

Grape Disease Management in Iowa



Mark Gleason & Sara Helland
Department of Plant Pathology
Iowa State University

Presented at the
Iowa Grape Growers Conference
February 1, 2003

Outline

- ◇ General disease control strategies
- ◇ Major diseases in Iowa
- ◇ Spray schedule by growth stage
- ◇ Resources

General Strategies

- ◇ Select resistant cultivars when possible
- ◇ Scout frequently
- ◇ Understand the diseases and fungicides
- ◇ Remove prunings from vineyard
- ◇ Promote quick drying:
 - Plant at good spacings in areas of full sun
 - Prune and train to maximize air flow
 - Keep the vineyard mowed and weeds under control

Anthracnose

- ◇ Fungus *Elisinoe ampelina*
- ◇ Over-winters on infected fruit or canes
- ◇ "Wakes up" in spring weather
- ◇ Rain-dispersed
- ◇ Likes 36–90° temperatures and a film of water

Anthracnose

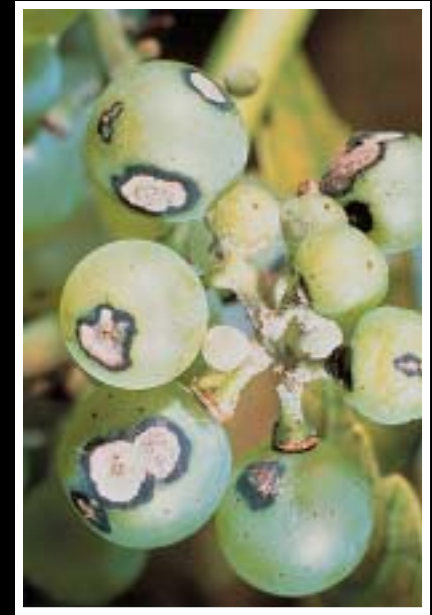
Symptoms



Brown spots
will lighten and
fall out



Gray, sunken
lesions with dark
edges



Light, sunken
spots with dark
centers

Anthracnose

Control Measures

◇ In the fall

- Rake up dropped leaves and berries
- Prune out infected canes (dormant)

◇ In the spring

- Cultivate to bury infected leaves
- Apply liquid lime sulfur (10 gal / A) at bud break

Black Rot

- ◇ Fungus *Guignardia bidwellii*
- ◇ Over-winters on infected fruit or canes
- ◇ "Wakes up" in spring
- ◇ Rain-dispersed
- ◇ Likes 60–90° temperatures and a film of water

Black Rot

Symptoms



Irregular reddish-brown spots with dark border &, eventually, black spores in the middle



Small, round, light brown spots rot fruit. Hard, shriveled mummies produce black spores



Black Rot

Control Measures

- ◇ In the fall
 - Rake up dropped leaves and berries
 - Prune out infected canes
- ◇ In the spring
 - Cultivate to bury diseased leaves
 - Remove diseased leaves from plants
 - Apply fungicides beginning at 6" new growth, continuing until fruit change color (veraison)

Black Rot

Disease Warning Model

- ◇ Base on a temperature / leaf wetness threshold.
- ◇ When the hours of wetness at a temperature are exceeded, apply a fungicide to control black rot (Mancozeb, ziram, Ferbam, or combination)

Temperature	Hours Wetness
≤ 45	<i>No infection</i>
50	24
55	12
60	9
65	8
70	7
75	7
80	6
85	9
≥ 90	12

Black Rot

◇ Resistant cultivars:

Cascade
Cayuga White
Chancellor
Chardonnay

Chelois
Cynthiana/Norton
De Chaunac

Elvira
Ives
Vidal blanc
Vignoles

◇ Susceptible cultivars:

Baco noir
Catawba
Chambourcin

Concord
LaCrosse
Melody

Niagara
Reliance
Seyval

Downy Mildew

- ◇ Fungus *Plasmopara viticola*
- ◇ Over-winters in infected leaves
- ◇ "Wakes up" in spring
- ◇ Rain-dispersed
- ◇ Likes mild temperatures (64-76 degrees) and wet weather

Downy Mildew

Symptoms



Irregular greenish yellow
translucent spots



White to gray fuzzy "down" on
underside of leaf



Spots turn brown and
brittle and fall out

Downy Mildew

Symptoms



Water-soaked lesion, then downy growth and misshapen shoot



Young berries turn light brown and soft with fuzzy fungal growth. Older berries turn dark brown, wrinkle, and shatter easily.



