

## **Determine the impact of biocontrol treatment in the fall on the grape powdery mildew (*Uncinula necator*) pressure in the following season**

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### **Introduction and Objectives:**

One of the characteristics of grape powdery mildew infections in W. Colorado vineyards is the tendency of infection incidence and severity to build to very high levels through late summer and early fall even when initial infections are not observed until mid-summer or later. The question has been raised of whether these high levels of infection and large numbers of overwintering cleistothecia serve as a source of inoculum the next spring and affect the levels of mildew the next season. Typical control options such as oil sprays or sulfur treatments can reduce the number of viable cleistothecia somewhat, but many cleistothecia wash or blow into protected locations inaccessible to these control materials. The mildew biocontrol fungus, *Ampelomyces quisquallis*, has the capability of seeking out the fungus, colonizing and destroying it and its cleistothecia. In a study on apple, application of *A. quisquallis* in mid-September in an orchard block severely infected with the apple powdery mildew fungus, *Podosphaera leucotricha*, reduced carry-over infections in the buds by 67% the following spring. No such data is available for grape mildew. Thus this study looked at fall application of the biocontrol fungus when mildew population levels were severe, and the impact of this fall application on mildew incidence within the treated and non-treated block sections the following season.

### **Materials and Methods:**

*A. quisquallis* (AQ10) was applied 23 October 2000 by tunnel sprayer at 1 oz product / acre on Chardonnay grape with severe (85 - 95%) infection of foliage. A second spray at the same rate was applied to the same vineyard panels on 30 October 2000. AQ10 was applied to the inmost eight panels of each row leaving the end panels for each row left as a non-treated control. Observations were to be made the following season on comparative infection incidence as mildew developed on the crop, but the 2001 growing season was a hot, dry season that was not conducive to grape powdery mildew development. This impacted observations, and mildew incidence and severity were assessed (using a 0-10 rating scale, with 0 = none, 10 = 100%) for both early season and late season leaves and canes on a single observation date of 3 October 2001.

### **Results and Discussion:**

No flag shoots (shoots emerging with prior mildew infection) were observed, and no incidence of mildew was observed until about 7 - 10 days after a significant rainfall event in July. Mildew infection then moved rapidly across the entire planting. Assessment of mildew infection on early season and late season leaves and canes found no differences for mildew incidence or severity by treatment (Table 1).

The lack of early season infections in the absence of significant early season rainfall supports prior suggestions that mildew cleistothecia serve as the primary overwintering inoculum for grape powdery mildew in Colorado vineyards. The lack of incidence of early season flag shoots means that the fungus does not overwinter as

mycelium in infected buds as it does in more mild climates like California. In addition, the uniformity and apparent rapidity of mildew infection across the block as reflected by the lack of difference in mildew incidence and severity for early and late season leaf and shoot growth would suggest that initial inoculum for infection likely was wind-carried into the block from outside the planting. Additional studies over seasons with more moist early spring growing conditions could help show whether these patterns are influenced by spring moisture availability.

Table 1. Incidence and severity of grape powdery mildew infection on early and late season produced leaves and canes of Chardonnay grape.

Growth Period / Treatment	Leaf		Cane	
	Incidence	Severity	Incidence	Severity
Early season growth				
Non-treated control	7.8 ( <i>±1.8</i> )	7.2 ( <i>±2.2</i> )	3.0 ( <i>±2.5</i> )	1.7 ( <i>±2.3</i> )
AQ10	8.6 ( <i>±1.0</i> )	8.1 ( <i>±1.2</i> )	4.5 ( <i>±2.8</i> )	2.8 ( <i>±1.7</i> )
Late season growth				
Non-treated control	8.3 ( <i>±2.3</i> )	7.2 ( <i>±1.8</i> )	9.2 ( <i>±1.0</i> )	6.8 ( <i>±1.3</i> )
AQ10	9.3 ( <i>±0.8</i> )	8.7 ( <i>±0.6</i> )	9.7 ( <i>±0.7</i> )	6.5 ( <i>±1.5</i> )

<sup>1</sup> Mean Rating (0 to 10 Scale, 0 = none, 10 = 100%) and standard deviation of rating (italicized).