

## Effect of Fat-Tail Docking on the Reproductive Performance in Ghezel and Mehraban Sheep

### Research Article

H. Atashi<sup>1\*</sup> and J. Izadifard<sup>1</sup>

<sup>1</sup> Department of Animal Science, Shiraz University, Shiraz, Iran

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\*Correspondence E-mail: [atashi@shirazu.ac.ir](mailto:atashi@shirazu.ac.ir)

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### ABSTRACT

78 Ghezel and 76 Mehraban sheep were used to evaluate the effect of fat-tail docking on reproductive performance. Within two days after birth the tails of 32 Ghezel female lambs and 28 Mehraban female lambs were docked using a tight rubber ring. The lambs were allowed to reproduce for three lambing opportunities and their reproductive performances were evaluated. The effect of docking on the fertility (ewe lambing per ewe exposed), litter size (lambs born per ewe lambing) were evaluated employing a multivariate logistic regression procedure, through the inclusion of tail docking in a 2-way interaction with breed, the fixed effect of parity and the random effect of the ewe. The results showed that the interaction of docking and breed significantly impacted fertility rate ( $P < 0.05$ ). In Ghezel ewes, docking reduced fertility [odds ratio (OR) (95% confidence interval (CI))= 0.29 (0.11-0.79) for docked vs. undocked Ghezel ewes]. Docking had no effect on fertility in Mehraban ewes [odds ratio (OR) (95% confidence interval (CI))= 1.19 (0.38-3.71) for docked vs. undocked Mehraban ewes]. The interaction effect of docking and breed had no impact on litter size, lamb birth weight and lamb weaning weight.

**KEY WORDS** docking, reproduction, sheep.

### INTRODUCTION

In Iran, all sheep breeds except for the Zel are fat-tailed. These sheep are characterized by the deposition of fat reserves in the tail and the fat-tail is regarded as a survival mechanism of animals in harsh environments (Khalidari *et al.* 2007). The amount of feed required to deposit fat in the fat tails is high, while the trend in consumer preference is changing away from fat to lean meat. Therefore, the marketing of fat-tailed sheep is becoming more difficult and the fat tail is considered as a waste product of the carcass. On the other hand, the fat tail of a ewe may make mating difficult or even impossible (Yami and Markel, 2008). For example, Shelton (1990) reported that the tail negatively impacts reproductive performance and lamb production from

fat-tailed Karakul sheep. Reducing the size of, or removing the fat-tail appears to improve carcass characteristics, including average daily weight gain, health and welfare of sheep and lambs, prevents excrement from accumulating on the tail and hindquarters, reduces fly strike, facilitates shearing, makes it easier to observe the ewe's udder and detect potential problems (Abouheif *et al.* 1992; Kent *et al.* 1995; Gokdal *et al.* 2004).

Ghezel and Mehraban sheep are among the predominant sheep breeds in Iran and adapt well to cold and mountain environments.

They are fat-tailed sheep reared mainly for meat production. Therefore, the aim of this study was to investigate the effect of docking on the reproductive performance in Ghezel and Mehraban sheep.

## MATERIALS AND METHODS

The animals included in this study consisted of Ghezel and Mehraban sheep reared at the Animal Experimental Station of Shiraz University, Shiraz, Iran. In total, 154 ewe lambs of Ghezel (n=78) and Mehraban (n=76) were used to evaluate the effect of fat-tail docking on the reproductive performance. Within two days after birth, 32 Ghezel and 28 Mehraban ewe lambs were docked using a tight rubber ring between the first and the second vertebrae down the tail. The ewe lambs (docked and undocked tails) were allowed to reproduce for three lambing opportunities and their reproductive performance was evaluated. At the Experimental Station all lambs grazed on natural vegetation during daytime and were housed overnight with access to water. The ewe flock was kept indoors during cold months and moved to the pasture when the weather condition was favorable. Lambs were housed with their mothers in stalls for 2 to 3 d post-lambing. From 10 d of age through weaning (75±5 d), lambs also had access to a creep-feed consisting of character hay and barley.

Information on reproductive traits including fertility (ewe lambing per ewe exposed), litter size (lambs born per ewe lambing), lamb birth weight and weaning weight were collected for three consecutive years. The measures of fertility and litter size were defined as ewe lambing per ewe exposed and lambs born per ewe lambing, respectively (Schoenian and Burfening, 1990).

