



## Effects of nutritional practices in different periods on some yield characteristics of Kilis goats

Kilis keçilerinde farklı dönemlerdeki besleme uygulamalarının bazı verim özellikleri üzerine etkileri

Mahmut KESKİN<sup>1</sup>

<sup>1</sup>Hatay Mustafa Kemal University, Faculty of Agriculture, Department of Animal Science, Antakya-Hatay, Turkey.

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✉ Corresponding author: Mahmut KESKİN

✉: [mkeskin@mku.edu.tr](mailto:mkeskin@mku.edu.tr)

### Ö Z E T / A B S T R A C T

**Aims:** In this study, the effects of supplementary feeding during gestation and lactation period on birth and weaning weights of kids and milk yield of dams in Kilis goats were investigated.

**Methods and Results:** In the study, experimental goats were divided into three groups as control group, short-term feeding (STF) group and long-term feeding (LTF) group. The control group was kept under breeder's management conditions. Supplementary feed of 750 g/head/day were given to the goats from the last 20 days of gestation to 90<sup>th</sup> days after birth in the STF group, and from last 40 days of gestation to the end of lactation in LTF group. At the end of the experiment, the highest lactation period was 220.2 days in the LTF group, followed by STF and control groups ( $P < 0.05$ ). Likewise, in the LTF and STF groups, the lactation milk yield, which was determined as 466.2 and 426.3 liters respectively, was higher than the control group (316.4 liters) ( $P < 0.05$ ).

**Conclusions:** It was concluded that supplementary feeding during gestation and lactation periods caused an increase in milk yield and lactation length of Kilis goats.

**Significance and Impact of the Study:** At the end of study, it can be stated that if supplementary feeding is made during gestation or lactation, milk yield characteristics of Kilis goats will be improved. Suckling period for the goats is the period when pasture conditions are good. For this reason, even in the goats managed only in the pasture, milk yield of mothers is sufficient for multiple born kids.

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## INTRODUCTION

According to the Turkish Statistical Institute data, Hair goats constitutes approximately 98% of total goat population that are 10,9 million in Turkey (Anonymous, 2018). Although it is not included in the official statistics, it is stated by different researchers that there are approximately 500 thousand heads of Kilis goats in the country (Gül et al., 2016b; Keskin et al., 2017). Kilis goat, which is one of the native gene sources of Turkey is reared extensively in Kilis, Gaziantep, Hatay, Adana and

Mersin provinces (Özcan, 1989; Keskin et al., 1996; Gül et al., 2016c; Keskin et al., 2017). Kilis goats, which have higher milk yield and litter size than Hair goats, have the advantages of being raised in hot and dry weather conditions, mountainous and rugged areas, and under extensive or semi-intensive conditions compared to breeds of European origin. Many studies have been conducted to determine and improve milk and fertility characteristics of Kilis goats (Keskin et al., 1996; Koşum et al., 2004; Kaymakçı, 2010; Gül et al., 2016b; Keskin et al., 2017).

According to our experience in the region where this goat is reared, Kilis goat breeding has been carried out depending on the natural conditions as in the Hair goats, with some minor differences. Some of these differences are feeding practices in different herds during the last periods of pregnancy and different periods of lactation and migration of some breeders to Cukurova region to feed their animals by evaluating the harvest residues in summer months due to the narrowing of the grazing areas in Kilis.

Many researchers have reported that feeding in late stages of pregnancy or during lactation period on milk yield and fertility in goats (Özcan, 1989; Kaya and Öztürkcan, 2005). As stated in these studies, supplementary feeding during these periods is important for better growth of the fetus, higher birth and weaning weights and more milk production in lactation. It is also known that the effect of feeding practice in the late stages of pregnancy appears more pronounced, especially in multiple pregnancies.

In this study, the effects of short and long-term supplementary feeding on the birth and weaning characteristics of the kids and milk yield characteristics of dams were investigated in Kilis goats reared under extensive conditions in Kilis province.

## MATERIALS and METHODS

The animal material of the study was consisted of 75 head of primiparous or multiparous Kilis goats and their kids born in 2017 year with the approval of the Mustafa Kemal University Ethics Committee(MKUHAYDEK-2016-6/1). The study was carried out in Kilis province located between 36.7165 north latitude and 37.1147 east longitude.

