UNIVERSITY OF ILLINOIS EXTENSION
College of Agricultural, Consumer and Environmental Sciences

report on
PLANT
DISEASE

RPD No. 809
September 2000

DEPARTMENT OF CROP SCIENCES
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

BLACK KNOT OF PLUMS AND CHERRIES

Black knot of plums and cherries, caused by the fungus *Dibotryon morbosum* formerly named *Apiosporina morbosum*) is a widespread and serious disease throughout the United States. In Illinois, black knot is common on wild plums and cherries and in home orchards, where pruning and spraying are not practiced regularly.

Black knot disease damages American, European, and Japanese cultivars of plums and prunes. The damage is less severe on sweet and sour cherries and Mahaleb cherry. Rarely is there damage to apricots, peaches, flowering almond, blackthorn, and other *Prunus* species. On an infected tree, the disease becomes more severe with each growing season. Eventually, it will stunt or kill the tree unless effective control measures are followed.

Figure 1. Young black knot galls are brown swellings that rupture the bark. Older galls are hard, crusty, and coal black in color.

Symptoms

The black knot fungus generally infects the twigs, branches, and fruit spurs, but trunks also can become diseased. Most infections originate on young growth. An abnormal growth of bark and wood tissues produces small, light brown swellings that later rupture as they enlarge (Figure 1). In late spring, the rapidly growing young knots have a pulpy to corky texture and are covered with a velvety, olive green fungal growth (Figure 2). During the summer, young knots turn darker and elongate. By the fall they are hard, brittle, rough, and coal black (Figure 3). During the second summer, the canker enlarges, mostly along the infected twig or branch, and gradually girdles the infected part.

The cylindrical or spindle-shaped swellings on a single branch or tree may vary from half an inch to a foot or more in length and up to 2 inches in diameter. Smaller knots may merge to form extensive galls. After the second year, the black knot fungus usually dies and the gall is invaded by secondary fungi (such as *Trichothecium roseum*) that give old knots a white or pinkish color during the summer. Insects frequently colonize older galls.

Once infected, smaller twigs usually die within a year. Several years may pass before larger branches are girdled and killed by the perennial, ever-enlarging knot. The whole tree gradually loses vigor and dies as the severity of the disease increases.

For further information, contact Mohammad Babadoost, Extension Specialist in Fruit and Vegetable Pathology, Department of Crop Sciences, University of Illinois, Urbana-Champaign (217/333-1523; email: babadoos@uiuc.edu).

Disease Cycle

Spores of the fungus spread the disease. Two types of microscopic spores are produced from early spring to early summer on the surface of 1- and 2-year-old knots (Figure 4). Both types of spores are carried by the wind or are splattered by rain onto the surface of young wood, where they germinate. From there, the spores either penetrate the bark directly or enter through wounds—primarily on recent growth and usually in the crotches of twigs and branches. Most infections occur between bud break and 2 weeks after bloom, when wet conditions are accompanied by temperatures of 55° to 77° F (13° to 25° C). Infections will continue until terminal growth stops or the supply of spores is exhausted. The trees are most vulnerable during blossoming.

Figure 2. Young black knot tissue covered with velvety, olive green growth of Dibotruon morbpsum.

The infections are not obvious until fall when they appear as small, light brown swellings (Figure 1). The following spring, the swellings enlarge rapidly and a velvety layer of asexual spores (conidia) is produced on the canker surface (Figure 4). From early spring to early summer, air currents and splashing rains spread the conidia to new infection sites on the same tree or ones nearby.

By the second winter, the knots have become coal black, hard, crusty galls. Sexual fruiting structures of the fungus (perithecia) are formed just beneath the surface of the cankers (Figure 4a). Ascospores (Figure 4c) produced in tiny sacs (asci) within the perithecia mature gradually over the winter (Figure 4b). The ascospores are released over a period of several weeks, from early to late spring. Rain and wind spread conidia from the 1-year-old swellings and the ascospores, mostly from 2-year-old black knot tissues. This process results in new infections and the completion of the disease cycle.

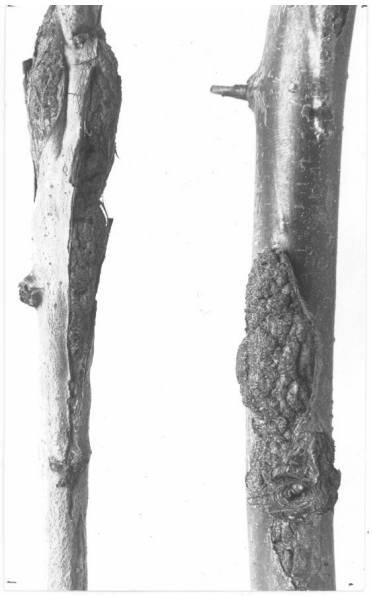

Figure 3. Swollen ruptured bark of plum twigs resulting from infection by the black knot fungus (photo courtesy of Dept. of Botany and Plant Pathology, Purdue Univ).

