

FINDING A BIOCONTROL AGENT FOR CRASSULA

Locations	Australia, United Kingdom
Dates	01/04/2011 - Ongoing

Summary

Crassula helmsii is an invasive water weed that dominates still or slow-flowing water bodies. It's spreading throughout the UK and has the potential to out-compete native flora and reduce oxygen levels by forming dense mats. Management of this species can be very challenging, with chemical and mechanical options limited. CABI were commissioned by the UK government to investigate the possibility of controlling the weed using biological control. This includes testing by our scientists to ensure that any potential agent is safe for release.

The problem

Crassula helmsii or Australian swamp stonecrop is an invasive, aquatic weed from Australia and New Zealand. It was introduced to the United Kingdom in the early 1900s as a garden pond plant and has since spread throughout the country.

This weed can dominate still and slow-moving water bodies, smothering native species and potentially depleting the water of oxygen. The introduction of the European Water Framework Directive requires European waterways to reach a 'good ecological status' but control of this species is a problem owing to restrictions on the use of chemicals near waterbodies. In addition, manual control often generates new plants by spreading viable fragments, exacerbating the problem.

The UK government has therefore commissioned CABI to investigate the potential of controlling *C. helmsii* using biological control. This involves assessing the suitability of the natural enemies that help to keep it under control in its native range in Australia and New Zealand.

What we are doing

Together with the University of Tasmania, the Department of Primary Industries, Victoria and Australis Biological, a scientific team from CABI conducted surveys throughout the plant's native range in order to identify natural enemies that could be considered as biocontrol agents in the introduced range (the UK). Those with the most potential were brought back to the UK for further testing in our quarantine facilities.

Results so far

Many of the natural enemies (both fungal and arthropod species) collected and identified during surveys, were rejected as potential control agents because they were able to attack other plants closely related to Australian swamp stonecrop.

Further testing, however, revealed the gall-forming mite, *Aculus crassulae* (Eriophyidae) as the most suitable agent. Mites from this family are renowned for their host specificity and ability to reduce the plants reproductive success (fitness). Mite feeding causes *C. helmsii* to develop galls in the growing shoots and growth is significantly reduced. Safety testing, carried out under quarantine conditions, demonstrated that the mite is specific to its host, *C. helmsii* and will only feed and complete development on this species. Subsequent laboratory-based studies also showed that the mites had the potential to survive and establish under environmental conditions in the UK.

CABI scientists compiled this research in a Pest Risk Analysis (PRA) which was reviewed by Defra, an expert scientific panel, the devolved governments and by stakeholder groups before ministerial approval was granted in June 2018. The mites have since been released at a small number of sites across England and Wales and continue to be monitored.

This initial restriction at the early stages of the release programme is to allow for more detailed assessments to take place to increase the understanding of field results before upscaling its release at a later stage. Early results have shown that the mites can survive and develop populations under UK conditions and the aim is now to ensure that the mites can establish robust and sustainable populations at the release sites.

For further information on CABI's work with Australian swamp stonecrop, please visit CABI's dedicated Australian swamp stonecrop page.

Donors

Department for Environment, Food and Rural Affairs (Defra), Natural England, Ministry of Defence, UK, UK Water Authorities

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