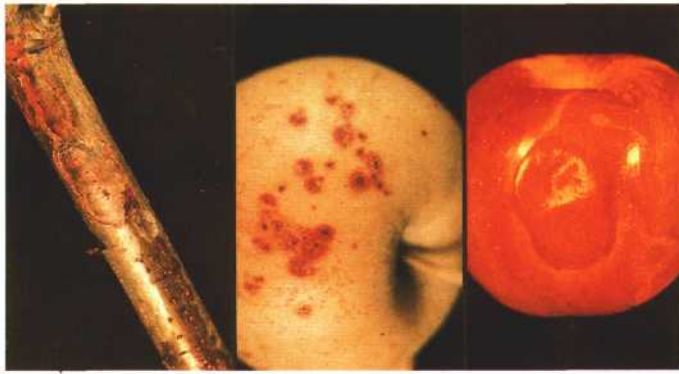


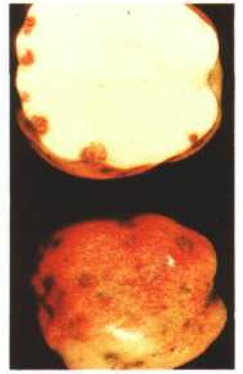
# APPLE DISEASES II



1. Papery bark canker



2. Botryosphaeria (Bot) rot



3. Bitter pit or Jonathan spot



4. Powdery mildew



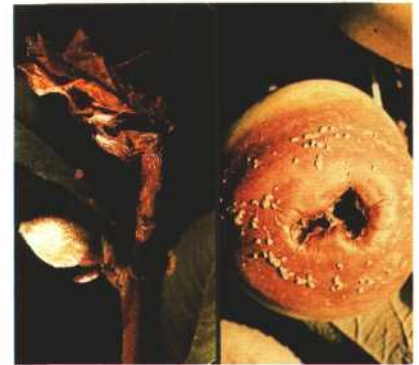
5. Phytophthora collar rot



6. Water core



7. Fire blight



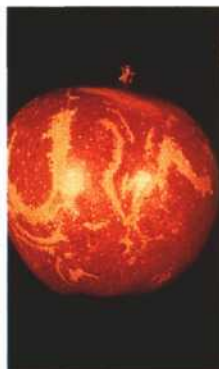
8. Brown rot



9. Apple mosaic



10. Trunk twisting and flattening



11. Russet-ring



12. Leaf pucker



13. 2,4-D injury



14. Brown heart or core

## APPLE DISEASES II

1. **Papery bark canker**, commonly called **silver leaf**, is caused by the fungus *Stereum purpureum*. The fungus infects a wide variety of woody plants, including pome and stone fruits, in the northern states, being most prevalent following severe winters. The first symptom is usually the appearance of dull lead to silvery leaves on infected branches. Death of infected branches or the entire tree may occur within a year or two after the appearance of the silvered leaves. The fungus enters through wounds and produces a dark brown decay first of the heartwood, later killing the sapwood. The outer bark becomes "papery," splits, and sloughs off. Stunting of growth is often apparent before the tree dies. The characteristic, small ( $\frac{1}{2}$  to about an inch in diameter), round, leathery, flattened to somewhat shelf-shaped sporophores of the causal fungus can often be found on limbs and trunks of dead trees. The upper surface of the fruiting body is velvety and buff or grayish in color; the spore-bearing under surface is purplish.

2. **Botryosphaeria (Bot) rot**, caused by the fungus *Botryosphaeria dothidea* (*B. ribis*), infects a wide range of woody plants. Young twig, limb, and trunk cankers appear as blisters filled with liquid. The liquid spreads over the wood surface when the blisters rupture. Enlarging, sunken, dark colored cankers are soon evident. Dark, spore-producing structures (stromata) form on the canker surface. The following spring the canker may cork off and become inactive or may continue to grow. Mechanical injury or environmental stress (freeze injury, drought) predispose wood to infection. Fruit infections start as small, reddish-brown spots surrounding a lenticel. The fungus advances through the fruit forming a soft rot. The skin color fades to a light brown and then a deeper brown. Completely rotted fruits may often have syrupy beads of exudate on their surface. Fruit rot commonly starts to develop in storage. The fungus overwinters on living and dead limbs.

3. **Bitter pit or Jonathan spot** is a noninfectious disease that is most common in years when the fruit crop is light. Slightly sunken, circular, dark green spots with some internal browning form on the skin of the fruit. Later the spots may become deep red or light green; finally gray or black. As the fruit matures, the pits become more sunken with a definite brown corkiness of the flesh that may extend  $\frac{1}{4}$  inch into the fruit. Bitter pit seems to be related to a fluctuating soil moisture supply associated with calcium nutrition, and is increased by abundant rainfall shortly before harvest. The disease is most severe on fruit picked immaturity; it increases in storage.

