# EFFECT OF SHOWER DIPPING PERIOD ON INSECTICIDE PENETRATION INTO FLEECES OF SHEEP WITH SIX MONTHS' WOOL

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## SUMMARY

The effectiveness of different periods of shower dipping with the top and bottom jets for application of insecticide to woolled sheep for flystrike control was investigated.

Penetration of insecticide into the fleece was poor on the breech and belly regardless of period of dipping or whether the top or bottom jets were used. Penetration along the backline was improved by increasing the period of dipping with the top jets from 0.5 to 2 minutes, but increasing it further to 4 minutes had no effect. Increasing the period with the top jets from 4 to 8 minutes and from 8 to 12 minutes both resulted in significant increases in penetration.

## INTRODUCTION

Hand jetting, the traditional method of applying insecticide to sheep for blowfly strike control, is tedious and slow. Shower dipping provides an attractive alternative because it is quicker and easier than hand jetting and many sheep producers already have shower dips on their properties.

Sinclair *et al.* (1964) found shower dipping more effective than either surface spraying or hand jetting in preventing strike. The protective effect of blowfly insecticides currently available depends largely on the amount of insecticide that can be introduced into the fleece and dissolved in the wool yolk in regions of the sheep susceptible to strike. James and Russell (1980) found the degree of penetration of insecticide into the wool along the backline, where most body strikes begin, was not significantly different from that provided by hand jetting, but the period of shower dipping used in their experiment was longer than would normally be used in practice.

This paper examines the degree of penetration of insecticide provided along the backline, in the breech and on the sides and belly of sheep by different periods of shower dipping with top and bottom jets.

## MATERIALS AND METHODS

Eighty mulesed Koonoona strain Merino ewes carrying six months' wool were randomly divided into ten equal groups. Each of the groups was separately dipped in a rotary shower dip of diameter 4.3 metres. Five of the groups were treated with the top jets for 0.5, 2, 4, 8 or 12 minutes and the other five with the bottom jets for the same periods.

A mixture of diazinon (Topclip Blue Shield, $^{R}$ Ciba Geigy Aust. Ltd.) at a concentration of 0.04% w/v, and methylene blue, at a concentration of 0.0017% w/v, was used as the dipping fluid.

Three days after treatment the sheep were examined for coverage and penetration of insecticide into the fleece. The fleece was parted at each of the 14 sites in figure 1 and at each site the depth of even penetration of insecticide into the fleece, as indicated by the methylene blue, was measured and a score for extent of wetting of the skin was assigned. The backline included sites l-5, the

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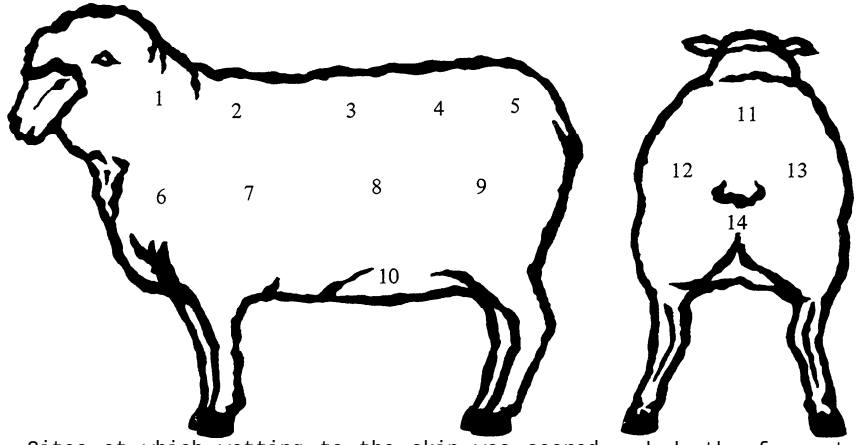


Fig. 1. Sites at which wetting to the skin was scored and depth of penetration was measured.

sides, sites 6-9, the belly site 10, and the breech, sites 11-14. The depth of even penetration into the fleece was defined as the depth to which all of the wool in the fleece at a particular site was marked with dye. The scoring system used for extent of wetting to the skin was:

1: No penetration to the skin
2: Less than 50% of the skin marked by dye
3: More than 50% but less than 90% of the skin marked by dye
4: Greater than 90% of the skin marked by dye
5: 100% of the skin marked by dye.

The data for depth of penetration of insecticide into the fleece were examined by analysis of variance with direction (top or bottom jets) and duration of treatment as main effects.

Counts of score for wetting of the skin in each class of direction and duration were analysed using a log linear model.

## RESULTS

### Depth of Penetration

Table 1 contains the mean depths of penetration provided by the top and bottom jets for the five durations. Significant effects of direction of the jets were found along the backline ($P<0.001$), in the breech ($P<0.001$), and on the belly ($P<0.001$). Along the backline the top jets were better, while in the breech and on the belly the bottom jets gave better penetration.

The duration of operation of the jets had a significant effect along the backline ($P<0.001$), in the breech ($P<0.001$), and on the sides ($P<0.001$) but penetration was poor on the belly regardless of the period of treatment.

