PHALARIS WINDBREAKS FOR SHORN AND FLEECED LAMBING EWES

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Summary

Shelter belts of a tall, reputedly unpalatable Phalaris hybrid, established at 20 m intervals in small paddocks, were extensively used by freshly shorn ewes prior to, during and after lambing, in the winter of the New England tablelands. Fully fleeced ewes also made some use of the shelter. During a period of inclement weather, survival of lambs born in the sheltered paddocks was superior to that of lambs born in unsheltered paddocks and survival of lambs from shorn ewes was superior to that of lambs from fleeced ewes.

I. INTRODUCTION

The exposure of domestic livestock to inclement weather can result in severe mortality, particularly amongst lambs and newly shorn adult sheep (Alexander, Peterson and Watson 1959; Obst and Day 1968; Geytenbeek 1962; Hutchinson 1968). While the beneficial effect, on lamb survival, of confining lambing sheep to shelter has been reported by Watson et al. (1968) and Egan et al. (1972) the husbandry systems involved require a labour input which may not be acceptable to producers; husbandry systems based on voluntary use of shelters by sheep are likely to be more acceptable.

This paper deals with an experiment in which sterile Phalaris hybrid, reputed to be unpalatable in the mature stage, was planted in strips, in an established pasture, to provide shelter for shorn and fleeced lambing Merino ewes.

II. METHODS

The experiment was conducted in a flat treeless area, at Armidale, N.S.W. in winter 1974. Sheep were studied in eight adjacent small paddocks, each of 50 m x 80 m, containing a long-established pasture of Phalaris (P. tuberosa) and white clover (Trifolium repens). Four of the paddocks were planted one year earlier with shelter strips, 0.6 m wide, of a sterile Phalaris hybrid (P. tuberosa x P. arundinaceae), at right angles to the prevailing westerly winds and 20 m apart. At the time of the experiment, the shelter strips were mostly 1¼ to 1½ m high, and the pasture 10-15 cm high.

Pregnant ewes of known mating date were divided at random into two groups. Ewes of one group were shorn four to six days before their due lambing dates. The other ewes remained in full wool with the fleece 6 cm long. There were two paddocks each of shorn sheltered and shorn unsheltered ewes, and of fleeced sheltered and unsheltered ewes. The ewes entered their experimental paddocks one to four days before each was due to lamb and there were 10-20 ewes in each paddock at any one time. Each ewe was branded on the side with a large number. Ewes and their lambs remained in the experimental paddocks for at least 24 h, and occasionally

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for up to three days, after lambing, after which they were removed to an unsheltered lucerne pasture. Paddocks were illuminated at night.

The positions of ewes and lambs in the paddocks were plotted hourly with the aid of a grid system (Fig. 1). Approximately 1.5 h after birth each lamb was numbered and its rectal temperature, vigour and weight were recorded together with a note on behaviour of the ewe.

Wind run, wind direction, temperatures in a standard Stevenson screen, rainfall and cloud cover were recorded hourly.

"Causes", or more strictly categories, of lamb deaths were assessed from autopsy, from observations on the birth process, from the weather and the various observations on the lamb and its mother.

III. RESULTS

(a) Weather

Seven of the 14 days were largely sunny and clear, and on seven of the nights screen temperatures fell below 0°C. There were periods of many hours with winds of 10-30 km h^{-1} particularly from the W or SW, and rain, though light, fell on five days. Run of wind per hour 45 cm above the ground in the sheltered paddocks was 5% to 65% of that in the unsheltered paddocks, depending on proximity to the shelters.

(b) Effect of sheep on the Phalaris strips

The Phalaris strips were exposed to sheep for a total of 18 days, stocking rates in the paddocks ranging from 25-50 sheep per ha. Initially the sheep broke down passage-ways but thereafter there was little damage to the strips.

(c) Position of ewes in relation to shelter strips

Fifty-eight percent of shorn ewes and 40% of fleeced ewes lambed within two metres of the shelters (i.e. within 20% of the available area); ewes that had not lambed and ewes with lambs also concentrated close to the shelters in similar proportions to those of lambing positions (Fig. 1). Shorn ewes, but not fleeced ewes, made more use of the shelters at night than during daylight.

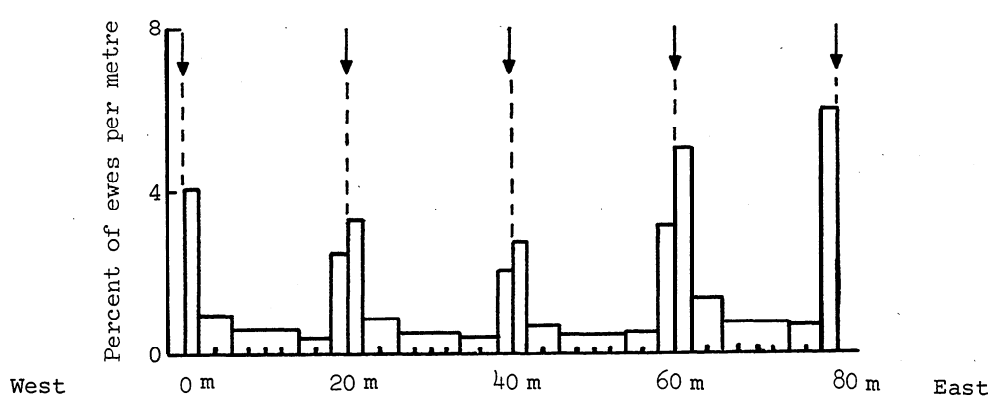

Fig. 1. The mean concentration (% per m) of shorn ewes in the various grid strips across the sheltered paddocks: replicates and data before, during and after lambing pooled. Arrows indicate position of shelters.

