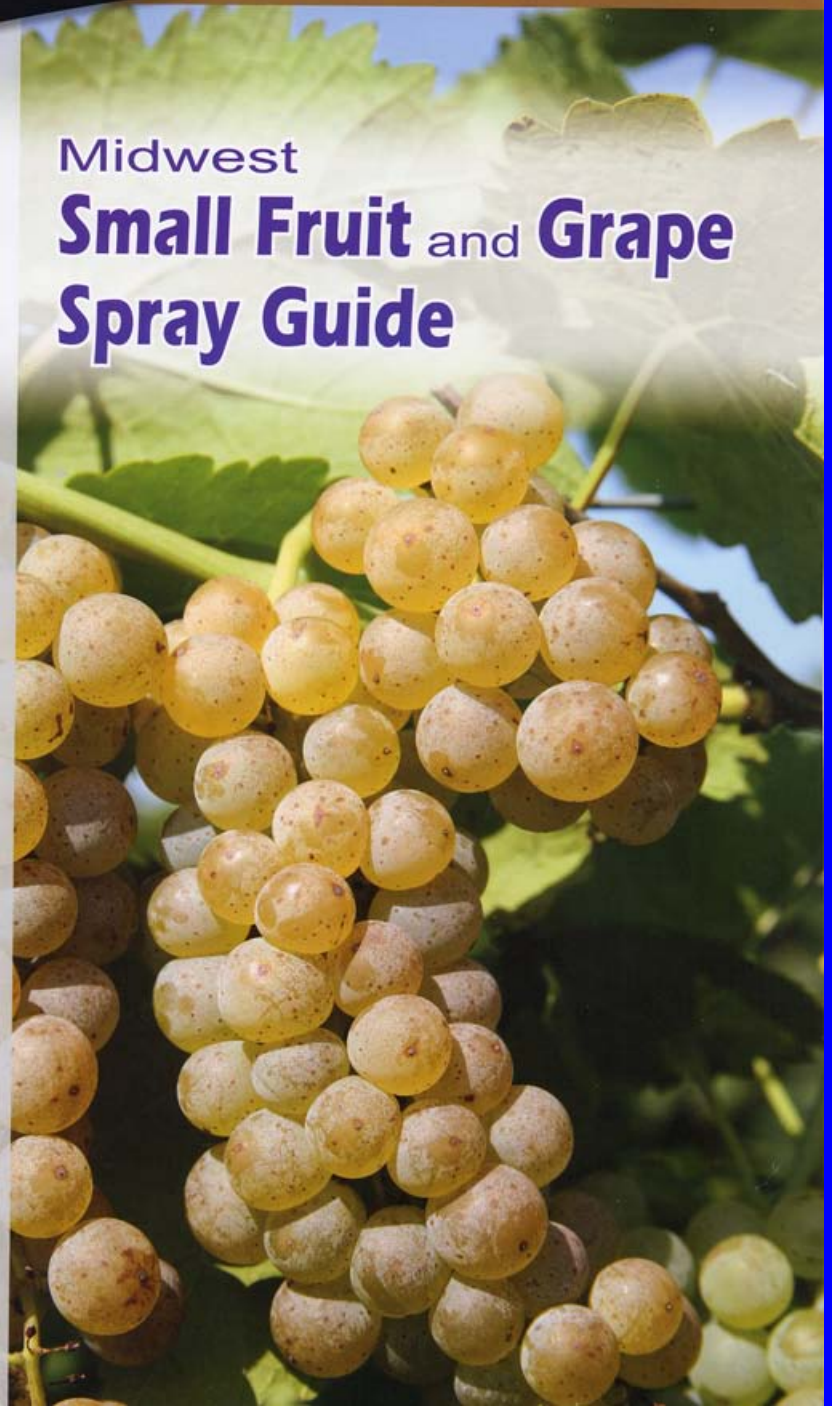
Kentucky Fruit and Vegetable Conference-2012

Grape-Wine Short Course

Grape Disease Identification and Effective Timing of Fungicide Applications

Mike Ellis
Ohio State University

2011 Midwest Small Fruit and Grape Spray Guide



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Midwest Small Fruit Pest Management Handbook




