

## Postpartum Reproductive Activity and Body Weight Changes in Fat Tailed Ewes

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**Abstract:** To compare body weight losses and postpartum anoestrus, Red Karman (n = 20), Awassi (n = 20) and Tuj (n = 20) ewes that lambed in mid-winter (February to March) were monitored from parturition for eight months. Body Weight (BW) decreased until 2 months after parturition in all breeds and Red Karaman had higher (p<0.05) BW than the other two breeds. The length of time between parturition and first oestrus did not differ between breeds. The duration of oestrus was significantly longer (p<0.01) in Red Karaman (37.0h±1.5) than Awassi (30.2h±1.6) and Tuj (29.8h±1.4). A greater percentage of Tuj ewes (68%) showed oestrus than Red Karman (26%) and Awassi (35%) ewes during the experimental period. Mating Red Karaman ewes and Awassi ewes in summer is inefficient compared to mating Tuj ewes due to a low percentage of ewes exhibiting oestrus at that time. Red Karaman ewes are likely to have better fertility and more lambs in the traditional mating period due to their greater bodyweight and longer duration of oestrus.

**Key words:** Postpartum, oestrus, fat tailed sheep

### INTRODUCTION

Knowledge of the postpartum reproductive activity is an important factor in flock management<sup>[1]</sup>. El-Fouly *et al.*<sup>[2]</sup> and Sefidbakht *et al.*<sup>[1]</sup> reported substantial breed variation in oestrus and breeding activity. The breeding season of domestic sheep is affected by the geographic origin of individual breeds, with those originating from high latitudes and colder climates having a more restricted season than those originating near the tropics. Photoperiod is generally accepted as the primary environmental cue influencing this seasonal breeding pattern,<sup>[3,4]</sup> and a genetic basis for photo responsiveness has been clearly demonstrated in both sheep and wild ruminants<sup>[6]</sup>. However, genetic selection for a longer mating season and greater prolificacy has produced breeds of sheep with widely different breeding seasons even in the same latitude<sup>[5]</sup>. Different breeds display important variation in the resumption of postpartum cyclic ovarian activity.

There is no reference which defines the postpartum reproductive activity in fat tailed Awassi, Red Karaman and Tuj breed raised in eastern Turkey. These breeds are defined as having multi purpose production level and generally bred once in a year. However, knowledge of reproductive physiology and selection of ewes less seasonal can allow breeders to benefit from an off-season breeding program. So, there is a need for information on the postpartum reproductive activity or opportunity for out of season breeding for these fat-tailed sheep breeds, whose population is about 23% of total sheep population

in Turkey. The object of this paper is to provide information on oestrus, ovarian activity and body weight changes from parturition to 8 months postpartum in fat tailed sheep raised in eastern Turkey.

### MATERIALS AND METHODS

A total of 60 Awassi (n = 20), Red Karaman (n = 20) and Tuj (n = 20) ewes of mixed ages (2-6 yr) that lambed in mid-winter between February and March, 2003 were followed from parturition for eight months.

The animal were offered barley 300 g/ewe/day and dried grass hay 1.5 kg/ewe/day until 70 days after lambing thereafter they grazed from 07:00-12:00 and 14:00-17:00 h in a natural pasture. Primary forage plants of pasture were *Festuca ovina*, *Koeleria cristata*, *Bromus tomentalis*, *Medicago* sp. and *Onobrychis* sp.

Each female was weighed the day following parturition on Day 0, and afterwards once monthly. The oestrous behavior was checked every day starting the day following parturition using an intact, aproned ram of proven sexual vigor. Observation of oestrus was done between 08:00-12:00 and 12:00-18:00 h for 1h on each occasion. Oestrus was noted if the female stood willingly for the male to mount her. In estimating the duration of the oestrus period, it was assumed that onset and cessation were half-way between observations, this period of time being added to the interval between the first and last detection. The postpartum anoestrous length was considered as the interval between parturition and the 1st

Table 1: Body weight (kg) changes from parturition to eight months (mean±SD)