Downy Mildew Control Measures

◇ In the fall

- Rake up dropped leaves and berries
- Prune out infected canes

◇ In the spring

- Cultivate to bury diseased leaves
- Apply fungicides (Captan, copper, metalaxyl) from bud break to the second post-bloom spray.

Downy Mildew

◇ Resistant cultivars

Baco Noir
Concord
Horizon

LaCrosse
Leon Millot
Marechal Foch

St. Pepin
Stueben

◇ Susceptible cultivars

Catawba
Chambourcin
Chancellor

Chardonnay
Delaware

Niagara
Rougeon

Powdery Mildew

- ◇ Fungus *Uncinula necator*
- ◇ Over-winters in bark crevices of vine
- ◇ "Wakes up" in spring
- ◇ Wind and rain dispersed
- ◇ Likes humidity, but not free moisture
- ◇ Live at 59–90° temperatures, but prefers 68–77°

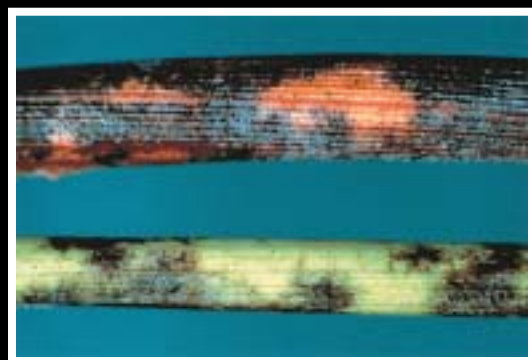
Powdery Mildew Symptoms



White, powdery patches may spread to whole leaf and stem



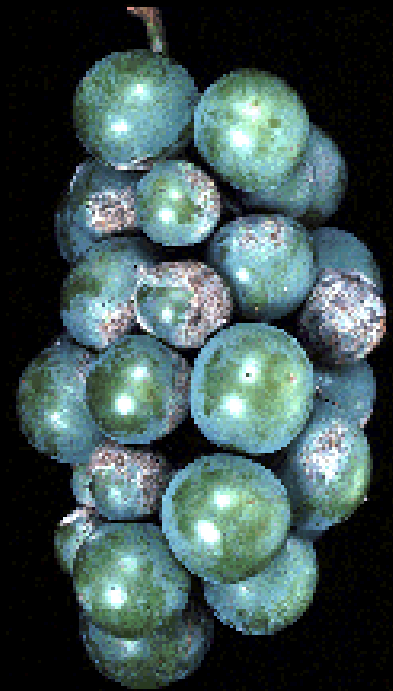
Stems will develop brown to black lesions



Fruit will have powdery coating, may not color, and will be misshapen.

Powdery Mildew Control Measures

- ◇ Few cultural controls other than planting and training strategies
- ◇ Apply fungicides (several) from bud break for susceptible cultivars—early season control most important.



