

**MANAGEMENT OF BONESEED (*CHRYSANTHEMOIDES
MONILIFERA* SSP. *MONILIFERA*) (L.) T. NORL. USING
FIRE, HERBICIDES AND OTHER TECHNIQUES IN
AUSTRALIAN WOODLANDS**

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Abstract

Invasive plants cause ecosystem degradation throughout the world, including the reduction of native plant density and diversity, and changes in ecosystem structure and function. Woody weeds often grow faster than native species and in invaded habitats produce larger and/or more seed and outshade other mid- and under-storey species. Boneseed *Chrysanthemoides monilifera* ssp. *monilifera* (L.) T. Norl. has caused the degradation of many temperate woodlands in Australia and has not yet reached its full potential distribution in this country. The control of this weed is therefore a high priority in Australia. Biological control agents have not controlled boneseed populations to date and no detailed integrated control strategies exist for different densities of mature boneseed plants and soil seed banks in native vegetation of varying levels of degradation. Fire, herbicides and manual plant removal have previously been used to control boneseed; however, substantial landscape scale control has not yet been achieved.

Boneseed population control experiments were undertaken in two temperate woodlands in Victoria, Australia. In highly degraded temperate grassy woodlands at the You Yangs Regional Park west of Melbourne in Victoria and in a highly diverse native closed woodland at Arthurs Seat State Park in south-eastern Victoria. Several combinations of the weed control techniques of fire, herbicide application, hand-pulling of seedlings and distribution of competitive native grasses were found to control both mature boneseed populations and the large reserves of viable boneseed seeds in the soil. The efficacy of controlled burning, and the combination and timing of control techniques were found to vary according to differing densities of boneseed plants, viable soil seed banks and post-fire emergent seedlings.

Where sufficient fine fuel existed, a warm, even, autumn burn consumed above ground biomass, killed the majority of viable boneseed seed in the soil, and caused the remaining boneseed seed to germinate. Spraying with glyphosate herbicide was as effective as metsulfuron-methyl herbicide for killing boneseed seedlings along with the secondary climbing weed *Billardiera heterophylla* (Lindl.) L.W.Cayzer & Crisp after fire. However, the use of glyphosate also killed all native species, resulting in bare ground. After fire in species rich vegetation, boneseed was eliminated where seed of the native C3 grass *Poa sieberiana* Spreng. had been broadcast onto the post fire ash-bed, and seedlings had been sprayed five

months after the burn or where seedlings had been sprayed 12 months after burning. Boneseed control occurred when seedlings were sprayed five months after the burn. In degraded vegetation few boneseed seedlings remained where seedlings were sprayed 17 months after fire. Where insufficient rainfall occurred, hand-pulling flowering boneseed seedlings prevented new seed fall for 6 to 12 months.

Suggestions are made for the integration of these methods with the establishment and proliferation of biological control agents. A new protocol for utilising several integrated control strategies for boneseed and other woody weeds in a mosaic at both the site and landscape scale is described. A mosaic would allow for a variety of native species responses to fire and other control methods and thus lead to heterogeneous ages and structures within the native vegetation following weed control.

Declaration

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being made available in all forms of media, now or hereafter known.

Signed:

Date:

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