Using native species to manage roadside weeds

David Orchard

Roadsides often serve as vital refuges for native plant species and provide important corridors for the movement of native animals. Just as often, however, roadsides act as reservoirs and transport pathways for weeds. Historical disturbance has left many roadsides entirely bare of natural groundcover, which has allowed exotic species to multiply. From these reservoirs, weeds can spread into surrounding farmland and into areas of native vegetation, diminishing the value of both.

How can native species help control weeds?

Replanting roadside areas with native species may be one way of combatting this problem. Locally native species often possess specific adaptations to local conditions that give them a competitive advantage against exotics. This competition, as well as shading effects and possible allelopathic effects (where a plant releases a chemical that inhibits the growth of neighbouring plants), may act to exclude introduced species and reduce weed infestations.

To investigate the potential value of native species in managing roadside weeds, in the spring of 2013 a series of trials was set up on the Marrar North Road. These trials aimed to investigate the competitive effects of various native species on the weed flora of the site.

How were the trials set up?

Initial weed surveys at the trial site revealed significant infestations of weeds including Paterson's curse (*Echium plantagineum*), St John's wort (*Hypericum perforatum*), Horehound (*Marrubium vulgare*), several species of thistle, Wild oats (*Avena fatua*) and Brome grasses (*Bromus* spp).

In order to look at the competitive effect of native species on weeds, it was necessary to clear all existing weeds (so that the weeds and natives would be competing for establishment). On the western side of the road, the weed community was sprayed and then mown. On the eastern side of the road, the soil was scalped, with approximately 5 cm of soil removed. This has been found to reduce the weed seed bank, and also reduce soil fertility, both of which should give the natives an advantage over weeds.

A series of trials were then planted on each side of the road. Where possible, similar trials were conducted on both sides of the road to allow an informal comparison of the effects of spraying and mowing versus the effects of scalping.

What did the trials investigate?

The trials compared the competitive abilities of several native species against the background weed population. The native species examined were:

- Grasses: Wallaby grass (*Rytidosperma* spp.), Foxtail speargrass (*Austrostipa densiflora*) and Feather speargrass (*Austrostipa elegantissima*)
- Forbs: Purple burr-daisy (*Calotis cuneifolia*) and Sticky everlasting (*Xerochrysum viscosum*)
- Shrubs: Wyalong wattle (*Acacia cardiophylla*), Western silver wattle (*Acacia decora*), Hakea wattle (*Acacia hakeoides*), Silver cassia (*Senna artemisioides*) and Berry saltbush (*Rhagodia*

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spinescens).

In addition, trials looked at the modification of the soil environment in the following ways:

- The effects of applying varying rates of sugar on the establishment of native species against the background weed population. Sugar has been found to stimulate microbial activity, which depletes soil nitrogen. This could potentially confer a competitive advantage on native species adapted to low soil fertility. The native species examined were Weeping grass (*Microlaena stipoides*) and Purple coral-pea (*Hardenbergia violacea*)
- The effects of the addition of mycorrhizal fungi on the establishment of native species against the background weed population. The addition of mycorrhizae (soil-borne fungal symbionts) may increase the ability of the host plant to access nutrients, which could increase its competitive ability. The native species examined was the native shrub Knife-leaf wattle (*Acacia cultriformis*), which is known to form a mycorrhizal association.

Trials included Knife-leaf wattle (top), and Sticky everlasting (bottom)

What are the results to date?

Planting was completed in spring 2013, which was extremely dry. Preliminary data has been collected from several of the trials, however the trials involving slower-growing shrub species will take several years to evaluate.

Current observations indicate that the pre-treatments of slashing/mowing or scalping markedly reduced broadleaf weed density. The background population now comprises Plains grass (*Austrostipa aristiglumis*, a native) and Wild oats.

The Berry saltbush (*Rhagodia spinescens*) has shown excellent competitive ability over weeds, with the plots containing these species now largely weed free.

Foxtail and Feather speargrasses, Purple burr-daisy, and Sticky everlasting have also significantly reduced weeds, particularly Wild oats.

The trials containing Knife-leaf wattle with the addition of mycorrhizae have also shown a positive impact on the competitive ability of native species over weeds.

Berry saltbush (left) has shown excellent competitive ability over weeds

The project gratefully acknowledges the assistance of Chris Slinger, Junee Council.

Further information

More results will be provided as the trials continue.

If you have any questions, or would like any further detail on the trials, please contact David Orchard: dorchard@csu.edu.au, or 0439 802 850.

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