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A Study of Body Weight andMilk Traits in Two Local Goat Breeds-SulaymaniyahGovernorate, Iraq

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Abstract

This study was carried out to investigate the effect of some factors on birth weight (BW), body weight at 30, 60 days, weaning weight (WW),body weight at 120, 150 days, total daily gain (TDG), pre- and post-weaning daily gain, daily milk yield (DMY), total milk yield (TMY), and milk composition (fat, protein, lactose, SNF, and total solids). A 51 does in two flocks used. The fixed effects were doe age, kid sex, and birth type, generally had no significant effects on most body weight and milk traits in both breeds. The month of kidding showed significant effects (P≤0.05) on BW, weight at (30,60, WW, and 150 days), TDG,post-weaning, DMY,and some milk components in Black doe. In contrast, thelactation stageshowed significant effects (P≤0.05) on DMY,TMY, and certain milk composition traits. Overall, milk composition remained relatively stable compared to milk yield. Maraz goats were more sensitiveto these factors than Black goats. These results indicate that management practices exert a greater immediate influence, whereas genetic selection appears to have a comparatively limited effect under the prevailing conditions.

I. Introduction

Goats are a valuable part of rural livelihoods in the Kurdistan region of Iraq, particularly in arid and mountainous areas where other livestock species are less adapted. Several local breeds are widely recognised, including the Mountain black goat (locally known as Native or Rashoky), which is primarily raised formeat and milk production, and well-adapted to lowland conditions, and the Maraz (Meriz) goat, common in the northern mountainous areas, and valued for milk and hair production (Alkass and Merkhan, 2013; Alkass and Juma, 2005).These local goats are highly adapted to harsh environments and contribute significantly to livestock production and food security in the region(Khdhr and Karim, 2024; Alkass and Mustafa, 2023;Owaid*et al*., 2023).

Many studies analyzing the factors affectingKis' growth performance, Milk production, and composition were reported (Getaneh *et al*., 2016, and Vacca *et al*., 2018). The main factors were age of does at kidding (Wang *et al.,* 2013; Ferro *et al.,* 2017; Youssef *et al.,* 2014),sex of kids (Sarma *et al*., 2019; Flores-Najera *et al*., 2021), type of birth (Margatho *et al*., 2019; Meza-Herrera *et al*., 2019), month or season of kidding (Abraham *et al.,* 2017; Mabrouk*et al.,* 2010), and stage of lactation(El-Tarabany *et al*., 2018; Carmo *et al*.,2016). These factors have also been reported to influence milk production efficiency and lactation length (Carnicella *et al*., 2008).

The objective of this study is to assess the influence of selected non-genetic factors on milk production traits and growth performance in Black and Maraz goat breeds.

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II. Materials and Methods

The data were obtained from Black and Maraz goats in two private flocks at different locations(*Fig.1*), the Dokan District (or Dukan), and the Ranya District, Sulamaniyah Governorate, in the Kurdistan Region of Iraq (*Fig.2*). In our study, a total of fifty-one doe goats were used, including thirty-two Black does (2–5 years old) and nineteen Maraz does (2–5 years old). At kidding, both does, and their kids were identified with spray markings in addition to ear tags. The kidding date, birth weight, sex of the kids, and other relevant information were recorded. The body weights of the kids were measured using an electronic scale from birth to 150 days of age.Milk yield was measured every two weeks from the second week after kidding until 150 days, using a combination of the kid-sucking method and hand milking. Kids were separated from their doe at 7:00 pm the day before the measurement. The next morning at 7:00 am, the kids were weighed, allowed to suckle until full, then weighed again and separated. The collected milk was recorded, doubled to estimate the daily yield, and then used to calculate monthly and total milk production. On the same day, milk samples were analysed immediately using a MilkoScanTM Minor device to determine composition, including fat, protein, lactose, solid non-fat, and total solids.

Statistical Analysis

Data was statistically analyzed using the complete randomized design (CRD) procedure by XLSTAT (version 2016). Duncan'smultiple range test was used to determine the significance of differences between treatment means (Duncan, 1955).

Figure 1. *Black and Maraz Goats flock*

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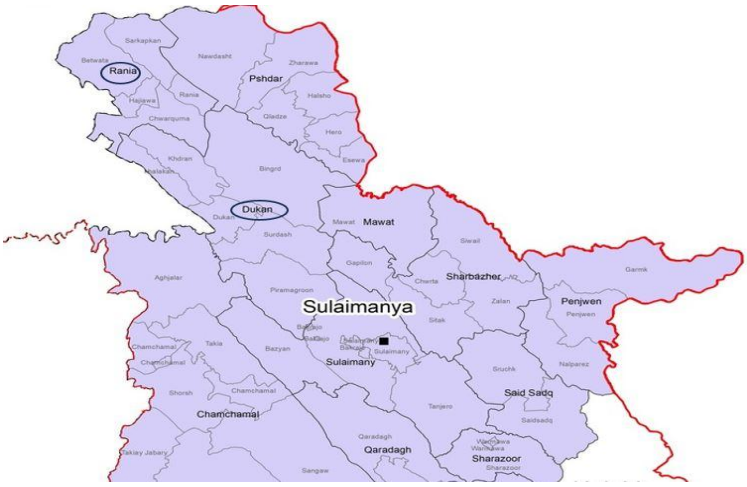

Figure 2. *Study location*

Results and Discussion

Growth traits of Black and Maraz kids

The analysis of variance results, least square means, and standard error for body weight at different ages (birth weight, 30, 60, weaning weight,120, 150 days), as well astotal daily gain, and pre- and post-weaning daily gains in Black and Maraz goats. Also, estimates of environmental factors, including doe age, kid sex, birth type, and month of kidding, are given in Tables 1 and 2.*Doe age*significantly affected (P≤0.05)birth weight and post-weaning daily gain in Black goats, with kids from older does (5 years) being heavier at birth, suggestingbetter maternal ability. This isconsistent with some earlier studies (Singh*et al*.,2022; Sodiq, 2012; Liu*et al*., 2005). However, no significant effects were observed on other traits, indicating that postnatal factors may play a larger role later. These resultsare consistentwith those of Güler *et al*. (2023) and Al-Khamaiseh *et al*. (2020). In contrast, doe age had no significant effect (P>0.05) on growth traits in Maraz goats at any stage, consistent with Hermiz and Baper (2019) and Ince and Köker (2011).

