

Vinevax Bio-inoculant trichoderma treatment for Eutypa shows promise in Henschke Vineyards following assessment of long-term trials.

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Over twenty years post treatment, Prue Henschke reports a dramatic difference in Eutypa symptoms between Vinevax Bio-dowel treated and untreated vines in her award winning Mt. Edelstone vineyard.

The use of trichoderma (naturally occurring soil fungi) treatments for trunk diseases in vines has been popular for several decades since David Gale and the late John Hunt of Agrimm P/L pioneered their use. Growers often reported both improved yields and plant health indicators. However, actual differences in the expression of Eutypa symptoms were not always obvious in the short term given the slow progress of the disease. Many of the early trials were not able to be followed long term due to management and structural changes in vineyards and the location of trials.

Fortunately, meticulous record keeping by Prue Henschke is about to change all that.

Mount Edelstone Vineyard

Now a famous single vineyard Shiraz of Henschke, Mount Edelstone was planted by the Angas family in 1912 on the windward side of an old plum and pear orchard, which is a prolific source of Eutypa inoculum.

The deep red brown soils over free draining gravel have a pH of 7 and are an interesting geological intermediary between the acidic soils of Eden Valley and the alkaline soils of the nearby Barossa. Prue believes that the depth of soil gives the vines vigour, which has enabled them to survive the impact of Eutypa more effectively than a normal dryland Shiraz vineyard.

The success of the wine produced from these 16.5ha has been nothing short of phenomenal with a show track record of 50 years of consecutive medal winners. "Although we no longer show it, this vineyard has an amazing pedigree," says Prue. "Each year Mt. Edelstone Shiraz has been a medal winner since 1952. The 2008 vintage was awarded 95 points by James Halliday."

Eutypa is not a new problem

For the 40 years that Prue has been part of the Henschke family vineyard, Eutypa has been slowly eating into the grape yields throughout the region. She suspects that it has been around a lot longer than that, particularly when she observes the impact of the orchard on young plantings.

Most grape growers familiar with Eutypa, understand that its effects can vary greatly in intensity from year to year and recognize symptoms in the spring growth. The flowers will generally be very poor from the cane or arm that is affected, as they are limited in their development by the toxin produced by the parasitic Eutypa fungus. Sometimes the drop in yield is only slight but, says Prue, “if the impact is great in a particular year the knockout effect of the disease can mean you get delayed shoot development and small berries or just don’t get any grapes at all.”

Mass Selection

Because of the value of the vineyard and the continued decline of the old vines to Eutypa, Prue did a mass selection of the best performing vines in the vineyard in 1986 in order to produce stock that could be used for replanting. This selection block was planted in 1989. Over 270 selections of Mt. Edelstone and Hill of Grace vines were chosen based on criteria such as even budburst and flowering, 2-3 bunches per shoot and evenness of veraison. “These selected vines were identified and planted in blocks of five from which we have been able to take maturity figures of yield, number of bunches, bunch weight, fruit weight and pruning weight. That’s a lot of data we have been able to record.”

Traditional Eutypa Treatment Methods

The main approach to limiting the effect of Eutypa at Henschkes was similar to most other vineyards. “We use cane pruning as the disease progresses down the arms so that we are always moving toward the healthier part of the vine. Unfortunately, spur pruning is just not on the cards for us in this vineyard.”

The implication of that is greater costs from extended pruning time involving more skill on the part of pruners and greater difficulty in raising the structure of the vine to vertical shoot positioning without spur pruning.

Hygiene has become essential at pruning time and every team of pruners has one painter assigned to them to ensure all large pruning wounds are sealed to prevent re-infection by Eutypa spores blowing in from the orchard any time rain or humid weather conditions prevail. Until now, pruning wounds have been sealed with acrylic paint but consideration is now being given to augmenting or replacing this treatment with Vinevax Pruning Wound Dressing. Having a stable crew of seven vineyard hands led by vineyard manager Travis Coombe enhances the maintenance of good vineyard hygiene.

Agrimm Bio-Inoculant

After the establishment of the mass selection block, Prue learned about the early trial work involving the Agrimm bio-inoculant products. She thought that firstly, it would be an opportunity to protect the block and that the extent of data collection would enable her to measure the level of protection provided by these products over time.

The first trials on the property were actually done in 1995-97 on old Muscadelle to be top grafted to Mataro. In 1997 parts of the (then) nine year old Mt. Edelstone mass selection block were treated as Prue agreed with advice from Agrimm that protecting younger vines would be more effective than trying to stem the disease in old ones.

