

# Muscadine Diseases – Fungicide Updates

**Bill Cline**  
**Department of**  
**Entomology and**  
**Plant Pathology**  
**North Carolina**  
**State University**

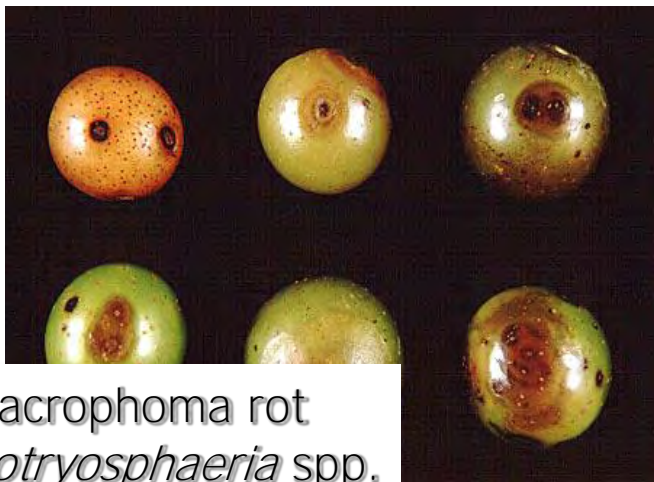




# **GALLERY OF MUSCADINE DISEASE IMAGES – SIGNS & SYMPTOMS**



# Fruit Rots



Macrophoma rot  
*Botryosphaeria* spp.



Ripe rot  
*Colletotrichum* spp.



Bitter Rot  
*Greeneria uvicola*



Sooty mold  
*Peltaster fructicola*



Ripe rot at harvest



# Leaf Diseases



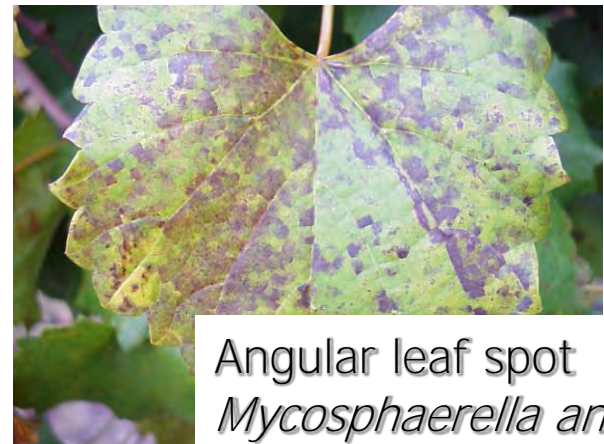
Bitter Rot  
*Greeneria uvicola*



Pierce's Disease  
*Xylella fastidiosa*



Black rot  
*Guignardia bidwellii*



Angular leaf spot  
*Mycosphaerella angulata*



Black rot on leaves

# Powdery Mildew


- Fungus (*Uncinula necator*)
- Appears as faint white “powder” on young fruit
- Causes brown russeting on surface
- Affected fruit cannot ripen normally; may crack











# Management and Control of Diseases

# Tissue Culture for Muscadines

- Disease-causing organisms can carry over in cuttings used to start new plants
- Crops that are propagated vegetatively by cuttings can be kept clean by using tissue culture and virus testing to grow clean, sterile plants in the lab
- Lab-grown plants can then be used as a source of clean cuttings going forward



**“Start Clean and Stay Clean”**

# Disease Resistance in Muscadines

- Resistant to Pierce's Disease
- No Downy Mildew
- No Botrytis Bunch Rot
- Resistant to Nematodes
- Not Grafted
- Few (if any) Viruses



cv. Noble



# Fungicides, Sprayers and Spray Timing



# Sprayers

- Airblast with 20-40 gallons per acre, OR
- High-pressure sprayer with 50-100 gallons per acre
- Sprayer must be designed to reach grapes underneath the canopy





<http://www.superbhorticulture.com>



<http://vtpv.ext.vt.edu>



# Spray Timing – much simpler for muscadine (compared to Vinifera)

- Mid-May (Before disease is visible!!)
- Shoots 6-10 inches in length
- Flowers not yet open
- Continue every 2 wk until early August
- Early summer sprays provide more disease control than later sprays, because fungicides are mainly protectants
- Write it down



# Fungicides

- Mancozeb early (66 d PHI)
- Alternate or tank mix myclobutanil (Nova, Rally) with Captan, apply every 2 wks from Mid-May through August
- Where ripe rot is a problem (shown), replace or supplement Captan with a strobilurin fungicide (such as Abound, Pristine or Flint)
- ALWAYS READ AND FOLLOW THE LABEL!



