INDUSTRY NOTICE

ACTIONS FOR INDUSTRY TO TAKE IN RESPONSE TO RECENTLY PUBLISHED PHYLLOXERA RESEARCH

Vinehealth Australia has translated four key research findings into actions for industry from the Final Report by Agriculture Victoria, titled 'Integrated management of established grapevine phylloxera'. These actions are important for industry to note and incorporate into standard operations and farm-gate hygiene practices.
This follows the Media Release from Agriculture Victoria and Wine Australia on Wednesday 22 September.

1. PHYLLOXERA LIVES LONGER

Study

- Intensive survival studies of five of Australia's key endemic phylloxera strains (G1, G4, G19, G20, G30), each representing a different group of strains with common ancestry, were completed. Survival was measured under a range of ambient temperatures, both in the presence and absence of food, and under wet and dry conditions.

Key finding

- In the absence of food (root material) but in the presence of water (approximating soil moisture), the **G20 phylloxera strain survived for up to 29 days at 18˚C**.

Relevance

- The length of survival for this strain is eight days longer than that found for any strain tested in previous strain-survival studies, with farm-gate hygiene practices until now, based on a 21-day survival without food. This new finding means that the window of opportunity to spread phylloxera to another vineyard has increased. Therefore, to mitigate this risk, changes to farm-gate practices must be introduced immediately to reflect the longest survival time known for an endemic phylloxera strain.
- This survival study highlights that different endemic phylloxera strains have different tolerances to temperature, food availability and moisture conditions, and the continued importance of including a range of strains in future such studies to build knowledge on phylloxera survival in Australia.

Actions for industry

- Update your farm-gate hygiene practices now → ensure you ask and check where machinery, equipment and visitors have been for at least the 29 days prior, before assessing the risk to your property and potentially granting controlled access into your vineyards. Refer to the flowcharts in Vinehealth Australia's Hosting Visitors fact sheet for further information.
- Make sure you adjust the wording in your visitor register, site sign-in process, biosecurity training materials and any other documentation you may have in place, to reflect this new time period.

2. UNDILUTED DETTOL, AN EFFECTIVE ALTERNATIVE TO BLEACH FOR DISINFESTATION OF FOOTWEAR AND SMALL HAND TOOLS

Study

- Survival of six key endemic phylloxera strains (G1, G4, G19, G20, G30, G38) was measured after exposure to over 20 potential disinfectant products for durations of 30 or 60 seconds. This study continued the long-term focus on finding an off-the-shelf alternative disinfectant to bleach for footwear and small hand tools.

Key findings

- Immersion in undiluted Dettol disinfectant (4.8% chloroxylenol) for 60 seconds with no water rinse thereafter, was determined as the most suitable alternative to bleach. It was effective in killing the phylloxera strains tested, easy to use, non-corrosive, not poisonous to grapevines, relatively safe and available from supermarkets.
- Undiluted Methylated Spirits also proved to be an effective disinfectant against the phylloxera strains tested, when used as a 30 second immersion with no water rinse thereafter.

Relevance

- Immersion for 60 seconds in undiluted Dettol with no water rinse thereafter offers an effective off-the-shelf alternative to bleach for footwear and small hand tool disinfestation. Flammability concerns of Methylated Spirits negate its recommendation for broad field use.

Actions for industry

- Consider situations where you may adopt the use of Dettol in preference to bleach for disinfestation of footwear or small hand tools. Cost, pack size and use situation may be contributing factors in this decision. Refer to Vinehealth Australia's Footwear and small hand tool disinfestation protocol.
- Note that if the used hand tool is being moved interstate or between Phylloxera Management Zones, it is important to check the relevant state Plant Quarantine Standard, or equivalent, for approved sterilisation methods. For South Australia's Plant Quarantine Standard, Dettol is not yet included as an approved sterilisation method for used hand tools.

3. NEW ROOTSTOCK-STRAIN KNOWLEDGE

Study 1

- The most recent key endemic phylloxera strain, discovered in 2015 in North East Victoria, is G38. The interaction of G38 with a range of rootstocks was evaluated in the field, glasshouse and laboratory over a three-year study. Prior to this, no formal rootstock screening had been completed against the G38 strain in Australia.
- In this study, rootstocks classified as susceptible had the following characteristics:
    - Field – nodosities (galls on young fibrous roots) and high populations of phylloxera at all life stages (i.e. eggs, first instars, intermediates, adults).
    - Glasshouse (potted vines) – phylloxera that lasted the full eight weeks post inoculation and produced necrotic tuberosities on lignified roots.

- Laboratory (excised roots) – phylloxera survived for the full 32 days post inoculation and adult phylloxera produced eggs in higher abundance than on the own rooted samples.

Key findings

- 101-14 and Schwarzmann rootstocks, both of *Vitis riparia* x *Vitis rupestris* parentage, were found to support high numbers of G38 phylloxera in the field, which were above that of own rooted vines. Both rootstocks were therefore classified as 'susceptible' to the G38 phylloxera strain. This is the same resistance rating as for own roots.
- Potted vine and excised root testing also supported the susceptibility of these rootstocks to G38.
- The other rootstocks screened in the field against G38 showed varying levels of resistance, aligned with their parentage. Rootstocks 1103 Paulsen and 99 Richter, both *Vitis berlandieri* x *Vitis rupestris* parentage, were classified as 'resistant' to G38. However, rootstocks with one *Vitis riparia* parent were classified as 'tolerant' to G38. These were 3309C (*Vitis riparia x Vitis rupestris*), Sori *(Vitis solonis x Vitis riparia*) and 5A Teleki, SO4 and 125AA Kober (*Vitis berlandieri x Vitis riparia*). The G38 strain was found to survive on the tolerant rootstocks, and only sometimes displayed nodosities, but characteristically did not produce necrotic tuberosities which are indicative of the rootstocks succumbing to the pest.

