

Effect of Tail Docking on Growth Performance and Carcass Traits in Turkish Tuj Lambs

¹Muammer Tilki, ²Mustafa Saatci, ¹Ali Riza Aksoy and ¹Turgut Kirmizibayrak

¹Department of Animal Science, Faculty of Veterinary Medicine,
Kafkas University, 36300 Kars, Turkey

²Department of Animal Science, Faculty of Veterinary Medicine,
Mehmet Akif Ersoy University, 15000 Burdur, Turkey

Abstract: The effect of tail docking on growth and carcass performance was studied using 17 Turkish Tuj ram lambs born in same week. Lambs were divided into two groups with 8 animals in undocked and 9 animals in docked group. The lambs were docked using a tight rubber ring within two days after birth. The lambs in both groups were handled similarly and were 90 days suckled by their dams. After the weaning, lambs managed as one flock with the other contemporary ram lambs. All the lambs grazed in the same pasture until at the end of 6 months period and received no supplementary feeding. Lambs were slaughtered for evaluation of carcass traits. There were no differences between the treatment and control group in growth, live weight, carcass weight and dressing percentage ($p>0.05$). Kidney fat and mesenteric fat were higher in docked group while testicles and kidney weights were heavier in undocked lambs ($p<0.05$). Loin percentage in docked lambs was higher than the undocked ones ($p<0.05$). All docked lambs survived until at the end of the 6 months experimental period. Docking in Turkish Tuj lambs did not affect growth performance and carcass leanness but some adipose tissues have been affected by the application. Lighter testicles in docked lambs might be considered as a reproductive concern, related with fat metabolism.

Key words: Docking, Tuj lambs, growth, carcass, meat, fat

INTRODUCTION

Consumers all over the world are more sensitive on diet and their preference is changing to consume less animal fat. This preference pushes the meat market to supply leaner carcass. It is reported that fat content in the carcass of fat-tailed sheep can be reached up to 33% (Shelton *et al.*, 1991). In the studies made in Turkey this ratio ranges from 19-29% for native Turkish breeds and their crosses (Akcinar, 1981; Kadak *et al.*, 1993). Ratio of the tail fat in the carcass of Akkaraman and Awassi lambs were reported as 19.23 and 16.24% (Tekin *et al.*, 1993). Because of this reality breeders are searching the ways to reduce total carcass fat. Tail docking can be accepted as one of the attempt to solve the problem. Although, tail docking is a common application in lamb rearing, it is not in practise in Turkey. Tuj sheep is one of the Caucasian breeds reared around northeast Turkey and know as fat rumped (fat tighted) sheep (Saatci *et al.*, 2003). But Tuj sheep reared in Turkey have a certain tail fat because of the crossing with native fat tailed rams; therefore they are generally called as Turkish Tuj (Yarkin and Eker, 1954). As mentioned in the referred

literature, Turkish Tuj are clearly differentiated then original Tuj with their hanged down fat tail. Tail docking had not been applied either to Turkish Tuj or any other breeds in the region. But several tail-docking studies in lambs have been employed to improve the growth and carcass composition (El-Karim, 1980; Alkass *et al.*, 1985; Shelton *et al.*, 1991; Al-Jassim *et al.*, 2002; Gokdal *et al.*, 2003; Sarvar *et al.*, 2009). Tail docking is also used both to protect animals from fly strike and to increase the reproductive performance and lamb production from fat tailed sheep (Shelton, 1990). It was reported that tail docking has no effect on the pre-weaning and post-weaning growth performance in lambs (Joubert and Ueckerman, 1971; Alkass *et al.*, 1985; Sarvar *et al.*, 2009).

It was also detected that tail docking decreased daily gain in Awassi lambs (Kadak *et al.*, 1993). According to Kusina (1995), tail docking has no effect on meat proportion on lamb carcass but it is effective to increase the fat and adipose tissues. Panopoulou *et al.* (1991) reported a non-significant effect of tail docking on total carcass fat percentage in Chios lamb. But they also found the different fat percentages in some carcass cuts. In

terms of the lamb production, any significant effect has not been observed in docked and undocked lambs in the study of French *et al.* (1994).

