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Tail Length at Docking and Weaning of Lambs

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[2] Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by the United States Department of Agriculture. The USDA is an equal-opportunity provider and employer.

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Summary

This study was conducted with crossbred lambs (n = 109 female and 120 male) to measure tail length at docking and weaning and to determine the change in length between docking and weaning. Lambs were born in April and weaned at approximately 125 d of age. Within 24 h after birth, lambs were weighed and ear tagged, and rubber rings were applied to dock tails. Rings were applied just past the distal end of the caudal folds of the tail, which is just beyond where the folds attached to the tail. Time of rubber ring application was considered time of docking. Using a specially designed device, tail lengths were measured immediately after rubber ring application and at weaning. Lambs were weighed at weaning. Sex and breed type affected ($P < 0.005$) BW at docking and weaning; male and black-faced × white-faced lambs were heavier than female and white-faced × white-faced lambs. At docking, neither sex, breed type, nor the sex × breed-type interaction affected actual tail length or tail length adjusted for BW, although BW at docking was a significant ($P < 0.0001$) covariate. At weaning, the sex × breed type interaction affected ($P < 0.002$) actual tail length, which was greater ($P < 0.002$) for male, black-faced × white-faced lambs than for lambs of the other sex-breed-type classifications. At weaning, sex and sex × breed type affected ($P < 0.01$) tail length adjusted for the covariate BW at weaning. Breed type affected ($P < 0.006$) the change in actual tail length between docking and weaning (white-faced × white-faced, 2.4 cm, vs. black-faced × white-faced lambs, 2.7 cm). The data indicate clearly that tail length increased between docking and weaning.

Key words: Lambs, Tail Docking, Tail Growth

Introduction

Docking the tails of lambs is a traditional, but recommended, method for reducing the incidence of fly strike and its associated morbidity and mortality (Dykstra, 1942; Battaglia and Mayrose, 1981; Merck, 1986; Thomas et al., 2003; Lewis et al., 2010). Docking procedures have remained largely unchanged for at least 70 years, and a recommendation from that era was to amputate the tail approximately 5 cm to 8 cm distal to the union of the tail with the body of the lamb (Dykstra, 1942). Complete removal of the tail produces no discernable benefits for the sheep and can increase the incidence of rectal prolapse (for extensive discussion, see Thomas et al., 2003).

Because of concerns about rectal prolapse, the current recommendation in the United States is to dock tails at the distal end of the caudal folds, where the caudal folds attach to the tail (Battaglia and Mayrose, 1981; ASI, 2002; Lewis et al., 2010). The recommendation for tail docking in Australia and the United Kingdom is to retain sufficient tail "to cover the vulva in the case of female sheep and the anus in the case of male sheep" (DEFRA, 2000; PISC, 2006). In New Zealand, the recommendation is to leave the tail "long enough to cover the vulva in females and at a similar length in males" (MAF, 2005).

In discussing tail docking with sheep producers and students, the question has often arisen, "How much does a lamb's tail grow after docking?" Despite the interest in the length of docked tails, little information is available about the growth of a tail between docking and weaning. The only locatable article in a professional journal indicated that tail length usually increased between docking, weaning, and market age (Goodwin et al., 2007). Thus, the purpose of this study was to measure tail length at docking and weaning and determine tail growth between docking and weaning.

Materials and Methods

Animal Procedures

The United States Sheep Experiment Station Institutional Animal Care and Use Committee reviewed and approved all husbandry practices and experimental procedures used in this study.

Crossbred lambs (n = 229) were used for the study. The crosses were various combinations of Targhee, Rambouillet, Polypay, and Columbia breeds (i.e., white-faced × white-faced; n = 212; 99 ewes and 113 wethers) and Suffolk × white-faced (i.e., black-faced × white-faced; n = 17; 10 ewes, 6 rams, and 1 wether). The lambs were born between April 4 and April 11 of the same year and were weaned on August 12 or August 13 at 124.9 d ± 0.1 d of age. Unique, visual identification tags were inserted into each ear of each lamb within 24 h after birth. Lambs were weighed immediately before they were tagged and again at weaning. Ewe and lamb management was the same as that described in Leeds et al. (2012).