Body weight (kg)	Awassi	Red karaman	Tuj	Significance
Days after parturition				
Parturition	55.4±1.8 <sup>a</sup>	60.8±1.8 <sup>b</sup>	54.9±1.9 <sup>a</sup>	0
30 days	48.0±1.5 <sup>a</sup>	52.4±1.5 <sup>b</sup>	47.1±1.6 <sup>a</sup>	0
60 days	46.7±1.2 <sup>a</sup>	50.5±1.3 <sup>a</sup>	44.1±1.3 <sup>b</sup>	**
90 days	47.0±1.2 <sup>a</sup>	50.6±1.2 <sup>b</sup>	44.3±1.2 <sup>a</sup>	**
120 days	48.0±1.1 <sup>a</sup>	52.0±1.2 <sup>b</sup>	45.8±1.2 <sup>a</sup>	**
150 days	50.9±1.1 <sup>a</sup>	54.5±1.2 <sup>b</sup>	47.3±1.2 <sup>a</sup>	**
180 days	52.0±1.3 <sup>a</sup>	56.0±1.3 <sup>b</sup>	50.2±1.3 <sup>a</sup>	**
210 days	54.0±1.2 <sup>a</sup>	58.0±1.3 <sup>b</sup>	52.1±1.3 <sup>a</sup>	0
240 days	56.0±1.2 <sup>a</sup>	60.0±1.3 <sup>b</sup>	54.1±1.3 <sup>a</sup>	0
Body weight loss	8.6±1.4	10.3±1.5	10.8±1.5	N.S

Body weight loss: Weight loss between parturition and eight months postpartum.<sup>ab</sup>: Means within rows, by category, comparisons not followed by the same letter are significantly different N.S: Not significant, \*\*: p<0.01, \*: p<0.05

Table 2: Postpartum reproductive characteristics of Awassi, Red Karaman and Tuj (mean±SD)

Genotype	Awassi	Red Karaman	Tuj	Significance
Length of anoestrus (Day)	183.4±7.8	184.0±7.5	166.0±7.5	N.S
Oestrus Percentage (%)	35.0±0.1 <sup>a</sup>	26.3±0.1 <sup>a</sup>	68.4±0.1 <sup>b</sup>	*
Total number of oestrus cycle	1.3±0.3 <sup>a</sup>	2.4±0.4 <sup>b</sup>	2.1±0.2 <sup>b</sup>	*
Oestrus cycle (Day)	17.0±1.6	17.4±1.1	20.0±1.0	N.S
Duration of oestrus (h)	30.2±1.6 <sup>a</sup>	37.0±1.5 <sup>b</sup>	29.8±1.4 <sup>a</sup>	*** <sup>ab</sup> .

Means within rows, not followed by the same letter are significantly different N.S: Not significant, \*: p<0.05, \*\*: p<0.01

oestrus. The offspring were individually weaned at 70 days of age. Data were analyzed by analysis of variance (MINITAB). Statistical differences between means were tested using Duncan's multiple range tests.

### RESULTS

The means of the mother's body weight after parturition are shown in Table 1. On Day 0 and throughout the study the Red Karaman local ewes were heavier than Awassi (p<0.05) and Tuj (p<0.01) ewes. The mean duration of body weight losses, 2 months, was similar among breeds. The body weight loss in two months did not significantly differ. The Red Karaman ewes had higher body weights than the Awassi and Tuj ewes during the 8 months after parturition even though birth weight of offspring was similar for the three breeds (Awassi = 4.5; Red Karaman = 4.4; Tuj = 4.3) and birth type had no effect on ewe body weight.

The interval between parturition and the onset of oestrus behavior was not different among three breeds Table 2.

In distribution of onset of oestrus in August, September and October does vary with the breed; 83% of Tuj but only 16% of Red Karaman and none of Awassi ewes were detected in oestrus in August. Most of the Red Karaman ewes showed their first oestrus in September and distribution of onset oestrus of Awassi was similar in September (%56) and October (%44) Fig. 1.