Numerous researchers reported changeable influence of docking on fat content and distribution over lamb carcass (Marai *et al.*, 1987; Shelton *et al.*, 1991; Bicer *et al.*, 1992; Abouheif *et al.*, 1993; Bingol *et al.*, 2006). But there is no available evidence of the docking effect on Turkish Tuj lambs. Tail docking practice may affect the growth and carcass characteristics of Turkish Tuj lambs especially in a short grazing season (3-4 months). From this hypothesis, the study aimed to investigate the influence of docking on growth performance and carcass traits in limitedly grazed Turkish Tuj lambs.

MATERIALS AND METHODS

During the lambing season, 17 male Turkish Tuj lambs born in the first week of April were chosen. Nine of them were docked within two days after birth by applying a tight rubber ring. Rubber ring tried to fix after 3rd and before 5th tail vertebrae. After the operation, the tail fell off within 2 weeks. Lambs were kept with their dams for 3 months before being weaned. After that, docked and undocked ram lambs run together and managed as one flock with the other contemporary male lambs. All the lambs grazed in the same pasture until at the end of 6 months and received no supplementary feeding. Botanical composition of grazed pasture was described by Saatci *et al.* (2003).

During the 6 months of experimental period, live weights of animals were recorded monthly. At the end of the period, lambs were slaughtered and carcasses were examined according to procedure developed by Akcapinar (1981) but only leg, shoulder and loin shown in Table 1. Before slaughter, animals were divested of food overnight and weighed just before slaughter. Lambs were body condition scored in 1st, 3rd and 6th months. Body Condition Score (BCS) was carried out with the hand palpation on the loin area according to Russel *et al.* (1969) as 1 being emaciated and 5 being obese. The statistical significance between the performances of docked and undocked lambs was assessed by two-sample t test in Minitab (version 12.1) and the relationships between the measurements were also evaluated (Akcapinar, 2000).

RESULTS AND DISCUSSION

Live weights of docked and undocked lambs from birth to 6 months of age are shown in Table 1. From the Table 1, it is shown that there was no statistical difference in weight of docked and undocked lambs from birth to end. But slightly higher monthly live weights in undocked

Table 1: The means and standard errors of slaughter and carcass traits in Turkish Tuj lambs

Characteristics	Docked	Undocked	Significance
Slaughter weight (kg)	33.14±0.86	32.92±1.10	-
Liver weight (g)	417.00±0.01	395.00±0.02	-
Heart weight (g)	160.00±0.01	163.00±0.01	-
Kidney weight (g)	80.00±0.01	95.00±0.01	*
Testicles weight (g)	142.00±0.01	220.00±0.01	*
Mesenterial fat weight (g)	45.00±0.01	26.00±0.01	*
Omental fat weight (g)	71.00±0.02	72.00±0.01	-
Kidney fat weight (g)	56.00±0.01	40.00±0.01	*
Cold carcass weight (kg)	13.7±0.480	14.8±1.100	-
Dressing percentage-I	41.87±2.00	45.88±2.60	-
Dressing percentage-II ϕ	39.21±1.83	41.03±1.87	-
Tail fat (g)	850.00±0.36	1750.00±0.67	*
Eye muscle area (cm ²)	11.02±0.45	12.01±0.34	-
Subcutaneous fat (mm)	4.43±0.63	3.92±0.47	-
Leg (kg)	4.48±0.21	4.53±0.25	-
Shoulder (kg)	2.59±0.07	2.55±0.16	-
Loin (g)	817.00±0.01	753.00±0.05	-
Leg (%) ϕ	34.84±0.69	34.67±0.44	-
Shoulder (%) ϕ	20.21±0.30	19.43±0.37	-
Loin (%) ϕ	6.40±0.17	5.72±0.13	*
Muscle in shoulder (kg)	1.66±0.04	1.64±0.11	-
Fat in shoulder (g)	356.00±0.01	366.00±0.02	-
Bone in shoulder (g)	607.00±0.02	585.00±0.03	-

