



# Product Information Update

Vinevax pruning wound dressing

Vinevax bio-implant dowel

Eutypa Dieback Control for Grapevines



## Vinevax Products

Vinevax products are registered with the APVMA with label claim: “may assist in control of *Eutypa* dieback of grapevines”. A considerable amount of new efficacy data has been accumulated since the initial submission was made in March 2002, some of which follows. This will be used to extend the current label claim with the APVMA.

**Pruning wound dressing..** contains the proprietary bio-actives formulated as a wettable powder and is designed to protect pruning wounds on grapevines by acting as a living barrier. Developed specifically for application by trigger spray pack or as a brush-on paste, Vinevax effectively delivers high activity of the beneficial *Trichoderma* active ingredient into the tissues of the pruning wound. The unique formulation of Vinevax Pruning Wound Dressing ensures the beneficial bio-inoculant is established as the dominant microbial population in the underlying tissues and conducting vessels of the wounded wood thereby protecting the open site from invasion by harmful wood-invading fungi.

**Bio-implant dowel..** contains the proprietary bio-actives formulated as a sustained release implant and is designed to protect valuable grapevines by acting as an immunising commensal to stimulate the vine's natural defense systems. Applied quickly and simply by insertion into a hole drilled in the trunk of the vine, Vinevax Bio-implants inoculate the living tissue where the bio-active lives symbiotically in amongst the parenchyma cells. Acting as a living guard, the beneficial *Trichoderma* active ingredient continues to prevent harmful pathogens from affecting the vine for 4 – 5 years in a “vaccine-like” manner.

## Mode of Action

Vinevax products contain a selection of proprietary strains of *Trichoderma harzianum* which have been demonstrated to have unique bio-activity against a wide range of harmful pathogens including fungi causing trunk and root decay in vines. Vinevax active ingredients have been shown to contain protective bio-activity against *Eutypa lata*, *Botryosphaeria* spp., *Phaeomoniella chlamydospora*, *Cylindrocarpon destructans*, *Phomopsis viticola*, and *Botrytis cinerea*.



There are a number of mechanisms of the Vinevax biological activity against other fungi. These include:

- **Niche exclusion and competition for nutrients:** The bio-actives are fast growing fungi, which will grow quickly and aggressively occupy the ecological niche when introduced into grapevine tissue. They will out compete other micro-organisms for space and nutrients and literally smother competing organism's growth.
- **Myco-parasitism - degradation of other fungi:** The bio-actives have the capacity to act as a parasite of other host fungi. During the parasitic process the cell contents of the host are used as a food source by the bio-actives.
- **Production of metabolites with antifungal activity:** The bio-actives produce a range of metabolites as a natural by-product of normal vegetative growth. A number of these metabolites are natural chemicals that have anti-fungal activity.
- **Stimulation of the plant's defense mechanism (SAR):** The bio-actives can stimulate the systemic acquired resistance (SAR) by amplification of the plant's natural chemical defense systems. This response enhances plant health by making the plant more resistant to disease.

## Vinevax Pruning Wound Dressing

**Vinevax wound dressing: one product for two applications**

- **Paste** for application by brush (100g Vinevax in 1litre)
- **Spray** for application by backpack or trigger spray device (100g Vinevax in 10 litres)

Vinevax pruning wound dressing protective properties give best results when applied immediately after the wound is made. Immediate application (within 3-5 minutes of the wounding) ensures the natural capillary suck-down effect, which happens when the vessels are cut, assists to ensure maximum penetration of the bio-actives occur. After application the bio-actives inoculate the wounded tissue producing a living barrier of protection which expands with time.

It is important that climatic conditions be monitored to achieve the best results from Vinevax pruning wound dressing. Grapevines should be pruned and treated only during periods of fine weather under dry conditions. Should rain occur within 24 hours of application the wound may become contaminated from water droplets containing spores of pathogenic fungi. If this occurs before the bio-inoculants have become established in the wounded tissue the wound protection afforded by Vinevax may be compromised.

