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BREECH STRIKE CAN BE REDUCED BY INCREASED AREA OF NATURALLY BARE SKIN AROUND THE PERINEUM OF LAMBS

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SUMMARY

Three experiments were conducted to test the hypothesis that increased naturally occurring breech bareness would reduce the incidence of breech strike. Breech bareness was scored from 1 where wool was growing around the edges of the anus (and vulva in females) to five where there was an extensive area bare of wool (50 cm^2 on a 23 kg lamb). There were very few lambs with a bareness score of 5, so for the purposes of these experiments score 4 and 5 were pooled for analysis. The first experiment showed no significant difference between breech bareness scores, although the trend was similar to subsequent experiments. The second ($P<0.05$) and third ($P<0.10$) showed that lambs with breech bareness scores of 4 or greater were much less likely to be flystruck. Females had slightly greater mean breech bareness score than males (2.3 vs 2) but were more susceptible to flystrike ($P<0.05$) in the first experiment. For management reasons, males and females were run in separate mobs in the second and third experiments. Overall, 22%, 16%, 11%, and 0% of lambs were flystruck when they had breech bareness scores of 1, 2, 3 and 4 or greater respectively. Considering the negligible loss of wool, the labour savings, the reduced suffering due to flystrike and the appeal to modern consumers, the trait seems a worthy selection goal.

Keywords: alternative to mulesing, myiasis, flystrike

INTRODUCTION

There is an emerging problem in extensive sheep production, one that can be outlined by a single word: resistance. There is resistance of blowflies to chemical control agents. Resistance to the use of chemicals in food and fibre production is also evident among consumers. The use of surgical methods such as docking and mulesing to reduce flystrike, have met with increasing resistance among animal rights groups.

Much work on body strike in Australia has been reviewed by Colditz and Tellam (2000), but in New Zealand the greatest proportion of flystrike is breech strike (Heath and Bishop 1995). Correct tail docking, mulesing and crutching have long been advocated as successful control agents for breech strike. Mulesing is not practised in the New Zealand crossbred sheep flock but crutching, and the colloquial 'dagging' are used at frequent intervals as prophylactic procedures.

Scobie *et al.* (1997) suggested a genetic solution to this perennial problem, a sheep that has a genetically bare backside and a genetically short tail. Other traits incorporated into this solution, such as a head, legs and belly bare of wool, have subsequently been predicted to reduce production costs (Scobie 2000) and shown to reduce the time taken to shear each animal (Scobie *et al.* 1999).

The ultimate test for the proposed phenotype will be susceptibility to breech strike. The following experiments were designed to test the hypothesis that greater inherent bareness of the perineum would reduce the incidence of flystrike.

MATERIALS AND METHODS

Experimental animals and design.

A total of 972 lambs were weaned and run together in groups of approximately 150 to 200. The lambs were obtained from various flocks from different breeding experiments. The lambs were Perendale (n=209), Finnish Landrace x Romney (n=289), and Finnish Landrace x Dorset Down (n=205), and three composite breeds; one based on intercrosses of Finnish Landrace x Cheviot (n=126), one based on the Wiltshire (n=85) and the other based on a feral sheep x Merino (n=48). In New Zealand, Wiltshires were crossed with Poll Dorsets when they were originally introduced and have since largely become a polled breed. For convenience, the Finnish Landrace will subsequently be referred to as Finn.

The lambs had previously been tail docked and were given regular drenching to control internal parasites, but they were not crutched or treated with ectoparasiticide to improve the chances of observing flystrike during the trial. Ideally the lambs would have been drafted into groups within breeds at random. In practice, this was not possible as the breed groups had different lambing and weaning dates and it was not possible to hold, score or handle all animals at one time. It was also not possible to run all the breed groups together at random. Essentially 3 separate experiments were conducted. In Experiment 1 the Perendale, Finn x Cheviot and some Wiltshire (n=34) lambs were drafted into two mixed-sex groups at random, within breech bareness scores. At around four months of age, before these animals became sexually active, they were recombined and drafted into two groups on the basis of sex (Experiment 2). When the remaining four breeds and the rest of the Wiltshires became available they were drafted into two sexes, and then drafted into two more groups balanced for breech bareness (Experiment 3).

Procedures

Monitoring. The animals were observed on a daily basis for any animal that was showing signs of being flystruck. Each flystruck animal was caught, treated using a commercial flystrike remedy and their identity recorded. The animal was then removed from the mob for further monitoring during the following days to ensure recovery. On many occasions the animal was not physically removed from the mob, but all were marked and 'removed' from the experiment. A small number (n = 4) were struck a second time. These were treated but not considered in the analysis.

