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Comparing the Productive Performance of Body Weight and Milk between Cypriot and Local Goats

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Abstract
This study was conducted at the Livestock Research Station-Abu Ghraib affiliated to the Ministry of Agriculture. The study included 53 Cypriot goats and 30 local goats at the age of 2-5 years. The study aimed to compare the productive performance represented by (dim weight at birth, body dimensions of dim, birth weight, weaning weight, total weight gain, total milk production, peak production, number of milking days and milk components) as well as the interaction between breed, month, birth, breed and age of dim. The results of the analysis showed a significant superiority of the Cypriot goats over the local ones in the index of body mass, and the superiority of the local over the Cypriots in the number of milking days and between the overlap between the breed and the month of birth. The Cypriot goat at the age of 5 years was superior in dim weight at birth, front height, rear height, and body mass index, and the local goat was superior at the age of 5 years. in newborn weight at birth and in total milk production. Keywords: Cypriot goats, local goats, milk production.

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Introduction

Sheep and goats are an important source of livestock in the country, where they are mainly raised for the production of meat and milk, then wool, hair and leather (Al-Barzanji and Abdel-Rahman, 2012) [3]. Interest in improving the production of farm animals, including goats, is an important aspect to raise the economic return, and animal breeders usually follow improvement programs. It works to increase and improve the productive capacity of animals (Al-Khazraji *et al*., 2020). [4] The rapid growth of newborns in the pre-weaning stage is also considered one of the important economic characteristics that affect their subsequent weights, which some breeders rely on in choosing their animals. Before weaning, it may give a clear indication of the mother's ability to produce milk and then to care for her newborns, especially in the early stages of her life. The growth of newborns in the pre-weaning phase is affected by a number of genetic and non-genetic factors, as well as the characteristic of milk production is one of the quantitative characteristics, which is also affected by genetic and non-genetic factors (Abdul Nour, 2011). [1] The increase in growth is evidence of the possibility of producing more meat, and that body weights and dimensions measured at different ages are indicators of high growth and fattening capabilities, and that the possibility of benefiting from these evidences in the processes of breeding and genetic improvement of animals, and that the harmonious and integrated form of live animals represents evidence of general growth and appropriate nutrition Therefore, it is possible to use these traits in conducting selection processes in order to obtain parents for future generations with the desired traits (Al-Rawi *et al*., 2002) [5].

The study aimed to compare the productive performance between the Cypriot goats and the local goats in terms of birth weight, body dimensions of dim, milk production and its components, as well as the interaction between the breed, the month of birth and the age of dim.

Materials and Methods

The study was carried out at the government ruminant research station/Baghdad governorate affiliated to the Agricultural Research Department/Ministry of Agriculture for the period from 1/3/2023 to 1/6/2023, on a sample of female Cypriot goats (53) and female local goats (30) at the age of 1-4. year, the herd was reared in semi-closed pens designated

for its shelter, represented by pens for dim and males, and pens for birth, in which newborns remain with their mothers for three days after birth, and others are closed for raising newborns, in which good ventilation and lighting are available. The quality and quantity of fodder varies according to seasons and depending on its availability at the station. As green fodder (barley, alfalfa) is provided in two meals, one in the morning and the second in the evening. Concentrated fodder is provided in the amount of (500) g/day/animal according to availability. This quantity is increased before and during the reproductive season, as well as in the milk production stage. Periodic grazing of the herd according to the station program.

The weight at birth was measured approximately 12 hours after birth using a special scale to measure the weights of the newborns. The dim were also weighed after birth and cleaned with a scale with a capacity of 120 kg. After 90 days, the weight was taken at weaning for the newborns, and the rate of weight gain was calculated according to the following equation:

Weight gain rate=weaning weight-birth weight

Also, the body dimensions of dim were measured after birth by means of a ruler and a measuring tape, and they include measurement (chest circumference, body length, front height, abdominal circumference, buttock height) according to the method (Cam *et al*., 2010) [6].