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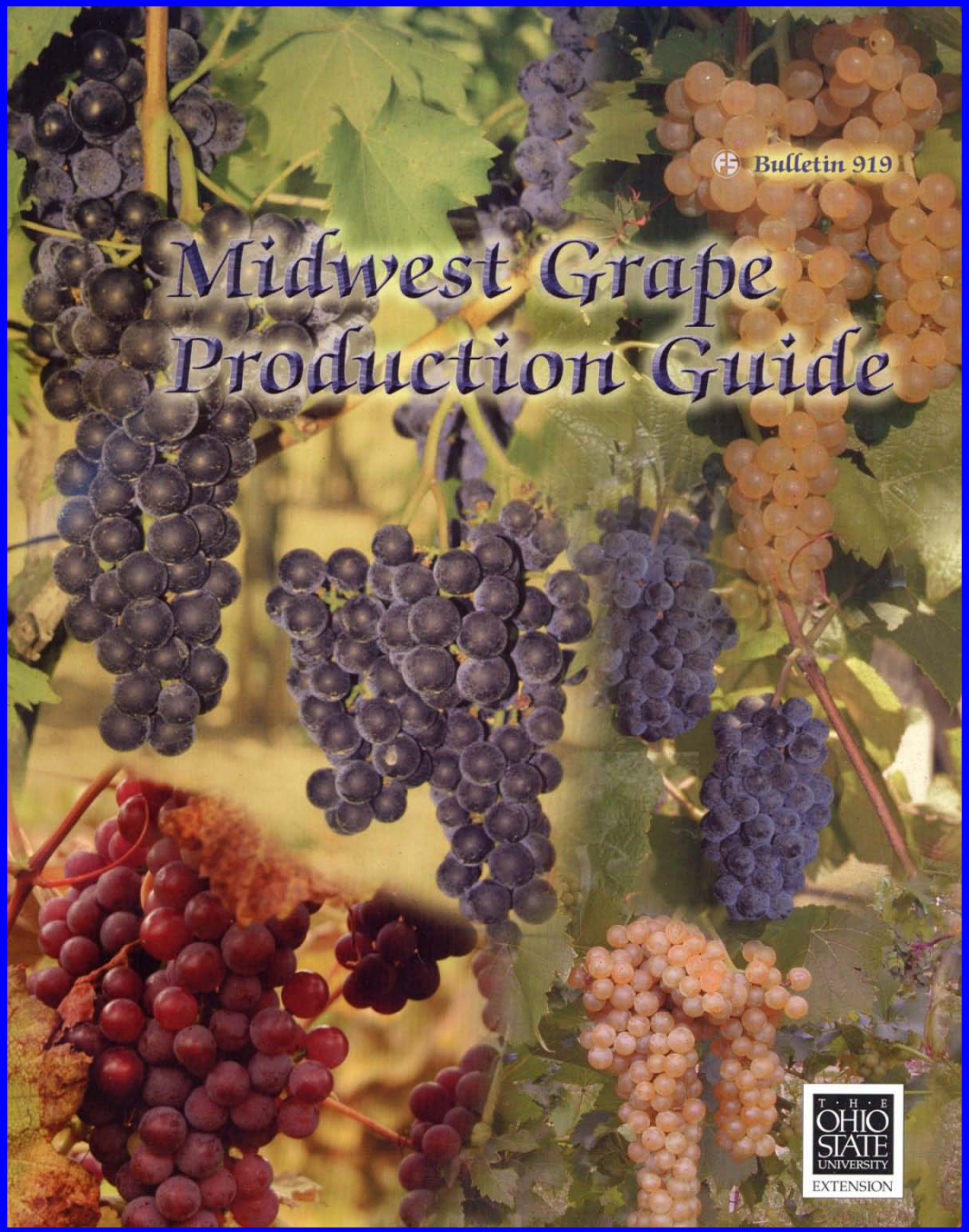
Bulletin 919
Midwest Grape Production Guide
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Review of Critical Periods For Fungicide Application on Grapes

Two Phase Fungicide Program

Phase 1 (Early Season)

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

Diseases = Powdery Mildew, Downy Mildew, Black Rot, Phomopsis and Anthracnose

Phase 2 (Late Season)

Timing = 3 to 4 weeks after bloom through harvest

Diseases = Powdery and Downy Mildew

Early Season (Phase 1)

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

Diseases = Phomopsis
Powdery Mildew
Black Rot
Downy Mildew
Anthracnose

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

Grape Anthracnose

Anthracnose can be serious once established, but is generally not that common

When the disease becomes established in the vineyard, a delayed dormant application of liquid lime sulfur is important for control

Dormant application of Liquid Lime Sulfur

- This is the very first spray of the season.
- I like to see it applied around bud swell (not too early)
- This is probably the most important spray for controlling the disease.
- It burns out inoculum (the fungus) that is over wintering in lesions on infected canes.
- If it hits green grape tissue, it will burn it.

Dormant application of Liquid Lime Sulfur

- Liquid lime sulfur is applied at 10 gallons/A
- I generally do not recommend this spray unless anthracnose is a problem or Phomopsis is getting out of hand in the vineyard.
- I also recommend it if you are trying to grow grapes organically.
- The dormant spray does not substitute for a good fungicide spray program during the season. It is a part of the program

After bud break, early season fungicide application for control of Phomopsis and the other diseases should help control new infections of anthracnose.

Mancozeb and Captan appear to provide a significant level of control during the growing season.

“Early season control is Important”

Phomopsis Cane and Leaf Spot

Cane and leaf infections do not cause a great deal of damage during the season that infection occurs; however, cane infections (lesions on infected canes) provide the source for inoculum that cause infections in next years crop in next years crop.

This makes cane infections very important

Cluster Stem (Rachis) Infections

These can result in serious Damage

Fruit Infection

We have recorded up to 30% fruit loss from Phomopsis fruit infection in Ohio

Phomopsis is a cool weather disease.
It requires cool and wet weather conditions in order to infect.

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).

Eichorn-Lorenz growth stage-12

Five to six leaves unfolded, inflorescence clearly visible.

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

As fruit ripens, the fungus becomes active and rots the fruit.

Phomopsis is a cool weather disease.
It requires cool and wet weather conditions in order to infect.

Pre-bloom sprays are very important for control.

Early season fungicide applications are critical for controlling this disease

For many years we have known that the most effective fungicides for control of Phomopsis are **mancozeb** and **captan**.

Many fungicide trials in New York and Ohio have shown that 2 to 3 pre bloom protectant application of fungicide provide about as good control as you are going to get.