**Ripe rot**

Nita, January 2016

## Summary cont.

### Vinifera

- Modes of action used
  - M1 (copper) x 2 times
  - M2 (sulfur) x 11 times
  - M3 (mancozeb) x 7 times
  - M4 (captan) x 4 times
  - 2 (Rovral) x 2 time
  - 3 (Rally) x 2 times
  - 9 (Scala) x 1 times
  - 13 (Quintec) x 1 time (+1)
  - 33 (Phosphite, Phostrol) x 2 times (+ 2-3 times)

Muscadine

Mancozeb 1-2X  
Captan 3-6X  
Rally 3-6X





# **2022 Southeast Regional Muscadine Grape Integrated Management Guide**

## **Commodity Editor**

Bill Cline (North Carolina State University)

## **Section Editors**

Pathology; Bill Cline (North Carolina State University), Phil Brannen (University of Georgia), Rebecca Melanson (Mississippi State University) and Mary Helen Ferguson (Louisiana State University)

Entomology; Brett Blaauw (University of Georgia), Frank Hale (University of Tennessee), Meredith Favre (North Carolina State University) and Aaron Cato (University of Arkansas)

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Pesticide Stewardship and Safety; Ash Sial (University of Georgia)

## **Senior Editors**

Phil Brannen (University of Georgia)

Bill Cline (North Carolina State University)

Recommendations are based on information from the manufacturer's label and performance data from research and extension field tests. Because environmental conditions and grower application methods vary widely, suggested use does not imply that performance of the pesticide will always conform to the safety and pest control standards indicated by experimental data.

This publication is intended for use only as a guide. Specific rates and application methods are on the pesticide label, and these are subject to change at any time. Always refer to and read the pesticide label before making any application! The pesticide label supersedes any information contained in this guide, and it is the legal document referenced for application standards.

Treatment and rate per acre	Ripe rot % <sup>z</sup>	Bitter rot %	Macrophoma rot %	Marketable %	Angular leaf spot <sup>y</sup>	
					incidence	severity
Untreated control	2.9 abcd <sup>x</sup>	5.6 a	8.1 a	86.8 a	80.0 a	15.0 a
Aprovia 10.5 fl oz	1.4 abcd	2.6 bc	1.4 cd	94.8 cd	12.5 bc	2.2 bc
Aprovia Top 13.3 fl oz	1.4 abcd	0.1 c	0.9 cd	97.4 cd	1.2 c	1.2 c
Gavel 2.5 lb	2.0 abcd	2.0 bc	3.8 bc	92.2 abc	0.2 c	0.2 c
Switch 14.0 oz	0 d	1.0 c	0.2 d	98.9 d	23.8 b	5.0 b
Miravis Prime 13.4 fl oz	0.3 d	1.2 c	1.1 cd	97.7 cd	7.5 c	1.5 bc
Luna Experience 8.6 fl oz	4.1 a	2.0 bc	3.6 bc	92.2 abc	0 c	0 c
Topguard EQ 8.0 fl oz	0.6 bcd	1.0 c	1.8 cd	97.0 cd	0 c	0 c
Kenja 22.0 fl oz	0.5 cd	1.7 c	0.8 cd	97.4 cd	13.8 bc	2.0 bc
Badge SC 3.5 pt	3.5 abc	4.6 ab	6.0 ab	87.7 ab	8.8 bc	2.8 bc
Procure 8.0 fl oz	3.8 ab	0.6 c	2.6 cd	92.7 bc	10.0 bc	3.5 bc
Merivon 5.5 fl oz	0.8 bcd	0.2 c	1.5 cd	97.4 cd	0.2 c	1.2 c
LSD	3.18	2.78	3.26	5.91	15.76	3.73

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Fungicide “Standards”	FRAC Code
Captan	M4
Rally	3
Abound	11
Pristine	7+11
Flint	11
Mancozeb	M3

**No phytotoxicity  
observed with any newly  
tested products in 2020**

**\*\*\*Significantly increased  
marketable yield on  
‘Carlos’ (vs no spray)**

Evaluated in 2020 + 2021	FRAC Code
Aprovia***	7
Aprovia Top***	3+7
Gavel	22+M3
Switch***	9+12
Miravis Prime***	7+12
Luna Experience	3+7
Topguard EQ***	3+11
Kenja***	7
Procure***	3
Merivon***	7+11
Badge (copper)	M1

**Efficacy of selected fungicides against diseases of muscadine grape** (E = excellent, VG = very good, G = good, F = fair, P = poor, NA = not recommended, UN = control unknown) These ratings are benchmarks, actual performance will vary.