Breech bareness scoring. The inherent bareness around the perineum was scored from 1 to 5 on the basis of Figure 1. The average liveweight of the lambs at weaning was 23kg, at which the bare patch of a score of 5 was approximately 50 cm^2.

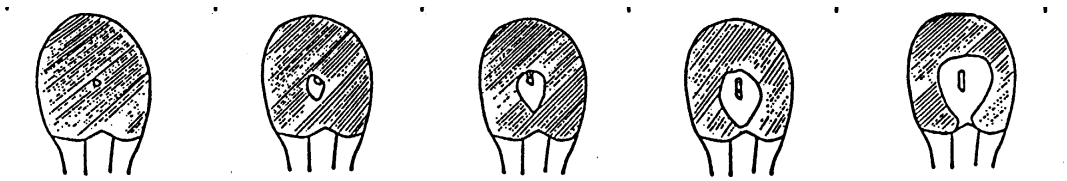

Figure 1. Breech bareness scores of 1 to 5 from left to right.

Statistical analysis

Flystrike is binomially distributed, either the lamb is struck or it isn't. The data were analysed using generalised linear models with binomial error and a logit link function. A chi-square test statistic was used for the comparisons. With the three trial designs described above, a number of restrictions were placed on the analysis with respect to the groupings on the basis of sex. Over all the available lambs there were very few with breech bareness scores of 4 or 5, and most of those were Wiltshires. No Wiltshire lambs were flystruck, which violates the variance assumptions of the analysis, so to analyse the data, the Wiltshires were excluded and the remaining score 4 and 5 animals were pooled as neither group were flystruck and there were so few of them.

RESULTS

During the course of the experiments, 146 lambs were flystruck around the breech (15%). Only a single case of body strike was observed.

With the small numbers of animals struck, there was no significant effect of breech bareness or breed on the incidence of flystrike in Experiment 1 (Table 1). Sex of the lambs affected the chance of being flystruck in Experiment 1 ($P<0.01$). Ewe lambs were more likely to be struck (18) than ram lambs (2). Although one ram lamb was struck in each mob, 13 ewe lambs were struck in one and only 5 in the other. This difference between mobs is commonly observed, and can be a result of topography, shelter, internal parasitism and more.

Breech bareness had a significant effect on flystrike ($P<0.05$) in Experiment 2 if the groupings on the basis of sex were ignored in the analysis. The sex difference became confounded with mob when the lambs from Experiment 1 were reallocated according to sex. The difference between male and females

(32 versus 5) could thus have been an effect of mob, location etc. or perhaps as the lambs became older the males were more susceptible.

Table 1. Number of lambs struck and total number of lambs in two mixed sex mobs in Experiment 1. Data have been pooled so that only the significant main effects are shown.

	Females	Breech bareness score				Males	Breech bareness score				Total
		1	2	3	4 & 5		1	2	3	4 & 5	
Struck Mob 1	13	1	10	2		1	1				14
Struck Mob 2	5		5			1		1			6
Total	189	11	138	40		146	45	72	27	2	335

Table 2. Number of lambs struck and total number of lambs in single sex mobs in Experiment 2. Data have been pooled so that only the main effects are shown.

	Females	Breech bareness score				Males	Breech bareness score				Total
		1	2	3	4 & 5		1	2	3	4 & 5	
Struck	14	1	12	1		32	11	17	4		46
Total	172	10	124	38		144	44	71	27	2	316

In the third experiment, breech bareness had a significant effect on flystrike ($P< 0.10$). As in the first experiment, females were more likely to be struck than males (16% versus 11%). On this occasion there was good agreement between mobs of the same sex, but as with Experiment 2 the groupings confound this result.

Table 3. Number of lambs struck and total number of lambs in four mobs, two of each sex in Experiment 3. Data have been pooled so that only the significant main effects are shown.

