

Wine Grape Diseases



Department of Plant Pathology

College of Agricultural & Environmental Sciences

UNIVERSITY OF GEORGIA



Cabernet Sauvignon
Cabernet Franc
Merlot
Riesling
Chardonnay
Seyval Blanc
Chambourcin
Cab Franc
Viognier
Malbec

Chardonnay
Sangiovese
Tannat
Pinot Blanc
Vidal
Pinot Noir
Gewurztraminer
Trebbiano
Pinot Gris
Primitivo

* **Suwannee**
* **Black Spanish / Lenoir**
* **Blanc Du Bois**
* **Norton / Cynthiana**
* **Muscadines**

Always start with the basics!

Soil samples and nematode samples should be conducted prior to vineyard establishment, and soil samples should be conducted yearly if possible.

Nematodes

- ❖ Dagger, root-knot, dagger, ring, and lesion are the known pathogenic nematodes found in a survey of vineyards.
- ❖ Nematodes can be important, especially for viral transmission in grapes.
- ❖ In replants, nematode samples will be of great importance. Fumigation may be necessary to prevent “replant disorder.”

Select rootstocks which are resistant to Phylloxera and nematodes. Make sure all plant parts are certified to be free of viruses, crown gall, etc.

Crown Gall of Grape

- ❖ *Vitis vinifera* cultivars are most susceptible to crown gall, but American and French-American hybrids, as well as many root stocks, are also susceptible to infection.
- ❖ Crown gall develops on trunks and canes wounded by subfreezing temperatures or other injuries. Plant cells which are active in healing a wound are susceptible to infection.







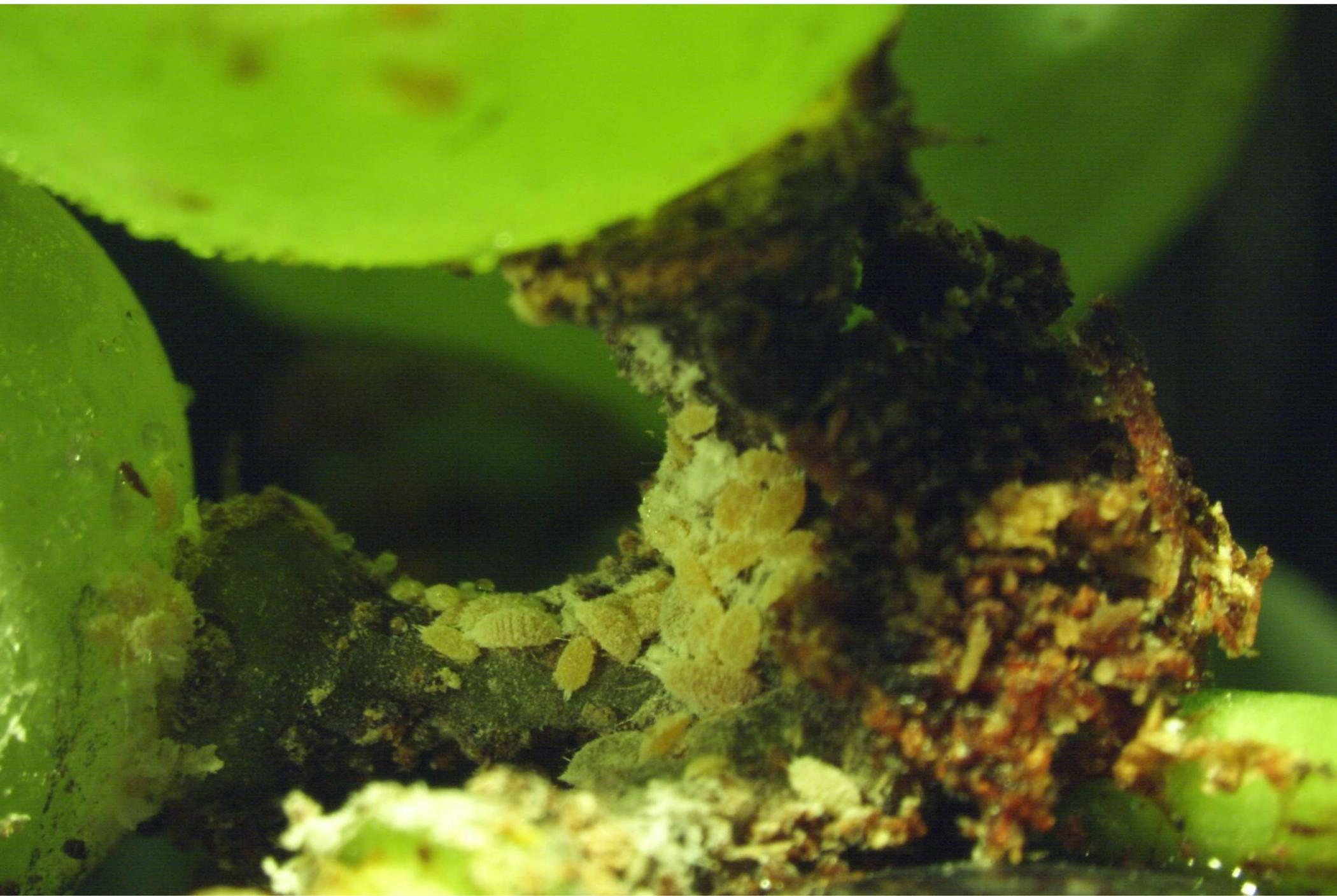










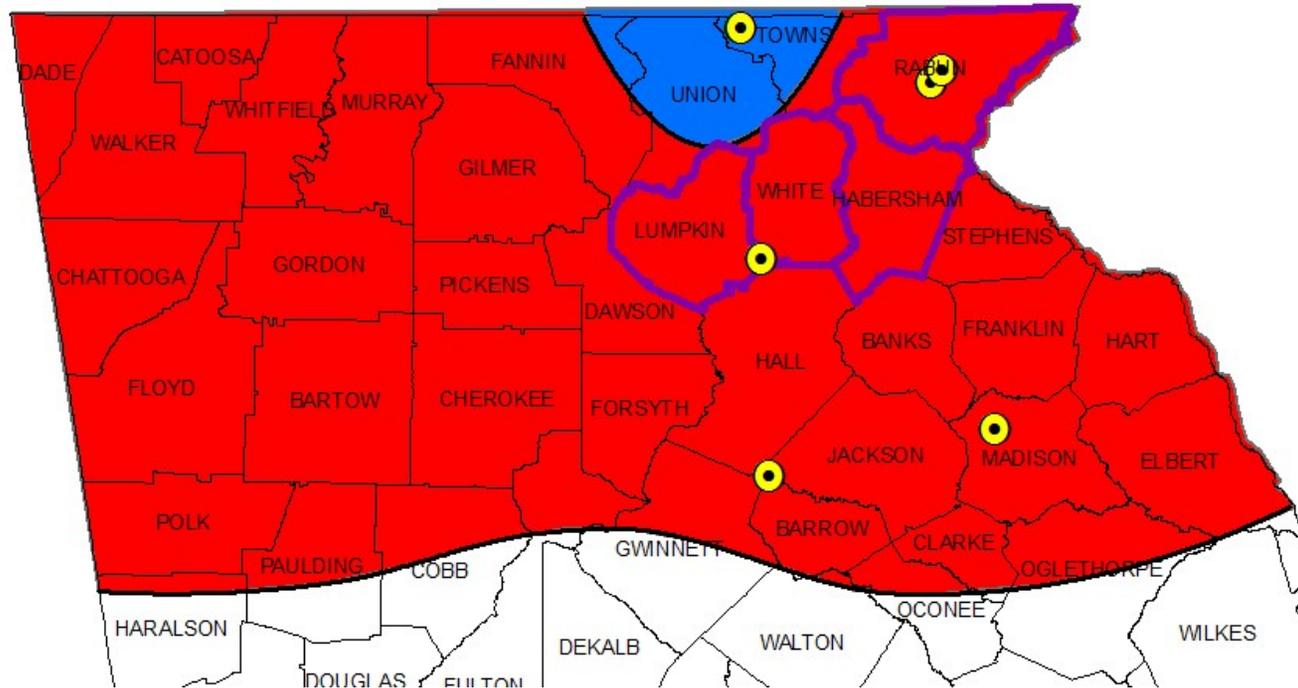


“Pierce’s disease is a principal factor limiting production of both *V. labrusca* and *V. vinifera* grapes in the Gulf Coastal Plains of the United States.”

