

POWDERY MILDEW ON ORNAMENTAL PLANTS

Fact and Control

Most of us have seen the symptoms, many know what disease it is or have heard of it, several of us know how to control it, but few know that "powdery mildew" is a generic term used to characterize diseases with similar symptoms but that can be caused by several different fungal species. Most of the powdery mildews are host specific, indicating that some type of fungi infects one species of plant hosts (hydrangea powdery mildew will not infect begonias for example). However some powdery mildew causing-fungi having several or wide number of hosts, for example, *Erysiphe cichoracearum* will infect begonias, campanula and dahlia hybrids.

Powdery mildew is a common disease of numerous ornamental perennial plants including azaleas, cherry, flowering crabapples, dogwood, English oaks, euonymus, honeysuckle, horse chestnut, lilac, privet, roses, serviceberry, silver maple, sycamore, tulip tree, viburnum, walnut, willow. Powdery mildews are also common on many herbaceous plants, such as chrysanthemums, dahlias, delphiniums, phlox, begonias, snapdragons, and zinnias to name a few.

The symptoms: Powdery mildew symptoms are usually the same or extremely similar regardless of the plant hosts. The disease is usually easy to identify due to a conspicuous fungal growth on the plant surface. Symptoms are often seen as superficial white to light-gray colored powdery

spots of the fungus over the surface of leaves, stems, buds or flowers of affected plants. Eventually these areas may enlarge until they cover the entire leaf, branch or stem. In many cases the fungus causes chlorosis or necrosis of infected tissues. Young foliage and shoots are especially susceptible to infection of powdery mildew. Other symptoms may include dwarfing, leaf curling, twisting and premature senescence. Severe powdery mildew infection will result in dried and brown leaves as well as disfigured shoots and flowers. Although it usually is not a fatal disease, powdery mildew may hasten plant defoliation and fall dormancy, and the infected plant may become extremely unsightly.

The organisms: Powdery mildew fungi belong to the Family Erysiphaceae and there are several genera considered powdery mildews including *Erysiphe*, *Microsphaera*, *Phyllactinia*, *Podosphaera*, *Sphaerotheca*, *Oidium* and *Uncinula*. Powdery mildews are obligate parasite and thus require a living plant host to complete their life cycle (and they can not be cultured in artificial nutrient media in the laboratory). The white mycelium (the thread-like structure which gives the particular symptoms) seen on the leaf surface, produces a specialized structure named haustoria (an anchor and feeding structure) which is used to absorb water and nutrients from the plant cells. The mycelium also produces short upright structures termed

conidiophores which produce chains of rectangular, ovoid, or round spores (conidia) that can be carried to other plants by air currents. When environmental conditions or nutrition become unfavorable or scarce, the fungi may produce one or a few sacs named asci inside of a black hard structure called a cleistothecium (which can usually seen as black pimples present on infected tissues), these structures are the over wintering and resting stages and they are very resistant to desiccation and harsh environments.

Environmental conditions favoring the disease: Most powdery mildew fungi produce airborne spores and infect plants under warm days and cool nights (typically 80°F daytime temperatures with 40-70% relative humidity and night temperature of 60°F with 95-99% relative humidity). Unlike most fungi that infect plants, powdery mildew fungi do not require free water on the plant surface in order to germinate and infect. In fact, for powdery mildews these two processes are favored by dry conditions on the leaf surface. The powdery mildew fungi, although they are common in the in cool or warm weather, are even more common and serious in warm and dry climates. This happens because their spores can be released, germinate and cause infection when the relative humidity in the air is fairly high but there is no film of water on the surface of the plant surface. Once the infection has begun the mycelium continues to spread on the plant surface regardless of moisture condition.

Control measures: There are several integrated management strategies that contribute to the control of Powdery mildews successfully.

Scouting: One of the most important steps to control powdery mildews (or any disease for that matter) is to detect and identify the problem before it can cause serious injury and losses. Inspect thoroughly and regularly, identify possible problematic areas such as shady and overcrowded spaces. Note weather patterns and evaluate if environmental conditions are conducive for disease development (humid, warm days and cool nights). Take notes on problematic sites or areas within a site or problematic plants species for future reference.

Sanitation: Pruning or removing infected leaves or stems can help to reduce the amount of the fungus present on the plants that can be potentially spread the disease. Sanitation will also help to reduce the over wintering or survival structures of the fungus. Rake and remove infected litter from underneath of the plants.

Cultural Practices and Environmental Modification: Since Powdery mildews are favored by high humidity in the environment and poor air circulation, increasing plant spacing and selectively pruning surrounding vegetation or dense canopies allows air flow and increases light penetration.

Host Resistance: There are specific ornamental plants

Continued on page 31

Mildew, continued from page 30

that have resistance to powdery mildews. Some examples are the powdery mildew-resistant crape myrtles (Acoma, Tuskegee, Zuma, Apalache etc). Check labels or obtain information for particular disease resistant plants.

Biological Control: The use of natural competitors or inhibitors of powdery mildews have been largely overlooked and research in this

area is still in its infancy. However recent research seems to indicate that some leaf surface dwelling organisms may be effective against powdery mildews.

Chemical Control: Chemical control has played a mayor role in reducing powdery mildew infections and disease spread. Systemic fungicides including fenarimol (Rubigan), myclobutanil (Sisthane), propiconazole

(Banner), thiophanate methyl (Cleary 3336; Domain), triadimefon (Bayleton, Strike) and triforine ((Triforine, Funginex) provide good control. Additionally, protectant fungicides such as chlorothalonil (Daconil), piperali (Pipron), trinumizole (Terragard) or wettable sulfur provide good powdery mildew control. Fungicide Resistance to some of these products (systemics) have been identified. Be aware that

if there is no improvement in disease control this may be due to resistance to the fungicide, consider the use of a different product.

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