



Blueberry Cankers & Twig Blights

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IMPORTANCE

Blueberry diseases are generally a minor problem in most Kentucky locations as long as the proper planting site is selected and good cultural practices are followed. However, stresses, such as improper pH

and freeze injury, can predispose plants to canker, tip blight, and twig blight diseases. Once established, these diseases can diminish plant health and reduce yields in commercial and residential plantings.

PHOMOPSIS TWIG BLIGHT

SYMPTOMS & SIGNS

Phomopsis twig blight affects twigs and flower buds on 1-year-old canes. Early symptoms occur shortly after green-tip, when buds begin to turn brown and die. Necrotic, reddish-brown, circular lesions (FIGURE 1) often develop around these blighted buds, become sunken, and spread downward into woody tissues. Cankers eventually girdle twigs and branches, causing sudden wilting of leaves and flagging with the onset of warm summer weather; leaves often turn reddish and remain attached. Fungal fruiting structures (pycnidia) may form on dead twigs (FIGURE 2).

Under severe disease conditions or when plants become stressed or wounded, other tissues may become infected. The fungus can infect branches, causing cankers that girdle and kill entire branches (FIGURE 3). These infections may occur on young or

mature branches, particularly if a wound serves as an entry point for the fungus. As cankers expand, they can cause dieback or flagging. The pathogen can also cause leaf spots, which are initially reddish in color, later developing tan centers peppered with pycnidia. Late-season symptoms may include premature ripening of fruit or fruit rot.

CAUSE & DISEASE DEVELOPMENT

Twig blight is caused by *Phomopsis vaccinii*, a fungus that overwinters in dead or infected twigs and branches. During spring, spores ooze from fruiting bodies (pycnidia) in stem lesions at the same time as bloom. Spores (conidia) are dispersed onto flowers by rain splash, and infection occurs through opening buds. From the blossoms, the pathogen invades the twig's vascular system; multiple unopened flower buds die as a result (FIGURE 4). Spores can also infect through

wounds on young woody stems or newly emerging branches, causing cankers. During the second year, twigs become blighted and bud loss is more severe. Infection through stems is most common on those damaged or wounded by freeze.



FIGURE 1. PHOMOPSIS CANKER LESIONS ARE INITIALLY REDDISH-BROWN AND DEVELOP AROUND BUD SITES ON 1-YEAR-OLD SHOOTS.



FIGURE 2. PHOMOPSIS CANKER CAUSES GIRDLING OF TWIGS AND BRANCHES; DARK PYCNIDIA ARE OFTEN VISIBLE IN LESION CENTERS. **FIGURE 3.** THE PHOMOPSIS PATHOGEN CAN INFECT NEW BRANCHES AND OLDER WOOD CAUSING RAPID DIEBACK. **FIGURE 4.** PHOMOPSIS FLOWER AND BUD BLIGHT RESULTS IN RAPID DIEBACK AND LOSS OF FLOWERS AND FRUIT.

BOTRYOSPHAERIA DIEBACK / STEM BLIGHT

SYMPTOMS & SIGNS

Botryosphaeria dieback symptoms include yellowing, reddening, and drying of leaves on infected branches. As disease progresses, leaves turn brown but remain attached (FIGURE 5). Brown or tan lesions develop on twigs and branches. When infected branches are cut in cross section, internal wood appears brown on the diseased side of the branch (FIGURE 6). Fungal fruiting bodies may form in dead wood and appear as tiny dark specks. Young plants are more susceptible than older and well-established ones. Blighted young plants can die within 1 to 2 years. Symptoms are often mistaken for winter injury.

CAUSE & DISEASE DEVELOPMENT

Dieback is caused by the fungus *Botryosphaeria dothidea*, which overwinters in infected cankers and dead branches. Two types of fungal structures release spores (conidia and ascospores) that are carried by wind and rain to susceptible tissues. Infections occur in spring (May to June) when temperatures reach 82°F to 88°F. The pathogen enters host tissue primarily through wounds (e.g. physical injury, pruning cuts) or infection sites created by other branch diseases; natural openings (lenticels) may also provide ports of entry. The pathogen invades the plant's water conducting tissues (vascular system) causing the brown discoloration observed in branch cross-sections (FIGURE 6B). Disease susceptibility decreases as plants mature.



FIGURE 5 BOTRYOSPHAERIA DIEBACK / STEM BLIGHT CAUSES YOUNG SUCCULENT BRANCHES TO DIE. **FIGURE 6.** INTERNAL WOOD OF DISEASED BRANCHES BECOMES DISCOLORED ON THE SIDE OF THE INFECTION (A); THE DISCOLOURATION IS SHOWN IN CROSS-SECTION HERE (B).

