THE EFFECT OF TIME OF SHEARING ON PLASMA GAMMA GLUTAMYLTRANSFERASE LEVELS AFTER A FACIAL ECZEMA OUTBREAK

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SUMMARY

Gamma glutamyltransferase (GGT) level in the blood was monitored as a criterion of liver damage due to sporidesmin toxicity (facial eczema). The sheep monitored were shorn at different times. Fewer sheep, shorn 20 to 30 days prior to a period when sporidesmin spore counts were high, had abnormally high plasma GGT levels than was the case for sheep shorn after grazing dangerous pasture. Shearing shortly after the danger period appeared to be associated with a more rapid recovery from liver damage.

INTRODUCTION

Blood gamma glutamyltransferase (GGT) levels have been shown to increase after both experimental sporidesmin poisoning and natural facial eczema (FE) in proportion to the visually apparent liver damage. Measurement of this enzyme, which leaks from the damaged liver into the blood, can be used to both determine the incidence of and assess the severity of FE-induced liver damage (Towers and Stratton, 1978). Levels were monitored to assess the effectiveness of control measures on a FE-prone farm at the same time as a trial to test the effects of shearing time on lambing spread was in progress. Hence observations were made on the GGT levels of sheep shorn at different times.

METHODS

Eighty ewes from each of two groups being shorn pre-mating (day 68; S68) and mid-mating (day 104; S104) were bled at approximately monthly intervals. A third group (S120) was shorn on day 120 and was not initially sampled. Grass samples were collected from an indicator paddock with a record of high spore counts, when grass minimum temperatures and rainfall figures suggested there might be a risk of sporidesmin toxicity.

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Sporidesmin spore numbers were measured using a wash count method. Measures were normally taken to protect stock when spore counts exceeded 150 000 spores/g of herbage. Plasma GGT levels were measured as described by Towers and Stratton (1978).

RESULTS AND DISCUSSION

During the trial period high spore counts were recorded on two occasions. During the first period, February 26 to March 3 (days 57-62), spore counts ranged from 45 000 to 195 000 and the animals were moved to pasture previously sprayed with fungicide. At the next bleeding (day 72) only a small proportion of the animals had elevated plasma GGT levels (Table 1) and the increases in GGT activities recorded were generally low.

TABLE 1: EFFECT OF SHEARING TIME ON PERCENTAGE OF EWES WITH ABNORMALLY HIGH PLASMA GGT LEVELS

	44	*72*	*103*	*124*	*145*	*171*
S68	0	3	25	38	61	31
S104	0	11	64**	71**	75**	28
S120					81**	82**

** Significantly greater ($P < 0.01$) than group S68.

Between March 29 and April 11 (days 88–102), spore numbers ranged from 10 000 to 130 000. The farmer did not use his sprayed pasture but shifted his sheep to more elevated and "exposed" paddocks where spore numbers were thought likely to be lower than those found in the indicator paddock.

Plasma taken at the end of this period (day 103) of high spore counts and again 3 weeks later (day 124) showed an increasing proportion of the flock to have abnormally high plasma GGT levels, indicating a very widespread outbreak of subclinical FE. Surprisingly, a preliminary analysis showed that the proportion of affected animals in the group shorn early was significantly less than that for the animals shorn mid-mating despite the fact that, apart from one night in the woolshed prior to shearing, all ewes were grazed as one mob (Table 1).

Arrangements were then made to collect blood from a further and larger sample of 110 additional ewes from both the pre- and mid-mating shorn groups (S68 and S104) and also from the late (post-mating) group. While the proportion of affected animals rose from 38 to 61% in the early shorn group as the effects of exposure to toxic pasture became evident, at this next bleeding

(day 145) the proportion of affected animals shorn mid-mating (S104) was significantly greater than for group S68, while that in the late shorn group (S120) was even greater still (Table 1).

In contrast to the groups shorn earlier, the proportion of animals with elevated GGT levels in the late shorn group (S120) remained high in the 171 day sample. Plasma GGT levels remain high while an active process of cell damage and death continues after liver damage, dropping back to normal levels as this process ceases and tissue regeneration occurs. Thus the delayed fall in the proportion of animals with abnormal GGT levels observed in group S120 can be interpreted as indicating the recovery of animals has been delayed.

It would appear that shearing early, prior to mating, and incidentally prior to exposure to toxic pastures, reduced the number of animals suffering liver damage in comparison to shearing mid- or post-mating. Shearing late was not only associated with the greatest incidence of liver damage but also appeared to delay the recovery of the animals.

It is difficult to explain this effect of shearing. Did the recently shorn ewes graze the more exposed and cooler faces where spore counts are expected to be lower? Perhaps a post-shearing increase in metabolic rate increased the rate at which sporidesmin was metabolized or excreted, effectively reducing exposure to the toxin. On the other hand, the post-shearing increase in appetite might be expected to increase spore and therefore toxin intake. Interpretation of these data is made even more difficult by the fact that the spore counts recorded are for an indicator paddock, not for the grazed area, leaving uncertainty as to what spore challenge the ewes actually received, and when. It is even more difficult to suggest a reason for the apparent delay in recovery associated with late shearing that is compatible with the apparent protection offered by early shearing.

These data also show the danger in relying on spore counts of an indicator paddock without checking the pasture being grazed, and the need to take action at considerably lower spore counts than the trigger level of 150 000 spores per gram used on this farm.

REFERENCE

Towers, N. R.; Stratton, G. C., 1978. *N.Z. vet. J., 26*: 109.