



## GRAY MOLD OF STRAWBERRIES

Gray mold is one of the most common and serious diseases wherever strawberries are grown. It is caused by the fungus, *Botrytis cinerea*. In wet seasons on unsprayed plants, 80-90% losses of flowers and fruit can occur. The disease thrives during prolonged rainy and cloudy periods just before or during harvest, and on dense, lush, foliar growth. Unless suitable controls are used, frequent irrigation for frost control can lead to serious losses; greatest losses occur from blossom infections. Fruit infections often start on injuries to the flower stalks (pedicels) and caps (sepals), on green fruit damaged by frost, or where dead petals adhere to the developing fruit.

### SYMPTOMS

Young blossoms are very susceptible to infection. One or several blossoms in a cluster may show blasting (browning and dying) that usually extends down the pedicel. Light gray masses of dusty spores soon appear and are easily dislodged and carried by air currents to other blossoms. Such infections are most common in well protected areas of the plant, where the humidity is high and air movement is poor.

Berries resting on soil and touching another decayed berry or a dead leaf in dense foliage are commonly infected. Fruit infections appear as soft, light brown, rapidly enlarging spots (see figure). The berry soon dries out, turns a darker brown, "mummifies," and is covered with a gray, dusty powder ) the spores of the *Botrytis* fungus. Immature berries may develop infection, but they become more susceptible as they ripen. The disease is often not detected until berry picking time, when many soft, brown, rotted fruits are found. Pickers handling infected fruits will spread infection to healthy fruit, causing good berries to become a rotted mass within 48 hours after being picked.



Figure 1. Strawberry with *Botrytis* Fruit Rot. Infected berries turn light brown but remain firm. This fungus produces a velvety gray growth with powdery dry spores.

### DISEASE CYCLE

The gray mold fungus overwinters as many minute, irregular, black, fungal bodies (sclerotia) and as dormant mycelia on many kinds of plant debris, such as dead strawberry leaves, stems, and fruit, and even on annual weeds in the strawberry patch and adjoining fence rows. As spring approaches, these sclerotia

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produce large numbers of microscopic spores (conidia). Wind, splashing water, and human activity spread the conidia throughout the strawberry patch, depositing them on blossoms, stems, young fruit, and leaves. Parts of the strawberry plant may become infected within three hours. Temperatures between 70° to 80°F (21° to 27°C) and free moisture on the foliage from rain, dew, fog, or irrigation are ideal conditions for spore germination and infection. Infections may occur at lower temperatures when plants are wet for longer time periods. The fungus usually attacks through dying, dead, or injured petals, stamens, flower stalks, berry caps, or other plant tissue. Fruit infections commonly originate at the stem end. The *Botrytis* fungus can penetrate the unbroken skin of the strawberry fruit. One affected berry may contaminate many others in the field or even after fruit has been harvested.

## **CONTROL**

Several strawberry cultivars, which include Canoga, Guardian, and Honeoye, appear to be partially resistant to gray mold. Under certain conditions, however, these cultivars may also become infected. Cultivars that produce the most exposed fruit suffer the least damage.

## **Cultural Practices**

1. Select a sunny planting site with good air and soil drainage that is not subject to frost injury.
2. Proper spacing of plants and timing of fertilizer applications are important preventive measures. Avoid wide, matted rows of densely spaced plants. Narrow the row to 8 to 12 inches at renovation. Apply a suggested fertilizer in the summer on the basis of a soil test. Heavy applications of nitrogen fertilizer in the spring produce excessive amounts of dense foliage. Thick foliage shades berries and prevents rapid drying of the fruit after wet periods, thus creating ideal conditions for development of gray mold rot.
3. Mulching strawberry plants and row middles with clean straw or other dry organic matter or with black polyethylene sheeting to keep fruit from direct contact with the soil, reduces disease incidence.
4. Whether plants are mulched or not, cultivate as little as possible from early bloom until after harvest. Control weeds at renovation time by cultural and chemical methods. Limiting wounding of plants slows disease spread.
5. Whenever possible, pick fruit frequently and early in the day as soon as plants are dry. Cull out all diseased berries but do not leave them in the field.
6. Always handle berries with care to avoid bruising. The fungus enters through wounds.
7. Refrigerate picked fruit promptly to control gray mold growth.
8. Follow a fungicide spray schedule as needed to control gray mold. Protect blossoms, fruit, pedicels, and leaves from infection by uniformly spraying all above-ground plant parts. Preventing blossom infection may double the yield of top-quality fruit. Applications should be repeated at 7- to 10-day intervals through the fruit harvesting period. Insecticides are usually added to fungicide sprays to control strawberry weevils, "cat-facing" plant bugs, spittlebugs, leafrollers, thrips, aphids, leafhoppers, other insects, and mites. Do not use these insecticides during bloom, when pollinating insects might be killed.

Spray at weekly intervals if the weather is rainy, foggy, or overcast, or if dews are heavy; if sunny and dry, stretch the spray interval to 10 days. If irrigations are used for frost control, more frequent fungicide applications may be needed. Where feasible, spray a day or two before rain is predicted.

Home fruit growers (lobbyists) should follow the spray program outlined in “Midwest Small Fruit Pest Management Handbook” (website: <http://www.hort.purdue.edu/hort/ext/sfg>). Commercial growers should obtain a copy of the “Illinois Commercial Small Fruit and Grape Spray Guide” (website: <http://www.ag.ohio-state.edu/~ohioline/b861/index.html>). These two publications are updated frequently to provide current recommendations on new products and labeled rates.<sup>1</sup>

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<sup>1</sup> For more details concerning suggested cultural management practices, including fertilization, commercial growers should check the most recent Proceedings of the Illinois Small Fruit and Strawberry Schools. Copies of the annual proceedings can be obtained by writing to Jeff Kindhart, Dixon Springs Agricultural Center, Simpson, Illinois 61985.