Managing Grape Diseases: Critical Fungicide Application Timing

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With credit to Mike Ellis, Ohio State University
for use of some photos and concepts.

Fungicides For Grape Diseases Can Be Applied In Two Phases

Phase 1 (Early Season)

<u>Timing</u> = 1 to 3 inch growth through 3 to 4 weeks after bloom

<u>Diseases</u> = Phomopsis cane and leaf spot, Black rot, Powdery mildew, and Downy mildew

Phase 2 (Late Season)

<u>Timing</u> = 3 to 4 weeks after bloom through harvest

<u>Diseases</u> = Powdery mildew and Downy mildew

Early Season Control of the Major Grape Diseases is Absolutely Critical.

Early Season (Phase 1)

Timing = 1 to 3 inch growth through 3 to 4 weeks after bloom

Growth Stages = Bud break, Ten-inch shoots, Pre-bloom, Bloom, Shatter, First cover, and Second cover

Diseases = Phomopsis cane and leaf spot

Black rot

Powdery Mildew

Downy Mildew

2009
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Phomopsis Cane and Leaf Spot (*Phomopsis viticola*)

Note lesions
on the cane

Note leaf spots

Phomopsis Cane and Leaf Spot

Phomopsis Cane and Leaf Spot

The Phomopsis cane and leaf spot fungus also attacks the fruit, causing fruit browning and decay.

Phomopsis cane and leaf spot infections are favored by cool and wet weather conditions.

2009
Mark Longstroth

Pre-bloom sprays are very important for control.

Although fruit infection by *Phomopsis* does not develop until harvest, the fungus actually enters the fruit early in the season (before or during bloom).

The *Phomopsis* fungus enters green fruit and remains dormant (latent infection) until fruit begins to ripen near harvest.

Although fruit remain susceptible to infection throughout the growing season, primary inoculum (conidia) appears to be depleted early in the growing season, shortly after bloom.

Phomopsis Cane and Leaf Spot

Latent infections do nothing at first, but as fruit ripens, the fungus becomes active and rots the fruit.

Fungicides for Phomopsis cane and leaf spot management
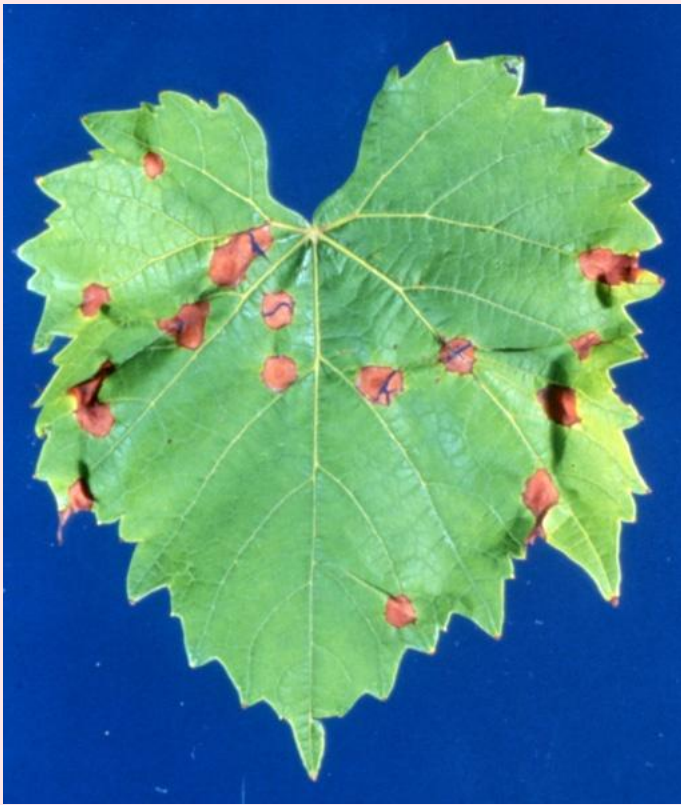

Bud Break to Bloom

Mancozeb 75DF *or*
Captan 50WP *or*
Ziram 76DF *or*
Abound 2.08F *or*
Sovran 50WG *or*
Pristine 38WG *or*

Apply fungicides from bud break through bloom at 7-10 day intervals depending on weather conditions and according to label directions.