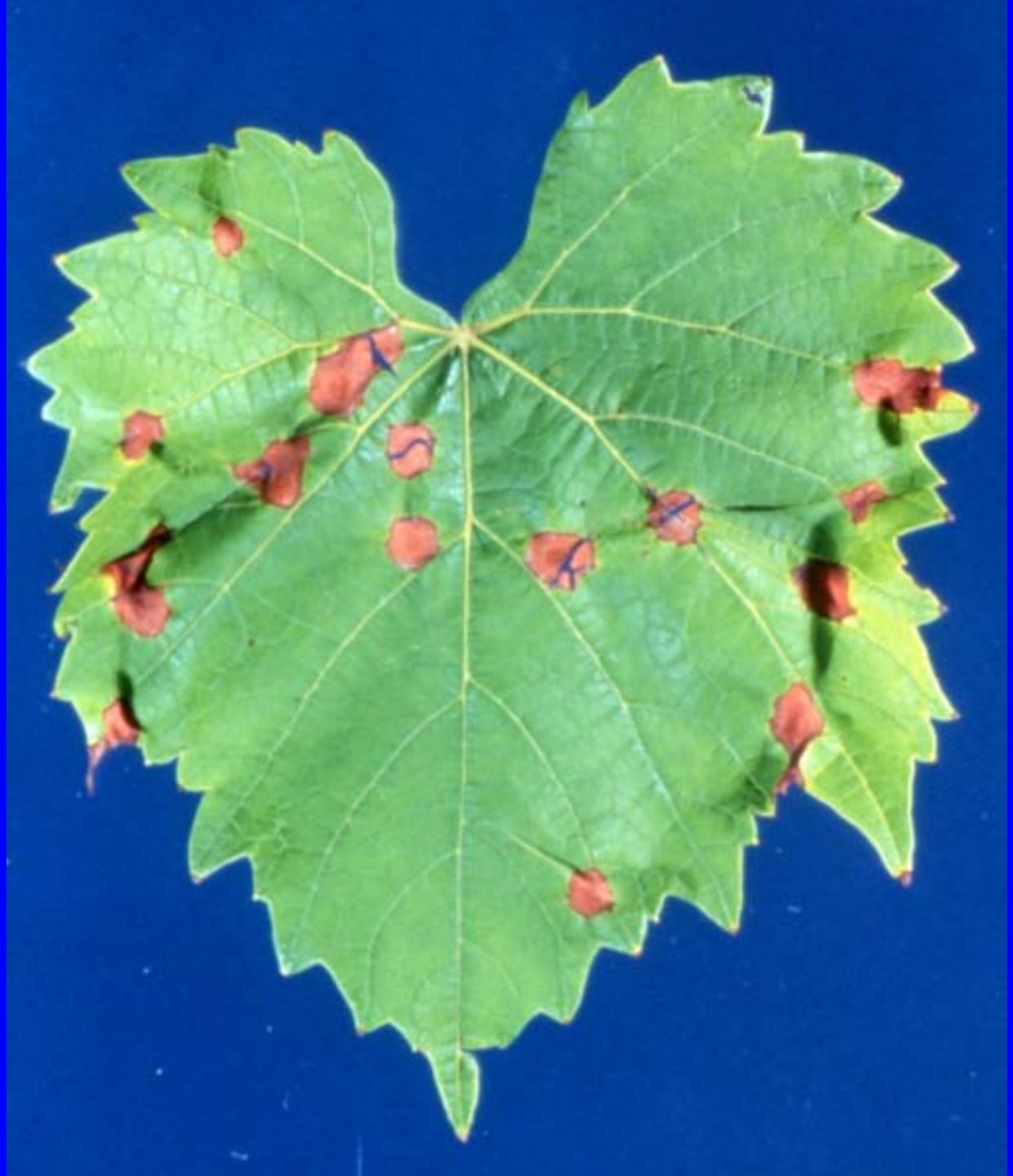
Powdery and Downy Mildew and Black Rot can also get established in the vineyard very early in the growing season.

Although Pre-bloom Sprays are Very Important, The Most Critical Period for Disease Control on Grapes Is:

Immediate Pre-bloom Through

3 to 4 Weeks After Bloom.

Black Rot



EARLY SEASON DISEASE CONTROL IS CRITICAL

Controlling Black Rot Fruit Infection

Current research indicates that berries become resistant to black rot infection much earlier than previously thought.

The old literature says berries are resistant when they reach 6 to 8 percent sugar.

Current research indicates that berries on most varieties are resistant by 3 to 4 weeks after bloom.

Fungicide tests in New York and Ohio 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.

Fungicides For Black Rot Control, 1999

Treatment and Rate/A	Black Rot	
	% leaf infection	% fruit infection
Nova 4oz. (3 sprays, CP)	1.8 b	0 b
Abound 11oz. (3 sprays, CP)	0.8 b	2.5 b
Penncozeb 4lbs. (3 sprays, CP)	1.3 b	5.0 b
Ziram 3lbs. (8 sprays, FS)	1.0 B	2.5 b
Untreated	19.4 a	82.5 a

Most Critical Period For Controlling Grape Diseases With Fungicides

Immediate Pre-bloom

Through

2 to 4 weeks after bloom

It is very important for grape growers to understand why this period is so important.

Why is this period so Critical?

