Diseases of Cucumber and Melons and Their Control

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Diseases of Cucumber and Melons and Their Control

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Diseases of Cucumber

There are a number of diseases that attack cucumbers in Colorado, of which bacterial wilt, mosaic, fruit-rot (Phytophthora), leaf blight (Macrosporium), powdery mildew, and damping-off are important.

Bacterial Wilt (Bacillus tracheiphilus) causes severe loss to the cucumber growing industry in Colorado nearly every year. This disease also causes serious losses to cantaloupe, honeydew melons, squash, and pumpkin crops.

The symptoms of bacterial wilt are easily detected, because of the sudden wilting and dying of either a single branch, or the entire vine. Often a plant will appear normal one day, then wilt and die the next day. This sudden wilting and dying is due to the plugging of the water-conducting tubes of the plants by the bacterial organisms which cause the disease. A simple method for diagnosing bacterial wilt in any of the host plants is: (1) Cut a cross-section of the vine, near the point where the wilting begins, (2) squeeze the vines near these ends and allow the juice to dry a few seconds, (3) place the ends together, and then slowly pull them apart. If the disease is bacterial wilt, usually there will be fine, stringy, glue-like strands of bacterial ooze extending between the cut ends of the vine. When this occurs one can safely diagnose the disease as bacterial wilt.

The organism which causes bacterial wilt of cucumber overwinters in the bodies of hibernating striped and 12-spotted cucumber beetles. When cucumber beetles feed upon bacterial wilt-diseased plants they become infested with the causal organism. Such bacterial infested beetles transmit the organism to healthy cucumber plants which they feed upon, thus causing the spread of the disease in cucumber, honeydew melon, cantaloupe, squash, and pumpkin crops.

The control measures for this disease consist of roguing out all infected plants, and controlling the cucumber beetles. The latter practice is most important. Colorado Extension Circulars 131-A and D-6 give the following dust mixture for control of these pests: 5 percent dry pyrocide, 6 percent red copper oxide, and 89 percent pyrophyllite. This dust mixture is also an excellent control for leaf blights.

Mosaic is a virus disease of much importance to the cucumber industry in Colorado. In one district of Weld County, cucumber production was abandoned because of the severe epidemics of mosaic.

The same disease may be found on melons, pepper, tomato, and also on such weeds as catnip, milkweed, groundcherry, wild cucumber, horsenettles, bittersweet, matrimony-vine, and other related plants.

Cucumber mosaic may affect the plant at any stage of its growth. In the seedling stage cucumber-mosaic symptoms are expressed by the yellow discoloration of the primary leaves (cotyledons), and often the plants are killed. In more mature infected cucumber plants the leaves become mottled with yellow and green patches, the vines are severely dwarfed, and the fruits are usually warty. The green color is often almost totally lacking in the fruits, and such a condition is termed white pickle. Fruits from mosaic-infected cucumber plants have no commercial value for canning purposes. After processing they become hard and somewhat bitter.

The virus which causes this disease overwinters in the seed of wild cucumber, and in such perennial hosts as groundcherry, horsenettle, nightshades, bittersweet, and matrimony-vine. It is transmitted from diseased plants to healthy ones by aphids and cucumber beetles, and on the hands of workers.

To control cucumber mosaic: (1) Rogue out and bury all infected plants. (2) Control all the weed hosts in the field, and for at least 300 yards around the field. (3) In the case of greenhouse crops, allow a 3-month period between cucumber crops in the same soil, or disinfect the soil with steam, formaldehyde, or chloropicrin. (4) Do not grow cucumbers or tomatoes in the same greenhouse, or too close to each other in the field. (5) After handling any of the mosaic-infected plants be sure to wash your hands with soap and water before handling healthy cucumber plants, or any other of its hosts. (6) In instances where pruning is practiced, it should be done by breaking, rather than by cutting, in order to avoid spreading the virus by the pruning knife. Avoid contamination of the hands while pruning and picking.

