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INTEGRATED SHRUB CONTROL STRATEGIES USING DILUTE CHEMICAL DEFOLIANTS

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INTRODUCTION

Several management options are currently available for controlling shrubs in semi-arid woodlands although their use over extensive paddock areas is heavily constrained by cost factors (MacLeod and Johnston 1990). Research over the past decade has clearly shown that single treatment options for shrub management are generally unsuccessful in providing long-term solutions. While prescribed fire has shown considerable promise for treating large areas of shrub-infested range (Hodgkinson and Harrington 1985), several shrub species such as budda (*Eremophila mitchellii*), turpentine (*E. sturtii*) and some punty bush (*Cassia nemophila*), regenerate rapidly after fire by coppicing at ground level. Trials using artificial fuel have shown however that such species are vulnerable if a second defoliation can be applied one year later but only in the autumn (Noble *et al.* 1986, Hodgkinson 1989). The only way secondary treatment can be imposed so soon after prescribed fire is by using chemical defoliants. If these could be used at dilute concentrations to mimic fire defoliation, then chemical defoliation may prove to be a cost-effective option for broadscale use. This paper briefly summarises results obtained from preliminary screening studies of several chemical defoliants applied over a range of dosage rates to coppicing *Eremophila* shrubs.

METHODS AND MATERIALS

Eleven chemicals (seven arboricides and four dessicants) were applied at six concentrations of active ingredient in November, 1990 to coppicing budda (*Eremophila mitchellii*) and turpentine (*E. sturtii*) on "Bundoon Belah", 40 km west of Cobar, N.S.W, where large blocks had been chained, windrowed and burnt in 1986. Treatments were randomised in six blocks (*c.* 200 x 50 m) with application rates (0, 12%, 25%, 50%, 75% and 100% of active ingredient concentration for root kill by the arboricides and 0, 50%, 100%, 135%, 170% and 200% for the dessicants) arranged as main plots split for shrub species. The arboricides used in this study were CT Roundup (450 g/L Glyphosate), Arsenal (250 g/L Imazapur + 60 g/L Isopropylamine), Garlon (600 g/L Triclopyr), Grazon (300 g/L Triclopyr + 100 g/L Picloram), Brushoff (600 g/L Metasulfuron Methyl), Velpar (250 g/L Hexazinone), Starane (300 g/L Fluroxpyr) while the dessicants were Gramoxone (200 g/L Paraquat), Ethrel (480 g/L Ethephon), Pix (38 g/L Mepiquat) and Harvade (600 g/L Dimethipin). None of these materials are currently registered for the purposes described in this paper. Duplicate plants were sprayed in each plot at low volume (2 sweeps of 30 ml each per coppice) using an Ag-murf Gas Gun(R) powered by propane gas. Treated plants were regularly monitored and rated for both effect (i.e. change in leaf colour) and defoliation (0=no effect and 10=100% effect).

RESULTS AND DISCUSSION

While it is too early to make definite statements on particular chemicals and rates of application, early results from this initial screening are extremely promising. Although half the chemicals tested in this experiment can probably be eliminated from further trials, some induced rapid defoliation, especially at higher rates (e.g. CT-Roundup), whereas others produced progressively greater defoliation over time (e.g. Arsenal), even at lower rates. Further studies are required to refine dosages, especially on young coppice regrowth (i.e. one season's growth). Such treatment is seen, *a priori*, to be more efficient because there is less canopy surface to be treated and chemicals may be more physiologically active when applied to young leaves. Recent observations on one-year-old *Eremophila* coppice sprayed in April 1992 have shown that some chemicals are active at the lowest concentration (12%). If such dilute concentrations are indeed effective, then large-scale testing of such treatments would logically follow. Large paddock size (up to 8,000 ha) may dictate the need for appropriate operational procedures involving both aerial ignition for primary fire treatment (Noble 1986) and aerial spraying for secondary treatment (Mathews 1979).

With the advent of ultra low volume spraying (1-5 L/ha) using spinning cage atomisers and specific ULV formulations, small droplet size can result in significant spray dispersal during broad swathe spraying. Such treatment, even if only at low volumes (5-15 L/ha), is likely to be the most efficient technology, with more country being sprayed per load in regions where adequate supplies of good quality water may be limiting.

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