The effect of shearing by cover comb or blades on the resistance of sheep to cold, windy and wet conditions

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ABSTRACT

Four pairs (total 8 sheep) of Romney mixed-age ewes were housed indoors and fed chaffed lucerne hay at a level equivalent to 1.2 times maintenance. Oxygen consumption was measured in two open circuit calorimeter chambers on days -3, -2, 0, 2, 6 and 10 with day 0 being day of shearing. On each measurement day, oxygen consumption was measured under two sets of climatic conditions (cold plus wind, followed by cold plus wind plus rain). Differences in live weight, fleece weight and liveweight gain of the ewes were not statistically significant. The difference in the rate of oxygen consumption (litres/kg$^{0.75}$/hour) between cover comb and blade shorn-sheep was not significant during the cold+wind conditions. However, when 'rain' was added to the weather treatment, the oxygen consumption of cover comb-shorn ewes was significantly ($P<0.05$) greater than that of their blade-shorn counterparts on the day of shearing and days 6 and 10 post-shearing. Blade shearing left almost twice the fleece stubble of a cover comb (11 vs. 5 mm), however this difference was not significant. The results show that shearing with blades provided slightly greater resistance to cold and wet conditions than did the cover comb.

Keywords: sheep; cover comb; blade shearing; weather; oxygen consumption.

INTRODUCTION

Approximately 5% of the sheep in the South Island, mainly fine wool, are shorn by blades each year. In comparison to other methods of fleece removal the blades leave the greatest length of stubble and this may provide the sheep with better protection against inclement weather conditions, although this possible superiority has not been measured. However, the use of a cover comb reduces shearing costs (ca. 5c/sheep) and doubles the rate of shearing in comparison to blade shearing.

Previous studies have shown that the cover comb provides sheep with significantly more insulation and protection against unfavourable weather post-shearing than the conventional comb (Holmes *et al.* 1992; Dabiri *et al.* 1995a; Dabiri *et al.* 1995b). These experiments may have contributed to a belief amongst some farmers that the cover comb offers weather protection similar to that of blade shearing. The present experiment was designed to test this perception by measuring the body insulation of blade-shorn sheep exposed to cold conditions compared to those sheep shorn with a cover comb.

MATERIALS AND METHODS

Four pairs (total 8 sheep) of Romney mixed-age ewes were used in the experiment. They were kept in pens at the Animal Physiology Unit, Massey University, for two weeks prior to the measurements of oxygen consumption, and were individually fed on chaffed lucerne hay, at a level equivalent to 1.2 times maintenance calculated from live weight. Two treatments were imposed with sheep being shorn either with a cover comb or by blades, by a Wools of New Zealand shearing instructor. The sheep were studied sequentially in pairs (one cover comb and one blades shorn sheep in each pair).

Oxygen consumption was measured in two open circuit calorimeter chambers on days -3, -2, 0, 2, 6 and 10 relative to shearing. On these days oxygen consumption was measured during the last two hours of exposure to climatic conditions of 'cold plus wind' (from 1600h to 1000h), followed by 'cold plus wind plus rain' (from 1000h to 1500h). Measurements were made while climatic conditions were held at a steady state with ambient temperature at 7°C and 10°C for the 'cold plus wind' and 'cold plus wind plus rain' conditions, respectively. The rate of air movement was held at 7 km/hour and the flow rate of water at 30 litres/hour (equivalent to a rainfall of 25 mm/h) as described by Dabiri *et al.* (1995a). The period of exposure to the different 'climates' provided sufficient time for oxygen consumption by the sheep to stabilise to the new weather conditions.

Fleece depth was measured on days -2, 0, and 10, relative to shearing, immediately prior to the animals being put in the chambers, using a standard ruler. Ten sites were measured on the back and on the midside of each animal. Live weight was measured immediately prior-to and after shearing on days 0 and 10. The difference between pre- and post-shearing live weight on day 0 was used to determine the weight of the fleece removed from the ewes.

The data were subjected to repeated measures analysis to determine the effects of shearing method on oxygen consumption measured under the two environmental conditions ('cold plus wind' and 'cold plus wind plus wet').

RESULTS

Live weights, fleece weight, liveweight gain and fleece depths of the ewes are shown in Table 1. There were no

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significant between treatment differences for these parameters. Blade shearing left almost twice the fleece stubble of a cover comb (P>0.05) and this difference was essentially maintained through to 10 days after shearing.