Breed		Breech bareness Score				Total
		1	2	3	4 & 5	
Finn x Dorset Down	Struck		9	3		12
	Total	8	138	55	4	205
Finn x Romney	Struck	13	39	9		61
	Total	55	196	38		289
Feral x Merino	Struck	1	4	1		6
	Total	8	25	13	2	48
Wiltshire	Struck					
	Total		1	3	47	51

DISCUSSION

In Experiment 2, the hypothesis that a greater inherent bareness of the breech would reduce the incidence of flystrike was supported at the 5% level of significance, in Experiment 3 at the 10% level, and while it was unsupported in Experiment 1 a similar trend was evident. Over all the lambs in the three experiments, the proportion flystruck decreased from 22% for breech bareness score 1 to 16% and 11% for score 2 and 3 respectively. In addition to the lambs used in these experiments, 52 lambs were flystruck prior to weaning, thus excluding themselves from the experiments and reducing the number of animals available. Of these, 45 were Finn x Romney, and such is the effect of flystrike, that it was not possible to obtain a breech bareness score for four of them. Of the remainder, 9, 38 and 1 had breech bareness scores of 1, 2 and 3 respectively, thus adding weight to the argument. On no occasion, in any mob, was a lamb with a breech bareness score of 4 or 5 flystruck.

The findings suggest that animals with relatively large bare areas of skin around the breech are less susceptible to flystrike. Breeding sheep with bare areas of skin is more likely to be acceptable to consumers than surgical mulesing.

The results for the sex difference were equivocal. Only Experiment 1 was designed to show a sex difference with males less susceptible. This appeared to be challenged by Experiment 2 and supported by Experiment 3. It is tempting to speculate that immediately following weaning under New Zealand conditions, ewe lambs are more susceptible due to urine stains, but later in the season ram lambs tended to become daggier similar to the results of Scobie *et al.* (1999) and Scobie unpublished. Perhaps this is a consequence of the slightly greater breech bareness of females (2.3 versus 2) since the vulva tends to increase the area bare of wool. It is recommended that further unconfounded experiments should be conducted on lambs destined for slaughter so the sexes can be run together, unlike those from breeding experiments used here.

Rathie *et al.* (1994) showed that Wiltshire Horn x Merino ewes were less susceptible to flystrike than Merinos. Likewise, Litherland *et al.* (1992) found Wiltshire lambs less susceptible under New Zealand conditions than traditional breeds, but 10% of their Wiltshires were struck. Although excluded from the statistical analysis here, Wiltshire lambs were not at all susceptible in the present experiments. Indeed one third of the Wiltshire lambs reported here had undergone a shedding event and were thus "self-crutched" beyond their breech bareness score. Also in contrast to our data, feral lambs (0%) were unlikely to be struck in comparison with Merino (33%) and Romney lambs (10%) in the experiment of Litherland *et al.* (1992). Our feral composites were genetically similar to their "feral" lambs, which they described as "at least half bred Hokonui Merino", yet ours were more susceptible (12%), and the current experiment was much shorter in duration than the earlier work.

There was an effect of breed on flystrike in Experiment 3. Since the least affected breed was the Wiltshire (0%), second the Finn x Dorset Down (6%) while 21% of the Finn x Romney were struck, it was considered that the length of wool around the breech might influence flystrike. Space does not allow the data to be presented here, but in summary the mean length of wool around the backside at weaning was 69 mm for the Finn Romney, 50 mm for Finn x Dorset Down, 38 mm for the Merino and 29 mm for the Wiltshire, (10 Wiltshire lambs had insufficient wool to measure as a result of shedding rather than bareness). These differences would probably have become exacerbated during the experiments but it was not possible to reliably measure the length of wool on flystruck animals following treatment, so wool length was not measured at the end of the experiments. The length of wool at weaning was no greater in those that were struck during the experiments than those that were not struck. Wiltshires aside, the lambs used in Experiments 1 & 2 had similar wool types (Perendales versus Finn x Cheviots), which may explain the lack of a significant breed difference.

The highly crimped wool of the Dorset Down tends to produce an erect staple, while the wool of the Finn x Romney is predisposed to hang down, which when hanging over the anus is very prone to becoming covered with dags. The Merino on the other hand has a dense fine fleece around the breech thought to be more attractive to flies, perhaps leading to the 12% of strike recorded in this group of lambs. The results for dag scores in the current experiments will be reported elsewhere, suffice it to say similar conclusions that increased dagginess increases the risk of flystrike have been reached by others (Watts and Marchant 1977; Watts *et al.* 1979; French *et al.* 1996). Our thesis is that wool around the anus is the root cause of the problem as it predisposes the animal to the formation of dags which exacerbate flystrike and it is not the dags *per se* as animals without any dags can be flystruck. Considering the negligible loss of wool, the labour savings, the reduced suffering due to flystrike and the appeal to modern consumers, the trait seems a worthy selection goal.

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