The sex of kids had no significant effect (P>0.05) on body weight in both Black and Maraz kids. Although males showed slightly higher values, the differences were not statistically significant, indicating similar growth performance between sexes under the same management conditions. This agrees with Sanahmmed *et al*.(2023), Sarma *et al.* (2019), Mia *et al*. (2013), and Birhanie *et al*. (2018), who reported non-significant sex effects on body weight. The slightly higher weights in males may be attributed to testosterone anabolic effects.

*Birth type*significantly affected (P≤0.05)on body weight at weaning, 150-day weight, and total daily gain in Black goat (Table 1), with single-bornkids showing higher values (23.72 ± 0.77kg) and total daily gain (0.12 ± 0.007 kg/day) than twins (20.56 ± 0.80 kg and 0.10 ± 0.007 kg/day, respectively). Thesefindings are consistent with Keskin *et al.* (2017) and Mabrouk *et al.* (2010). In Maraz goats, only single births were recorded, so the effect was not evaluated.

The month of kidding significantly affected (P≤0.05) on birth weight, weights at 30, 60, and 150 days, and post-weaning growth in black goats, with October-born kids'performance better early, and February-born kids showing improved post-weaning growth, likely due to seasonal feed and climate conditions. These results are consistent with those of Vázquez-Armijo *et al.* (2021), Maylinda *et al.* (2018), and Mioč *et al.* (2011). In contrast, no significant effect (P>0.05) was observed in Maraz goats, consistent with Jat and Datt (2025) and El-Moghazy *et al*. (2015).

Table 1: Least square means ± standard error of some factors affecting body weights (kg) in Black goat kids

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Fixed effects	Birth Weight	B.W at 30d	B.W at 60d	W. Weight	B.W at 120d	B.W at 150 d	Daily gain		
							Total	Pre-weaning	Post-weaning
Doe age (year)	*	NS	NS	NS	NS	NS	NS	NS	*
2	2.67±0.19^{ab}	6.48±0.49^{a}	10.36±0.83^{a}	14.47±1.19^{a}	19.03 ± 1.30^{a}	23.76±1.33^{a}	21.09±1.26^{a}	0.12±0.012^{a}	0.15±0.015^{ab}
3	2.85±0.13^{ab}	6.69±0.33^{a}	10.06±0.55^{a}	13.54±0.79^{a}	17.94±0.87^{a}	20.85±0.88^{a}	18.04±0.84^{a}	0.11±0.008^{a}	0.11±0.010^{b}
4	2.40± 0.17^{b}	5.69±0.42^{a}	9.20±0.71^{a}	13.25±1.02^{a}	17.49±1.11^{a}	23.79±1.13^{a}	21.38±1.07^{a}	0.11±0.010^{a}	0.17±0.013^{a}
5	3.24± 0.25^{a}	5.81±0.63^{a}	8.77±1.06^{a}	11.99±1.51^{a}	16.19±1.65^{a}	21.16±1.68^{a}	17.92±1.59^{a}	0.09±0.015^{a}	0.14±0.019^{ab}
Sex of kid	NS	NS	NS	NS	NS	NS	NS	NS	NS
Male	2.77±0.12^{a}	6.34±0.29^{a}	9.77 ±0.47^{a}	13.54±0.67^{a}	18.02±0.74^{a}	22.33±0.79^{a}	19.58±0.77^{a}	0.12 ±0.007^{a}	0.14±0.009^{a}
Female	2.71±0.15^{a}	6.20±0.35^{a}	9.70±0.58^{a}	13.35±0.82^{a}	17.54±0.90^{a}	22.05±0.96^{a}	19.34 ±0.93^{a}	0.11±0.008^{a}	0.14±0.011^{a}
Type of birth	NS	NS	NS	NS	NS	*	*	*	NS
Single	2.68±0.13^{a}	6.36±0.31^{a}	10.22±0.49^{a}	14.27±0.69^{a}	18.55±0.77^{a}	23.72±0.77^{a}	21.04±0.74^{a}	0.12±0.007^{a}	0.15±0.010^{a}
Twin	2.82±0.13^{a}	6.20±0.32^{a}	9.22 ±0.52^{a}	12.57 ±0.73^{a}	17.03 ±0.81^{a}	20.56 ±0.80^{b}	17.77±0.77^{b}	0.10±0.007^{b}	0.13±0.010^{a}
Month of kidding	*	*	*	NS	NS	*	*	NS	*
Oct	3.12±0.12^{a}	7.23±0.27^{a}	10.77±0.51^{a}	14.51 ±0.76^{a}	18.90 ±0.84^{a}	20.56±0.865^{b}	20.98±0.69^{b}	0.12±0.008^{a}	0.09 ±0.006^{b}
Feb	2.46±0.10^{b}	5.57±0.24^{b}	8.97±0.45^{b}	12.68 ±0.66^{a}	17.02±0.73^{a}	23.45±0.74^{a}	17.47±0.80^{a}	0.11±0.007^{a}	0.17±0.005^{a}

*Means in the same column for each trait with different letter differ significantly (p≤0.05). NS : non significant