Goheen and Hopkins, Compendium of Grape Diseases (1998).



November 2003 – March 2004

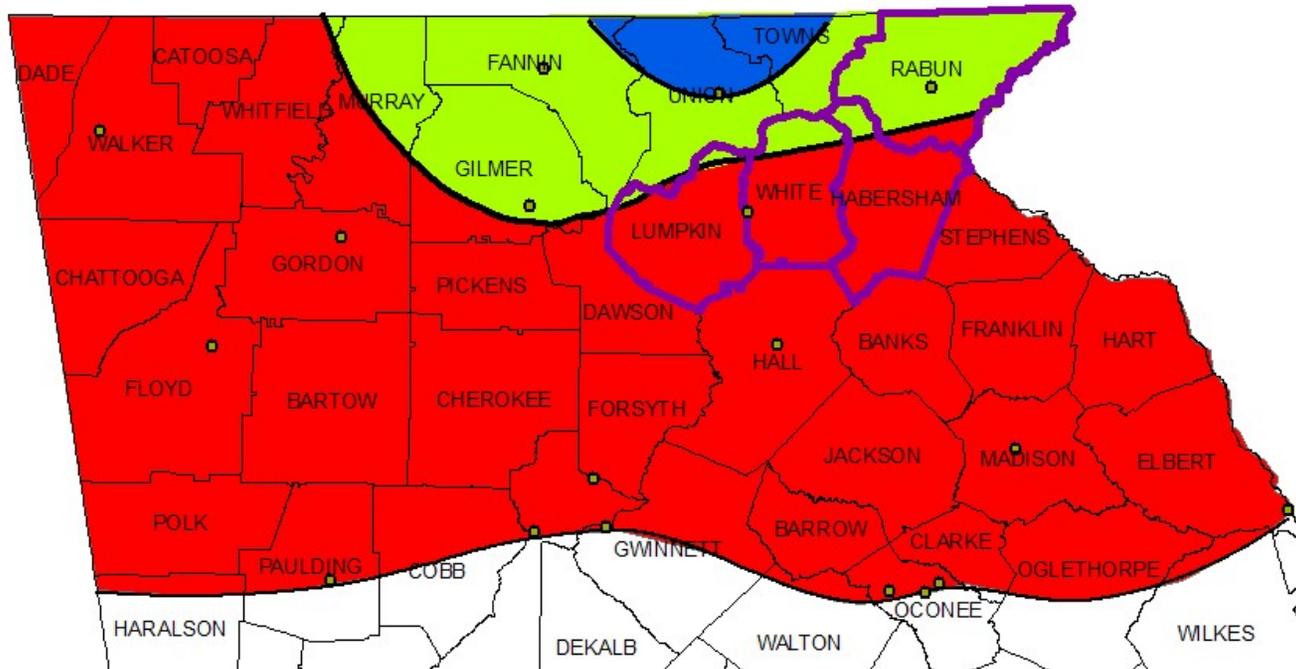


Legend

- Major Area of French Grape Production
- Low
- Moderate
- High

1 in = 25 miles

November 2004 – March 2005

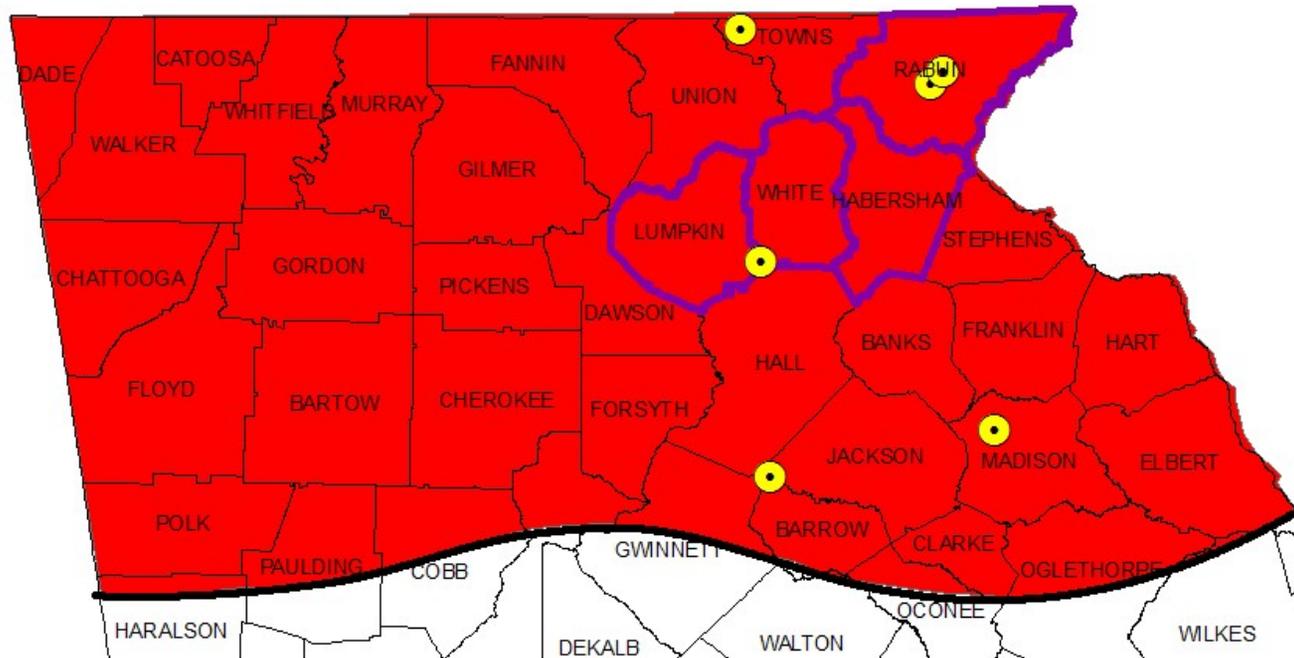


Legend

-  Major Area of French Grape Production
-  Low
-  Moderate
-  High

1 in = 25 miles

November 2005 – March 2006

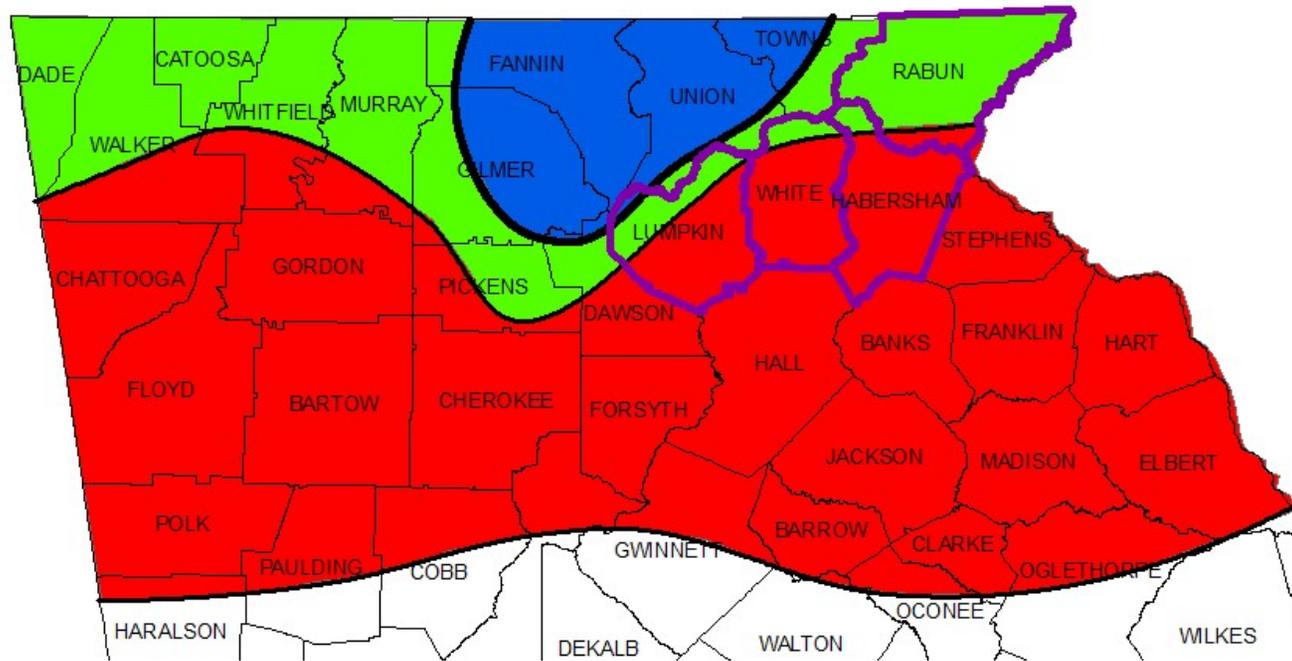


Legend

- ! Contaminated Vineyards
