

# POWDERY MILDEW OF ORNAMENTALS

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Powdery mildew occurs on many herbaceous and woody ornamentals in Tennessee. Mildew diseases may appear in greenhouses, nurseries or landscape settings. Woody ornamentals including crepe myrtle (*Lagerstroemia indica*) (Figure A), flowering dogwood (*Cornus florida*) (Figure B), Japanese maple (*Acer palmatum*) (Figure C), hydrangea (*Hydrangea spp*) (Figure D), rose (*Rosa spp*), (Figure E), witch hazel (*Hamamelis spp*) (Figure F), peony (*Paeonia spp*) (Figure G), garden phlox (*Phlox paniculate*) (Figure H), Chinese photinia (*Photinia serrulata*), common lilac (*Syringa X vulgaris*), Persian lilac (*Syringa X persica*), magnolia (*Magnolia spp*), ninebark (*Physocarpus spp*), azalea (*Rhododendron spp*), euonymus (*Euonymus spp*), and many crab apple cultivars are highly susceptible and may be seriously damaged by powdery mildew infections. Herbaceous ornamentals frequently infected with powdery mildew include lobed tickseed or mouse ear coreopsis (*Coreopsis auriculata*) (Figure I), beebalms (*Monarda spp*) (Figure J), African violet (*Saintpaulia ionantha*), begonia (*Begonia spp*), aster (*Aster spp*), dahlia (*Dahlia spp*), spirea (*Spiraea spp*), Petunia (*Petunia spp.*), chrysanthemum, and kalanchoe (*Kalanchoe blossfeldiana*), zinnia (*Zinnia elegans*) and snapdragon (*Antirrhinum majus*).

## Signs and Symptoms

The fungus appears as a white or gray powdery growth (mycelium) on upper surface of the leaves and on stems or flowers of diseased plants. The disease powdery mildew is caused by several genera of fungi including *Erysiphe spp.*, *Golovinomyces spp.*, *Podosphaera spp.*, *Microsphaera spp.*, *Oidium spp.*, *Uncinula spp.*, and *Sphaerotheca spp.* Each fungal genera contains several species. Most powdery mildew species infect only one family or genus of the plants. For example: *Podosphaera spp* only infect rose plants. Powdery mildews are obligatory parasites, meaning they require a living plant host to complete their lifecycle.

Infected young shoots and leaves may be twisted and distorted by the fungus. Damage to flower buds often causes misshapen flowers of low quality. Powdery mildew may prevent flowering on highly susceptible plants. The symptoms and severity of the disease vary depending on the host plant species. Powdery mildew pathogens are biotrophic, meaning they require living plant tissue to survive; as a result, they generally do not kill their host.



Figure A. Powdery mildew on flower buds of Crape Myrtle



Figure B. Powdery mildew on flowering dogwood



Figure C. Powdery mildew on Japanese Maple



Figure D. Powdery mildew on Hydrangea leaves



Figure E. Powdery mildew on Rose leaves



Figure F. Powdery mildew on Vernal witch hazel



Figure G. Powdery mildew on Peony leaves



Figure H. Powdery mildew on Mouse-ear Coreopsis





Figure I. Powdery mildew on Phlox



Figure J. Powdery mildew on beebalm

## Factors Favoring Mildew

Powdery mildew produces airborne spores that infect plants when temperatures are moderate (65-90° F). Temperatures above 90° F often inhibit growth of the fungus. Mildew spores do not need abundant free water to germinate and infect plants. However, fungal growth is favored by cool night-time temperatures, and high relative humidity that cause condensation on plant leaves. High nitrogen fertility that produces abundant succulent plant growth usually favors disease development. Light may also affect mildew growth indirectly. Plants grown in heavy shade are generally cooler than plants grown in full sun, and powdery mildew is favored by cooler temperature and higher humidity.

## Disease Management

### Cultural management:

- Use disease-resistant plants. (See Table 1.)
- Implement continuous monitoring and scouting for powdery mildew diseases.
- Practice sanitation by removing infected plants and plant parts properly to prevent spores from spreading.
- Avoid crowding plants and ensure adequate spacing to promote air movement.
- Prevent leaf wetness. In greenhouses, heat air to increase the amount of moisture in the air and then vent the house to exhaust moist air. Horizontal air flow fans can be used to circulate air directly over leaves to reduce leaf wetness.
- Avoid overhead irrigation. If it is the only available option, schedule irrigation during morning hours to prevent prolonged leaf wetness.
- Avoid excessive nitrogen fertilization, especially if young foliage has become infected with mildew.

Table 1. Powdery mildew resistant ornamentals

Crape Myrtle	Roses Hybrid Teas	Floribundas-Grandiflora	Phlox
Regal Red	Tiffany	Queen Elizabeth	Blue Paradise
Muskogee	Futura	European	Miss Mary Phlox
Tuscarora	Peace	Rose Parade	Garden Phlox Natascha
Potomac	Tropicana	Saratoga	Morris Berd
Powhatan	Chicago Peace	Prominant	Robert Poore
Natchez	Double Delight Seashell	Sarabande	
Fantasy	Zephirine Drouhin		
Apalachee			
Biloxi			
Tuscarora			
Seminole			

## Chemical Control Methods

Cultural management practices alone may not effectively prevent powdery mildew. Therefore, fungicides need to be applied as soon as mildew is detected. It's important to ensure that both surfaces of all leaves are thoroughly covered with spray. Depending on the specific fungicide's label instructions, disease pressure, and weather conditions, additional applications may be required at one-to three-week intervals. Table 2 contains a list of several fungicides available for powdery mildew control. Not all fungicides can be used on every ornamental plant, so read the label to determine if there are limitations.

Product	Active ingredient(s)	FRAC Code*	Rate/100 gal
Banner MAXX II EC	Propiconazole	3	8 fl oz
Concert II 4.3 SE	Propiconazole + chlorothalonil	3	8 fl oz
Daconil Ultrex	Chlorothalonil	M05	1.4 lb
Mural 45 WC	Azoxystrobin + benzovindiflupyr	11 + 7	5-7 oz
Strike Plus 50 WDG	Trifloxystrobin + triadimefon	11 + 3	1.2 - 2.4 oz
Heritage	Azoxystrobin	11	4 oz
Affirm WDG	Polyoxin D zinc salts	19	0.25 - 0.5 lb/acre
Eagle 20EW	myclobutanil	3	1.2 fl oz
Compass	trifloxystrobin	11	1.6 - 4 oz
Cleary's 3336	thiophanate methyl	1	24 oz
Junction WSP	Mancozeb + copper hydroxide	M3 + M1	2.5 lb
Torque	tebuconazole	3	4-10 fl oz/100
Palladium WDG	Cyprodinil + fludioxonil	9+12	4-6 fl oz
Pageant Intrinsic 38WG	Boscalid + Pyraclostrobin	7+11	6-12 fl oz
MilStop	Potassium bicarbonate	NC	See label
Kaligreen	Potassium bicarbonate	NC	1-3 lbs
Triact 70	Neem oil	NC	2%

**Table 2.** Fungicide labeled for powdery mildew management

\*FRAC Code, NC = Not Classified, employing a rotation strategy with fungicides having different FRAC Codes could reduce the development of fungicides resistant strains since fungicides with the same FRAC Code have the same mode of action.

## Precautionary statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

## Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

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