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Table 2: Least square means ± standard error of some factors affecting body weights (kg) in Maraz goat kids

Fixed effects	Birth Weight	B.W at 30d	B.W at 60d	W. Weight	B.W at 120d	B.W at 150 d	Daily gain		
							Total	Pre-weaning	Post-weaning
Doe age (year)	NS	NS	NS	NS	NS	NS	NS	NS	NS
2	2.37±0.12[a]	7.15±0.37[a]	11.16 ±0.56[a]	14.02 ± 0.63[a]	17.95±0.85[a]	20.18±0.85[a]	17.81±0.82[a]	0.12±0.007[a]	0.10 ±0.045[a]
3	2.17±0.21[a]	7.45±0.62[a]	11.90±0.92[a]	15.69 ± 1.05[a]	19.50±1.41[a]	22.26±1.42[a]	20.09±1.36[a]	0.14±0.012[a]	0.28±0.075[a]
5	2.56±0.21[a]	6.31±0.62[a]	11.14±0.92[a]	14.15±1.05[a]	18.36±1.41[a]	20.32±1.42[a]	17.76±1.36[a]	0.13±0.012[a]	0.10±0.075[a]
Sex of kid	NS	NS	NS	NS	NS	NS	NS	NS	NS
Male	2.34± 0.11[a]	7.02±0.34[a]	11.55±0.47[a]	14.56±0.57[a]	18.65±0.74[a]	20.84±0.77[a]	18.50±0.74[a]	0.13±0.006[a]	0.15±0.044[a]
Female	2.44± 0.19[a]	7.07±0.57[a]	10.65±0.79[a]	13.93±0.96[a]	17.56±1.24[a]	20.11±1.28[a]	17.67±1.25[a]	0.12±0.011[a]	0.10±0.073[a]
Month of kidding	NS	NS	NS	NS	NS	NS	NS	NS	NS
Mar	2.25±0.17[a]	6.96±0.52[a]	11.49±0.74[a]	14.37 ±0.88[a]	18.26 ±1.15[a]	20.62±1.18[a]	18.37±1.15[a]	0.13±0.010[a]	0.10 ±0.067[a]
Apr	2.42± 0.11[a]	7.07 ±0.35[a]	11.23 ±0.50[a]	14.41±0.60[a]	18.41±0.78[a]	20.66 ±0.80[a]	18.23±0.78[a]	0.13±0.007[a]	0.15 ± 0.045[a]

*Means in the same column for each trait with different letter differ significantly (p≤0.05). NS : non significant

Milk traits of Black and Maraz kids

Least square means for DMY, TMY, fat%, protein%, lactose%, SNF%, and total solids in Black and Maraz goats are presented in Tables 3 and 4. These traits reflect milk quantity and quality and are used to evaluate dairy performance. Their variation is mainly influenced by non-genetic factors such as doe age, sex of kids, type of birth, month of kidding, and stage of lactation.

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Doe's age showed different effects in Black and Maraz goats. In Black goats, age had no significant effect on DMY and TMY, or most milk components (fat, protein, lactose, and total solids), except for SNF%, indicating generally stable milk traits across age with only minor variation (Table 3). Similar findings were reported by Tesema *et al*. (2020); Hermiz *et al*. (2015, 2004); Abd Allah e*t al*. (2011), although some studies,Ibrahim and Jalil (2022); Ferro *et al*. (2017); Park *et al*. (2007), noted that age or parity can influence certain components like SNF. In Maraz goats, doe age significantly affected DMY and TMY, with peak production at 5 years and lower yieldsat younger age, reflecting improved productivity and maturity, as supported by Jawasreh and Alkass (2023); Ferro *et al*. (2017); Youssef *et al*. (2014). However, milk composition was not significantly affected by age, indicating stable quality, as it is more influenced by factors such as nutrition and lactation stage (Králíčková *et al*., 2012; Abd Allah *et al*., 2011).*Kid sex* had no significant effect on DMY, TMY, or milk composition in both Black and Maraz goats, despite slight differences between male and female kids, indicating that milk yield and quality are largely independent of offspring sex. These findings agree with previous studies (Ali *et al*., 2025; Al-Qasimi *et al*., 2020; Al-Samarai *et al*., 2016 and 2014; Çakır Sahilli and Çimen, 2016; Sanogo *et al*., 2012). *Birth type* had no significant effect on DMY and TM, or milk composition in Black goats, indicating that litter size does not influence milk yield or quality, in agreement with Singh *et al*. (2021); Pizarro *et al*. (2019), but differing from studies reporting significant effects (EL-den *et al*., 2020; Ketto *et al*., 2014; Zumbo and Di Rosa, 2007; Milerski and Mareš, 2001; Kaskous *et al*., 2015; Caetano and Melo, 2011). In Maraz goats, only single births were evaluated. In Black goats,*kidding month* significantly affected DMY but not TMY, showing that daily yield responds to seasonal changes while total yield remains stable (El-Raghi *et al*., 2021; Khandoker *et al*., 2018;Abraham *et al*., 2017; Salari *et al*., 2016). Milk composition was partly affected, with fat, protein, and SNF showing significant differences, whereas lactose and total solids did not, indicating moderate seasonal sensitivity (Kahsu *et al.,*2025; Kljajevic *et al*., 2018; Inglingstad *et al*., 2014). In Maraz goats, DMY was not significantly affected by kidding month, while TMY was significantly higher in March than in April, likely due to better environmental and feeding conditions during early lactation. These findings agree with previous studies (Almasri *et al*., 2023; Ayasrah *et al*., 2013; Al-Noor, 2011). Milk composition did not differ significantly between months, in agreement with Saviard *et al*. (2026); Li *et al*. (2022).In Black goats, the *lactation stage* significantly affected DMY, which declined from early to late lactation, showing a clear physiological pattern consistent withIbrahim and Tajuddin (2021); El-Tarabany *et al*. (2018); Lombaard (2006). Milk composition was mostly stable, only lactose was significantly affected, while fat, protein, SNF, and total solids were not, in agreement with Gecaj *et al*. (2021); Özkan *et al*. (2020);Zamuner *et al*. (2020). In Maraz goats, DMY followed the normal lactation curve, peaking in mid-lactation and decliningin late lactation (Table 4). In agreement withKetto *et al*. (2014); Norris *et al*. (2011). Milk composition also varied significantly, with lactose, SNF, and total solids decreasing toward late lactation, in agreement with Gecaj *et al*. (2021); Tovar-Luna *et al*. (2010).