*: $p < 0.05$; ϕ : Without tail fat; Sig. = Significance

Table 2: The means and Standard Error (SEM) of live weights and Body Condition Scores (BCS) of lambs*

Characters	Docked	Undocked
----- $\bar{X} \pm S\bar{X}$ -----		
Live weights (kg)		
Birth weight	3.29±0.11	3.53±0.14
1 Month	13.10±0.86	14.00±1.15
2 Month	19.46±1.22	20.47±1.14
3 Month	26.03±1.05	27.67±1.43
4 Month	34.80±1.23	35.72±1.94
5 Month	34.64±1.51	36.33±1.88
6 Month	33.14±1.68	34.42±1.05
BCS		
1 Month	2.75±0.13	2.67±0.11
3 Month	3.12±0.16	3.13±0.09
6 Month	2.96±0.11	3.04±0.20

*There was no statistical significance between the groups ($p > 0.05$)

group were observed till 5 months. Also no statistical difference occurred in BCS between groups. Slaughter and carcass traits for docked and undocked ram lambs are shown in Table 2. From Table 2, it is shown that docked and undocked lambs had similar carcass weight and dressing percentage ($p > 0.05$). It was observed in the carcasses of lambs that docked lambs still accumulated some fat around the tail and back thigh. But this accumulation was lighter ($p < 0.05$) in docked lambs than undocked lambs (850 vs. 1750 g). There was no significant difference in muscle decreasing the testicle and kidney weights ($p < 0.05$). Additionally, loin percentage from the carcasses without tail fat in docked lambs was higher than the undocked lambs ($p < 0.05$). Correlation between weights of tail fat and testicles were significant ($p < 0.05$, $r = 0.80$) but no correlation between kidney weight and tail fat were detected ($p > 0.05$).

Meat, fat and bone content were evaluated in shoulder cut (Table 1); there was not significant difference in mentioned traits over the shoulder cut between docked and undocked lambs ($p>0.05$).

Docking on Turkish Tuj ram lambs in short term grazing season brought a chance to evaluate this application in north-east of Turkey, in terms of growth and carcass performance. As can be shown in Table 2, decreasing in the live weights of lambs after the 5th month is a reflection of pasture quality as determined earlier study of Saatci *et al.* (2003).

Results of the corresponding study showed no effect of tail docking on the growth performance of lambs. This is similar with the research of El-Karim (1980) for Dubasi sheep, Kusina (1995) for male Sabi lambs and Bicer *et al.* (1992) for Awassi ram lambs. These results also supported with those reported by Joubert and Ueckerman (1971) who found no differences in live weights of Namaqua Afrikaner crosses lambs. No effect of docking on growth rate of docked and undocked Karakul and Karakul x Rambouillet lambs was reported by Shelton *et al.* (1991).

There were no differences between the groups in total carcass weight and dressing percentage. Similarly no differences in total carcass weight between the docked and undocked lambs were reported by Kusina (1995). While Joubert and Ueckerman (1971) had reported low dressing percentage for docked lambs, Marai *et al.* (1987) reported the opposite. Additionally no difference in dressing percentage between docked and undocked lambs was reported by Shelton *et al.* (1991) and Bicer *et al.* (1992).

It was anticipated that docking would change the fat accumulation in the body but results of corresponding study showed that lambs were not greatly affected by docking. The only differences were found in kidney fat and mesenteric fat in both measurements fat content of docked lambs were heavier. O'Donovan *et al.* (1973) reported that nearly 50% of fat normally deposited in tail was relocate as subcutaneous, intermuscular and internal fat in docked lambs. Detected more fat deposition around kidney and mesenteries in docked lambs in corresponding study agrees with the results of those O'Donovan *et al.* (1973). Similarly, Al-Jassim *et al.* (2002) reported higher pelvic and kidney fat in docked lambs.

