



# BIOLOGICAL CONTROL OF OXEYE DAISY

**Locations** Australia, Canada, United States

**Dates** 01/01/2008 - Ongoing

## Summary

Although closely related, Oxeye daisy is an invasive weed in places like North America and Australia, while Shasta daisy remains a garden favourite, especially in North America. CABI is investigating whether specialist natural enemies from oxeye daisy's area of origin in Eurasia could be introduced in North America and Australia as biological control agents. In North America the popularity of Shasta daisy makes this a challenge because any introduced agent must damage oxeye daisy but not Shasta daisy.

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## The problem

Oxeye daisy (*Leucanthemum vulgare*) is a perennial herbaceous plant with showy flowerheads. Originating from Europe and western Asia, it has been introduced to many other parts of the world. It became naturalised in the wild throughout most of temperate North America and in south-eastern Australia, where it is found in pastures, meadows and open woodland, and on roadsides and wasteland.

Oxeye daisy is highly invasive and difficult to control by conventional means. Biological control offers an alternative approach: one reason for the plant's impact may be the absence of natural enemies that attack it in its area of origin. The challenge is to find natural enemies that attack oxeye daisy but do not damage related ornamentals or native species.

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## What we are doing

In 2008, CABI was asked by the Ministry of Forests and Range in British Columbia to investigate the prospects for biological control of oxeye daisy in North America. CABI has since become involved in a similar project for Australia.

A literature survey revealed some 80 insect species known to feed on oxeye daisy in Europe – about 25% are thought to have a narrow host range. Seven species were prioritised as potential biological control agents: the root-mining tortricid moths *Dichrorampha aeratana* and *D. baixerasana*, the shoot-mining *Dichrorampha consortana*, the root-feeding weevils *Cyphocleonus trisulcatus* and *Diplapion stolidum*, the root-galling fly *Oxya nebulosa* and the flowerhead-attacking tephritid fly *Tephritis neesii*.

The next step is to study these species in depth to assess their suitability for introduction to North America or Australia. We are looking for species that are both specific and damaging to the target weed, but not to non-target species.

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## Results so far

The two weevils *D. stolidum* and *C. trisulcatus* and the fly *T. neesii* were rejected because they proved not specific enough for introduction in North America. However, *C. trisulcatus* may still be a suitable biological control for Australia where the attacked Shasta daisy (*Leucanthemum x superbum*) is less common.

Tests with the root-mining tortricid moth *D. aeratana* proved to be very promising. From laboratory tests, we found that its fundamental larval host range (the plant species the larvae can develop on) is mainly restricted to the genus *Leucanthemum*. In outdoor experiments in Switzerland, where we gave moths a choice of test plant species and oxeye daisy, we found high numbers of larvae in oxeye daisy and just a few in ornamental Shasta daisies (*Leucanthemum x superbum*). Impact experiments with potted plants showed that larval feeding reduces biomass and flowering of oxeye daisy, but has no impact on Shasta daisy. In 2021, in collaboration with our partners in Canada and the US, we applied for permission to introduce it to North America. We will also continue host-range tests with *D. aeratana* using non-target species native to Australia as well as additional species important for the horticultural industry in Australia.

We started tests with the root-galling tephritid fly *O. nebulosa* in 2016. In no-choice tests (where the fly is exposed to only one test species or the target weed), galls were exclusively found on oxeye daisy and, to a much lesser extent, on four other species. These are positive results and we will, therefore, continue working with this insect.

In 2018, we set-up a rearing colony with the shoot-mining tortricid moth *Dichrorampha consortana* in order to start investigating its biology and host range.

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## Donors

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## Partners

New South Wales Department of Primary Industries, Australia, McClay Ecoscience, Ottawa, Canada

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