- Major Area of French Grape Production
- High

1 in = 25 miles

November 2006 – March 2007

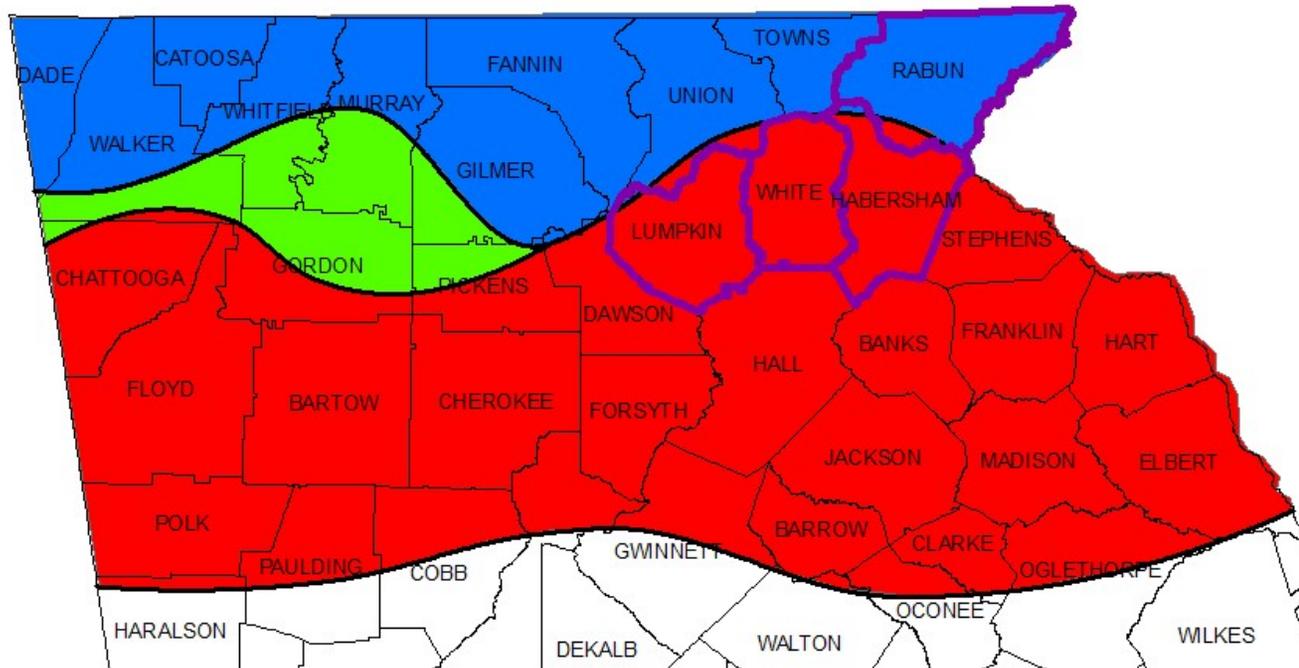


Legend

- Major Area of French Grape Production
- Low
- Moderate
- High

1 in = 25 miles

November 2007 – March 2008

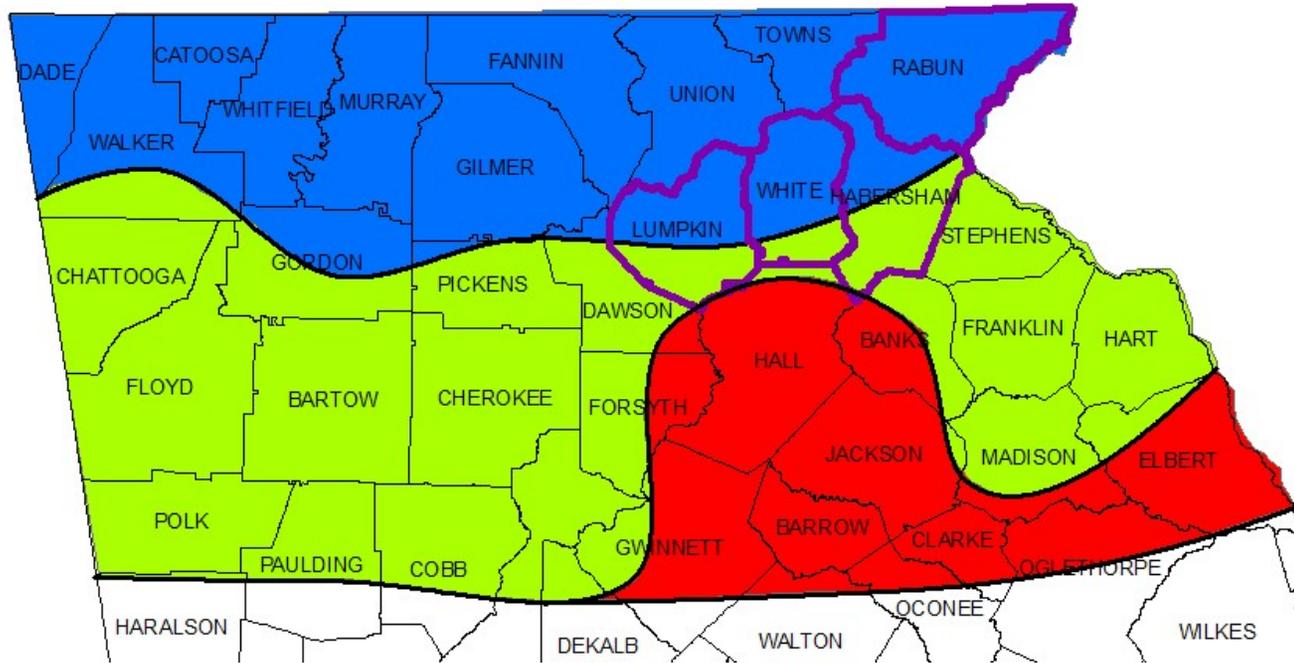


Legend

-  Major_Area_of_French_Grape_Production
-  Low
-  Moderate
-  High

1 in = 25 miles

November 2008 – March 2009

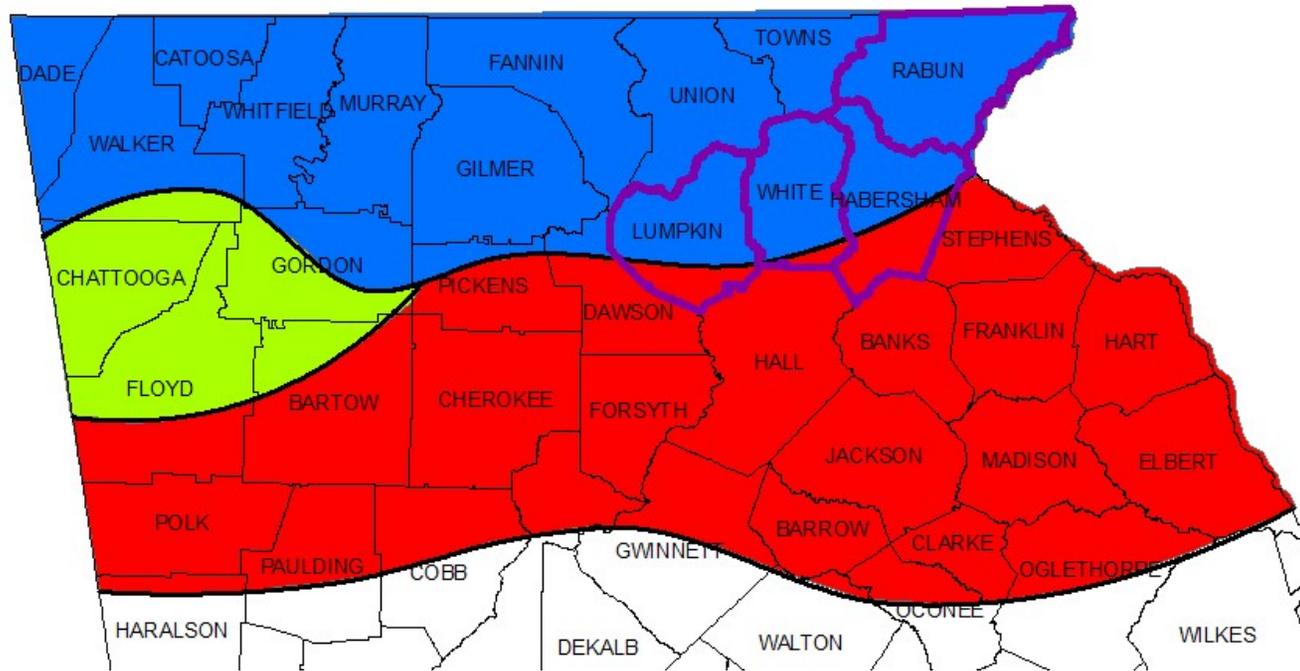


Legend

