A pilot evaluation of shedding sheep breeds compared with non-shedding breeds for susceptibility to nematodes and flystrike

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ABSTRACT

Thirty ewe lambs each of Merino, Romney, feral (of Merino origin) and Wiltshire breeds were evaluated for dag score, flystrike and nematode resistance. The lambs were born in August 1990 with the feral lambs around one month younger. The lambs were transported to Flock House and shorn and grazed together from the 21 January 1991 until 1 June 1991.

There was no difference in the geometric mean of faecal egg counts between the different breeds ($p=0.11$). Lambs were fly struck from February to May with 33%, 10%, 10% of Merinos, Romneys and Wiltshires being attacked. No feral lambs were fly struck. Most flystrike was caused by the Australian green blowfly (Lucila cuprina).

The Wiltshire breed had the lowest dag score while the feral sheep had a dag score consistently lower than the Romney and Merino breeds ($p<0.001$). The wet weight of dag clipped at the end of the experiment was 4 ± 15, 4 ± 16, 30 ± 18, 122 ± 16 g for feral, Wiltshire, Merino and Romney respectively. The dry weight percentage of dags was higher in the feral and Merino ($79 \pm 3\%$, $76 \pm 3\%$ respectively) than in the Wiltshire ($69 \pm 3\%$) or the Romney ($61 \pm 2\%$) ($p<0.001$).

Keywords Feral, Wiltshire, Merino, Romney, flystrike, nematode, dags.

INTRODUCTION

Resistance by nematode parasites to anthelmintic drenches (West *et al.*, 1989), and blowflies to insecticidal dips (J. Wilson pers. comm.) is firmly established in New Zealand. With the increasing demand for chemical-free meat and other products and the decrease in chemical efficacy, it is becoming increasingly important to identify sheep lines and breeds which possess the ability to resist or tolerate flystrike and nematode parasites. Identification of such sheep facilitates studies on host resistance mechanisms and may permit the incorporation of such genes into the New Zealand sheep flock.

It is possible that New Zealand feral sheep which have been naturally selected for survival traits for more than 40 years will have some flystrike and nematode resistance. Another breed of sheep in which low flystrike susceptability due to fleece shedding has been reported is the Wiltshire Horn (Tierney 1978, 1980). These two breeds were compared with Romney and Merino sheep for flystrike and nematode resistance.

METHODS

Thirty ewe lambs from each of four breeds of sheep were transported to Flock House Agricultural Centre and grazed together and evaluated from 21 January until June 1991. The Romneys were sourced from the Flock House Agricultural Centre breeding flock, Merinos from the Wanganui Hill Research Station breeding flock, Wiltshires from John Morrison's property in Marton, and feral sheep (at least half bred Hokonui Merino) from the Whatawhata Hill Country Research Station.

The lambs were born in August with the exception of the feral lambs which had been born a month later. The lambs had not been dipped for eight weeks before the start of the experiment. At the start of the experiment the lambs were shorn, faecal sampled, drenched with Ivomec and weighed. The lambs were then weighed and scored for dags (1=no dags, 5=extremely daggy) monthly. At the end of the experiment, wet dags were removed and dried.

The lambs were rotationally grazed together on pastures previously grazed by cattle. Five lambs from each breed were faecal sampled at randon at two weekly intervals. If the faecal egg counts (FEC) from one or more breed groups exceeded 1000 eggs per gram (epg), all lambs were faecal sampled and drenched with Ivomec. The FEC data were log transformed and analysed using generalised linear models. The data were then back transformed giving geometric means.

The lambs were checked every three days for the presence of flystrike. On identification of strike, the area affected was sketched on an elevated plan of a sheep (MAFTechnology, Wallaceville Flystrike sample submission protocol) and then the percentage strike area was calculated and analysed. Maggot samples were collected for identification of fly species and the strike was then treated topically with 70% alcohol and flystrike dressing powder.

RESULTS AND DISCUSSION

Liveweight and Survival

At the start of the experiment the sheep differed in liveweight ($p<0.001$). The mean liveweights were 19, 21, 25 and 34 kg for the feral, Merino, Romney and Wiltshire sheep respectively. During the experimental period the sheep gained 10, 7, 14 and 10 kg for feral, Merino, Romney and Wiltshire sheep respectively. No conclusions can be drawn from the weight gains of these animals due the large differences in liveweight at the beginning of the experiment.

One feral and five Merino lambs died during the experiment. Four of the Merino lambs died in very poor condition. One Merino and one feral lamb died of pneumonia. All of the Merino lambs which died had been previously struck by fly.

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Flystrike

The flystrike rate was 0.33, 0.10 and 0.10 in Merinos, Romneys and Wiltshires respectively during the experimental period (maximal binomial confidence interval 0.18). No feral lambs were struck.

Analysis of the area struck conducted on the three breeds exhibiting flystrike failed demonstrate significant breed differences (p=0.12). Merinos were struck from 1 February to 29 April while the first case of flystrike following shearing did not occur in Romney lambs until 21 March. All recorded fly strike up to 29 April occurred on the crutch in either Merinos or Romneys. All animals which were struck on the crutch had dag scores of 3 or above. However only 35% of the Romney and Merino sheep with dag scores of 3 or greater were struck. During May all strike occurred on the back and sides of the sheep. Wiltshire sheep were affected at the end of the fly strike season in early May and in all cases occurred on the back and were associated with dermatophilosis in the wool. Dermatophilosis is a common predisposing condition for flystrike in Australia (Raadsma and Rogan, 1987). The Australian green blowfly (*Lucilia cuprina*) was isolated from all but two cases of strike. The other major fly isolated was the common green blowfly (*Lucilia sericata*). In over half the cases of strike, both species could be found. Both species were associated with flystrike from February to May but there was no interaction between breed of sheep and fly species.