The data were analyzed statistically using SAS (Statistical Analysis System) (2010) to study the comparison between Cypriot and local goats in milk production and growth characteristics of newborns. Significant differences between the means were tested using Duncan's multiple range test (Duncan, 1955).

$Yijm = \mu + Bi + eij$

Yj = observed value for genotype i.

μ = the overall average of the studied trait.

Bi = effect of strain (Cyprus, local) on the studied traits.

eijm = the random error that is assumed to be randomly and normally distributed with a mean of zero and a variance of $\sigma^2 e$.

Results and Discussion

Table 1 shows that there are no significant differences in the characteristics of the body dimensions of dim, except for the body mass index, as the Cypriot goats performed on the local goats (66.32, 62.35) cm, and the local goats performed on the Cypriot goats significantly in the weight of the newborn at birth (2.73, 2.37) kg, and this result was in agreement With many studies on the importance and role of the genetic morphogenesis of the leptin gene in growth characteristics and body weights at different age stages in many farm animals (Jonas *et al*., 2016) [11] and also the local superiority over the Cypriot is significant in the number of days Milking (217.13, 193.09) days, while there were no significant differences for milk production and its components.

Table 1: Comparison of body weight, milk production and its components between Cypriot and local goats

	Cypriot goats	local goats
Number	53	30
Dim weight at birth/kg	1.51 ± 45.30	1.63 ± 41.20
Chest circumference/cm	0.97 ± 83.77	1.06 ± 81.90
Body length/cm	0.85 ± 82.05	1.08 ± 81.0
Front height/cm	0.61 ± 76.37	0.63 ± 76.46
Back height/cm	0.62 ± 78.56	0.72 ± 78.40
Body mass index	1.26 ± 66.32a	1.67 ± 62.35b
Birth weight/kg	0.09 ± 2.37b	0.14 ± 2.73a
Weaning weight/kg	0.45 ± 15.03	0.67 ± 14.81
Total weight gain/kg	0.41 ± 12.66	0.61 ± 12.08
Birth twins dim Number-ratio	%62.2 – 33	%63.3 – 19
Total milk production/kg/season	15.77 ± 212.66	34.27 ± 244.68
Peak output/kg	1.26 ± 35.17	1.56 ± 38.33
No. milking days/day	6.47 ± 193.09b	9.72 ± 217.13a
%fat	0.13 ± 3.13	0.23 ± 2.94
%protein	0.03 ± 2.97	0.03 ± 3.03
%lactose	0.03 ± 4.38	0.04 ± 4.50
%non-fat solids	0.05 ± 8.08	0.07 ± 8.24

Table 2 shows interaction between the goat breed and the month of birth, as the results showed that there were no significant differences for the mother's weight at birth and dim body dimensions, and these results were close to what was found by Abd EI- Hamid *et al*. 2017. [5] Table 3 shows that the interaction between the breed and the month of birth did not have a significant effect on the proportion of twins, the weight of lambs at birth, weaning, and the total weight gain. The weight of the mother at birth is considered an important evidence for the production of babies with high weights, and this is an important point because the weight at birth is positively correlated with the subsequent weights of the animal, as the large females are characterized by having a larger uterus, which provides more space that allows for better growth and development of the embryos during pregnancy Especially the last stages of pregnancy, and this is reflected positively on birth weights (Garcia *et al*., 1985) [9].