By 3 to 4 weeks after bloom, the fruit develop

"ONTOGENIC RESISTANCE"

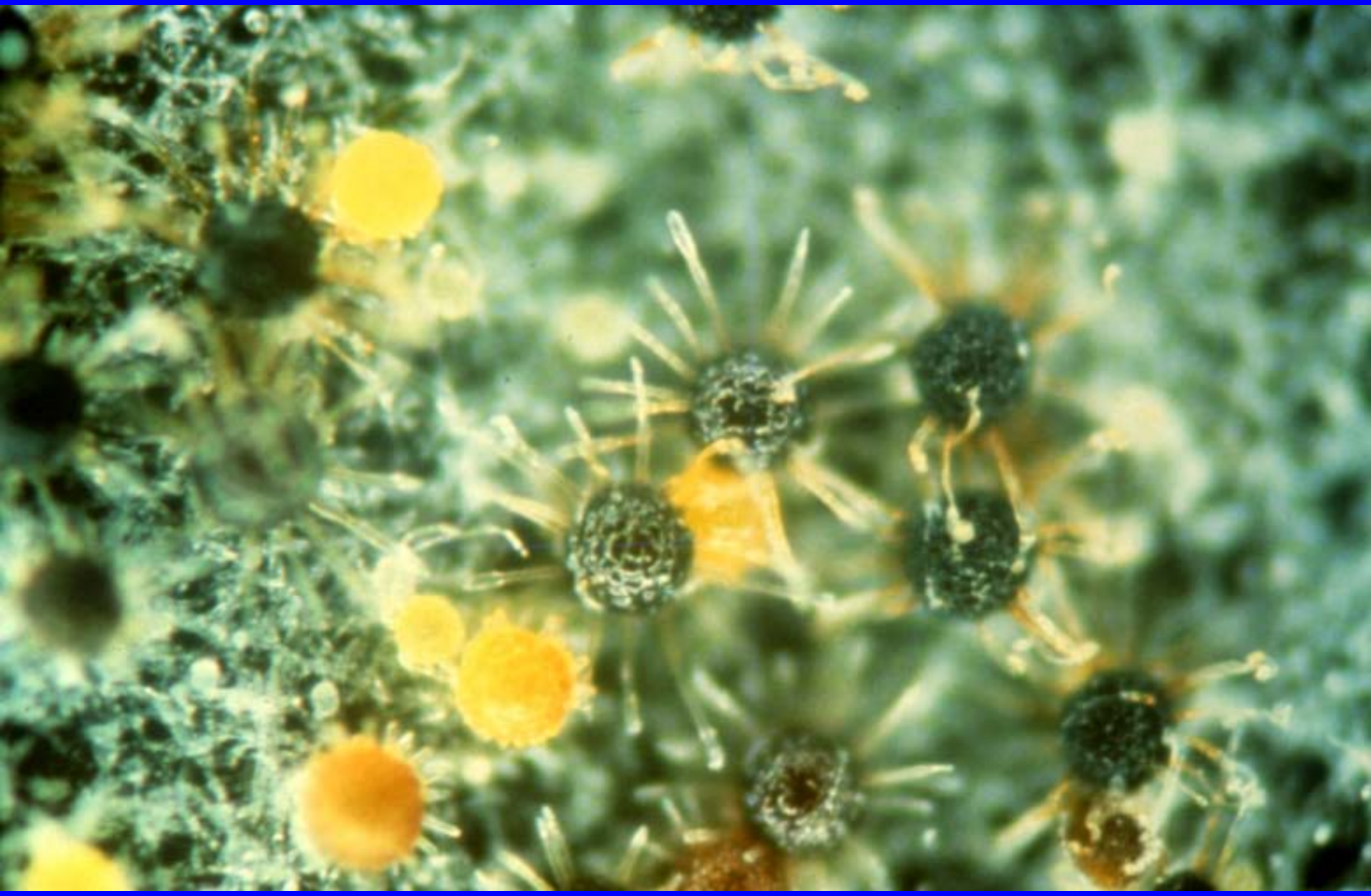
and the fruit are not longer susceptible to infection by Black Rot

