

● **Apply fungicides preventively**

Use fungicides specific for powdery mildew. Although the names are similar, powdery mildew is very different from downy mildew. Fungicides registered to control downy mildew will not control powdery mildew.

- **Prior to disease:** Apply fungicides every 14 days.
- **Active infection:** Apply fungicides every 7 days.



Rose fungicide program (alternate the following):

Heritage®: 3–4 oz
 Eagle® 20EW: 6–12 fl oz/Eagle 40WP: 3–6 oz
 Heritage: 3–4 oz
 Terraguard® 50W: 4 oz
 Strike® 50WDG: 1–2 oz + Latron®

Outside use only: Banner MAXX®: 5–8 fl oz



Gerbera fungicide program (alternate the following):

Heritage: 3–4 oz
 Eagle 20EW: 6–12 fl oz/Eagle 40WP: 3–6 oz
 Heritage: 3–4 oz
 Terraguard 50W: 8 oz
 Strike 50WDG: 1–2 oz + Latron

Outside use only: Banner MAXX: 5–8 fl oz



Poinsettia fungicide program (alternate the following):

Heritage: 4 oz
 Eagle 20EW: 6–12 fl oz/Eagle 40WP: 3–6 oz
 Heritage: 4 oz
 Terraguard 50W: 4 oz



Verbena fungicide program (alternate the following):

Heritage: 3–4 oz
 Eagle 20EW: 6–12 fl oz/Eagle 40WP: 3–6 oz
 Heritage: 3–4 oz
 Terraguard 50W: 4–8 oz
 Strike 50WDG: 1–2 oz

Outside use only: Banner MAXX: 5–8 fl oz



General fungicide program (alternate the following):

Heritage: 3–4 oz
 Eagle 20EW: 6–12 fl oz/Eagle 40WP: 3–6 oz
 Heritage: 3–4 oz
 Terraguard 50W: 4–8 oz

Outside use only: Banner MAXX: 5–8 fl oz

Rates provided are amount of product per 100 gal. Read label thoroughly before using any fungicide.



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TECHNICAL BULLETIN

Powdery Mildew



The visual appeal of a plant is in direct correlation to its marketability. So once the white powdery spots of powdery mildew are established on a plant, it can no longer be sold. Not only is the plant's appearance compromised, the spores of powdery mildew become airborne and can infect other healthy plants. Factors such as greenhouse temperature to hygiene can affect the development of this fungus. With good scouting and preventive fungicide use, you can avoid the unsightly effects of powdery mildew on your plants.

Identifying and treating powdery mildew

● Disease symptoms and crop damage

Powdery mildew fungi form white, talcum-like spots (approximately ½ inch in diameter) called “colonies” on leaves, stems, and flowers. Over time, these spots or “colonies” increase in size, covering the plant’s surface. The white “powder” results from clumps of powdery mildew spores. Single spores are microscopic and produced in chains on fungal stalks. When they are mature or “ripe” they are released into the air and carried on currents to nearby healthy plants where they can cause new infections. Powdery mildew may develop first on the undersides of leaves, escaping detection until favorable temperatures and relative humidity prompt an epidemic. If the disease is not controlled, many colonies form and grow together, causing leaves to turn yellow, brown, and then drop. As heavily diseased leaves die, plant vigor and growth is reduced. Flowers and buds may also become infected causing distortion of flowers and bud failure.

Checklist

- White powdery coating (fungal colonies) is found on leaves, stems, and flowers.
- Both sides of the leaves may develop white colonies.
- Diseased leaves become yellow, then turn brown and die.
- Flowers are distorted or do not develop.
- Roots are healthy and not affected by mildew.
- Severely diseased plants become stunted and do not push new growth.