Black Rot (*Guignardia bidwellii*)

Black rot leaf infections (left) showing fungal pycnidia (lower left).

Black rot fruit infections (right)

Current research indicates that berries on most varieties are resistant by 3 to 4 weeks after bloom. This is called ontogenetic resistance.

Thus: Early Season
Disease Control is Critical

Fungicides for black rot management

Fungicide tests indicate that 3 sprays on a 10 to 14 day interval from early bloom through berry touch (the critical period for control) provides excellent control of black rot.

Early Bloom to First or Second Cover

Mancozeb 75DF *or*
Captan 50WP *or*
Ziram 76DF *or*
Abound 2.08F *or*
Sovran 50WG *or*
Pristine 38WG *or*
Adament 50WG

Apply fungicides from bud break through bloom at 7-10 day intervals depending on weather conditions and according to label directions.

Reminder: The most critical period for controlling black rot with fungicides is just before bloom through 2 to 4 weeks after bloom.

Powdery Mildew (left) and Downy Mildew (right) can also become established in the vineyard very early in the growing season. Phase 1 pre-bloom sprays are important to prevent disease establishment by these fungi as well.

Downy mildew sporulation on leaf underside (left).

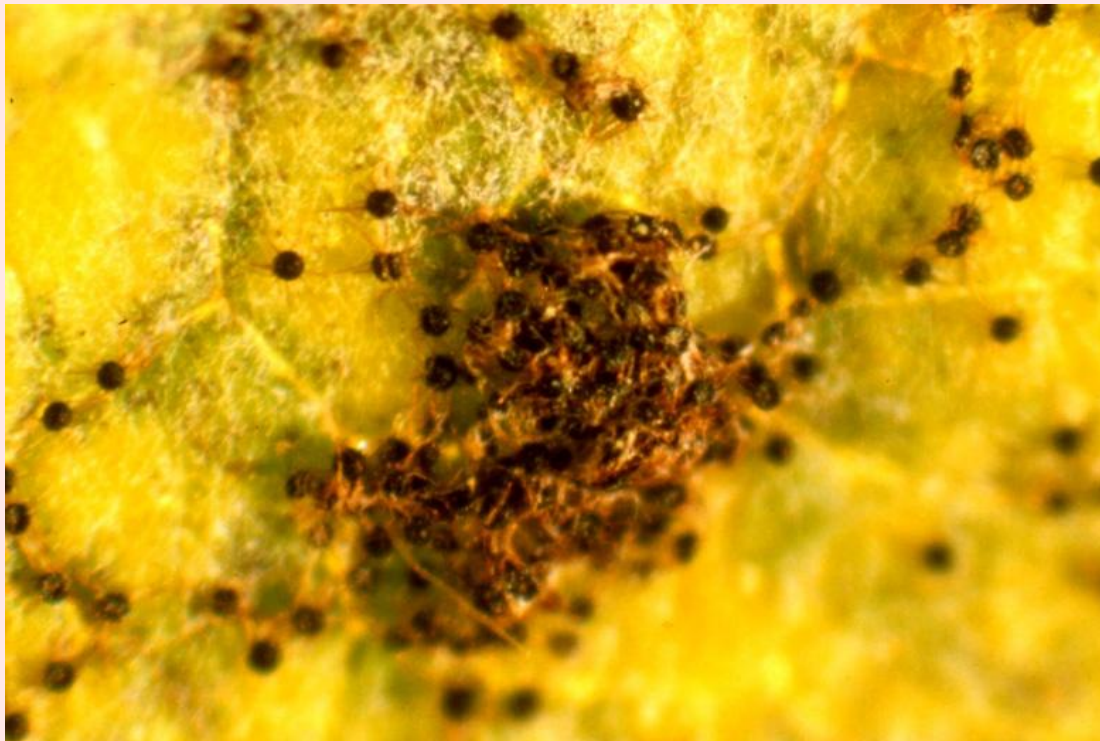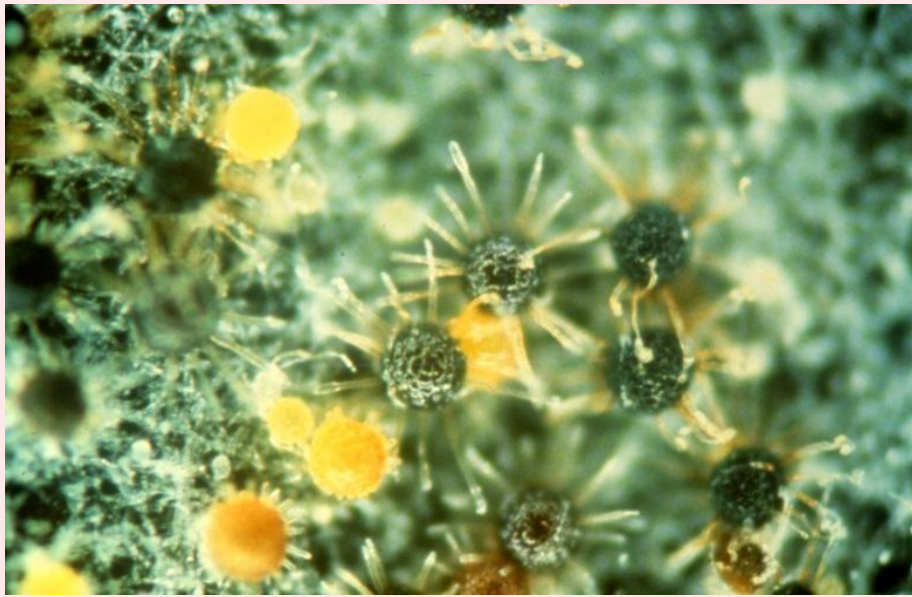# The two mildew diseases will also require disease management attention during Phase 2.