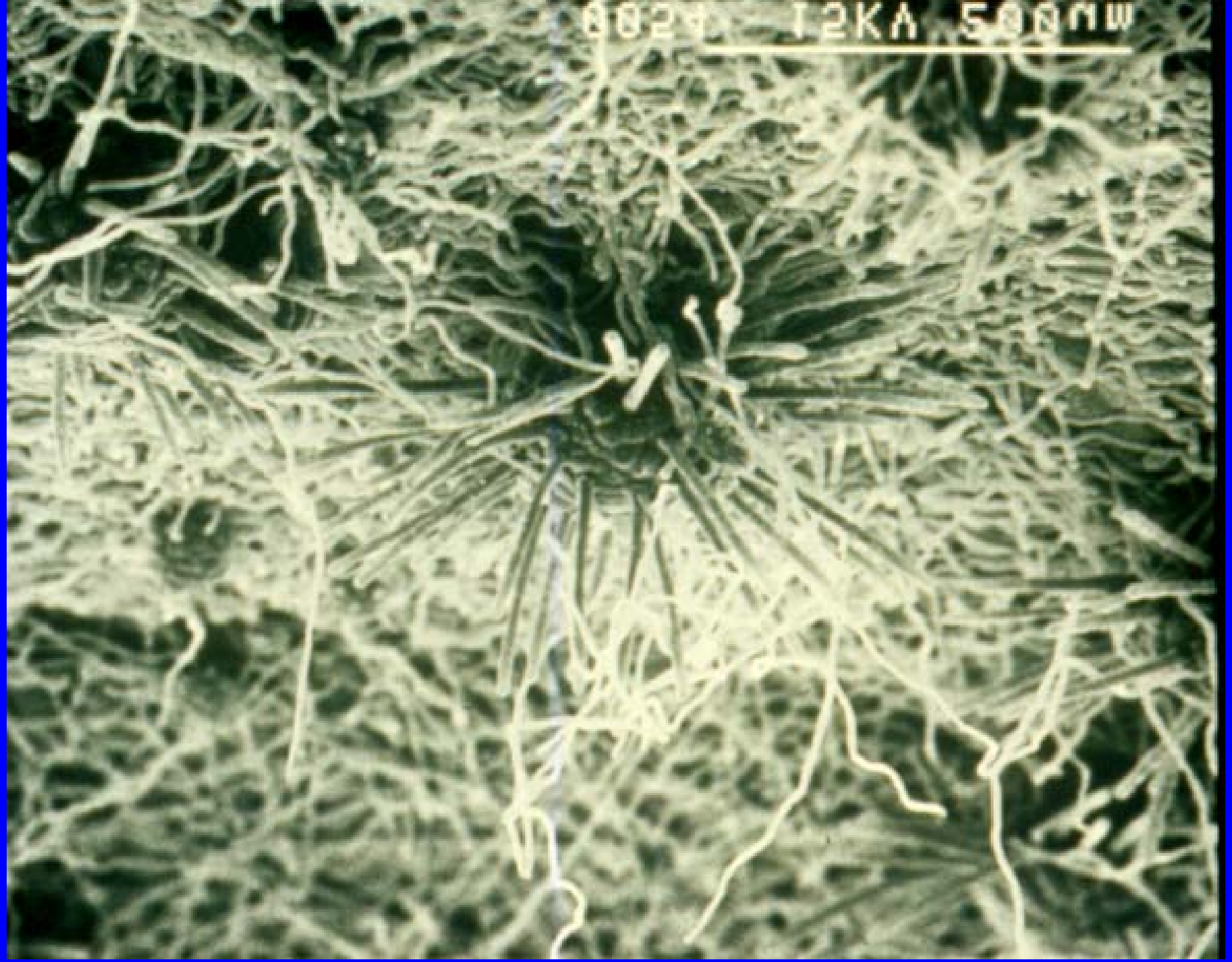
Fruit also Develop
"Ontogenic Resistance"
to
Powdery and Downy Mildew
at 3 to 4 weeks after bloom

