Strawberry Disease Management

David T. Handley, Vegetable and Small Fruits Specialist
University of Maine Cooperative Extension
Highmoor Farm, P.O. Box 179, Monmouth, Maine 04259
(207) 933-2100

Successful management of strawberry diseases requires constant vigilance on the part of growers to assess strawberry plant health and diagnose any disease symptoms as soon as they occur. In general, the important diseases of strawberries in New England are caused fungi, or in the case of angular leaf spot, bacteria. These organisms require moisture to successfully grow and multiply. Planting only in well-drained soils, growing on raised beds, using straw mulch, and maintaining narrow plant rows, will help keep the plants and soil surface dry, greatly reducing the potential for disease development.

Gray Mold: Bloom is *the* critical time to protect the fruit against **gray mold** caused by the fungus *Botrytis cinerea*. This fungus overwinters on old leaves and plant debris. Infections take place almost exclusively through the flowers. This is why gray mold control efforts should be focused on the bloom period. If the bloom period is dry and/or good fungicide coverage is maintained, incidence of gray mold at harvest should be low. Two to three sprays of fungicide during bloom are typically required to provide good protection against this disease. If you tank mix insecticides and fungicides, avoid spraying when bees are active.

There are several excellent fungicide choices for control of gray mold in strawberries. Elevate® (fenhexamid) has good to excellent activity against Botrytis. Captevate® is a pre-mix of captan and fenhexamid and has a broader spectrum of activity than Elevate® alone. Switch® (cyprodinil and fludioxonil) and Pristine® (pyraclostrobin and boscalid) are also excellent products for gray mold control. Topsin M® + Captan is also a good fungicide combination, but remember that Captan is strictly a protectant and can be washed off by rain or irrigation water. Thiram (thiram) is similarly effective but susceptible to wash-off. Cabrio® (pyraclostrobin) and Abound® (azoxystrobin) are NOT suitable for gray mold control, but are effective against anthracnose and other fruit rot and leaf spot diseases. All fungicides mentioned above have a 0-day pre-harvest interval, except Topsin M® (1 day) and Thiram (3 days). Remember to alternate fungicides with different modes of action for resistance management purposes.

Leather rot (*Phytopthora cactorum*): This disease may become an issue when there is lots of standing water in the fields during bloom and fruit ripening. Infected fruit have a dull, lifeless appearance and may have a lilac color. The fruit will have a very bad flavor. Eventually, white, cottony growth may emerge from the infected fruit. Leather rot can also be a problem in fields that have been irrigated frequently for frost protection. This disease is best controlled by growing strawberries in well-drained soil and by applying straw mulch between the rows to prevent the berries from touching the soil and preventing soil from splashing up onto the berries. Foliar sprays of Aliette®, Agri-Phos® or Phostrol® (similar to Aliette) may also provide control. Spray during bloom and fruit development.

Anthracnose: This fruit rot is favored by warm, humid conditions and can spread rapidly during rains or frequent irrigation. In cool seasons, it tends to appear close to harvest or may not show up at all. Anthracnose fruit rot can be identified by black sunken lesions with wet, orange (and sometimes gray) spore masses in them. The anthracnose fungus is able to multiply on the leaves without visible symptoms, which may explain its sometimes widespread and sudden appearance in fields. Fungicides such as Cabrio® and Abound® can provide good control of anthracnose fruit rot.

Red stele root rot: Cold damp soils can create ideal conditions for red stele root rot. Don't assume that plants dying in the field are the result of winter injury unless you have first checked for symptoms of red stele. To diagnose red stele, pull up a few plants that look weak, i.e. have small leaves, scrape the roots of these plants to see if the center of the root, known as the stele, is a rusty red in color, instead of the normal white. The red color would indicate an infection. Red stele is cause by *Phytophthora fragariae*, a soil borne fungus that infects the roots when soils are saturated with temperatures around 50°. The fungus grows into the roots and blocks the vascular system causing the plants to become weak, stunted and eventually die. Symptoms are most evident in the spring, and can be mistaken for winter injury. Ridomil Gold®, Alliette® or Phostrol® are fungicides that can be applied in the late fall or early spring for control of red stele. Many varieties have some level of resistance to the disease, but the most effective management strategy is to plant only into well-drained soils, and or plant on raised beds.

Powdery Mildew: Periods of humid weather can often stimulate symptoms of powdery mildew on strawberry plants. The most obvious indication of this fungus is the upward curling of the leaves. Purple or reddish blotches, and/or white, powdery growth may be observed on the undersides of the leaves. Mildew infections weaken plants and can reduce yield the following year. Some varieties are more susceptible than others, for example Annapolis is quite susceptible, while Mira and Mesabe are thought to be resistant. Abound®, Captan, Pristine®, Cabrio®, Topsin-M® and Stylet oil are presently registered to control powdery mildew.

Angular leaf spot is a bacterial disease that is characterized by translucent leaf spots that may turn yellow and eventually black. The symptoms tend to start on the lower leaves but may move upwards as bacterial spores are splashed up by rain or irrigation water. Infection of the calyxes may result in a blackening of the berry stems and caps, reducing their marketability. Bacterial angular leaf spot is favored by extended cool, wet weather and nights with temperatures close to freezing. Frequent irrigation for frost protection can greatly encourage the development and spread of the disease, as will extended cool, damp weather. Susceptibility to this disease appears to vary significantly between varieties. Copper-containing chemicals, such as Kocide, Cuprofix, and Bordeaux are the only materials that have much effect on this disease. Some labels suggest adding lime as a "safener" to reduce the risk of crop injury. In susceptible varieties, start spray applications before bloom to prevent multiplication of the bacteria on the leaves before they jump to the berry caps. **Application of copper sprays after bloom can result in fruit injury and is not recommended**. Recent research suggests that hydrogen dioxide (OxiDate) may also have some activity against angular leaf spot when used on strawberries as part of a gray mold management program.

For more detailed information on strawberry pest management, see the ***New England Small Fruit Pest Management Guide***, available through your University Cooperative Extension, and ***Strawberry Production Guide for the Northeast, Midwest and Eastern Canada***, published by the Natural Resource, Agriculture and Engineering Service (NRAES-88), and available through your University Cooperative Extension.