Table 2: The effect of the interaction between breed and month of birth on dim weight and body dimensions

Breed	Birth Month	NO.	Dim Weight Birth	Chest Circumference CM	Body Length CM	Front Height CM	Back Height CM	Body Mass Index
Cypriot goats	January	40	1.87 ± 45.57	1.19 ± 83.75	1.03 ± 82.0	0.70 ±77.12	0.71 ± 79.25	1.53 ±66.61
	February	4	6.16 ± 50.0	3.83± 86.25	2.38 ±85.0	2.49 ± 76.75	2.95±79.50	5.34 ±68.42
	March	5	1.93±42.60	1.59±80.20	1.82±81.20	0.94±73.0	0.96±75.20	2.69 ±64.66
	May	4	2.39±41.25	2.12±86.0	2.49±80.75	1.49±72.75	1.29±75.0	3.64 ±63.40
Local goats	January	26	1.52 ±40.84	1.16±81.88	1.16±81.26	0.57±76.23	0.78±78.15	1.59 ±61.57
	February	2	2.0±40.0	2.0±82.0	2.0±80.0	1.0±78.0	1.0±80.0	0.001 ±62.46
	March	2	19.0±47.0	7.0±82.0	7.50±78.50	5.0±78.0	5.0±80.0	16.84 ±72.79
	May	0						

Table 3: The effect of the interaction between breed and month of birth on the percentage of twins and weight of lambs

Breed	Birth Month	No	Birth Twins Dim Number-Ratio	Birth Weight/kg	Weaning Weight/kg	Total Weight Gain/kg
Cypriot goats	January	40	%67.5 – 27	0.11 ± 2.39	0.54± 15.46	0.48 ± 13.06
	February	4	%75 – 3	0.54 ± 2.40	0.31± 12.12	0.61 ± 9.72
	March	5	%20 – 1	0.11 ± 2.50	1.28± 15.60	1.24 ± 13.10
	May	4	%50 – 2	0.20 ± 2.0	1.08± 13.0	0.93 ± 11.0
Local goats	January	26	% 61.5 – 16	0.15 ± 2.75	0.75± 14.94	0.69 ± 12.19
	February	2	%100 – 2	0.75 ± 2.75	1.0± 14.0	0.25 ± 11.25
	March	2	%50 - 1	1.15 ± 2.55	3.0± 14.0	1.85 ± 11.45
	May	0	0			

From Table 4, it is noted that the local goats in February were superior to the Cypriot goats in the rest of the birth months in terms of the number of milking days (239, 220, 199, 191, 177, 151, 148) kg, and the Cypriot goats excelled in the month of May in terms of fat percentage (3.70, 3.46, 3.12, 3.10, 2.23, 1.95, 1.90) and the percentage of protein (3.20, 3.05, 3.04, 2.98, 2.96, 2.88, 2.80) and the percentage of lactose (4.70, 4.60, 4.51, 4.46, 4.35, 4.34, 4.20) and materials The non-fatty solid (8.59, 8.35, 8.27, 8.15, 8.03, 8.01, 7.76). This result agreed with what was reached by Kralickova *et al*. (2013) [12], as they noted that goats that were born in January and February had higher milk production than those born in March, and it was contrary to the study result of what Ciappesoni *et al*. (2004) [7].

Table 4: Effect of the interaction between the breed and month of birth on milk production and its components.

Breed	Birth Month	No	Total Milk Production/kg/Season	Peak Output/kg	No. Milking Days/Day	%Fat	%Protein	%Lactose	%Non-fat Solids
Cypriot goats	January	40	16.92 ± 223.63	1.19 ± 34.07	7.41 ± 199.75ab	0.14 ± 3.12ab	0.03 ± 2.96ab	0.04 ± 4.34ab	0.06 ± 8.03ab
	February	4	89.68 ± 276.15	7.92 ±39.25	32.1 ± 191.2ab	0.49 ± 2.23ab	0.07 ± 2.88ab	0.12 ± 4.35ab	0.20 ± 8.01ab
	March	5	24.29 ± 115.71	7.25 ± 38.20	14.6 ± 177.4ab	0.6 ± 3.46ab	0.04 ± 2.98ab	0.08 ± 4.46ab	0.11 ± 8.15ab
	May	4	65.35 ± 160.62	2.59 ± 37.75	12.8 ± 148b	0.70 ± 3.70a	0.13 ± 3.20a	0.08 ± 4.7a	0.14 ± 8.59a
Local goats	January	26	38.45 ± 257.62	1.69 ± 37.53	10.1 ± 220.5ab	0.25 ± 3.10ab	0.03 ± 3.04ab	0.04 ± 4.51ab	0.08 ± 8.27ab
	February	2	30.05 ± 235.65	5.50 ± 39.50	16.0 ± 239a	0.25 ± 1.95ab	0.0 ± 2.80b	0.0 ± 4.20b	0.01 ± 7.76b
	March	2	41.70 ± 85.5	2.50 ± 47.50	48.0 ± 151b	0.30 ± 1.90b	0.05 ± 3.05ab	0.0 ± 4.60ab	0.03 ± 8.35ab
	May	0							

