



STUDY OF SOME FIXED EFFECT IN MILK PRODUCTION AND GROWTH TRAITS IN LOCAL BLACK GOATS

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Article history:	Abstract:
Received: April 10 th , 2022	The study was conducted on a sample of 34 local goats from a breeder in Canaan sub-district / Diyala governorate for the period 13/11/2021 to 1/5/2022. The objective of the present study was to study of some effect factors in milk production (daily milk production- DMY and total milk production-TMY) and growth traits (birth, weaning weight and weight gain pre weaning). The General linear model (GLM) within the SAS (2012) computer package was used to analyze the data. The resulted showed a significant difference of sex in weaning weight (WWT), as males superiority (14.67) kg over females (13.19) kg, while the type of birth had a significant difference for all growth traits, as single births superiority twins in Birth weight (BWT) (2.95 and 2.64) kg, respectively, as for WWT and weight gain (WTG), twin births (15.87 and 15.46) kg, respectively, superiority single births (13.48 and 10.53) kg, respectively. As for the month of birth, there was a significant difference for all growth traits, The highest significant for the month of January was in WWT and WTG over the rest of study months (19.88 and 19.42) kg respectively, while significant of December for BWT (3.32) kg). As for the traits of milk production, the sex of newborn and type of birth had non significant effect. There while significant effect for the month of birth on the traits of DMY and TMY but month of birth was significant different, was in superiority of January (0.477 and 373.02) kg, respectively.
Accepted: May 10 th , 2022	
Published: June 22 nd , 2022	

Keywords: effect factors, milk traits, growth traits, local black goats.

Research extracted from the master's thesis of the first researcher.

INTRODUCTION

Goats are among the first animal species that humans domesticated for the purpose of producing milk, meat, leather and hair. The number of goats in Iraq, according to the estimates of the FAO for the year 2019, amounted to about 1,282,856 million heads (FAOSTAT (2019)). Goats are distinguished from farm animals in that their management and nutrition are simple, as well as their birth to twins, early sexual puberty, metabolic efficiency and long productive life, as well as their efficiency in using pastures and eating feed that other animals may not eat, as well as the cheap price of goats compared to sheep (Al-Qass et al., 1993). Also, the production of goats can be improved by increasing the number of weaned births for each goat exposed to a male, and this comes from an increase in the frequency of births (Ahmed et al., 2015). There are three breeds of goats in Iraq: the local black goats, the mountain black goats, and the goats (Al-Jalili et al., 1984). One of the main objectives of raising goats is the production of meat by increasing the proportion of twins in births in the first place, so we find that the discrepancy in body weights. As well as the variation in milk production for goats is the result of a number of genetic and non-genetic factors and the purpose of the breeder is to identify these factors and reduce their effects, so the research aims to study the effect of the sex of the newborn, type of birth as well as the month of birth on the aforementioned economic traits in the local black goats (Jawasreh, 2003 and Hermize et al., 2009).

MATERIALS AND METHODS

The study was conducted on a sample of 34 local goats in a private field of a breeder in Kanaan sub-district / Diyala governorate for the period from 13/11/2021 to 1/5/2022. With the aim of studying some constant factors affecting milk production traits (daily and total milk production) and growth traits (birth weight, weaning weight and weight gain before weaning) in local black goats. The total milk production (TMY) of the goats under study (34 goats) for one production season was calculated based on the daily milk production (DMY), which was measured weekly for each goat using manual milking method, by isolating the newborns from their mothers at night and for a period of 12 hours from eight o'clock in the middle of the night until seven in the morning, in order for the goats to be milked In the morning,

depending on the morning circuit, then the total milk production is estimated (ICAR, 2004), based on the following equation (Gootwine and Pollott, 2000) :

$$TMY = (T_1 - T_0) M_1 + \sum^{11} (T_r - T_{r-1}) (M_r + M_{r-1}) / 2$$

They represent:

TMY = total milk production.

- T0 = date of birth.
- T1 = the date of the first measurement.
- M1 = the first measurement (amount of milk in kg).
- Tr = the date of measurement for that week.
- Tr-1 = measurement date for the previous week.
- Mr = the measurement in that week (amount of milk in kg).
- Mr-1 = measurement in the previous week (amount of milk in kg).

