UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION COUNTY OF LAKE

your Lake County HORTICULTURAL NOTES

883 LAKEPORT BOULEVARD
LAKEPORT, CALIFORNIA 95453
TELEPHONE: 263-2281

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PLAN NOW TO AVOID GRAPE POWDERY MILDEW RESISTANCE TO DMI'S

In the April 1989 issue of Hort Notes, it was noted that sterol inhibitors, or demethylation inhibitor (DMI) use, was rare in most Lake County vineyards. If and when the use of DMI's, e.g. Bayleton, Rally, Rubigan, increases, the possibility of resistance will occur. Resistance to Bayleton has already been documented in certain vineyards that received heavy usage over successive years. Fortunately, in Lake County, wettable sulfur at budbreak followed by dusting sulfur is an effective program and there is no reason to convert to an exclusive DMI-based program; the pressure just isn't there in the great majority of vineyards.

If you are considering increasing the number of DMI applications, also consider the potential of future resistance build-up. Indeed, DMI producers are themselves working to prevent this problem (which would, of course, lead to market loss). The following is by Paul Verdegaal, U.C. Farm Advisor, San Joaquin County:

> The problem of powdery mildew control and possible resistance to available fungicides has become enough of a concern since 1982 (with the introduction of the first demethylation inhibitor (DMI) triadimefon or Bayleton), that there is now a North American Fungicide Resistance Action Committee with a DMI working group...
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> 'The North American Fungicide Resistance Action Committee DMI Working Group is a cooperative effort among producers of these highly active demethylation inhibiting (DMI) fungicides to prevent the development of resistant pathogens. Selection for resistant individuals can, over time, lead to loss of field efficacy. The following recommendations should help to reduce selection pressure on the fungal population and, therefore, to preserve the excellent activity of these fungicides against grape powdery mildew (Uncinula necator):

- Use preventatively, not curatively.

- Ensure thorough coverage to allow penetration.

- Do not exceed the recommended maximum interval between applications.

- Do not exceed the allowed maximum amount applied per season.

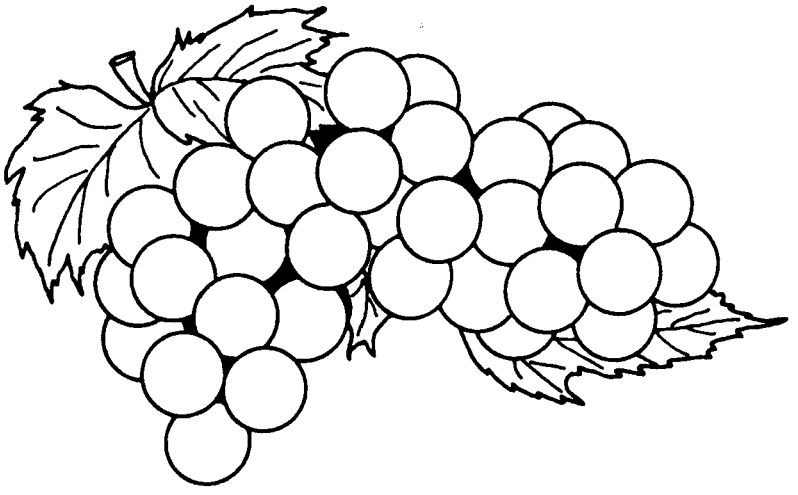
- Do not use DMI's alone season-long. Either use a a tank mix, alternate, or use alternating blocks of sprays with a non-related fungicide. Alternation with other DMI fungicides will not help prevent resistance development.

- Apply a dilute spray of wettable sulfur, lime sulfur or copper at, or just prior to, bud break. This will delay the onset of powdery mildew. Protect the vines with additional sprays of sulfur or other non-DMI protectant until timing is appropriate for DMI fungicide application.'

Your adherence to this anti-resistance strategy benefits all users of these fungicides.

In summary; go early, get good coverage and follow the label. This will not only help meet legal requirements, but will help avoid further problems now that there is a good choice of materials to alternate with currently, including: sulfur, Bayleton, Rally, Rubigan, and others soon to be released.

Current UC Powdery Mildew Guidelines are attached. If you would like to further discuss your mildew program, or have been seeing increased PM pressure, please contact me.



POWDERY MILDEW (7/89)

Pathogen: *Uncinula necator*

SYMPTOMS: Red blotchy areas appear on dormant canes. On leaves, initial symptoms appear as chlorotic spots on the upper leaf surface. Signs of the pathogen appear a short time later as white, webby mycelium. As spores are produced, the colony takes on a white, powdery appearance. On fruit and rachises the pathogen appears as white, powdery masses that may colonize the entire berry surface.

