What happens when a biocontrol agent attacks exotic but desired ornamentals?

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Summary Significant damage to non-target plant species by a biological control agent could be iminical to the future of biocontrol, particularly if it is associated with widespread community concern. When an agent attacks exotic non-target species that are valued by some members of the community, then the issues become clouded and difficult to address. *Aconophora compressa* (Walker) was approved for release as an agent for biocontrol of *Lantana camara* L. in 1995, after 21 state and federal environmental and agricultural agencies reviewed and supported the submission.

*Aconophora compressa* established in the field and since 1999, when *A. compressa* populations became locally high, it has also attacked the introduced ornamentals fiddlewood, *Citharexylum spinosum* L. and duranta, *Duranta erecta* L. Both plant species are popular garden plants, although fiddlewood is no longer widely planted. Adults were also found on several other closely related species in the same family or closely related families. While rural landholders and land managers were demanding agents to assist in the management of lantana, Australia’s worst environmental weed, residents in south-east Queensland were concerned that *A. compressa* was damaging their garden plants. The situation was both challenging and complex – placating angry homeowners, while trying to control a Weed of National Significance. This paper discusses the issues, processes and outcomes involved with the handling of the *A. compressa* situation in south-east Queensland, covering science, extension, communication, policy and media.

Keywords Non-target, *Aconophora*, lantana, communication strategy, public concern.

INTRODUCTION

Lantana, *Lantana camara* L. (Verbenaceae) is a Weed of National Significance (WONS) and as such, is regarded as one of Australia’s worst weeds (Day et al. 2003). Lantana was estimated to cost Australia $7 million per annum in lost production for primary industries and more than $10 million per annum in control costs (Culvenor 1985). A more recent unpublished estimate of the total cost indicates it exceeds $20 million annually (Department of Natural Resources, Mines and Energy 2004).

*Aconophora compressa* (Walker) (Homoptera: Membracidae) was the 27th insect species released in Australia as a biocontrol agent for lantana. It is a sap-sucking bug imported from Mexico and was first released for the Queensland Department of Natural Resources, Mines and Energy (NRM and E) in 1995 by the Alan Fletcher Research Station (AFRS) (Palmer et al. 1996). The last release in Queensland was in November 2001 at Helidon.

All quarantine protocols for the import, testing and release of *A. compressa* were met. *Aconophora compressa* was extensively tested against a total of 62 potential host plant species, representing numerous plant families. The list of host plants for testing, and the results of the testing were reviewed by 21 state and federal agencies across the country. Final approval for release of the insect was given by the Australian Quarantine Inspection Service (AQIS) and the Department of Environment and Heritage.

*Aconophora compressa* was widely released in Queensland and New South Wales from 1995 to 2001 and established at several sites in both states, including south-east Queensland and central NSW.

Since late 1999, researchers at AFRS have become aware that *A. compressa* populations were locally high around Brisbane, and the insect was found to attack the introduced ornamental tree fiddlewood, *Citharexylum spinosum* L. (Verbenaceae) and the introduced, ornamental shrub duranta, *Duranta erecta* L. (Verbenaceae). However, heatwaves over the following summer caused the insect to disappear from fiddlewoods and no further study of the insect was possible. Insect populations again increased slowly during 2002. The summer of 2002/2003 was relatively mild and populations persisted and built up to very large numbers on lantana and fiddlewood, especially around the Brisbane bayside suburbs (Day et al. 2003), the Gold Coast and higher altitude areas around Mount Tamborine and Springbrook in the Gold Coast hinterland, causing concern for homeowners.
Fiddlewood, a rapidly growing exotic tree from the West Indies, which grows up to 20 metres, has been sporadically planted throughout Brisbane as a screening/feature tree in suburban backyards and parks. Local government and energy generation companies (such as Energex in Brisbane) now regard fiddlewood as an undesirable species, as its shallow, aggressive root system interferes with underground services and plumbing and its vigorous growth can damage overhead powerlines.

THE 2003 OUTBREAK

NRM and E received its first phone call from a concerned homeowner regarding *A. compressa* damaging their fiddlewoods in late 2002 and by early April 2003, was receiving about 1–2 calls per week. The Department first received significant media attention and high levels of public enquiry regarding *A. compressa* in late April 2003. While a vast majority of calls related to damage to fiddlewoods, there were a significant number that suggested the insect was attacking ‘every plant in the garden’.

By the end of February 2004, NRM and E had received 59 radio and seven television mentions, a significant number of print media articles and a total of 1732 telephone enquiries regarding *A. compressa*. The number of calls NRM and E received clearly demonstrated that these non-target impacts of *A. compressa* attacking fiddlewood and possibly other species concerned a significant number of homeown- ers in south-east Queensland. These concerns were fuelled by media activity from one particular outlet that likened the insect to ‘another cane toad’.