In the study, goats were divided into three groups (control, STF and LTF) considering their equal ages. Effects of the ages to the observed data were adjusted to the means using the additive correction factor method. Mating was performed under controlled conditions. In the periods after the mating, the herd management applied by the breeder in the control group was followed without any changes. In the short-term feeding group (STF), each goat was given daily 750 g concentrate (170-180 g crude protein, 2600 kcal ME per kg dry matter) in addition to pasture, starting from the last 20 days of pregnancy until the 90<sup>th</sup> days after birth. Goats in long term feeding group (LTF) were given daily 750 g/goat the concentrate during lactation starting from the last 40 days of pregnancy. Routine vaccines and internal and external parasitic medication were applied to the goats. Birth type, sex of kids, number of mating

goats, number of infertile goats, birth weight and weaning (60<sup>th</sup> day) weight were determined as the birth characteristics in all groups. Kidding rate, kid yield by mated goats, kid yield by goats giving birth, survival rate and single, twin and triple birth rates were calculated using the formulas reported by Özcan (1989). The milk controls were made at 28 days intervals from birth in order to determine lactation milk yield and length. The calculation of milk yield was made according to the AT method of ICAR (The International Committee for Animal Recording), which was also given in Keskin (2000). Fleischman (Trapez II) method was used to calculate lactation milk yields for each goat. The Oneway Anova test and DUNCAN test were used for statistical analysis in SPSS Packet Program (Version 22.00, SPSS, IBM, NY, USA).

## RESULTS and DISCUSSION

Different fertility characteristics of Kilis goats are given in Table 1. As seen in this table, litter sizes that was number of kids per number of goats joined by bucks for the control, STF and LTF groups were calculated as 132.0%, 144%, 164%, respectively. While the single birth rate was 54.5% in the control group, it was calculated as 48.0% and 33.3% in the LTF and STF groups, respectively. As average of all groups, birth rate, kid yield by mated goats, kid yield by goats giving birth, survival rate and multiple birth rate were detected as 90.7%, 146.7%, 161.8%, 91.8% and 54.4%, respectively. Feeding practices during the mating period may have effect on these properties. However, there was no statistical comparison between the groups since the different feeding practices to the groups were applied after the last 20<sup>th</sup> and 40<sup>th</sup> days of pregnancy in the current study. The reproductive characteristics determined in the study were higher than the values reported by Keskin and Tüney (2015). On the other hand they were similar to the values reported by Keskin et al. (1996), Gül et al. (2016a,b) and Keskin et al. (2017) for the same breed. In the study, the effects of different feeding practices on birth and weaning weights of Kilis goats are given in Table 2. As seen in this table, birth and weaning weights were similar in control, STF and LTF groups. However, it was determined that sex of the kids affected birth and weaning weight. Male kids were heavier than female kids at both birth and weaning ( $P < 0.05$ ). It was also determined that the birth weights of triplets were lower than twins and singles ( $P < 0.05$ ). The average birth and weaning weights of the kids were calculated as  $4.4 \pm 0.06$  kg and  $12.7 \pm 0.23$  kg, respectively.

Table 1. Some reproductive traits of experimental goats (%)

Traits	STF	LTF	Control	Total
Kidding rate	84.0	100.0	88.0	90.7
Kid yield by mated goats	144.0	164.0	132.0	146.7
Kid yield by goats giving birth	171.4	164.0	150.0	161.8
Survival rate	97.2	90.2	87.9	91.8
Single birth rate	33.3	48.0	54.5	45.6
Twin birth rate	61.9	40.0	40.9	47.1
Triple birth rate	4.8	12.0	4.6	7.3

Different feeding practices had no effect on the birth and weaning weights of the kids (Table 2). This may be due to the fact that the number of single-born kids in the control group is higher than the other two groups, even by chance. However, the fact that the birth weight was lower in triplets showed that the nutrients given to the dams fed during gestation were insufficient for three fetuses to gain enough live weight. Similar effect of birth type on birth weight in Kilis goat was also reported by Keskin et al. (1996). It was also seen in the same table that this effect of birth type on the kids' body weight disappears during the weaning period. This is due to the fact that the milk yield of Kilis goats is sufficient to raise the multiple born kids, even in the control group (Table

3). The period when the milk yield rises after birth and peak coincides with the months when the pasture conditions are good due to the rains in the region. Therefore, even if the breeders do not feed additionally, goats' milk production is sufficient for the growth of the kids. For this reason, the important effect of birth type on birth weight disappeared during the weaning period since multiple born kids in all groups were fed well during the period of suckling. This situation is compatible with the effect of gender on birth and weaning weight, as stated by many researchers (Al-Shaikh and Mogawer, 2001; Kaya and Öztürkcan, 2005; Keskin et al., 2017; Nugroho et al., 2018).

Table 2. Birth and weaning weight (kg) of the kids ( $\bar{x} \pm$  s.e.)

