

# Biological control innovations to manage weeds and pest animals

April 2017: The NRM community is in a prime position to advance the delivery of innovative new biological control agents of weeds and pest animals to reduce their devastating impact on Australian agriculture.

## Highlights

- Weeds and pest animals cost agriculture \$5 billion every year.
- Many highly effective and cost-efficient bio-control agents are available or are in the pipeline.
- NRM staff have the critical skills and are in a unique position to help ensure bio-control agents are effectively and widely deployed to have the biggest positive impact.

Introduced pest plants and animals damage agriculture substantially with a combined annual cost of almost \$1 billion for pest birds, rabbits, wild dogs, mice, foxes and feral pigs; and over \$4 billion for the wide range of weed species. These losses include reduced agricultural output, management costs, restricted access to overseas markets, administration and research costs.

Environmental damage from exotic species is more difficult to quantify but the impacts are substantial. For example, feral herbivores compete with native herbivores, degrade native pastures, prevent recruitment of native trees and shrubs, support high numbers of feral carnivores that in turn threaten populations of small native vertebrates, and favour weed establishment. Weeds

compete with and displace native plant species, degrade habitat for native animals, and can lead to complete ecosystem shifts by altering key processes such as fire regimes.

## Biological controls

Many invasive species can be managed by conventional methods but the costs are high. These methods are typically not cost-effective for application in rangelands or conservation reserves.

Self-disseminating biological controls are often the only viable means of control in these areas, and provide substantial benefits for industry by reducing recurrent conventional management costs and/or slowing the rate of pest and weed re-establishment and spread after conventional control.



Bio-control beetle *Leptinotarsa texana* eating silverleaf nightshade – one of Australia's worst agricultural weeds. (Photo: Greg Lefoe.)

New biological controls include the recently released K5-RHDV and proposed *Eimeria* intestinal parasites for rabbits, which aim to improve biological control in the high rainfall agricultural areas where the original RHDV was least effective. Koi herpes virus is being tested as a control agent for European carp that may restore water quality and native fish stocks in the Murray-Darling river system. And a North American leaf-eating beetle shows great promise for control of silverleaf nightshade, a persistent deep-rooted perennial weed of crops and pastures, and one of Australia's worst agricultural weeds.

New biological controls typically offer a return on research investment in excess of 20:1 and each has the potential to provide long-term benefits without ongoing costs.

#### Role of NRM staff

NRM staff provide several crucial links in the chain of innovation and development of biological control agents, from conception to deployment. NRM staff:

- Provide on-ground information to identify the failure of conventional control and the need for biological control solutions.
- Collect samples of weeds and related native species in biological control development, so that tests can be undertaken to ensure native species will not be impacted.
- Have local on-ground knowledge and well developed networks making them ideally placed to promote biological control amongst land managers who may rely on conventional control methods and

who may be unaware of the full range of biological controls, or unconvinced of their efficacy.

- Provide knowledge and advice to ensure the correct biological control agents are applied because the distribution and application of biological control agents often requires specialised knowledge.
- Collect and provide much of the data on weed and pest animal distributions before and after release, as well as spread of agents.
- Provide locally-tailored integrated advice on weeds and pest animals to ensure maximum value is gained from biological control methods through the use of complementary conventional techniques.

In the future, revolutionary gene-driven technology may produce targeted, reversible biological control agents that can drive pest populations to extinction. Whether community acceptance aligns with advances in technology remains to be seen, but engaging NRM staff in the community discussion will be essential.

### Get on board!

Interested in getting involved or want to find out more? Then please contact us.

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