Timing = 3 to 4 weeks after bloom through harvest and then post-harvest

Diseases = Powdery mildew (left) and Downy mildew

Powdery mildew (*Uncinula necator*) overwinters on the previous year's infected tissues.

Overwintering fungal fruiting structures called cleistothecia produce ascospores in early spring.

Springtime environmental conditions needed for powdery mildew ascospore discharge.

Based on Cornell University data, .01 inch of rain with average temperature of 50 degrees Fahrenheit

It is critical to control primary infections caused by ascospores early in the season.

Thus: Pre-bloom sprays are very important to keep powdery mildew from becoming established in the vineyard.

Pre-bloom sprays for powdery mildew may include:

Sterol inhibitors such as Rally 40WSP, Rubigan 1EC, Vintage SC, Procure 50WS, Elite 45DF or Mettle 125ME

or

Strobilurins such as Abound 2.08F, Sovran 50WG, or Flint 50WG
plus
Sulfur, JMS Stylet Oil, Quintec 2.08F, Endura 70WG, or Potassium salts
OR
Pristine 38WG *or*
Adament 50WG.

Controlling Fruit and Late-Season Foliage Infection by Powdery Mildew

Research indicates that berries become resistant to powdery mildew infection within 2-4 weeks after bloom.

Concord grape berries -- very resistant by two weeks after bloom.

Vinifera and susceptible French hybrid berries -- resistant by three to four weeks after bloom.

It is important to remember that cluster stems (Rachis) and leaves remain susceptible throughout the growing season.

The most critical period for spraying grapes is the pre-bloom through 2-4 weeks after bloom period.

Applications during Phase 2 (late season, 3-4 weeks after bloom through harvest) are also important especially if early season powdery mildew has been managed poorly.

Preventing powdery mildew late in the season improves winter hardiness in grapes.

Phase 2 sprays for powdery mildew may include:

Sterol inhibitors such as Rally 40WSP, Rubigan 1EC, Vintage SC, Procure 50WS, Elite 45DF or Mettle 125ME

or

Strobilurins such as Abound 2.08F, Sovran 50WG, or Flint 50WG

plus

Sulfur, JMS Stylet Oil, Quintec 2.08F, Endura 70WG, or Potassium salts

OR

Pristine 38WG *or* Adament 50WG.

Reminder: Early Season Control of the Major Grape Diseases (Phomopsis Cane and Leaf Spot, Black Rot, Powdery Mildew, and Downy Mildew, is Absolutely Critical.

Early season (1 to 3 inch shoot growth through 2-3 weeks after bloom) fungicide applications are important for management of Phomopsis, Black Rot, Powdery mildew, and Downy Mildew.

