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Franklin Laemmlen, Botany and Plant Pathology
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Botrytis Diseases: Recognition and Control

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By Franklin Laemmlen,
Botany and Plant Pathology Dept.

Under favorable conditions of high moisture and cool temperatures, *Botrytis* sp. fungi produce massive quantities of tiny spores which are readily airborne. Due to this characteristic and the ability of this fungus to use many plant tissues as a food base, *Botrytis* causes many diseases in the home vegetable and flower garden, and in the greenhouse. Gray mold disease is the common name most often used for *Botrytis*-caused infections. Many plants are affected and all plant parts may become infected.

SYMPTOMS

The fungus normally establishes itself on stressed, aging, dead or inactive tissues (Fig. 1). Once established, the fungus produces enzymes which digest the host tissues, causing a rapidly spreading brown, watery rot.

Infected flower petals may fall on leaves thereby initiating a new infection site. From the leaf, the disease may progress down the petiole into the stem causing complete collapse of all host tissues above that point. Cuttings may also be rotted when the organism invades the cut wound at the base, or any bits of dying tissue such as stipules on the stem.

Under favorable moisture and temperature conditions, a beige-to-gray, fuzzy growth develops on



Figure 1. Dead leaf of geranium with heavy growth of *Botrytis cinerea*. From this tissue the fungus may invade healthy leaves or stems. Photo courtesy: C. Stephens.



Figure 2. The fuzzy growth over much of this lettuce plant is the spores and spore bearing structures of *Botrytis*. One small infection such as this can produce thousands of spores.

diseased tissues. This growth is made up of the spore-producing structures and spores of *Botrytis* and gives rise to the common name "gray mold disease" (Fig. 2).

CAUSAL AGENT AND ENVIRONMENT

Most gray mold disease is caused by *Botrytis cinerea*. This fungus is responsible for flower blights in petunia, rose, peony (Fig. 3), zinnia, geranium and many other flowers. When temperature and moisture conditions are not ideal, *Botrytis cinerea* may cause only a petal spot disease in these same hosts. *Botrytis cinerea* is also one of the main causes of cutting rot in the propagation of herbaceous plant materials (geranium, bleeding heart, impatiens, dahlia, etc.). This fungus also causes fruit rot in strawberries, sunflowers, grapes, and raspberries. It can cause storage decay in cherries, peaches, plums, apricots and other fruits and vegetables such as lettuce (Fig. 2).

The disease known as "Fire" in tulips is caused by *Botrytis tulipae* (Fig. 4). This fungus can cause a complete rotting of the plant and bulb or it may cause only flower spotting when moisture levels

for disease development are not adequate. Leafspot and neck rot in onions are caused by *Botrytis squamosa* and can cause severe crop losses for onion growers if not controlled. Even though the species are not the same, the sign of the disease, the gray mold, is similar for all the above mentioned and other *Botrytis* diseases.

The botrytis fungus is fairly easy to detect. To check diseased tissues for *Botrytis*, place a small portion of the suspect tissues in a plastic bag with a damp (not wet) towel. If *Botrytis* is present, the gray mold will appear on the tissues within 24 hours.

Botrytis can grow at temperatures from just above freezing to above 25°C (77°F). However, maximum growth occurs at 20-22°C (67-72°F).



Figure 3. Bud blight in peony caused by ***Botrytis cinerea***. Note fuzzy growth on the bud, stem and surrounding leaves.



Figure 4. Bulb rot of tulip caused by ***Botrytis tulipae***. Structures present are sclerotia (resistant survival structures) of the fungus.

The fungus must also have high humidity, 90-100%, or free water on the plant surface in order for spores to germinate and penetrate the host. Hence, warm weather with dew or rain or sprinkler irrigation is ideal for the development of gray mold diseases.

CONTROL

Cultural practices which can help reduce *Botrytis* diseases include:

- 1) Watering in the morning only, so plant surfaces dry quickly and are not wet during cool periods of the night.

- 2) Space plants, pots and flats to allow good air circulation around and through them. This promotes rapid drying of plant tissues.

- 3) In greenhouses, vent and heat in the evening to reduce humidity and prevent night time dew formation.

- 4) Keep plants and greenhouses clean. Remove and destroy dead flowers and leaves and overripe fruit. Prune out dead and dying stems.

- 5) Provide adequate fertilization and water to keep plants vigorous but avoid excessive nitrogen levels.

- 6) Avoid injuring plant tissues as much as possible.

Several fungicides provide good control of *Botrytis* diseases. When using chemical controls, it is important to obtain thorough coverage of the plants being treated. In plants that have hairy leaves (such as geranium) or a waxy cuticle (such as rose) it may be necessary to add a wetting agent to the spray mixture in order to thoroughly wet the plants. Systemic fungicides which control gray mold include benomyl (Benlate) and methyl thiophanate (Topsin-M). Contact and protectant fungicides include chlorothalonil (Bravo, Daconil 2787), dicloran (Botran), mancozeb (Manzate 200, Fore, Dithane M-45), maneb, captan, some copper materials, thiram and zineb.

All fungicides provide the best control if applied before *Botrytis* becomes a significant problem. It is, therefore, necessary for the grower or gardener to keep close watch over his plants and apply controls at the first sign of disease. All of the chemicals mentioned may be used on ornamentals; however, only a few are registered for use on fruits and vegetables. The user should read the package label carefully for dosage instructions and to make sure he is not misusing the fungicide under consideration.

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