4. **Powdery mildew**, caused by the fungus *Podosphaeria leucotricha*, overwinters mostly in terminal buds. A whitish, powdery to felt-like growth covers infected buds, blossoms, leaves, twigs, and fruit. The leaves are often stunted, narrower than normal, folded lengthwise, and become stiff and brittle with age. Twig growth is stunted and may have a witches'-broom appearance. Infected fruit commonly have a fine network of russetting, may be severely russeted, and sometimes are dwarfed. This disease is most common on certain cultivars in southern apple-growing areas.

5. **Phytophthora collar rot**, caused by the soil-borne fungus *Phytophthora cactorum*, infects a wide range of plants. Disease incidence has increased as dwarfing rootstocks (especially Malling-Merton or MM) have replaced seedling rootstocks. The fungus attacks the lower 30 inches of apple trunks, usually between the soil line and the crown roots. Infected bark becomes brown, somewhat depressed, and is often slimy when wet. A brown to reddish-brown discoloration of the wood and a gummy exudate under the dead bark is typical. The enlarging, definitely outlined cankers, girdle the lower trunk and/or roots and often result in death of the entire tree. A general lack of vigor, poor shoot growth, and formation of sparse leaves in summer, or reddish leaves in early autumn, is commonly the first indication of the disease. The *Phytophthora* fungus attacks the fruit of susceptible apple cultivars producing a firm, brownish rot. The disease is more common in heavy, poorly drained soils.

6. **Water core** is a noninfectious disease that occurs both in the orchard and in storage. The fruit must be cut open to observe the symptoms which arise in the core as a clear, "glassy" translucence that soon spreads to the surrounding flesh. Water core is most common in

large mature fruits from sun-exposed portions of the tree. Fruits with low calcium or high potassium and magnesium are most susceptible to water core.

7. **Fire blight** is an extremely destructive disease caused by the bacterium *Erwinia amylovora*. Infected blossoms become water-soaked in appearance and soon wilt, turning brown to dark brown. Infected shoots wilt from the tip, often forming a "shepherd's-crook," and soon turn dark brown (as if scorched by fire). The disease may progress into the shoot from its base, blighting the lower tissues and girdling the parts beyond. In young trees, the bacteria may girdle the trunk and kill the tree. The bark of invaded branches and scaffold limbs is darker than normal with the wood beneath turning brown. Later the margins become sunken and often cracked, forming a definite canker. During wet, humid weather, blighted tissues exude a milky, sticky ooze that soon turns brown.

8. **Brown rot** is caused by two closely related species of fungi, *Monilinia fructicola* and *M. laxa*. The disease is usually a minor problem in the United States, but is much more important in Great Britain and continental Europe. In the U.S., the fungi infect apple fruits injured by insects, hail, birds, or other means. Mature apples develop soft, light brown spots that enlarge rapidly in warm weather. Entire fruits may be destroyed within a day or two. Ash-gray tufts of mold develop on the surface of rotted fruits in damp weather. These fungi are much more destructive to stone fruit trees where the blossoms, twigs and fruit are infected.

9. **Apple mosaic** is the most familiar viral disease of apple. The leaves on some twigs develop white-to-light yellow flecks, spots and blotches and bands along the veins. Occasionally, mosaic may appear as light and dark green areas in the leaves. Severely infected leaves turn brown and drop early. Tree vigor and yield may be reduced. The virus is transmitted by budding, grafting and by root grafts between adjacent trees.

10. **Trunk twisting and flattening**, believed by some to be caused by a virus, results in twisting and flattening of the trunk. Infected trees are generally weak and vigor declines by the sixth year.

11. **Russet-ring** is a viral disease that is fairly common in certain years. Affected Golden Delicious fruits develop narrow, irregularly closed rings to a solid circle of russet up to 1 to 2 inches in diameter. Yellow Newton apples develop elaborate networks of ring russetting, usually covering much of the fruit surface. Extensive, superficial, purple-to-brown blotches, without russetting, form on Stayman and Jubilee fruits. Some cultivars are symptomless carriers (see also Leaf pucker below).

12. **Leaf pucker** may be part of a virus complex with russet-ring and fruit blotch. Foliage symptoms appear on the first-formed leaves in early spring. Leaves on the fruit spurs appear dwarfed and puckered and sometimes show yellowish-green flecking. Symptoms are masked on leaves formed during hot weather. Fruit symptoms vary depending on the variety, tree, and orchard and are described under Russet-ring. The severity of leaf pucker and fruit russetting varies from season to season, depending largely on temperature. In cool summers severe russetting occurs; when summers are warm, no fruit symptoms occur and only the first-formed leaves develop puckering and flecking.

13. **2,4-D injury** appears as a curling, twisting, and distortion of the leaves. Often there is a fern-leaf effect instead of normal foliage. Fortunately, unless the dose (from spray drift, other air-borne particles and sprayer contamination) is too large, the plants gradually return to normal.

14. **Brown heart or core** is a noninfectious disease that develops in storages that are excessively cold (below 36° F.). The core is dark brown. Symptoms are not evident until the fruit are cut in half.

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

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