PLANT & FOOD RESEARCH *Pseudomonas syringae* pv. *actinidiae* (Psa) RESEARCH NOTE

Psa-V Infection Observed via Inoculated Girdling Wounds

Growers urgently require information relating to the relative risk of infection that key orchard/vine management techniques create. One example of this is girdling. Anecdotal observations from offshore and New Zealand have suggested that the practice of girdling does not increase the risk of Psa-V infection. In-fact the expression of internal staining symptoms has been inhibited at the point of cane girdles.

To quantify this risk a project funded under the ZESPRI/KVH Psa Research Programme by Plant & Food Research investigated the potential to infect potted 'Hort16A' vines via a spring cane girdle. Included in this work were treatments to investigate the impact of a time delay between girdling and infection and the potential of three commercially available products to act as protectants.

Nearly two months after inoculation no visible symptoms were observed. A sub-sample of vines from all treatments were destructively harvested and isolations were attempted from the point of inoculation and up to a maximum of 7 cm above and 7 cm below the girdle. No cultures of Psa-V were recovered from the control vines (no Psa-V) and vines to which Psa-V was only applied to the surface of the vine (i.e. not girdled). Psa-V was recovered from all girdled and inoculated vines – the distance which the bacteria had moved did vary but in one instance it was recovered at a point 7 cm away from the girdle. Psa-V was also isolated from all vines treated with Nordox™, Greenseal Ultra™ and Oxyspray prior to inoculation.

Growers have expressed concerns that the application of protectants to girdles will slow down the healing process and therefore leave the vine open to infection for longer. To address this concern vines were girdled, protectants were applied (according to manufacturers' instructions) and the following day the vines were inoculated with Psa-V. Callusing was visually rated at regular intervals for the next two months. Interestingly when Psa-V was applied to girdles the rate of callusing was greatly reduced compared to the girdle only control – the mechanism involved is not understood. Only Greenseal Ultra™ had an obvious affect in reducing callusing compared to the control and it is unknown whether this effect will be observed on mature vines. Manufacturers are of the opinion that acrylic paint based wound protectants will encourage callusing. No callusing was observed on Greenseal Ultra™ treated plants 27 days after girdling compared to minor callusing in the control plants. Callusing did eventually occur on the Greenseal Ultra™ treated plants but always lagged behind the control and plants treated with Nordox™ and Oxyspray.

These results demonstrate that when Psa-V is applied at very high levels of inoculum (50,000 cfu/girdling wound) to Hort16A it is:
- able to move into the vascular system via protected girdling wounds
- move up to 7 cm away from the initial entry point and
- still viable four weeks later.

This is not a surprising result, though it was expected that recovery of Psa-V would decrease with use of protectants and/or increasing time between girdling and inoculation with Psa-V. It is suspected that the high inoculum load and the inherent susceptibility of Hort16A may have overridden these treatment effects.

It is unknown from this work whether or not this will result in the development of secondary symptoms or whether this would occur in the field. To try and answer this question potted vines have been girdled and will placed out in a heavily infected block. The existing vines will also continue to be monitored for symptom development.

Growers are reminded of the importance of the spring girdle for achieving good fruit size and with the summer girdle high dry matter. This work also highlights the need to ensure good hygiene practices at girdling time, to only girdle when the risk of infection is low (i.e. during dry conditions) and to apply protectants to wounds.