The lamb weaning weight at 75 d of age was calculated by linear interpolation. The effect of docking on fertility and litter size was evaluated using multivariable logistic regression, using PROC GENMOD in SAS (2010), through the inclusion of docking in a 2-way interaction with breed, fixed effect of parity, and random effect of the ewe.

The potential effect of docking on birth weight, and weaning weight was evaluated using PROC MIXED in SAS (2010), through the inclusion of docking in a 2-way interaction with breed, parity, lamb gender and random effect of the ewe.

## RESULTS AND DISCUSSION

The means of fertility, litter size, birth weight and weaning weight of lambs from undocked Ghezel, docked Ghezel, undocked Mehraban and docked Mehraban are presented in Table 1. Mean fertility and litter size was 68.75% and 1.08, respectively. Mean (SD) birth weight and weaning weight was 4.42 (0.84) and 18.40 (3.22) kg respectively. The interaction effect of docking and breed significantly impacted fertility rate (P<0.05).

The rates of fertility for undocked Ghezel, docked Ghezel, undocked Mehraban and docked Mehraban ewes

was 72.85, 45.95, 76.05, 80.82%, respectively (P<0.05).

In Ghezel ewes, docking reduced fertility by 26.9% [OR (95% CI)=0.29 (0.11-0.79) for docked vs. undocked Ghezel ewes]. Docking had no effect on fertility in Mehraban ewes [OR (95% CI)=1.19 (0.38-3.71) for undocked vs. docked Mehraban ewes].

**Table 1** The effect of docking on the fertility, litter size, birth weight of lambs and weaning weight of lambs (n=154)

Breed	Fat-tail docking	Fertility	Litter size	Birth weight	Weaning weight
Ghezel (78)	Undocked (46)	72.85 <sup>a</sup>	1.06 (0.05) <sup>a</sup>	4.67 (0.92) <sup>a</sup>	18.49 (3.03) <sup>a</sup>
	Docked (32)	45.95 <sup>b</sup>	1.10 (0.04) <sup>a</sup>	4.42 (0.67) <sup>a</sup>	18.15 (2.96) <sup>a</sup>
Mehraban (76)	Undocked (48)	76.05 <sup>a</sup>	1.07 (0.05) <sup>a</sup>	4.39 (0.79) <sup>a</sup>	19.13 (3.29) <sup>a</sup>
	Docked (28)	80.82 <sup>a</sup>	1.08 (0.04) <sup>a</sup>	4.22 (0.84) <sup>a</sup>	17.73 (3.25) <sup>a</sup>

The means within the same column with at least one common letter, do not have significant difference (P>0.05).

Although the hypothesis of this research was that docking of the fat-tailed ewes may improve the fertility rate, the results showed that docking has a negative effect on fertility Ghezel sheep. In contrast to this study, Shelton (1990) reported that the tail has a negative impact on reproductive performance and lamb production from fat-tailed Karakul sheep.

The interaction effect of docking and breed had no impact on litter size, birth weight or weaning weight. The means (SE) of birth weight for lambs of undocked Ghezel, docked Ghezel, undocked Mehraban and docked Mehraban were 4.67 (0.92), 4.42 (0.67), 4.39 (0.79) and 4.22 (0.84) respectively; while the corresponding values for weaning weight were 18.49 (3.03), 18.15 (2.96), 19.13 (3.29) and 17.73 (3.25).

Jawad *et al.* (1986) reported that age at first estrus and ovulation rate were lower in docked ewes compared to undocked ewes. Shelton (1990) reported that the percentage of ewes that gave birth was higher, while litter size was lowering in docked vs. undocked ewes. In a close agreement with this study, several reports indicated that docking has no effect on pre-weaning and post-weaning growth in lambs (Alkass *et al.* 1985; Shelton, 1990).

In conclusion, although the Ghezel and Mehraban ewes have a large fattail which may make mating difficult, this study did not confirm the hypothesis that docking of ewes may improve fertility.

## CONCLUSION

Although the Ghezel and Mehraban ewes have a large fat-tail which may make mating difficult, this study did not confirm the hypothesis that docking of ewes may improve fertility.

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