- **Protective benefits from Vinevax pruning wound application** are dependent upon the integrity and activity of the bio-inoculants in the wounded tissue forming a living barrier for protection.
- **Immediate application after pruning ensures optimum penetration levels** of bio-inoculants into the wounded site leading to high colonisation and excellent protective benefits.
- **Maximum protection from Vinevax pruning wound dressing occurs 2 days** after application and continues for the entire season due to the living barrier nature of the bio-inoculants. Untreated pruning wounds can remain susceptible to infection for periods of 2-8 weeks depending on several factors according to Prof. Doug Gubler (UC Davis, California). Traditional fungicides such as benomyl can cease protective activity after about 1 week.

## Major Benefits

**Vinevax wound dressing is a safe, organic biological plant protection product** without residues, MRL's and has nil withholding periods.

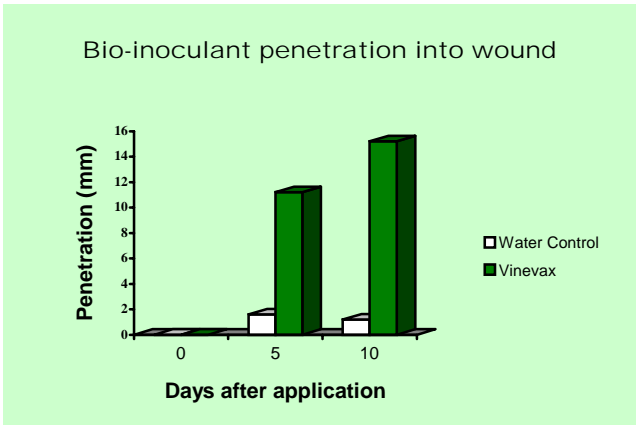
**Vinevax wound dressing benefits grapevine health** because pruning wounds inoculated with the Vinevax bio-actives are protected from infection by pathogens causing vascular trunk diseases that lead to production losses and eventual vine death.

**Vinevax wound dressing has proven cost benefits** because its use reduces the incidence of vascular trunk diseases such as Eutypa die-back which is responsible for significant losses in vineyard productivity.

## Wound Penetration

Vinevax bio-inoculant penetrates, colonises and occupies wood vessels wounded by pruning and the surrounding tissue areas. Results from an independent controlled field trial performed by PlantWise, Lincoln on experimental wounds (see picture) appear in the graph below. These results show how the bio-inoculant penetrates the woody vessels below the pruning wound and can be isolated from thin wood sections cut from up to 15mm

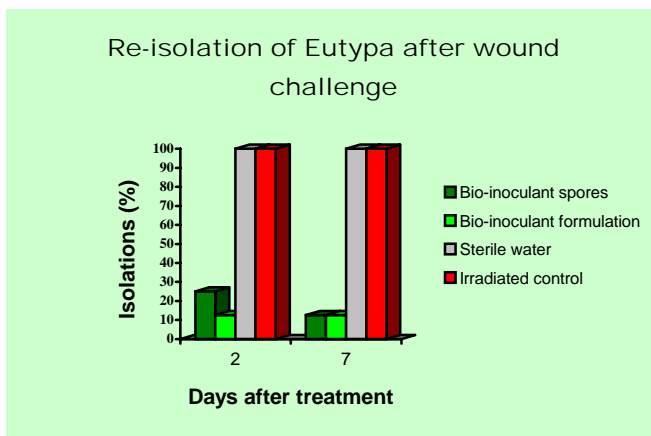
below the wound 10 days after application.



## Wound Protection

The treatment of pruning wounds with Vinevax protects against infections by wood invading pathogens such as *Eutypa lata*, which causes Eutypa dieback, *Botrytisphaeria spp.* which cause black dead arm, *Phomopsis viticola* which causes cane dieback and *Botrytis cinerea*, which can also affect grapevine canes.

