CONTROL OF HARRISIA CACTUS BY DICHLORPROP AND FENOPROP: FORMULATION STUDIES

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Harrisia cactus possesses very thick, hydrophilic epidermal and pseudohypodermal cell walls. When the plants are sprayed with 2,4-D or 2,4,5-T ester formulations, or fenoprop ester in oil, many plants are not killed. The epidermis of these surviving plants produces a grey cork, the stem remaining green and succulent inside this cork layer. Sometimes secondary growth of the epidermis and pseudohypodermis occurs, indicating a growth-regulator response, and further indicating that the herbicide has not penetrated beyond these layers in sufficient concentration to produce any herbicidal effect.

An obvious conclusion to be drawn from these results is that penetration of hydrophobic esters in oil or oil and water emulsions is restricted by the hydrophilic cell wall. A trial was therefore conducted to determine if substitution of various hydrophilic solvents for the normal hydrophobic oil solvent in formulations of fenoprop butyl/isobutyl ester would result in increased herbicidal efficiency.

Solvents tested were isopropanol, polyethylene glycol 600, polyethylene glycol 400, trichloroethylene, ethyl icinol, ethyl diicinol, and diesel distillate.

Although the improvements were not great (maximum kill 26%) the results showed that some benefit could be expected from development of a commercial formulation of fenoprop ester containing a solvent other than diesel distillate.

At the same time potassium salts of dichlorprop and fenoprop were evaluated. Both gave excellent control of Harrisia. There were no differences between the two, or between these two and fenoprop ester, in either experimental or commercial application. The only trial in which any significant difference was found was one in which dichlorprop iso-octyl ester proved significantly better than fenoprop butyl/isobutyl ester ($p>0.01$).

These formulation trials have not been continued because hexaflurate has replaced dichlorprop and fenoprop as the herbicide of choice for Harrisia control. However, they do illustrate the point that normal commercial formulations, although usually effective against a wide variety of weeds, are not necessarily the best formulations for control of certain weeds which are difficult to suppress. It is possible that much more could be accomplished with the herbicides that