

# WHAT IS BIOLOGICAL CONTROL OF WEEDS?

## What is a weed?

A weed is a plant that is so successful it interferes with human activities in some way, for example, by reducing primary production, or our enjoyment of the environment. Weeds tend to be plants that are not native to New Zealand. These introductions often grow extremely well here because our climate is favourable and because their natural enemies are absent. At Landcare Research our aim is to develop biological control (or biocontrol) strategies aimed at restoring the natural balance between weeds and the environment by introducing some of these natural enemies.

## What is biological control?

Biological control uses one living organism to control another. There are two kinds of biological control: classical and inundative. In classical biological control, once the agents (usually insects or fungi) are well established there is no need to make further releases as they persist forever. By comparison inundative biological control uses large quantities of pathogens to create artificial disease epidemics, but they do not persist for long and need to be reapplied. This sheet describes classical biological control.

## How are biological control agents selected?

We survey the weed in New Zealand to see whether there is anything already here causing significant damage to the weed. Usually we do not find anything of significance, but if we do, we choose further agents to complement the existing attack. At the same time we study the weed in its native range to make a list of all its natural enemies. From this list we select specialist species that appear unlikely to attack other desirable plants for testing. We cannot possibly test every plant



species in New Zealand but a set of internationally accepted guidelines has been developed to help us choose the right sample (see *How safe are biocontrol agents for weeds?*). If the safety-tests indicate that a potential control agent is likely to cause unacceptable damage to other species we reject it.

## What happens next?

Once the Environmental Risk Management Authority (ERMA) approves an introduction, the Ministry for Agriculture and Forestry issues a permit that allows us to import control agents into a containment facility. We keep the agents in these secure facilities until they have been positively identified, and have received disease and parasite clearance. This step is necessary to ensure that we do not import any unwanted species with the control agents. Because we are able to free the agents of their own natural enemies they have the potential to be even more damaging in New Zealand than in their homeland. Once the quarantine phase is complete, a case is made to ERMA to take the agent out of confinement. ERMA ensures that adequate consultation has been carried out with all interested parties, and makes





a decision based on all available evidence and opinions. If permission to release agents is granted we rear them in large numbers so they can be distributed as widely and as quickly as possible.

### **How are the agents distributed?**

Because substantial long-term (5-10 years) funding is required to implement biological control programmes, large organisations, rather than individuals, have been asked to contribute to the task. We distribute control agents largely via programmes with regional councils, The Department of Conservation, and community groups. Once in place the on-going costs are minimal.

### **What happens after the agents have been released?**

There is no guarantee that any agent will establish in New Zealand, but our current success rate is high. Agent survival is checked through follow up visits to the release sites. As their numbers build, the agents begin to disperse naturally, or field staff move them to areas where the target weed is still a problem. Once agents are well established we undertake assessment trials to measure the effect they are having on their hosts. Many of the agents that we are importing have never before been released outside of their native range, so we cannot easily predict beforehand how much damage they will cause to their target plants. Most researchers believe that several control agents are usually required to have a significant impact on a weed. The impact of any one agent is likely to vary throughout New Zealand, and from year to year.

### **What should I do if I want to try biological control on my property?**

Read the next section to make sure that biological control is a suitable solution for your weed problem. If the answer is yes, get in touch with the pest plant or biosecurity officer at your Regional Council, or with Landcare Research if you need further advice.



### **Is biological control a suitable solution for my weed problem?**

- Biological control is an option when you do not need to eradicate the weed. Biological control agents do not eliminate weeds, because they can never find or utilise every plant. Rather, a successful biological control attack may reduce the vigour and abundance of a weed so that it stops spreading and it may reduce existing infestations to a level that we can live with or eliminate effectively and economically by other means. If biological control is successful, plants become increasingly rare and the agent population reduces accordingly, so a new equilibrium forms between the abundance of agents and their host plants. Weeds are controlled regardless of land ownership as control agents do not respect fences.
- Biological control is an option when you do not need to control the weed immediately, because it takes time for the agents to build up damaging populations. Weeds are removed gradually so large areas of soil are not exposed to erosion, and invasion by other undesirable species is limited.
- Biological control is an option when it is important that you harm only the target weed, a result that is difficult to achieve by mechanical or chemical means. Furthermore, biological control agents rarely pose health risks to handlers.
- Biological control may be the only option when other methods are not physically or economically possible.

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