Fruit Rot (Phytophthora capsici) is a relatively new disease which caused severe loss of mature cucumber fruits in the Rocky Ford area in 1936. Since that time it has caused but very little trouble on cucumber, but reached an epidemic stage on tomato fruits in that same district in 1939 and 1940. The same mold causes a severe blight of pepper, a fruit rot and wilt of cantaloupe, honeydew melon, squash, and watermelon. The disease is caused by a mold which may live for a number of years in the soil. Rains, heavy irrigations, and high-

temperature conditions favor its development and spread. The affected fruits become soft, discolored, and develop water-soaked and olive-green to yellow, sunken areas. The rotted fruits have a strong fermentation odor. Vines are rarely affected, but when diseased, they develop a typical wilted condition.

Work on this project is still in the experimental stage, and therefore, the control methods given here are tentative. These control methods are: (1) Plant seed from healthy fruits, (2) treat all seed either with Semesan, at the rate of ½ teaspoonful per pound of seed, or Cuprocide at the rate of ¼ teaspoonful per pound of seed, (3) employ a crop rotation of non-cucurbit crops, (4) either spray the plants, and especially the fruits with Yellow Cuprocide, or dust with Cuprocide dust. Make the spray by adding 1¼ pound Yellow Cuprocide and ⅓ pint of Emulsifier B-1956, in 100 gallons of water. The dust is made by thoroughly mixing 6 pounds Yellow Cuprocide, with 94 pounds of Cherokee Clay or any other inert, fine dust filler. Where cucumber beetles are present, add 5 pounds of pyrocide and reduce the dust filler 5 pounds in the above dust mixture. Make 3 applications at 12-day intervals from time disease first appears in the crop.

Leaf Blight (Macrosporium cucumerinum) is a disease which often causes much damage following rains or heavy irrigations, when the humidity surrounding the plants is high. It may appear any time in the growing season after the middle of June in Colorado. At first the infected leaf areas are small, circular, and water-soaked. Later these spots enlarge in all directions and the dead tissue of the upper side develops definite margins and concentric rings. These concentric rings seldom appear on the under side, and the margins are indefinite. The spots vary from the size of a pin point to ½ inch in diameter.

For control of leaf blight, use the same control method given for fruit rot (Phytophthora capsici) of cucumber.

Powdery Mildew (Erysiphe cichoracearum) is a disease which may cause considerable loss to cucumber and other vegetable plants, as well as ornamental plants and fruit trees. It flourishes when humid conditions together with high temperatures exist. The disease is caused by a mold that overwinters in the soil and on diseased plant refuse. The symptoms of powdery mildew are easily recognized by the grayish-white, powdery spots, or extensive areas on the upper and under surfaces of the leaves, on young buds, and vines. Spots on the leaves usually turn brown and die. By close observation one can see the small, black, spherical fruiting bodies of the mold.

Spray either with wettable sulfur, or Yellow Cuprocide, when the disease first appears. Dusting sulfur (300 mesh), or Cuprocide dust will also give excellent results.

Damping-off (Pythium debaryanum and others).—This disease is quite common throughout the State. It causes poor stands, by the rotting of seed in the soil, rotting of the seedlings before they emerge, and often causing a water-soaked rot which girdles the stem near the ground line and kills the seedlings.

For control of damping-off, (1) treat cucumber seed either with Semesan at the rate of ½ teaspoonful per pound of seed, or Cuprocide at ¼ teaspoonful per pound of seed. The dust may be easily applied to the seed by shaking them together either in a quart jar, or similar container. (Colorado Extension Circular D-8.)

Diseases of Cantaloupe

Bacterial Wilt (Bacillus tracheiphilus) is a disease of considerable importance on cantaloupe in Colorado. It occurs generally in all of the cantaloupe producing districts of the State. The cause, symptoms, and control for bacterial wilt of cantaloupe are identical with those for the same disease on cucumber. See bacterial wilt of cucumber.

