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## **DISEASE CONTROL FOR HOME PLUM ORCHARDS**

The diseases that commonly occur year after year in both commercial and backyard plantings of plum in Connecticut are brown rot and black knot. These diseases develop in a fairly regular sequence depending upon the weather and the development or phenology of the plum host, beginning at dormancy and continuing until fruit are harvested. As a consequence, a season-long program for disease management is often necessary in order to harvest a high percentage of useable fruit. Weather conditions greatly influence both the occurrence and severity of plant diseases. Therefore, diseases are generally most difficult to control in years of prevailing high temperature, high humidity, and abundant rainfall and cloud-cover.

### ***I. CONTROL STRATEGIES:***

Plum diseases can be effectively managed through the combined use of culture, sanitation, resistance, and fungicide sprays. This integrated approach to disease control minimizes the reliance upon one type of control over the others and usually results in a high percentage of quality fruit.

#### **A. CULTURE-**

Cultural methods include maintaining tree vigor by proper planting, fertilizing, and pruning and by following general practices that help to minimize tree stress.

#### **B. SANITATION-**

Sanitation involves pruning and removing affected or dead portions of the tree and removing diseased foliage or fruit which are often important sources of inoculum for the next season.

#### **C. RESISTANCE-**

Resistance involves selection and planting of varieties with genetic resistance to specific diseases. This effectively reduces or eliminates occurrence of the disease in question.

#### **D. FUNGICIDE SPRAYS-**

Proper selection, timing, and application of these sprays are important. Thorough coverage of all parts of the tree is necessary and sprays should be applied until run-off. The fungicide label will contain information on plant hosts and diseases, dosage rates, days to harvest interval, and safety precautions.

### ***II. COMMON DISEASES:***

#### **A. BROWN ROT-**

Brown rot, caused by the fungus *Monilinia fructicola*, is the **most** common and destructive disease of plum in Connecticut and New England. The disease is especially severe in wet, humid weather. Brown rot causes blossom blights, twig blights, twig cankers, and fruit rots. Infected blossoms wilt, shrivel, and die, becoming covered with a grayish mold. Infection can then spread to the twig and form a brownish oval canker. These cankers can expand and eventually girdle the twig, causing the terminal growth to wither and die. On fruit, symptoms first appear as a small, circular brown spots that increase rapidly in size and eventually result in a soft rot of the entire fruit. Under wet, humid conditions, ash-gray, powdery tufts appear all over the surface of the fruit, a characteristic diagnostic symptom of this disease. Fruit decay is often not apparent on immature fruit but becomes obvious as fruit begin to ripen. Fruit which are wounded (by insects, mechanical injury, bird pecks, etc.) are more readily infected than unwounded fruit. Rotted fruit may fall to the ground or persist as mummies on the tree. The fungus overwinters in fruit mummies on the tree or ground and in twig cankers. In spring, the fungus produces two types of spores; one type is produced on the surface of cankers and mummied fruit on the tree and the other type is produced in mummied fruit on the ground. Both spore types can cause infection under warm, moist conditions.

Sanitation is **essential** to control of brown rot. Any mummied fruit that remain on the tree should be removed and destroyed and all dead and/or cankered twigs should be pruned and removed from the vicinity of the tree or planting. In addition, all mummied fruit on the ground should be raked and removed and/or the ground beneath the tree cultivated to prevent spores from forming on the mummies in the spring. In conjunction with this sanitation program, a season-long fungicide spray program is usually necessary for effective brown rot control. Properly selected and timed fungicide applications should be made to protect blossoms, foliage, and fruit throughout the growing season. Plum fruit are very sensitive to brown rot for the first few weeks after setting so the shuck split and first cover sprays are very important. Refer to spray guide on page 4. At harvest, care should be taken to avoid bruises, punctures, or tears in the skin of mature fruit to prevent sites for potential infection. Additionally, use only clean containers and cool fruit as soon as possible.