The graph below shows the protection achieved when the pruning wounds treated with Vinevax active ingredient spores or Vinevax formulation, were challenged with live *Eutypa* spores 2 or 7 days later\*. Challenge of the wounds after control treatment with sterile water or gamma-irradiated formulation (to kill the bio-inoculant activity) shows 100% infection with *Eutypa lata*.



\*Experiments performed on live wounded grapevines by Sharmini John, a PhD student at Adelaide University.

## Getting the Best Out of Vinevax PWD

### Applications:

#### 1. Small- Medium Wounds

Vinevax wound dressing can be mixed as a high activity spray formulation to treat annual pruning wounds up to 25mm diameter.

#### 2. Large Wounds

Vinevax wound dressing can be mixed as an extremely high activity brush-on paste to treat large wounds on mature vines and vines undergoing reconstruction.

## Which Situations Suit Vinevax Pruning Wound Dressing?

- Vineyards with a history of trunk diseases.
- Producers seeking to improve vine-health management systems and productivity.
- Growers that wish to complement current IPM strategies.
- Managers seeking sustainable biological alternatives to chemical pesticide wound treatments.
- Vineyards producing organically certified grapes

## Key Attributes and Advantages

- **Natural** disease suppression of woody plant pathogens. Vinevax pruning wound dressing offers a non-chemical alternative to **disease prevention**.
- **Organic** product fully registered with Biological Farmers of Australia and Certenz (NZ).
- **Safe**, no phyto-toxicity has ever been observed or recorded on crops treated with Vinevax; there are **no MRL's** and **no withholding periods** for Vinevax.
- **Proven cost benefits** in viticultural production by disease prevention.
- **Healthier**, stronger, vines will result after treatment with Vinevax.

## Cost benefits

- **Reduction of disease** leading to improved crop performance for better returns
- **Reduction of pesticide use** and associated application costs
- **Premium returns** for nil residue crops
- **Increased health** and safety for staff
- **Convenient** to use and cost effective product

## Vinevax Bio-Implant

***Vinevax bio-implant: simple application for 4-5 year protective vaccination.***

- **Apply** to young vines for “vaccination” protection once the trunk is 40-50mm diameter.
- **Apply** to valuable vines for disease protection and to prolong vine life with improved productivity
- **Apply** to vines prior to re-working to protect the new graft or water shoot when used to replace the diseased cordon.

Application only takes a moment and involves:

1. Drilling a 6mm-diameter hole in the trunk of the vine 25 mm deep.
2. Insertion of the bio-implant dowel into the hole to be flush with the trunk of the vine.

Vinevax bio-implant dowel’s protective properties give best results when applied prior to disease symptoms becoming apparent. This is because the bio-actives in the formulation inoculate the grapevine tissue and stimulate the natural defense mechanisms of the vine. This produces a “vaccination” effect that enables the vine to become more resistant to disease. This effect is long-term (4-5 years) and is most effective in protecting vines from early stage disease.

It is important to note that after application the inoculated vine will benefit from the growth of the bio-actives into the grapevine tissue. Growth of the bio-actives will continue for a number of years so re-application is not required for 4 to 5 seasons. After this time the vine will benefit from a “re-vaccination” to boost the activity of the bio-inoculant.

- **Protective benefits from Vinevax bio-dowel application** are dependent upon the integrity and activity of the bio-inoculants growing in the vine tissue and stimulating a protective vaccination effect.
- Application to vines prior to obvious disease symptoms occurring will ensure the maximum protection occurs.
- **Re-application to vines after 4 to 5 seasons** is recommended to boost the vaccination effect for optimum protection with improved productivity.