-  Major Area of French Grape Production
-  Low
-  Moderate
-  High

1 in = 25 miles

November 2009 – March 2010

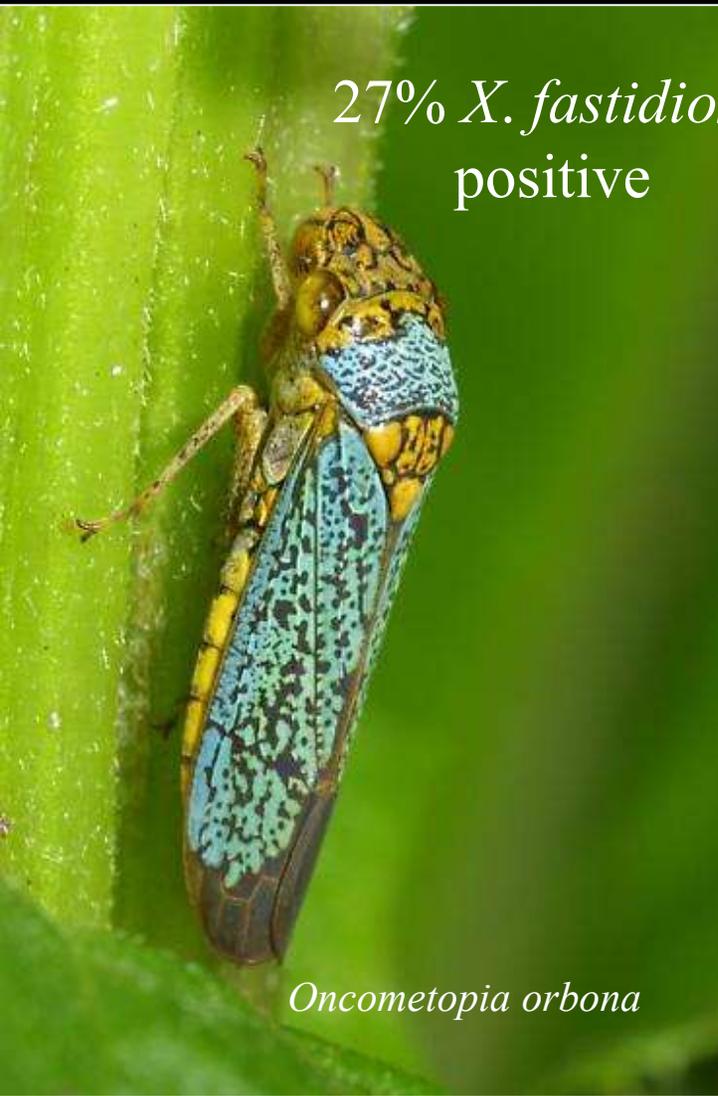


Legend

-  Major Area of French Grape Production
-  Low
-  Moderate
-  High

1 in = 25 miles





27% *X. fastidiosa*
positive

Oncometopia orbona



33% *X. fastidiosa*
positive

Bespeckled leafhopper;
Paraphlepsius irroratus



28% *X. fastidiosa*
positive

Graphocephala versuta



Agallia constricta

Bunch Grape (continued)

