

# Effectiveness of Fungicides for Management of Grape Diseases

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This guide is a decision-making tool to help growers select fungicides from different chemical classes (FRAC).<sup>1</sup>

Additional information can be found in a number of UK Cooperative Extension Service publications, including ID-232, or by contacting county Extension agents.

FRAC Code Fungicide Group <sup>1</sup>	Fungicide	Chemical	Phomopsis Cane and Leaf Spot <i>Fungal</i>	Black Rot <i>Fungal</i>	Downy Mildew <i>Water molds (Oomycete)</i>	Powdery Mildew <i>Fungal</i>	Botrytis Rot <i>Fungal</i>	Bitter Rot <i>Fungal</i>	Anthraco-nose <i>Fungal</i>	Root and Crown Rots <i>Water molds (Oomycete)</i>
1 Methyl Benzimidazole Carbamates (MBC)	Upwardly systemic. Fungicide resistance risk high. Tank mix with fungicides from a different fungicide group (FRAC) to prevent or delay resistance development. Do not mix with copper.									
	Topsin M <sup>~</sup>	thiophanate-methyl	++	+		+++	++	++	+++	
2 Dicarboximides	Locally systemic, long protection period during wet conditions. Medium to high risk for resistance. Do not apply more than 2 applications per season. Toxic to honey bees; do not apply during bloom.									
	Rovral	iprodione					+++			
	Meteor	iprodione					+++			
3 Sterol Inhibitors (DMI or SI)	Upwardly systemic. Rainfast in 2 hours. Some curative activity. There is wide variation in activity within this group. Medium risk for resistance. Make no more than 5 applications per season. Note: this group was formerly known as De-Methylation Inhibitors (DMI) and are now classified as Sterol Biosynthesis Inhibitors (SBI or SI).									
	Tebu-zol	tebuconazole		+++		+++			+++	
	Inspire Super*	difenoconazole + cyprodinil		+++		+++	+++		+++	
	Luna Experience*	fluopyram + tebuconazole	+ / ++	+ / ++		+++	+++			
	Mettle	tetraconazole		+++		+++			+++	
	Quadris Top*	azoxystrobin + difenoconazole	+	+++	+++	+++	++		+++	

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3 Sterol Inhibitors (DMI or SI) <i>(cont'd)</i>	Upwardly systemic. Rainfast in 2 hours. Some curative activity. There is wide variation in activity within this group. Medium risk for resistance. Do not exceed 5 applications per season. Note: This group, which was formerly known as De-Methylation Inhibitors (DMI), is now classified as Sterol Biosynthesis Inhibitors (SBI or SI).									
	Rally	myclobutanil		+++		+++			+++	
	Revus Top*	mandipropamid + difenoconazole		+++	+++	+++			+++	
	Tebuzol	tebuconazole		+++		+++			+++	
4 Phenylamides	Systemic. Effective on water molds (oomycetes). There are various formulations and combinations of Ridomil fungicides on the market. Read labels carefully before use. Ridomil Gold SL is labeled only for Phytophthora root and crown rot. Ridomil Gold MZ (contains mancozeb) and Ridomil Gold/ Copper (with copper) are labeled for control of downy mildew; do not make more than 4 applications per season.									
	Ridomil Gold/ Copper	mefenoxam + copper	+	+	+++	++	+	+		
	Ridomil Gold MZ	mefenoxam + mancozeb	+	++	+++			++	++	
	Ridomil Gold SL	mefenoxam								+++
7 Succinate Dehydrogenase Inhibitors (SDHI)	Upwardly systemic fungicide with varying degrees of systemic activity. Medium to high risk for resistance.									
	Endura	boscalid				+++	++		+++	
	Luna Experience*	fluopyram + tebuconazole	+ / ++	+ / ++		+++	+++			
	Pristine*	boscalid + pyraclostrobin	++	+++	+++	+++	++		+++	
9 Anilino Pyrimidines	Locally systemic. Medium risk for resistance development. Apply no more than 3 applications per season.									
	Inspire Super*	cyprodinil + difenoconazole		+++		+++	+++		+++	
	Scala	pyrimethanil					+++			
	Switch*	cyprodinil + fludioxonil					++			
	Vanguard	cyprodinil					+++			

