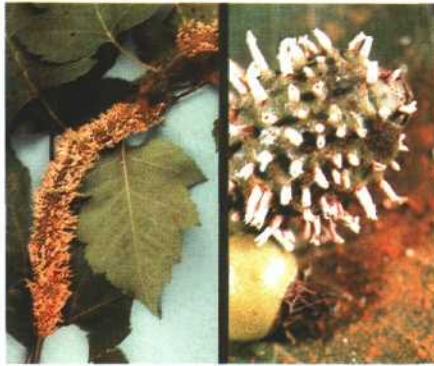


TREE DISEASES II



1. Hawthorn rust



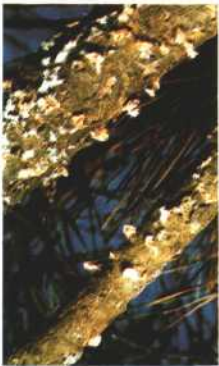
2. Quince rust



3. Cedar-apple rust



4. Juniper rust



5. White pine blister rust



6. Eastern gall rust of pine



7. Phloem necrosis of elm



8. Dutch elm disease



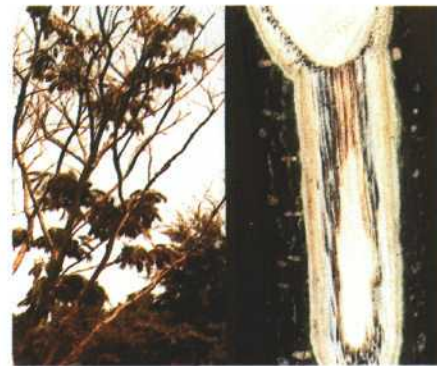
9. Wetwood of elm



10. Oak wilt



11. Verticillium wilt of maple



12. Mimosa wilt



13. Fire blight of hawthorn



14. Willow black canker



15. Phomopsis canker of Russian olive



16. Bleeding necrosis of sweet gum



17. Sunscald and black rot of mountain-ash

TREE DISEASES II

1. **Hawthorn Rust** is caused by the fungus *Gymnosporangium globosum*. Yellow to orange spots form on the upper leaf surface while raised, orange to brownish spots containing tubelike appendages develop on the corresponding under surface. Other pomaceous hosts include apple and crabapple, mountain-ash, and pear. Alternate hosts of the fungus are species of juniper (see No. 4 below). The fungus overwinters in small brownish galls on juniper.
2. **Quince Rust** is caused by the fungus *Gymnosporangium clavipes*. Hawthorn twigs and fruit are swollen, distorted, and covered with whitish orange, tubelike appendages filled with masses of orange spores. Other pomaceous hosts include apple and crabapple, Japanese quince, mountain-ash, pear, and quince. The fungus overseasons on species of juniper (see No. 4 below).
3. **Cedar-Apple Rust**, caused by the fungus *Gymnosporangium juniperi-virginianae*, infects numerous junipers. Apple and crabapple are alternate hosts. Juniper twigs are stimulated to form small, greenish brown, globular galls. The slowly enlarging galls, by the second spring after infection, are up to 2 inches in diameter. Older galls (or "cedar apples") are chocolate-brown, globular to kidney-shaped, and corky. Small, pitlike depressions form on the gall surface. Orange, gelatinous, fingerlike spore-horns (up to 100 per gall) protrude up to 2 inches from the circular depressions during spring rains. During dry periods the spore-horns wither into wrinkled threads. The galls later dry, shrivel and turn black.
4. **Juniper Rust**. Several juniper species, especially red cedar, are affected by 3 common rusts: cedar-apple, cedar-hawthorn, and cedar-quince. Quince rust appears as slight swellings, somewhat spindle-shaped, on twigs, branches and trunk. The fungus is perennial in the outer living bark. Hawthorn rust (1) galls are similar to those of apple rust (3), but are seldom over ½ inch and produce only a few gelatinous spore-horns. Cedar-hawthorn and cedar-apple rust galls produce spore-horns for only one season.
5. **White Pine Blister Rust**, caused by the fungus *Cronartium ribicola*, attacks 5-needle pines. The fungus invades and kills the needles before growing into twigs and branches. Swollen, oval, yellowish cankers slowly enlarge, girdle, and kill stems. Killing of pines progresses from small to larger branches and into the trunk. Several years after the needles were infected, the cankered bark produces whitish yellow blisters filled with masses of orange-yellow spores. The spores are carried by the wind to infect leaves of certain currants and gooseberries, the alternate hosts.
6. **Eastern Gall Rust of Pine**, caused by *Cronartium quercuum*, attacks numerous pines forming roundish galls on the stems. Alternate hosts include oaks and chestnuts. In spring, yellow fruiting bodies, filled with dusty spores, break through the pine bark in a brainlike arrangement. The fungus overseasons in pine stems.
7. **Phloem Necrosis of Elm**, caused by a mycoplasma-like organism, is widespread and destructive. Elm leaves curl upward at the margins, turn yellow or brown and drop. The disease can be confused with Dutch elm disease (8) and other elm wilts. A reliable symptom is a butterscotch yellow color of the inner bark, often flecked with brown or black when freshly cut, plus a wintergreen odor. Transmission is by the white-banded elm leafhopper (*Scaphoideus luteolus*).
8. **Dutch Elm Disease**, caused by the fungus *Ceratocystis ulmi*, is the most destructive shade tree disease. All American and European elms are susceptible. Leaves on the tips of one or more branches wilt, curl, and turn yellow or brown ("flag"). Many elms show progressive wilting, discoloration, and dropping of leaves on additional branches until the tree dies in several weeks to a year or more. Dark brown or black streaks develop in the sapwood (other wilts show similar streaking). Elm bark beetles (*Scolytus multistriatus* and *Hylurgopinus rufipes*) breed in dead and dying elm wood. The beetles transmit the fungus when they feed in twig crotches of nearby healthy elms. Transmission from diseased to healthy elms also occurs via root grafts.