Prebloom

Pest/Problem	Management Options	Amount of Formulation per Acre	Effectiveness (+) or Importance (*)	REI	PHI	Comments (FRAC/IRAC)
Insect Pests						
Sharpshooter leafhoppers (Pierce's disease suppression) Initiation of foliar treatments should be based on trap captures.	carbaryl (Sevin 80S)	1.25-2.5 lb	++	12 hrs	7 days	(IRAC=1A)
	malathion (Malathion 8F or Malathion 5)	1.88 pt	++	12hrs	3 days	Rates are based on 200 gal per acre spray volumes. (IRAC=1B)
	fenpropathrin (Danitol 2.4 EC)	5.33-10.66 fl oz	++	24 hrs	21 days	(IRAC=3A)
	cyfluthrin (Baythroid)	1.6-3.2 fl oz	++	12 hrs	3 days	(IRAC=3A)
	bifenthrin (Brigade 10 WSB)	16 oz	++	12 hrs	30 days	(IRAC=3A)
	(Sniper 2EC)	6.4 fl oz	++			
	imidacloprid (Admire Pro)	1-1.4 fl oz (foliar) 7-14 fl oz (soil)	+++ ++++	12 hrs	0 days (foliar) 30 days (soil)	If a soil application of a Group 4 is made, at least one foliar application of a different mode of action should be made before a foliar application of a Group 4A material is made. Only apply 14 fl oz per season. (IRAC=4A)
	dinotefuran (Scorpion 35 SL)	2-5 fl oz (foliar) 9-10.5 fl oz (soil)	+++ ++++	12 hrs	1 day 28 days	
	(Venom)	1-3 oz	+++		1 day	
	clothianidin (Clutch 50WDG)	1-2 oz	+++	12 hrs	0 days	
acetamiprid (Assail 30SG)	2.5 oz	+++	12 hrs	7 days		







Primary Southeastern Bunch Grape Diseases

- ❖ Black Rot (*Guignardia bidwellii*)
- ❖ Downy Mildew (*Plasmopara viticola*)
- ❖ Powdery Mildew (*Erysiphe necator*)
- ❖ Botrytis Bunch Rot (*Botrytis cinerea*)
- ❖ Phomopsis Cane and Leaf Spot (*Phomopsis viticola*)
- ❖ Anthracnose or Bird's-eye Rot (*Elsinoë ampelina*)
- ❖ Bitter Rot (*Melanconium fuliginum*)
- ❖ Ripe Rot (*Colletotrichum gloeosporioedes*)
- ❖ Sour Rot

Principal Southeastern Foliar/Fruit Diseases

	Relative importance	
	Fruit	Foliage
Downy mildew	++	++++
Powdery mildew	++	++++
Black rot	++++	++
Phomopsis	+++	++
Botrytis	++++	-
Bitter rot	++++	++
Ripe rot	++++	-
Anthracnose or Bird's Eye Rot	++++	+++
Sour rot	++++	-

Harrison and Sutton; NC State

Anthracnose (budbreak to bloom)

Downy Mildew (immediate pre-bloom to senescence)

Phomopsis (budbreak to fruit set)

Black Rot (immediate pre-bloom to veraison)

Botrytis (late season if weather conducive)

Powdery mildew (still active)

Non-specific bunch rots

Cultural Control Methods

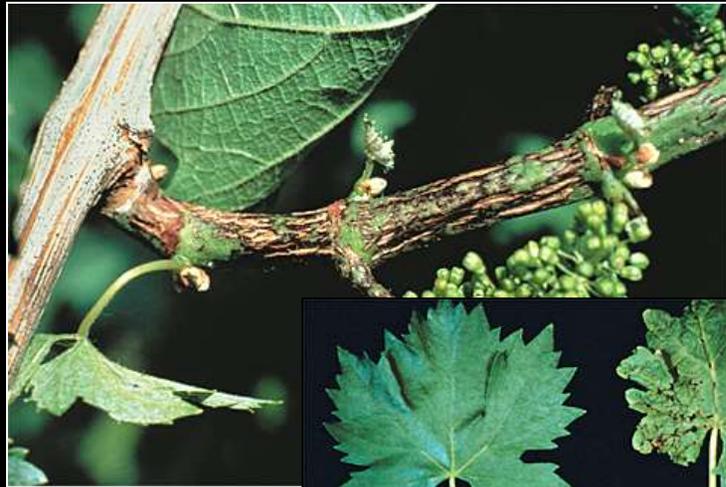
- ❖ Select planting sites with direct, all-day sunlight (avoid shade). Good soil drainage and air circulation are also very important. Orient rows to take full advantage of sunlight and wind movement. Cultural practices that increase air circulation and light penetration in the vineyard will reduce wetting periods and should be beneficial for control.
- ❖ Carefully prune out badly infected canes to reduce the carryover of spores. Select only strong, healthy canes that are uniform in color to produce the next season's crop.



Phomopsis Cane and Leaf Spot

(Phomopsis viticola)

- ❖ Georgia (Southeastern) climates are particularly conducive for disease development.
- ❖ Again, early sprays are particularly important.
- ❖ Continue applications till at least green pea stage.



APS Press; Diseases of Small Fruits



UC Statewide IPM Project
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Downy Mildew

(Plasmopara viticola)

- ❖ **Attacks all green parts of the vine, but leaves are particularly susceptible.**
- ❖ **Prebloom sprays are necessary for control.**
- ❖ **Somewhat limited in our late-season options.**
- ❖ ***Vitis vinifera* are highly susceptible, *V. aestivalis* and *V. labrusca* are less susceptible, and *V. rotundifolia* is resistant.**
- ❖ **Infected leaves drop, resulting in reduced sugars in the fruit and decreased hardiness of overwintering buds.**

