



ROSE CANE CANKERS

Roses are susceptible to canker diseases whether they grow in the wild or under cultivation in gardens or greenhouses. Canker diseases were first reported on roses in Europe in the late 1800s and were first recognized in the United States in 1917. Although all aboveground plant parts are susceptible to one or more canker-causing fungi, the greatest canker damage occurs to the canes. Cane infections may approach 100 percent where no controls are practiced.

SYMPTOMS

The first symptoms on the canes are small yellow, dark red, or purple spots that gradually enlarge and may girdle or partially girdle the cane. Complete girdling results in dieback or poor growth of the parts above the affected area. Minute black fruiting bodies of the canker-causing fungus or fungi are visible in the cankered areas.

When infection is extensive, cankers may spread down the canes to the crown, where the fungus then spreads into other canes. In such cases, the entire plant may wilt, wither, and die.

Penetration and infection occur chiefly through wounds in the epidermis caused by pruning cuts, thorn abrasions, frost cracks, hail damage, cultivar wounds, insect and rodent injuries, or flower removal. Broken thorns and leaf and thorn scars also serve as entries for infection. In some instances, the canker fungi can invade the uninjured, tender epidermis of new growth or dormant buds.

The three most common canker diseases of roses in Illinois are stem blight and canker (also known as common canker), caused by the fungus *Coniothyrium fuckelii* (teleomorph *Diaplella coniothyrium*); brand canker, caused by the fungus *Coniothyrium wernsdorffiae*; and brown canker, caused by the fungus *Cryptosporella umbrina* (anamorph *Diaporthe umbrina*).

Brown canker is the most destructive of the three diseases. Outdoor roses—primarily floribundas, hybrid teas, and hybrid perpetuals—are the most susceptible to brown canker. Rugosa (*Rosa rugosa*), moss (variety of *R. centifolia*), and brier (*Rosa* spp.) roses show some resistance.



Figure 1. Initial infection lesions of brown canker on rose canes in various stages of age.

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Stem canker, although more prevalent than brown canker (occurring on both outdoor and greenhouse roses), is less injurious because the causal organism is a weak parasite. With both brown and stem canker, all aboveground plant parts may be attacked, but the canes are the most commonly and seriously infected.

Compared with stem and brown cankers, brand canker is a minor problem and is primarily confined to the canes. It occurs chiefly on rambler roses, especially those covered by some kind of winter protection, such as soil or other mulch, which promotes moist conditions conducive to infection.

Brown Canker

Very small, reddish to bluish purple, often slightly raised, circular spots appear during the growing season on the current year's canes. As the lesions enlarge the centers turn a grayish white and are surrounded by a purple to reddish purple margin. The spots may be so numerous and closely grouped that they coalesce into large whitish tan patches with purple margins (Figure 1). Minute, raised, reddish brown to black fruiting bodies (pycnidia and perithecia) of the fungus occur in the affected areas.

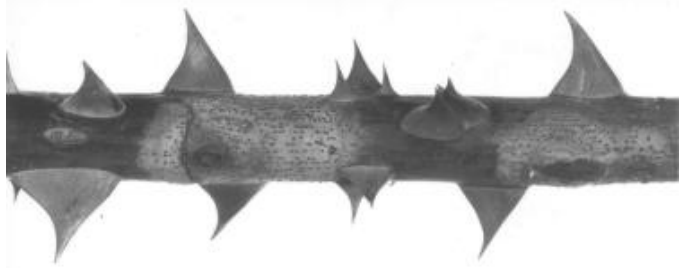


Figure 2. Brown canker. Note the minute black fruiting bodies of the fungus in the cankered areas. (Courtesy Department of Plant Pathology, Cornell University)

During the winter and early spring, particularly on portions of canes covered with soil or other moist mulch, the whitish patches on the one-year-old canes often become surrounded by tan to dark brown, often variegated cankers with purple borders. These cankers commonly reach several inches in length and often girdle the canes (Figure 2). In wet spring weather these large cankers are covered with spore masses or yellow tendrils of spores containing conidia and ascospores (Figure 3). The cankers may enlarge and girdle the stem, causing dieback from the tip.



Figure 3. Fruiting bodies (pycnidia) of the brown canker fungus rupturing the epidermis (lower right corner) and spore tendrils extending from the mouths of others (above thorn). (Reproduced from 1927 American Rose Annual).

Although the disease is most common on the canes of outdoor roses, infections may also occur on the leaves and flowers. The leaf spots range from purple to buff or are grayish white with a purple margin. The flower spots are often a cinnamon-buff color, usually bearing the dark, dot-like fruiting bodies in concentric zones (Figure 4). Diseased flower petals may remain attached or drop to the ground. Infected buds may sometimes fail to open and often remain on the plant until the following spring. The hips (fruits) and calyx lobes may also become infected and bear the minute dark fruiting bodies of the fungus.