interaction between the breed and the age of dim in the weight and body dimensions of dim Table 5: show the superiority of the Cypriot goats at the age of 5 years in dim birth weight (55.80, 53.50, 47.20, 43.27, 42.53, 41.23, 37.92, 37.37) and the superiority of the local goats at the age of 5 years in chest circumference (89.60, 88.90, 88.18, 83.81, 83.07, 80.47, 78.46) and the local goats at the age of 5 years were superior in body length (86.60, 85.60, 85.33, 81.76, 81.72, 80.58, 78.3). 8, 78.37) and the Cypriot goat at the age of 5 years excelled in Front height (79.10, 78.20, 77.66, 77.27, 77.0, 76.15, 75.70, 73.15) and back height (81.40, 80.20, 80, 79.54, 79, 78.23, 77.58, 75.23) and body mass index (75.15, 72.95, 63.99, 63.36, 63.16, 62.78, 61.40, 60.34) and this result did not agree with Al-Azzawi (2011) [2].

Table 5: Effect of the interaction between breed and age of dim on the weight and body dimensions of dim

Breed	Age Dim	No	Dim Weight Birth	Chest Circumference CM	Body Length CM	Front Height CM	Back Height CM	Body Mass Index
Cypriot goats	1year	13	1.66 ± 37.92bc	1.18 ± 78.46c	1.28 ± 78.38c	0.74 ± 73.15b	0.75 ± 75.23b	1.60 ±61.40b
	2year	13	1.90 ± 42.53bc	1.61 ± 83.07bc	1.48 ± 81.76bc	0.80 ± 76.15ab	0.84 ± 78.23ab	1.53 ±63.36b
	3year	11	2.80 ± 43.27bc	2.02 ± 83.81bc	2.10 ± 81.72bc	1.50 ± 77.27a	1.54 ± 79.54a	2.36 ±63.99b
	4year	6	4.82 ± 53.50a	2.68 ± 88.18ab	2.36 ± 85.33ab	1.99 ± 77.66a	1.84 ± 80.0a	4.58 ±72.95a

	5year	10	3.89 ± 55.80a	2.50 ± 88.90ab	1.82 ± 85.60ab	1.64 ± 79.10a	1.68 ± 81.40a	3.79 ±75.15a
local goats	1year	0						
	2year	8	2.21 ± 37.37c	1.51 ± 80.12c	1.53 ± 78.37c	0.77 ± 77.0ab	0.77 ± 79.0ab	1.71 ±60.34b
	3year	17	2.34 ± 41.23bc	1.25 ± 80.47c	1.46 ± 80.58bc	0.88 ± 75.70ab	1.07 ± 77.58ab	2.71 ±63.16b
	4year	0						
	5year	5	3.51 ± 47.20ab	1.83 ± 89.60a	2.11 ± 86.60a	2.03 ± 78.20a	2.03 ± 80.20a	3.35 ±62.78b

The statistical analysis showed that the interaction between the breed and the age of the mother was significantly superior to the local goats at the age of 5 years in the weight of the newborn at birth (3.02, 2.71, 2.69, 2.61, 2.41, 2.37, 2.33, 2.02). As for the weaning weight and the total weight gain, the interaction of the breed and age did not affect. Table 7 shows that the local goats at the age of 5 years were significantly superior to the Cypriot goats at different ages for total milk production (296.88, 273.45, 252.83, 238.05, 234.88, 207.2, 194.73, 136.57). Zaman *et al*. (2002) [14] indicated that the mature and older mother provides a large part of her food for the sex as she has passed the growth stage, while the young mother shares with her embryos the food they receive to complete their growth and physiological development. This result partly agreed with what was indicated by Hermiz (2009) [10] that the mothers who were at the age of (4) years were the highest in terms of the birth weight of their newborns.