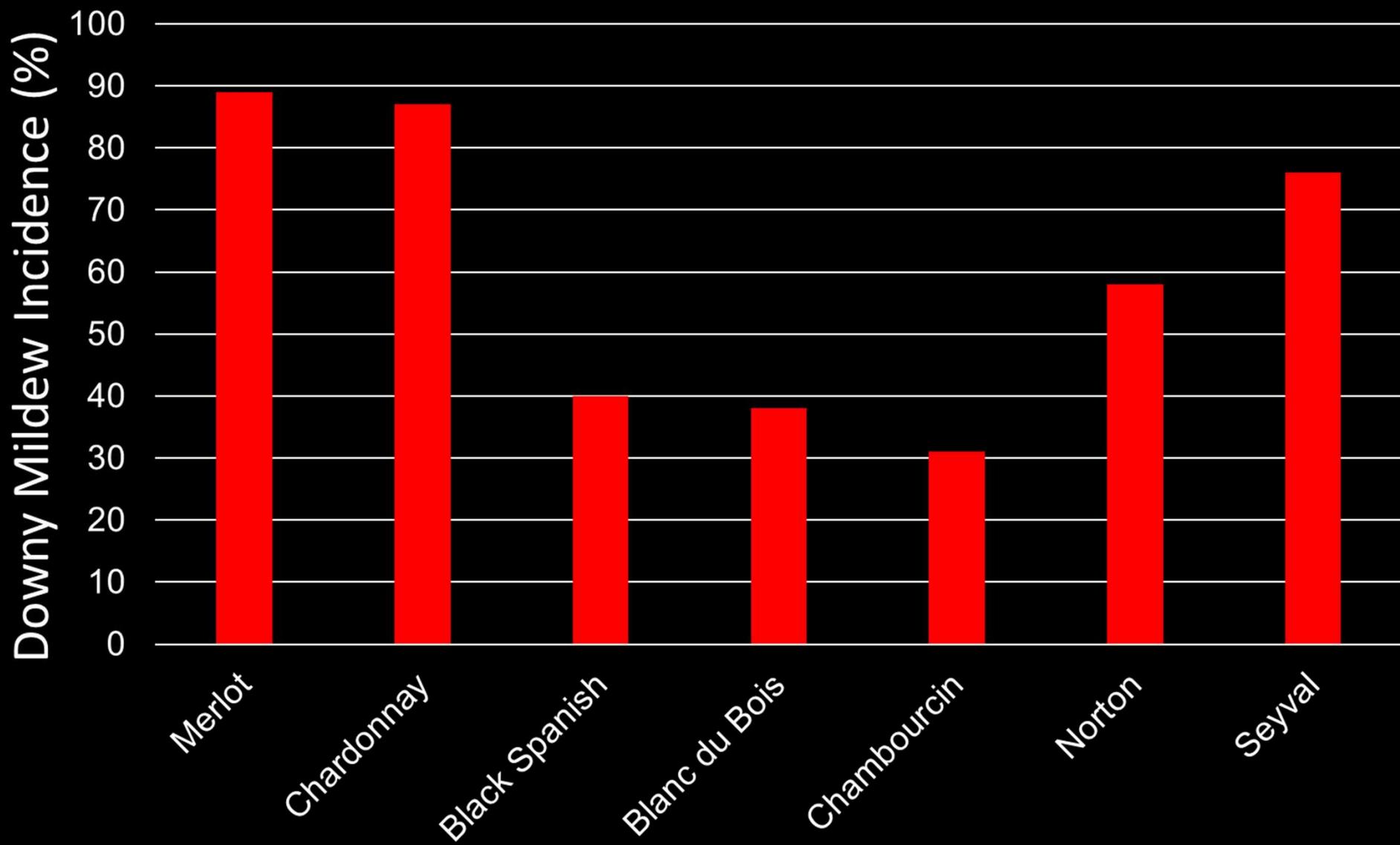


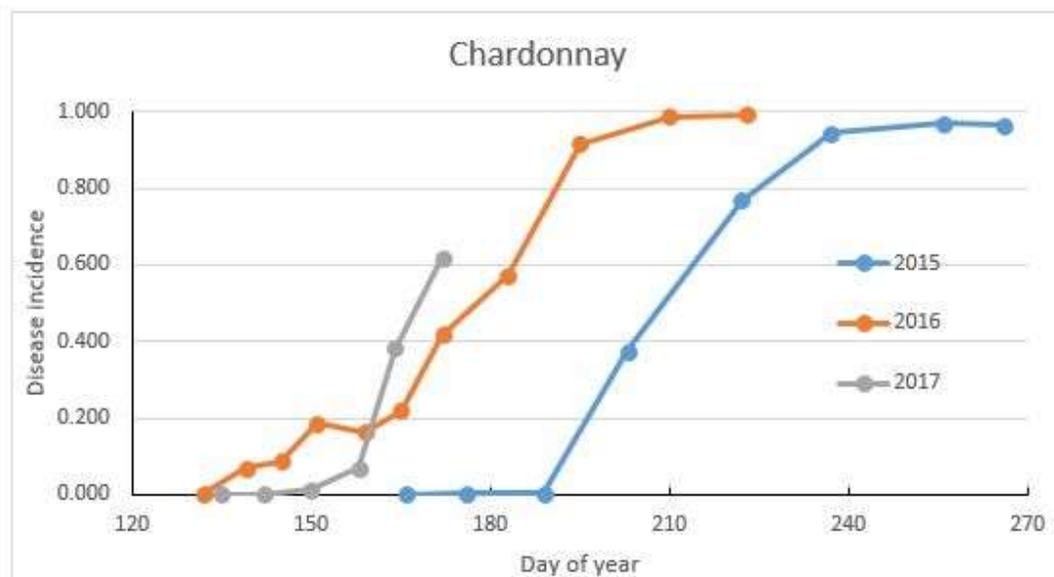
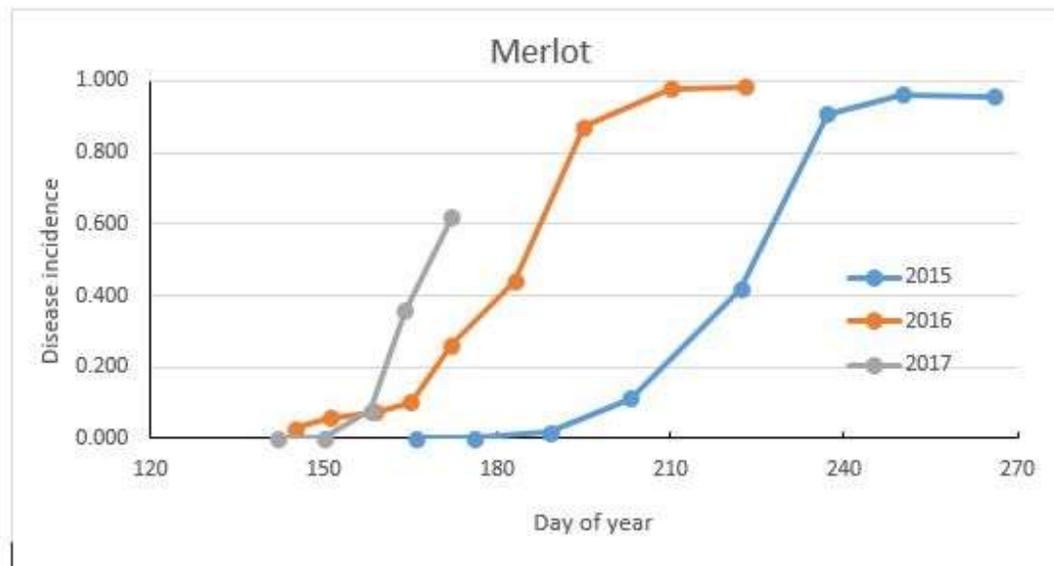












Fungicides	FRAC Code	Efficacy
Ametocradin + dimethomorph (Zampro)	40 + 45	+++++
Azoxystrobin (Abound)	11	+++++ (Resistance ??? + Captan)
Boscalid + Pyraclostrobin (Pristine)	7 + 11	+++++ (Resistance ??? + Captan)
Captan	M4	++++ (+++) Contact protectant; mix with Phosphonates
Cyazofamid (Ranman)	21	++++ Combine wth Phosphonates
Famoxadone + Cymoxanil (Tanos)	11 + 27	++++ (+++) Use with Captan or Mancozeb (required)
Mancozeb	M3	+++++ (++++) Contact protectant
Mandipropamid (Revus)	40	+++++
Mandipropamid + Difenoconazole (Revus Top)	3 + 40	+++++
Mefanoxam + Mancozeb (Ridomil Gold MZ)	4 + M3	+++++
Phosphonates (Prophyt, etc.)	33	+++++ (mix with Captan)
Ziram	M3	++++ Contact protectant

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Mandipropamid + Difenoconazole (Revus Top)	3 + 40	+++++
Phosphonates (Prophyt, etc.)	33	+++++ (mix with Captan)
Ziram	M3	++++ Contact protectant

Powdery Mildew

(*Erysiphe necator*)