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Table 3: Least square means ± standard error of some factors affecting milk yield and composition in Black goats

Fixed effects	Daily Milk Yield (g)	Total Milk Yield (kg)	Fat%	Protein %	Lactose%	SNF%	TS%
Doe age (year)	NS	NS	NS	NS	NS	*	NS
2	151.25± 17.07^{a}	26.47 ± 1.48^{a}	3.63± 0.30^{a}	4.70± 0.25^{a}	4.58 ± 0.08^{a}	10.37 ± 0.18^{ab}	14.01 ± 0.26^{a}
3	193.33± 23.38^{a}	29.01 ± 1.08^{a}	3.69±0.22^{a}	4.50± 0.18^{a}	4.70 ± 0.06^{a}	10.22 ± 0.13^{b}	13.91 ± 0.19^{a}
4	151.25± 23.38^{a}	30.21 ± 1.48^{a}	3.34± 0.30^{a}	4.91±0.25^{a}	4.73 ± 0.08^{a}	10.90 ± 0.18^{a}	14.23 ± 0.26^{a}
5	154.33± 20.98^{a}	27.89±2.01^{a}	3.34±0.41^{a}	4.64± 0.26^{a}	4.56± 0.07^{a}	10.65±0.13^{a}	13.98±0.31^{a}
Sex of kid	NS	NS	NS	NS	NS	NS	NS
Male	166.11±15.81^{a}	28.42 ±1.01^{a}	3.84±0.18^{a}	4.61±0.16^{a}	4.68±0.05^{a}	10.35±0.13^{a}	14.19±0.16^{a}
Female	180.00±17.93^{a}	28.70 ± 1.14^{a}	3.32±0.21^{a}	4.68±0.18^{a}	4.65±0.06^{a}	10.51±0.15^{a}	13.83±0.19^{a}
Type of birth	NS	NS	NS	NS	NS	NS	NS
Single	165.45±14.21^{a}	28.27 ±0.90^{a}	3.59±0.179^{a}	4.67±0.151^{a}	4.68±0.05^{a}	10.36±0.12^{a}	13.95±0.15^{a}
Twin	187.00±21.08^{a}	29.41 ± 1.34^{a}	3.66±0.265^{a}	4.58±0.224^{a}	4.65±0.07^{a}	10.55±0.18^{a}	14.21±0.22^{a}
Month of kidding	*	NS	*	*	NS	*	NS
Oct	216.92 ± 15.24^{a}	30.10 ± 1.14^{a}	3.96 ± 0.21^{a}	4.23±0.17^{b}	4.57 ± 0.06^{a}	10.07±0.14^{b}	14.04±0.20^{a}
Feb	141.57± 12.75^{b}	27.62 ± 0.94^{a}	3.38±0.180^{b}	4.92±0.141^{a}	4.74 ±0.05^{a}	10.65±0.11^{a}	14.04±0.17^{a}
Stage of lactation (Month)	*		NS	NS	*	NS	NS
1	225.78 ± 10.29 ^{b}	-------	4.01± 0.09 ^{a}	4.09 ± 0.07 ^{a}	4.43± 0.05^{ab}	9.86± 0.07^{a}	13.27± 0.16^{a}
2	286 ± 9.93 ^{a}	-------	4.06± 0.08 ^{a}	4.05± 0.07 ^{a}	4.29± 0.05^{b}	9.75± 0.07 ^{a}	12.95± 0.14^{a}
3	246.25 ± 9.64 ^{b}	-------	3.97± 0.09 ^{a}	4.03± 0.06 ^{a}	4.46± 0.04^{a}	9.71± 0.07 ^{a}	13.31±0.17^{a}
4	125.16± 4.73 ^{c}	-------	4.05± 0.08 ^{a}	4.00 ± 0.06 ^{a}	4.39± 0.05 ^{ab}	9.97± 0.05 ^{a}	13.05±0.14^{a}
5	70.31± 2.68 ^{d}	-------	3.92± 0.08 ^{a}	4.09 ± 0.06 ^{a}	4.44± 0.04^{ab}	9.78 ± 0.06 ^{a}	13.21± 0.14^{a}

*Means in the same column for each trait with different letter differ significantly (p≤0.05), NS: non-significant

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Table 4: Least square means ± standard error of some factors affecting milk yield and composition in Maraz goats

