TREE FRUIT CROPS

CORNELL COOPERATIVE EXTENSION

IPM Integrated Pest Management

Disease Identification
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Black Knot of Plums

Dibotryon morbosum (Schw.) Theiss & Syd.
(synonym = *Apiosporina morbosa* (Schw.) Arx)

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Black knot is a common and often serious disease of plum and prune trees in New York. Once established, the disease becomes progressively more severe each year unless control measures are taken. Infected limbs and twigs lose vigor and may eventually die, and commercial plantings in which the disease becomes widespread are seldom economically viable to maintain. Black knot is occasionally found on cherries, peaches, and apricots but is seldom a problem on these trees.

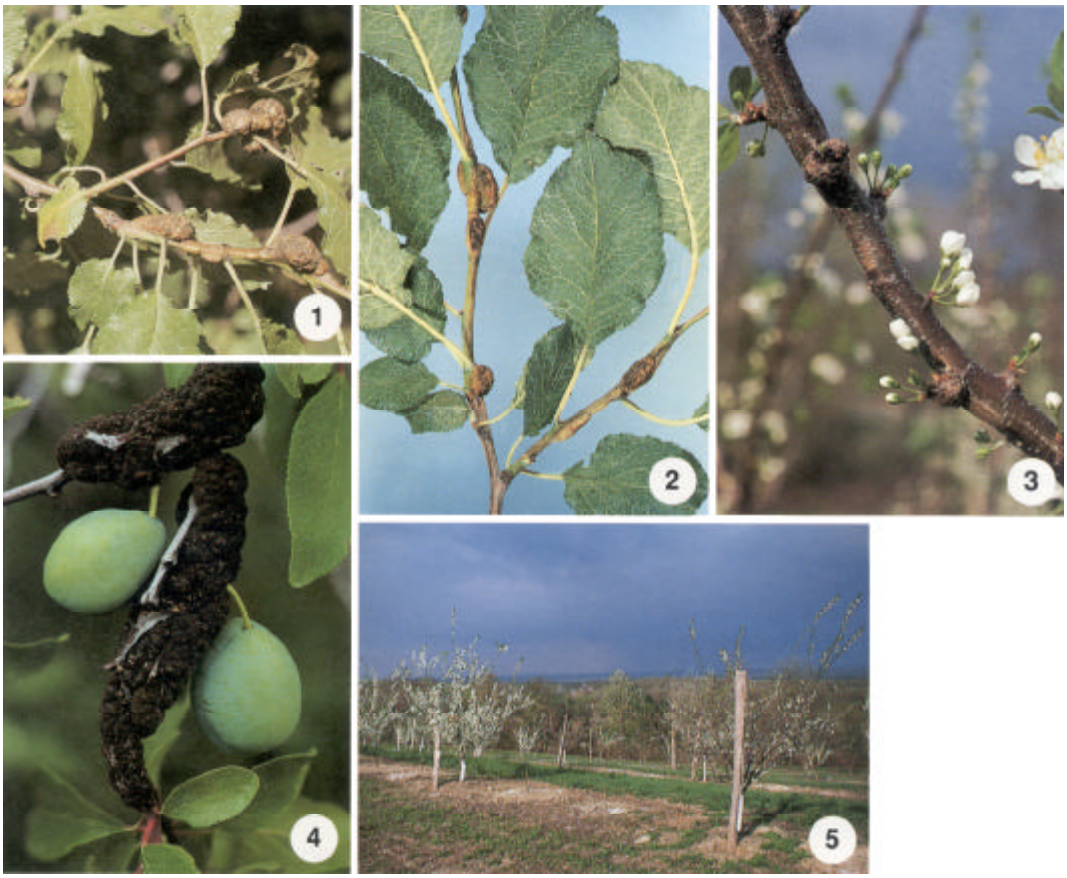
Symptoms

The disease is characterized by elongated, rough black swellings or knots that develop on the woody portions of infected trees. These knots are most common on small twigs and branches (figs. 1 and 2) but may be found on main scaffold limbs and even the trunk in heavily infected orchards. Knots often start to form near the point of leaf attachment (figs. 2 and 3). They are initially green and soft but then turn brown, harden, and finally become black as they expand and age (fig. 4). Mature knots eventually encircle the infected branch and may be several inches to 1 foot (30 cm) or more in length. Old knots are sometimes partially covered with a powdery pink or white fungus growth and are often invaded by insect borers. Numerous infections cause trees to lose vigor, bloom poorly (fig. 5; infected tree right foreground, healthy tree left foreground), and become increasingly unproductive and susceptible to winter injury.