Stem or Common Canker

This disease occurs on both outdoor and greenhouse-grown roses. It is widespread in occurrence. Small, pale yellow to reddish spots appear in the bark around wounds, especially at the end of stubs left after pruning (Figure 5). These spots gradually increase in size, and the infected dead tissue (or canker) turns light brown with a dark brown margin. The epidermal tissue within the canker dries out, shrinks, and sometimes cracks (Figure 6) exposing sooty masses of spores (conidia). The stem may ultimately be

girdled, resulting in wilting and death from the cane tip back to the cankered area. Large numbers of minute, black fruiting bodies (pycnidia) rupture the epidermis and are covered by sooty masses of blackish brown conidia. Hybrid tea varieties are more commonly infected with stem canker than other types of roses. Symptoms occur initially at the union of rootstock and scion in warm, moist propagating areas and development continues in the dead wood when plants are removed to the greenhouse. The disease can be serious on rose plants in storage and on recently planted roses, especially if they are placed under stress.

Brand Canker

The first symptom is the appearance of small, dark reddish spots on the canes, often starting around insect or other wounds (Figure 7). As the spots gradually enlarge, their centers turn light brown and have a definite reddish brown or purple margin that contrasts sharply with the green of the rose cane. Minute, raised, black fruiting bodies (pycnidia) appear just before the center of the lesion turns brown. As the pycnidia enlarge, small longitudinal slits appear in the epidermis above them, exposing black masses of microscopic spores (conidia). These tiny slits are characteristic of brand canker. The cankers may enlarge and girdle the cane, resulting in dieback from the tip and eventually death of the entire cane. This rather rare disease is most serious on outdoor climbing roses that are protected for winter by soil, evergreen boughs and leaves, or other moisture-retentive materials. The disease is sometimes confused with common canker.

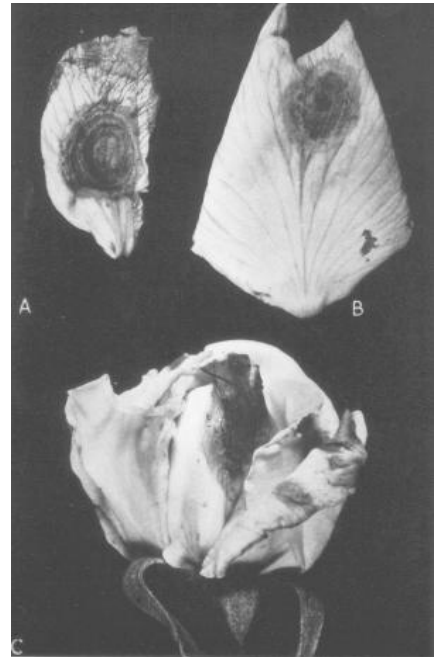


Figure 4. Flower petals (A and B) and blossom (C) attacked by the brown canker fungus. (Reproduced from 1927 *American Rose Annual*)

DISEASE CYCLE

The mycelia of the canker fungi overwinter in stems and perhaps also in other infected parts. In late winter or early spring, the mycelium renews growth and extends the area affected. Fruiting bodies produced in cankered areas mature, rupture the epidermis, and release spores in masses of yellow tendrils. The spores are liberated and spread by splashing or dripping water and wind-blown rain. Lesions are evident within 4 to 15 days after infection, and the dark fruiting bodies soon form within them. Cankers may develop throughout the growing season when conditions are favorable.

CONTROL

1. Good sanitation is the primary means of control. Prune canes in the fall and early spring, according to type and cultivar. All dead wood and infected canes should be removed when first observed. In addition, inspect plants frequently. Promptly prune out, remove, and burn or haul away with the trash all infected, dead, and weak parts of canes, as well as infected leaves, flowers, buds, and hips.



Figure 5. Stem or common canker that has started at the cut end of a stub left after pruning and progressed almost to the node.

When pruning out cankerous parts of stems, cut back to a strongly growing shoot or branch at least 2 to 3 inches below the infected portion. Before each pruning cut, dip the shears in a disinfectant solution of 70 percent rubbing alcohol, or liquid household bleach (1 part of bleach to 9 parts of water).

When pruning and cutting flowers, make clean cuts with **sharp** pruning tools no more than 1/4 inch above a node, and on a slant parallel to the angle of the bud or leaf petiole at the node. When cuts are made too far above a node, the remaining stem stub may die and frequently becomes an entry point for infection. If cuts are properly made immediately above a node, the wound tissue remains alive and will callus over, thus preventing infection.