Fixed effects	Daily Milk Yield (g)	Total Milk Yield (kg)	Fat%	Protein %	Lactose%	SNF%	TS%
Doe age (year)	*	*	NS	NS	NS	NS	NS
2	95.38±4.350^{ab}	23.28 ±0.82^{a}	3.23±0.33^{a}	4.48±0.09^{a}	4.93±0.06^{a}	10.37±0.08^{a}	13.61±0.35^{a}
3	85.00±7.84^{b}	19.2 ± 1.48^{b}	4.46±0.60^{a}	4.61±0.17^{a}	4.69±0.11^{a}	10.05±0.16^{a}	14.51±0.63^{a}
5	122.50 ±11.09^{a}	27 ±2.10^{a}	3.72±0.862^{a}	4.16±0.24^{a}	5.03±0.16^{a}	10.07±0.22^{a}	13.79±0.89^{a}
Sex of kid	NS	NS	NS	NS	NS	NS	NS
Male	96.07±4.949^{a}	22.71 ±0.98^{a}	3.78±0.32^{a}	4.41±0.09^{a}	4.89±0.06^{a}	10.22±0.08^{a}	14.00±0.33^{a}
Female	96.00±8.281^{a}	23.1 ±1.64^{a}	2.87±0.54^{a}	4.65±0.15^{a}	4.88±0.110^{a}	10.43±0.14^{a}	13.30±0.55^{a}
Month of kidding	NS	*	NS	NS	NS	NS	NS
Mar	110.00±8.44^{a}	27.33 ± 1.37^{a}	3.70±0.64^{a}	4.32±0.17^{a}	4.83±0.12^{a}	10.27±0.17^{a}	13.97±0.64^{a}
Apr	92.33±4.35^{a}	21.61 ±0.70^{b}	3.50±0.33^{a}	4.51±0.08^{a}	4.90±0.06^{a}	10.27±0.09^{a}	13.78±0.33^{a}
Stage of lactation (Month)	*		*	*	*	*	*
1	194.12± 9.07^{c}	-------	3.40± 0.12^{b}	3.40±0.12^{b}	4.70±0.05^{b}	9.85±0.05^{b}	13.25±0.13^{b}
2	216±27± 8.56^{a}	-------	3.28± 0.12^{b}	3.28± 0.12^{b}	4.54±0.06^{b}	9.53±0.07^{c}	12.80±0.14^{c}
3	234.31±7.14^{b}	-------	3.59±0.11^{a}	3.59±0.11^{a}	4.40±0.05^{c}	9.37±0.08^{c}	12.96±0.14^{c}
4	122.84± 3.95^{d}	-------	3.42±0.11^{b}	3.42±0.11^{b}	4.33±0.06^{c}	9.26±0.11^{d}	12.67±0.14^{d}
5	69.22± 1.98^{e}	-------	3.61±0.11^{a}	3.61± 0.11^{a}	4.23± 0.04^{d}	9.46±0.08^{c}	13.07±0.13^{c}

*Means in the same column for each trait with different letter differ significantly (p≤0.05), NS : non significant

III. Conclusion

The study showed that most non-genetic factors (doe age, kid sex, and birth type) had little or no effect on milk traits and body weight in both Black and Maraz goats, indicating stable performance.However, the stage of lactation and the month of kidding had clearer effects, especially on milk yield, while milk composition was generally less affected. Overall, production traits were more influenced by physiological and seasonal conditions than by the other studied factors.

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IV. REFERENCES

sheep. International Journal of Livestock Production, 2(3), 24-30.

Abraham, H., Gizaw, S., and Urge, M., (2017). Milk production performance of Begait goat under semi-intensive and extensive management in Western Tigray, North Ethiopia. Livestock Research for Rural Development, 29(240), 347-355.

Ali, M. E., Mohamed, R. H., Hussein, H. A., Mahmoud, A. H., Rabee, A. E., and Zakaria, A. M. (2025). Potential effect of the number and type of birth on udder, milk yield, milk composition, ovarian follicles, and certain blood parameters in Baladi goat. The Journal of Basic and Applied Zoology, 86(1), 12.

Alkass, J.E. and Mustafa, K., (2023). Performance of native goats in Kurdistan region of Iraq: A review. Mesopotamia Journal of Agriculture, 51(3), 11-0.

Alkass, J.E. and Juma, K.H., (2005). Small ruminant breeds of Iraq. In characterization of small ruminant breeds in West Asia and North Africa. Small Ruminant Research,1, 63-101.

Alkass, J.E. and Merkhan, K.Y., (2013). Meriz goat in Kurdistan region/Iraq: A review. Adv. J. Agric. Res, 1(007), 105-111.

Al-Khamaiseh, S. K., Al-Sawalqa, A. G., and Al-Atiyat, R. M. (2020). The effects of doe weight, litter size and sex on kids' birth weight of three goat breeds under a sedentary production system. Livest. Res. Rural Dev, 32(10), 154.

Almasri, O., Abou-Bakr, S., Ibrahim, M.A.E.A.M., Asaad, Z., Ghoush, M. and Awad, M.A.A., (2023). Lactation curve and milk production traits of Syrian Damascus goats. Egyptian Journal of Animal Production, 60(1), 7-16.

Al-Noor, M. J. (2011). Some factors effect in milk production and lactation period in local Awassi and Turkish sheep. Diyala Agricultural Sciences Journal, 3(1), 21-29.

Abd Allah, M., Abass, S. F., and Allam, F. M. (2011). Factors affecting the milk yield and composition of Rahmani and Chios

Al-Qasimi, R. H., Abbas, S. M., Al-Khauzai, A. L., and Allawi, L. D. (2020). Effect of breed and some non-genetic factors on milk production and some proportions of its chemical components in two breeds of local sheep. Qadisiyah Journal for Agriculture Sciences, 10(1), 227-231.

Al-Samarai, F. R., Abdulrahman, Y. K., Mohammed, F. A., Al-Zaidi, F. H., and Al-Anbari, N. N. (2014). Influence of some genetic and non-genetic factors on total milk yield and lactation period in Iraqi Awassi sheep.Advances in Animal and Veterinary Sciences, 2(12), 662-667.

Al-Samarai, F. R., Mohammed, F. A., Al-Zaydi, F. H., Al-Anbari, N. N., and Abdulrahman, Y. K. (2016). Genetic Evaluation of Iraqi Awassi Rams According to Some Growth Traits of Their Progeny Lambs. American Journal of Applied Scientific Research, 2(1), 1-5.

