## SPRAY PATTERN EFFICIENCY

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The effectiveness of post-emergence herbicides for wild oat (*Avena* spp.) control is greatly influenced by the volume of application and a large increase in efficiency is obtained by decreasing the volume from the standard 10 gal. per acre (112 litres per hectare) to 2.5 gal. per acre (28 litres per hectare). The standard pattern (10 gal. per acre, or 112 litres per hectare) is similar to that normally used in research and commercial spraying. Both treatments were applied with a Chesterford logarithmic sprayer mounted on a four-wheel-drive vehicle.

Some of the differences between the two patterns are listed in the Table below

| | 2.5 gal. per acre (28 litres/ha) | 10.0 gal. per acre (112 litres/ha) |
|---|---|---|
| Droplet size | 80-200 | 80-1,200 |
| Nozzle spacing | 9 in. (22.9 cm) | 18 in. (45.7 cm) |
| Nozzle type | 80° hollow cone | 70° flat fan |
| Ground-speed | 4.75 mph (7.65 k/hr) | 7.0 kph (11.27 k/hr) |
| Output/nozzle at 40 psi (2.8 kg per sq. cm) | 84 ml/min. | 892 ml/min. |
| Amount of dye deposited on target | 43.2 units | 14.2 units |

The amount of dye these two spray patterns could deposit on a metallic, artificial wild oat at the two-leaf stage was measured with a spectrophotometer. The low-volume spray pattern deposited three times the amount of dye deposited by the standard 10 gal. per acre pattern; this was supported by field results on the effectiveness of these two patterns on wild oat control, using barban as an indicator herbicide.

The big difference in droplet range and size contributed to the variation in efficiency of the two spray patterns. The large droplets from the 10 gal. per acre pattern either fell past the target or bounced off it. The small droplets fell at a much slower rate than the large ones and thus had a greater chance of

striking the target. The proportion of droplets bouncing off the target was also smaller with the low-volume pattern. The hollow cone nozzles projected droplets towards the small wild oat plants from every direction whereas those from the flat fan nozzles could only be directed forward.

A spray pattern with droplets in the 100-200 micron range appears to be highly suitable for post-emergence wild oat spraying. However, such a pattern would be detrimental to the application of 2,4-D to wheat. There would be little increase in efficiency as far as the broadleaved weeds were concerned but the wheat could be damaged by overdosage. Some dicotyledonous weeds may require spray patterns with all the droplets in the 600-1,000 micron range; these droplets would tend to miss the wheat but not the broadleaved weed.

Festiguay and Olympic wheat become relatively susceptible to barban about the time they begin to assume a prostrate habit. This increase in susceptibility may be due to an increase in the amount of herbicide deposited on the leaf. A horizontal leaf would collect more herbicide from the 10 gal. per acre spray pattern used in determining the susceptibility of Festiguay and Olympic to barban.

## LOGARITHMIC STEP SPRAYER FOR FIELD SCREENING OF HERBICIDES

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### INTRODUCTION

ICIANZ carries out its initial screening of herbicides in the laboratories at 'Merrindale' in Croydon, Vic. The step log sprayer was developed to enable a quick crosscheck of laboratory results in the field. A continuous log sprayer is of limited use for this purpose, because one concentration occurs only instanteously during spraying. The step log sprayer puts out a given concentration for a given time, and several concentrations