Powdery Mildew

ASCOSPORES

PRODUCED IN THE SPRING IN OVERWINTERING FRUITING STRUCTURES

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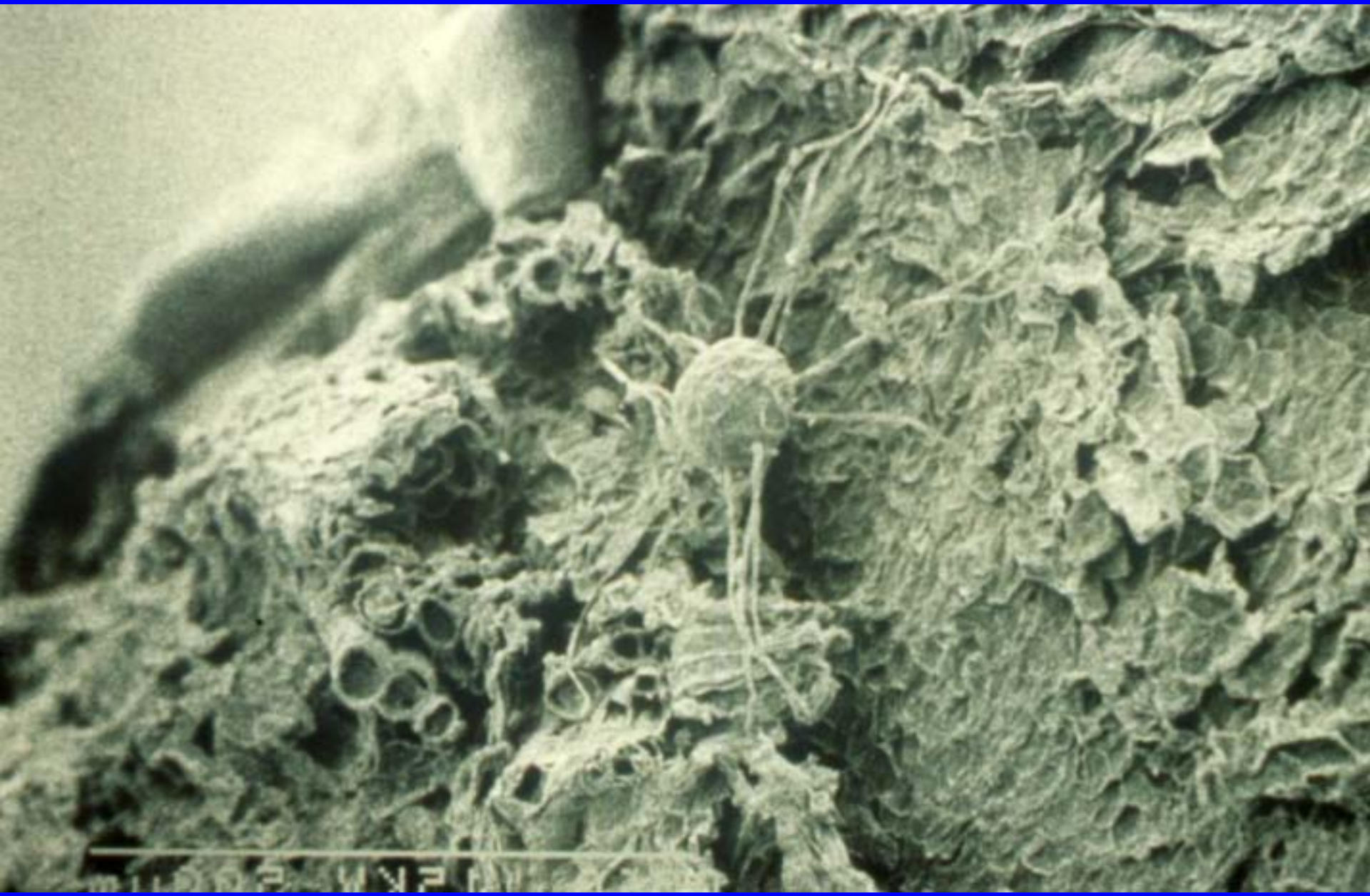
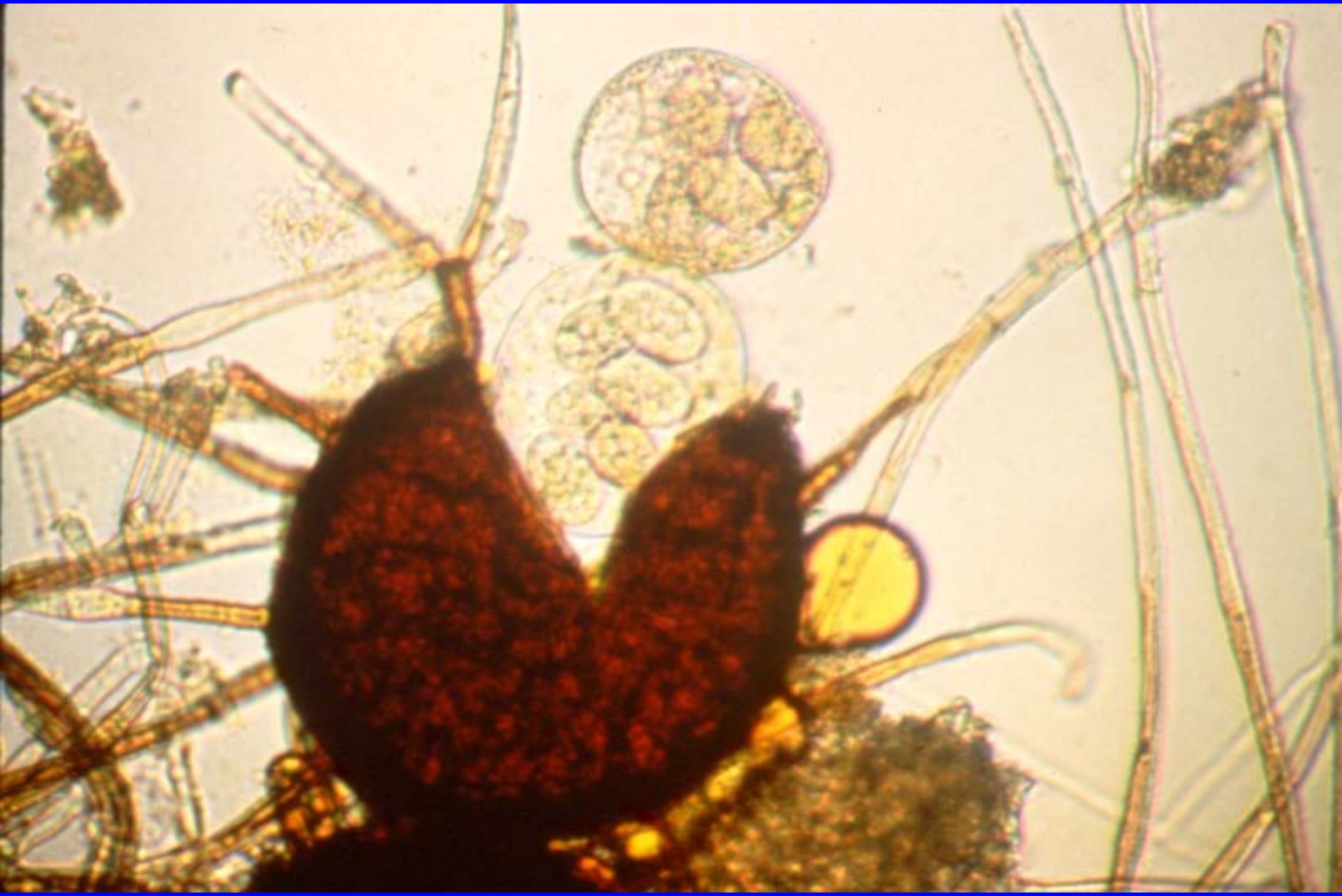




ENVIRONMENTAL CONDITIONS REQUIRED FOR POWDERY MILDEW ASCOSCPORE DISCHARGE IN THE SPRING

.01 inch of rain with average temperature of 50 degrees Fahrenheit

D. M. Gadoury, Cornell University, Geneva

IT IS CRITICAL TO CONTROL PRIMARY INFECTIONS CAUSED BY ASCOSPORES EARLY IN THE SEASON

Pre-bloom Sprays Are Very Important to Keep Powdery Mildew From Getting Established In the Vineyard

Controlling Fruit Infection By Powdery Mildew

Research in New York indicates that berries become resistant to powdery mildew infection much earlier than previously thought.