## **B. BLACK KNOT-**

Black knot, caused by the fungus *Apiosporina morbosa*, is a very destructive disease of plum and prune. It is also quite common on wild plum and cherry as well as on *Prunus* species in the landscape. The disease affects only woody tissues and can develop on twigs, branches, and scaffold limbs. Losses result from extensive dieback of girdled limbs and stunting of growth beyond the knots. In extreme cases, whole trees can be killed. Symptoms are easily recognized as hard, black, elongate swellings or galls on twigs, branches, and trunks of trees. While knots are most outstanding on dormant trees, newly formed knots are greenish and soft but become hard and black with age. The fungus overwinters on infected twigs and produces spores in spring. New shoots are susceptible and can be infected soon after budbreak and throughout the period of active shoot elongation. However, most infections are thought to occur just before bloom or after petal fall. Wet spring weather is favorable for disease since rain is important for discharging the spores from the knots. In addition, wind and rain help to spread these spores to the susceptible tissues. Spores of black knot are capable of penetrating non-wounded tissues so they do not require wounds in order to infect. Most infections occur in spring but symptoms are often not visible until fall when they appear as small swellings on the twigs. These knots

gradually enlarge, mature, and take on their diagnostic rough, black appearance during the winter and the following spring.

Control is best achieved using a combination of pruning and sanitation, properly timed fungicide sprays, and resistant varieties. **Pruning and sanitation are essential** to any control program since fungicide sprays are relatively ineffective unless old knots are pruned and removed from the vicinity of the tree. Infected tissues should be pruned *before budbreak* and cuts made at least 6-8" below any visible swellings or knots. In addition, any wild plum, cherry, or ornamental *Prunus* species with symptoms should be pruned or removed within 600 ft. of the orchard. These trees can be important sources of inoculum. Resistance is an option for control since plum varieties differ in their susceptibility to black knot. The cultivars Stanley, Damson, Bluefree, and Shropshire are considered most susceptible; Fellenburg, Methley, Milton, Bradshaw, and Early Italian are moderately susceptible; Formosa, Shiro, and Santa Rose are slightly susceptible; and President is considered highly resistant. In general, Japanese varieties are less susceptible than most American varieties. In conjunction with pruning and sanitation, a fungicide spray program is necessary for effective black knot control. Properly selected and timed fungicide applications should be made to protect developing twigs. Refer to spray guide on page 4.

### ***III. SPRAY GUIDE:***

#### **A. PESTICIDES-**

A **general purpose tree fruit spray**, available under a variety of trade names, is effective for control of many of the common diseases and insect pests of plum. This mixture usually contains captan as the fungicide component and methoxychlor and malathion or carbaryl as the insecticide component. However, captan may result in leaf injury on "Stanley" and Japanese-type plums if used repeatedly in early season sprays. **It is very important to make certain the product you purchase has a label for use on edible fruit and specifies the days-to-harvest (or pre-harvest) interval.**

Alternative fungicides for control of black knot and brown rot can be used to supplement or can substitute for the general purpose mix. These include:

1. **thiophanate-methyl-** use alone or in combination with captan
2. **chlorothalonil-** use alone; *cannot be used after shuck split*
3. **sulfur-** use alone; has a short residual and must be applied frequently in wet seasons

***CAREFULLY READ THE LABEL ON EACH PESTICIDE BEFORE USE !!!!***

## **B. SPRAY SCHEDULE-**

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<b><u>GROWTH STAGE</u></b>	<b><u>DISEASE</u></b>	<b><u>MATERIALS</u></b>
<b><i>WHITE BUD-</i></b> just before first blossoms open	Brown rot (blossom blight) and black knot	General purpose mix or captan, sulfur, chlorothalonil or thiophanate- methyl
<b><i>BLOOM-</i></b> when 30 to 60% of the blossoms have opened	Brown rot (blossom blight) and black knot	Captan, sulfur, chlorothalonil, or thiophanate-methyl <b>DO NOT APPLY GENERAL PURPOSE MIX OR ANY INSECTICIDE</b> to avoid harming pollinators
<b><i>PETAL-FALL-</i></b> when most petals have fallen	Brown rot and black knot	General purpose mix or sulfur, chlorothalonil or thiophanate- methyl
<b><i>SHUCK SPLIT-</i></b> when shucks begin to fall from fruit	Brown rot and black knot	Same as above; <b><i>do not use chlorothalonil after this stage</i></b>
<b><i>FIRST COVER SPRAY-</i></b> approx. 10 days after Shuck Fall	Brown rot and black knot	Same as above
<b><i>COVER SPRAYS-</i></b> spray at 7-10 day intervals until harvest; or frequency depends upon the weather; Refer to “days-to-harvest” (pre-harvest) interval on the fungicide label.	Brown rot	General purpose mix or thiophanate methyl alone in combination with captan

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