Powdery Mildew

◇ Resistant cultivars

Cayuga White
Chambourcin

Melody
Steuben

◇ Susceptible cultivars

Aurora
Chancellor
Chelois
DeChaunac
Espirit

Horizon
DeChaunac
Rosette
Saint Pepin
Rougeon

Seyval
Ventura
Vidal
Vignoles

Prototype Spray Plan

- ◇ Also use cultural practices
- ◇ Scout for disease often
- ◇ Based on growth stages
- ◇ Can vary with disease pressure/vineyard
- ◇ Adjust after first years of use
- ◇ May differ especially if
 - No prior history of disease
 - Not a susceptible variety

Fungicide Use

- ◇ Safety, legality
- ◇ Protectant v. Systemic
 - Protectant: 7-10 days "forward" activity
 - ◇ EBDCs: Polyram, Dithane, mancozeb
 - Systemic: ~4 days "backward" activity
 - ◇ Sterol inhibitors (SI): Rubigan, Nova, Elite
 - ◇ Strobilurins: Flint, Abound, Sovran
 - ◇ Ridomil

Growth Stages



Dormant



Bud Break



Bloom



Shatter



(Cover)



Veraison

Dormant Sprays



- ◇ No visible growth
~ Early April

One application **liquid lime sulfur** at
10 gal / A for Anthracnose.

Bud Break to Shatter Sprays

- ◇ Begin at 1/2 inch new shoot growth (~late April to early May)
- ◇ Spray every two weeks until shatter

- ◇ Week 1: EBDC
- ◇ Week 3: EBDC
- ◇ Week 5: SI + EBDC
- ◇ Week 7: SI + EBDC

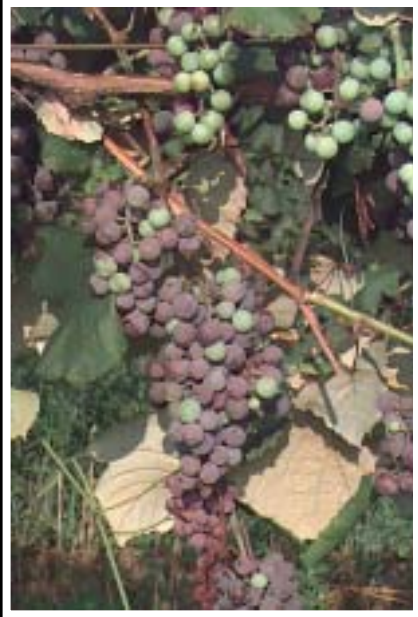
Cover Sprays



- ◇ Begins 7–10 days after shatter.
- ◇ Continue until veraison
- ◇ Scout-driven sprays

- ◇ Black Rot: SI
- ◇ Downy Mildew: Ridomil Copper
- ◇ Powdery Mildew: SI
- ◇ Anthracnose: No worries– you’ve made early lime sulfur application!

Veraison Sprays



- ◇ Begins when berries soften and change color
 - ◇ Continue until harvest
 - ◇ **Mind harvest intervals**
-
- ◇ Scout-driven sprays as before, but no black rot after veraison

Fungicide Effectiveness

	<u>Black Rot</u>	<u>Downy Mildew</u>	<u>Powdery Mildew</u>
Abound	+++	+++	+++
Bayleton	+++	O	NR
Benlate; Topsin M	+	O	+++
Captan	+	+++	O
Elite; Nova	+++	O	+++
Ferbam	+++	+	O
Fixed copper and lime; Ridomil Gold Copper	+	+++	++
Flint	+++	+	+++
JMS Stylet Oil; Sulfur	O	O	+++
Mancozeb	+++	+++	O
Procure; Rubigan	++	O	+++
Ridomil Gold MZ	++	+++	O
Sovran	+++	++	+++
Ziram	+++	++	O

Resources

◇ Mark Gleason, ISU Plant Pathologist

–(515) 294-0579 or
mgleason@iastate.edu

◇ ISU Plant Disease Clinic

–(515) 294-0581

–www.exnet.iastate.edu/Pages/plantpath/pdcintro

Resources

- ◇ Midwest Commercial Small Fruit and Grape Spray Guide, 2003 (PM-1375, or <http://www.hort.purdue.edu/hort/ext/sfg/>)
- ◇ Compendium of Grape Diseases
 - APS Press, \$49
 - <http://www.shopapspress.org/40888.html>
- ◇ ISU Viticulture website:
<http://viticulture.hort.iastate.edu/>