On Concord grapes, berries appear to be very resistant by two weeks after bloom.

On susceptible Vinifera and French Hybrids, resistance appears to develop within 3 to 4 weeks after bloom.

Chardonnay

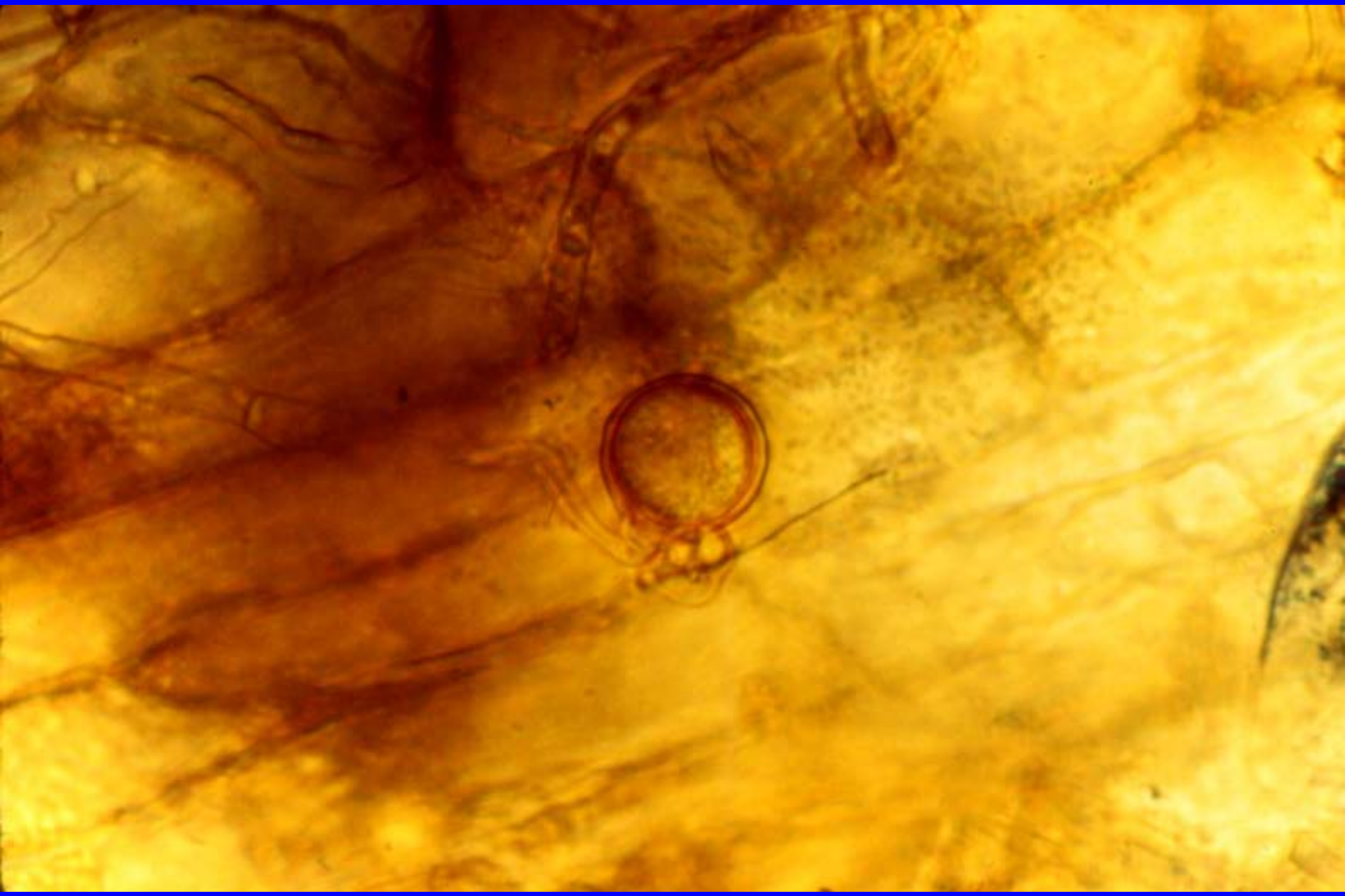

21 June
prebloom
Brix=nd
4 July
2mm fruit
Brix=nd
17 July
5mm fruit
Brix=4.6
2 August
Brix=4.2
15 August
Brix=4.8
29 August
Brix=9.3

Critical Period for Disease Control on Grapes

Immediate Pre-bloom through
2 to 4 weeks after bloom

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

Downy Mildew



ENVIRONMENTAL CONDITIONS REQUIRED FOR DOWNY MILDEW OOSPORE GERMINATION IN THE SPRING

10ºC = 50ºF

10 mm of rain = 0.4 in

10 cm of vine growth = 4 in.

EARLY SEASON DISEASE CONTROL IS CRITICAL

Controlling Fruit Infection By Downy Mildew

Downy Mildew

It appears that fruit become resistant to Downy Mildew by 3 to 4 weeks after bloom.

Remember that the rachis leaves remain susceptible later in the season.

Most Critical Period For Controlling Grape Diseases With Fungicides

Immediate Pre-bloom

Through

2 to 4 weeks after bloom

This is the most critical period to prevent fruit infections by Black Rot, Powdery Mildew and Downy Mildew.