The rate of oxygen consumption (litres/kg$^{0.75}$/hour) for cover comb- and blade-shorn sheep when exposed to 'cold+wind' conditions are shown in Table 2. Differences between cover comb- and blade shorn-sheep were not significant (P>0.05) at any stage of the experiment when 'cold+wind' conditions were applied, although significance was approached (P<0.08) on day 6 post-shearing. When 'rain' was added to the weather treatment, the oxygen consumption of cover comb-shorn ewes was significantly (P<0.05) greater than that of their blade-shorn counterparts on the day of shearing, and on days 6 and 10 post-shearing (Table 3).

TABLE 1: Live weight (kg), liveweight change (g/d), fleece weight (kg) and fleece depth (mm) of the cover comb and blade shorn- sheep.

	Cover comb	Blade	Standard Error of Mean	Level of significance
Live weight				
Day -2 Pre-shearing	51.0	54.4	2.6	NS
Day 0 Post-shearing	45.4	49.6	2.4	NS
Day 10 Post-shearing	45.8	49.2	2.1	NS
Liveweight change	33	-38	110	NS
Fleece weight	5.55	4.80	0.61	NS
Fleece Depth				
Day -2 Pre-shearing	142	142	4	NS
Day 0 Shearing	5	11	4	NS
Day 10 Post-shearing	10	16	4	NS

TABLE 2: Oxygen consumption (litres/ kg$^{0.75}$/hour) of cover comb- and blade shorn-sheep subjected to simulated climates of 'cold+ wind'.

Climate	Cover comb	Blade	Standard Error of Mean	Level of significance
Cold + Wind				
Day -3 Pre-shearing	0.58	0.61	0.07	NS
Day -2	0.60	0.67	0.07	NS
Day 0 Post-shearing	1.22	1.14	0.06	NS
Day 2	1.24	1.16	0.07	NS
Day 6	1.05	0.83	0.07	0.08
Day 10	1.00	1.01	0.07	NS

TABLE 3: Oxygen consumption (litres/ kg$^{0.75}$/hour) of cover comb - and blade shorn-sheep subjected to simulated climates of 'cold+wind+ rain'.

Climate	Cover comb	Blade	Standard Error of Mean	Level of significance
Cold + Wind + Rain				
Day -3 Pre-shearing	0.68	0.60	0.06	NS
Day -2	0.69	0.64	0.06	NS
Day 0 Post-shearing	1.47	1.28	0.05	0.02
Day 2	1.32	1.34	0.06	NS
Day 6	1.29	1.06	0.06	0.04
Day 10	1.25	1.03	0.06	0.05

DISCUSSION

Under conditions of 'cold plus wind', that correspond to a cool, but fine, winter-early spring day in the lower North Island, there were no differences in oxygen consumption and therefore in insulation between the cover comb- and blade shorn-sheep. However, after rain was added to the weather conditions, the superior protection afforded by the greater fleece depth of blade-shorn sheep was evident immediately after shearing and this continued through to 10 days after fleece removal. A significant effect of rain on oxygen consumption was also recorded by Dabiri *et al.* (1995b) in their comparison of standard- versus cover-comb shearing. The effects of shearing with a cover comb compared to blades under the 'cold+wind+rain' were apparent up to 10 days after shearing, as observed by Holmes *et al.* (1992) in their standard- vs. cover-comb calorimetry study.

From a practical point-of-view, the results from this experiment indicate that blade shearing would probably have advantages in terms of sheep survival where fleece removal coincided with a high risk of cold, wet and windy conditions, such as in the South Island high country where rapid changes in weather conditions can be experienced during the winter and spring. However, if relatively settled conditions are forecast for the week following shearing, and adequate feed reserves are available to meet possible post-shearing increases in sheep appetite (Parker 1992), cover comb shearing would be just as effective in terms of sheep protection and less expensive than blade shearing.

In the transition from blade to cover comb shearing a small amount of additional wool would be harvested at the first clipping, but differences in fleece weights due to stubble length thereafter would not occur. No data on the relative incidence of second cuts due to the use of a cover comb rather than blades was obtained. However experienced Wools of New Zealand shearing instructors believe that the incidence of fleece second cuts due to the use of blades rather than cover combs would be small, if the correct technique is used and sheep are presented for shearing in average or better body condition.

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