El-Karim (1980) and Bicer *et al.* (1992) reported no differences in subcutaneous fat and eye muscle of docked and undocked lambs like found in this study. But the loin percentages from the carcasses without the tail fat were showed a statistically significant difference ($p<0.05$). The loin percentage from the ducked rams was higher than the entire ones. This difference might be explained with the more fat deposition around the loin area in the ducked lambs. Although, tail fat removed, some fat stocking around the tail and back tight were determined

this stocking could be related with the characteristics of Turkish Tuj sheep which is also known as fat-thighted (fat rumped) sheep (Akcapinar, 2000; Yildiz *et al.*, 2003). It also was observed that mentioned stocking fat around the tail had been originated from the back tight.

Lighter testicle and kidney weights in docked group have been detected but any related information cannot be found in the literature. It looks that fat in the tail activates different part of body such as testicles. This might be the specification of fat tailed sheep which can survive in harsh environment. Strong and significant correlation and regression between the tail fat and testicles weight ($p<0.05$, $R^2 = 63\%$) could also be a result of the relationship between fat store and reproduction in that species (Yildiz *et al.*, 2003).

This might be due to leptin secretion from fat tissues, especially from the tail fat. Yildiz *et al.* (2003) found a significant correlation between plasma leptin concentration and LH pulse frequency which affects the testis development. Lighter kidney weight in docked group can be related with higher accumulated kidney fat with the special location of kidneys. It could be thought that growth of kidneys might be mechanically restricted by kidney fat because total weight of kidney and kidney fat in the groups were quite close to each other Table 1 (135 and 136 g).

Fat, muscle and bone distribution in the shoulder have been evaluated as a reflection of whole carcass but none of them was affected by the groups as reported by El-Karim (1980). However Bicer *et al.* (1992) and Kusina (1995) reported opposite reports mentioning the less lean and higher intermuscular fat content in docked lambs.

CONCLUSION

In this study, docking of Turkish Tuj lambs after birth did not affect growth performance and leanness of carcass but some adipose tissues have been affected by the application. Lighter testicles from the docked lambs might be considered as a reproductive issue related with fat metabolism.

All docked lambs in the study survived until at the end of the experimental periods, this ending shows that docking did not decrease the survival rate of the Turkish Tuj lambs in the region and docking with a practical application such as tight rubber ring can be used to reduce the tail fat content in carcass. Additionally defined effect of docking tail fat on testicles can be taken an account in terms of reproduction and fat relation especially in fat tailed sheep.