Most plum cultivars grown in New York, including Stanley and Damson, are susceptible to this disease. It has been reported that Early Italian, Brodshaw, and Fallenburg are somewhat less susceptible than Stanley; Shiro, Santa Rosa, and Formosa are much less susceptible; and President is apparently resistant to black knot.

Disease Cycle and Causal Organism

Black knot is caused by the fungus *Dibotryon morbosum* (another name for the fungus is *Apiosporina morbosa*). The fungus overwinters in knots on twigs and branches or in the infected wood immediately surrounding them. In the spring, infective spores (ascospores) are produced in sacs (asci) contained within tiny fruiting bodies on the surface of the knots. These ascospores are ejected into the air during rainy periods and are blown for moderate distances by wind currents. Only succulent green twigs of the current season's growth are susceptible to infection. Ascospores that land on them may germinate and cause infection if the twigs remain wet for a sufficient length of time.



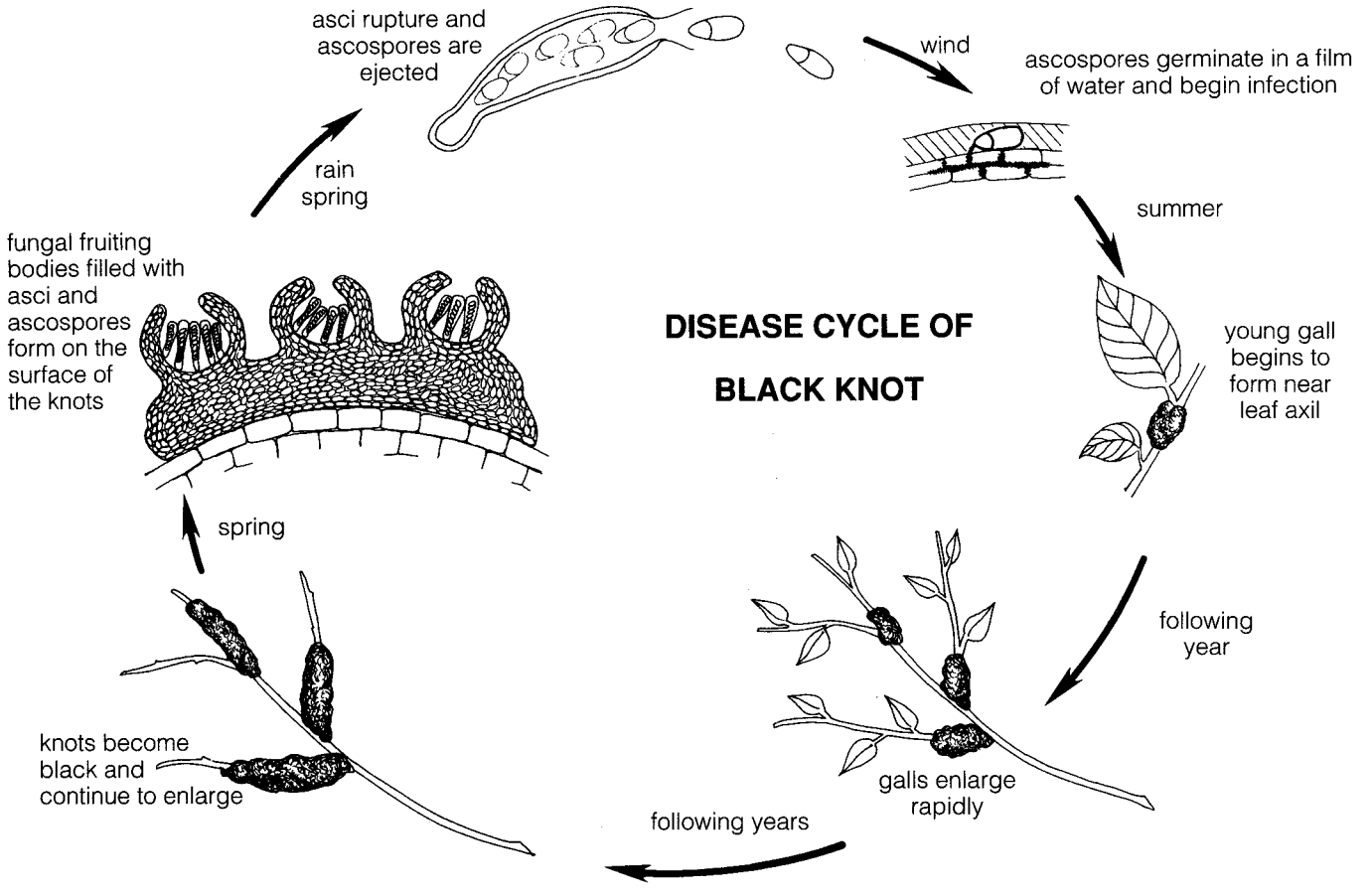
Normal growth is disrupted in the infected regions, and a knot is formed as the fungus causes the plant to produce tumorlike growths. Knots may become visible by the late summer of the year of infection but often are not noticed until the following spring, when they begin to enlarge rapidly. New ascospores capable of spreading the disease may be formed in the young knots the year following infection but often are not formed until the second spring. The fungus continues to grow in infected wood during the spring and fall months, causing the knots to elongate several inches each year and eventually girdle affected twigs and branches.