## Major Benefits

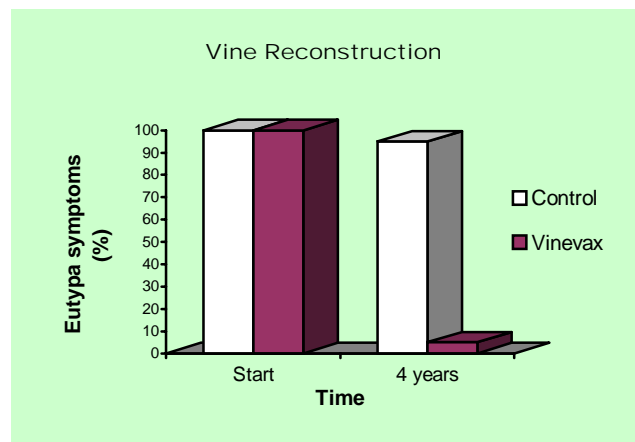
**Vinevax bio-implants are a safe, organic biological plant protection product** without residues, MRL’s and has nil withholding periods.

**Vinevax bio-implants benefit grapevine health** because vines inoculated with the Vinevax bio-actives become protected from infection by pathogens causing vascular trunk diseases such as Eutypa die-back that lead to production losses and eventual vine death.

**Vinevax bio-implants have proven cost benefits** because application reduces the incidence of vascular trunk diseases, improves vine health, longevity and productivity

## Protection of Re-constructed Vines

Vinevax Bio-implants are most effective when used to protect the new productive canopy when a water shoot is trained up from near ground level to replace the diseased cordon structure. Vines marked for reconstruction during the growing season should be allowed to develop a water shoot from near the bottom of the trunk. During the first winter 1 Vinevax bio-implant should be placed under the water shoot that has been tied to



the wire. The following season the new canopy should be trained to replace the diseased cordon structure, which is removed during the winter of the second season. Provided all the diseased part of the vine is removed when the trunk is cut off and the wound is protected with Vinevax wound dressing the re-constructed vine will be

protected from re-infection with trunk disease fungi.

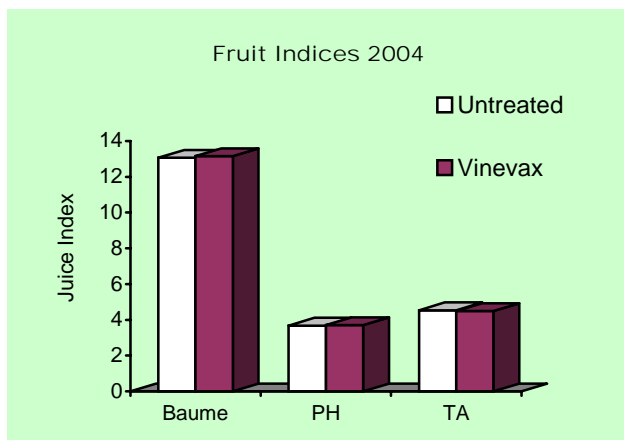
The graph beside shows results from a field trial conducted in the Hawkes Bay, NZ where 500 Vinevax treated, reconstructed vines were followed for 4 seasons to monitor re-emergence of Eutypa die-back disease symptoms. Untreated control vines showed 95% incidence of new disease symptoms whereas the Vinevax treated vines showed only 5% re-emergence of symptoms.

## Quality & Fruit Yield Improvement

A unique property of the Vinevax Bio-implant is the ability to stimulate the vines natural defense systems against trunk disease fungi. This capacity has been shown to improve vine health and productivity in vines under-performing due to disease pressure. The two graphs following show the results from a 0.5 ha field trial established in the Clare Valley, South Australia on 21-year-old asymptomatic Cabernet Sauvignon vines from a block surrounded by vines showing Eutypa die-back disease symptoms. Treated vines received 1 Vinevax bio-implant per vine in April 2002; results are from April 2003 and 2004 harvests.

The Vinevax treatment significantly increased the fruit yield from both vintages, increasing the total average weight of fruit harvested per vine by 33% in 2003 and 22% in 2004.

