

Potential exotic virus threats to Lucerne seed production

What you should know

Alfalfa dwarf disease (ADD) is causing major economic loss in lucerne (*Medicago sativa*) production in Argentina. Five different viruses are known to be associated with this disease. Alfalfa leaf curl virus (ALCV) is the most likely key virus, leading to severe symptoms and yield losses. ALCV is known to be transmitted by the aphid *Aphis craccivora* and is found infecting lucerne in South America, the Mediterranean region and the Middle East. There is a risk of accidental introduction of ALCV into Australia. Potential pathways of ALCV entry are through viruliferous aphids or infected host plants. Biosecurity measures should be put in place to prevent its entry. Grower vigilance and early detection will be key to keeping the industry safe from ADD.

Background

In 2010, a severe disease of lucerne was reported from Argentina. Alfalfa dwarf disease-affected plants appear severely dwarfed, bushy with leaf puckering, with curled leaves, and veins enations. In Argentina, infection rates of more than 50% have been recorded, as well as yield loss in hay dry mass of up to 30%. Effects on seed production are unknown. Due to the economic importance of lucerne in Argentina and Australia, and the sudden impact of ADD in Argentina (losses of US\$700 million), this project investigated the risks that ADD could pose to the Australian lucerne industry.

Disease symptoms

ADD-affected plants display the following characteristics:

- Leaf puckering
- Varying-sized vein enations on abaxial leaf surfaces
- Shortened internodes, which cause a bushy appearance
- Shortening of internodes, which severely deforms and decreases the size of leaflets
- Chlorosis
- Appearance of papillae and buds in the ribs of the underside of the leaves (Fig. 1).

Recent studies have shown that whenever the ADD infection rate exceeds 50% in a lucerne-growing area (paddock), the hay dry mass yield can decrease by as much as 30%.

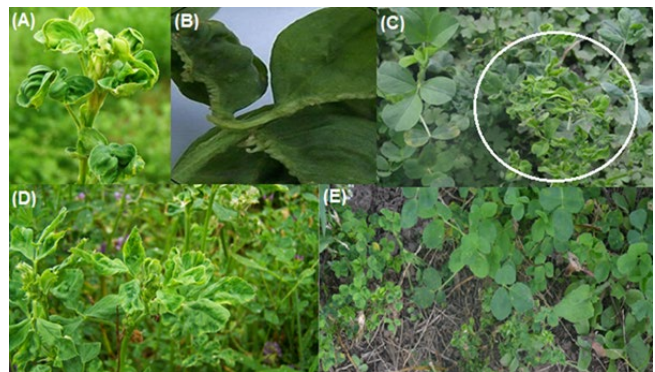


Figure 1. Characteristic ADD symptoms include the following: severe leaf puckering (A); leaf enation (B); severely dwarfed plants (C, right white circle); leaf curling (D); and dwarfed plants (left) compared to uninfected plants (right) (E).



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Diagnosis

ALCV incursion and the associated potential to lead to ADD in Australian lucerne could have several consequences: higher costs for control of insect vectors; and lower lucerne hay yields and seed quality. Timely detection and reporting might ease eradication and reduce the long-term impact of an incursion into Australia. This process generally includes the following steps:

1. Recognition of a symptomatic plant by growers, consultants, research personnel, university staff, agribusiness, or the general public.
2. Validation of the presence of the virus by a diagnostic facility. This can be done by the research team at the University of Queensland. Contact Dr Ralf Dietzgen at r.dietzgen@uq.edu.au to arrange testing of suspect samples.
3. Informing the relevant state Department of Agriculture through the Exotic Plant Pest Hotline (1800 084 881) or by contacting the department directly.

What might happen next

If ALCV is detected in Australia, it will be subject to eradication and/or containment processes. The decision to eradicate should consider the potential economic impact for hay and seed production, the cost of eradication, and the technical viability. Eradication costs must factor in long-term surveys to validate the success of the eradication program. It is essential that

a minimum period of time must pass with no detection of the pathogen before pest-free status can be declared. The duration of no detections must be determined from three factors:

1. The size of the infected area
2. The ALCV host range in the incursion zone
3. The extent of surveillance and intensity of monitoring for the virus.

If there is an incursion and establishment in a growing region, ALCV could become established in hosts other than lucerne, which would make eradication more unlikely.

Given that ALCV is known to be transmitted by an aphid species, it is recommended that the Contingency Plan for Aphid-Transmitted Viruses also be consulted in any response to ALCV.

Further information and resources

PRJ-009751 - Potential exotic virus threats to lucerne seed production in Australia (Final Report)

ALCV Contingency Plan

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