Ayasrah, E. M., Abou-Bakr, S., and Ibrahim, M. A. M. (2013). Characteristics of lactation curve in Damascus goats in Jordan. Journal of Animal and Poultry Production, 4(8), 479-491.

University of Thi-Qar Journal of agricultural research

Thi-Qar Journal of agricultural research

ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 15, Issue 1 (2026) PP 324-337

https://jam.utq.edu.iq/index.php/main *https://doi.org/10.54174/wq69d865*

Birhanie, M., Alemayehu, K. and Mekuriaw, G., (2018). Performance evaluation of Abergelle goat under community-based breeding program in selected districts, Northern Ethiopia. Livestock Research for Rural Development, 30(4), 1-9.

Caetano, G. D. C., and Melo, A. (2011). Genetic and environmental factors that influence production and quality of milk of Alpine and Saanen goats. Genetics and Molecular Research.10 (4): 3794-3802.

Çakır Sahilli, Y. and Çimen, M., (2016). The effect of birth type and sex of kids on milk lactose levels.International Journal of Biosciences, 9 (4), 365-368.

Carmo, R.F., Marques, R.O., Gonçalves, H.C., de Lima Meirelles, P.R., Cañizares, G.I.L., de Oliveira, G.M., Gomes, H.F.B., Fernandes, S., de Oliveira, A.A. and Brito, É.P., (2016). Effect of concentrate supplementation during pre-kidding on the productive and reproductive performance of goats raised on Guinea grass (Panicum maximum cv. Tobiatã) pasture. Semina: Ciências Agrárias, 37(3),1489-1504.

Carnicella, D., Dario, M., Ayres, M.C.C., Laudadio, V. and Dario, C., (2008). The effect of diet, parity, year and number of kids on milk yield and milk composition in Maltese goat. Small Ruminant Research, 77(1), 7174.

Duncan, D. B. (1955). Multiple range and multiple F tests. biometrics, 11(1), 1-42.

El-Den, K., Mohammed, K. M., and Dahmoush, A. Y. (2020). Genetic evaluation of milk yield and milk composition of Saudi Aradi and Damascus goats. Archives of Agriculture Sciences Journal, 3(2), 118-126.

El-Moghazy, M.M., Metavi, H.R., Faid-Allah, E. and El-Raghi, A.A., (2015). Genetic and non-genetic factors affecting body weight traits in Zaraibi goat in Egypt. Journal of Agricultural Research Kafr El-Shaikh University, 41(1), 27–40.

El-Raghi, A. A., Hassan, M. A., El-Ratel, I. T., Hashem, N. M., and Abdelnour, S. A. (2021). Sustainable management of voluntary culling risk in primiparous Zaraibi goats in Egypt: roles of season and reproductive and milk production-related traits. Animals, 11(8), 2342.

El-Tarabany, M.S., El-Tarabany, A.A. and Roushdy, E.M., (2018). Impact of lactation stage on milk composition and blood biochemical and haematological parameters of dairy Baladi goats. Saudi Journal of Biological Sciences, 25(8), 1632–1638.

Ferro, M.M., Tedeschi, L.O. and Atzori, A.S., (2017). The comparison of the lactation and milk yield and composition of selected breeds of sheep and goats. Translational Animal Science, 1(4), 498-506.

Flores-Nájera, M.J., Cuevas-Reyes, V., Vázquez-García, J.M., Beltrán-López, S., Meza-Herrera, C.A., Mellado, M., Negrete-Sánchez, L.O., Rivas-Jacobo, M.A. and Rosales-Nieto, C.A., (2021). Milk yield and composition of mixed-breed goats on rangeland during the dry season and the effect on the growth of their progeny. Biology, 10(3), 220.

Gecaj, R.M., Ajazi, F.C., Bytyqi, H., Mehmedi, B., Çadraku, H. and Ismaili, M., (2021). Somatic cell number, physicochemical, and microbiological parameters of raw milk of goats during the end of lactation as compared by breeds and number of lactations. Frontiers in Veterinary Science, 8, 694114.

Getaneh, G., Mebrat, A., Wubie, A. and Kendie, H., (2016). Review on goat milk composition and its nutritive value. Journal of Nutrition and Health Sciences, 3(4), 1–10.

Güler, S., Çam, M., and Atik, A. (2023). Determination of the effect of the dam age, birth type, and sex on growth curve traits of hair goat kids. Tropical Animal Health and Production, 55(6), 371.

ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 15, Issue 1 (2026) PP 324-337

https://jam.utq.edu.iq/index.php/main *https://doi.org/10.54174/wq69d865*

Hermiz, H. N., and Baper, M. I. (2019). Effect of fixed factors and estimation of genetic parameters of growth traits for Mountain kids. The Iraqi Journal of Agricultural Science, 50(6), 1542–1550.

Hermiz, H. N., Ameen, S. M., Al-Khatib, T. R., Ahmed, A. M., and Hamad, D. A. (2015). Non-genetic effects and prediction equations for milk traits of Shami ewes in Erbil-KRG, Iraq. International Journal of Advances in Science, Engineering and Technology (IJASEAT), Special Issue-4, 54–57.

Hermiz, H. N., Singh, M., Al-Rawi, A. A., and Alkass, J. E. (2004). in Iraqi Local Goat and their Crosses. Dirasat, Agricultural Sciences, 31(2).

Ibrahim, N. S., and Jalil, A. R. (2022). The effect of age on milk yield and milk composition in Saanen dairy goats. Journal of Agricultural Science and Technology A, 12(1), 10–14.

Ibrahim, N. S., and Tajuddin, F. H. A. (2021). Evaluation of milk production and milk composition at different stages of Saanen dairy goats. Journal of Agrobiotechnology, 12(1S), 204–211.

