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UT Extension

SP 277-A

Plant Diseases

Cedar-Apple Rust

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Cedar-apple rust is a common disease of apple and crabapple. The fungus that causes the disease, Gymnosporangium juniperi-virginianae, is unusual because it must spend a phase of its life cycle as a parasite on Juniperus species, such as red cedar or ornamental junipers.

Cedar-apple rust can be severe on apple. Infections of apple fruit result in lower fruit quality and early fruit drop. Leaf spots may cause early defoliation, especially during dry summers. If trees are defoliated several years in a row, they become weakened and unthrifty. Fruit bud formation may be reduced after one year. The disease is not as harmful to juniper, causing galls but not severely affecting plant vigor.

Symptoms and Disease Cycle

The fungus causing cedar-apple rust lives nearly two years on juniper, the primary host. From July to September, spores from apples fall on junipers. During warm, moist weather, the spores germinate and infect twigs. Small galls become apparent on juniper the next spring and grow during the summer.

Figure 1. A “cedar-apple” gall on cedar.

These galls are light brown, reddish or chocolate brown, round or kidney-shaped, and up to 2 inches in diameter (Figure 1). The galls develop round pits with small pimple-like spots in the center.

The following year, after a few warm spring rains, the galls (sometimes called cedar-apples) swell and produce bright orange, jelly-like tendrils from the circular pits. These tendrils are called spore horns or telial horns, and may be up to 2 inches long. They are highly visible on junipers.

One large gall can produce billions of spores, borne on the spore horns. These "basidiospores" can be carried several miles on air currents. Those that land on young apple tissue germinate and cause infection during short periods of wetness.

Apple leaves four to eight days old are the most susceptible to infection. Fruit lesions result from infections that took place before and during the blossom stage, from tight-cluster until just after petal fall. Most infections occur in Tennessee between early April and early May.

One to two weeks after infection, small yellow to orange spots appear on the upper leaf surface (Figure 2). These spots increase in size up to 1/4 inch. They become bright yellow or orange, and often have a dark border. Small black dots (pycnia) develop in the spots. Similar spots develop on the fruit.

A few weeks after these pycnia develop, yellow spots begin to form on the lower apple leaf surface (July-August). The leaf thickens and small tubular projections (aecia) develop. These split open and curl backward forming tiny, cup-like structures sometimes called "cluster cups." The aeciospores released from these cluster cups are wind blown to junipers, where infection occurs. These spores cannot reinfect apples.

Figure 2. Leaf spots of cedar-apple rust on apple.

Control

(1) Grow resistant apple or crabapple varieties. Apple varieties that normally show good to excellent resistance to cedar-apple rust include Red Delicious, McIntosh, Arkansas Black, Winesap, Mollies Delicious, Spartan, Priscilla, Liberty and Empire. Varieties that are usually highly susceptible include Prima, Sir Prize, Lodi, Jonathan, Rome, Golden Delicious and Jonafree.

(2) Destroy nearby wild, abandoned or worthless apples, crabapples, cedars or junipers. If only a few "cedar-apples" are present, prune and destroy them. Although apples may occasionally become infected by spores produced several miles away, most infections result from spores produced on Juniperus within a few hundred feet from the apple trees.

(3) Follow a recommended fungicide spray schedule, beginning at the pink-bud stage and continuing through the second cover spray. The cedar-apples have usually exhausted their spores by this time. Immunox® is a fungicide available to homeowners (see Extension PB1622, "Disease and Insect Control in Home Fruit Plantings," for timing and rates). Captan®, the fungicide component of many pre-mixed home fruit sprays, is not effective against cedar-apple rust. Commercial growers should refer to "Integrated Orchard Management Guide for Commercial Apples in the Southeast" for additional fungicides for control of cedar-apple rust.

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store, or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label. Persons who do not obey the law will be subject to penalties.

Disclaimer Statement

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