Many fiddlewood trees were affected, with some trees being completely defoliated by the stress brought on by large numbers of feeding insects. To compound the issue, when large numbers of *A. compressa* occurred on fiddlewood and the tree began to lose leaves, the insects migrated to other garden plants. These ‘overflow’ populations sometimes fed on other species but, in most cases, the insects were merely resting and did not feed or damage these other plants.

Like other sap-sucking insects (e.g. aphids, psyllids, scales), *A. compressa* exudes copious quantities of processed sap known as honeydew, a sugar–water solution in which black sooty moulds often thrive. The production of honeydew by *A. compressa* was found to be undesirable for homeowners. *Aconophora compressa* also fed upon other plant species, both exotic and native, the highest profile of which was jacaranda, *Jacaranda mimosifolia* (D. Don pers. comm.). Although field observations ultimately indicated that the effects on jacaranda and these other plant species were minor (Palmer *et al.* 2004), and that they were very marginal hosts, the appearance of the insect on these plants caused understandable concern for homeowners.

DEPARTMENTAL APPROACH TO PROBLEM

The major problem for the Department was how to deal with the issue of an introduced biocontrol agent that was causing substantial damage to one of Australia’s worst weeds and the public perception that the Department had released ‘another cane toad’ that attacked ornamentals, which themselves were exotics.

Other difficulties encountered included: the ability to produce public information materials; indications of possible legal action; demands for compensation and/ or solving the problem for homeowners; significant public reaction, i.e. ‘gardens being trashed’, ‘bug attacking everything’; polarised opinion between science and communication issues; delay between research staff knowing of a potential problem and the communication of the issue to the broader departmental body; in-house resources to manage the problem of high volumes of public callers seeking information about the problem; and no registered control method for the insect being available for use on large trees.

Once the problem of *A. compressa* attacking fiddlewood and possibly other garden species was established, the Department adopted a coordinated public relations strategy. A management group was established and met regularly to discuss and formulate communications plans that were updated as required. The following actions were initiated and updated on a regular basis at a cost to the department of approximately $175,000.

- Two part time staff were appointed to offer technical and extension advice to the general public and to visit concerned homeowners.
- A fact sheet for *A. compressa* was produced, reviewed and updated several times.
- Fact sheets were mailed with covering letters to all retail nurseries, garden centres, hardware outlets and tree surgeons in south-east Queensland including Toowoomba. Supplies of the brochure were also made available to affected local governments and to members of the public at targeted extension events such as ‘Gardening Australia Live’ and on the internet.
- Media releases were issued with only one nominated spokesperson.
Media appearances, including the Brisbane nightly news and a gardening show, were made.

Question and Answer items were posted to the NRM and E web site.

Presentations were made to local governments.

Presentations were made to the Horticultural Media Association.

A half-day industry forum was held at AFRS.

Ministerial and Director General briefs were prepared.

Media monitoring was implemented to issue transcripts of electronic media and press cuttings on the same day.

On-going situation updates were prepared for local government and industry.

The Department also proceeded to resolve several scientific issues. It was necessary to distinguish plants that were actually being threatened by the insect from plants subject to minor feeding or plants on which the insects were simply resting. In this regard, the status of mangrove species was of particular importance (Palmer et al. 2004). Research into control methods for use on large trees that could be registered nationally was initiated. The relationship between high temperatures and insect mortality was investigated. The phenology of insect populations over time and on various plant species including mangroves, the mapping of the spread of infestations, and the influence of predators and parasites were also investigated. This research is presently continuing and will develop a greater understanding of the behaviour of A. compressa and provide accurate information on the plants affected.

Insect populations have declined substantially on lantana and fiddlewoods after heatwaves during the 2003–4 summer. Consequently, public and media comment has also reduced dramatically. Despite the reduced populations, A. compressa is firmly established in parts of Queensland and NSW and is continuing to spread and contribute to the biocontrol of lantana. However, it is likely that insect populations will again increase and that there will be further attack on fiddlewoods, with the possibility of overflow populations again moving onto other ornamental species. As a result, public concern and media activity and interest is expected to follow.

CONCLUSION

The main concern with A. compressa was one of perception and impact. On one hand, there is a need to control one of Australia’s worst environmental weeds and on the other the damage to exotic ornamentals in gardens. When such a conflict arises, it is critical that an adequate management plan is quickly activated, so that neither the Department nor the public is caught with insufficient information. This information should include the status of the problem, the decision-making processes involved, the benefits of the particular action and any possible negative impacts to certain groups.

The communications and extension strategies developed for A. compressa have since been adapted and applied to other more recent problems, in particular to the seizing of a Class 1 animal incursion (the red-eared slider turtle) and to breaches of the Land Protection Act involving a wild animal park in far north Queensland.

REFERENCES


