

Woody weed control in the Dandenong Ranges National Park

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The Dandenong Ranges National Park (DRNP), situated 30 km east of Melbourne, comprises 1,900 ha of open forest. The Park attracts over 800,000 people annually with mountain ash forests, moist fern-gullies and wildlife including superb lyrebirds in Sherbrooke Forest.

During the past 40 years, urban development has expanded around the Park resulting in the invasion of environmental weeds. Many of these weeds are garden escapees entering the Park by birds, poor drainage and dumped garden refuse. Weed establishment within the Park has been enhanced by disturbances such as fertilizer runoff from adjacent agricultural areas and septic tank effluent from residential areas.

Weeds have invaded significant plant communities within the Park, altering their species composition and often caus-

ing loss of habitat for native fauna such as lyrebirds and wombats. In areas severely infested by English ivy (*Hedera helix* L.), one of the main weeds in the Park, lyrebirds are unable to scratch for food.

Over 200 environmental weeds species have been recorded within DRNP and nearby areas. Woody weeds such as *Acer pseudoplatanus* L. (sycamore maple), *Pittosporum undulatum* Vent. (sweet pittosporum), *Ilex aquifolium* L. (holly), *Cestrum elegans* (Brongn.) Schlect. (red cestrum), *Genista monspessulana* (L.) L.A.S. Johnson (cape broom) are believed to cause serious ecological problems. As little or no data were available on control methods for many of the weed species present, control techniques were developed by Park staff and volunteer community groups. In 1989, the then Department of Conservation, Forests and Lands pro-

vided the DRNP with \$100,000 to establish an environmental weed control program. Recurrent funding during the last two years has enabled this program to continue.

This paper summarizes observations made over two years of the environmental weed control program that has concentrated on woody weeds in DRNP.

Control methods

A form of the Bradley method of bush regeneration (Bradley 1971) was used in the initial stages of the weed control program. Weeds were hand-pulled or injected with herbicides but left standing to reduce soil disturbance. This minimized further weed invasion and allowed natural regeneration to occur. In many areas infestations of some persistent species such as blackberry (*Rubus fruticosus* spp. agg.) and brooms (*Genista* and *Cytisus*) required foliar applications of herbicides. Woody weed species and methods of control used in DRNP are listed in Table 1.

Most woody weeds in DRNP can be controlled by the drill and fill method. This technique leaves the target plant standing and an increase in light intensity beneath the defoliated canopy stimulates the regeneration of native species and weeds which require follow-up treatment.

The drill and fill method involves drilling 8 – 15 mm diameter holes through the bark and cambium of the trunk. The holes should be 4 – 6 cm apart and located 20 – 50 cm above ground level and below the lowest living branches. The holes are then immediately filled with a suitable herbicide using a Velpar gun. It is essential that holes are placed vertically below all main branches; if offset, branches may not be killed. For large trees with basal diameters greater than 40 cm up to 20 holes are required to ensure sufficient herbicide uptake.

Drill and fill holes can be made using a brace and bit or a rechargeable power drill. In the latter case, several battery packs or a portable recharging facility are required for each person every day. The herbicides used are those that are registered for the target plant or where the label lists species similar to the target plant. Undiluted glyphosate has been successfully used to kill woody weed species in the DRNP. Glyphosate and water 1:1 also appears to kill sweet pittosporum but further evaluation is required.

Most woody weed species are prepared for drilling by removing their lower branches to provide access to the trunk. Exceptions are holly and cherry laurel (*Prunus laurocerasus* L.) where all suckers and low-lying branches need to be removed to prevent re-establishment. Cut branches of these species should be removed or piled without ground contact to prevent re-rooting.

Table 1. Summary of successful control techniques used in the Dandenong Ranges National Park

Weed species		Suggested control techniques
Common name	Botanic name	
Sweet pittosporum, Karamu	<i>Pittosporum undulatum</i> <i>Coprosma robusta</i>	Trees with stems > 5 cm in diam.: drill and fill with undiluted glyphosate. Smaller trees: handpull or cut and paint with undiluted glyphosate.
Cootamundra wattle	<i>Acacia baileyana</i>	
Early black wattle	<i>A. decurrens</i>	
Cedar wattle	<i>A. elata</i>	
Cherry laurel	<i>Prunus laurocerasus</i>	
Flax-leaf broom	<i>Genista linifolia</i>	
Cape broom	<i>G. monspessulana</i>	
Cotoneaster	<i>Cotoneaster</i> sp.	
Monterey pine	<i>Pinus radiata</i>	
Holly	<i>Ilex aquifolium</i>	
English broom	<i>Cytisus scoparius</i>	Garlon 170mL 100L ⁻¹ water provides a good knockdown but follow-up is required.
Spanish heath	<i>Erica lusitanica</i>	
Red cestrum	<i>Cestrum elegans</i>	Pull plants in winter or spring. Do not leave uprooted pieces in contact with the ground as re-establishment will occur. Follow-up work is required to control seedling regeneration as soil seed banks can be large.
Tutsan	<i>Hypericum androsaemum</i>	
Sycamore maple	<i>Acer pseudoplatanus</i>	Drill and fill with undiluted glyphosate. Do not treat in winter when the tree is dormant. Treat in early autumn.

Sycamore maple and other deciduous species should not be treated between late autumn and mid spring when sap flow is inactive. Evergreen species such as sweet pittosporum can be treated all year round although the rate of death depends on the season, i.e. slower death rates occur during mid winter when plants may be semi-dormant.

Another control method for woody weeds is 'frilling'. A tomahawk is used to prise away the bark creating pockets into which herbicide can be placed. The location of incisions is similar to the drill and fill method but care needs to be taken not to ringbark the tree. Although this technique is faster than drilling and filling it has not proved to be as reliable.

Garlon 600 is used for most high volume spraying in the DRNP as fern species, a predominant component of the wet sclerophyll forests, are not affected by this herbicide. Brooms and spanish heath (*Erica lusitanica* Rudolph) are controlled with Garlon 600 at 170 mL 100 L⁻¹ of water dur-

ing spring to autumn, however, follow-up spraying is usually required. Garlon 600 is unsuitable for drilling and filling, especially during warmer weather as its high volatility makes its use in high concentrations undesirable.

Many woody weed species are easily controlled by hand-pulling especially during winter and spring when the soil is moist and soft. Mature red cestrum plants can be easily hand-pulled but must be removed from ground contact to prevent re-establishment from stem fragments. In DRNP up-rooted red cestrum plants are placed on log platforms where they dry and decompose. Holly can also be treated in this way.

Woody weeds are usually treated at least six months after blackberry spraying when access to sites is possible. Follow-up treatment usually involves hand-pulling seedlings or spot spraying. Unless treated areas are stabilized either by heavy mulching or replanting, one weed is usually replaced by another. Often weed seeds are

present in the soil-seed bank along with native colonizing species such as kangaroo apple (*Solanum aviculare* G. Forster). Herbaceous weeds such as black nightshade (*Solanum nigrum* L.) may be suppressed with the re-establishment of a vigorous native understorey and middlestorey stratum.

The weed control program in the DRNP is labour intensive. Currently, there is the equivalent of two full time staff members who remove weeds from the Park. It is anticipated that, with adequate funding, a substantial decrease in the abundance of woody weeds in the Park will be achieved. With the aid of a major public education program, 'ParkCare', it is hoped that future threat to the Park by the invasion of weeds will be reduced.

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Reference

Bradley, J. (1971). 'Bush regeneration'. 16 pp. (Mosman Parklands and Ashton Park Association, Sydney).