9. **Wetwood of Elm** is cosmopolitan and caused by a bacterium. Invaded spring wood and heartwood becomes water-soaked and dark brown. Fermented sap under pressure (up to 60 psi) in diseased wood is forced out through cracks, branch crotches and wounds. The dark flux flows down the trunk or branches and dries to a grayish white incrustation. Affected elms often show yellowing, scorching, wilting, and dropping of leaves. Branches may die back and the tree shows a general decline.
10. **Oak Wilt**, caused by the fungus *Ceratocystis fagacearum*, is widespread, serious, and affects all species of oak. Leaves in the crown of red and black oaks turn dull pale green then yellow to bronze or tan (starting at the margins), curl upward, and drop. Symptoms progress downward and inward throughout the tree. Mature leaves are usually stiff before dropping; immature leaves curl, droop, turn dark brown to black, and remain attached. Leaves on wilting bur and white oaks usually turn light brown or straw-colored, curl, and remain attached. Red and black oaks commonly wilt and die in 4 to 6 weeks; white and bur oaks usually die slowly ("staghead") over a period of years. Transmission is from diseased to healthy oaks via root grafts and over longer distances by feeding of sap-feeding insects in fresh wounds.
11. **Verticillium Wilt of Maple**, and 300 other species of woody and nonwoody plants, is caused by the fungus *Verticillium albo-atrum* (*V. dahliae*). Maple leaves usually wilt and turn brown suddenly in summer on a few branches, on whole sections, or the entire tree. The sapwood may show greenish streaks. The soil-inhabiting fungus invades through wounds in roots and stems.
12. **Mimosa Wilt** is caused by the fungus *Fusarium oxysporum* f. *peniciosum*. Leaves on certain branches wilt, turn yellow, hang down, die, and drop. Brown to black streaks form in the sapwood. The soil-borne fungus enters through the roots. Nematode feeding may increase the incidence of wilt.
13. **Fire Blight of Hawthorn** is caused by the bacterium *Erwinia amylovora*. Other hosts include apple and crabapple, amelanchier, cotoneaster, mountain-ash, photinia, pyracantha, quinces, and spirea. The blossoms, leaves and twigs suddenly wilt and appear scorched by fire. Affected twigs and small branches die. The bacterium overwinters in living tissue at the edge of discolored, slightly sunken cankers (with marginal cracks) on the branches and trunk.
14. **Willow Black Canker** is caused by the fungus *Physalospora miyabeana*. The fungus proceeds from leaves (which curl and wither) through the petioles into twigs and larger branches where conspicuous, girdling black cankers are formed—followed by defoliation. The fungus produces pinkish spore masses on dead twig and branch cankers.
15. **Phomopsis Canker of Russian Olive**, caused by the fungus *Phomopsis elaeagni*, is common and serious in the Midwest. Oval to elongate, depressed, reddish brown cankers with smooth bark form on the branches and trunk. Cracks often form around the margins. Girdled parts wilt and die. The withered leaves remain attached for some time.
16. **Bleeding Necrosis of Sweet Gum**, caused by the fungus *Botryosphaeria dothidea*, induces profuse bleeding from younger branch and trunk cankers and emits an unpleasant, sweet odor. Bleeding areas are connected internally to reddish brown sapwood. Weakened trees may produce numerous sprouts along the branches. When severe, trees exhibit branch dieback and later a general decline. The disease occurs mainly on stressed trees.
17. **Sunscaud and Black Rot of Mountain-ash**. The south side of densely shaded trees, when suddenly exposed to intense sun, often develop summer sunscaud (cankers) that kills the bark. The black rot fungus, *Physalospora obtusa*, commonly invades the dead bark. Numerous, raised, black, fungus-fruiting bodies form in the cankers.

For cultural and chemical control suggestions, and other control measures, consult the Extension Plant Pathologist at your land-grant university, or your county extension office.

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