Along the backline the depth of penetration increased significantly as the duration of dipping with the top jets was increased from 0.5 to 2 minutes, from 4 to 8 and from 8 to 12 minutes; there was no increase from 2 to 4 minutes. In the breech and on the sides significant increases in depth were obtained only when the duration was increased from 0.5 to 2 minutes and from 4 to 8 minutes. With the bottom jets, increase in time from 2 to 4 minutes brought about significant increases along the backline, in the breech and on the sides.

TABLE 1. Mean depths of penetration (cm) of insecticide into the fleece for four regions on sheep treated by shower dipping with the top or bottom jets for five different time periods

| REGION | DIRECTION | DURATION (mins) 0.5 | 2 | 4 | 8 | 12 | LSD P<05 |
|---|---|---|---|---|---|---|---|
| Backline | Top | 0.90 | 1.44 | 1.43 | 1.80 | 2.45 | 0.31 |
| | Bottom | 0.76 | 1.06 | 1.41 | 1.44 | 1.45 | |
| Breech | Top | 0.39 | 0.62 | 0.71 | 1.04 | 0.91 | 0.18 |
| | Bottom | 0.83 | 0.88 | 1.20 | 1.17 | 1.02 | |
| Belly | Top | 0.00 | 0.02 | 0.09 | 0.11 | 0.24 | 0.17 |
| | Bottom | 0.60 | 0.70 | 0.69 | 0.76 | 0.91 | |
| Sides | Top | 0.50 | 0.81 | 0.90 | 1.11 | 0.86 | 0.16 |
| | Bottom | 0.70 | 0.70 | 1.20 | 1.12 | 0.84 | |

## Score for wetting of the skin

There were significant effects of both direction ($P<0.05$) and duration ($P<0.05$) on score for wetting to the skin along the backline and a significant effect of duration along the sides ($P<0.05$). Scores for different durations are not presented but the differences observed along the backline and on the sides were of a similar pattern to those recorded for depth of penetration.

In the breech 89% of all sites showed no wetting of the skin at all and no sheep with score 4 or 5 was found in any of the treatment groups. On the belly only 3 out of 40 sheep treated with the bottom jets showed any wetting of the skin, whilenonetreated with the top jets showed wetting of the skin.

## DISCUSSION

This experiment shows that very little insecticide is applied to the breech or belly by shower dipping woolled sheep.

The bottom jets provided significantly deeper penetration in the breech and belly regions than the top jets. However, increasing duration of operation of the bottom jets above 0.5 minutes did not appreciably increase depth of penetration or score for wetting of the skin in the breech or on the belly. Although there was significant increase in depth of penetration in the breech when time with the bottom jets was increased from 2 minutes to 4 minutes this increase was only 0.32 cm. If insecticide is applied only to the fleece tip the concentration of insecticide in the fleece will be low. Nevertheless a degree of protection will be provided and a short treatment with the bottom jets may be worthwhile.

In most circumstances, however, breech and pizzle strike can be controlled by mulesing, docking tails to the correct length, management to avoid scouring (Watts 1979) and pizzle dropping (Donnelly 1979).

Most body strikes begin on the dorsal aspect of sheep (Watts *et al.* 1979). In flocks in which the problem is mainly body strike shower dipping may provide a convenient method of emergency flystrike control. In our experiment no increase in penetration on the backline was detected by increasing time with the top jets from 2 minutes to 4 minutes, but it would seem that generally, the longer the

sheep are left in the dip, the more thorough the treatment is likely to be. This is because in the wool along the backline the insecticide solution will gravitate towards the skin. However, if the sheep are left in the shower dip for 8 to 12 minutes the time advantage, and hence attractiveness, of shower dipping as an emergency measure is reduced.

From this experiment, the most efficient time of shower dipping for emergency flystrike control seems to be 2 minutes with the top jets and 30 seconds with the bottom jets. However, the best time is likely to be affected by many factors such as wool length, pressure and volume rating of the dip, wetting properties of the dip fluid, amount of dust in the fleece and a range of fleece characters.

If shower dipping is to be used for flystrike control the possibility of problems of wool staining (Sinclair *et al.* 1964) and increased incidence of lumpy wool, *Dermatophilis dermatonomus*, (Roberts and Graham 1966) should be borne in mind. Shower dipping uses more insecticide than race or hand jetting (Sinclair *et al.* 1964; James and Russell 1980) and this should also be taken into account.

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## REFERENCES

DONNELLY, F.B. (1979). Proc. National Symposium on the Sheep Blowfly and Fly-Strike, Sydney, P. 189.

JAMES, P.J. and RUSSELL, D.W. (1980). Agric. Rec. 7: 59.

ROBERTS, D.S. and GRAHAM, N.P.H. (1966). Aust. Vet. J. 42: 74.

SINCLAIR, A.M., GIBSON, A.J.F. and CAVEY, W.A. (1964). Aust. Vet. J. 40: 44.

WATTS, J.E. (1979). Proc. National Symposium on the Sheep Blowfly and Flystrike in Sheep, Sydney, P. 175.

WATTS, J.E., MURRAY, M.D. and GRAHAM, N.P.H. (1979). Aust. Vet. J. 55: 325.