Table 6: The effect of the interaction between breed and the age of dim on the weight of the lambs

Breed	Age Dim	No.	Birth twins dim Number-ratio	Birth weight/kg	Weaning weight/kg	Total weight gain/kg
Cypriot goats	1year	13	%23 – 3	0.20± 2.33ab	0.95 ± 15.38	0.79 ± 13.04
	2year	13	%84.6 –11	0.24± 2.69ab	0.95 ± 15.38	0.87 ± 12.69
	3year	11	%36.3 – 4	0.10 ± 2.02b	1.09 ± 14.09	1.08 ± 12.06
	4year	6	%83.3 – 5	0.34± 2.41ab	1.06 ± 16.0	0.90 ± 13.58
	5year	10	%40 - 2	0.18± 2.37ab	1.04 ± 14.60	0.94 ± 12.23
Local goats	1year	0				
	2year	8	%62.2 – 5	0.25± 2.61ab	0.85 ± 13.87	0.66 ± 11.26
	3year	17	%58.8 -10	0.21± 2.71ab	1.04 ± 15.73	0.93 ± 13.02
	4year	0				
	5year	5	%80 – 4	0.36 ± 3.02a	1.06 ± 13.20	1.03 ± 10.18

Table 7: The effect of the interaction between breed and the age of dim on milk production and its components

Breed	Age Dim	No	Total milk production/kg/season	Peak output/kg	No. Milking Days/Day	%Fat	%Protein	%Lactose	%Non-fat Solids
Cypriot goats	1year	13	19 ± 136.57b	3.02 ± 35.0	9.42 ± 170.76	0.31 ± 3.21	0.02 ± 2.96	0.06 ± 4.42	0.09 ± 8.23
	2year	13	29.69 ± 234.88ab	3.41 ± 36.83	16.12 ± 202.38	0.30 ± 2.87	0.07 ± 3.04	0.06 ± 4.46	0.11 ± 8.12
	3year	11	37.21 ± 207.2ab	1.66 ± 33.63	10.11 ± 187.63	0.26 ± 3.26	0.07 ± 2.95	0.10 ± 4.33	0.15 ± 8.03
	4year	6	53.3 ± 238.05ab	3.53 ± 35.33	22.5 ± 213.5	0.37 ± 2.93	0.10 ± 2.93	0.11 ± 4.30	0.11 ± 8.06
	5year	10	38.16 ± 273.45ab	2.53 ± 35.0	16.03 ± 203.8	0.32 ± 3.33	0.08 ± 2.93	0.10 ± 4.34	0.18 ± 7.92
Local goats	1year	0							
	2year	8	45.73 ± 194.73ab	3.42 ± 42.0	20.16 ± 212.12	0.61 ± 3.0	0.10 ± 3.03	0.12 ± 4.52	0.22 ± 8.37
	3year	17	52.28 ± 252.83ab	2.04 ± 38.35	13.44 ± 221.82	0.30 ± 2.97	0.03 ± 3.02	0.04 ± 4.48	0.06 ± 8.19
	4year	0							
	5year	5	79.55 ± 296.88a	1.43 ± 32.40	21.76 ± 209.20	0.36 ± 2.76	0.05 ± 3.04	0.11 ± 4.50	0.18 ± 8.20

Conclusions

We conclude that the Cypriot and local goats are close in body weight, milk production and its components, and there are very few differences. Therefore, the local goats are mixed with the Afghan goats spread in Iraq due to their large size and the production of new hybrids of large size and weight.

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