Rubber rings (Supervet Castrating Rings; Syrvet, Inc., Waukee, Iowa) were used to dock and castrate lambs that were assigned to the study. The rings were applied within 24 h after birth, immediately after lambs were tagged. In this study, the time when a rubber ring was applied to a tail was considered the time of docking, even though the act of applying a rubber ring to a tail is not, by definition, docking. For docking, the rings were applied just past the distal end of the caudal folds of the tail, which was just beyond where the caudal folds attached to the underside of the tail (Lewis et al., 2010). The portion of the tails, including the rubber rings, distal to the site of amputation typically dropped free within approximately 45 d.

Using a device and methods that have been described in detail (Goodwin et al., 2007), dock lengths were measured immediately after rubber rings were applied and again at weaning. The measuring device was graduated in 0.254-cm increments. At docking, the device was positioned firmly against the ischial tuberosities, and the distance to the cranial edge of the rubber ring was measured. At weaning, the device was positioned as described, and the distance to the free end of the docked tail was measured. A single, highly skilled technician applied rubber rings and performed all measurements.

Statistical Analyses

Methods in PROC GLM (SAS Inst. Inc., Cary, N.C.) were used to analyze the data. The models used in the analyses included terms for sex (i.e., female vs. male), breed type (i.e., white-faced × white-faced vs. black-faced × white-faced), and sex × breed type. When appropriate, BW was included in a model as a covariate. The dependent variables were tail length and BW at docking and weaning and tail growth between docking and weaning. Pair-wise contrasts (PDIFF = ALL option), with Tukey-Kramer methods for adjusting for multiple comparisons, were used to compare means.

Results

Table 1 contains the data from this study. Sex and breed type affected BW at docking and weaning; *P*-values ranged from < 0.005 to < 0.0001. At docking and weaning, respectively, male (5.4 kg and 44.6 kg) and black-faced × white-faced lambs (5.4 kg and 47.4 kg) were heavier than female (4.9 kg and 40.3 kg) and white-faced × white-faced lambs (4.8 kg and 37.4 kg).

At docking, neither sex, breed type, nor the sex × breed-type interaction affected actual tail length or tail length adjusted for BW, although BW at docking was a significant ($P < 0.0001$) covariate. At weaning, the sex × breed-type interaction affected ($P < 0.002$) actual tail length, which was greater ($P < 0.002$) for male, black-faced × white-faced lambs than for lambs of the other sex-breed-type classifications. At weaning, sex (female, 6.9 cm; male, 7.1 cm) and sex × breed type affected ($P < 0.01$) tail length, adjusted for the covariate BW at weaning. Breed type affected ($P < 0.006$) the change in actual tail length between docking and weaning: 2.4 cm for white-faced × white-faced and 2.7 cm for black-faced × white-faced lambs.

Using the parameter estimates derived from the statistical analyses of the data from this study, the following equations were constructed to predict tail length, in centimeters, at docking and weaning, respectively (SAS, 2009): 3.515 + (0.223 × birth weight, kg) and 5.943 + (0.028 × weaning weight, kg), where 3.515 and 5.943 are intercepts adjusted for breed type, sex, and sex × breed type, and 0.223 and 0.028 are covariates. The average difference between actual and predicted tail length at docking and weaning was −0.05 cm ± 0.03 cm and −0.02 cm ± 0.02 cm, respectively.

Table 1. Tail lengths and bodyweights of lambs when rubber rings were applied to dock tails and at weaning when lambs were 124.9 ± 0.1 d of age[1]

	White-faced × white-faced[2]		Black-faced × white-faced[3]		
Time of measurement	Female	Male	Female	Male	Pooled SE
	n				
	99	113	10	7	
	BW, kg				
Docking[4]	4.7	5.0	5.1	5.9	0.05
Weaning[5]	36.7	38.2	43.9	50.9	0.33
	Actual tail length, cm				
Docking	4.6	4.6	4.3	4.8	0.03
Weaning[6]	7.0[a]	7.0[a]	6.9[a]	7.6[b]	0.03
	Tail length adjusted for BW, cm[7]				
Docking[8]	4.6	4.3	4.5	4.5	0.03
Weaning[9]	7.0[a]	6.8[a,b]	7.0[a]	7.3[a,c]	0.02
	Docking to weaning actual tail growth, cm[10]				
	2.4	2.6	2.4	2.9	0.03