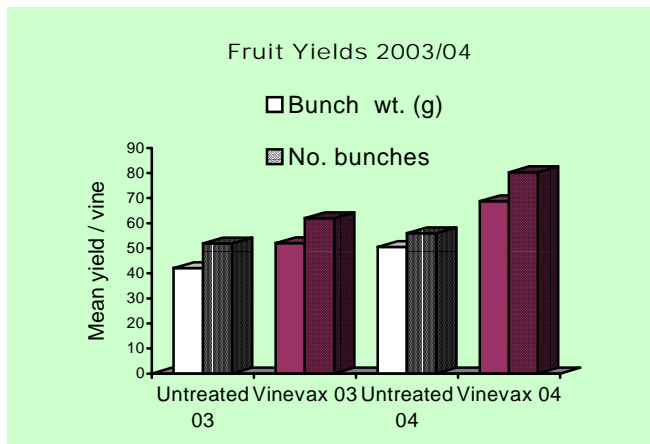
## Quality & Fruit Yield Results



During the 2004 vintage berries were sampled from untreated and Vinevax treated rows at the trial site for comparison of quality indices. The

graph shows results from this sampling and demonstrates that the Vinevax treatment marginally improved the quality of the fruit from the 2004 vintage.

In summary, Vinevax treatment with 1 bio-implant per vine improved the fruitfulness of the



treated vines significantly in both 2003 and 2004 vintages with a marginal improvement in the fruit quality indices in 2004.

## Getting the Best Out of Vinevax Bio-Implants

### Applications:

The Vinevax bio-actives, once established in the tissues of the grapevine will provide plant protection benefits for a number of seasons. Young vines can be protected by vaccination once the trunk is 40 – 50 mm in diameter.

#### 1. Existing vines under disease pressure

Vinevax bio-implants (1 implant per vine) can be applied to vines in areas of disease pressure to vaccinate and protect vines from disease and improve health and productivity.

#### 2. Diseased vines for re-working

Vinevax implants can be applied to mature vines:

- That have disease symptoms and are about to re-worked by grafting (apply 1 implant per vine to the trunk under the cordon).
- That are undergoing reconstruction (apply 1 implant per vine to the trunk at ground level under the water shoot for protection of the new cordon).

### 3. Which situations are best?

- Vineyards with a history of trunk diseases and blocks of under performing vines.
- Vineyards planning to re-work vines with trunk diseases.
- Viticulturists seeking to improve vine-health management systems and productivity.
- Growers that wish to complement current IPM strategies.
- Managers seeking sustainable biological alternatives to improve productivity.
- Vineyards producing organically certified grapes

## Grapevine Dieback Diseases

Cordon dieback and trunk diseases affecting grapevines have been recognized for over sixty years as having a major economic impact on production although demonstration that the *Eutypa lata* fungus was the principal causal agent has been relatively recent.

*Eutypa* dieback can affect a high percentage of vines in some old premium vineyards in South



Australia (Figure) causing significant losses to the industry. Losses in Shiraz alone are estimated to cost Australian growers \$20M annually. Other trunk disease-causing fungi include *Botryosphaeria* spp. causing black dead arm, *Cylindrocarpon* spp. causing black root rot, *Phaeoacremonium* and *Phaeomoniella* spp. causing vine decline often associated with “black goo” symptoms (Petri disease).

All these fungal trunk decline diseases are generally spread by spores released from infected vines or other host plants during wet conditions being dispersed by wind currents and landing on fresh pruning wounds. Most trunk decline diseases have a “latent” period after the initial infection before symptoms appear; *Eutypa* dieback symptoms often take 3 – 4 seasons to become apparent on the foliage. During this latent period vines are under significant stress and although asymptomatic, will suffer production loss. Management of vineyard hygiene is an important factor in minimising disease pressure:

- All pruned material from large cuts and restructuring should be removed from the vineyard and burnt (1-year-old pruning wood can be mulched)
- Burn all dead vines removed from the vineyard, don't leave them around in piles for use as firewood.
- Always prune during periods of dry weather, if you must prune in the wet then don't prune your most valuable vines at this time.
- If your vines are in an area of obvious disease pressure (vines in the vicinity shows disease symptoms) protect vines with Vinevax Bio-implants and pruning wounds with Vinevax wound dressing.

## More information?

Check out our website:

[www.vinevax.com](http://www.vinevax.com)

Or ring our hotline:

1 800 424746

