

Developing an Effective Fungicide Spray Program for Wine Grapes In Ohio 2006

Michael A. Ellis
OARDC
The Ohio State University
Wooster, Ohio 44691

The following information is intended to be “food for thought” in relation to developing a fungicide spray program for wine grapes in Ohio. The spray schedule presents various fungicide options that can be considered by growers. It is important to note that the schedule is intended to provide simultaneous control of black rot, powdery mildew, downy mildew and Phomopsis cane and leaf spot. The schedule is also intended to provide fungicide resistance management, primarily against the powdery mildew fungus. Note that there are usually several fungicide options that can be selected. This schedule does not contain all of the fungicides currently registered for use on grapes. Remember, these are only “**Suggested Guidelines**” for use in developing a fungicide program. The final program that you develop will depend upon the disease complex in your vineyard as well as economic considerations.

SUGGESTED GUIDELINES FOR DEVELOPING A FUNGICIDE SPRAY PROGRAM

FOR WINE GRAPES IN OHIO

This program is intended to provide simultaneous control of Block Rot, Powdery Mildew, Downy Mildew and Phomopsis Cane and Leaf Spot, as well as Fungicide Resistance Management

Application Timing	Material (and rate/A)
1 inch shoot	Mancozeb (3 lb/A)

NOTE: Mancozeb alone for Phomopsis only. If Powdery Mildew is a concern this early in the growing season, use:

Mancozeb (3 lb/A)
PLUS
A sterol-inhibiting fungicide
[Elite (4 oz/A) or Rubigan (3 fl. oz/A) or Nova (4 oz/A)]
or
Endura 70WG (4.5 oz)
or
Quintec 2.08F 3-4 fl oz
or
Flowable Sulfur 6F (3 qt/A)
or
Wettable Sulfur (8-10 lb/A)
or
JMS Stylet Oil (1% concentration)
or
Potassium salts (see comments page 2)

NOTE ON POTASSIUM SALTS: Several potassium salt materials are currently registered for

control of powdery mildew on grape. These include Nutrol (monopotassium phosphate), Kaligreen and Amicarb 100 (potassium bicarbonate). They provide moderate to good control of powdery mildew when applied to developing powdery mildew colonies. They do not provide protectant activity, and they are not effective against the other grape diseases caused by fungi. See label of each material for usage rates and other recommendations.

3-5 inch shoot or 10 days after last spray	Mancozeb (3 lb/A) PLUS A sterol-inhibiting fungicide [Elite (4 oz/A) or Rubigan (3 fl. oz/A) or Nova (4 oz/A)] or Endura 70WG (4.5 oz) or Quintec 2.08F 3-4 fl oz or Flowable Sulfur 6F (3 qt/A) or Wettable Sulfur (8-10 lbs/A) or Potassium salts or JMS Stylet Oil (1% concentration)
--	--

NOTE: If Powdery Mildew is a major concern, a sterol inhibiting fungicide such as Rubigan, Elite or Nova are the fungicides of choice to combine with Mancozeb. Also, be aware that the efficacy of Sulfur for Powdery Mildew control declines below 65°F. If cool temperatures persist (below 65°F), Rubigan, Elite or Nova should be used instead of Sulfur for Powdery Mildew early in the growing season. On Sulfur sensitive varieties, use Rubigan, Elite or Nova. Other alternatives for powdery mildew control are Endura, Quintec, Potassium salts and JMS Stylet Oil. If Powdery Mildew is not a problem, Mancozeb alone can be used.

NOTE: In some areas, reduced sensitivity or resistance to the sterol inhibiting and strobilurin fungicides has been reported in the powdery mildew fungus. If resistance to these materials is present in your vineyard, alternative materials for powdery mildew control must be used.

NOTE: Always check the price (cost per acre per application) of each fungicide. At the rates recommended, fungicides vary considerably in cost.

10-12 inch shoot or 10 days after last spray	Same fungicides as 3-5 inch shoot
--	--------------------------------------

- Immediate prebloom or 10 days after last spray	(Strobilurin Fungicide) Abound (11-12 fl oz/A) or Sovran (4-6½ oz/A) OR Mancozeb (3-4 lb/A)
---	---

PLUS
Endura 70WG (4.5 oz)
or
Quintec 2.08F 3-4 fl oz
or
Flowable Sulfur 6F (3 qt/A)
or
Wettable Sulfur (8-10 lb/A)
or
JMS Stylet Oil (1% concentration)
or
Potassium salts
OR
Pristine 38WG (6-10.5 oz) used alone

NOTE: When downy mildew is a concern, use Abound or the highest rate of Sovran.