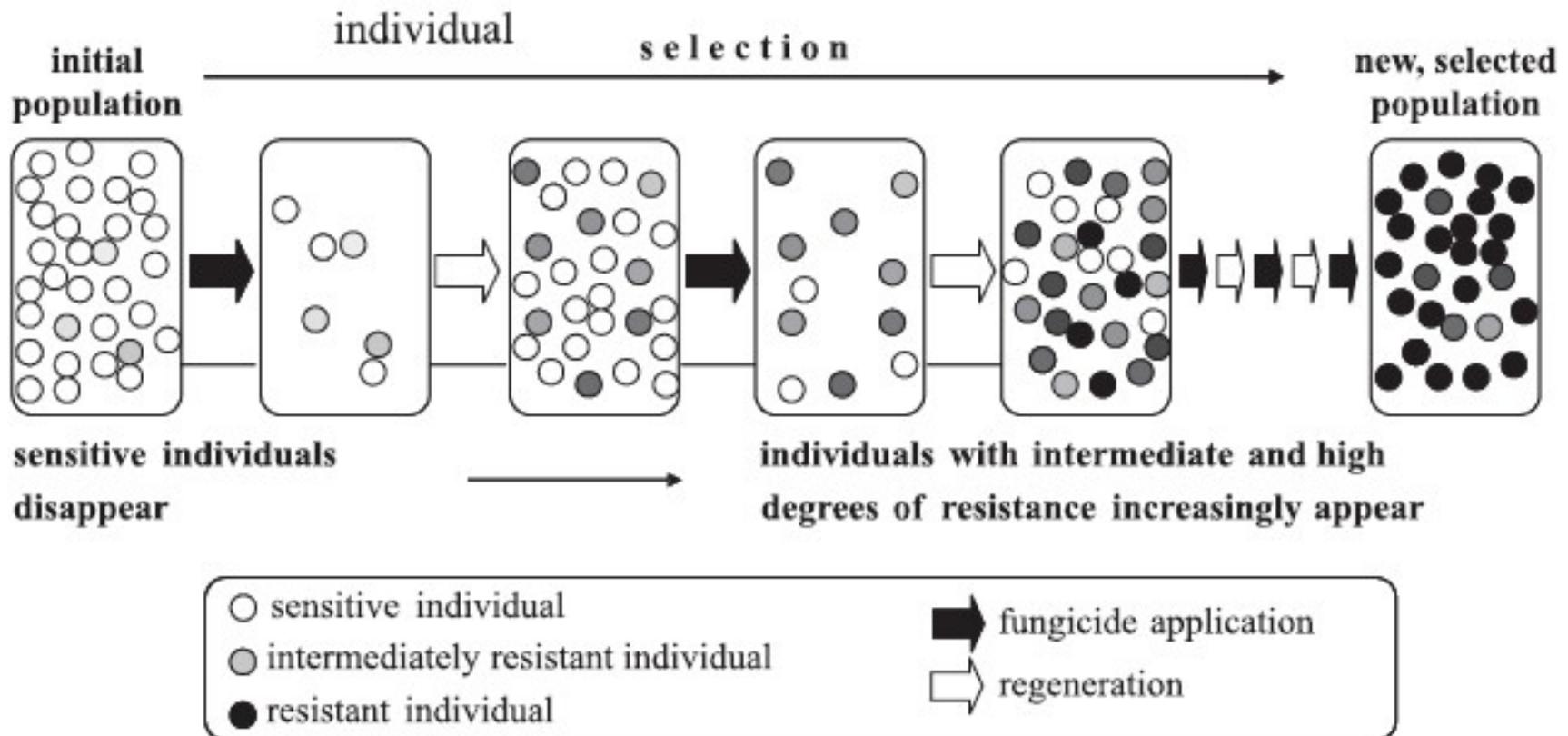
- ❖ Can also infect all green vine parts.
- ❖ White powdery growth
- ❖ Infected fruit may cause off flavor in wines.
- ❖ Early sprays are also required for control.



