

An Introduction to Black Knot

Apiosporina morbosa

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Black knot is a fungal disease, caused by *Apiosporina morbosa*, that attacks stone fruit species in the genus *Prunus*. Black knot is known for irregular, thick, black swellings on limbs. Severe infestations can reduce production drastically, reducing infected trees to a worthless condition in a few years if the disease is not addressed.

Disease susceptibility

Black knot is very common on plums (Figures 1, 2 and 3) and wild cherries (Figures 4 and 5); however, it is rarely seen on peaches and apricots. Susceptibility of tart cherries seems to be regional, with some areas having heavy infestations and others little or none.

Plum species affected by it are American plum (*Prunus americana*), Canadian plum (*P. nigra*), European plum (*P. domestica*), Japanese plum (*P. salicina*) and Purple Leaf plum (*P. cerasifera*).

Cherry species sensitive to black knot are chokecherry (*Prunus virginiana*) and European bird cherry (*P. padus*). Other species of cherries, like pin cherry (*P. pensylvanica*), sand cherry (*P. pumilla*), tart cherry (*P. cerasus*), Nanking cherry (*P. tomentosa*) and Western sand cherry (*P. var. besseyi*), are more tolerant.

Disease biology

Black knot can be confused with crown gall, a bacterial disease that will occasionally cause galls, or abnormal outgrowths of plant tissue, in branches of tree fruits; however, surfaces of black knot tend to be darker in color and rougher than crown galls.

Disease development is most active in spring and the season from early bloom to shortly after shuck split. Development is favored by frequent wetting periods and temperatures above



Figure 1. Early symptoms – Two-year-old shoot is showing swelling, rough bark and a small wart-like dark brown-blackish knot. (Photo credit: M. Danilovich)



Figure 2. Three-year-old shoot with two wart-like knots merging into one right above the bud scar from previous years. (Photo credit: M. Danilovich)

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Disease management

55 degrees Fahrenheit. The causal pathogen overwinters in infected branches and galls of infected trees or pruned branches. During wetting events in the spring, the fungus starts to sporulate and release sexual stage ascospores that are carried by the wind and physical contact. Spores that land on susceptible young branches, twigs and leaf stems will germinate and invade the intercellular space where symptoms are not immediately visible.

During the infection process, the fungus causes host tissue to swell, resulting in olive-colored tissue that is noticeable by the end of the summer or next spring. (Figures 1 and 2). After the first year, the infected areas are swollen, black, rough, irregular galls. As the galls age, they develop a lighter brown appearance and start to disintegrate. It takes approximately two years from infection for the fungus to start producing and releasing ascospores (Figure 3).

Avoid purchasing nursery stock with visible gall symptoms. Selecting plum varieties with more resistance helps. Plum varieties with some resistance to this disease include Shiro, Castleton, Santa Rosa, Methley, Early Italian, Fellenberg, Seneca, Damson, Blufree, NY9, Au Rosa and President. Very susceptible varieties include Stanley, Valor, Shopshire and Rosy Gage.

Effective black knot management requires both cultural and chemical approaches. Cut out all knots, including those on nearby wild hosts, to reduce chances for future infections. Knot removal should be done in winter or in the spring before bud break.

To remove infected tissue not yet showing symptoms, pruning cuts should be made to include the knots plus an additional 8 to 10 inches of growth closer to the trunk. Black knot galls on main scaffolds or on trunks need to be removed by chisel. At least 1 to 2 inches of healthy tissue around the knots must be removed as well. Pruned branches with knots should be promptly removed from the site and burned to eliminate them as a source of infection.



Figure 3. Fully developed black knot. (Photo credit: M. Danilovich)



Figure 4. Black knots on cherry, showing swelling with rough bark at the end of a shoot just below some spurs. (Photo credit: M. Danilovich)



Figure 5. Black knots on cherry, showing swelling with rough bark at the end of a shoot just below some spurs. (Photo credit: M. Danilovich)

For more information

An important precaution is removing wild plums and cherries from fence rows and nearby wooded areas whenever practical. The best recommendation is to choose black knot resistant or highly tolerant varieties for planting.

Managing black knot in an orchard showing symptoms is at least a two-year project as there are also infections that will not become visible until the following year.

Chemical treatments should start early, approximately at bud break in the spring, as protectant sprays. Fungicides are applied at seven- to ten-day intervals from green tip/tight cluster to mid-June when the active shoot growth stops. These are the most commonly used sprays:

- *Chlorothalonil* (available under various product names such as *Daconil*, *Docket DF*, *Bravo*, *Chloronil* and *Echo*) – an effective contact material also useful for brown rot. Check the label to make sure the product is labeled for the crop. This product cannot be used after shuck split.
- *Febuconazole* (*Indar*) – a systemic material used by the commercial fruit industry that is also effective for brown rot. This should be rotated with other materials to help avoid chances for fungal resistance.
- *Topsin M* – relatively effective. Adding Captan is recommended to help reduce chances for resistance.
- *Captan* – Not effective by itself. Caution: Captan applied after bloom may cause leaf burn (shot-holes) and after shuck off can cause fruit spotting in Stanley and some other European and some Japanese plums.
- *Wettable sulfur* – only moderately effective for this disease.

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Date created: October 2018

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AG18-345