

## Cucurbits

# Powdery Mildew (Cucumber, Melon, Pumpkin, Squash, and Zucchini)

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### Identification and Life Cycle

Powdery mildew of cucurbits is caused by the fungi *Erysiphe cichoracearum* and *Podosphaera fuliginea*. The disease cycle is initiated by windblown conidia, which infect cucurbits over a range of humidity (50 to 95%) during moderate to warm (68 to 80°F) temperatures. *E.cichoracearum* is more active at lower temperatures than *P. fuliginea*. The pathogen overwinters on wild cucurbit hosts, weeds, and dead vines.

### Plant Response and Damage

Powdery white spots appear first on leaves, and eventually grow to cover entire leaves. Symptoms usually develop on the bottom surface of older leaves first, but all leaves become diseased as plants age. Infected leaves wither and die, leading to premature defoliation. Powdery mildew can reduce fruit yield and size, but the amount of damage is directly related to the amount of time plants have been diseased.

### Management Approaches

#### Biological Control

AQ10 biofungicide is a fungal hyperparasite (*Ampelomyces quisqualis*) of the powdery mildew fungus. AQ10 must be applied preventatively along with a mineral-oil or silicone surfactant early in the morning or later at night to be most effective. The use of conventional fungicides such as EBDCs, sulfur, and strobilurins should not be applied when AQ10 is used for powdery mildew control.

#### Cultural Control

Eliminate weeds in and around cucurbit fields. Resistant cucumber and melon varieties are available and should be planted if suitable for your marketing and production needs.

Several races of the powdery mildew fungi have been identified, and resistant varieties must be matched against the prominent races of the pathogens to be most effective.

## **Chemical Control**

Chemical controls must be used in combination with cultural controls to be most effective. Resistance to several fungicides has been reported in the powdery mildew fungi, so fungicides with different modes of action must be rotated or tank-mixed to prevent or delay resistance development. Thorough coverage is essential for effective disease control.

### *Product List for Powdery Mildew:*

<b>Pesticide</b>	<b>Product per acre</b>	<b>Application Frequency (days)</b>	<b>Remarks</b>
<b>Chlorothalonil and Chlorothalonil Mixtures</b>			
Bravo 720	1.5-2 pt	7 days	Do not graze or feed debris to livestock; 7 day PHI
Bravo Ultrex	1.4-1.8 lb	7-10 days	Maximum of 16.5 pounds per season; 0 day PHI
Bravo WeatherStik	1.5-2.0 pt	7-10 days	Maximum of 20 pints per season; 0 day PHI
Echo 720	1.5-2.0 pt	7-10 days	Maximum of 2.5 gallons per season; 7 day PHI
Echo 90DF	1.2-1.6 lb	7-10 days	Maximum of 16.67 pounds per season; 7 day PHI
Echo Zn	2.2 to 2.8 pt	7-10 days	Maximum of 3.6 gallons per season; 7 day PHI
Ridomil/Bravo	1-2 lb	7-14 days	7 day PHI
<b>Copper Fungicides</b>			
Champ Dry Prill	1.33 lb	5-7 days	
Champ Formula 2	1.33 pt	5-7 days	
Copper-Count-N	4-6 pt	7 days	Mid-harvest.
Cuprofix Disperss	2.5 lb	5-7 days	
Kocide 101	1.5-3 lbs	5-7 days	May cause injury
Kocide DF	1.5-3 lbs	5-7 days	May cause injury
Kocide 4.5LF	1-2 pts	5-7 days	May cause injury
Kocide 3000	0.5-1.25 lb	5-7 days	May cause injury
Nordox	1.5-2.0 lb	7-10 days	
Tri Basic Copper	2-4 pt	7-10 days	1 day PHI
<b>EBDC, Copper/EBDC, and EBDC/Zoxamide Mixtures</b>			
Cuprofix Disperss MZ	4-7.25 lb	3-10 days	Maximum of 63.1 pounds per

			season; 5-14 day PHI
Dithane	2-3 lb	7-10 days	Maximum of 25.6 pounds per season; 5 day PHI; use a non-ionic surfactant to improve performance
Gavel 75DF	1.5-2.0 lb	7-10 days	Maximum 16 pounds per season; 5 day PHI; include a nonionic surfactant to improve performance
Maneb 75 DF	1.5-2.0 lb	7-10 days	Maximum of 17.1 pounds per season; 5 day PHI
Manex 80W	1.5-2.0 lb	7-10 days	Maximum of 16.0 pounds per season; 5 day PHI
Manex	2.4-3.2 pt	7-10 days	Maximum of 25 pints per season; 5 day PHI
ManKocide	2.0-2.5 lb	7-10 days	Maximum of 128 pounds per season; 5 day PHI
Penncozeb 80W	1.5-3.0 lb	7-10 days	Maximum of 24.0 pounds per season; 5 day PHI
Penncozeb 75DF	1.5-3.0 lb	7-10 days	Maximum of 25.6 pounds per season; 5 day PHI
<b>Myclobutanil</b>			
Nova 40W, Rally 40W	2.5-5 oz	7-10 days	Maximum of 1.5 lb/A per season; 0 PHI; 30 day plant back restriction
<b>Strobilurins and Strobilurin Mixtures</b>			
Cabrio	12-16 oz	7-14 days	Maximum of 4 applications or 64 oz per season; Alternate with different modes of action; 0 day PHI
Flint	4 oz	7-14 days	Suppression only; Maximum of 4 applications or 16 ounces per season; 0 day PHI; rotate with fungicides with different modes of action
Quadris	11.0-15.4 fl oz	5-14 days	Maximum of 4 applications or 2.88 quarts per season; Alternate with different modes of action; 1 day PHI
Tanos	8 oz	5-7 days	Rotate with fungicides with a different mode of action, such as chlorothalonil or mancozeb; Maximum of 48 ounces per season; 3 day PHI
<b>Thiophanate Methyl</b>			
Topsin M 70WP	0.5 lb	7-14 days	Maximum of 3 lb per season;

			Alternate fungicide sprays or tank-mix with fungicides with a different mode of action; 1 day PHI
Topsin 4.5 FL	10 fl oz	7 days	Maximum of 60 fl oz per season; Alternate fungicide sprays or tank-mix with fungicides with a different mode of action; 1 day PHI
Topsin WSB	0.5 lb	7-14 days	Maximum of 3 lb per season; Alternate fungicide sprays or tank-mix with fungicides with a different mode of action; 1 day PHI
<b>Triazole</b>			
Nova	2.5-5.0 oz	7-10 days	Maximum of 1.5 pounds; 0 day PHI
Procure	4-8 oz	7-14 days	Maximum of 40 ounces per season; Alternate with fungicides with different modes of action; 0 day PHI

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