

# POWDERY MILDEW

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Figure 1. Powdery mildew of rose.



Figure 2. Powdery mildew of cantaloupe.

## Pathogen

Species of fungi in many different genera including *Erysiphe*, *Sphaerotheca*, *Uncinula*, *Microsphaera*, *Phyllactinia*, *Podosphaera*, *Leveillula*, all known as powdery mildews

## Host

vegetables; landscape plants; fruit trees; grapes; desert annuals, trees and shrubs

## Symptoms/signs

Most powdery mildews are recognized by the white to gray, powdery spots or large blotches on the surface of leaves, stems and fruits of host plants. The white powdery growth consists of the fungal mycelium and asexual reproductive spores. One of the most common powdery mildews in Arizona landscapes is *Podosphaera pannosa*, the powdery mildew of rose (Fig 1). In vegetable gardens, the powdery mildew of cucurbits, *Podosphaera fuliginea*, is problematic all summer (Fig 2).

## Environmental conditions

Unlike many pathogens, powdery mildew fungi grow and infect their hosts in the absence of free water. Disease is favored by moderate or high humidity and low light intensity, conditions which are often prevalent on lower plant parts or in dense foliage. Powdery mildew is found

throughout the low desert areas most of the year and is one of the few foliar diseases that is prevalent in low desert areas. At higher elevations, powdery mildew fungi appear when their host plants begin to grow new foliage in the spring and may continue to grow and infect plants until late fall.

## At a Glance

- Powdery mildew appears as white, powdery spots on the leaf surface of many different kinds of plants.
- Powdery mildews are specific to their hosts and one type will infect only certain plants, usually those in the same or closely related plant families.
- Disease is favored by warm temperatures, moderate to high humidity, absence of overhead watering, low light intensity and poor air flow.
- Resistance is available in some plant species; sulfur compounds give good control but should be used carefully to avoid foliar burn; potassium bicarbonate is an effective contact treatment.

## Disease

The different genera or groups of powdery mildew fungi are very specialized and infect only certain groups of plants. For example, the powdery mildew on watermelon (*Podosphaera fuliginea*) will not infect roses, but infects cantaloupe, squashes and other cucurbits. Likewise, the powdery mildew on grape (*Uncinula necator*) only infects grapes. The spores produced on the leaf surface are easily carried in the wind to new hosts. Unlike most fungi, spores germinate on the surface of plant parts without the presence of free water. In all powdery mildews except the *Leveillula* group, the fungus develops into a mass of tiny tubular filaments called mycelium that grows over the surface. In the *Leveillula* group, the mycelium may be inside the plant tissue as well as on the surface in older infections. Infected leaves may curl, turn brown and die when heavily infected. In fruit trees, grape, and berries, new shoots may be infected and killed.

Powdery mildew fungi survive in low deserts as short-lived windborne spores and as mycelium in the host plant tissue. The mycelium cannot survive unless it is in living host tissue. In colder areas where freezing temperatures are common throughout the winter months, powdery mildew fungi survive as mycelium in the host tissue and by forming a sexual stage with spores that are resistant to drying and cold temperatures. The sexual spores germinate in the spring to start the disease cycle over again.

## Prevention/control

### Tolerant varieties

When planting trees and shrubs, look for varieties of plants that are suited to the area and avoid those that are most susceptible to powdery mildew. In some plant groups such as cucurbits and for some ornamentals such as crape myrtle, varieties tolerant to powdery mildew are available. Rose varieties vary greatly in their susceptibility. Check seed packets and container tags for information.

### Cultural Practices

With good general cultural practices and using plants in the landscape that are not highly susceptible, powdery mildew is not a problem in most cases. The following practices reduce incidence in all but the most susceptible plants.

plant in full sun	plant susceptible plants in sunny locations — examples: zinnias, euonymous, roses, grapes, penstemon
use overhead irrigation	consistent application of free water will inhibit spore germination or kill spores
create good air flow in the canopy	careful pruning in grapes, fruit trees and susceptible shrubs will open the canopy, increasing light and decreasing humidity

## Chemical

Timely applications of fungicides can prevent or control powdery mildew. Chemicals may be necessary for very susceptible plants such as grapes and cucurbits. Sulfur is very effective for preventing infection. However, caution must be taken with sulfur applications since some plant species, especially some varieties of cucurbits, are easily damaged by sulfur if applied at high temperatures. Other contact and systemic fungicides are available, and their application rates will vary according to plant type and severity of disease. The table below lists some commonly used compounds for horticultural applications that are available to homeowners.

Compound	Comments
wettable sulfur and dusting sulfur	Label rate; use with caution above 90°F; do NOT use sulfur with oil sprays
bicarbonate of soda	1 tbsp/gal water; effective contact but can burn leaves; use at first detection and repeat applications often
potassium bicarbonate	Label rate; effective contact, no residual activity
Myclobutanil	Label rate; very effective protectant with good residual
Thiophanate methyl	Label rate; mix or rotate with other compounds; good overall control
horticultural oil	Useful as an eradicant, especially for treating woody stems; do not apply oil sprays on plants treated with sulfur sprays, when the temperature is over 90°F or to water stressed plants.



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