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G90-979 Powdery Mildew of Roses

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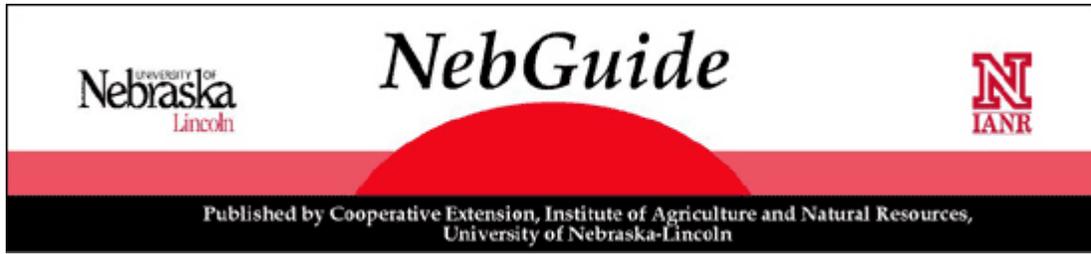


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Powdery Mildew of Roses

Cause, symptoms of and conditions for powdery mildew are covered, as well as ways to control the disease.

John E. Watkins, Extension Plant Pathologist

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The rose is one of the most popular flowering ornamentals in the world. It is thought to have first been cultivated 4,000 to 5,000 years ago in northern Africa. Today it is a favorite ornamental for landscapes, as well as the most important commercial cut flower.

In the United States alone, the wholesale value of roses annually exceeds \$100 million.

Although highly adaptable to many geographical regions, the rose is subject to attack by a number of plant pathogens. Powdery mildew is one of the more serious fungal diseases. It occurs on roses in Nebraska and, at times, can be severe.

To produce a long bloom period, roses require proper care during the growing season. Plant health must be an important component of rose culture. When a disease situation gets out of hand, the popularity of roses with the home gardener can go from high to low almost overnight.

This NebGuide describes the nature and control of powdery mildew on roses.

Cause of Powdery Mildew

There are several genera of fungi that cause powdery mildew; the one infecting roses is *Sphaerotheca pannosa* var. *rosa*.

Powdery mildew fungi belong to the group of plant pathogens called obligate parasites. Plant pathogens within this group can only grow and reproduce on or in a living host plant. *S. pannosa* can infect any green tissue; thus, powdery mildew may be found on leaves, green stems, and flower parts.

This fungus lives largely on the outer surface of the host plant. It has a high demand for the nutrients necessary for growth and spore production. It obtains these from host plant cells by means of small, root-like organs, called haustoria, that feed within the epidermal layer of the host plant.

Powdery mildew is one of the most widespread and destructive diseases of garden and greenhouse roses. The first historical account of powdery mildew on roses was by Theophrastis about 300 B.C., and the disease ranks among the oldest recorded plant diseases. It wasn't until 1819, however, that the causal fungus was identified.

Although powdery mildew rarely kills a plant, infection reduces host vigor and lowers aesthetic value. Weakened plants may not survive the harsh Nebraska winters.

This can be prevented if the gardener understands the nature of the disease, learns to recognize early symptoms, and conscientiously applies preventative control measures.

Symptoms

Powdery mildew is named for the grayish-white, powdery mat consisting of fungus mycelium and masses of spores present on the surface of plant tissues. The mildew mat may vary from white to light gray to light tan, but is distinct and not easily confused with other rose diseases.

Reaction of roses to powdery mildew varies considerably. Age of host tissue at the time of infection, susceptibility of the variety, rate of plant growth, race of the mildew fungus, and environmental and cultural conditions determine the extent of symptoms and injury.

Newly unfolded leaves are the most susceptible to infection. Mature leaves are resistant to mildew and usually show no symptom development or, at most, only small local lesions.

Leaves of garden roses often are attacked first on the lower surface and then later on the upper surface. First symptoms are small, raised, blister-like distortions on the leaf that may or may not be accompanied by a slight purpling and curling.

As symptoms continue to develop, much of the leaf surface becomes covered by the grayish-white mildew (*Figure 1*), and the leaves are twisted or distorted. The coating of the leaf by the mildew reduces the leaf surface area available for photosynthesis.



Figure 1. Severe powdery mildew infection

When young canes become infected, they are dwarfed and distorted. Severe infections even may kill the tips of tender young canes.

Unopened flower buds sometimes become partially covered with mildew before the leaves show extensive symptoms. The petals are usually not affected, but the sepals can be covered with mildew (*Figure 2*). Infection of flower buds causes poor quality flower formation.

Conditions Favoring Mildew

Environment plays a major role in powdery mildew development. The disease occurs during cloudy, humid conditions when days are warm and nights are cool; in Nebraska it often is not seen until

midsummer.



Figure 2. Powdery mildew infection of flower parts

Day temperatures in the 80s and high night humidity induce mildew formation. Unlike most foliar blights or leaf spot diseases, powdery mildew does not require free moisture on the foliage to infect the plant; however, high humidity is important for infection.

Powdery mildew is common in crowded plantings, in damp areas, or in shaded sites where air movement is restricted.

The powdery mildew fungus survives the winter months as mycelia in rudimentary leaves of buds or in the inner bud scales. The initial infection of roses comes from spores, called conidia, produced on this mycelium.

Secondary or repeating inoculum are conidia produced on mildewed plant tissues during the growing season. Conidia are formed in chains on infected host tissues and are wind-blown or rain-splashed from leaf to leaf and plant to plant.

Mildew can spread rapidly since the disease cycle can be completed in as little as 72 hours. It commonly takes seven to 10 days from the time of infection to the development of symptoms and secondary spore production.

Prescription for Healthy Roses

Gardeners and rosarians should use an integrated approach to control powdery mildew. Diligent monitoring for powdery mildew development is required because the pathogen has developed new races with the ability to attack certain mildew-resistant rose varieties.

Although resistance should continue to be the primary method of controlling powdery mildew, growers should be aware that a variety may be resistant to powdery mildew in one geographical area but not in another. Fortunately, powdery mildew is relatively easy to control by following a few simple practices:

- Select powdery mildew resistant roses.
- Plant roses in full sunlight.
- Do not crowd plants.
- Adequately fertilize roses but avoid stimulating succulent growth.
- Apply a fungicide at first evidence of mildew and repeat applications as necessary.
- Prune infected canes and rake and discard mildewed leaves and flowers during and after the growing season.
- Use a drip irrigation watering system.

Several fungicides (*Table I*) can be used to control powdery mildew. It is a good idea to use a different fungicide each season or alternate between different fungicides during the growing season. This is done to prevent the development of fungicide resistance in the natural powdery mildew population.

Table I. Fungicides¹ for control of powdery mildew of roses

- Benomyl, Benlate, Tersan 1991
- Folpet, Phaltan
- Bayleton
- Funginex, Triforine
- Karathane
- Sulfur

¹Not all of these products are available at the garden center.

Sometimes a plant pathogen will become resistant to a certain fungicide if it is repeatedly used over a period of time. Anyone using a fungicide should first carefully read the label and apply it as outlined on that label.

Completely cover the foliage, including the upper- and lower-leaf surfaces, with the spray. Spray in the evenings when there is little wind, and always wear the proper protective clothing.

References to fungicide products in the NebGuide are for the reader's convenience; the University of Nebraska neither endorses products listed nor discriminates against products omitted. Nor does the University of Nebraska guarantee effectiveness of those products listed. Consult the product label before purchase to make certain it is registered for use on roses.

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