NebGuide

University of Nebraska–Lincoln Extension, Institute of Agriculture and Natural Resources

Know how. Know now.

G2021

Powdery Mildew on Landscape Plants

Amy D. Timmerman, Extension Educator, Plant Pathology
Stephen N. Wegulo, Extension Plant Pathologist

This NebGuide discusses the life cycle, identification, and management of powdery mildew on landscape ornamentals and lists labeled fungicides for control.

Powdery mildew is a prevalent disease on several landscape ornamental species every summer. While different fungi cause powdery mildew on different plant species, all powdery mildew diseases are similar in appearance and life cycle.

Symptoms

Powdery mildew often appears as a superficial white to gray powdery growth on the surface of leaves (*Figure 1*), stems (*Figure 2*), flowers, or fruit. Small patches of powdery growth appear initially and can continue to grow and eventually cover a large area or the entire surface of the affected plant part. The youngest tissue is the most susceptible to infection and is usually the first part of the plant infected. Severe infections often cause yellowing, drying, and browning of leaves; disfigurement of shoots and leaves; and premature defoliation and dormancy of plants in the fall. Powdery mildew is rarely fatal to plants.

Hosts

Powdery mildew can infect most landscape plants, but is most often observed on susceptible plants. These include:

Herbaceous Plants — Chrysanthemums, columbine, coral bells, cosmos, dahlias, delphiniums, hydrangea, pansy, phlox, snapdragons and zinnias

Woody Plants — Azaleas, catalpa, cherry, some crabapples, dogwood, euonymus, honeysuckle, lilac, privet, rose, rhododendron, serviceberry, silver maple, sweet pea, sycamore, some viburnums, walnut, and willow

Infection of one plant species does not necessarily mean that other plant species in the landscape are threatened; usually powdery mildew fungi are specific to the host plant species.

Disease Cycle

Powdery mildews are unique fungi because they do not require free water on the plant surface for spores to germinate and infect, as some other pathogens do. When free water is present on plant surfaces for an extended time, spore germination is inhibited. With powdery mildew, disease development

Figure 1. Powdery mildew infecting the leaf of a gerbera daisy.

Figure 2. Powdery mildew infecting the stems of delphinium.

Figure 3. Viburnum leaf with cleistothecia (small black fruiting structures) on the leaf surface.

is favored by high humidity and moderate to warm temperatures (60°F to 80°F). Infected plants are typically observed in shady and overcrowded areas where conditions promote higher humidity.

Most powdery mildew fungi grow as thin layers of mycelium (the body of the fungus) on the leaf surface of infected plant parts. Asexual spores known as conidia are produced in chains on the infected plant part and can be seen with a hand lens. The mycelium and conidia give infected areas a powdery appearance. The wind carries these spores to healthy areas on the plant or to other plants of the same species in the landscape.

As the season ends, the fungus produces spherical, sexual fruiting bodies called cleistothecia (*Figures 3* and *4*) that develop on infected plant parts. The cleistothecia survive in plant debris and serve as the overwintering structure. In early summer, when weather conditions become favorable again, the cleistothecia rupture and release sexual spores known as ascospores. These cause new infections and start the next disease cycle.

Management

There are several approaches to managing powdery mildew, each of which offers some degree of success. The best long-term management, however, involves integrating multiple tactics.

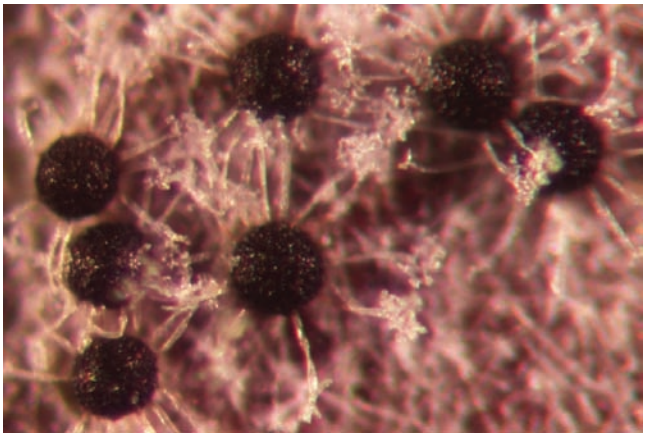

Figure 4. Cleistothecia on the viburnum leaf surface at 12x magnification.

Resistant Cultivars

Incorporating resistant plants into areas of the landscape where powdery mildew development is highly favored is an effective method of management. A variety of euonymus, phlox, rose, rhododendron, and zinnia have been identified with resistance. Check with horticulturists in the green industry and Extension offices for resistant varieties available in your area.

Cultural Control

Areas in the landscape that are shaded and have moderate temperatures are favorable for powdery mildew development. Avoid planting or placing highly susceptible plants in these areas. Instead, place or plant them in sunny areas. If plants are in areas favorable for disease development, provide good air circulation and avoid excessive nitrogen fertilization or use a slow-release fertilizer.

Rake and remove leaves in autumn or winter. Either destroy or thoroughly compost the leaves. This will reduce the number of spores that can start the disease cycle the next year. In woody plants that are frequently infected (rose), prune out diseased growing points during the normal pruning period.

