

## Argentinian fungi for Bathurst burr fail preliminary host-specificity tests

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*Xanthium spinosum* (Bathurst burr) is a widespread summer annual weed in rangeland, pasture and crops in eastern Australia. Prospects for classical biological control of this weed were investigated in the 1990s by carrying out a series of surveys for fungal pathogens attacking *X. spinosum* in Argentina, the putative country of origin of this plant. The powdery mildew *Erysiphe cichoracearum* and the facultative parasite *Cercospora xanthicola* were the most frequently recovered pathogens and were widely distributed within the regions of Argentina surveyed. Significant damage was associated with the presence of *E. cichoracearum*, which sporulated profusely on both leaf surfaces, stems and shoots. Infection by *C. xanthicola* was spectacular at several sites in northern Argentina in March 1995, but it appeared that the pathogen was favoured by humid environmental conditions. In following surveys, infection was scattered, restricted to lower leaves and rarely damaging. The pathogenicity of isolates of *E. cichoracearum* was tested on Bathurst burr, other *Xanthium* spp. and a selection of species from related genera of Asteraceae. Severe infection and heavy sporulation developed on Bathurst burr plants while the other *Xanthium* spp. developed only mild symptoms. All other Asteraceae tested proved to be immune or resistant, but three of the eight sunflower cultivars tested became heavily infected. The most aggressive isolate of *C. xanthicola* tested in the laboratory produced necrotic lesions on Bathurst burr that expanded to cover most of inoculated leaves within 3 weeks. However, no stem lesion ever developed and plants recovered rapidly. The fungus required a minimum of 2 days under humid conditions to infect plants. All sunflower cultivars tested were susceptible to the pathogen and developed necrotic lesions. The lack of specificity of *E. cichoracearum* and *C. xanthicola* militates against their possible use as biological control agents for Bathurst burr in Australia.

## Biological control of saffron thistle with fungi: limited prospects

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*Carthamus lanatus* (saffron thistle), a native of the Mediterranean region, affects livestock, pasture and grain production throughout temperate and subtropical Australia. Herbicides are effective in controlling this weed, but the cost of this control method prohibits its use over the vast areas infested. Biological control, if successful, is likely to be the only solution to effectively manage saffron thistle populations in Australia. Following surveys carried out in Greece, two pathogens, *Puccinia sommieriana* (microcyclic rust) and *Septoria centrophylli* (facultative parasite), were identified as potential candidates for classical biological control of saffron thistle. A preliminary study was conducted to determine the susceptibility to these pathogens of Australian accessions of saffron thistle and cultivars of the closely related crop, safflower (*Carthamus tinctorius*). All isolates of *Puccinia sommieriana* tested produced, within 5–6 days after inoculation, small chlorotic flecks on leaves of all Australian accessions of saffron thistle tested. Flecks had developed into mature telia by 14 days after inoculation. However, the rust also infected leaves, bracts and stems of safflower cultivars and developed mature telia within the same time frame.

*Septoria centrophylli* infected Australian accessions of saffron thistle tested. Small necrotic lesions were first observed at 8 days after inoculation and developed into necrotic lesions by 13 days after inoculation. All safflower cultivars inoculated with *S. centrophylli* also developed large necrotic lesions. The finding that safflower is also a host for the two pathogens isolated from *C. lanatus* in Greece raises concerns about the suitability of these pathogens for biological control of saffron thistle in Australia. Although the safflower industry is shrinking in Australia, farmers are still contracted to grow this crop for the Japanese market because of the high quality oil produced. It is likely that a conflict of interest would emerge with this industry should this biological control program be pursued.

## **Assessing the risks associated with the release of a flowerbud weevil, *Anthonomus santacruzi*, against the invasive tree *Solanum mauritianum* in South Africa**

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Biological control of *Solanum mauritianum* Scopoli, a major environmental weed in the high-rainfall regions of South Africa, is dependent on the establishment of agents that can reduce fruiting and limit seed dispersal. The flowerbud weevil, *Anthonomus santacruzi* Hustache, is a very promising fruit-reducing agent, despite ambiguous results obtained during host-specificity evaluation in quarantine. Adult no-choice tests showed that although feeding is confined to *Solanum* species, normal feeding and survival occurred on the foliage (devoid of floral material) of cultivated eggplant (aubergine), potato and several native South African *Solanum* species. During paired choice tests involving floral bouquets in 10-litre containers, *A. santacruzi* oviposited in the flowerbuds of 12 of the 17 test species, including potato and eggplant, although significantly more larvae were recovered on *S. mauritianum* than on eight species. Larvae survived to adulthood on all 12 species, with survival significantly lower on only four species than on *S. mauritianum*. However, during multichoice tests, involving potted plants in a large walk-in cage, *A. santacruzi* consistently displayed significant feeding and oviposition preferences for *S. mauritianum* over all of the 14 *Solanum* species tested. Analyses of the risk of attack on non-target *Solanum* plants suggested that, with the possible exception of two native species, none are likely to be extensively utilized as hosts in the field. Also, host records and field surveys in South America have suggested that *A. santacruzi* has a very narrow host range and that the ambiguous laboratory results are further examples of artificially expanded host ranges. These and other considerations suggest that *A. santacruzi* should be considered for release against *S. mauritianum* in South Africa and an application for permission to release the weevil was submitted in 2002.