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11 Quinone outside Inhibitors (QoI)	Locally systemic. High risk for resistance development. Do not make more than 4 applications per season. Note: These fungicides are also known as strobilurins.									
	Abound	azoxystrobin	+	+++	+++	+++	++		+++	
	Flint	trifloxystrobin	+	+++	+	+++	++		+++	
	Pristine*	pyraclostrobin + boscalid	++	+++	+++	+++	++		+++	
	Quadris Top*	azoxystrobin + difenoconazole	+	+++	+++	+++	++		+++	
	Sovran	kresoxim-methyl	+	+++	++	+++	++		+++	
	Reason	fenamidone			++					
12 Phenyl Pyrroles	Switch is labeled for Botrytis grey mold and sour rot. Low to medium risk for resistance. Do not make more than 4 applications per season.									
	Switch*	cyprodinil + fludioxonil					++			
13 Azanaphthalenes	Upwardly systemic fungicide with some downward-moving ability. Effective for protection against powdery mildew. Most effective during the early stages of powdery mildew development as a protectant only. Medium risk for resistance. Do not make more than 5 applications per season.									
	Quintec	quinoxifen				+++				
17 SBI: Class III	Locally systemic. Low to medium risk for resistance. Maximum of 3 applications per season.									
	Elevate	fenhexamid					+++			
19 Polyoxin D	Botanical product. Medium risk for resistance. Maximum of 6 applications per season.									
	Tavano	polyoxin D zinc salt				+++	++			
21 Quinone inside Inhibitors	Locally systemic. Resistance risk unknown but presumed to be medium to high. Do not make more than 6 applications per season.									
	Ranman	cyazofamid			+++					

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33 Phosphonates	Fully systemic; when applied to leaves, product can translocate to lower parts. Low risk for fungicide resistance development. Effective against water molds.									
	Agri-fos	phosphorus acid			+++					
	Fosphite	phosphorus acid			+++					
	ProPhyt	phosphorus acid			+++					
	Phostrol	phosphorus acid			+++					
	Rampart	phosphorus acid			+++					+++
40 Carboxylic Acid Amides	Locally systemic. Low to moderate resistance risk. Do not exceed 4 applications per season.									
	Revus	mandipropamid			+++					
	Revus Top*	mandipropamid + difenoconazole		+++	+++	+++			+++	
	Forum	dimethomorph			+++					
	Zampro*	ametoctradin + dimethomorph			+++					
43 Benzamides	Systemic fungicide with protective and curative properties. Tank mix with another labeled fungicide from a different chemical group. Risk for resistance not known. Rainfast within 2 hours.									
	Presidio~	fluopicolide			+++					
M Multi-site Inhibitors	Broad spectrum protectants. Best applied early-season as a protectant before infection. Not systemic, washes off in the rain. Low risk for resistance.									
	Captan	captan	+++	+	+++		+	++	++	
	Copper	copper	+	+	+++	++	+	+		
	Dithane	mancozeb	+++	+++	+++			++	+++	
	Koverall	mancozeb	+++	+++	+++			++	+++	
	Mancozeb	mancozeb	+++	+++	+++			++	+++	
	Penncozeb	mancozeb	+++	+++	+++			++	+++	
	Ziram	ziram	++	+++	++			++	++	

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U6 Phenyl- acetamide	Do not exceed 2 applications per season. Valued for late-season management of powdery mildew (3-day PHI).									
	Torino	cyflufenamid				+++				
U8 Aryl-phenyl- ketones	Medium risk for resistance. Do not exceed 3 applications per season. Has no curative properties; tank mix with another labeled fungicide if powdery mildew is already established.									
	Vivando	metrafenone				+++				
Not Classified	Valued for late-season management of powdery mildew (0-day PHI). Resistance risk not known.									
	Armicarb	potassium bicarbonate				+ / ++				
	Kaligreen	potassium bicarbonate				+ / ++				
	Sil-Matrix	potassium silicate				+ / ++				

#### Notes

- <sup>1</sup> FRAC codes group fungicides by their mode of action. Fungicides groups should be rotated in order to prolong the effectiveness of fungicides.
- ~ Never apply Topsin M alone. Combine with unrelated fungicide such as Captan.
- \* Chemical contains more than one active ingredient, thus more than one FRAC code is assigned.

#### Efficacy ratings

- +++ highly effective
- ++ moderately effective
- + slightly effective

March 2016

**Check fungicide labels for specific host information, possible phytotoxicity, rates, re-entry intervals, and resistance management information. Always follow label instructions.**