Ascospores are potentially available from the time of bud break until terminal shoot growth stops, but the greatest number appear to be released during the period between white bud and shuck split. Although the precise environmental conditions required for infection are uncertain, only a few hours of rain apparently are required at temperatures above 55° F (13° C), whereas much longer rainy periods are required to produce infection at temperatures below this threshold.

Control

The primary goal of any black knot control program should be to limit the amount of ascospore inoculum available to cause infection. When establishing a new plum or prune orchard, avoid planting trees next to or downwind from an old or abandoned orchard with a significant black knot problem. Similarly, remove all wild plum and cherry trees (potential disease reservoirs) from fencerows or woodlands next to the orchard site. The value of these preliminary steps for increasing an orchard's longevity cannot be overemphasized. Established orchards should be scouted each year for the presence of black knot, and infected twigs should be pruned and burned or buried before bud break. Chopping prunings with a flail mower (to strip infected bark and knots from wood) is an alternative method of destroying infected prunings if burning or burying is impractical. It is important to prune at least 2–4 inches (5–10 cm) below each knot because the fungus grows beyond the edge of the knot itself. If pruning is not possible because knots are present on major scaffold limbs or the trunk, they can be removed by cutting away the diseased tissue down to the wood and out at least 1/2 inch (1 cm) beyond the edge of the knot.

Fungicide programs (check current recommendations for approved materials) can offer significant protection against black knot but are unlikely to be effective if pruning and sanitation are ignored. The timing of fungicide sprays should be adjusted to account for inoculum levels and weather conditions. Where inoculum is high because of an established black knot problem or a neighboring abandoned orchard, protection may be needed from bud break until early summer. Where inoculum has been maintained at low to moderate levels, sprays are most likely to be useful from white bud through shuck split (the period of maximum availability of ascospores). Fungicides are most necessary and will provide the greatest benefit if applied before rainy periods, particularly when temperatures are greater than 55° F (13° C). In evaluating control programs, remember that knots often do not become apparent until the year following infection.



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