	Birth weight	Weaning weight
<i>Feeding application groups</i>		
STF	4.6±0.10 (n=36)	12.6±0.47 (n=35)
LTF	4.3±0.09 (n=41)	12.5±0.37 (n=36)
Control	4.2±0.13 (n=33)	13.2±0.33 (n=29)
P	>0.05	>0.05
<i>Sex</i>		
Male	4.5±0.09 (n=55)	13.7±0.27 (n=49)
Female	4.2±0.08 (n=55)	11.8±0.32 (n=51)
P	<0.05	<0.05
<i>Birth type</i>		
Single	4.4±0.14 <sup>a</sup> (n=31)	12.6±0.49 (n=24)
Twin	4.4±0.08 <sup>a</sup> (n=64)	12.9±0.30 (n=62)
Triplet	3.9±0.15 <sup>b</sup> (n=15)	12.4±0.57 (n=14)
P	<0.05	>0.05
<i>Total</i>		
	4.4±0.06 (n=110)	12.7±0.23 (n=100)

P, statistical significance; a, b, c, different superscripts in same column indicate statistically different groups.

Table 3. Lactation milk yield and lactation length of the groups ( $\bar{x} \pm s.e.$ )

Groups	Lactation milk yield (l)	Lactation length (days)
STF	426.3±20.96 <sup>a</sup> (n=21)	210.1±2.05 <sup>b</sup> (n=21)
LTF	466.2±19.59 <sup>a</sup> (n=25)	220.2±2.03 <sup>a</sup> (n=25)
Control	316.4±16.76 <sup>b</sup> (n=22)	194.4±2.05 <sup>c</sup> (n=22)
P	<0.05	<0.05

P, statistical significance; a, b, c, different superscripts in same column indicate statistically different groups

As can be seen from Table 3, the highest lactation length was calculated for the LTF group with 220.2 days, followed by STF and control groups ( $P < 0.05$ ). Similarly, the lactation milk yields, which were determined as 466.2 for LTF group and 426.3 liters for STF group were higher than the control group (316.4 liters;  $P < 0.05$ ). In other words, both lactation length and lactation milk yield were affected by additional feeding. These results regarding the lactation characteristics were in agreement with the reports of Kaya and Öztürkcan (2005) which indicated that feeding had a positive effect on lactation time and lactation milk yield. In addition, the milk yield characteristics obtained in the current study were compatible with the reports of different researchers (Gül ve ark., 2016b; Keskin ve ark., 2017).

## CONCLUSIONS

In this study carried out with Kilis goats to investigate the effect of supplementary feeding on the growth of kids and some lactation traits, it was concluded that (a) supplementary feeding practices during the last 20 or 40 days of gestation did not affect on the birth weight, (b) both sex and birth type affected birth weight, (c) the effect of birth type disappeared in the weaning because the milk yield of the dams was sufficient for the growth of the kids, (d) supplementary feeding during the first 90 days or whole lactation increased lactation length and milk yield.

## ÖZET

**Amaç:** Bu çalışmada Kilis keçilerinde, gebelik ve laktasyon dönemlerinde ek yemleme uygulamalarının doğum ve süttten kesim ağırlıkları ile anaların süt verimleri üzerine etkileri araştırılmıştır.

**Yöntem ve Bulgular** Bu projede deneme materyali keçiler kontrol, kısa süreli besleme ve uzun süreli besleme grupları olarak üç gruba ayrılmışlardır. Kontrol grubu yetiştirici koşullarında yönetilmiştir. Kısa dönem besleme grubunda gebeliğin son 20 gününden

başlayarak doğum sonrası 90. güne kadar, uzun süreli besleme grubunda ise gebeliğin son 40 gününden başlayarak laktasyon süresince keçilere günde 750 g/baş kesif yem verilmiştir. Deneme sonunda en yüksek laktasyon süresi 220.2 gün olarak uzun süreli besleme grubunda olmuş bunu kısa süreli besleme grubu ve kontrol grubu takip etmiştir ( $P < 0.05$ ). Benzer şekilde uzun süreli ve kısa süreli besleme gruplarında laktasyon süt verimleri sırası ile 466.2 ve 426.3 litre olarak belirlenmiş ve kontrol grubundan (316.4 litre) daha yüksek olmuştur ( $P < 0.05$ ).

**Genel Yorum:** Çalışmada gebelik ve laktasyon dönemlerinde ek yemleme uygulamalarının laktasyon süresi ve süt veriminde artışa neden olduğu sonucuna varılmıştır.

**Çalışmanın Önemi ve Etkisi:** Bu çalışma sonunda Kilis keçilerinde gebelik ve laktasyon dönemlerinde ek yemleme yapılırsa keçilerin süt verim özelliklerinin iyileşeceğini göstermektedir. Bölgedeki oğlaklar için süt emme dönemi mera şartlarının iyi olduğu zaman dilimindedir. Bu nedenle, hayvanlar sadece merada yönetilseler dahi, annelerin süt verimleri çoğuz doğan oğlaklar için yeterli olmaktadır.

**Anahtar Kelimeler:** Ek yemleme, oğlak gelişimi, süt.

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## CONFLICT OF INTEREST

The author declares that there is no conflict of interest in the study.

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