Relevance

- The reported susceptibility of 101-14 and Schwarzmann rootstocks to G38 in North East Victoria is concerning. This finding also aligns with Californian reports of phylloxera strains that appear highly adapted to feeding on rootstocks with *Vitis riparia* parentage.
- The tolerant rootstocks to G38 – 3309C, Sori, 5A Teleki, SO4 and 125AA Kober will act as reservoirs, or population sources of this phylloxera strain, from which spread can occur to susceptible rootstocks (such as 101-14, Schwarzmann), and to own roots, potentially leading to vine death.
- Rootstocks currently available for use in Australia have limited genetic parentage. This puts them at risk when a breakdown in phylloxera resistance to one or more of these parentages occurs – as appears to be the case in this study for the G38 endemic strain only.

Study 2

- Teleki 5C rootstock screening against six key endemic phylloxera strains (G1, G4, G19, G20, G30, G38) was undertaken both in the glasshouse on potted vines and in the laboratory on excised roots. Screening was not undertaken in the field. Prior to this, no formal screening of Teleki 5C had been completed against a range of endemic strains Australia.

Key findings

- In potted vines and in the laboratory, Teleki 5C demonstrated resistance to the G1 strain of phylloxera. No life stages of G1 were found to survive at the end of the study, and no galls on young fibrous roots (nodosities) were recorded.
- Teleki 5C was rated as 'tolerant' to the G19, G20, G30 and G38 phylloxera strains in both potted vines and in the laboratory.

- In potted vines, symptoms of this phylloxera tolerance included presence of nodosities and that phylloxera developed into reproductive adults. While these endemic phylloxera strains can inflict some damage on Teleki 5C and host reproductive populations of phylloxera, damage and population size is lower than inflicted on own rooted vines.

- Teleki 5C was rated as 'resistant' to the G4 strain in the laboratory, but 'tolerant' in the glasshouse.

Relevance

- Pending field testing of phylloxera strain interactions with Teleki 5C, these results suggest this rootstock is likely to support a base population of G19, G20, G30, G38 and potentially G4, from which spread can occur to susceptible rootstocks and own rooted vines.

Actions for industry from Studies 1 and 2

- Carefully consider your rootstock choice using available information and tools. New information from this study has been incorporated by Vinehealth into the rootstock-phylloxera strain interaction table, and by Wine Australia into the Rootstock Selector tool.
- With new phylloxera strains being detected in Australia, and their interactions with rootstocks starting to be understood, it has never been more important to undertake farm-gate hygiene practices to limit the introduction and spread of phylloxera, and importantly the different strains of phylloxera, between vineyards.
- Advocate for all newly-bred rootstocks in Australia to undergo comprehensive screening against key endemic phylloxera strains prior to release.
- Support rootstock breeding programs in Australia which aim to enhance the genetic base of rootstocks available for use in Australia with broad and stable resistance to phylloxera.

4. MORE PHYLLOXERA STRAINS IDENTIFIED

Study

- Intensive phylloxera strain surveys over two seasons were undertaken across eight vineyards in the King Valley in the North East Phylloxera Infested Zone (PIZ) in Victoria, to quantify the diversity of phylloxera strains present on vine roots.

Key findings

- 36 phylloxera strains were identified from a population of over 750 insects that were strain-typed. Previous very limited surveys in the King Valley had only identified one root strain, G4, as present.
- 32 of the 36 phylloxera strains found had never been previously identified in Australia. This result is a 39% increase in genetic diversity and takes Australia's endemic phylloxera strain tally to 115 from 83.
- The 32 new strains were all found to be closely related to other known endemic strains.
- Vines were frequently found to have more than one strain of phylloxera on their roots. The highest genetic diversity found in a vineyard block was 14 phylloxera strains.

Relevance

- An explanation proposed by the researchers for these closely related strains, is that they are a result of sexual reproduction, rather than asexual reproduction, which has been assumed as the predominant form of phylloxera reproduction in Australia. If this is the case, it brings with it an increased risk of long-range dispersal of these strains due to a winged form of the insect being part of the sexual reproduction lifecycle. Sexual reproduction also tends to enhance adaptability to new or changing environments.
- Results from this study have facilitated an update to the phylloxera strains distribution map, which is integral to informing decisions on rootstock selection, given a particular rootstock's ability to withstand a particular phylloxera strain.

Action for industry

- Continue to be vigilant with your on-farm biosecurity practices, both within PIZs and outside PIZs, to limit the introduction and spread of phylloxera strains. Let's not become complacent.

SUMMARY

This phylloxera research project, co-funded by Wine Australia and Agriculture Victoria, delivered a broad range of new information.

This Industry Notice informs industry of key actions to implement now. To assist, Vinehealth Australia has also updated its posters and fact sheets. We urge vineyard owners and winemakers to download these updated resources and amend farm-gate hygiene practices accordingly.

If you need help incorporating these findings into your farm-gate hygiene practices, please do not hesitate to contact us on (08) 8273 0550.

To read Agriculture Victoria's full report, click here.