Pre-bloom Sprays

1 to 3 inch shoot growth

Through

Immediate Pre-bloom

Important for:

Phomopsis, Powdery mildew, Downy Mildew, Anthracnose

and Black Rot

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

Although Pre-bloom Sprays are Very Important, The Most Critical Period for Disease Control on Grapes Is:

Immediate Pre-bloom Through

3 to 4 Weeks After Bloom.

Controlling
Black Rot,
Powdery Mildew,
and
Downy Mildew
Fruit (Cluster) Infections

Take home message

By 3 to 4 weeks after bloom, the fruit develop

"ONTOGENIC RESISTANCE"

and the fruit are not longer susceptible to infection by Black Rot, Powdery or Downy Mildew

Early Season (Phase 1) Fungicides

Diseases to Consider

Powdery Mildew

Downy Mildew

Black Rot

Phomopsis

Prior to Resistance Development in the Powdery and Downy mildew pathogens to the Strobilurin Fungicides

Abound

Sovran

Pristine

(used alone)

Provided excellent control of all early season diseases

Black Rot, Powdery, Downy and Phomopsis

Mancozeb

Plus

Nova , Elite , or Rubigan

or Quintec

or Endura

or Sulfur

or JMS Stylet Oil

or Potassium Salt

The Cheapest Program by Far is

Mancozeb plus a Sulfur Fungicide

next least expensive

Mancozeb plus Rubigan (Vintage)

On sulfur tolerant varieties, the sulfur combination makes pretty good sense

Sulfur is the old standard on tolerant varieties
It still works well and it is cheap!

“If possible, I think sulfur should be part of the fungicide program on wine grapes”

Late Season (Phase 2)Fungicides

Timing = 3 to 4 weeks after bloom
Through Harvest

Diseases = Powdery Mildew
Downy Mildew
Botrytis Bunch Rot

Prior to Resistance Development in the Powdery and Downy mildew pathogens to the Strobilurin Fungicides

Abound

Sovran

Pristine

(used alone)

Provided excellent control of all early season diseases

Powdery and Downy Mildew

(Summer or late season cover sprays)

Captan or Phosphorous acid

Plus

A Sulfur Fungicide

or

another powdery mildew material

Quintec, Vivando Endura, potassium salt, or JMS oil

OR

A Copper Fungicide (used alone)

Pristine for Ice wine grapes

Apply at normal harvest

Pristine 38WG

Pristine cannot be applied to American grapes such as Concord

Several new Combination products (Package Mixes) were recently registered

- Revus Top (difenoconazole + mandpropamid)
  (sterol inhibitor) + (Revus)
- Quadris Top (difenoconazole + azoxystrobin)
  (sterol inhibitor) + (Abound)
- Inspire Super (difenoconazole + cyprodinil)
  (sterol inhibitor) + (Vangard)
- Adament (tebuconazole + Trifloxystrobin)
  (Elite) + (Flint)

- Revus Top (sterol inhibitor) + (Revus)
  Controls black rot, powdery and downy mildew

- Quadris Top (sterol inhibitor) + (Abound)
  Controls black rot, powdery and downy mildew, and suppression of Phomopsis and Botrytis fruit rot

- Inspire Super (sterol inhibitor) + (Vangard)
  Controls black rot and powdery mildew

- Adament (Elite) + (Flint)
  Controls black rot and powdery mildew

Use (rates) and PHI

- Revis Top (7 fl oz/A) 14-Day
- Quadris Top (10-14 fl oz/A) 14-DAY
- Inspire Super (16-20 fl oz) 14-DAY
- Adament 50WG (3-4 oz/A) 14-Day

Notes on Revus Tops

- Looks good for late season control of powdery and downy mildew.
- Cost is about $17.00 /A
- Can’t be used on Concord or other Labrusca type grapes.
- Apparently no problem on Vinifera or French hybrids.
- Affected grapes will be on the label

There have been several new fungicides recently registered for use on grapes in Ohi0

Four new fungicides have been registered for control of Downy Mildew

- Revus 2.08F - mandipropamid (Syngenta)
- Presidio 4L - fluopicolide (Valent)
- Forum 4.17F - dimethamorph (BASF)
- RANMAN 3.33F - cyazofamid (FMC)
- All of these materials provide good to excellent control of downy mildew
- They are all in different classes of fungicide chemistry- important for resistance management

Use rates and PHI

- Revus 2.08F (8 fl oz/A) PHI=14 days
- Presidio 4L (3-4 fl oz/A) PHI=21 days
- Forum 4.17F (6 fl oz/A) PHI=28 days
- RANMAN 3.33F (2.1-2.75 fl oz/A) PHI-30 days

Switch and Scala

Recently Registered for Control of Botrytis Bunch Rot

- Switch 62.5 WG is a combination product form Syngenta.

  Cyprodinil (Vangard) plus fludioxanil

- Scala 5SC (pyrimethonil) is similar chemistry to Vangard and is a product of Bayer.

- Both materials provide excellent control of Botrytis bunch rot but do not control other diseases. They are different chemistry.

Phosphorous Acid (phosphite) Fungicides

There are many products on the market

- Agri Fos
- ProPhyt
- Phostrol
- Topas
- Rampart
- Aliette
- Legion

That Concludes my Presentation

Thank You

Mike Ellis
OARDC
Dept. of Plant Pathology
1680 Madison Ave.
Wooster, Ohio 44691
Phone: 330-263-3849
Email: ellis.7@osu.edu