Ince, D. and Köker, A., (2011). The effect of estrus synchronisation on the reproductive characteristics of Turkish Saanen goats and growth characteristics of kids under extensive conditions. Afr J Agric Res, 6, 5715–5719.

Inglingstad, R.A., Steinshamn, H., Dagnachew, B.S., Valenti, B., Criscione, A., Rukke, E.O., Devold, T.G., Skeie, S.B., and Vegarud, G.E., (2014). Grazing season and forage type influence the composition of goat milk and the rennet coagulation properties. J.Dairy Sci., 97(6), 3800–3814.

Jat, G.R. and Datt, M., (2025). A Study on the Effect of Season, Sex and Birth Type on Birth Weight of Sirohi Goat Kids under Semi-Arid Conditions. Journal of Experimental Agriculture International, 47(5), 299-304.

Jawasreh, K.I. and Alkass, J.E., (2023). Genetic and non-genetic parameters for milk production traits of Damascus goat in Jordan. Iraqi Journal of Agricultural Sciences, 54(1), 156–160.

Kahsu, D., Woldegebriel, D., Estifanos, A., and Begashaw, T. (2025). Evaluating Abergelle goat milk: effects of season and lactation stage on physico-chemical and microbiological quality. Discover Agriculture, 3(1), 70.

Kaskous, S., Jawad, S., and Fadlelmoula, A. (2015). Factors affecting daily milk yield and composition during suckling in mountain goats. Livestock Research for Rural Development, 27(6).

Keskin, M., Gül, S., Bicer, O. and Daşkiran, I., (2017). Some reproductive, lactation, and kid growth characteristics ofKilis goats under semiintensive conditions. Turkish Journal of Veterinary and Animal Sciences, 41(2), 248-254.

Ketto, I. A., Massawe, I., and Kifaro, G. C. (2014). Effects of supplementation, birth type, age and stage of lactation on milk yield and composition of Norwegian x Small East African goats in Morogoro, Tanzania. Livestock Research for Rural Development, 26(12), 2014.

ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 15, Issue 1 (2026) PP 324-323

https://jam.utq.edu.iq/index.php/main *https://doi.org/10.54174/ncmtb379*

Khandoker, M.A.M.Y., Afini, N. and Azwan, A., (2018). Productive and reproductive performance of Saanen goat at AZZahra farm of Sandakan in Malaysia. Bangladesh Journal of Animal Science, 47(1), 1-12.

Khdhr, D. M., and Karim, K. J. (2024). Cytogenetic study of Meriz goat breeds in Iraqi Kurdistan region. Cellular and Molecular Biology, 70(7), 155-160.

Kljajevic, N.V., Tomasevic, I.B., Miloradovic, Z.N., Nedeljkovic, A., Miocinovic, J.B. and Jovanovic, S.T., (2018). Seasonal variations of Saanen goat milk composition and the impact of climatic conditions. Journal of Food Science and Technology, 55(1), 299-303.

Králíčková, Š., Pokorná, M., Kuchtík, J., and Filipčík, R. (2012). Effect of parity and stage of lactation on milk yield, composition and quality of organic sheep milk. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 1, 71-78.

Li, S., Delger, M., Dave, A., Singh, H. and Ye, A., (2022). Seasonal variations in the composition and physicochemical characteristics of sheep and goat milks. Foods, 11(12), 1737.

Liu, W., Zhang, Y., and Zhou, Z. (2005). Adjustment for non-genetic effects on body weight and size in Angora goats. Small Ruminant Research, 59(1), 25-31.

Lombaard, C.S., (2006). Hierarchical Bayesian modelling for the analysis of the lactation of dairy animals (Doctoral dissertation, University of the Free State).

Mabrouk, O., Sghaier, N., Costa, R.G., Amor, G., Amel, A.E. and Delgado, J.V., (2010). The effect of non-genetic factors on the early body weights of Tunisian local goats. Revista Brasileira de Zootecnia, 39(5), 1112-1117.

Margatho, G., Rodríguez-Estévez, V., Quintas, H. and Simões, J., (2019). The effects of reproductive disorders, parity, and litter size on milk yield of Serrana goats. Animals, 9(11), 968.

Maylinda, S., Sarah, O.L. and Busono, W., (2018). Role of seasons on the production and reproduction performance of Kacang goats (Kambing Kacang) in North Middle Timor Regency. Indian Journal of Animal Research, 52(8).

Meza-Herrera, C.A., Menéndez-Buxadera, A., Serradilla, J.M., Lopez-Villalobos, N. and Baena-Manzano, F., (2019). Estimates of genetic parameters and heterosis for birth weight, one-month weight and litter size at birth in five goat breeds. Small Ruminant Research, 174, 19-25.

Mia, M. M., Khandoker, M. A. M. Y., Husain, S. S., Faruque, M. O., Notter, D. R., and Haque, M. N. (2013). Genetic Evaluation of Growth Traits of Black Bengal Goat. Iranian Journal of Applied Animal Science, 3(4).

Milerski, M. and Mareš, V., (2001). Analysis of systematic factors affecting milk production in dairy goats.*Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 49(1), 43-50.

Mioč, B., Sušić, V., Antunović, Z., Prpić, Z., Vnučec, I., and Kasap, A. (2011). Study on birth weight and pre-weaning growth of Croatian multicolored goat kids. Veterinarski Arhiv, 81(3), 339-347.

Norris, D., Ngambi, J. W., Benyi, K., and Mbajiorgu, C. A. (2011). Milk production of three exotic dairy goat genotypes in Limpopo Province, South Africa. *Asian Journal of Animal and Veterinary Advances*, 6(3), 274-281.