BOTRYOSPHAERIA STEM CANKER

SYMPTOMS & SIGNS

Botryosphaeria stem canker first appears as small red lesions on succulent twigs, which often resemble winter injury. These lesions develop into girdling cankers that result in dieback above the cankers; centers of cankers become filled with tiny black fungal fruiting structures. Second-year cankers may have a rough or blistered appearance (FIGURE 7).



FIGURE 7. BOTRYOSPHAERIA STEM CANKERS APPEAR RED WITH A ROUGH BLISTERED APPEARANCE.

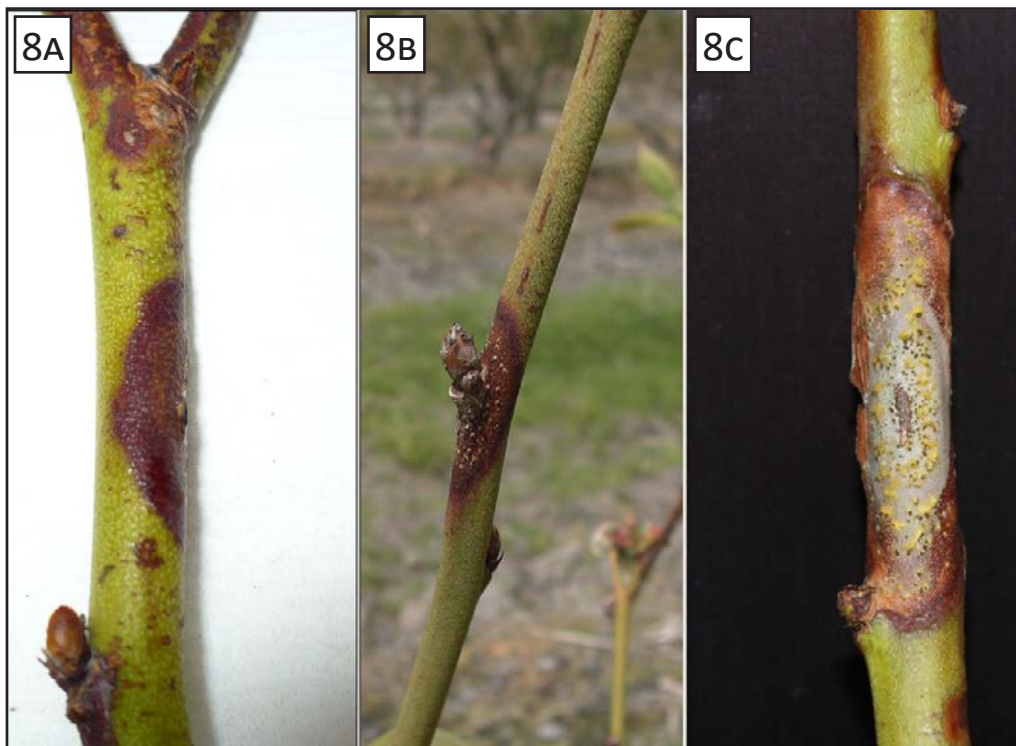
CAUSE & DISEASE DEVELOPMENT

Stem canker is caused by *Botryosphaeria corticis*, a fungus that overwinters in infected and dead branches. Spores (conidia and ascospores) are released from fungal structures and carried via rain splash, wind, insects, and contaminated pruning tools to susceptible hosts. This opportunistic pathogen invades the wounds and natural openings of stressed (improper pH, drought, winter-injured) plants. Wet conditions with temperatures between 77°F and 82°F are optimal for spore production and infection. The fungus only initially infects the current season's growth and may not seriously affect plants the first year. However, once established, disease can spread into older tissues and, without proper disease management, become more severe each year.

FUSICOCCUM CANKER / GODRONIA CANKER

SYMPTOMS & SIGNS

Fusicoccum canker begins as small, reddish-brown lesions at wound (FIGURE 8A) or bud sites (FIGURE 8B) on current-year branches. As lesions enlarge, their centers become gray with darker margins (FIGURE 8C). Abundant fungal structures (pycnidia) develop as tiny dark specks within cankers. Enlarging cankers girdle branches and may become sunken; premature autumn coloration and dieback result.



CAUSE & DISEASE DEVELOPMENT

Fusicoccum canker is caused by *Godronia myrtilli* (syn. *G. cassandrae* f. sp. *vaccinii*; asexual stage: *Fusicoccum putrefaciens*). This fungus overwinters in old cankers, initially releasing spores (conidia) in spring and early summer; however, spores may also be released in autumn if conditions are favorable. Spores can be dispersed by overhead irrigation or rain splash to wounds (physical injury, pruning cuts, winter-injured tissues), leaf scars, or bud sites on new wood. Young twigs are more susceptible to infection than mature ones. Prolonged wet conditions and temperatures between 50°F and 75°F favor infection and disease development.