● Powdery mildew fungi and the crops they infect

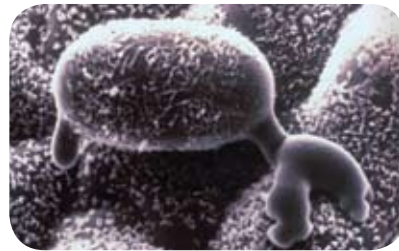
Powdery mildew affects bedding plants, potted plants, and perennials. Several different fungi cause powdery mildew. Powdery mildews may look the same, but they are quite different microscopically with each powdery mildew fungus preferring specific plants. For example, the powdery mildew that infects zinnias will not spread to nearby begonias. Some of the powdery mildew fungi can infect more than one plant type. On roses, susceptibility to powdery mildew varies widely.

Susceptible Crops

<i>Erysiphe australiana</i> (formerly <i>E. lagerstromiae</i>)	Crape Myrtle
<i>Erysiphe cichoracearum</i>	Monarda
<i>Erysiphe polygoni</i>	Hydrangea
<i>Microsphaera penicillata</i>	Lilac
<i>Oidium</i> sp.	Snapdragon
<i>Oidium</i> sp.	Poinsettia
<i>Oidium begoniae</i>	Begonia (fibrous and tuberous)
<i>Oidium dianthi</i>	Carnation
<i>Oidium longpipes/Erysiphe</i> sp.	Petunia
<i>Sphaerotheca pannosa</i> var. <i>rosae</i>	Rose (cut and miniature)
<i>Sphaerotheca macularis</i>	Pansy



Powdery Mildew



Microscopic View



Powdery Mildew on Verbena



Powdery Mildew on Gerbera



Powdery Mildew on Zinnia

A commonly occurring powdery mildew fungus, *Erysiphe cichoracearum*, infects many plants including:

Ageratum	Delphinium	Rudbeckia
Aster	Gaillardia	Salvia
Calendula	Gerbera daisy	Scabiosa
Coreopsis	Gloxinia	Verbena
Dahlia	Phlox Paniculata	Zinnia

Some of the above crops infected by the *Erysiphe cichoracearum* powdery mildew fungus are also susceptible to one or two additional powdery mildew fungi. A microscope must be used to determine the particular powdery mildew fungus involved. This makes it difficult to know whether the powdery mildew occurring on one plant type can infect other plant types.

● Environment favoring disease

Powdery mildews prefer temperatures between 62°–72° F and relative humidity higher than 70%. Many powdery mildew fungi can infect plants even when the relative humidity is low, but epidemics are catalyzed when relative humidity is high. Powdery mildews usually cannot grow at temperatures higher than 86° F. When the environment is warm and dry, the powdery mildew spores dry out and cannot infect plants. When the relative humidity is high during warm temperatures, the spores do not dry out and disease can develop. Moisture on plants from dew or irrigation does not favor powdery mildew and can even limit the disease development.

● Cultural tips

A dry, clean growing environment coupled with preventive fungicide treatments is needed to protect crops that are especially susceptible.

Look for the disease. Scout fully expanded leaves weekly, especially on the lower and middle portion of the plants, paying special attention to the undersides of the leaves. Scout one out of 30 plants in areas where powdery mildew has not been detected. If powdery mildew is detected within a growing area, scout one out of 10 plants weekly until plants are free of disease for at least three weeks. After that time, resume scouting one out of 30 plants weekly.

Check incoming plants for disease. Shipments of plants prone to powdery mildew should be inspected for disease prior to placing them in the growing area.

Remove infected plants/plant parts. Masses of spores from diseased plants travel on air currents to nearby healthy plants. Plants with mild infections should have infected leaves removed. Any plant that is severely diseased should be discarded. To prevent spore spread, place severely diseased plants directly into containers/bags and seal before removing them from the greenhouse.

Keep the growing environment dry. Reduce relative humidity by venting and heating as needed. High humidity occurs at the leaf surface when cold nights change to warm days or when plants are grown in crowded or shady locations without good air movement.



Powdery Mildew on Verbena



Verbena Conidia