

Environmental group expectations of biological weed control

Kate Blood, Friends of the You Yangs, Victoria, Australia.

There are many environmental groups in Victoria that are involved in the rehabilitation of degraded and threatened ecosystems. Quite often, the primary issue these groups face is the removal of introduced plants.

One such group is the Friends of the You Yangs which was established in 1985 and now has a membership of 17 people. The group is based at the You Yangs Regional Park which is 60 km south west of Melbourne near Little River and is managed by the Department of Conservation and Natural Resources (CNR).

The parks proximity to Melbourne and Geelong makes it a popular place for visitors to picnic and pursue a range of recreational activities. The park receives in excess of 25 000 visitors each year.

The You Yangs is a granitic outcrop in the western basalt plains and has had a long history of disturbance. Industries such as timber and tan bark production, sand extraction, grazing and tourism have all left their legacy. In addition to these disturbances, rabbits, foxes, other

pest animals and changes in the fire regime have all contributed to the degradation of the indigenous flora. Table 1 illustrates the sequence of events that lead to the degradation of the parks flora.

Between 1986 and 1987, I conducted a flora survey of the You Yangs Regional Park which recorded the plant species at that time and looked at historic documentation to try and determine what the flora was like at the time of European settlement. Since 1802, it is estimated that 40 species of indigenous plants have become locally extinct. In 1987, 260 indigenous species remained. In addition to these, about 140 introduced species are now established in the park which represents 35% of the current species but considerably more in area coverage.

Every plant community in the park has been invaded by introduced plants. The most significant and widespread of these environmental weeds is boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*). Boneseed is a declared noxious weed and now covers a staggering 98% of

the 2025 hectare park and has only taken about 40 years to do so.

Boneseed is an upright softwooded shrub with yellow daisy flowers that grows to about 3 m in height. The dense nature of the shrub allows it to smother all ground vegetation and the shade tolerance of its seedlings allows its own offspring to continue to grow. It eventually forms dense swards to the exclusion of most indigenous vegetation.

There are of course many other wide spread or potentially serious environmental weeds in the park including smilax (*Myrsiphyllum asparagoides*), ink weed (*Phytolacca octandra*), silvery hairgrass (*Aira caryophyllea*), annual veldt grass (*Ehrharta longiflora*), large quacking-grass (*Briza maxima*), cat's ear (*Hypochaeris radicata*), rat's-tail fescue (*Vulpia myuros*) and serrated tussock (*Nassella trichotoma*).

The history of boneseed in the park is relatively short and its establishment and spread is illustrated in Table 1.

It is only through the efforts of environmental groups such as the Friends of the You Yangs that some areas of the park's indigenous flora are being protected through mechanical control methods. A long term program of hand pulling boneseed and follow-up revegetation with indigenous plants of local provenance is holding the boneseed at bay in some locations.

Table 1. Establishment and spread of boneseed in the You Yangs Regional Park.

Date	Stage	Environmental determinants	Resultant environmental impacts
1802		You Yangs discovered by Europeans	
1858		Boneseed first introduced into Victoria	
1859	Initial disturbance	European settlement at the You Yangs	The first disturbance from European occupation began
1866		Forestry activities establish at the You Yangs	Introduced plant species related to forestry are introduced
1880		Grazing begins and rabbits invade	Soil disturbance is accelerated and selective grazing begins
1940s	Introduction	Boneseed is probably dumped in garden refuse in a rubbish tip adjoining the park	Propagules of the boneseed plant are introduced
1950	Establishment and local colonization		The first boneseed infestation is reported in the You Yangs
1950s	Survival	Grazing is stopped and the rabbit population drops due to myxomatosis	Consumers of boneseed are reduced
1958 and 1965		Environmental groups start pulling boneseed and revegetating	Some areas are beginning to be cleared of boneseed and additional environmental weeds are introduced
1963			32% of the park is infested with boneseed
1969	Numerous propagules are produced	A fire burns a large section of the park	Boneseed seeds are given the opportunity to germinate en masse
1974	Widespread dispersal		50% of the park is infested with boneseed
1981			94% of the park is infested with boneseed
1985		83% of the park is burnt by a wildfire	Huge quantities of boneseed seeds are able to germinate
1986			98% of the park is infested with boneseed (50% heavily infested)

The Bird Observers Club of Victoria started pulling boneseed in 1958 and the Geelong Field Naturalists Club started in about 1965. These groups have concentrated on specific areas where they have conducted follow up revegetation. Unfortunately, initial revegetation was not with indigenous plants so a number of the planted native species have now become environmental weeds. The work of these two groups has been significant and their long term commitment to their projects is to be praised.

