

2013 Fungicide Resistance Management Guidelines for Cucurbit Downy Mildew and Powdery Mildew Control in the Mid-Atlantic & Northeast regions of the United States

Fungicide	Active Ingredient(s)	FRAC Code*	Risk Rating**	Management Required***	Powdery Mildew	Downy Mildew	General Fungicide Resistance Management Guidelines****
Kocide 3000 or OLF	fixed copper(s)	M1	L	N	+		FRAC code M fungicides are low risk, protectant fungicides. Use alone, or tank mix with high-risk fungicides to improve control
Microthiol or OLF	sulfur	M2	L	N	++		
Manzate, Dithane or OLF	EBDC	M3	L	N		++	
Gavel	zoxamide + mancozeb	M3 + 22	L - M	N		++	
Bravo, Echo or OLF	chlorothalonil	M5	L	N	++	++	Select fungicides with at least ++ rating. Rotate among fungicides with different FRAC codes. Tank mix high risk fungicides with FRAC code M product if the product is not formulated with a FRAC code M fungicide. When resistance is qualitative (FRAC code 1 and 11 fungicides), resistant pathogen strains are completely insensitive and cannot be controlled with the fungicide. With quantitative resistance (FRAC Code 3 fungicides), pathogen strains exhibit range in fungicide sensitive and efficacy depends on level of insensitivity. Better control can be obtained with high label rates and tight spray intervals. ^a Luna fungicides are labeled for watermelon only. ^b Revus is poor on cucumber. Presidio has exhibited poor control when the pathogen originated from the southeast.
Topsin M	thiophanate methyl	1	H ^R	Y	+		
Rally	myclobutanil	3	M ^R	Y	++		
Procure	triflumizole	3	M ^R	Y	++		
Folicur	tebuconazole	3	M	Y	++		
Inspire Super	difenconazole + cyprodinil	3 + 9	H	Y	++		
Ridomil Gold Copper	mefenoxam + copper	4 + M1	H ^R + L	Y		+	
Ridomil Gold Bravo	mefenoxam + chlorothalonil	4 + M5	H ^R + L	Y		+	
Fontelis	penthiopyrad	7	M - H	Y	++		
Luna Experience*	fluopyram + tebuconazole	7 + 11	M	Y	+++		
Luna Sensation ^a	fluopyram + trifloxystrobin	7 + 11	M	Y	+++		
Quadris	azoxystrobin	11	H ^R	Y	+	+	
Cabrio	pyraclostrobin	11	H ^R	Y	+	+	
Flint	trifloxystrobin	11	H ^R	Y	+		
Reason	fenamidone	11	H	Y		+	
Pristine	pyraclostrobin + boscalid	11 + 7	H ^R	Y	++	+	
Tanos	famoxadone + cymoxanil	11 + 27	L - M	Y		+	
Quintec	quinoxifen	13	H	Y	++++		
Ranman	cyazofamid	21	M - H	Y		+++	
Gavel	zoxamide + mancozeb	22 + M3	M + L	Y		++	
Curzate	cymoxanil	27	L - M	Y		++	
Previcur Flex	propamocarb HCL	28	L - M	Y		+++	
Alliete	aluminum tris	33	L	Y		+	
Phosphonates	phosphorous acid salts	33	L	Y		+	
Forum	dimethomorph	40	L - M	Y		+++	
Revus ^b	mandipropamid	40	L - M	Y		+ / +++	
Presidio ^b	fluopicolide	43	H	Y		+ / +++	
Zampro	ametoctradin + dimethomorph	45 + 40	M	Y		++++	
Torino	cyflufenamid	U6	M	Y	++++		

Efficacy Ratings: + = poor (not recommended), ++ = poor to good, +++ = good, ++++ = very good, +++++ = excellent

* FRAC code: M = multi-site mode of action (MOA), numbered groups = fungicides with similar MOA

** Risk Ratings: L = low risk, M = moderate risk or H = high risk for fungicide resistance to develop

*** Risk management required according to fungicide label

**** See fungicide label for specific crops, rates and instructions on use

^R = resistance known; (+) control failures detected in the mid-Atlantic and Northeast regions

Fungicides with the same color belong to the same FRAC code