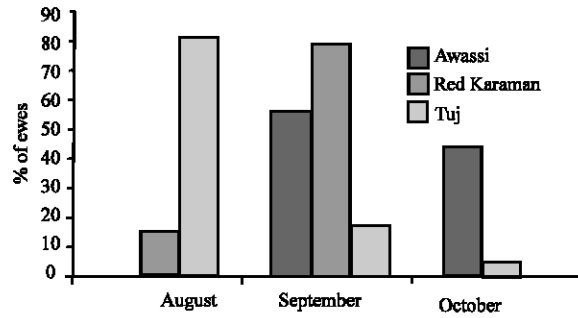


Fig.1: The distribution of onset of oestrus days of Awassi, Red Karaman and Tuj by month

The length of the oestrus cycle was similar among breeds while duration of the oestrous period was significantly longer (p<0.01) in Red Karaman (37±1.5 h) compared to Awassi (30.2±1.6) and Tuj (29.8±1.4). The total number of oestrus cycles from parturition to eight months was significantly higher (p<0.05) in Red Karaman than Awassi ewes and the percentage of animals in heat was higher in Tuj (68%) compared to Red Karaman (26%) and Awassi (35%) Table 2.

### DISCUSSION

After parturition, it is well known that the metabolic requirements increase in relation to the lactation process and that this may induce a decrease in the body weight if the nutritional level is not accurately balanced. In the current study, there was a shorter (2 months) duration of body weight losses in the three breeds of ewes compared to 3 months reported for local Burdian ewes<sup>[7]</sup>. Factors such as increased milk yield could have caused greater body weight loss. Macit<sup>[8]</sup> reported that milk production of Awassi is higher than that for the Red Karaman. The Red Karaman also has an advantage on grazing performance compared to the Awassi and Tuj. Since the Red Karaman is the local breed of the region, their grazing ability is higher than other two breeds and this advantage has reflected as a better response in their body weight during the grazing period. Avdi *et al.*<sup>[9]</sup> reported that even though sheep are seasonal breeders, a lower seasonality has been reported for breeds from the Mediterranean countries enabling spring mating. Our results show that Tuj have shorter postpartum anoestrus interval and higher percentage of animals observed in oestrus compared to Red Karaman and Awassi. The results showed that the duration of breeding activity in Tuj sheep appears to be more extended compared with Red Karaman and Awassi. Thus, Tuj may be more feasible in view of the elongated breeding season. Duration of anoestrus for Iranian fat-tailed Mehraban ewes<sup>[10]</sup> was reported as 69.7 days

which was shorter than that for recorded for Awassi, Red Karaman and Tuj fat-tailed ewes. A decrease in oestrus activity during the spring months was reported in other fat-tailed breeds<sup>[1,11,12]</sup>. The proportion of Mutton Merino ewes showing first oestrus was within 90 days of lambing<sup>[13]</sup> and shorter than those obtained for Awassi, Red Karaman and Tuj in the current study.

The duration of oestrus is critical to improving conception rates as the longer the ewe is in oestrus the more times she can be served. Red Karaman was recorded with longer duration of oestrus period than Tuj and Awassi. Dunlop and Tallis<sup>[14]</sup> reported that ewes with longer oestrous periods produced slightly more lambs, and that ewes in oestrus on a second day benefited most from re-insemination.

As previously reported for Holstein cows<sup>[15]</sup> ovarian activity and oestrus behaviour were observed when the body weight began to increase for the three breeds of fat-tailed sheep. Tuj ewes had their 1st oestrus 20 days earlier than Awassi and Red Karaman.

### CONCLUSION

These results demonstrate that, being local breed of the region brings advantage in grazing performance to maintain higher body weight and enter the breeding season with better body condition, which positively effect reproductive performance. Red Karaman ewes are superior to Tuj and Awassi with not only higher body weight but also longer duration of oestrus period which appears as higher fertility and more lambs in the subsequent breeding season. However, Tuj could be considered as a breed with a longer breeding season with an optimal oestrus activity in summer. This characteristic might be exploited for out-of-season lambing in Tuj. Awassi reared in eastern Turkey showed better reproductive performance with a higher percentage of animals in heat compared to other fat tailed sheep breeds raised in other Mediterranean countries.

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