FIGURE 8. FUSICOCCUM CANKER COMMONLY INITIATES AT A WOUND (A) OR BUD SITE (B). AS LESIONS EXPAND, CENTERS BECOME GRAY; ABUNDANT SPORULATION IS EVIDENT DURING WET CONDITIONS (C).

ANTHRACNOSE

SYMPTOMS & SIGNS

Anthracnose is primarily a disease of blueberry fruit (ripe rot, FIGURE 9), but it can also affect twigs (Figure 10) and shoot tips. Infections often originate in infected blossoms and then spread to twigs, resulting in dark brown lesions. Fungal fruiting structures (acervuli) develop within lesions, often in concentric rings, and produce masses of sticky, salmon/orange/pink, slimy spores (conidia). As lesions girdle twigs or shoots, they die beyond the canker.

CAUSE & DISEASE DEVELOPMENT

Anthracnose is a fungal disease caused by the fungus *Colletotrichum fioriniae* (*C. acutatum* species complex), but it can also be caused by other *Colletotrichum* species. These fungi overwinter in diseased branches, old fruit spurs, and bud scales, as well as on infected fruit left on the plant or on the ground. Spores (conidia) are released during rainy periods throughout the growing season and are spread via rain splash and overhead irrigation. The sticky spores can also be spread by workers and equipment. Infections may occur anytime, beginning during bloom. Temperatures between 60°F and 80°F, along with leaf wetness exceeding 12 hours, favors infection.



FIGURE 9. ANTHRACNOSE RIPE ROT IS RECOGNIZED BY MASSES OF SALMON-COLORED STICKY SPORES.

FIGURE 10. THE SHOOT BLIGHT PHASE ORIGINATES IN BUDS AND SPREADS INTO TWIGS AND BRANCHES.



DISEASE MANAGEMENT

The key to avoiding most blueberry disease problems is proper site selection, maintaining an appropriate soil pH, and following good crop management practices. While the timely application of approved fungicides or biological control agents can be employed when needed, following sound cultural practices and using disease resistant cultivars can minimize the need for fungicides.

PLANTING MATERIAL

- Select disease-resistant or tolerant cultivars when they are available.
- Purchase only healthy, disease-free, virus-indexed plants from a reputable nursery.

SITE SELECTION

- Choose a planting site with good air circulation and fully exposed to direct sunlight throughout the day. Avoid frost pockets.
- Plant into well-drained soil with a high organic content.

- Begin adjusting soil pH 1 or 2 years prior to planting in order to obtain a desired pH of 4.5 to 5.2; continue to monitor pH after planting and modify as needed.

CULTURAL PRACTICES

- Remove infected twigs during dormancy and blighted twigs that develop during the growing season by cutting at least 6 inches below infected tissue. Old, weak branches and twiggy growth should also be removed. Destroy prunings.
- Prune plants that have a dense canopy to improve air circulation and sunlight penetration, thus promoting more rapid drying of fruit and foliage.
- Protect plants from late-winter injury and unnecessary wounding.
- Avoid overhead irrigation to reduce splashing spores.
- Control weeds.
- Water plants regularly during dry periods to reduce stress.
- Avoid late season fertilization (August or later), as plants may not harden-off properly prior to winter.

DISEASE MANAGEMENT (CONT'D)

FUNGICIDES

If good cultural practices are followed, fungicides are generally only necessary in high-risk plantings where potentially damaging disease has occurred and become established in the planting. Fungicides must be applied preventively and are ineffective once infection occurs.

- A dormant application of lime sulfur during bud break is recommended in plantings where disease is established.
- Protectant, preventative fungicides may be applied at bud-break and at regular intervals through full bloom in plantings with high risk for infection.
- Additional fungicide applications can be added after harvest for severely diseased plants, especially if weather conditions are wet.

ADDITIONAL RESOURCES

- Commercial Midwest Fruit Pest Management Guide (ID-232)
<https://plantpathology.ca.uky.edu/files/id-232.pdf>
- Growing Blueberries in Kentucky, HO-60 (University of Kentucky)
<http://www2.ca.uky.edu/agc/pubs/ho/ho60/ho60.pdf>
- Iron Deficiency of Woody Plants (ID-84)
<http://www2.ca.uky.edu/agcomm/pubs/ID/ID84/ID84.pdf>
- Midwest Blueberry Production Guide (ID-210)
<http://www2.ca.uky.edu/agcomm/pubs/ID/ID210/ID210.pdf>

January 2022

Editor: Cheryl Kaiser, Plant Pathology Extension Support

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Revised from the fact sheet, *Blueberry Diseases* (PPFS-FR-S-10) by John Hartman, Sara Long, and Paul Bachi