REFERENCES

- Abouheif, M.A., M.S. Kraidees and R.A. Shatat, 1993. Performance and carcass traits of docked and intact fat-tailed Najdi lambs. *Asian Aust. J. Anim. Sci.*, 6: 135-138.
- Akcapinar, H., 2000. Sheep Breeding. Ismat Press, Ankara, Turkey.
- Akcapinar, H., 1981. Comparison of the growth and carcass characters of daglic, white karaman and kivircik lambs reared to different final weights. *FU Vet. Fak. Derg.*, 6: 165-184.
- Al-Jassim R.A.M., G. Brown, E.D. Salman and A. Abodabos, 2002. Effect of tail docking in Awassi lambs on metabolizable energy requirements and chemical composition of carcasses. *Anim. Sci.*, 75: 359-366.
- Alkass, J.E., N.H. Rashid, M.A. Ishak and H. Talib, 1985. The combined effects of docking and castration on growth rate and carcass characteristics of Awassi lambs. *World Rev. Anim. Prod.*, 11: 49-52.
- Bicer, O., E. Pekel and O. Guney, 1992. Effect of docking on growth performance and carcass characteristics of fat-tailed Awassi ram lambs. *Small Rumin. Res.*, 8: 353-357.
- Bingol, M., T. Aygun, O. Gokdal and A. Yilmaz, 2006. The effects of docking on fattening performance and carcass characteristics in fat-tailed Norduz male lambs. *Small Rumin. Res.*, 64: 101-106.
- El-Karim A.I.A., 1980. Effect of docking on growth and carcass characteristics of Dubasi desert sheep. *Trop. Anim. Prod.*, 5: 15-17.
- French, N.P., R. Wall and K.L. Morgan, 1994. Lamb tail docking, a controlled field study of the effects of tail amputation on health and productivity. *Vet. Rec.*, 134: 463-470.
- Gokdal, O., T. Aygun, M. Bingol and F. Karakuo, 2003. The effects of docking on fattening performance and carcass characteristics of male Karakao lambs. *South Afr. J. Anim. Sci.*, 33: 185-192.
- Joubert, D. and L. Ueckerman, 1971. A note on the effect of docking on fat deposition in fat-tailed sheep. *Anim. Prod.*, 13: 191-192.
- Kadak, R., H. Akcapinar, M.E. Tekin, A. Akmaz and S. Muftuoglu, 1993. Fattening and carcass characters of F1 German blackheaded mutton x akkaraman, hampshire down x akkaraman, German blackhead mutton x Awassi and hampshire down x Awassi lambs. *Hay. Aras. Derg.*, 3: 1-7.
- Kusina, N.T., 1995. Lamb tail docking: Effect of tail amputation on productivity, carcass composition and carcass quality of fat-tailed intact indigenous Sabi male lambs. *J. Zimbabwe Soc. Anim. Prod.*, 7: 187-193.
- Marai, I.F.M., M.S. Nowar, L.B. Bahgat and L.B. Owen, 1987. Effect of docking and shearing on growth and carcass traits of fat tailed Ossimi sheep. *J. Agric. Sci.*, 109: 513-518.
- O'Donovan, P.B., M.B. Ghadaki, R.D. Behesti, B.A. Saleh and D.H.L. Rollinson, 1973. Performance and carcass composition of docked and control fat-tailed Kellakui lambs. *Anim. Prod.*, 16: 67-76.
- Panopoulou, E., T. Papadimitriou, S.G. Deligeorgis and E. Rogdakis, 1991. Effect of docking on carcass composition, fat cell size and NADP-dependent anzyme activity in adipose tissue of female Chois lambs at 40 kg live weight. *Epitheor. Zootechnikes Epistemes*, 13: 93-107.
- Russel, A.J.F., J.M. Doney and R.G. Gunn, 1969. Subjective assessment of body fat in live sheep. *J. Agric. Sci.*, 72: 451-454.
- Saatci, M., S. Yildiz and I. Kaya, 2003. New rearing systems for Tuj lambs. *Small Rumin. Res.*, 50: 23-27.
- Sarvar, E.N., M.M. Moeini, M. Poyanmehr and E. Mikaeli, 2009. The effects of docking on growth traits, carcass characteristics and blood biochemical parameters of Sanjabi fat-tailed lambs. *Asian-Aust. J. Anim. Sci.*, 22: 796-802.
- Shelton, M., 1990. Influence of docking fat tail (Karakul) sheep on lamb production. *Small Rumin. Res.*, 3: 73-76.
- Shelton, M., T. Willingham, P. Thompson and E.M. Roberts, 1991. Influence of docking and castration on growth and carcass traits of fat-tail Karakul, Rambouillet and crossbred lambs. *Small Rumin. Res.*, 4: 235-243.
- Tekin, M.E., A. Akmaz, R. Kadak and M. Nazli, 1993. The fattening and carcass characteristics of Akkaraman, Awassi and Turkish merino male lambs. *Hay. Aras. Derg.*, 3: 98-102.
- Yarkin, I. and M. Eker, 1954. Kars cevresinde yetistirilen Tuj koyunu uzerine calismalar. *Ankara Univ. Zir. Fak. Derg.*, 4: 375-388.
- Yildiz, S., D. Blache, F. Celebi, I. Kaya, M. Saatci, M. Cenesiz and B. Guven, 2003. Effects of short-term high carbohydrate or fat intakes on leptin, growth hormone and luteinizing hormone secretions in prepubertal fat-tailed Tuj lambs. *Reprod. Domestic Anim.*, 38: 182-186.