*Pristine is a package mix combination of a strobilurin fungicide (pyraclostrobin) and the fungicide, Endura (boscalid). Do not make more than 2 sequential applications of Pristine without switching to another fungicide in a different class of chemistry, and do not make more than 6 applications per season.

NOTE: Do not combine JMS Stylet Oil with sulfur fungicides or Captan or serious vine injury can occur. The products should not be sprayed on vines within 14 days of each other.

NOTE: The period from immediate prebloom through 3 to 4 weeks after bloom is the **CRITICAL PERIOD** for controlling fruit infection by Phomopsis, black rot, powdery mildew and downy mildew.

NOTE: It is important to alternate different fungicide chemistry in the program in order to prevent the development of fungicide resistant strains of fungi, especially powdery mildew. Our intention here is to alternate the sterol-inhibiting fungicides (Rubigan, Elite or Nova) with the strobilurin fungicides (Abound, Sovran or Pristine). There is evidence that the powdery mildew fungus has developed resistance to the strobilurin and sterol inhibiting fungicides in some locations. On varieties or in vineyards where powdery mildew is a concern, the addition (tank mix) of sulfur or another fungicide with powdery mildew activity with these fungicides is recommended. This is especially true during the most critical period for disease control (immediate pre bloom through 3 to 4 weeks after bloom). On sulfur sensitive varieties, Endura, Quintec, Potassium salts and JMS Stylet Oil are alternatives to sulfur. See note on Pristine above.

NOTE: Do not apply sulfur to sulfur sensitive varieties.

--
First postbloom spray
no longer than 10-14 days after
last spray

(Strobilurin Fungicide)
Abound (11-12 fl oz/A)
or
Sovran (4 oz/A)

OR

Mancozeb (3-4 lb/A)

PLUS

Endura 70WG (4.5 oz)

or

Quintec 2.08F 3-4 fl oz

or

Flowable Sulfur 6F (3 qt/A)

or

Wettable Sulfur (8-10 lb/A)

or

Potassium salts

OR

Pristine 38WG (6-10.5 oz) used alone

NOTE: The strobilurins (Abound, and Sovran) cannot be applied more than 4 times per season on wine grapes, and 3 times per season on all other types of grapes (juice). The label also states “do not apply more than 2 sequential sprays of any strobilurin fungicide before alternating with a fungicide that has a different mode of action”.

Second postbloom spray

no later than 10-14 days after

last spray

Mancozeb (4 lb/A) or Captan 50W (3-4 lb/A) or Phosphorous Acid

PLUS

A sterol-inhibiting fungicide

Elite (4 oz/A) or Rubigan (6oz/A) or Nova (4 oz/A)]

or

Endura 70WG (4.5 oz)

or

Quintec 2.08F (3-4 fl oz)

or

Flowable Sulfur 6F (3 qt/A)

or

Wettable Sulfur (8-10 lb/A)

or

Potassium salts

OR

Pristine 38WG (6-10.5oz) used alone

**** NOTE on Phosphorous Acid:**

Several products containing phosphorous acid (phosphonates, phosphites) are sold as nutritional supplements and “plant conditioners”, but a few products (ProPhyt, Phostrol, Agri-Fos) are registered for use as fungicides for downy mildew control on grape. Phosphorous acid has been used successfully for many years in Australia for downy mildew control on grape. Australian experience suggests that these products provide most control on foliage when applied within a few days after the start of an infection period, providing only a few days of additional residual (protective) activity. Experience in New York suggests that spray timing is less critical for control of downy mildew on fruit, perhaps because this highly mobile chemical (which is exempt from residue tolerances) accumulates in these organs. Phosphorous acid is a promising fungicide for control of downy mildew, but commercial experience in the U.S. is limited and questions pertaining to optimum spray timing still need to be answered. Usage rate recommendations vary

among different products. Some recommend a specific number of pints per 100 gallons of water and some recommend a percent solution such as 0.3%. The products mentioned here have a 4-hour re-entry interval and a 0 day preharvest interval. Obtain and read the label of each product prior to use.

