

## Annual Results

SW00-039

# Control of botrytis by compost tea applications on grapes in Oregon

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Oregon

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## SUMMARY

Powdery mildew was a serious problem in vineyards of the Willamette Valley of Oregon in 2002 as it was in 2001. In the vineyards used in this study, powdery mildew outbreaks were largely controlled, or the severity reduced, in areas sprayed weekly with compost tea. The organism biomass in the teas, and therefore the leaf surface coverage by microorganisms, particularly fungi, was not enough to prevent infection. But weekly compost tea applications reduced the number of chemical fungicide applications needed to control powdery mildew over the growing season by at least one and as many as three.

The project team documented changes in soil microorganisms between 2001 and 2002, with bacterial level generally higher in 2002. Fungal biomass declined in some areas sprayed with compost tea. Organism biomass in soils from conventionally treated areas followed similar patterns, which suggests that changes are related to season, other environmental factors or management practices and are not the result of applying compost tea. Foliar sprays did not significantly improve soil biology in the two years of the study.

To preclude miscommunication and inconsistencies in protocols and application rates, as has occurred at some points during the study, a project manager will be responsible this year for all applications and sample collections.

## OBJECTIVES/PERFORMANCE TARGETS

This project seeks to assess the ability of different compost teas to reduce diseases in grapes. Differences have been observed in the ability to control disease with compost teas. In some cases, control of foliar disease is 100%; in others the control is no better than without the tea. The probable explanation is variation in tea quality, caused by differences in tea recipes, in tea aeration or in the initial compost used (therefore, the complement of organisms present to compete with and control the disease). This project will assess which tea recipe, production method, application method and compost best controls the disease.

## ACCOMPLISHMENTS/MILESTONES

**Compost tea and disease suppression.** The compost teas applied to Wren, Broadly and Reed & Reynolds vineyards contained similar levels of total bacterial biomass, active bacterial biomass, total fungal biomass and active fungal biomass. Few of the teas contained the 10 micrograms of fungal biomass found to be sufficient for disease suppression in 2001.

Teas applied to leaves significantly increased percent coverage of the leaf by bacteria relative to pre-spray samples and unsprayed controls. The percent coverage by fungi did not increase relative to pre-spray samples or unsprayed controls, and rarely reached the 2-5% level found to give effective disease control in 2001.

Leaf samples from the Reed & Reynolds vineyard were not replicated because of miscommunication. A sample taken on July 11 found 60% of the leaf surface covered with organisms, mostly bacteria. A sample taken on Sept. 11 showed only 3% surface coverage, probably because a desiccant was sprayed Sept. 10 to control the powdery mildew fungus.

As in 2001, disease pressure was higher from powdery mildew than from botrytis. In 2002, powdery mildew was first found at Wren on July 25, both in the plots sprayed weekly and biweekly. The first application of Kali-E-Green fungicide was made July 27, and the fungicide was applied three more times in August.

The late frost in spring 2002, combined with reduced investment by the vineyard manager, delayed the usual vine thinning, so it had not been completed when the rows were sprayed with compost tea July 31. On Sept. 5, the vineyard manager noted that most of the fruit on the vines sprayed biweekly had been lost to powdery mildew, but the rows were not scheduled to be harvested because of the late frost.

At Broadly vineyard, powdery mildew was found on July 19 in the plot sprayed biweekly. By July 23, it was also found in plots sprayed weekly. Fungicide applications began July 23. On Aug. 8, powdery mildew was present in both treatment areas, but was more prevalent in the plots sprayed biweekly.

At the Reed & Reynolds vineyard, powdery mildew was noted May 20 in the conventionally treated area, which had received seven applications of fungicide. On July 16, powdery mildew was found in both plots sprayed with compost tea. This area had received only one application of fungicide on July 23, followed by two applications of compost tea at twice the normal rate, measures that halted the progress of powdery mildew.

**Changes in soil microorganisms.** Soil samples taken at Wren and Broadly in April 2001 were compared with those taken in April and May 2002. Total bacterial biomass did not change significantly, but active bacterial biomass increased in both tea-sprayed plots and the control plots. Total fungal biomass decreased in the plots sprayed weekly and in the control plots. The numbers of protozoa (flagellates, amoebae and ciliates) showed mixed trends, none significant. The number of nematodes in plots sprayed weekly and in controls decreased significantly from 2001 to 2002. Most of the decrease was in the plant-parasitic category.

Soil samples from the Reed & Reynolds vineyard were not replicated. Between October 2001 and June 2002, total bacterial biomass tended to decrease. Total fungal biomass was lower in all plots in 2002, but fungal biomass was higher in plots receiving weekly tea sprays.

Some miscommunication and inconsistencies in teas and their application, coupled with mechanical and environmental problems, prompted the project manager to assume the sole responsibility of making compost, applying teas and collecting samples. While the project was funded for the two years ended in 2002, it will be continued for a third year with several changes, including a reduction to two vineyards and one compost tea plot for comparison with conventional grape production.

In addition, fungi in the compost will be maximized by adding a special inoculum into the compost, which will be properly maintained through the summer. The plots will be sprayed once a month starting at bud break and will include a soil drench. When the extension service issues the mildew alert, sprays will be applied once a week until color change. The spraying will continue at that point only if botrytis is a problem.

## **IMPACTS AND CONTRIBUTIONS/OUTCOMES**

The initial findings from this study were disseminated during a November 2002 compost tea seminar sponsored by Soil Foodweb Inc. in Corvallis. In December 2002, 65 growers attended a seminar on the Soil Foodweb at the ACRES USA meetings, and 500 growers expressed interest in compost tea and how to use it.

A presentation was scheduled in January 2003 during the meeting the U.S. Composting Council.