The Government has conducted chemical control programs for many years at great expense with little long term success. Since 1985, CNR has spent about \$200 000 in chemical control of boneseed at the You Yangs. This included unsuccessful trials of aerial spraying of boneseed seedlings after the 1985 wild-fire. An aesthetics program then followed which sprayed boneseed within a roughly 50 m buffer strip along the perimeter roads of the park. In hindsight, this chemical control program was doomed and control for aesthetic reasons was a waste of resources.

A biological control program for boneseed was established at the Keith Turnbull Research Institute in 1987. The first biological control agent, the black boneseed leaf beetle, was introduced into the You Yangs in 1990. The bitou tip moth was introduced to the You Yangs in August this year. The first agent has not had a big impact on the plants and it is too early to judge the success of the bitou tip moth.

The Friends group was informed of the biological control program when the program was established. Initially some members of the group were concerned that it was going to be another "cane toad". However, with education from the program leader, the group realized that it was the only hope the You Yangs had if it was integrated with other control techniques. Members of the group participated in the initial site investigations and took an interest in the program. The establishment of a display about the program in the park visitor centre has assisted in the promotion and understanding of the biological control work at the You Yangs.

A number of new biological control agents are being investigated and these look a lot more promising. It is a pity that the \$200 000 spent on unsuccessful chemical control over the last eight years was not spent on research into biological control agents and integrated control techniques.

In summary, there is simply too much boneseed to remove by mechanical methods such as hand pulling. Chemical control has really made no impact due to access difficulties and rough terrain and the lack of follow up revegetation. The park area covered by boneseed is simply too large to treat by chemical methods alone. Biological control integrated with other control techniques and follow-up revegetation are our last chance. The Friends Group has high expectations for biological control but we realize we're in this for the long haul and biological control will only be successful if integrated with other techniques.

"The sun smiles down on the ancient hills as a slow day passes and a new day brings hope."

The role of the community in the implementation of biological control

S. Darby and D.A. McLaren, Department of Conservation and Natural Resources, Keith Turnbull Research Institute, PO Box 48, Frankston, Victoria 3199, Australia.

Summary

Community involvement in a number of biological control projects is discussed. Education is emphasized as a major factor required to make the community understand the capabilities and limitations of biological control and its implementation as part of integrated management plans for pests.

Introduction

Biological control is now being incorporated as part of a total management system for the control of pests in a wide range of situations. Weed infestations affect all members of the community, either directly or indirectly. They may cause increased commodity prices for agricultural produce by increasing costs of production, lowering yields or by contaminating produce. They may also have detrimental effects on the environment by choking out native vegetation, invading national parks and bushland and affecting the aesthetics of our landscape. They can also create problems through the over use of chemicals and the consequent contamination of soil and waterways.

Much time and money is currently devoted to addressing these problems, and increasing involvement can be seen through the formation of Landcare groups, ragwort action groups and school environmental awareness projects.

Biological control has specific but often limited use in the control of weed species. It is a long term approach useful in areas where other means of control are inappropriate, uneconomic or unachievable. The role of the community in the implementation of biological control is very important and an under utilized resource. The distribution and establishment of agents is essential to the success of a biological control program, but for the program to be wholly successful, the community needs to know of the use of biological control, understand it, believe in it, want to apply it and have the resources to use it (Andrews *et al.* 1992). It is through their participation and extension of ideas that community groups can work together to achieve the greatest success in biological control.

Education is critical in helping community groups to have realistic expectations

concerning the speed and success of biological control. This would prevent some of the adverse effects on the establishment of biological control agents, such as site destruction through pressure to control or spray a weed. Greater understanding of the processes and long term nature of biological control would reduce these sorts of problems.

There are a number of ways that landholders currently support biological control. Many agricultural industries (e.g., Wool) pay a levy on sale of their produce that goes into research and development. Some of this money may then be allocated to research on biological control of weeds. On an individual basis, assistance is sometimes given by the provision of release sites, labour to protect sites (i.e., fencing), production of release cages to aid establishment or through use of local knowledge and observations. It is intended that future biological control projects will incorporate wider community involvement and that once a particular community group has had success with a biological control program, they can network with and help new or inexperienced participants. The Department of Conservation and Natural Resources supports community involvement and will provide up to date information that will assist in the implementation of biological control.

The rearing of biological control agents is an extremely costly and labour intensive process. If community groups can help with this rearing, more agents can be