COMMENTS ON THE DISEASE: Fungus overwinters in the dormant buds of some varieties. Infections occur as buds push in the spring. Information has been developed that also shows cleistothecia to be important sources of overwintering inoculum. Infection occurs following spring rains or sprinkler irrigations. During years when weather is conducive for rapid pathogen reproduction, inoculum concentrations remain high throughout the growing season.

ORGANICALLY ACCEPTABLE METHODS: Sulfur only program.

WHEN TO TREAT: FOR SULFUR ONLY PROGRAM (dust, wettable, flowable or micronized): Begin treatment at budbreak to 2 inch shoot growth. Reapply at 7 day intervals if treating every other middle or at 10 day intervals if treating every middle. Reapply if sulfur is washed off by rain or irrigation. Treatments may be discontinued for wine and raisin grapes when fruit reaches 12 Brix but should be continued to harvest for table grapes.

FOR STEROL INHIBITORS (Rally, Rubigan, Bayleton): Begin treatment when shoots are 4 to 6 inches long. Sterol inhibitors can be applied earlier than 4 to 6 inches; however, research data shows that a wettable sulfur application (5 lb/100 gal water/acre) at budbreak should be used before application of a sterol inhibitor. During cool springs causing slow growth, an additional wettable sulfur treatment is advisable 10 days later. Subsequent sulfur treatments should be applied at 7 to 10 day intervals until shoots reach 4 to 6 inches and treatments with a sterol inhibitor may begin (with the exception of Rubigan, which should not be used before 18 inches of shoot growth has occurred). Treatments may be discontinued for wine and raisin grapes when fruit reaches 12 Brix but should be continued to harvest for table grapes. Because shoot growth rate is weather dependent, shoot size should not be used as a spray date indicator after the first treatment.

Bayleton remains efficacious for 10 to 17 days at temperatures conducive for rapid pathogen population buildup. Bayleton is not a good eradicant if applied later than 3 days after inoculation. This means that once the spray interval has been set, stretching the interval beyond 3 days of when the spray should have been applied might result in infection. Additional information on the efficacy of Rally and Rubigan is currently being developed.

COMMENTS ON CONTROL: Late season control is dependent upon early season reduction in inoculum potential and subsequent infection. Neither sterol-inhibiting fungicides, such as Bayleton, Rally, and Rubigan, nor dusting sulfur should be used as an eradicant. Control strategies will only work with these materials applied as protectants prior to infection. Bayleton appears to be most efficacious when used at 2 to 4 oz per acre on a 10 to 17 day spray interval; use Rally at 4 oz per acre on a 21 day spray interval; and Rubigan at 3, 4, 6 and 6 oz, respectively, on an 18 day schedule. Sterol-inhibiting fungicides are systemic but only for 1 or 2 cm around each spray droplet; therefore, thorough coverage is critical to economic disease control. Sulfur

Continued on next page.

Powdery mildew cont. (7/89)

should be used at 7 to 10 day intervals unless temperatures exceed 100 F; in this case the interval should be extended. Eradicant sprays should contain only wettable sulfur and a wetting agent.

TREATMENT:

Pesticide (commercial name)	Amount to Use** (dosage/acre)	P.H.I.+ (days)	Comments
A. MYCLOBUTANIL (Rally) 40WP	3-5 oz in 50 or more gal water/acre	14	1.5 lb maximum/season. Begin application at prebloom and continue on a 14 to 21 day interval. Use higher rate on susceptible varieties or udner heavy disease pressure.
B. FENARIMOL (Rubigan) EC	3-6 oz	30	Apply 3 oz at 10-18 inch shoot growth; 4 oz 18 days later; 6 oz 18 days later, and 6 oz 18 days later.
C. TRIADIMEFON (Bayleton) 50WP	4-6 oz	14	18 oz maximum/season. Strains of *U. necator* differ in their sensitivity to Bayleton. Thus far this difference occurs only at sub-label rates, i.e., from 0.25 to just over 1 oz. Because of this, growers should not apply less than 2 oz per acre per application. See timing cautions above.
D. SULFUR# (dust, wettable, flowable, or micronized)	Label rates		Sulfur can cause injury to foliage and fruit when applied just before or on days when the temperature exceeds 100 F. The amount per acre may be reduced during periods of high temperature to prevent burning. In some counties there is a 3 day re-entry period when using sulfur; consult your county agricultural commissioner.

** Apply with enough water to provide complete coverage.
+ Preharvest interval. Do not apply within this many days of harvest.
* Permit required from county agricultural commissioner for purchase or use.
# Acceptable for organically grown produce.

