

Strawberry Diseases

COLLEGE OF AGRICULTURAL, FOOD, AND ENVIRONMENTAL SCIENCES

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High yields of quality strawberries require vigorous growth and healthy plants. Growth can be affected by many different factors such as soil fertility, lack of moisture, weeds, insects, and diseases. Growers can control all of these factors, while certain factors, such as weather conditions, cannot be controlled. Growers can also control plant growth characteristics, productivities, and blossom hardiness by selecting different varieties. A sound strawberry production program should include the control of all pests and the use of good cultural practices. A total program replaces most of the “luck factor” and results in excellent crop production yearly.

Strawberries are attacked by many diseases that vary widely in their destructiveness and distribution. Preventative disease control measures begin with planting disease-free stock with genetic resistance and using recommended cultural practices. The production of disease-free plants and fruits may also require preventative applications of fungicides. When using fungicides to control diseases of foliage and fruit, follow label directions and the time limit given for “last application before harvest.”

Foliage Diseases

Powdery Mildew. Leaf symptoms appear as white patches of mycelium on the lower leaf surface. The entire lower leaf surface may be covered, the leaf edges roll upward, and purple to reddish areas develop on the lower leaf surface. Losses result from infection of flowers and fruits, while leaf infection has not significantly reduced yields. A high degree of resistance is present in many cultivars.

Leaf spots. This complex of foliage problems includes: Leaf Scorch (Red Spot), Leaf Spot, Purple Leaf Spot, and several other leaf diseases. The symptoms are characterized by numerous irregular purple blotches, round lesions with red rusty borders and white centers, or spreading lesions that cover nearly the entire leaflet. Leaf diseases survive the winter on infected leaves as conidia or other overwintering fungal structures. The new disease cycle begins when rain or wind disperse fungal material to new leaves. Mid-age leaves are most susceptible and protective fungicides are required when susceptible cultivars are grown. Resistant cultivars of pathogen-free stock are desired.

Slime molds. Slime mold fungi may be found on

strawberry plants and mulch during the warm, wet weather of spring or fall. This creamy white or tan colored, jellylike mass moves out of the soil and up onto leaves and grasses. It produces variously shaped and colored, crusty structures with powdery dry spores. Slime molds are found on fruit grown under plastic. These fungi are not parasitic to plants but can smother single leaves or fruits and be unsightly. Slime molds disappear when hot dry weather returns and do not require treatment.

Root and Crown Diseases

Red Stele. Diseased plants occur in patches and produce fewer runners and smaller berries. The tips of young roots rot first, after which the stele of infected roots becomes red. Lateral roots also die and decay, producing a “rattail” symptom. Red color may extend up to the plant crown. Plants may appear stunted or wilted, and leaf color may change to red, orange, or yellow. Avoid soil compaction and improve drainage. Plant resistant cultivars from inspected planting stock.

Verticillium Wilt. Damage from this disease is often most severe in the first year of growth. The oldest leaves show marginal and interveinal (between the veins) browning and death, while newer leaves are stunted but remain green and don't wilt. The symptom often appears in late spring with the onset of hot temperatures and dry periods, or with stress from high light intensity. Planting disease-free stock in soil without a history of *Verticillium* has been successful. However, this fungus has become widespread, so use of disease-resistant varieties and soil fumigation may be needed.

Black Root Rot. This is caused by a complex of root-attacking fungi, injurious environmental conditions (freezing or waterlogging of soil), nematodes, or any combination of these factors. Infected roots turn dark and lose their feeder roots. Black root rot causes poor plant vigor. This problem is associated with soils of high clay content, excessive irrigation, and soil compaction. Avoid these soils and provide

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adequate soil aeration for vigorous root growth.

Nematodes. Parasitic nematodes are small round worms that range in size from one-sixty-fourth to one-sixteenth of an inch long. Some species of nematodes cause serious damage to strawberries when they occur in high numbers. Root-knot nematodes cause characteristic knots or galls on roots.

Symptoms associated with root-knot and other nematodes include: stunting, yellowing of leaves, reduced berry yields, reduced production of runner plants, wilting, and general loss of vigor. Severe infestations of nematodes on strawberry plants have been found in a few instances in Minnesota.

Nematode root diseases are almost impossible to diagnose from symptoms alone. To make an accurate diagnosis, nematodes must be recovered and identified from diseased plants and soil. Such a diagnosis can be made only in a specially equipped laboratory by trained personnel.

The basic principle of nematode control in strawberries is planting only nematode-free strawberry plants in nematode-free soil. Eliminating nematodes from the soil is, at best, a rather expensive and difficult task. The basic method of field-scale nematode control is soil fumigation (application of chemicals). Crop rotation is generally more economical than soil fumigation if land is available.

Fruit Diseases

Gray Mold. This fruit disease develops as a cover of velvety gray mycelial and/or conidia on the fruit surface. The rot usually starts at a point of contact such as the soil or other infected fruits. The berry turns brown and remains firm with little leakage. Frequent rains produce maximum rot development, and fungicides from bloom to harvest are required. Mulching, debris removal, and narrower row widths help reduce this disease.

Rhizopus Rot. The berry is discolored, somewhat brown, softens quickly, and juices leak out when this disease occurs. If wet conditions continue, a dense white mycelium coats the berry. Wounds are necessary for penetration. Fungicides may be required during fruit ripening. Damage can also be reduced by quickly cooling berries after harvest.

Leather Rot. The berry may be affected from bloom to maturity. Young berries turn brown or dark brown while mature berries may be bleached, purple, or normal in color. The flesh remains firm and tastes bitter. Reduce fruit contact with soil and select fungicides for specific activity against this disease.

Noninfectious Disease

Winter Injury. Some growers have lost many plants in new plantings and surviving plants were often weakened from winter injury. Low yields generally resulted. Injury is most likely to occur if plants are exposed to alternating warm and cold temperatures during winter. Mulching with hay, straw, leaves, or similar material reduces the chance of winter injury.

Fungicide Application

The production of the best possible crop from existing plantings may require fungicide treatment. Foliar and fruit diseases respond best to fungicide treatments, while root and crown problems, along with noninfectious problems, are best controlled by planting disease-free stock that is specific to the grower's area.

Treatments should begin at bud break and, when required, may continue until harvest. Fungicides can be applied during bloom, which reduces blossom infection by fungi and results in fewer fruit blemishes. Repeat applications when needed at 7- to 10-day intervals up to the limitation given on the label. This will produce the best results. Fungicides must be used at label rates. See and read label directions before use. Harvest applications generally are not necessary if several earlier applications were made. However, wet conditions at harvest may require fruit protection treatments. For additional information on fungicide application, refer to FS-1134, *Commercial Strawberry Pest Control Guide*.

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