

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.

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.

What we are doing

In 2008, CABI was asked by the Ministry of Forests 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 moth, *Dichrorampha consortana*, the root-feeding weevils, *Cyphocleonus trisulcatus* and *Diplapion stolidum*, the root-galling fly, *Oxyna 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.

Results so far

The weevils, *D. stolidum* and *C. trisulcatus,* and the fly, *T. neesii,* were rejected because they proved not specific enough for introduction in North America.

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 2021, we completed testing and, in collaboration with our partners in Canada and the USA, we applied for permission to introduce it to North America. In Canada, a release permit was granted in 2022 and the first releases of *D. aeratana* took place in British Columbia and Alberta in 2023. In the USA, the USDA-APHIS Technical Advisory Group (TAG) recommended its field release in 2022. In the USA, the moth now has to pass further environmental regulations before being permitted for release. An application to release this species in Australia will be prepared by our collaborator 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. In choice tests, we found galls only on oxeye daisy and, to a lesser extent, on the ornamental Shasta daisy (*Leucanthemum* × *superbum*). Together with our North American partners we are preparing a petition to release *O. nebulosa* in Canada and the USA.

Tests with the root-feeding weevil, *C. trisulcatus,* revealed that this species is 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* × *superbum*) is less common and an application to release this species in Australia will be prepared by our collaborator in Australia.

We are currently also investigating the biology and host range of the shoot-mining tortricid moth, *Dichrorampha consortana.*

Donors	New South Wales Department of Primary Industries and Regional Development, Australia, New South Wales Environmental Trust, Montana Noxious Weed Trust Fund through Montana State University, USA, Ministry of Forests, British Columbia, Canada, Wyoming Biological Control Steering Committee, USA
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