26 males	Al-Bayatti et al.,(2018)
Sharabi	----------	119	----------	Majid et al,(2003)
Karady	----------	106	----------	Majid et al,(2003)

Table (3) Some reproductive characteristics of local cattle breeds

The breed	Age at first birth (months)	Interbirth interval (day)	Age at first vaccination (month)	Period between birth and fertilization (day)	Number of vaccinations required for fertilization	Source
AL-Janoubi	30	414-381	20	-------	------	Ghazal et al(1979) ,. Al-Jalili et al.,(1985) Saleh et al., (1989)
AL-Janoubi	29.5	----------	----------	--------	--------	Essa et al.,(2020)
Rustaki	31					Jamil et al(2015) ,.
Rustaki		-326.66			1.16	Al-Jubori

		337.5				andSenkal(2023)
Sharabi	30	405	---------	130	1.8	Saleh et al., (1989)
Sharabi	-------	--------	----------	---------	1.83-1.74	Majid et al,(2003)
Karaddi	30.4	---------	----------	----------	---------	Jamil et al., (2015)

Table (4) Some phenotypic characteristics of local Iraqi cattle breeds

The breed	the color	Source	The breed	hump and core	Source
AL-Janoubi	Dark red to brown in males and yellow in .females Multiple colors, the most famous of which are dark brick in males and light in .females The color of the male is brown, the neck is black, and the females .are yellow	.Ghazal et al (1979) .Al-Sayegh et al (1987) ,.Essa et al (2020)	AL-Janoubi	They are clearly visible in males and are somewhat less prominent in females. The presence of the hump is a dominant trait in males and is 30 cm high. The hump is small in .both sexes	.Ghazal et al (1979) Essa et al.,(2020)
Rustaki	Dark reddish brown, some individuals are white or grey. Black in both .sexes	.Ghazal et al (1979) Al-Bayatti et al.,(2018)	Rustaki	The presence of a small hump in males, less than 15 cm high, and a straight back in females, which is a dominant trait, and the rump is small in both .sexes	Al-Bayatti et al.,(2018)
Sharabil	Black on both sides with a white line along the back, going down to the bottom of the animal, dividing it into two halves. Some individuals are white with black spots or black with white .spots	kodsy and Elijah (2010)	Sharabi	Clear in males and less clear in females, and their back is not straight. The presence of a small hump in .males	.Ghazal et al (1979) Majid et al.,(2003)
Karaddi	Black, black-brown with red, grey or red-speckled grey individuals. Black-brown	.Ghazal et al (1979) kodsy and Elijah (2010) Issa(1979)	Karaddi	Her back is straight and her .core is small	kodsy and Elijah ((2010)
AL-Janoubi	The horns are short, forward-pointing and present in both sexes. They are present in both sexes, black in colour and 7 cm	.Ghazal et al (1979) Majid et al.,(2003) Essa et al.,(2020)	Rustaki	The largest Iraqi cows	Saleh et al ,. (1989)

	.long				
Rustaki	The horns are short and curved and are present .in both sexes	Ghazal et al., (1979) Majid et al.,(2003) Al-Bayatti et al.,(2018)	Sharabi	Its body size is slightly larger than the rest of .the Iraqi cows	kodsy and Elijah (2010)
Sharabi	The horns are small and present in both .sexes	Ghazal et al ,. (1979) Majid et al.,(2003) kodsy and Elijah (2010)	Karaddi	The smallest Iraqi cows	,.Saleh et al (1989) kodsy and Elijah (2010)
Karaddi	Short, but in some individuals it is long and arched, and is present in both .sexes	,.Saleh et al (1989)	AL-Janoubi	Its head is thin, long and wide in .some	,.Saleh et al (1989) kodsy and Elijah (2010)
AL-Janoubi	Small body size	kodsy and Elijah (2010)	Rustaki	Its head is medium sized. The face is straight in females, 45 cm long, and shorter and wider in .males	,.Saleh et al (1989) kodsy and Elijah Al-Bayatti (2010) et al.,(2018)
Sharabi	Its head is big and short and its .neck is short	,.Saleh et al (1989) kodsy and Elijah (2010)	Karaddi	The animal's head is medium-sized and has a medium-sized .forehead	,.Saleh et al (1989) kodsy and Elijah (2010)
AL-Janoubi	The udder is relatively small in size, the teats are small and symmetrical, and the texture of the udder tends to be fatty rather .than spongy	,.Saleh et al (1989) kodsy and Elijah (2010) kodsy et al.,(2012)	Sharabi	Her udder is large and not pendulous and the nipples are .large	,.Saleh et al (1989) kodsy and Elijah (2010)
Rustaki	The udder is medium in size and the teats are .long and thick	Ghazal et al ,. (1979) Al-Jalili et al.,(1985)	Karaddi	Her udder is very small and the teats are very .short and thin	,.Saleh et al (1989)

Table (5) Average breed weight, birth weight, daily weight gain, feed conversion rate and percentage of local Iraqi cattle breeds

The breed	Average breed weight (kg)	Average birth weight (kg)	Daily weight gain (g)	Food conversion rate kg feed/kg weight	% Clearance	Source
AL-Janoubi	400-350	35	889-689	7.57	58.21-51	Ghazal et al ,. (1979) Al-Jalili et al.,(1985)
AL-Janoubi	390	--------	500	---------	--------	Al-Sayegh et (1987) ,.al