The weight at birth (BWT) was taken 24 hours after birth using a disc scale (20 kg), and the weight of the mothers at birth was measured on a scale of 150 kg. Body weight at weaning (WWT) was measured after three months with a scale of (150 kg), and then the weight gain pre-weaning (WG) was calculated following equation: WG = WWT – BWT.

The data on milk production and growth traits were analyzed using the General Linear Model (GLM) method within the SAS (2012) statistical program according to the following mathematical model :

$$Y_{ijkl} = \mu + S_i + T_j + M_k + e_{ijkl}$$

Since:

Y_{ijkl}: observation value l.

μ: over all mean.

S_i: effect of sex of newborn i (male, female).

T_j: effect of birth type j (single, twin).

M_k: effect of the month of birth k (November, December, January, February).

e_{ijkl}: The random error, which is normally distributed with an average of zero and a variation of σ²e.

RESULTS AND DISCUSSION

Factors affecting the traits of milk production

Sex

There were non significant differences for sex of the newborn in the daily milk production (DMY) and total milk production (TMY) (Table 1). The results of this study were identical to what was stated by (Al-Samarrai 1999, Al-Douri., 2001, Baker et al., 2009, Reiad et al., 2010 and Al-Muhammadi., 2013), as they did not notice a significant effect of sex of the newborn on DMY and TMY traits of the Awassi sheep breed.

Birth type

There was non-significant effect of type of birth in DMY and TMY (Table1). The results of this study were contrary to what was stated by (Al-Dabbagh et al. 2011) in a study on the Shami goat breed in Iraq, as it showed a high rate of TMY for individual births (188 kg For twins (197) (kg), but this increase was non- significant in both DMY and TMY, and this is contrary to what was stated by (Salih and Marrof ., 2004), as there was a significant (p<0.05) superiority of twin births than their single counterparts in the traits of TMY (160.66 and 103.65) kg, respectively, in black Mountainous goat breed in Sulaymaniyah Governorate, northern Iraq.

Birth month

The study indicated that there was a significant (p < 0.05) superiority for the month of birth in the traits of DMY and TMY (Table 1), as the goats were superior in DMY and TMY for the month of January and (0.477 and 373.02 kg) respectively over the months of the study. The reason for this is the availability of pastures as well as fodder in this month. The results of the study were in agreement with what was found by (Kraličkova et al. 2013). It was found that the goats whose newborns were born in January and February gave more DMY (2.24 and 2.46) kg, respectively, than the goats whose newborns were born in the month of March (1.66) kg this is due to the availability of fodder in the winter.

Table (1): Some factors affecting the traits of daily and total milk production.

effecte factors	Mean ±SE	
	DMY /Kg	TMY /Kg
sex		
Male	a 0.02 ± 0.326	a 19.14 ± 255.22
Female	a 0.03 ± 0.352	a 29.83 ± 275.13
Level of significance	Ns	Ns
birth type		
Single	a 0.02 ± 0.321	a 19.50 ± 251.14
Twins	a 0.03 ± 0.374	a 27.18 ± 292.66

Level of significance	Ns	Ns
Birth month		
November	b 0.01 ± 0.274	b 8.51 ± 214.40
December	b 0.02 ± 0.270	b 15.94 ± 211.09
January	a 0.04 ± 0.477	a 32.66 ± 373.02
February	a 0.04 ± 0.440	a 38.23 ± 344.08
Level of significance	*	*

The different letters within the column differ significantly from each other * (p < 0.05) NS (non- significant)

Factors affecting growth trait

Sex

Table (2) showed that there was a significant difference (p < 0.05) for the sex of newborn in the traits of weight at weaning (WWT), as the male newborns were superior in this traits (14.67 kg over the female newborns (13.19) kg, and there were non- significant differences for the sex of newborn for the traits of birth weight (BWT) and weight gain pre-weaning (WG), and the reason may be due to the correlation of WWT with BWT as a result of the dams influence during pregnancy (the fetus) resulting in an increase in the size of the cotyledons and testosterone and after birth the consumption of a higher amount of milk, which is reflected in WWT. The results of the study were in agreement with what was stated by (Abdul Rahman et al., 2006) showed that males were significantly superior (p < 0.01) over females in the average WWT (19.08, 16.81 kg), respectively. This was confirmed by (Browning and Leite-Browning, 2011) males' superiority over females in WWT. In three breeds of goats in America, the general average was (15.7, 13.09) kg, respectively, but (Mia et al., 2013) did not find significant differences between the sexes in their study on Black Bengal goats.

