

1986 Project Proposal
Grape Powdery Mildew Research
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Powdery mildew is the most important disease of grapevines in California. An epidemic of the disease occurred in 1985 despite recent advances in fungicidal control of the disease. Many raisin, wine and table grape growers suffered significant losses due to reduction in quality and yield. Often vineyards are receiving minimal care and pest control due to lack of operating capital, participation in the raisin diversion program, decreased winery contracting, or abandonment. It is recognized that powdery mildew and other pest populations build up in these vineyards, but the significance of inoculum movement is not understood. It is hypothesized that powdery mildew spores may blow downwind and affect adjacent vineyards, but studies are confounded by the diversity of cultural and disease control practices employed by growers.

Basic research in powdery mildew epidemiology and ecology is lacking. The significance and measurement of windblown spore dispersal and disease spread has not been examined. This information is necessary in predicting disease probability and control recommendations to growers.

Tridemefon (Bayleton) was registered for use in 1982. It provided excellent control of powdery mildew until the 1985 growing season. It would be useful to re-examine the use of this material to optimize its performance under conditions of high disease pressure.

Preliminary research in New York demonstrates that dormant spray treatments may delay onset of powdery mildew. This should be investigated under California conditions.

Objectives:

1. POWDERY MILDEW SPREAD AND INCREASE: To investigate the movement of grape powdery mildew from a diseased area to healthy vines. The information would improve understanding of disease spread and increase, and the impact of abandoned and minimally managed (RID) vineyards on powdery mildew occurrence in production vineyards.
2. To evaluate current control strategies and determine methods of optimizing control.
 - a. BAYLETON/SULFUR TIMING STUDIES: Evaluation of Bayleton spray schedules, and schedules alternating Bayleton with sulfur dusts. This would provide information on how growers could improve disease control, reduce costs, and improve resistance management.
 - b. APPLICATION EFFICACY STUDIES: Compare coverage and disease control obtained with dilute versus concentrate application of Bayleton.
 - c. DORMANT APPLICATION OF FUNGICIDES: To investigate the efficacy of dormant sprays in reducing overwintering powdery mildew inoculum.

PLANS AND PROCEDURES

POWDERY MILDEW SPREAD AND INCREASE

The experiment would be conducted in a commercial vineyard that participated in the RID program during 1985 and had a history of mildew. This 10 to 15 acre block must not be surrounded by other vineyards. The block will be treated with a standard Bayleton program, with the exception of a small area in the center consisting of approximately 20 vines. This untreated area will serve as the point source of inoculum for the vineyard (see figure 1). Spread of powdery mildew will be monitored outward in all directions.

Data to be collected includes:

1. Weekly monitoring of leaves for outward disease progression (budbreak to bloom).
2. Weekly evaluation of clusters for outward disease progression (bloom to veraison).
3. Periodic monitoring of entire block for disease incidence.
4. Cluster evaluation of disease incidence and severity at veraison.
5. Climatic data.

Analysis will be performed regressing distance against time in each direction.

BAYLETON/SULFUR TIMING STUDIES:

A commercial table grape vineyard will be selected. The following treatments will be evaluated:

1. Bayleton - 4 oz/acre @ 18 inch shoot growth, bloom, 18 days following bloomtime application, 36 days following bloomtime application.
2. Bayleton - 4 oz/acre @ 18 inches, shatter, 18 days, 36 days.
3. Bayleton - 3 oz/acre beginning at 10 inches, and continuing at 20 day intervals, for a total of 6 applications.
4. Combination - Bayleton 4 oz/acre @ 18 inches or first sign of disease, Bayleton @ berry set, followed by sulfur dusting timed at temperature based intervals.
5. Combination - Sulfur dusting at temperature based intervals up to berry set, followed by Bayleton 6 oz/acre.
6. Untreated check.

The treatments will be replicated five times in a randomized complete block design. An analysis of variance and a Duncan's Multiple Range test will be used to calculate significance.

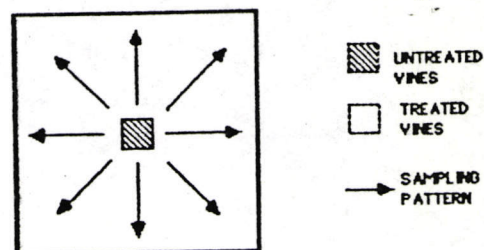
Data to be collected:

1. Veraison evaluation of incidence
2. Veraison evaluation of severity
3. Harvest evaluation of stem mildew incidence and severity

APPLICATION EFFICACY

The trial will be conducted in a commercial vineyard with a history of powdery mildew. A standard Bayleton spray program will be applied with grower equipment. Treatments will compare:

FIGURE 1.
POWDERY MILDEW MOVEMENT
PLOT DESIGN



1. Dilute application at 200 gallons water per acre
2. Concentrate application at 20 gallons water per acre

The trial will consist of six replications of paired plots in a randomized complete block design. An analysis of variance and F test will be used to determine significance.

Data to be collected:

1. Quantitative evaluation of spray material recovered from clusters after each application. (Amino acid and stain colorimetric evaluation.)
2. Veraison evaluation of powdery mildew incidence and severity.

DORMANT CONTROL TESTS

The experiment will be conducted in a commercial vineyard that suffered from severe powdery mildew during 1985. The treatments are as follows:

1. Lime sulfur - 24 gallons per acre
2. Dinoseb (Premerge) - 2.5 gallons per acre
3. Untreated control

The treatments will be replicated five times in a randomized complete block design. An analysis of variance and Duncan's Multiple Range test will be used to calculate significance of data.

Data to be collected:

1. Disease incidence and severity evaluations will be conducted weekly from bud break to bloom.
2. Disease incidence and severity will be evaluated at veraison.