

Vivando™ Fungicide for Grape Powdery Mildew Control

Technical Information Bulletin



Vivando provides highly effective control of powdery mildew in grapes. The active ingredient, **metrafenone**, has a unique mode of action and is the first fungicide in the benzophenone chemical class. The versatile range of use rates on the **Vivando** label give it the flexibility to control powdery mildew for various intervals based on grower needs and disease pressure. The Multi-level activity of **Vivando** enhances control beyond preventing the initial infections and maximizes plant coverage for better protection, particularly of clusters.



Vivando Attributes

Unique Mode of Action

Flexible and Effective

Multi-level Activity

Unique Mode of Action

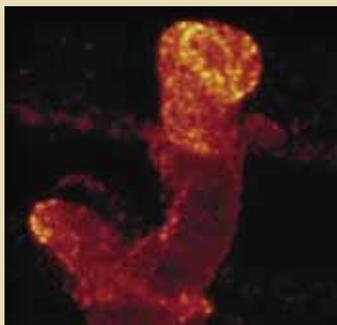
Fluorescent Stained Actin Distribution in Untreated and Vivando Exposed Hyphae

Untreated

- Actin concentrated at tip - normal growth



- Actin **NOT** concentrated at tip - normal growth stopped



Studies have shown that **Vivando** is not cross-resistant to fungicides with other modes of action.

Vivando has a direct effect on the morphological development of grape powdery mildew and acts to disrupt the normal functioning of the structural protein, actin, in the fungus cells.

When exposed to **Vivando**, the actin in the cells does not concentrate properly to allow for normal cell division and growth. The result is failure of spores to infect, inhibition of mycelial growth and reduced sporulation.

The specific biochemical mode of action for metrafenone is not known.

Using Vivando™ Fungicide for Powdery Mildew Control



Diseases controlled: Powdery mildew

Use Rates: 10-15 fl oz/A

Disease Pressure	Rate (oz/A)	Spray Interval (days)
Typical	10	14
Typical	15	21
Heavy	12.8	14
Heavy	15	17

Application Timing

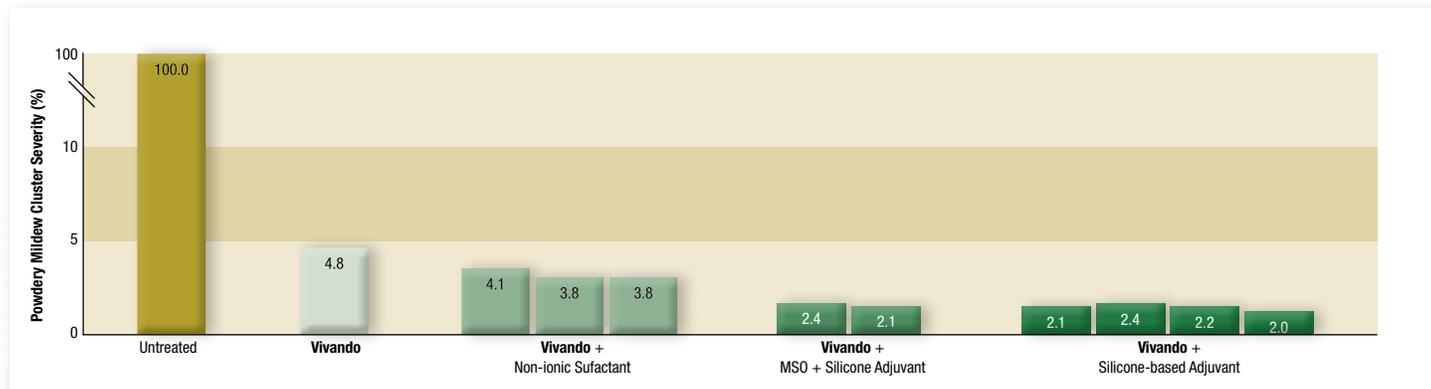
Apply preventively for best performance

14-day PHI

Adjuvants

Silicone-based adjuvant recommended

Impact of Adjuvant Class on the Performance of Vivando for Grape Powdery Mildew Control Silicone-based are Superior (SCB)