During this period, immediate pre-bloom to 3-4 weeks after bloom are the most important times for fungicide applications.
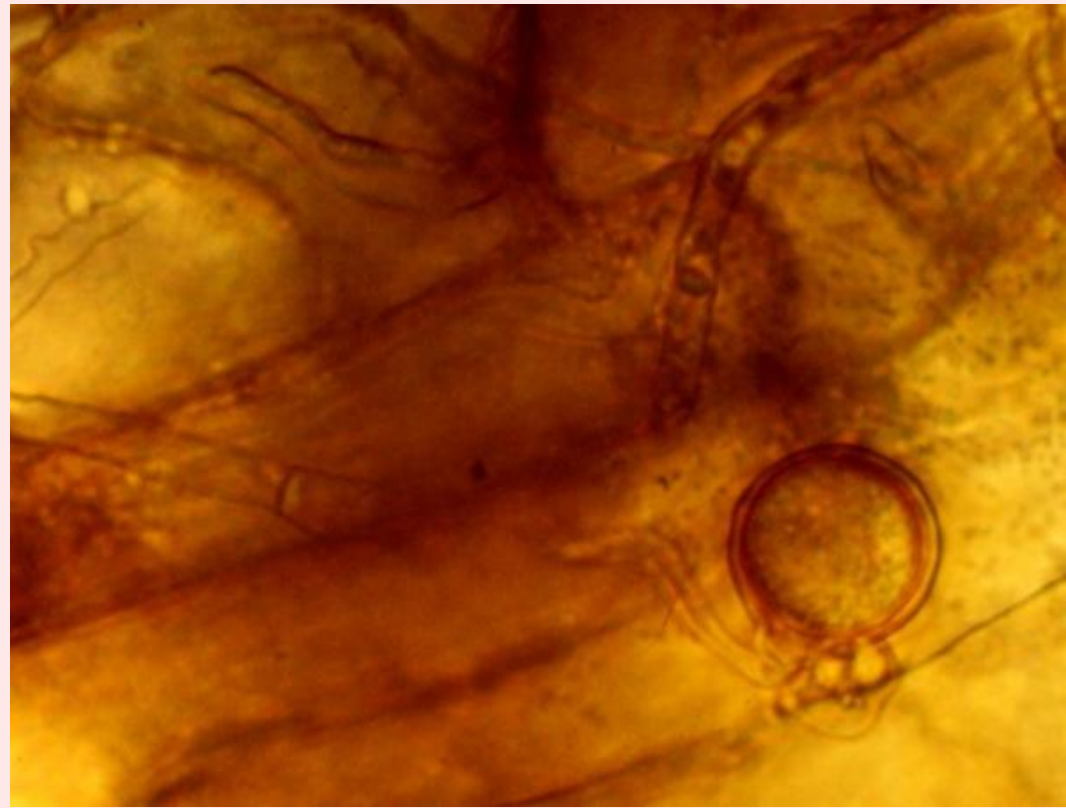
Downy Mildew (*Plasmopara viticola*)

Downy mildew causes yellow spots on the leaf top surface and white fungal growth (sporulation) on the leaf underside.

Springtime Environmental Conditions Required for Downy Mildew Oospore Germination

10ºC	= 50ºF
10 mm of rain	= 0.4 in
10 cm of vine growth	= 4 in.

- Based on Cornell University research

Early Season Downy Mildew Control is Critical

Sporulating downy mildew-infected immature berries. Close-up of immature berry with downy mildew mycelium and sporagia (bottom, left).

