

# Effectiveness of Fungicides for Management of Apple 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	Scab <i>Fungal</i>	Powdery Mildew <i>Fungal</i>	Rust <i>Fungal</i>	Black Rot & White Rot <i>Fungal</i>	Bitter Rot <i>Fungal</i>	Sooty Blotch & Fly Speck <i>Fungal</i>
1 MBC Benzimidazoles	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~	thiophanate-methyl	++	++		++		+++
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. Do not apply SI fungicides past 2nd cover. Note: This group, which was formerly known as De-Methylation Inhibitors (DMI), is now classified as Sterol Biosynthesis Inhibitors (SBI or SI).							
	Indar	fenbuconazole	+++	++	++			++
	Inspire Super*	difenoconazole + cyprodinil	+++	+++	+++			++
	Procure	triflumizole	+++	+++	+++			
	Rally	myclobutanil	+++	+++	+++			
	Topguard	flutriafol	+++	+++	+++			

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7 Succinate Dehydrogenase Inhibitors (SDHI)	Varying degrees of systemic activity. Medium to high risk for resistance. Do not exceed more than 4 applications per season. Fluxapyroxad, marketed as Xemium (Merivon), is more mobile in plants and is reported to provide a broader spectrum of disease control. Fluopyram, marketed as Luna, is reported to be extremely effective when mixed with trifloxystrobin; research suggests that disease control leads to elimination of inoculum, which leads to longer storage.							
	Fontelis	penthioopyrad	+++	+++	++			
	Luna Sensation*	fluopyram + trifloxystrobin	+++	+++	++	++	++	++
	Luna Tranquility*	fluopyram + pyrimethanil	+++	+++				
	Merivon*	pyraclostrobin + fluxapyroxad	+++	+++	+ / ++	++	++	++
	Pristine*	pyraclostrobin + boscalid`	+++	+++	+++	++	++	+++
9 Anilino Pyrimidines	Upwardly systemic. Medium risk for resistance development. Apply no more than 3 applications per season. Perform best in cooler temperatures; use early in the season.							
	Inspire Super*	difenoconazole + cyprodinil	+++	+++	+++			++
	Luna Tranquility*	fluopyram + pyrimethanil	+++	+++				
	Scala	pyrimethanil	++					
	Vanguard	cyprodinil	++					
11 Quinone outside Inhibitors (QoI)	Locally systemic. High risk for resistance development. Do not make more than 4 applications per season. Excellent post-harvest protection from fruit rots when used late-season. Note: This group may also be referred to as Strobilurins.							
	Flint	trifloxystrobin	+++	++	++	++	+++	+++
	Luna Sensation*	fluopyram + trifloxystrobin	+++	+++	++	++	++	++
	Merivon*	pyraclostrobin + fluxapyroxad	+++	+++	+ / ++	++	++	++
	Pristine*	pyraclostrobin + boscalid`	+++	+++	+++	++	++	+++
	Sovran	kresoxim-methyl	+++	++	+++	++	++	+++

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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 of resistance. Do not apply mancozeb fungicides past 2nd cover.							
	Captan	captan	++			++	+++	+ / ++
	Mancozeb, Dithane, Manzate, Penncozeb	mancozeb	++		++	++	+++	+++
	Polyram	metiram	++		++	++	++	+++
	Sulfur	sulfur	+	++		+		
	Syllit	dodine	+++					
	Ziram	ziram	+		++		++	+ / ++

#### 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

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

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