Chemical Control

In most cases, a fungicide application is not required for powdery mildew since overall plant health is not affected. If the appearance of white, powdery growth is not a major concern, yearly infections generally can be ignored. Lilacs are a good example of plants that are infected yearly, but don't decline in health. Other plants, however, can sustain significant damage when infected with powdery mildew. Thus, a chemical application is recommended in addition to other management strategies. Chemical applications should be made when the weather is favorable for disease development. When fungicide (*Table I*) applications are made, ensure thorough coverage of all plant parts.

Table I. Fungicides[a] available for management of powdery mildew.

Fungicide Active Ingredient	*Trade Name*	*Commercial (C)/ Homeowner (H) Use*
Bacillus subtilits	Bayer Advanced Natria™ Disease Control Ready to Use (Bayer CropScience)	H
	Companion® Liquid Biological Fungicide (T Growth Products)	C
Chlorothalonil	Echo® Ultimate Turf and Ornamental Fungicide (Sipcam Agro)	C
	Ferti-lome® Broad Spectrum Landscape and Garden Fungicide (Voluntary Purchasing Groups, Inc)	H
	Fung-onil® (Bonide)	H
	GardenTech Daconil Fungicide Concentrate (TechPac LLC)	H
	Hi-Yield® Vegetable, Flower, Fruit, and Ornamental Fungicide (Voluntary Purchasing Groups, Inc)	H
	Ortho® Max™ Garden Disease Control (Ortho Company)	H
	Pegasus™ DF (Phoenix Environmental Care)	C
	Quali-Pro® Chlorothalonil 500 ZN (FarmSaver.com LLC)	C
Copper	Copper Dust Ready to Use (Bonide)	H
	Garden Dust Ready to Use (Bonide)	H
Copper hydroxide	CuPRO 2005 T/N/O (SePRO)	C
Ethylene bisdithiocarbamate	Clevis™ (Prokoz)	C
Kresoxim-methyl	Cygnus® (BASF)	C
Mancozeb	Junction (SePRO)	C
Mineral oil	Civitas (Civitas)	C
Myclobutanil	Eagle® 20EW (Dow AgroSciences)	C
	Hoist™ (Prokoz)	C
	Spectracide Immunox® Multi-Purpose Fungicide Spray (United Industries Corporation)	H
Neem oil	70% Neem Oil (Lawn and Garden Products)	H
	Natural Guard Neem Py (Voluntary Purchasing Group)	H
	Rose Rx 3-in-1 Ready to Use (Bonide)[b]	H
Piperalin	Pipron Liquid Concentrate (SePRO)	C
Potassium bicarbonate	Ecomate Armicarb "O" (Helena Chemical Company)	H
	Kaligreen (Toagosei Co., LTD)	C
Potassium salts	Fosphite® Fungicide (JH Biotech, Inc)	C
Propiconazole	Fathom™ 14.3 MEC (Prokoz)	C
	Gordon's Systemic Fungicide (PBI/Gordon Corporation)	H
	Infuse Systemic Disease Control (Bonide)	H
	Liquid Systemic Fungicide (Voluntary Purchasing Groups, Inc)	H
	Monterey Fungi-Fighter (Monterey)	C
Streptomyces lydicus	Actinovate® SP (Natural Industries, Inc)	H
Sulfur	Bayer Advanced Natria™ Insect, Disease and Mite Control Ready to Use (Bayer CropScience)[b]	H
	Sulfur Plant Fungicide Ready to Use (Bonide)	H
	3-in-1 Garden Spray (Safer Inc)[b]	H
	Hi-Yield® Lime Sulfur Spray (Voluntary Purchasing Groups, Inc)	H
	Lime Sulfur Spray (Bonide)	H
	Ortho® Ecosense™ Brand 3-in-1 Rose and Flower Care (Ortho Company)[b]	H
Tebuconazole	Bayer Advanced 3-in-1 Insect, Disease and Mite Control Concentrate (Bayer CropScience)[b]	H
	Bayer Disease Control for Roses, Flowers and Shrubs (Bayer CropScience)[b]	H
Thiophanate-methyl	3336™ F (Cleary Chemicals LLC)	C
	3336™ WP (Cleary Chemicals LLC)	C
	Allban 50 WSB (Scotts-Sierra Crop Protection Company)	C
	Halt Systemic Rose, Flower, Lawn, Ornamental Fungicide (Voluntary Purchasing Groups, Inc)	H
	Quali-Pro® TM 4.5 (FarmSaver.com LLC)	C

[a]This list is presented for information only and no endorsement is intended for products listed nor criticism meant for products not listed. Consult the product label for specific application rates. Read the label carefully before making any application.
[b]Product also contains an insecticide.

This publication has been peer reviewed.

Disclaimer

Reference to commercial products or trade names is made with the understanding that no discrimination is intended of those not mentioned and no endorsement by University of Nebraska–Lincoln Extension is implied for those mentioned.

UNL Extension publications are available online at *http://extension.unl.edu/publications*.

Index: Plant Diseases
Ornamentals
Issued May 2010