

Targeted fungicides for cucurbit powdery mildew, when they received U.S. federal registration for this use, when resistance detected, and current status and use recommendation. Fungicides are listed by FRAC code.

Trade name	Active ingredient	FRAC Code	When labeled in U.S.	Resistance confirmed	Status or current use recommendation
Benlate ^z	benomyl	1	1972	1967	discontinued
Topsin M ^z	thiophanate-methyl	1	after Benlate	cross resistance	not recommended
Bayleton	triadimefon	3	1984 (April)	1990 (1986 suspected)	discontinued
Nova, Rally ^y	myclobutanil	3	2000	PCR	not recommended
Procure ^y	triflumizole	3	2002	PCR	recommended
Proline ^y	prothioconazole	3	after Procure	PCR	recommended
<i>other DMIs</i> ^y	<i>multiple</i>	3	after Procure	PCR	some recommended
Pristine, Endura	boscalid	7	2003 (July)	2008	not recommended
Fontelis ^w , Merivon ^w , etc.	penthiopyrad, fluxapyroxad	7	after Pristine	cross resistant w/boscalid	not recommended
Luna ^{x,w}	fluopyram	7	2012	PCR	recommended. Use sparingly
Quadris ^z	azoxystrobin	11	1999 (spring)	2002	not recommended
<i>other QoIs</i> ^z	<i>multiple</i>	11	after Quadris	cross resistance	not recommended
Quintec ^v	quinoxifen	13	2007 ^w	2015	recommended. Use sparingly
Torino ^u	cyflufenamid	U6	2012 (July)	2017 ^v	not recommended
Vivando	metrafenone	50	2014 (spring)		recommended
Prolivo	pyriofenone	50	2017		not recommended
Gatten ^w	flutianil	U13	2018		recommended

^z Resistance to FRAC code 1 and 11 active ingredients is qualitative, thus pathogen strains are either resistant or sensitive. Cross resistance is complete and renders all products in the group ineffective.

^y Resistance to FRAC code 3 active ingredients is quantitative, thus cross resistance is partial (PCR). Products registered after Bayleton have higher inherent activity. Their efficacy varies.

^x Luna fungicides contain fluopyram plus another active ingredient in a different chemical group (FRAC 3 or 11). PCR was documented with other succinate dehydrogenase inhibitor (SDHI) fungicides (FRAC 7), thus Luna fungicides can effectively control boscalid-resistant strains whereas other SDHI fungicides cannot. However, control with Luna Sensation was poor in 2017 at LIHREC.

^w Not permitted used on Long Island, New York. Fontelis not registered in NY.

^v Labeled in 2007 for use only on melons; 2009 for pumpkin and winter squash. Quintec has continued to be effective in fungicide evaluations at LIHREC. Resistant isolates are uncommon.

^u Poor control in fungicide evaluation at LIHREC in 2017. Resistance confirmed.