

## WHAT IS BIOLOGICAL CONTROL?

Biological control of weeds uses one living organism to control another. Weeds are generally not native to New Zealand so for some weeds their natural enemies can be imported to help restore the natural balance between the weed and the wider environment.

The Taranaki Regional Council is part of a national collective which provides research, advice and assistance on biological control of pest plants. Biological control is a method recognised in the *Council's Pest Management Strategy for Taranaki: Plants*.



Ragwort flea beetle (magnified 8x)

## HOW ARE BIOLOGICAL CONTROL AGENTS SELECTED?

A thorough survey of the weed is done in NZ to make sure good natural enemies are not already available. The weed is surveyed overseas in its native range to identify its natural enemies. Species unlikely to attack desirable plants in New Zealand are listed and when the Environmental Risk Management Authority (ERMA) has approved the introduction, the species are imported to containment facilities where they are tested on the weed, related plants, similar unrelated plants, native plants and economically important plants, before a final decision to release or not, is made.

Some biological control agents are self introduced to New Zealand. For example, blackberry rust is thought to have blown here from Australia.

## WHICH BIOLOGICAL CONTROL AGENTS DO WE HAVE IN TARANAKI?

Since 1987 biological control agents, generally sourced from Landcare Research, Lincoln, have been released in Taranaki to assist in control of gorse, ragwort, scotch thistle, nodding thistle and old man's beard. AgResearch at Lincoln is continuing trials with a fungus to control giant buttercup and there are other agents which have arrived here unassisted (eg mist flower fungus).

The effects of biological control agents to date are mixed, due to the unpredictability of some environmental factors (eg weather) and the gradual nature of their effects. The distribution and control effects of the biological control agents that have been released in Taranaki are shown in Table 1 (over).

## FINDING BIOLOGICAL CONTROL AGENTS IN THE FIELD

**Ragwort flea beetles** (*Longitarsus jacobaeae*) are 2-3 mm long and bronze coloured. The beetles eat small holes in leafy ragwort plants in early summer and autumn and a careful search, without bumping the plant, will reveal the beetles. The larvae do the main damage by eating the roots and crown of the plants. The eggs are laid in cooler periods than summer when they would dry out too much. If a ragwort population is completely consumed by the beetles, they develop wings and fly to other ragwort sites.

**Old man's beard leaf miner** (*Phytomyza vitalbae*) was first released in Taranaki in 1996 and is now widespread. Tunnels on

the leaf caused by the miner can be seen a couple of months after the new leaves arrive in spring, until the leaves fall. Leaf damage can be severe enough to reduce the vigour of the vine.



Old man's beard leaf miner damage

**Nodding thistle gall flies** (*Urophora solstitialis*) were released to thistles in eastern Taranaki in January 1994 and are well established beyond the release sites. The gall fly larvae eat the developing seeds in late season flowers. The adult flies have black bodies and black stripes on their wings. Infested flower heads don't lose their fluff, are hard and lumpy compared to uninfested seed heads and when broken apart, the gall fly larvae are visible.

## OTHER BIOLOGICAL CONTROL AGENTS

The Environmental Risk Management Authority (ERMA) has approved the release of the South African boneseed leaf roller moth in New Zealand. In its native habitat, the insect helps control the boneseed plant. Boneseed is a pest plant especially in coastal areas of New Zealand. The first New Zealand release of the leaf roller moth was made at Waiheke Island in 2007. Taranaki has some boneseed plant populations at Oakura and New Plymouth.

## WHEN IS BIOLOGICAL CONTROL AN OPTION?

Biological control is best suited to weed problems where:

- other methods of control cause unacceptable damage
- other methods are not economically or physically possible
- the desired outcome is not total eradication.

Classical biological control does not remove the weeds immediately because it takes time for the control agents to build up to an effective population. The gradual removal of weeds is good, in that areas of bare earth are not suddenly exposed to erosion or invasion by other weeds.

For further advice or information about pest plant management contact:

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Table 1: Distribution and control effects of biological control agents in Taranaki (June 2007).

Pest Plant	Biological Control Agent	Release	Control effects as at June 2007
Gorse	Gorse seed weevil, gorse soft shot moth, Gorse spider mite, gorse thrips-European and Portuguese	1990-2004	Most of these agents can be found on gorse throughout Taranaki. While the spread of some of these agents is naturally slow they are considered effective over the long term.
Ragwort	Cinnabar moth, ragwort flea beetle	1987-1995	These agents are now widespread throughout Taranaki. They have been effective and now need no assistance to spread.
Old Man's Beard	Leaf fungus, leaf miner and sawfly	1996-2003	Although old man's beard leaf miner and leaf fungus are widespread throughout Taranaki the control effects have been poor. Old man's beard sawfly, released in 2004, has yet to become established.
Nodding Thistle	Crown weevil, gall fly and receptable weevil	1994-1997	These three agents are now widespread throughout Taranaki and are self spreading. There has been good control of nodding thistle in the eastern area of the region.
Scotch Thistle	Thistle gall fly	2004 and 2006	This agent is spreading beyond the initial release site.
Blackberry	Blackberry rust	1990 (self-introduced)	Widespread throughout Taranaki and is suppressing blackberry growth.
Mist Flower	Mist flower fungus	2003 (self-introduced)	The fungus has spread to all known infestations of mist flower in the New Plymouth area.
Giant Buttercup	Buttercup fungus	2004	The buttercup fungus is still in development period and data on control capabilities is not yet available.