APS Press; Diseases of Small Fruits

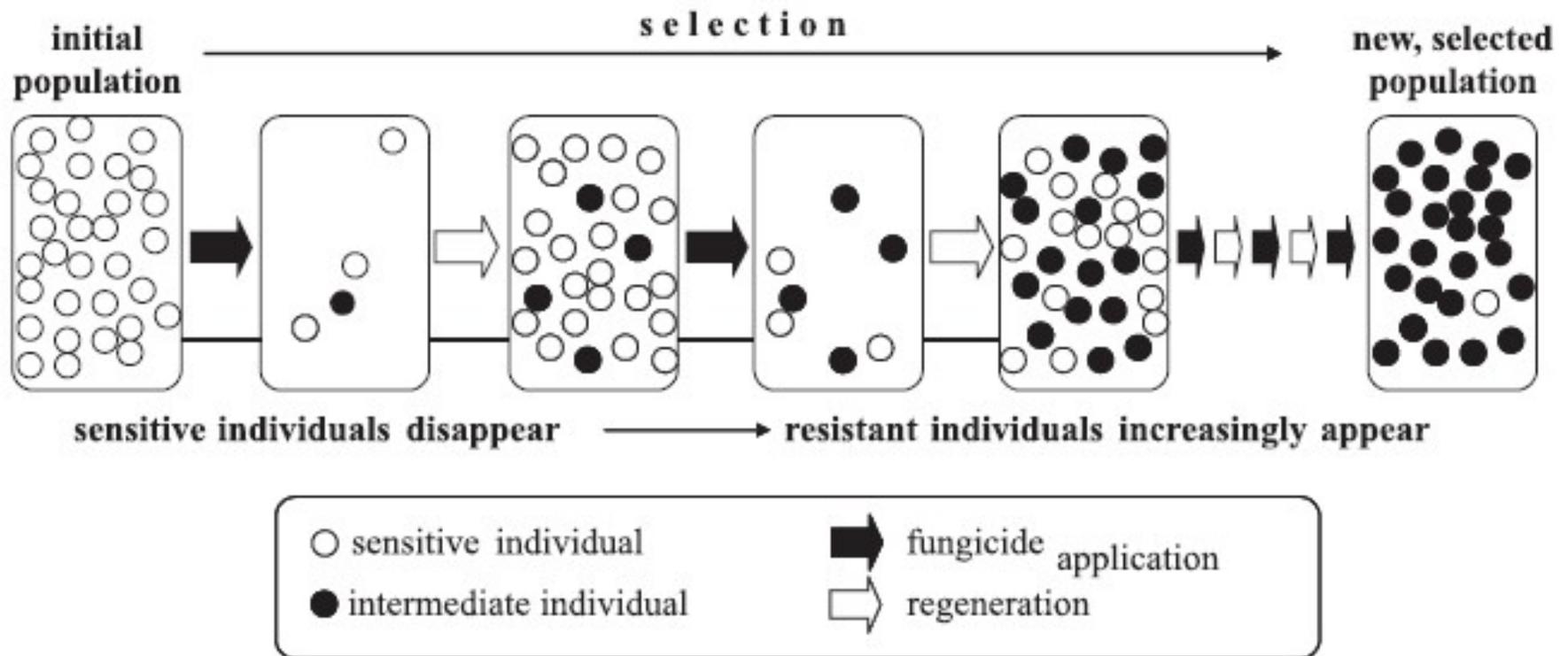


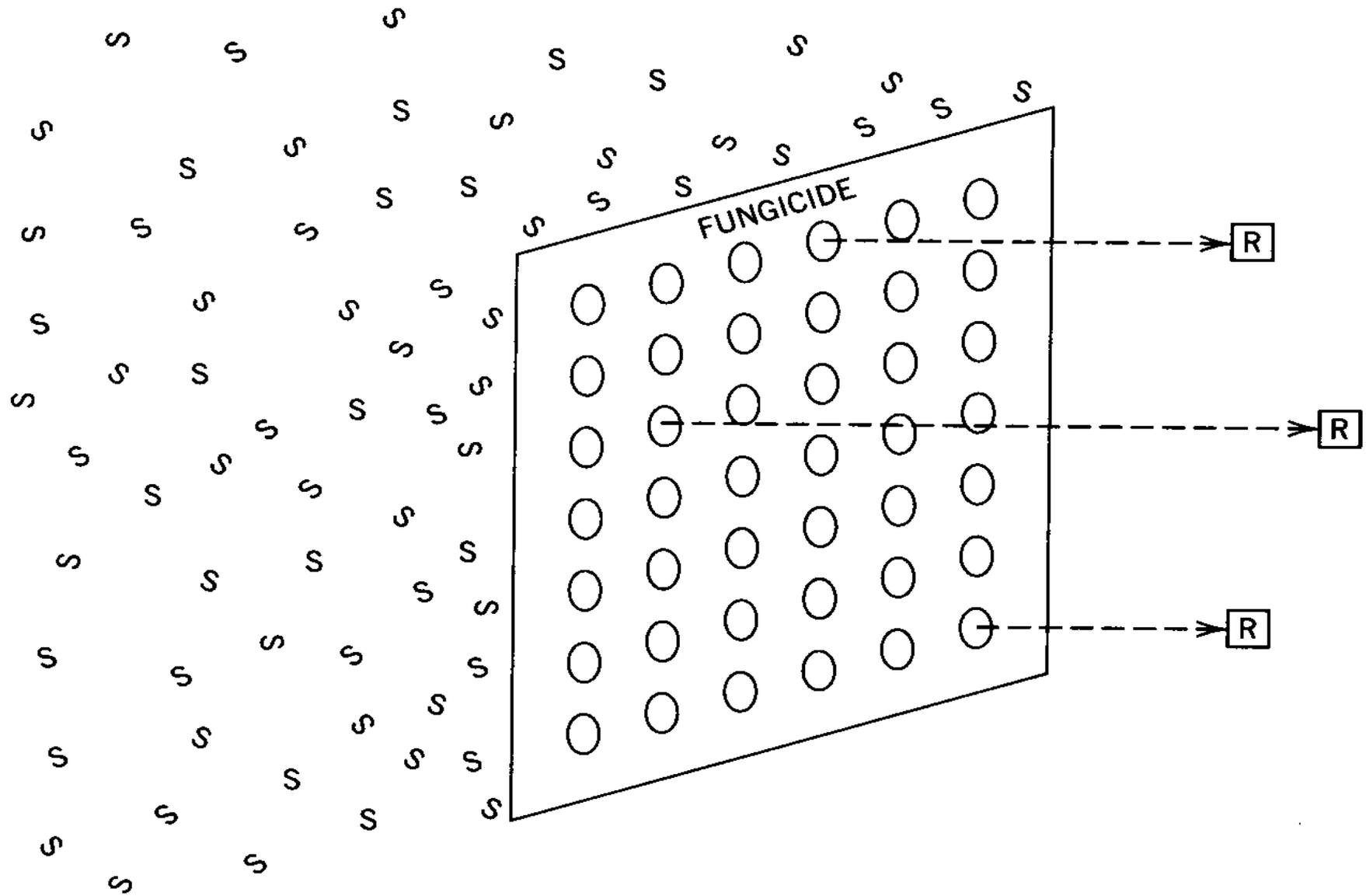
Evolution of fungicide resistance: quantitative resistance



Evolution of fungicide resistance: qualitative resistance

Really bad





R = resistant S = sensitive

Principles of Resistance Management

- ❖ Alternating sprays with fungicides from different classes (different modes of action) is an important means of resistance management.
- ❖ Tank-mixing of different fungicides is also an acceptable method of resistance management, and both methods are employed.
- ❖ Many fungicides are limited to a set number of applications per year in order to improve their long-term survival. Follow the label recommendations.

Botrytis Bunch Rot

(*Botrytis cinerea*)

- ❖ Botrytis infects primarily at bloom, killing flowers.
- ❖ Bloom sprays are essential for control of this disease.
- ❖ Also sprayed prior to bunch closing, at the beginning of fruit ripening, and prior to harvest.

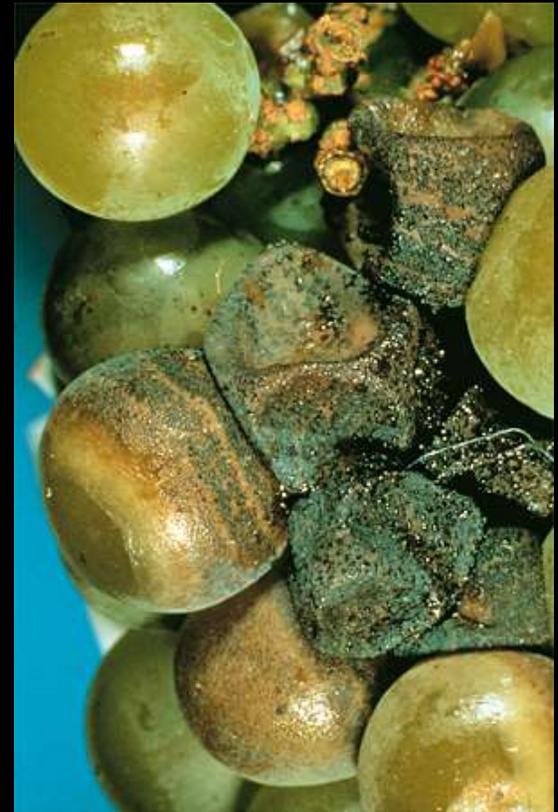


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Bitter Rot

(Melanconium fuligineum)

- ❖ Overwinters on canes and mummified fruit.
- ❖ Can infect all green vine parts, to include the pedicels.
- ❖ Fruit is infected at maturity.
- ❖ Fungicides can be applied late-season and at preharvest to control fruit rots.



Ripe Rot

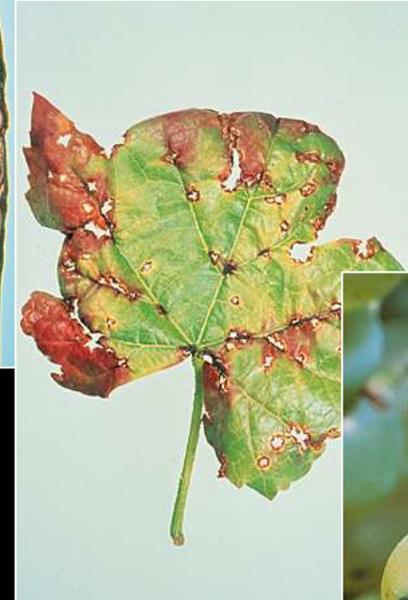
(Colletotrichum gloeosporioides)

- ❖ Overwinters on canes, dormant vines and mummies.
- ❖ Fruit can become infected anytime during fruit development, but the infection is quiescent until fruit maturation.
- ❖ For control, fungicides should be applied from bloom until preharvest.



Anthracnose or Bird's-eye Rot (*Elsinoë ampelina*)

- ❖ Overwinters on infected canes
- ❖ Disease of rainy, humid regions
- ❖ Spreads to new growth in the early spring
- ❖ Young, tender tissue is more susceptible to attack
- ❖ Lime sulfur is critical at late dormant application



APS Press; Diseases of Small Fruits

Sour Rot

- ❖ Caused mainly by bad yeasts and bacteria.
- ❖ Infections result from wounds (insects, birds, mechanical damage, etc.) or other diseases.
- ❖ No fungicide methods are acceptable, and control must be achieved through reduction of damage.
- ❖ Insecticides for control of fruit flies can provide suppression.



