SUMMARY

Acrylic fleece-tip barriers were studied in Merino ewes to evaluate the protection given against grass seed/medic burr penetration of the fleece and carcase.

Vegetable matter contamination of wool or contamination of carcases by grass seeds were not influenced by the presence of acrylics used as fleece-tip barriers. Although the barrier on the fleece may have resisted the penetration of grass seeds the structure of the staples was altered, the fleece was more open and penetration occurred unrestricted between staples where the wool was unprotected.

INTRODUCTION

Grass seed contamination of wool and sheep carcases reduce the prices received by the grazier for these products. Vegetable fault in wool is a national problem but is most serious in New South Wales, followed by Queensland and South Australia (Cornish and Beale 1974). Major contaminants are barley grass (Hordeum leporinum), native perennial grasses such as corkscrew grass (Stipa spp.) and wiregrass (Aristida spp.) and naturalised annual Medicago species. Large discounts can be applied for vegetable fault (Anon. 1975), for example price reductions of 25% for vegetable matter contamination and 35% for high quantities of non-clearable wiregrass. Wiregrass contamination is heavily penalised as the seeds may pass through normal processing and end up in the final product.

Seeds of some grass species (Bromus, Hordeum, Stipa and particularly Aristida) can also penetrate the skin and carcase reducing their value. Thrift is often caused in young animals. Hamilton (1978) estimated that on the central and northwestern slopes of New South Wales, over 40% of the sheep slaughtered at export abattoirs were downgraded as a result of carcase trimming to remove grass seeds.

Acrylic polymers are widely used in industry for the production of plastics, paints, polishes, adhesives and sealants to name a few of their diverse applications. One of their early direct uses in agriculture was to hold the fleece together during chemical defleecing after the wool fibres had been weakened. Although proven unsuccessful it was apparent that as the acrylic polymer dried to form a clear plastic-like film over the fleece, the entry of vegetable matter may be reduced or prevented. This paper reports the wool and carcase contamination of Merino sheep sprayed with acrylic polymers.

* Department of Agriculture, Agricultural Research Station, Condobolin, N.S.W. 2877.

Present address: Department of Agriculture, Agricultural Research Centre, Wollongbar, N.S.W. 2480.
In August 1979 two hundred medium wool Merino ewes were selected on the basis of uniform wool characteristics from a flock of 450 and randomly allocated to ten treatment groups. The control group was unsprayed, while the others were sprayed with three acrylic polymers under three application strategies.

Acrylic polymers

The acrylics are referred to by the manufacturers (Monsanto Australia) code numbers and were sprayed as an emulsion at the rate of two litres per sheep. When dry the acrylic films used in this experiment have different physical properties. Two (RE471 and RE472), although scourable under alkaline conditions, are not as resistant to environmental degradation as RE460 which is not scourable. The films of RE471, RE472 and RE460 were classified respectively by the manufacturer as non-tacky, slightly tacky and tacky at 25°C. If RE460 gave superior protection against grass seed penetration it was proposed to incorporate its durability into the scourable acrylics.

Treatment Strategy

The timing for spraying was:

I - Post shearing, a single application in early August 1979.
II - Before grass seed maturation, a single application in late October 1979.
III - Dual application to reinforce protection (early August and late October 1979).

Location and Management

Initially all animals were run at Condobolin, New South Wales, as a single flock on a pasture composed of spear grass (Stipa variabilis), barley grass (Hordeum leporinum) and Medicago species. When drought prevented the pasture from seeding the sheep were transferred to Tamworth, New South Wales, in early February, 1980 and run on a pasture containing mostly wiregrass (Aristida ramosa) and spear grass (Stipa variabilis) until shearing.

The sheep were shorn in April 1980, greasy fleece weights were obtained and mid-side samples collected for clean wool yield and vegetable fault determination.

After shearing five sheep were randomly selected from the control group and from each group that had been sprayed with acrylic before grass seed maturation (Strategy II). They were slaughtered to determine carcass grass seed contamination by the method of Lodge and Hamilton (1981). Five sheep that had grazed with the experimental flock were slaughtered to determine previous grass seed contamination at Condobolin.

The data were analysed by one or two way analysis of variance.

RESULTS

Spraying

The acrylic dried to form an effective barrier on the tip of each staple. However, the surface area of the tip contracted during drying, increasing the gap between staples. The average gap between staples on the mid-side was 3 mm in unsprayed sheep but this can increase to 4 mm after the acrylic spray dries.
Animal Production in Australia

Pasture

Few native grasses set seed at Condobolin due to drought conditions. Contaminating medic burrs were present from previous years.

The main pasture species at Tamworth (Aristida and Stipag) had set seed before the sheep were transferred and continued to drop seed over the period the sheep were grazing the pasture.

Greasy Fleece Weight and Yield

Although acrylic sprayed sheep produced more wool than the control sheep (P < .05), the clean wool yield was lower. Annual clean wool production did not differ significantly between treatments and the control. Yield could not be determined for fleece sprayed with acrylic RE460 as the acrylic does not scour out.

Wool contamination

TABLE 1 Vegetable matter contamination of mid-side wool samples (mg/100 g clean wool)

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Strategy I</th>
<th>Strategy II</th>
<th>Strategy III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RE471</td>
<td>RE472</td>
<td>RE471</td>
<td>RE472</td>
</tr>
<tr>
<td>Grasp seed</td>
<td>506</td>
<td>52</td>
<td>463</td>
<td>64</td>
</tr>
<tr>
<td>Medic burl</td>
<td>298</td>
<td>53</td>
<td>360</td>
<td>109</td>
</tr>
<tr>
<td>Total fault</td>
<td>804</td>
<td>86</td>
<td>623</td>
<td>129</td>
</tr>
</tbody>
</table>

* Strategy I = Post shearing
  Strategy II = Before grass seed maturation
  Strategy III = Dual application

Vegetable matter contamination was not significantly influenced by acrylic treatment or spraying strategy (Table 1). Dust penetration was observed to extend further down the staple on sheep sprayed with acrylic than unsprayed sheep.

Carcase contamination

No grass seed contamination had occurred before the sheep were transferred to Tamworth. Although high grass seed penetration occurred at Tamworth, there were no significant differences between treatments and the control (Table 2). Only Aristida and Stipag seeds penetrated the hide and the heaviest penetration occurred on the mid-side followed by the shoulder and the hind leg. Most of the seeds were found in the hide (73.4%) or on the surface of the carcase (21.9%). Only 4.7% had penetrated the carcase fat and none had penetrated the muscle.
DISCUSSION

Wool and carcase contamination were not reduced with acrylic fleece-tip coatings for although the acrylics are long lasting, the fleece was more 'open' than untreated fleece. This is a result of acrylic shrinkage during drying which reduces the area of the staple tip, increasing the gap between staples. Therefore, although the barrier is effective on the staple tip, grass seeds and burrs penetrate the fleece between the staples where the wool is unprotected.

The use of acrylic may also reduce the processing quality of wool. As the fleece is more 'open' dust penetration increases and greater weather damage may occur. As both factors increase processing losses or affect the quality of the product it is likely that acrylic treated wool would be penalised in the marketplace.

ACKNOWLEDGEMENTS

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REFERENCES