Helpline Happenings – August 2024

Powdery Mildew

Judy Colburn

Powdery mildew is the common term for a number of fungal diseases caused by one of several closely related – but different – species of fungi. Most species have a limited number of hosts, affecting only a small number of plant species; yet a few others have a broad array of hosts plants they parasitize. These pathogens are considered 'obligate parasites', meaning they need live plant tissue to grow and produce reproductive spores. The spores, however, can persist on dormant leaves and twigs through the winter and re-infect host plants the following spring.

As the fungus grows on the leaf surface, it sends small 'threads' (haustoria) into the cells of the leaf to harvest nutrients. While generally not fatal to plants, heavy fungal 'loads' are likely to reduce plant vigor and winter hardiness. While generally not fatal, powdery mildew can damage shrubs and herbaceous plants if the infection is severe.

Characteristics

The 'expected' symptom of powdery mildew is the appearance of small, circular, powdery white spots on the top surface of leaves. These spots tend to begin on lower leaves, moving up the plant as the disease progresses, the spots expanding and joining. Generations accumulate rapidly: spores can germinate and produce the next generation of spores in only 48 hours.



Powdery mildew on dogwood
University of Minnesota Extension, Powdery Mildew on Trees and Shrubs

The infection can also appear on twigs, stems and flowers. Flowers may develop abnormally or fail to open.



Powdery mildew damage on rose flower buds.
Clemson University – USDA Cooperative Extension Slide Series, www.forestryimages.org

Note that, in some cases, leaves may begin to distort, wilt, or discolor even before the appearance of the characteristic 'powdery' spots on the plant.

It is also important to note that symptoms of powdery mildew can present quite differently, depending on the host plant species. Some plants (such as kalanchoe) may present with dry, corky, scab-like spots rather than the more characteristic white circular patches of the fungus.

Optimal Conditions for Infection

Conditions for powdery mildew growth are most favorable in the spring and fall. While powdery mildew can occur at any time during the growing season, it is less common during the summer months. The fungus thrives at temperatures of 70-80 degrees and in the presence of significant 'humidity gradients', periods with high relative humidity at night and low relative humidity during the day. Nighttime humidity enhances spore germination while daytime low humidity conditions make spores more transmissible by wind currents. Spores can also be spread by splashing water.

Unlike most fungi, powdery mildew germination is generally inhibited by the presence of free moisture on leaf surfaces. In greenhouse settings, leaves of plants may be syringed with water on days when relative humidity is low, inhibiting the transmission of spores. This is not a risk-free strategy, however, as this treatment may facilitate the growth of other pathogens that do rely on free moisture to germinate (such as downy mildew, which is not a fungus, but rather a water mold).

Prevention…and Treatment

The priority is to focus on prevention through attention to cultural conditions in the garden. Space plants to allow for air circulation, and avoid overhead irrigation, if possible, which increases the level of relative humidity within the plant canopy. Fertilize conservatively, especially with regards to nitrogen (particularly late in the season), which stimulates foliar growth; tender new growth being more susceptible to infection.

Know your plants' risk with regards to powdery mildew; some species are more resistant to infection. Among those plants more susceptible to infection there are cultivars that display greater resistance to the fungus -- seek out resistant species and cultivars.

Immediately remove and discard plant parts showing signs of infection – prompt action here will help with control. In the fall, prune out infected plant stems and discard fallen leaves -- material on which the fungus can overwinter. For shrubs with a suckering growth habit, prune away suckers as they are especially susceptible to infection.

If chemical controls are deemed necessary, fungicides must be applied early and often. Remember that fungicides are not curative, they are merely preventative, protecting against germination on treated plant tissue. Always follow product label instructions closely. The label may reflect a range of time intervals for periodic applications; use the shorter of the recommended intervals during times of cool, damp weather. There are several fungicides that are effective against the fungi responsible for powdery mildew: consider alternating fungicides to minimize the risk of resistance developing.

Be circumspect regarding treating later in the season. When the disease occurs late in the season, it causes little damage and treatment is generally not indicated. Further, the presence of powdery mildew on deciduous trees at any time is not cause for concern or treatment.

Current research is focusing on ultraviolet light treatment for plants. The DNA of fungal cells, like those of animals, are affected/damaged by exposure to UV light. Researchers are finding that low levels of UV light exposure, particularly at night, is producing good control in experimental greenhouse settings.

REFERENCES

Powdery Mildew, PennState Extension, Gary W. Moorman, Ph.D., November 27, 2023.

Powdery Mildew, Clemson Cooperative Extension – Home and Garden Information Center, Chuck Burgess, revised by Joey Williamson Ph.D., February 26, 2021.

Diseases of Landscape Plants: Downy Mildew, Purdue University Extension - Botany & Plant Pathology, Jann Beckerman, March 2022.