SUPPORT STAKES FOR YOUNG WALNUTS

In March, Butte County Farm Advisor Bill Olson and I toured several young orchards. We noted a tendency to tie support stakes so close to the tree that they were actually cutting into the bark. Bill suggested two "tricks" to alleviate this problem while still maintaining the required support against the wind:

1) Put the stake upwind of the tree. This way the tree will lean away from the stake and be less likely to get "choked".

2) Rather than prune off all the shoots on the stake side of the main trunk, keep a couple of short stubs between the tree and the stake to act as a "buffer" between the stake and the main trunk. The stake will then lean on the stub(s) rather than the trunk.

3) Check the stake periodically to make sure it is not too tight. Remember, the tree is growing in girth as well as height.

1990 PEST MANAGEMENT GUIDELINES AVAILABLE

U.C. Pest Management Guidelines for many crops including apples, grapes, pears and walnuts, have recently been updated and there are some significant changes. They are available at our office for $.05/page to cover xerox costs. In some cases, only certain pages need to be updated. Contact us if you are interested.

RECENT U.C. PUBLICATIONS OF INTEREST (contact our office)

#7046	Control of Yellowjackets	Free
#4030	Growers Weed Identification Handbook-sheets #W1232-247 (16 new weeds)	$5.00
#21454	Irrigation Scheduling: A Guide For Efficient On-Farm Water Management	$6.00
#2959	Strawberry Production in California	$1.75
No #	Organic Farming Directory	Free
#21467	Walnut Hedgerow Planting System	$1.50

PUBLICATION CATALOGS AVAILABLE

The following catalogs contain many useful agricultural publications:

1) Technical Books Catalog, 1989-90
contact: UCD Bookstore
University of California
Davis, CA 95616

2) agAccess - Agricultural Book Source
contact: agAccess
Post Office Box 2008
Davis, CA 95617

1990 WINTER MEETINGS

Meetings for all commodities, as well as pesticide and worker safety, are over. Thanks to all of you that attended. Turn out was the best in the three years since I've been in Lake County. It is obvious growers realize that the demands of modern day farming require keeping up-to-date on new developments. There is an awareness that the way grandparents, and even parents, farmed, will be obsolete in the coming years; grower interest in this year's meetings indicated this.

A special thanks to refreshment and hall rental sponsors: Lake County Farm Bureau, Lake County Grape Growers Association, California Tree Fruit Agreement, Moyer Products and Rainbow Ag Services. Meetings are a social, as well as educational, event and your assistance definitely helps increase attendance!

DID SOMEONE YOU KNOW NOT RECEIVE A MAY NEWSLETTER?

The current issue of Hort Notes was only sent to those who mailed in their 1990 subscription form. Many of you responded, so many of you stayed on the mailing list. However, in going over the list, there are missing names of growers who should be receiving this valuable information but failed to return the subscription form.

If in the course of "coffee shop talk" the subject comes up, recommend that friends who did not receive a May newsletter contact our office so we can get them back on the Hort Notes mailing list. Also, please check with your foreman or other key ranch personnel; if you need extra forms, we'll send you as many as you need.

MAY CHECKLIST (contact me about any of the following):

Young Trees And Vines

*WEED CONTROL!!! (but watch herbicide phytotoxicity)
*Remember, young plants need more frequent, lighter irrigations than established trees, but watch excess moisture which reduces vital oxygen in the root zone.
*A little fertilizer to push growth should be applied after growth begins.
*Begin to train the leader in 1-year-old walnuts.
*Vertebrates can kill young plants in a hurry.

Early Irrigations

1990 is another dry year. Deep soil moisture is likely lacking, in the lighter soils necessitating early irrigations where possible to avoid season-long stress and subsequent problems. Pears and walnuts require even moisture through the season, but early moisture is crucial. Grapes absolutely require early moisture but can take (and even benefit from) water stress after veraison.

For detailed comments on orchard and vineyard management under drought conditions, see the following articles in Hort Notes (contact us for copies).

-Early Season Stresses can Reduce Next Year's Grape Crop, April 1988.

-Topic of the Year - Drought, May 1988.

Nutritional Problems

* Plan for bloom-time petiole analysis in grapes.
* Spring is the ideal time to correct Zinc deficiency in walnuts and begin foliar zinc sprays on pear if needed.
    -Walnut - 1 lb. 36% $ZnSO_4$/100 gal. water
    apply just as leaves turn green
    repeat 1-2 times at 2-3 week intervals if severe.
    -Pear - 4-5 lbs. 50% basic $ZnSO_4$/100 gal. water
    2-4 weeks after bloom.
* N uptake is optimal during the growing season - but avoid too much.

Rachel

Rachel Elkins
Farm Advisor