(d) Lamb mortality

During the 14 days 12.0% (25/209) of the single lambs and 23.3% (7/30) of the twins died within three days of birth. In the five twin pairs in which the first and second born were positively identified, all of the dead lambs were second born twins ($P < 0.004$).

The major factors associated with death were assessed as cold exposure (13 lambs) and poor condition at birth (15 lambs) as judged by a depressed rectal temperature at approx. 1½ h after birth. Frequently these two factors were inextricably associated in the same lamb.

(e) Effect of shelter and shearing on mortality

During the experiment, mortality of single lambs was only slightly higher in the unsheltered lambs (14/101 or 13.9%) than in the sheltered lambs (11/108 or 10.2%), but when the comparison is restricted to a 4½ day interval that spanned the only periods of significant rainfall and sustained high wind speeds, 10 of 30 unsheltered single lambs died, seven attributable largely to cold exposure; this compares with only one death in 41 lambs in the sheltered group ($P < 0.01$). There were too few twins for a useful comparison. In the unsheltered lambs during the same period, three of 30 singles and two of four twins had severely depressed rectal temperatures (< 36.5%) at about 1½ h after birth, compared with none of 41 singles and none of two twins from the sheltered ewes. Over the whole experiment the respective proportions of unsheltered and sheltered lambs with low temperatures were 10/114 and 3/119 ($P < 0.05$).

Mortality of single lambs also tended to be higher in lambs from fleeced ewes (18/115, 15.7%) than in lambs from shorn ewes (7/94, 7.4%) ($Chi^2 = 3.31$, $0.1 > P > 0.05$); the mortality was proportionately higher in each of the 4 fleeced groups (4 or 5 per group of 27-30) than in any of the shorn groups (1, 2 or 3 per group of 20-26). Four single lambs from the 115 fleeced ewes died during birth but no single lamb from the 94 shorn ewes died at this stage.

The proportion of lambs with depressed rectal temperatures 1½ h after birth was similar in the shorn and fleeced groups (6/108 v 7/125). When the lambs were handled 1½ h after birth 34 of 120 fleeced ewes were recorded as having "run off" compared with only 11 of 104 shorn ewes ($P \simeq 0.001$).

(f) Subsequent growth rate of lambs

The effect of shearing and shelter on the growth rate of lambs to 21 days was examined by analysis of variance. The mean growth rates of lambs from the shorn and the fleeced ewes were similar (187 ± 4.6 versus 189 ± 3.6 g/day), but the mean for lambs from the sheltered paddocks was significantly above that for the unsheltered lambs (194 ± 3.8 versus 182 ± 4.2 g/day^{-1}; $P < 0.05$).

IV. DISCUSSION

Mortality of single lambs during the study was only 12%, which is low by comparison with losses that may be encountered during inclement weather (Alexander et al. 1959; Obst and Day 1968). Nevertheless, trends that could be of considerable biological significance were apparent.

During the period of inclement weather, losses in the sheltered paddocks were much lower than in the unsheltered paddocks. Shelter also appears to provide lambs with a growth advantage; superior growth rates

in lambs sheltered for the first few days of life when compared with unsheltered lambs have been observed previously (164 versus 148 g/day^{-1}) (Alexander, unpublished data from study of Alexander and Peterson 1961).

The results also indicate that the chances of survival of lambs are improved by shearing ewes a week or so before lambing, which conforms with claims made in New Zealand (Coop and Drake 1949). Some of the benefit may be due to the shorn ewes using, and therefore lambing in areas of maximum shelter, and some benefit may be due to a reduction in the difficulty of birth. The results also indicate that shearing may in some way quieten ewes, perhaps by increasing their field of vision, and hence decreasing maternal unease.

While few twins were born, the results indicate that second born twins may be more prone to die than first born twins; the same trend has been observed previously in a Corriedale flock (Alexander and others, unpublished data).

Elucidation of effects of shearing and Phalaris shelters on lamb mortality and associated phenomena requires continued study for several lambing seasons, but strips of hybrid Phalaris have proved to be effective durable windbreaks, which could be incorporated into pastures to provide protection for lambs and newly shorn sheep without interfering with grazing.

V. ACKNOWLEDGEMENTS

This work could not have been done without the assistance of' Ms K. Keniry and S. Hunt, and Messrs B. Mottershead, R. Elwin, G. Green, R. Edols and A. Marjoram.

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