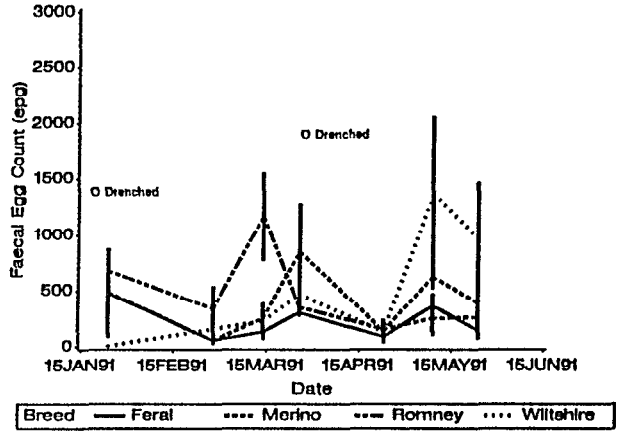
The feral sheep showed a low susceptability to flystrike and additional studies with larger numbers of sheep are warranted. The short wool and hence different fleece structure associated with summer moulting in the feral and Wiltshire sheep (Slee, 1959) may present an environment not conducive to strike, or flies may not be initially attracted to feral sheep in the presence of other sheep. The lack of dags on feral and Wiltshire sheep may reduce the attractiveness of the sheep to flys. Feral sheep have low production levels (Bigham and Cockren, 1984) which limit their usefulness as a commercial sheep breed. Low production may be compensated for to some extent by heterosis in the crossbred. The use of the feral sheep as a terminal sire for low-chemical lamb production may have some merit. Wiltshire sheep are known to be less susceptible to flystrike in Australia (Tierney, 1980) and, providing dermatophilosis is controlled, this could be the case in New Zealand Wiltshire lambs. The Wiltshire sheep had the advantage of being a highly productive meat producer in its own right and could be used as a terminal sire.

Gastrointestinal nematodes

Following the use of grazing management techniques to minimise nematode infections in undrenched lambs, FECs remained low throughout the experiment (Figure 1). Drenching therefore was carried out only at the start of the experiment and on 26 March 1991. At these times faecal samples were collected from all lambs. There were differences at the start of the experiment before the initial drench with the Wiltshires having virtually no eggs in their faeces while the Romneys had the highest at 678 epg. However, these differences may reflect the varying management of these lambs before the experiment began rather than any breed differences.

Despite the smaller size and younger age of the feral lambs, they tended to have consistently lower absolute FECs throughout the monitoring period (Figure 1). However, conversion to geometric means, which corrects for non normal ranges, in the major sampling ranked Romneys as having the lowest FEC. Geometric means of FEC with actual ranges were 203 (50-750), 131 (0-2500), 325 (50-1250) and 238 (0-10000) epg for feral, Romney, Wiltshire and Merino lambs respectively (p=0.11).

FIGURE 1 Arithmetic mean and standard error bars of FEC's in four breeds of sheep.



This experiment supports research which cites large variation between individuals (Piper *et al.*, 1978; Preston, 1978) within breed groups. There was no conclusive evidence from this experiment to indicate that feral sheep were more resistant to nematodes than traditional breeds. The nematode challenge however was low and limited data were collected.

Dags

The Wiltshire breed had the lowest dag score over the treatment period (Table 1) while the feral sheep had a dag score consistently lower than the Romney and Merino breeds ($p<0.001$). The Wiltshire and feral lambs had very low dag weights. Merinos and, in particular, Romneys had much higher dag weights (Table 1). The dags of the Merino and the feral sheep were 9% higher in dry weight than Wiltshires and 17% higher than the Romneys (Table 1). In this study the breeds with low dag levels also had a low prevalence of flystrike. The percentage dry weight of dags did not appear to be associated with flystrike though this was only measured at the end of the experiment after flystrike had been exhibited. It is thought that nematode infection predisposes animals to the formation of dags (Morley *et al.*, 1976). In this study however the presence of dags bore no relationship to nematode levels.

TABLE 1 Mean and standard error of weight of dag and dry matter percentage of dags in four breeds of sheep.

Sheep Breeds	Dag Score	Wet weight of dags (grams)	Percentage dry weight of dags (%)
Feral	1.14 ± 0.09^{b}	4 ± 15^{a}	79 ± 3^{c}
Merino	1.5 ± 0.1^{a}	30 ± 18^{b}	76 ± 3^{bc}
Romney	1.6 ± 0.09^{a}	122 ± 16^{c}	61 ± 2^{a}
Wiltshire	0.86 ± 0.09^{c}	4 ± 16^{a}	69 ± 3^{b}

Values with different superscripts within a column differ ($p<0.001$)

CONCLUSIONS

The feral sheep evaluated in this experiment may contain genes which are associated with low flystrike susceptability. Further data are required to determine the nematode resistance of feral sheep. Provided they are treated for dermatophilis, Wiltshire sheep may be resistant to flystrike. Both feral and Wiltshire sheep had low dag levels and no incidence of crutch fly strike.

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