

Weed Management Society of South Australia



Branched Broomrape Eradication Program

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Background

Branched broomrape is a parasitic weed of a wide range of broadleaf crops. Broomrapes are root parasites that extract all of their nutritional requirements from their host plants. Branched broomrape, discovered in 1992 near Bowhill, is only found in the Mallee country around Murray Bridge in South Australia.

The Branched Broomrape Eradication Program is a nationally funded program aimed at eradicating the parasitic weed branched broomrape (*Orobanche ramosa* L.) and is managed by the Department of Water, Land and Biodiversity in South Australia. A quarantine zone ensures containment of Branched Broomrape is maintained, with over 300 000 hectares of land surveyed annually for outbreaks. This long-term program is justified by the potential for branched broomrape to both reduce crop yields across Australia and also disrupt marketing of a wide range of produce to countries with zero tolerance to the weed, including major trading partners such as Japan and the USA.

The mood is optimistic as the Branched Broomrape Eradication Program moves through its tenth year. The important indicator of success has bettered its target for successful eradication. History and research are proving some of the important quarantine and eradication criteria as accurate despite being set in place with minimal scientific data.

Program strategy

The broad strategy of the program is to contain the spread of the weed and eliminate the seed bank by:

- Denying hosts to this parasitic plant and
- Direct destruction.

These strategies are applied with minimal

impact on land use and farmer's pursuit of profit.

After six years, long term seed decay experiments indicate that the seed bank will decay over 12 years. Two more collections in the experiment's time series will reduce variability and firm up the projections for this key statistic.

Successful eradication relies on a long-term partnership between program managers and the 1340 landholders who are undertaking the fieldwork on behalf of all the stakeholders. The minimum time a landholder will have paddocks under

quarantine is 12 years, longer lasting than many other human relationships.

Eradication relies on the successful application of a range of herbicide regimes, within a range of management practices that prevent additions to the seed bank. The herbicide regimes are tested in experimental trials and must be successful before release to landholders. There is evidence that landholders are increasingly successful in their execution of these regimes. No branched broomrape has been discovered in the cropped area of infested paddocks for three years. Pasture paddocks and scrub are challenges with close to 50% of emerged broomrape found in these classes, however control is increasingly successful within these land uses.

A paddock is the smallest single management unit used by the program. Additional infestations are found following the first discovery in 27% of paddocks. On this basis, control measures are applied to whole paddocks as part of the management strategy.

The release rate – a measure of satisfactory progress

Satisfactory progress to eradication is conceptually simple – at some point, decay must consistently exceed accession. Assuming that freedom from the discovery of branched broomrape in a paddock for 12 years, as measured by annual survey, equates to eradication, a 12-year eradication period implies that accessions must be less than 1/12 or 8.25% during the extinction phase of a program.

Four factors are important in estimating the time to extinction:

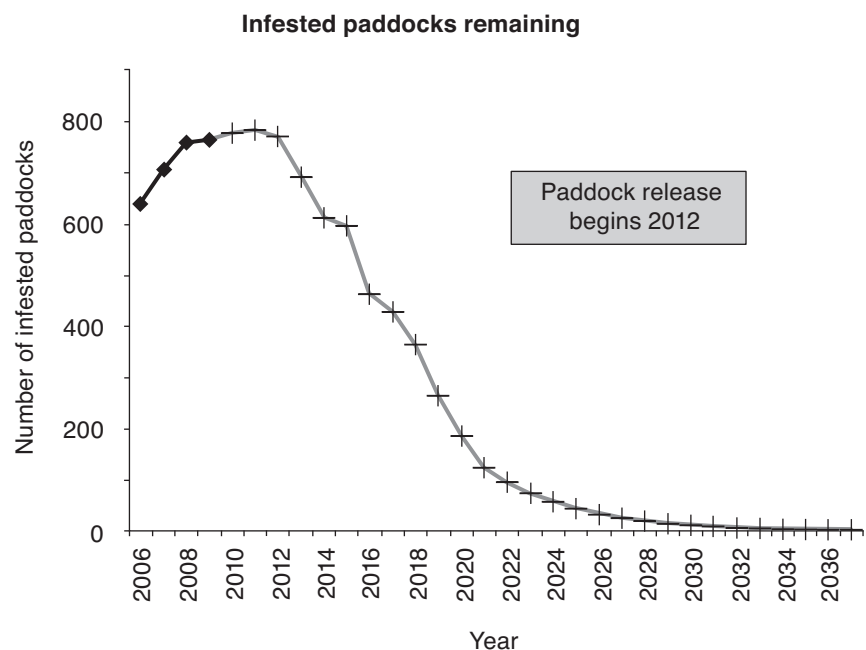


Figure 1. Quarantine rundown.

- There are failures or 'returns' of infested paddocks. Each year branched broomrape sets seed in a number of known infested paddocks and interrupts progress to the 12-year eradication target.
- Management improvement. There is a decrease in return rate of paddocks as they progress to the 12-year eradication target.
- Predicted discoveries of new infestations based on modelling of the historical rate of discovery.
- Eradication is achieved after 12 years freedom from branched broomrape.

This 'Release Rate' model illustrates the long term nature of this program and, importantly, provides a target return rate. Figure 1 shows how paddock numbers build up until paddock release begins in 2012, then the run down at a 5% return rate. The diamond line in Figure 1 shows the actual results from 2006 to 2009.

Return rate achievement

The point of this story is that the return rate for 2009 is 5%. This is below the target rate of 8.25% and the first year this has been achieved. Not a bad effort, considering promotion of the concept began in 2006, a mere three production cycles ago.

Completion of the 2009 market assurance and discovery surveys of 351,000 ha in and around the quarantine area revealed six new paddock discoveries in the Mallee zone in addition to the 759 known infested paddocks. This places new paddock discoveries at below the eighteen predicted, which adds to the optimistic outlook.

The challenge is to keep the return rate at 5%. This translates to successful control in more than 725 paddocks per year over the next few years.

Summary

There are many uses for a simple model that measures progress to eradication against a target, including promotion of their success to landholders and clarity of purpose to funding bodies. The 2009 spring survey shows the Branched Broomrape Eradication Program is on target to achieve eradication.