University of Thi-Qar Journal of agricultural research

Thi-Qar Journal of agricultural research

ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 15, Issue 1 (2026) PP 324-323

https://jam.utq.edu.iq/index.php/main *https://doi.org/10.54174/ncmtb379*

Owaid, J. M., Yousief, M. Y., Abdulrda, A. J., and Ayied, A. Y. (2023). Study of local black Iraqi goats genotypes for the cytb gene. Archives of Razi Institute, 78(3), 915.

Özkan, H., Yakan, A., Çamdeviren, B. and Karaaslan, İ., (2020). Milk traits of Damascus goats at different lactation stages: 1. Somatic cell counts and milk quality parameters. Erciyes Üniversitesi Veteriner Fakültesi Dergisi, 17(3), 318–324.

Park, Y.W., Juárez, M., Ramos, M.G.F.W. and Haenlein, G.F.W., (2007). Physico-chemical characteristics of goat and sheep milk. Small ruminant research, 68(1-2), 88–113.

Pizarro, M. G., Landi, V., Navas González, F. J., León, J. M., and Delgado, J. V. (2019). Non-parametric analysis of the effects of αS1-casein genotype and parturition non-genetic factors on milk yield and composition in Murciano-Granadina goats. Italian Journal of Animal Science, 18(1), 1021-1034.

Salari, F., Altomonte, I., Ribeiro, N. L., Ribeiro, M. N., Bozzi, R., and Martini, M. (2016). Effects of season on the quality of Garfagnina goat milk. Italian Journal of Animal Science, 15(4), 568–575.

Sanahmmed, A.M., Raoof, S.O. and Sartip, S.S., (2023). The effect of Genetic and Non-Genetic factors on Birth and weaning weights in Saanen goats. Journal of Survey in Fisheries Sciences, 10(3S), 4844-4849.

Sanogo, S., Shaker, M.M., Nantoumé, H. and Salem, A.F.Z., (2012). Milk yield and composition of crossbred Sahelian× Anglo-Nubian goats in the semi-intensive system in Mali during the preweaning period. Tropical Animal Health and Production, 45(1), 305–310.

Sarma, L., Nahardeka, N., Goswami, R. N., Aziz, A., Zaman, G., Das, A., and Akhtar, F. (2019). Non-genetic factors affecting pre-weaning growth and morphometric traits in Assam Hill goat. Veterinary world, 12(8), 1327.

Saviard, T., Deglaire, A., andDupont, D. (2026). Seasonal variations in goat milk composition: a comprehensive review. International Dairy Journal, 106569.

Singh, M. K., Pourouchottamane, R., Singh, S. P., Kumar, R., Sharma, N., Kumar, A., Das, G.,and Pundir, R. K. (2022). Non-genetic factors affecting pre-weaning growth and survival rate in Barbari kids under a semi-intensive management system. Indian J. Anim. Sci, 92, 1081–1087.

Singh, M. K., Singh, S. K., Dige, M. S., and Kumar, A. (2021). Genetic and non-genetic factors affecting first parity growth, reproductive and lactation traits in Barbari goats under semi-intensive management in the semi-arid region of India. Indian J. Anim. Sci, 91, 128–136.

Sodiq, A. (2012). Non-genetic factors affecting pre-weaning weight and growth rate of Ettawah grade goats. Tropical Animal Science Journal, 35(1), 21.

Tesema, Z., Alemayehu, K., Kebede, D., Getachew, T., Kefale, A., and Deribe, B. (2020). Reproductive performance and milk production of Central Highland and Boer x Central Highland goats. Heliyon, 6(12).

Tovar-Luna, I., Puchala, R., Sahlu, T., Freetly, H.C. and Goetsch, A.L., (2010). Effects of stage of lactation and level of feed intake on energy utilization by Alpine dairy goats. J. Dairy Sci., 93(10), 4829-4837.

Vacca, G.M., Stocco, G., Dettori, M.L., Pira, E., Bittante, G. and Pazzola, M., (2018). Milk yield, quality, and coagulation properties of 6 breeds of goats: Environmental and individual variability. J. Dairy Sci., 101(8), 7236-7247.

University of Thi-Qar Journal of agricultural research

Thi-Qar Journal of agricultural research

ISSN Onlin:2708-9347, ISSN Print: 2708-9339 Volume 15, Issue 1 (2026) PP 324-323

https://jam.utq.edu.iq/index.php/main *https://doi.org/10.54174/ncmtb379*

Vázquez-Armijo, J. F., Salvador-Cáceres, A., Lopez-Villalobos, N., Herrera-Ojeda, J. B., García-Medina, A., and Parra-Bracamonte, G. M. (2021). Non-genetic and genetic effects related to birth and weaning weight of crossbred dairy goats. Journal of Animal and Feed Sciences, 30(2), 165-172.

Wang, R., Liu, Y., Shi, Y., Qi, Y., Li, Y., Wang, Z., Zhang, Y., Zhao, Y., Su, R. and Li, J., (2023). Study of genetic parameters for pre-weaning growth traits in inner Mongolia white Arbas cashmere goats. Frontiers in Veterinary Science, 9, 1026528.

Youssef, H.F., El-Gendy, M.E., Saifelnasr, E.O.H., El-Sanafawy, H.A. and Saba, F.E., (2014). Relationship between body conformation and milk yield and composition in Zaraibi and Damascus goats. Egyptian Journal of Sheep and Goats Sciences, 9(3), 1-12.

Zamuner, F., DiGiacomo, K., Cameron, A.W.N. and Leury, B.J., (2020). Effects of month of kidding, parity number, and litter size on milk yield of commercial dairy goats in Australia. J. Dairy Sci., 103(1), 954-964.

Zumbo, A. and Di Rosa, A.R., (2007). Effects of parity and type of kidding on the quantitative and qualitative milk characteristics of "Rossa Mediterranea" goats. Italian Journal of Animal Science, 6(sup1), 636-636.