

Biological control of crofton weed on Lord Howe Island

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Summary Lord Howe Island (LHI) is an island off the New South Wales coast in Australia declared a World Heritage Area in 1982 in recognition of its outstanding natural beauty and exceptional biodiversity. It is however, under serious threat from weeds. Since 2004 the LHI Board has been implementing a weed eradication program mostly for woody and scrambling weed species for which eradication is possible. Crofton weed (*Ageratina adenophora* (Spreng.) R.M.King & H.Rob.: Asteraceae) is one of the two dominant weeds on the island (tiger lily (*Lilium formosanum*) is the other one) that has not been included in the eradication program. The extent of its distribution, mainly in non-accessible areas, makes manual removal and herbicide control impractical. Biological control is believed to be the only viable option to reduce densities of crofton weed across its range on the island (Auld and Hutton 2004).

Crofton weed, with its wind-dispersed seed, often takes advantage of large-scale natural landslip disturbances and readily colonises these areas preventing native flora regeneration, particularly in the southern mountains of LHI. Invasion by crofton weed poses a major threat to intact plant communities such as the Mixed Fern and Herbfeld Community, which is one of the most significant vegetation communities on the island. The critically endangered twiner *Calystegia affinis* is also threatened by crofton weed invasion.

This project explored options to establish a self-sustaining and environmentally-friendly biological control program for crofton weed on LHI. The project initially focused on the fungal pathogen *Passalora ageratinae* (previously known as *Phaeoramularia eupatorii-odorati*), which is widespread on the mainland (Wang *et al.* 1997) and was believed to be absent from LHI. Following an initial survey that confirmed its presence on the island, the project's focus was redirected towards assessing the potential of the exotic rust fungus, *Baeodromus eupatorii*.

The rust fungus was collected in Mexico in November 2011 and imported for evaluation into the CSIRO high security quarantine facility in Canberra. Results from initial testing on 35 closely-related

species to crofton weed in the family Asteraceae, including the two Australian native *Adenostemma* spp. in the tribe Eupatorieae and a few endemic species from LHI, showed that the fungus is highly specific towards crofton weed. In these tests, it was capable of infecting only one other species, mistflower (*Ageratina riparia* (Regel) R.M.King & H.Rob.), a close relative of crofton weed which is also an introduced weed in Australia. However, considerably less infection and restricted development of the fungus were observed on this species compared to that on crofton weed. These results are very promising as it is essential to demonstrate that the fungus does not pose a threat to non-target plants before permission can be obtained to release it in the Australian environment. Monitoring plots have already been established at five sites on LHI and baseline demographic data on crofton weed and associated plants collected to enable comparison with future data to assess the impact of the fungus once it is released.

We are hoping to secure additional funding to complete remaining host-specificity tests to ensure a robust case exists before an application is put forward to the authorities for the release of the rust in Australia.

Keywords Environmental weed, biological control, plant pathogens, rust fungus, host-specificity testing.

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