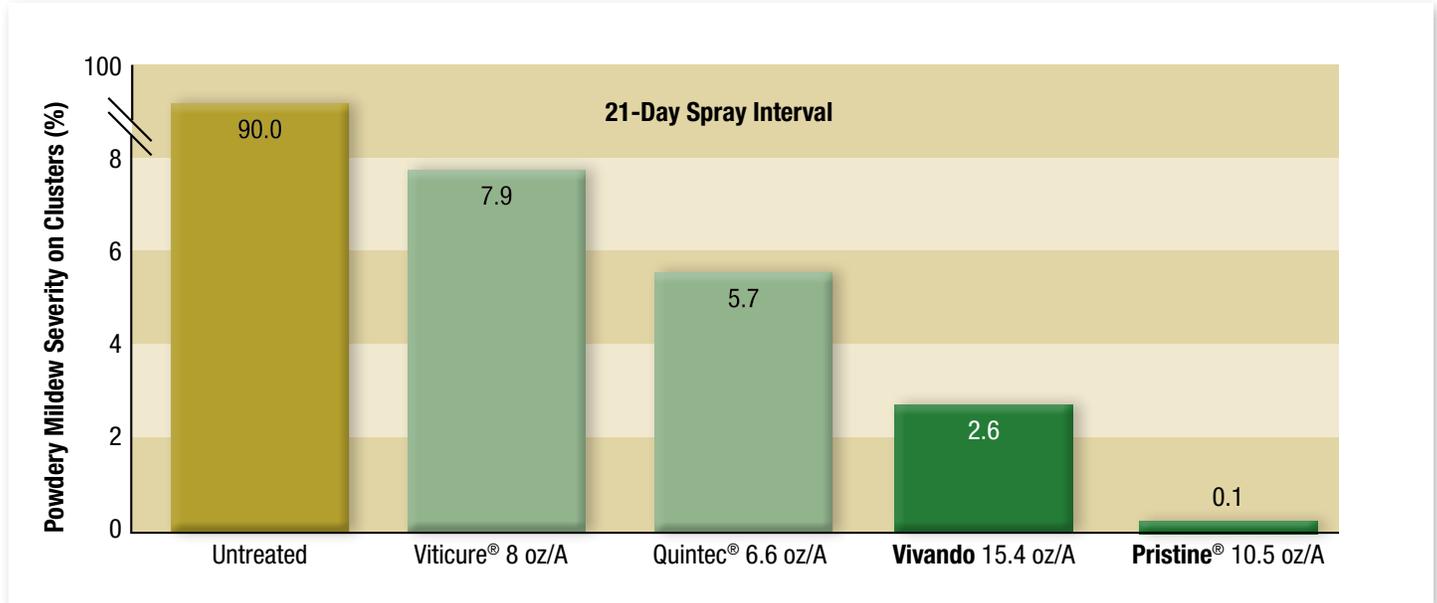
2009 BASF Research Station, Dinuba, CA, Grape variety: 'Red Flame' and 'Carignane.' **Vivando** 10.24 oz/A. Adjuvant rates based on label recommendations and local practices. Red Flame applications on: Apr 9, Apr 22, May 6, May 20, Jun 3 and Jun 17. Powdery mildew cluster severity ratings done Jun 25, 2009. Carignane applications on: Apr 9, Apr 22, May 6, May 20, Jun 3, Jun 17 and Jul 1. Powdery mildew cluster severity ratings done Jul 22, 2009.



Vivando™ Fungicide Grape Powdery Mildew Control: Effective and Flexible

Vivando – Grape Powdery Mildew Control; Severity of Infection on Bunches

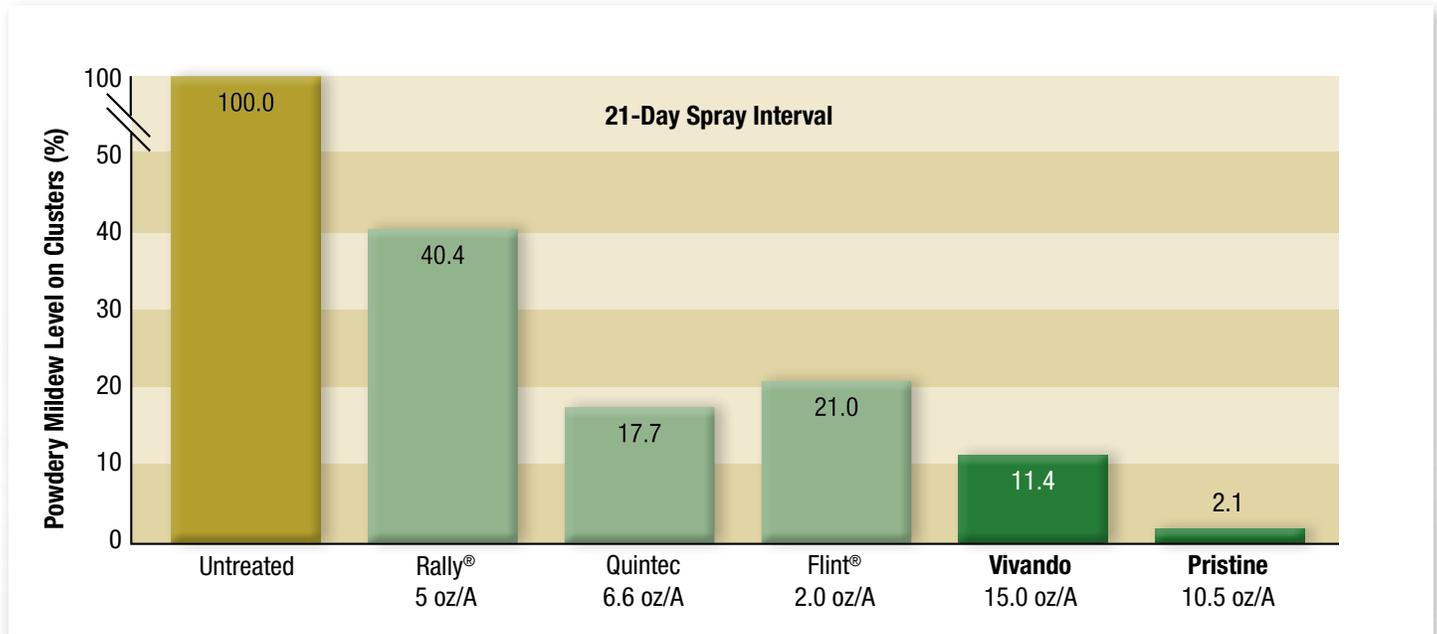
Variety - Chardonnay Doug Gubler- UC Davis; Hood, CA: 2009