Fungicide	PHI (days)	FRAC MOA	Bitter rot	Powdery mildew	Ripe rot	Macro-phoma rot	Black rot	Sooty blotch	Dead arm	Angular leaf spot
Thiophanate-methyl (Topsin- M)	7 days	1	G	G	F	G	G	G	F	G
Myclobutamil (Rally)	14 days	3	G	VG	NA	G	VG	G	UN	VG
Triflumizole (Procure)	7 days	3	VG	VG	UN	VG	VG	UN	UN	VG
Fluopyram + tebuconazole (Luna Experience)	14 days	3+7	VG	VG	UN	G	VG	UN	UN	E
Benzovendiflupyr (Aprovia)	21 days	7	VG	UN	G	VG	VG	UN	UN	VG
Isofetamid (Kenja)	14 days	7	VG	VG	G	E	VG	UN	UN	VG
Azoxystrobin + flutriafol (Topguard EQ)	14 days	3+11	E	VG	G	VG	VG	UN	UN	E
Fluxapyroxad + pyraclostrobin (Mervion)	14 days	7+11	E	VG	VG	VG	VG	UN	UN	E
Pyraclostrobin + boscalid (Pristine)	14 days	7+11	G	VG	VG	E	VG	E	F	VG
Kresoxim-methyl (Sovran)	14 days	11	G	G	G	G	G	G	F	G
Azoxystrobin (Abound)	14 days	11	G	VG	VG	VG	VG	VG	F	VG
Trifloxystrobin (Flint Extra)	14 days	11	G	VG	VG	E	VG	E	F	G
cyprodinil + fludioxonil (Switch)	7 days	9+12	E	VG	VG	E	VG	UN	UN	G
pydiflumetofen + fludioxonil (Miravis Prime)	14 days	7+12	E	VG	VG	E	VG	UN	UN	VG
Copper oxychloride + Copper hydroxide (Badge)	0 day (48 hrs re-entry)	M 1	NA	G	NA	NA	G	UN	UN	VG
Wettable Sulfur (Microthiol and other trade names)	0 day (24 hrs re-entry)	M 2	NA	VG	NA	NA	NA	F	NA	NA
Mancozeb + Zoxamide (Gavel)	66 days	22+M3	G	G	NA	G	G	UN	UN	G
Ziram (Ziram)	21 days	M 3	G	G	G	G	G	G	F	G
Captan (Captan, Captec)	0 days (72 hrs re-entry)	M 4	G	G	VG	G	G	G	F	G
EBDCs (includes Maneb, Manex, Penncozeb, Manzate, Dithane M-45)	66 days	M 3	G	G	G	G	G	G	F	G

<https://smallfruits.org/files/2022/03/2022-Muscadine-Guide.pdf>

# Seasonal ‘at a glance’ fungicidal spray schedule -- options for muscadine grape

Do not rely on a single product -- use alternating modes of action (MOA) shown below in brackets [FRAC Code]. EARLY SPRAYS are more effective than late-season sprays. This table is only a guide -- read and follow the label prior to making applications.

Develop- mental Stage	Dorm- ant	Pre-bloom -- new shoots to 6 inches	Second pre- bloom	Bloom -- 50% open flowers	First Cover -- small green fruit	Subsequent Cover sprays (second, third, fourth)	Can be used up to 14 days preharvest	Can be used up to 7 days preharvest
Diseases (bold) Fungicide [FRAC Code]	Dieback "dead arm" Eutypa, Botryosph aeria and similar organisms	These products can be used to manage most fruit rots and leaf diseases (Black rot, Bitter rot, Angular leaf spot, Powdery mildew, Macrophoma rot) but do NOT provide control of Ripe rot ( <i>Colletotrichum</i> sp.)						
		Topsin M [1] Rally [3] Procure [3] Luna Experience [3+7]		Topsin M [1] Rally [3] Procure [3] Luna Experience [3+7]		Topsin M [1] Rally [3] Procure [3] Luna Experience [3+7]	Topsin M [1] Rally [3] Procure [3] Luna Experience [3+7]	Topsin M [1] Procure [3]
	Rally [3] applied at pruning time to fresh cuts	These products can be used to manage fruit rots and leaf diseases (Black rot, Bitter rot, Angular leaf spot, Powdery mildew, Macrophoma rot) -- INCLUDING management of Ripe rot ( <i>Colletotrichum</i> sp.)						
		Aprovia [7] Kenja [7] Topguard EQ [3+11] Mervion [7+11] Pristine [7+11] Sovran [11] Abound [11] Flint Extra [11] Switch [9+12] Miravis Prime [7+12] Ziram [M3] Captan [M4]  EBDCs (66-day preharvest interval) -- includes Maneb, Manex, Penncoze, Manzate, Dithane M-45 [M3] and Gavel [22+M3]	Aprovia [7] Kenja [7] Topguard EQ [3+11] Mervion [7+11] Pristine [7+11] Sovran [11] Abound [11] Flint Extra [11] Switch [9+12] Miravis Prime [7+12] Ziram [M3] Captan [M4]	Aprovia [7] Kenja [7] Topguard EQ [3+11] Mervion [7+11] Pristine [7+11] Sovran [11] Abound [11] Flint Extra [11] Switch [9+12] Miravis Prime [7+12] Ziram [M3] Captan [M4]	(Note -- Do not use EBDCs within 66 days of harvest)	Kenja [7] Topguard EQ [3+11] Mervion [7+11] Pristine [7+11] Sovran [11] Abound [11] Flint Extra [11] Switch [9+12] Miravis Prime [7+12] Captan [M4]  (Note -- fungicides will leave a visible residue on harvested fruit when used close to harvest)	Switch [9+12] Captan [M4]	(Note -- fungicides will leave a visible residue on harvested fruit when used close to harvest)
		<b>Powdery mildew ONLY</b>						
		Wettable Sulfur [M2]		Wettable Sulfur [M2]		Wettable Sulfur [M2]		