1 Rubber rings were applied within 24 h after birth.
2 White-faced crosses were various combinations of Targhee, Rambouillet, Polypay, and Columbia breeds.
3 Suffolk × white-faced crosses.
4 Sex ($P < 0.005$; female, 4.9 kg, vs. male, 5.4 kg) and breed type ($P < 0.003$; white-faced × white-faced, 4.8 kg, vs. black-faced × white-faced, 5.4 kg) were significant.
5 Sex ($P < 0.001$; female, 40.3 kg, vs. male, 44.6 kg) and breed type ($P < 0.0001$; white-faced × white-faced, 37.4 kg, vs. black-faced × white-faced, 47.4 kg) were significant.
6 Sex × breed was significant ($P < 0.002$). [a,b] Means with dissimilar superscripts differed ($P < 0.002$).
7 Least squares means.
8 The covariate BW at docking was significant ($P < 0.0001$).
9 Sex ($P < 0.01$; female, 6.9 cm, vs. male, 7.1 cm), sex × breed type ($P < 0.01$), and the covariate weaning weight ($P < 0.0001$) were significant. [a,b,c] For the sex × breed-type interaction, means with different superscripts differed ($P < 0.04$).
10 Breed type was significant ($P < 0.006$; white-faced × white-faced, 2.4 cm, vs. black-faced × white-faced, 2.7 cm).

Discussion

Between docking and weaning in the present study with male and female lambs, tail length increased an overall average of 2.6 cm ± 0.03 cm. Tail length increased for 100 percent of the lambs, and the increase ranged between 1.3 cm and 3.8 cm. As expected (Leeds et al., 2012), male and black-faced × white-faced lambs were heavier at docking and weaning than were female and white-faced × white-faced lambs. Body weight was a significant covariate for tail length. The equations using the covariates to adjust body weight at docking and weaning were reliable predictors of tail length, although additional research will be needed to determine whether the parameter estimates derived from the data in this study are useful for other subpopulations of crossbred lambs and other docking procedures.

In contrast to the data from this study, measured tail length in another study increased approximately 0.8 cm between docking (length 3.2 cm) and weaning (length 4.1 cm) and approximately 1.2 cm between docking and market (length 4.5 cm; Goodwin et al., 2007). The ages at weaning and market were not specified and BW data were not provided in that study (Goodwin et al., 2007). Furthermore, in Goodwin et al. (2007), tail length between docking and weaning and between docking and market decreased in 3.4 percent and 17.8 percent of the lambs, respectively, and the authors stated that the caudal folds were lost after docking. In Goodwin et al. (2007), a line was drawn on the ventral side of the tail at the distal end of at least one caudal fold to mark the site of docking. The authors stated that, “If one caudal fold was shorter than the other, the line was drawn on the shorter of the two and the procedure was carried out at this location.” Perhaps this docking procedure resulted in the loss of the caudal folds.

The average actual increase in tail length in the present study was approximately twice that reported previously (Goodwin et al., 2007), and caudal folds were clearly intact at docking and weaning in the present study. Based on Thomas et al. (2003), ensuring that the caudal folds remain intact after docking may reduce fecal contamination of wool and further reduce the chances of fly strike. In addition, tail length at docking in the present study was similar to tail length at market in Goodwin et al. (2007). The United States Sheep Experiment Station tail-docking procedure seems to leave tails somewhat longer than the United States “norm,” assuming tails are docked near the recommended anatomical location, but somewhat shorter than the length recommended in Australia, New Zealand, and the United Kingdom (DEFRA, 2000; Goodwin et al., 2007; MAF, 2005, Thomas et al., 2003; PISC, 2006). Even though the present study and the study of Goodwin et al. (2007) do not seem equivalent, both studies indicate clearly that tail length should be expected to increase after docking.

Conclusions

Tail length consistently increased between docking and weaning. The tail-docking procedure used in this study left the caudal folds intact, which is considered to be beneficial to the well-being of sheep.

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