Table (2) The effect of some factors affecting growth traits.

effecte factors	Mean ±SE		
	BWT/kg	WWT/kg	WG/kg
sex			
Male	a 0.12 ± 2.85	a 1.05 ± 14.67	a 1.09 ± 11.71
Female	a 0.12 ± 2.74	b 1.08 ± 13.19	a 2.19 ± 12.42
Level of significance	Ns	*	Ns
Birth type			
Single	a 0.144 ± 2.95	b 0.89 ± 13.48	b 0.92 ± 10.53
Twins	b 0.08 ± 2.64	a 1.48 ± 15.87	a 2.61 ± 15.46
Level of significance	*	*	*
Birth month			
November	c 0.14 ± 2.21	b 0.52 ± 11.62	b 0.48 ± 9.36
December	a 0.16 ± 3.32	b 0.39 ± 11.13	b 0.41 ± 7.78
January	b 0.05 ± 2.78	a 1.31 ± 19.88	a 2.62 ± 19.42
February	b 0.07 ± 2.81	a 0.64 ± 19.50	a 0.66 ± 16.65
Level of significance	*	*	*

The different letters within the column differ significantly from each other * (p < 0.05) NS (not significant).

Birth type

The results showed that there was a significant (p < 0.05) for the type of birth (Table 2) in the growth characteristics, as single births were superior to twins in both birth weight (2.95 and 2.64 kg), respectively, and in weaning weight (15.87, 13.48). kg) respectively and the weight gain before weaning (15.46, 10.53 kg) respectively. The superiority in twin births over singletons in weaning weight and weight gain may be due to the consumption of twin newborns a higher amount of milk during breastfeeding, as well as the compensatory growth of the newborns, and this is reflected in the trait. The study was in agreement with a number of studies, including what (Al-Azzawi., 2011) indicated to the significant superiority of single births over twins in the characteristic of birth weight in his study on Shami and local goats and their racket, and (Mohamedh .,1985) explained in his study on four breeds of goats: Sannen, Nupian, Toggerburg and Alpine had a significant effect on the type of birth, as single births outperformed twins and triples in their weights. (Al-Azzawi .,2011) referred to significantly in favor of single births in terms of weight at weaning over twin and triple births, with the average weight of single, twin and triple (18.46, 17.47, 17.90) kg, respectively. This contradicts the current study, as twin births outperformed singles in Body weight at weaning. As well as what was brought by Osman (2013) to the existence of high moral differences between the births of single births (16.5 g), twins (9.9 g) and triples (8.9 g) in the characteristic of weight gain before weaning in his study of Egyptian Zaraibi goats, which is contrary to the current study, as it excelled Twin births over individual in weight gain before weaning. (Al-Samarrai et al., 2015) also found a high significant superiority among the newborns if single births outperformed twins in terms of birth weight, weaning weight and weight gain.

Birth month

The results of the study showed a significant superiority ($p < 0.05$) (Table 2) in the month of birth for birth weight, weaning and weight gain, as the birth weight in December outperformed (3.32 kg) over the months of the study. While the month of January was superior to the weaning weight (19.88 kg) over the months of November and December (11.62 and 11.13 kg), respectively. 9.36 and 7.78 kg) respectively. The reason may be due to the high weaning weight of the offspring in January, as well as the good nutrition regime, which was positively reflected on the weight gain, as (Al-Azzawi., 2011) confirmed that the newborns born in the months (January and February) were significantly superior in terms of birth weight. ($p < 0.01$) on deliveries in other months. Between (Jawasreh., 2003), the reason for the difference in weights at weaning is the variation in temperatures, quality of pastures and quantity of feed, as well as the amount of feed the goats eat, which affects the mothers' milk productivity. (Deribe and Taya., 2013) clarified the existence of highly significant differences between births that occurred in the cold months and those born in the dry months in the rate of weight gain to weaning in their study on the Abergele goat breeds spread in Ethiopia.

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