AL-Janoubi	360-300	21-20	--------	---------	--------	,.Saleh et al (1989)
AL-Janoubi	325-309	21.8-20.7	557	--------	--------	Majid et al.,(2003)
Rustaki	500-450	-------	688	8.5-8.45	54.21	Ghazal et al ,. (1979) Al-Jalili et al.,(1985)
Rustaki	450-400	----------	688	8.45-7.39	--------	Majid et al.,(2003)
Sharabi	500-450		633-600	8.28	52.7-52	Ghazal et al ,. (1979) Al-Jalili et al.,(1985 Al-Sayegh et al(1987) ,.
Sharabi	468-305	19-18.6	---------	---------	--------	Saleh et al ,. (1989)
Sharabi	400-295	19.98-18.5	633	8.23	----------	Majid et al.,(2003)
Sharabi	450-420	19	---------	----------		kodsy and Elijah(2010)
Karaddi	350-300	----------	633-630	12.7-12.68	54.26	Ghazal et al ,. (1979) Al-Jalili et al.,(1985
Karaddi	350-300	--------	400	---------	---------	Al-Sayegh et al(1987) ,.
Karaddi	208	15-14.5	---------	---------	--------	,.Saleh et al (1989)
Karaddi	300-220	14.5	397	12.68	---------	Majid et al.,(2003)

Table (6) Daily and total milk production, length of milk season and dry period

The breed	Daily milk production (kg)	Total milk production (kg)	Length of milk season (day)	Dry period (day)	Source
AL-Janoubi	6.75-6.25	1350-1250	200	146	,.Ghazal et al (1979) Al-Jalili et al.,(1985
AL-Janoubi	5.83	1400	240	----------	Majid et al.,(2003)
AL-Janoubi	5.038	936.43	185.87	----------	Al-Anbari et al.,(2012)
AL-Janoubi	1.16	350	300	----------	Jamil et (2015),.al
AL-Janoubi	3.29	345.45	105	----------	Essa et al.,(2020)
AL-Janoubi	4.17	1039.56	305	----------	Yousief et al.,(2023)

AL-Janoubi	5.71-3	1200	210	----------	,.Ghazal et al (1979) Al-Jalili et al.,(1985 Majid et al.,(2003)
Rustaki	4-3	--------	----------	----------	Al-Sayegh et al ,. (1987)
Rustaki	5-3	1300	240-180	---------	kodsy and Elijah (2010)
Rustaki	--------	1200-720	-------	--------	kodsy and Elijah (2010)
Rustaki	7.32	1537.2	210	---------	Al-Bayatti et al.,(2018)
Rustaki	4.5-3.5	787-603.75	175-172.5	------	Al-Jubori and Senkal(2023)
Sharabi	7-6	1030	216	180	,.Ghazal et al (1979) ,.Saleh et al (1989)
Sharabi	5.79	1140	197	------	Majid et al.,(2003)
Sharabi	4.77	1030	216	------	Jamil et (2015),.al
Sharabi	9.7-9.1	---------	----------		Nasser et al.,(2009)
Sharabi	7.83	--------	---------	--------	Farhan and Sami(2014)
Karaddi	3-2	--------	------	-----	,.Ghazal et al (1979) Al-Jalili et al.,(1985 Al-Sayegh et al ,. (1987)
Karaddi	2.14	159.14	74.34	-----	Issa(1979)
Karaddi	2.15	159.745	74.3	------	,.Saleh et al (1989)
Karaddi	2.18	161	74	------	Majid et al.,(2003)
Karaddi	3.25	290.43	89.38	------	Ahmed et al.,(2010)
Karaddi	--------	148	--------	-------	kodsy and Elijah (2010)

Table (7) Milk composition of local Iraqi cow breeds

The breed	F%	P%	L%	SNF%	ASH%	TS%	W%	D	Source
AL-Janoubi	4.85	3.62	4.81	9.2	0.72	14.05	85.95	32.92	Shukri et a.,(1981)
AL-Janoubi	4.1	---------	-------	--------	--------	-------	-------	-------	Majid et al.,(2003)
AL-Janoubi	2.5	------	-----	------	-------	--------	-------	--------	Jamil et al ,. (2015)

AL-Janoubi	3.92	2.20	4.18	6.39	0.01	10.31	89.69	22.24	Yousief et al.,(2023)
Rustaki	4-3.5	------	-------	-------	-------	-------	-------	-------	,.Jamil et al (2015)
Rustaki	-3.28 3.44	-2.90 2.93	-4.39 4.40	-7.99 8.03	0.70	-11.27 11.47	-88.53 88.73	-29.34 29.37	Al-Jubori and Senkal(2023)
Sharabi	5.2-3.33	--------	--------	--------	-------	--------	-------	--------	,.Saleh et al (1989)
Sharabi	3.5-3.3	3.5-3	4.9-4.3	9.2-8.8	-0.65 0.73	-12.1 12.7	-87.3 87.9	32-30	Nasser et al.,(2009)
Sharabi	4.89	3.23	4.79	8.74	0.72	13.63	86.63	27.99	Farhan and Sami(2014)
Karaddi	5.6-3.6	-------	--------	---------	-------	--------	-------	-------	,.Saleh et al (1989)
Karaddi	4.8	-------	-----	------	------	-------	-------	-------	Majid et al.,(2003)

%F represents the percentage of fat, %P: the percentage of protein, %L: the percentage of lactose, %SNF: the percentage of non-fat solids in milk, %Ahs: the percentage of ash or minerals, %TS: the percentage of total solids, %W: the percentage of water in milk, D: the density of milk.

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