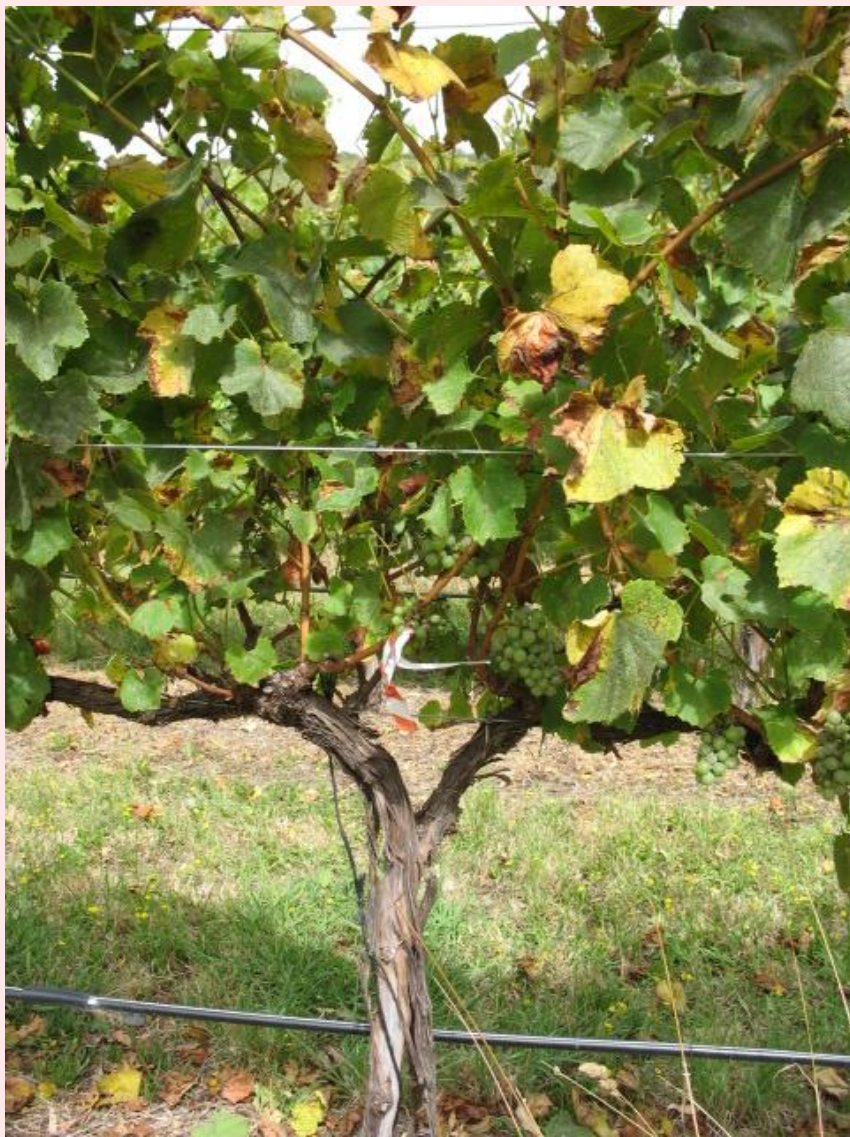# Controlling Downy Mildew Fruit Infection

Downy Mildew

It appears that fruit become
resistant to downy mildew
by 3 to 4 weeks after bloom.

Downy Mildew

Remember that the leaves and rachis stems remain susceptible throughout the season.

Most Critical Period For Controlling Grape Diseases With Fungicides

The first 7 fungicide applications made before bloom through 2 to 4 weeks after bloom are an important step in grape disease management.

Cane & leaf spot, Black rot, Powdery mildew, Downy mildew
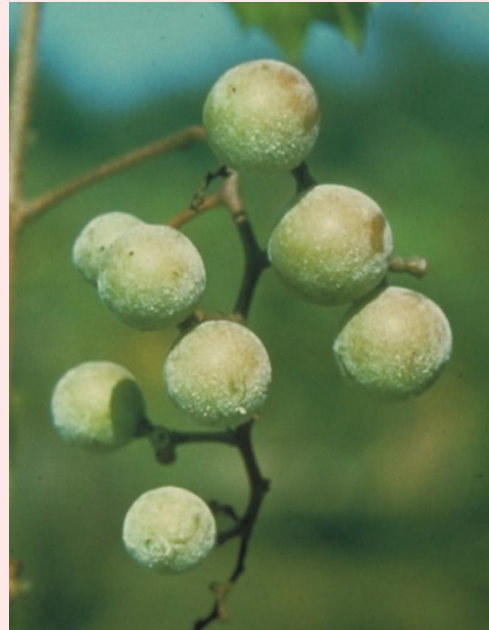
Additional Grape Foliar and Fruit Disease Management Activities

a) Use grape cultivars with disease tolerance.

b) Practice sanitation by removing mummies from the trellis and off the ground and by pruning out diseased vines.

c) Manage the canopy with pruning and leaf removal to reduce relative humidity.

d) Apply fungicides. The U.K. spray guide provides spray information. Use early applications of fungicides to control primary infections. If primary infections are controlled, less fungicide will be used.

Questions?

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