Fruit Rot causes severe losses to the cantaloupe industry of Colorado. In 1940 and 1941, fruit rot of cantaloupe reached an epidemic stage when from 20 to 25 percent of the melons produced in the Rocky Ford district were diseased. Fruits not only rotted in the field, but also decayed in transit. The situation was so serious that certain packing companies refused to pack and ship the melons to the marketing points in 1941.

Fruit rot of cantaloupe in Colorado may be caused by one or more species of Fusarium molds and a Phytophthora mold. These molds overwinter in the soil and on the cantaloupe fruit refuse. Although most of the fruit-rot infection likely occurs in the field, it is probable that many mechanically injured fruits become inoculated by the Fusarium-mold-contaminated water used for washing. In such instances the melons appear healthy when packed, and develop the rot either while in transit, or in market places.

In the early stages of the fruit-rot disease, caused by Fusarium molds, the rind is little affected, and it is difficult to distinguish between the lesions and the healthy tissue. Later, however, the diseased area can be readily recognized by the abundant development of white or pinkish-white mold growth. At first this mold growth pushes up in small tufts between the netting, then it spreads over the netting

and sutures. At this stage, the affected tissue becomes somewhat softer than the healthy tissue. Although the margins of the lesions in the rind are not sharply defined, they appear faintly water-soaked. The decay extends from ¼ to ¾ of an inch beneath the rind. The diseased tissue is somewhat soft and slightly felty to a firm, spongy, leathery consistency. The general color of the affected tissue varies from that of normal fleshy tissue to a somewhat lighter tint. The diseased tissue has an odor and taste like that of raw mushrooms.

The symptoms of cantaloupe fruit rot, caused by the Phytophthora mold are quite characteristic. From one to several irregularly outlined circular to oval spots, which are from 1 to 4 inches in diameter, appear on the infected fruits. The spots have a water-soaked surface slime, slightly depressed to definitely sunken, and extend nearly to the seed cavity of the fruit. The flesh of fruits in the advanced stages of the disease is water-soaked and a light-brownish to nearly normal color. The flavor of diseased fruits varies from practically normal to slightly sour, with little or no odor. The diseased fruits of watermelon and squash manifest symptoms that are quite similar to those of cantaloupe.

Research work on the control of fruit rot of cantaloupe has been rather limited and therefore, the recommendations given here are tentative. (1) Treat all cantaloupe seed either with Semesan, at the rate of ¾ ounce per 15 pounds of seed, or Cuprocide at the rate of 1 ounce per 3 pounds of seed; (2) plant seed from healthy melons; (3) employ long crop rotations in which no other cucurbits are used; (4) either spray the plants with Yellow Cuprocide, or dust them with Cuprocide dust, as in the case of fruit rot (Phytophthora capsici) of cucumber. (5) Avoid mechanical injury and bruising of melons when harvesting and packing. (6) Strict inspection of all fruits should be made, and all diseased melons discarded. (7) The water used for washing the melons should contain 150 parts per million of free chlorine for disinfecting purposes. Such products as B-K, or Diversol, used by creameries are available on the market. The chlorinated water should be brought up to strength twice each day. Devices for testing the dilution of chlorine solutions are sold on the market.

Anthracnose (Colletotrichum lagenarium).—This disease is of minor importance on cantaloupe in Colorado, however, it causes severe losses of the honeydew melon crop in the Rocky Ford District. See anthracnose of honeydew melons for symptoms and control of the disease.

Leaf Blight (Macrosporium cucumerinum) is a disease that causes much damage to the cantaloupe crop in the State, especially

during seasons when rains are rather frequent, or following heavy irrigations.

The first symptoms appear on leaves nearest the center of the hill, and normally about the middle of the growing season. Later the spots increase in number quite rapidly on these leaves, and infection spreads to all the leaves on the vine. The diseased areas are at first small, circular, and somewhat water-soaked. Later they enlarge and ordinarily show concentric rings and a definite leaf margin on the upper surface. On the lower side of the spots the concentric rings seldom occur and the leaf margins are very definite. Single spots may vary in size from a mere point to ½-inch in diameter. Quite often many spots combine so that they may cover ¼ of the leaf surface. Vines are frequently defoliated. When spots occur on the fruit they are somewhat depressed.

