Improving the Efficiency of Herbicide Application to Pasture Weeds by Weed-Wiping and Spot-Spraying

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ABSTRACT

This study investigated methods to reduce herbicide application through improved targeting of weeds, thereby also reducing damage to pastures. The focus was to evaluate and improve wiper and spot-spraying application techniques for pasture herbicides as they reduce chemical use by treating just the weed.

Wiper application of herbicides was shown to be a useful technique for controlling Californian thistles. In one trial, a stem reduction of over 90% when assessed 10 months post application was achieved with a double pass of clopyralid, metsulfuron and glyphosate when the plants were treated at the post-flowering stage and were vigorously growing. A double pass was superior to a single pass for glyphosate and triclopyr/picloram, but not for clopyralid and metsulfuron. Subsequent trials produced poor results possibly because of the stressed condition of the thistles and their growth stage as well as lack of consistency in wiper output and operator differences. Despite wiper applicators usually being selective, some damage to pastures was observed in the field, and from a series of experiments it was concluded that rain falling soon after wiper application was the likely cause of pasture damage.

An innovative and highly sensitive technique using a spectrophotometer was developed to measure herbicide output from wiper applicators. A spectrophotometer could accurately measure clopyralid concentrations as low as 0.02 g active ingredient in a litre of water. The Eliminator and Rotowiper outputs were found to be highly variable while the Weedswiper was more consistent although it applied less herbicide than the other two wipers.

Spot spraying experiments confirmed that glyphosate and metsulfuron create bare patches by damaging both grass and clover while clopyralid and triclopyr/picloram only eliminate clover. However, metsulfuron patches stayed bare for much longer while glyphosate ones quickly filled up with weeds and clover. Ingress of clover stolons appeared to be more important than re-establishment from seed in the recovery of patches. The bigger the damaged patch, the higher the likelihood of re-colonisation by opportunistic weeds. Bioassay studies found that over-application of clopyralid and triclopyr/picloram provided residual activity up to 18 and 30 weeks, respectively, thereby potentially preventing re-establishment of white clover. The negative effects on clover seedlings from metsulfuron ranged from 3 to 6 weeks for

standard and high rates, respectively, with a stimulatory effect on seedlings thereafter for up to 18 weeks.

Dose-response curves for the application of metsulfuron and triclopyr/picloram into the centre 5% versus full plant coverage of Scotch thistle and ragwort rosettes showed that application of herbicide to the centre 5% was as effective at the same concentration and greatly reduced the risk of damage to pasture.

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