Control

1. Purchase only disease-free trees from a reputable nursery. Never buy nursery stock that shows visible knots or abnormal swellings on the twigs and branches.

2. Prune and burn all infected wood during the late winter or in early spring before growth starts and as soon as new knots appear. Make cuts 4 to 8 inches below any obvious, black knot swellings. Knots on the trunk or on large limbs should be carefully cut out with a knife and chisel, removing about an inch of healthy bark and wood beyond any visible gall tissue. Wounds of over 2 inches in diameter should be painted with shellac and covered with tree-wound dressing.

3. If possible, destroy (burn) all nearby wild, neglected, or worthless plum and cherry trees within 600 feet of the orchard. They frequently harbor the black knot fungus.

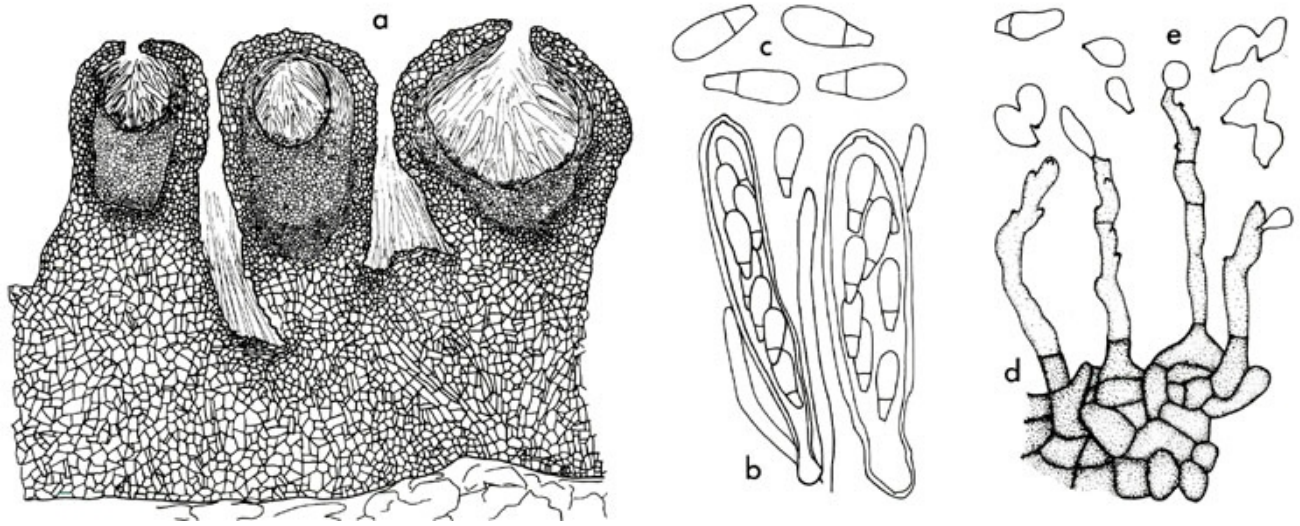

Figure 4. The black knot fungus (Dibotryon morbosum as seen under a microscope: a) portion of a stroma bearing three perithecia and asci; b) two asci each containing eight ascospores; c) ascospores; d) four conidiophores some bearing conidia; e) conidia (drawing by Lenore Gray).

4. Apply a delayed dormant spray just before the buds break open. This spray will destroy many of the overwintering, spore-bearing structures of the black knot fungus. Apply the delayed dormant spray for two successive years as the black knots produce spores for at least that length of time. The spray must be applied in the early spring before or just as the buds begin to swell. Spray both diseased and nearby, apparently healthy trees.

   Apply a recommended fungicide again at pink bud, petalfall, and at 2-week intervals until mid-June to reduce the discharge of ascospores. Plum and cherry growers should follow a complete pest-control program. Commercial orchardists should follow the spray schedules outlined in the current Illinois Commercial Tree Fruit Spray Guide. Home fruit growers should follow the spray schedules given in Midwest Tree Fruit Pest Management Handbook. Keep trees protected with fungicides throughout the growing season.

5. Plum cultivars differ in their resistance to black knot. Of the European types, 'Damson', 'Lombard', 'Shropshire', and 'Stanley' are very susceptible; 'Bluefre' is also susceptible; 'Brodshaw', 'Early Italian', 'Fellenburg', 'Methley', and 'Milton' are moderately susceptible. 'President' is a resistant variety. Japanese varieties of plums are less susceptible than most American varieties.

Publications listed above are available at your nearest Extension office or by calling 1-800-345-6087.