Four applications made on 21-day intervals starting April 30, except Viticure which began on April 28. Data Collected on July 21; Adjuvant; Sylgard 309 @ 0.03% w/v, Viticure w/o adjuvant

Vivando Compared With Commercial Standards for Control of Grape Powdery Mildew

Variety: Ruby Seedless BASF DRS Research Center, Dinuba, CA



Five applications made on 21-day intervals starting April 8. Adjuvant* Sylgard 309 @ 0.03% w/v in all treatments.



Stops Infections

Limits Lesions and Sporulation*

Surface Migration

Multi-level Activity Makes Vivando™ Fungicide More Effective

The high level of disease control performance from **Vivando** results from the wide variety of ways that it acts to stop the powdery mildew fungus. Each of these levels of activity combine and interact continuously to inhibit the infection cycle and slow powdery mildew epidemic development.

Level 1 - Stops Infections:

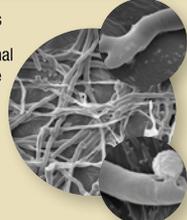
Vivando causes deformation of the appressorium to stop infections before they can begin

Untreated Grape Powdery Mildew	Treated with: Vivando ^{fungicide}
<ul style="list-style-type: none"> • Powdery mildew spore with appressorium • Successful penetration into the plant  <p>A</p>	<ul style="list-style-type: none"> • Spore with abnormal appressorium • Infection of plant tissue stopped  <p>B</p>

Level 2 - Limits Lesions and Sporulation:

Vivando also has activity that limits lesion growth, spore production and spore viability*

* **Vivando** does not have curative activity. Always apply **Vivando** preventively.

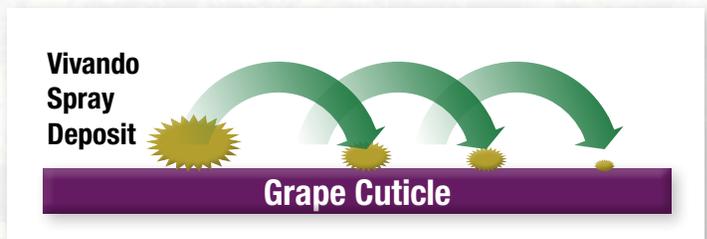
Untreated Grape Powdery Mildew	Treated with: Vivando ^{fungicide}
<ul style="list-style-type: none"> • Powdery Mildew mycelium colonizes the leaf surface  <p>A</p>	<ul style="list-style-type: none"> • Split hyphal tips • Bursting of hyphal tip with leakage of cytoplasm • Collapsed mycelium  <p>B</p>

Untreated Grape Powdery Mildew	Treated with: Vivando ^{fungicide}
<ul style="list-style-type: none"> • Functional, normally shaped spores • New infections possible  <p>A</p>	<ul style="list-style-type: none"> • Abnormal spores with irregular shape • No spore formation, no new infections  <p>B</p>

Level 3 - Surface Migration:

Vivando's unique chemistry (release and re-attraction) causes it to 'leap-frog' across leaf and grape surfaces for protection beyond the application site

'Leap-frog' Surface Migration of Vivando



Always read and follow label directions.

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