

WHAT IS BIOLOGICAL CONTROL OF WEEDS?

What is a weed?

A weed is a plant that grows so well it becomes a nuisance, for example by displacing other more desirable plants, 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 (biocontrol) strategies aimed at restoring the natural balance between weeds and the environment by introducing some of these natural enemies.

What is biological control?

Biocontrol uses one living organism to control another. There are two kinds of biocontrol: classical and inundative. In classical biocontrol, 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 biocontrol 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 biocontrol agents selected?

We survey the weed in New Zealand to see whether there is anything already here that is causing significant damage to the weed or is likely to interfere with any biocontrol agents. This allows us to choose the best possible potential agents. At the same time we study the weed in its native range and any available literature regarding its natural enemies. This enables us to prepare a short list of candidates for testing that appear unlikely to attack other desirable plants. 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. If the safety-tests indicate that a potential control



agent is likely to cause unacceptable damage to other species it is rejected.

See *How safe are biocontrol agents for weeds?*

What happens next?

All biocontrol agents must initially come into a containment facility. Landcare Research has containment facilities at Lincoln and Auckland. Inside these secure facilities control agents can be positively identified and checked to ensure they are free of diseases, parasites and other unwanted contaminants. This step is necessary to ensure that we do not import any unwanted species along with the control agents. Because we are able to free biocontrol agents of their own natural enemies they have the potential to be even more damaging in New Zealand than in their homeland. The Environmental Protection Authority (EPA) must give approval for the introduction of agents into, and removal from, containment facilities. The Ministry for Primary Industries issues permits for these activities.

To gain permission to release a new biocontrol agent a case must be made to EPA. The EPA ensures that there is sufficient information available to make a decision and that adequate consultation has been carried out with interested parties. The EPA then makes a



decision based on all likely costs, risks and benefits. If permission to release an agent is granted we then rear it in large numbers so it can be distributed as widely and quickly as possible.

How are the agents distributed?

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

What happens after the agents have been released?

There is no guarantee that any agent will establish here, but our current success rate is high (~85%). Agent survival is checked through follow up visits to release sites. As numbers build, the agents begin to disperse naturally. People can, and often do, speed up the natural dispersal process by harvesting and moving the agents to new sites. Once well established the effectiveness of agents can be assessed. Many of them have never been released as biocontrol agents outside of their native range before, so we cannot easily predict beforehand how much damage they will cause to their target plants. As a rule several complementary 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, and this is often not predictable in advance.

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

Read the next section to make sure that biocontrol 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 biocontrol a suitable solution for my weed problem?

- Biocontrol is an option when you do not need to eradicate the weed. Biocontrol agents do not eliminate weeds, because they can never find or utilise every plant. Rather, a successful biocontrol 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 biocontrol 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.
- Biocontrol 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.
- Biocontrol 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, biocontrol agents rarely pose health risks to handlers.
- Biocontrol may be the only option when other methods are not physically or economically possible.

For further information contact:

Lynley Hayes
Landcare Research
PO Box 69040, Lincoln 7640
NEW ZEALAND
email: hayesl@landcareresearch.co.nz
Ph (03) 321 9694
Fax (03) 321 9998