Vinevax Bio-dowels were used as a long term, organically certified treatment which would not threaten the organic status of the vineyard. Easily applied, a small wooden dowel impregnated with a specially formulated mix of various trichoderma strain spores is inserted into a hole drilled into the base of the vine. The whole procedure takes less than a minute per vine. The cost is about \$1 each plus cost of application.

Trial Results

From 2004 onwards, data on many of the measurable components of the vines' performance was monitored. Prue reports that the treatment and controls appeared fairly even with the exception of 2006/7 where the control clearly showed a lower pruning weight. Up until 2009 typical symptoms of Eutypa were not present. When they became evident, some 20 years after planting, Prue decided it was time to include counts of vines exhibiting disease.

The survival rates of the Vinevax treated and untreated vines were noticeably different after 2010. "This was going to be important because we try to keep these valuable vines going for a long time."

In 2010 the Vinevax treated vines showed an incidence of infection of 19.5% compared to 37% in the control. In 2011, 41% of the Vinevax treated vines showed infection but the control group had increased to nearly 65.6%.

Prue says it is obvious that there is some sort of control being provided by the Vinevax treatment but in hindsight believes that the vines were treated too late at 8 years, probably after the infection had begun. There is no doubt that she would prefer to see more control than she is getting at the moment. However the difference is very clear twenty years after treatment.

How does Vinevax Bio-Inoculant Work?

University of Adelaide researchers have proven that Agrimm Vinevax Bio-inoculant formulations are capable of slow upward growth in the xylem tissue of grapevines. Eutypa infections typically occurring from pruning wounds start in the upper sections of the vine and grow downward. It does not appear that the two fungi actually have to be in contact with each other inside the plant for the Eutypa to be affected by the Vinevax. In fact, this contact is uncommon. A more likely scenario for how the control is affected was explained by Agrimm's John Hunt in his 2004 article in the *The Australian & New Zealand Grapegrower & Winemaker*. "Trichoderma has been shown to be capable of eliciting a systemic acquired resistance (SAR) response in plants, which can raise the levels of resistance to disease by stimulating phytoalexins, natural plant defence chemicals."

Because Agrimm is convinced that the main mechanism is not the bio-inoculant growing throughout the plant but rather the elicitor response on the part of the vines' immune system, they recommend retreatment every 4-6 years with a high concentration of new spores to boost this response.

The cost of Eutypa

After 22 years, 20% of the treated vines needed remedial lopping and taking up a water shoot compared to 43% of the control. However only 50% of the lopped vines from either the control or treatment produced trainable water shoots after one year. With 1,500 vines per hectare, the cost of replanting 20-40% of the vineyard could range from \$1,500-\$3,000/ha which would possibly double with the cost of lopping off the infected vines.

Costs associated with 20% infected vines including loss of yield per ha, replanting and training are estimated by Prue to be approximately \$6750/ha for the Mt. Edelstone vineyard. She compares that to treating with Vinevax Bio-Inoculant at about \$4500/ha once every 4-6 years.

“If you get a 40% loss then that is around \$3000 a hectare to replant those vines and 3 years loss of crop and three years training. If you work on 5kg per vine and a price of \$3000/tonne for 1500 vines per ha – that works out to \$67500 over three years. So costs are huge and, going by my figures, the losses are closer to 50%.”

Prue thinks that even if the vines she treated with a single dowel 20 years ago eventually succumb to Eutypa, the investment has more than paid off given the value of Mt. Edelstone grapes. At a recent field day to observe Eutypa control at Mt. Edelstone Prue Henschke told the assembled group, “If the Vinevax Bio-dowel treatment enables us to hang onto quality vines a bit longer than would ordinarily be the case, that is very important to us. We can see from all our trial data that the vines need to be over 20 years old to show any of the complexity in the fruit that we are looking for. If this decline continues, albeit at a slower rate, it is still an economically valuable thing to do anyway, on the figures we have, because it is such a rapid fall in yield without treatment.”

Prue Henschke is hopeful that by treating young vines earlier at five years of age, as soon as the trunks are thick enough to accept a dowel, re-treating every 4-6 years and maintaining vineyard hygiene she will be able to maximize the effects on Eutypa. This will make the cost advantage of avoiding likely production losses through the use of Vinevax Bio-dowels irresistible.