For control of leaf blight of cantaloupe: (1) Either spray the plants with Yellow Cuprocide 1½ pounds to ⅓ pint Emulsifier B-1956 spreader to 100 gallons of water, or dust with Cuprocide dust. To make Cuprocide dust, thoroughly mix 6 pounds of Yellow Cuprocide with 94 pounds of inert talc, such as Cherokee clay. (2) Apply the dust when the disease first appears, and make 3 applications at 10-day intervals. (4) The spray or dust should be applied with power outfits.

Damping-off (Pythium debaryanum and others).—This disease often causes considerable loss of cantaloupe stands. It causes rotting of seed in the soil, may kill the seedlings before they emerge from the soil, or it may cause a watery soft rot of the seedlings near the ground line, which causes them to fall over and die.

For control of damping-off, treat the seed either with Semesan at the rate of ¾ ounce per 15 pounds of seed, or with Cuprocide at the rate of 1 ounce per 3 pounds of seed. (See Colorado Extension Circular No. D-8.)

Diseases of Honeydew Melon

Anthracnose (Colletotrichum lagenarium) is a disease of much importance to the honeydew melon-growing industry of Colorado. In 1940 and 1941, growers of the Rocky Ford district experienced heavy losses in fields and in transit because of this disease.

In the early stages of the anthracnose disease, spots with narrow, water-soaked or narrow, yellowish borders appear on the leaves. Later, these spots enlarge, become angular, and the affected tissue dies. The spots on fruit are at first small, shallow, and roughly circular to oval in shape. Later the spots enlarge and salmon-colored spore masses, arranged for the most part in concentric rings, are

produced in abundance on their surfaces. The affected fleshy tissue becomes somewhat spongy or leathery in texture, and remains nearly normal in color and flavor. Watermelon, cantaloupe, and squash that are infected with anthracnose manifest symptoms quite similar to the same disease on honeydew melon. The organism which causes anthracnose overwinters on the seed and on plant refuse in the soil.

Control for anthracnose involves certain practices on the part of growers and packers. (1) All seed used for planting purposes should be treated either with Semesan at the rate of ¾ ounce per 15 pounds of seed, or Cuprocide at the rate of 1 ounce per 3 pounds of seed. (2) Plant only seed harvested from healthy fruit. (3) Employ long crop rotations with non-cucurbitaceous crops. (4) Either spray the plants with Yellow Cuprocide or dust them with Cuprocide dust. For making these products, see fruit rot of cucumber. Make 3 applications at 12-day intervals from the time the symptoms first appear in the crop. Use power sprayer or power dusting equipment. (5) Growers and packers should handle the melons with care in order to avoid mechanical injury. (6) All diseased and mechanically injured melons should be discarded prior to washing and packing. (7) There should be strict fruit inspection at packing time by agents of the State Department of Agriculture. (8) The water used for washing melons should contain 150 parts per million of free chlorine. The chlorine content of such water should be brought up to strength twice or more each day. Devices for testing the chlorine strength of solutions are available on the market.

Leaf Spot (Macrosporium cucumerinum).—See leaf spot of cantaloupe for symptoms and control methods.

Diseases of Watermelons

Wilt (Fusarium niveum) is one of the most destructive diseases of watermelon. Although wilt has never been reported in Colorado, it is probable that it will be introduced from out-of-state districts. The mold organism which causes the disease may live in the soil for 10 to 15 years.

The symptoms are typical wilting, followed by death of the plants, at any stage of growth. Often a part of a vine will die on one day, another the next day, until finally the entire plant succumbs to the disease. Avoid growing watermelons in wilt-sick soil, except when wilt-resistant varieties, such as Pride of Muscatine, Iowa King, Improved Kleckley Sweet No. 5, and the Leesburg varieties, or other resistant varieties are grown.

Anthracnose (Colletotrichum lagenarium).—See anthracnose of honeydew melon for symptoms and control methods.