NOTE: Do not combine Captan or sulfur with JMS Stylet Oil or serious plant injury can occur. These materials should not be applied within 14 days of each other.

NOTE: The second postbloom spray should be the last spray in the **CRITICAL PERIOD** for controlling fruit infection by black rot, powdery and downy mildew (immediate prebloom through 3 to 4 weeks after bloom). By this time, the fruit of most varieties should be resistant. Remember that cluster stems (rachis) and leaves are still susceptible to powdery and downy mildew.

NOTE: In order to prevent or delay the development of fungicide resistance to the sterol-inhibiting fungicides (Rubigan, Elite or Nova) and the strobilurin fungicides (Abound or Sovran), each class of fungicide should not be used more than 3 to 4 times (preferably 2-3 times) per season and they should be alternated with each other.

NOTE: Watch the 66 days PHI on Mancozeb. If you get within 66 days of Harvest, Captan or ProPhyt can be used in place of Mancozeb for downy mildew control. If you have more than 66 days to harvest, Mancozeb would be the fungicide of choice. The danger of black rot infection should be over by this time. Berries should be resistant to black rot. Mancozeb, Captan, or ProPhyt is included for downy mildew control only. If weather is dry and downy mildew is not a problem, these fungicides are not required.

Summer Sprays Should Not Exceed a 14-Day Interval

Third post bloom spray

10-14 days after

last spray

Mancozeb (3-4 lb/A) or Captan 50W (3-4 lb/A) or Phosphorous Acid

PLUS

Endura 70WG (4.5 oz)

or

Quintec 2.08F (3-4 fl oz)

or

Flowable Sulfur 6F (3 qt/A)

or

Wettable Sulfur (8-10 lb/A)

or

Potassium salts

NOTE: A sterol-inhibitor fungicide (Rubigan, Elite or Nova) or a strobilurin fungicide (Abound or Sovran) can be used postbloom for Powdery Mildew control; however, season long use of these fungicides will greatly increase the risk of fungicide resistance development. Especially if early season disease control is good, emphasis for Powdery Mildew control later in the season should be placed on Sulfur, a fixed copper fungicide or JMS Stylet Oil. Sulfur would be the preferred material on nonsensitive varieties. Do not mix Captan or sulfur with any form of oil.

NOTE: Watch the 66 days PHI on Mancozeb.

Fourth post bloom spray

10-14 days after

Captan 50W (3-4 lb/A) or Phosphorous Acid

PLUS

last spray

Endura 70WG (4.5 oz)
or
Quintec 2.08F (3-4 fl oz)

Maintain a 10-14 day
spray schedule
through harvest

**These fungicide
will be used through
harvest**

or
Wettable Sulfur (8-10 lb/A)
or
Flowable Sulfur 6F (3 qt)

or
Potassium salts

OR

Fixed Copper Fungicide used alone

OR

Pristine 38WG (6-10.5 oz) used alone

NOTE: If dry weather persists and the risk of Downy Mildew is low, Captan or ProPhyt should not be required and Sulfur can be used alone for powdery mildew control. If weather is wet and Downy is a problem, a Downy Mildew material should be included. A Fixed Copper Fungicide will give good control of both Downy and Powdery Mildew. Especially on susceptible varieties, powdery mildew will need to be controlled throughout the growing season.

NOTE: Do not apply Captan, sulfur or copper fungicides within 30 days of harvest or fermentation may be affected and **DO NOT** combine Captan or Sulfur with any form of oil.

NOTE: For Botrytis bunch rot control, the following fungicides are available:

Rovral (1.5 lb/A)

PLUS

Latron B1956(6 fl oz/100 gal)

OR

Vanguard (10 oz/A) used alone

OR

Elevate (1 lb/A) used alone

OR

Scala 6SC 18 fl oz/A

These will be used only on bunch rot prone cultivars. The first spray should be made when disease is first observed or at veraison (or shortly thereafter). Then wait until a combination of threatening weather and/or disease develops and make a second spray (at least 2 weeks after the first spray). On late maturing varieties a third spray may be required.

NOTE: Some tests in New York have indicated that Rovral at 1 lb/A plus Vanguard at 5 oz/A may have an additive effect and provides good bunch rot control. The use of a **strobilurin fungicide** during the bloom period should provide some control of Botrytis.