Angular leaf scorch: biosecurity implications for Australia

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Introduction
Angular leaf scorch (ALS) of grape, listed on the Viticulture Industry Biosecurity Plan as a high priority exotic disease with high potential for spread, is caused by the ascomycete fungus Pseudopezicula tetraspora and is found in North America. The fungus infects grapevine leaves to cause necrotic lesions (Figs 1 a, c, d). If established in Australia, the disease may cause significant yield loss and would incur significant costs for control programs. Research based at Cornell University in New York, USA is evaluating methods of control and eradication of ALS.

Control of angular leaf scorch with fungicides

In vitro experiments
- Fungicides were assessed for restricting growth of P. tetraspora cultures on agar compared with controls (no fungicide; Fig 1e).
- Trifloxystrobin and pyraclostrobin prevented growth of P. tetraspora at all concentrations (Fig 2).
- Tebuconazole and difenoconazole prevented growth at the three highest concentrations.
- Myclobutanil and boscalid were the least effective.

![Diameter of Pseudopezicula tetraspora cultures grown for 2 weeks on PDA plates amended with fungicides at a range of concentrations (ppm a.i.). Bars represent standard error of the mean.](image)

Potted vine experiments
- Commercial formulations of tebuconazole, trifloxystrobin or pyraclostrobin applied to cv Riesling vines; inoculated with P. tetraspora 1 day later (Fig 3).
- Foliar symptoms observed on untreated control plants after 4 weeks.
- No symptoms observed on any fungicide-treated plants.

![Potted cv Riesling vines sprayed with individual fungicides or left untreated (controls), then inoculated with Pseudopezicula tetraspora; b) symptomatic leaf on control vine 4 weeks after inoculation, showing necrotic lesion surrounded by chlorotic margin.](image)

Cultivar susceptibility
- Potted vines of eight cultivars commonly grown in Australia were inoculated with P. tetraspora and assessed for leaf lesions after 4 weeks.
- The interspecific hybrid cultivar Chancellor, known to be susceptible to ALS, was included for comparison.
- Riesling was more susceptible than Chancellor; all other cultivars were less susceptible, with lesion sizes from 35% that of Riesling to almost nil (Fig 4).

![Differences in susceptibility to Pseudopezicula tetraspora among cultivars of Vitis vinifera, as determined by leaf lesion size 4 weeks after inoculation. Bars represent standard error of the mean.](image)

Field eradication trial
- Grapevines were either drastically pruned using eradication protocols previously developed for black rot or pruned normally (controls) (Fig 5).
- In the first year, ALS symptoms developed on controls but not treated vines.
- Trial is being monitored to confirm continued efficacy in Year 2.

![Untreated (control) vines; b) treated vines following drastic pruning; c) treated vines eight weeks after drastic pruning; d) advanced angular leaf scorch symptoms in control vines.](image)

Conclusion
ALS can be controlled with fungicides already in use in Australian viticulture, and preliminary results suggest it could be eradicated from vineyards by drastic pruning. Grapevine cultivars commonly grown in Australia vary in susceptibility to ALS, with Riesling being highly susceptible. A diagnostic protocol has been developed to help prepare the viticulture industry for a rapid and effective response in the event of an ALS incursion into Australia.

Reference

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