2. Because wounds heal more readily early in the growing season, prune moderately just before or just after growth starts in the spring. Fall pruning is also recommended because it removes long canes whose thorns could injure adjacent canes when whipped by winter winds.
3. Purchase only top-quality, disease-free plants from a reputable nursery. "Cutrate" roses are often infected. Examine plants carefully before planting to make certain they are free of cane bruises or colored spots indicative of incipient infections.
4. Maintain plants in high vigor.

- a. Proper planting. Use well-prepared and well-drained soil, high in organic matter, where roses will receive sunlight all day (or a minimum of 6 hours daily). Do not plant near large shrubs or trees that will shade the roses and compete with them for moisture and soil nutrients.
- b. Space plants for good air circulation and at the suggested distance for the cultivar, type of rose, and effect desired.
- c. Do not handle or work among plants when the canes and foliage are wet.
- d. Fertilize based on a soil test. Avoid excessive applications of high-nitrogen fertilizers. Newly planted roses should not be fertilized until they are well established and growing steadily. The soil reaction (pH) should be between 5.5 and 6.5.

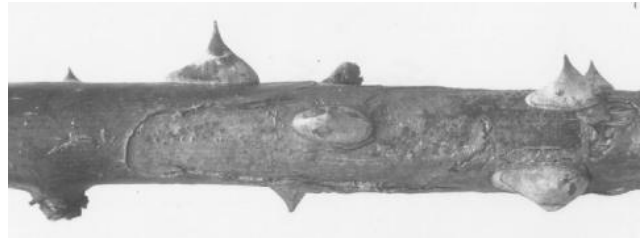


Figure 6. Stem canker showing tissues dried and shrunken. (Courtesy L.P. Nichols, Department of Plant Pathology, Pennsylvania State University).



Figure 7. Brand canker of rose. A. Early stages in lesion development. B. Brand canker lesions around treehopper wounds. (Reproduced from Cornell University Agricultural Experiment Station Memoir 153).

- e. Water thoroughly at weekly intervals during periods of drought. The soil should be moist 8 to 12 inches deep. Avoid overhead irrigations and syringing the foliage when watering, especially in late afternoon or evening. Use a soil-soaker hose or some method that will not wet the foliage.
 - f. Protect plants for the winter following local recommendations. Winter safeguards provide insulation against extremely low temperatures and alternate periods of freezing and thawing, as well as protection against damage by wind or heavy snow and ice. If mounding the canes with soil for winter protection, do not add leaves, evergreen boughs, or other material that will add to the moisture content. Brand canker can be controlled almost entirely by leaving climbing roses uncovered during the winter.
 - g. Whenever possible, destroy nearby wild or uncared-for roses. These plants commonly serve as a source of infection for garden roses.
5. Always handle plants carefully to avoid injury to the stems (even small breaks in the epidermis) since all canker fungi are wound pathogens.
6. Thoroughly spray all aboveground parts of each rose plant, including both leaf surfaces, with a suggested fungicide. Start as the buds break open in the spring and continue into September or early October.

Spraying is more efficient than dusting. Sprays are required at 7- to 10-day intervals to keep the young, susceptible growth adequately covered. If the period is unusually rainy and warm (above 60°F or 15.5°C) the spray intervals need to be shortened to 5 days; if dry, lengthened up to 10 days. The fungicide must be present on the leaves, canes, and other susceptible parts prior to rainfall. If possible, sprays should be applied before it rains to provide maximum protection of the foliage and canes from spores that are distributed by splashing water.

When possible, apply combinations of one or more fungicides, insecticides, and a miticide to control a wide variety of diseases and animal pests. Insect penetration and feeding wounds in particular are entry points for canker fungi. Many spray mixes for roses are available. Check the label to be sure it contains one or more of the fungicides listed in Illinois Homeowners' Guide to Pest Management and an insecticide recommended by the University of Illinois Extension Entomologists. In general, 1 gallon of spray mix will cover 10 to 20 rose bushes. Spray to the point of runoff (plants begin to drip). In terms of nurseries, 100 gallons of spray are needed for half an acre in midsummer.

When spraying hard-to-wet canes and foliage, add a small amount of a household detergent (about ½ teaspoonful per gallon) or use a commercial spreader-sticker (surfactant) if your preparation does not already contain a surfactant. Follow the directions on the container label.

A dormant spray of liquid lime-sulfur applied to canes and surrounding soil just before adding the winter protection and again just prior to budbreak in the spring helps control cankers plus a wide range of other disease and insect pests. **Do not apply after** bud break. Add 1 part of liquid lime-sulfur to 9 parts of water. Lime-sulfur is caustic and disagreeable to apply and will discolor paint. Lime-sulfur should not be exposed to freezing. Use lime-sulfur alone; it is not compatible with most fungicides and insecticides.