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College of Agricultural, Consumer and Environmental Sciences

report on
PLANT
DISEASE

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PEACH LEAF CURL AND PLUM POCKETS

Peach leaf curl, caused by the fungus *Taphrina deformans*, has been reported from most of production areas of peaches and nectarines in the world. It is an important disease of peaches and nectarines in Illinois. In home plantings, this is one of the most common diseases. Commercial peach orchards are sometimes seriously damaged when a dormant fungicide application has not been made.

Figure 1. Peach leaves distorted by peach leaf curl disease. Note reddish purple areas.

Plum pockets also occurs worldwide. This disease is caused by the fungi *Taphrina communis* and in some areas by *T. Pruni*. Plum pockets attacks a number of cultivated and wild species of plums.

Neither peach leaf curl nor plum pockets normally kills trees, but both may leave them in a weakened condition and, thus, more susceptible to winter injury and infection by other disease-causing organisms. The fruit crop is reduced for the following year, or even longer.

Both diseases are discussed here because their management and conditions for their development are the same. Disease development is favored by cool, moist weather (frequent light showers) during the buds break dormancy in early spring.

Symptoms

Leaves. Infected leaves are severely puckered, distorted, thickened, crisp in texture, and curled downward and inward within a month after full bloom (Figure 1). Usually the whole leaf is affected. Such leaves lose their normal green color, which is replaced by red and purple tints. Later, a grayish white "velvet" spore-producing layer of the *Taphrina* fungi covers the upper surface of diseased areas. All affected leaves eventually turn yellow or brown, wither, and drop several weeks after infection. Hot, dry weather usually hastens leaf fall. Such leaves are replaced by a second growth of healthy leaves in June and July. The tree, now in a weakened condition, is under stress because of the food reserves used in producing a second crop of leaves. With nursery stock, successive attacks for two or more seasons usually kill the tree or stunt its growth to such an extent that it is practically valueless.

For further information concerning diseases of fruit trees, contact Mohammad Babadoost, Extension Specialist of Fruit and Vegetable Diseases, Department of Crop Sciences, University of Illinois, Urbana-Champaign.

Twigs. The leaf curl fungus may attack young peach shoots causing the terminal 4 to 5 inches to become stunted, swollen, twisted, and pale yellow or green. Such twigs generally produce nothing but tufts of curled leaves at their tips. Many affected twigs will die back. The tips of plum shoots become greatly enlarged and are often twisted and curled.

Fruits. Infected fruits become distorted and enlarge as much as 10 times the normal size (Figure 2), with spongy or hollow centers with or without pits. In modern cultivars, the pockets can be difficult to detect and may be observed only in cut fruit. Early symptoms are small whitish spots or blisters that enlarge rapidly. Later, they become reddish and display a velvety gray appearance. Upon dehydration, only exterior shell remains. Deformed fruits become brown or black with age and fall from the trees. Symptoms become evident six to eight weeks after budbreak.

Figure 2. Plum pockets fruit and leaf infections.

Disease Cycle

The disease cycles of the three *Taphrina* species are very similar (Figures 3 and 4). Soon after the distorted leaves or plum fruit become visible, enlarging asci of the fungi break through the cuticle (Figure 3A). A compact layer of "naked" asci appear as the powdery gray, feltlike growth on the thickened leaves and plum fruit. Each ascus produces eight or a multiple of eight, one-celled, oval ascospores (Figure 3B, left), which are released into the air as the mature asci rupture. The ascospores multiply by budding (Figures 3B-D) producing blastospores (conidia) during warm, moist weather. The conidia may continue to bud and eventually produce tremendous numbers of thin- or thick-walled spores (Figure 3C and 3D). The ascospores and conidia are washed, splashed, or blown and become lodged in the bud scales and in cracks and crevices of the twigs and bark where they germinate (Figure 3E) at once to produce yeast-like colonies. These colonies persist throughout the winter. The spores (conidia) produced by these colonies and ascospores are the source of infection. During cool, rainy weather in early spring, [optimum 50 to 70°F (10 to 21°C)], from bud swell to bud opening, the spores germinate and infect the swelling leaves and flowers within the buds.

The mycelium of the *Taphrina* fungi grow rapidly between the cells of the host tissues beneath the upper or lower epidermis, stimulating excessive cell growth and enlargement and producing an uneven expansion of the leaf. This results in wrinkled and puckered appearance. Secondary infections do not generally occur in these fungi since susceptible host tissues soon become highly resistant to invasion. The ascospores and conidia are capable of surviving hot, dry summers and freezing winters for two years or longer. Thus, a year of relatively light infection may be followed by a year of severe infection. If preventive measures are not taken before trees break dormancy in early spring, control of peach leaf curl and plum pockets is impossible.

Disease Management

1. Peach leaf curl and plum pockets are easily controlled. Apply any one of the fungicides listed in the Illinois Pest Management for the Home Landscape, or, for commercial growers Midwest Fruit Pest Management Guide (https://ag.purdue.edu/hla/Hort/Documents/ID-465.pdf) to control these diseases. A single thorough, dormant spray in late fall, winter, or very early spring before the buds begin to swell should provide nearly perfect control. Once the fungi enter the leaf or fruit, these diseases cannot be controlled. Spray all buds, using high pressure. Spray on a dry, calm day when the temperature is over 40°F (4C). Fungicide dusts will not control peach leaf curl or plum pockets. Follow all fungicide label directions regarding rates, method of application, and precautions.

   Commercial peach growers normally do not apply a dormant leaf curl spray following a crop year when summer fungicides are used routinely. The frequent use of a summer fungicide detroys the *Taphrina* ascospores and conidia that would normally overwinter. Thus, a dormant fungicide is most important following a non-crop year.

2. If a dormant spray is omitted, and peach leaf curl or plum pockets develop, all that can be done is to maintain tree vigor: (a) fertilize with nitrogen in early spring to stimulate the growth and development of new leaves. Fertilize according to a soil test report. The amount of fertilizer should be controlled to avoid overstimulating the tree; (b) reduce drought stress by periodic irrigations (soil moistened 12 inches deep); (c) thin fruits heavily to reduce the demand on the remaining leaves.

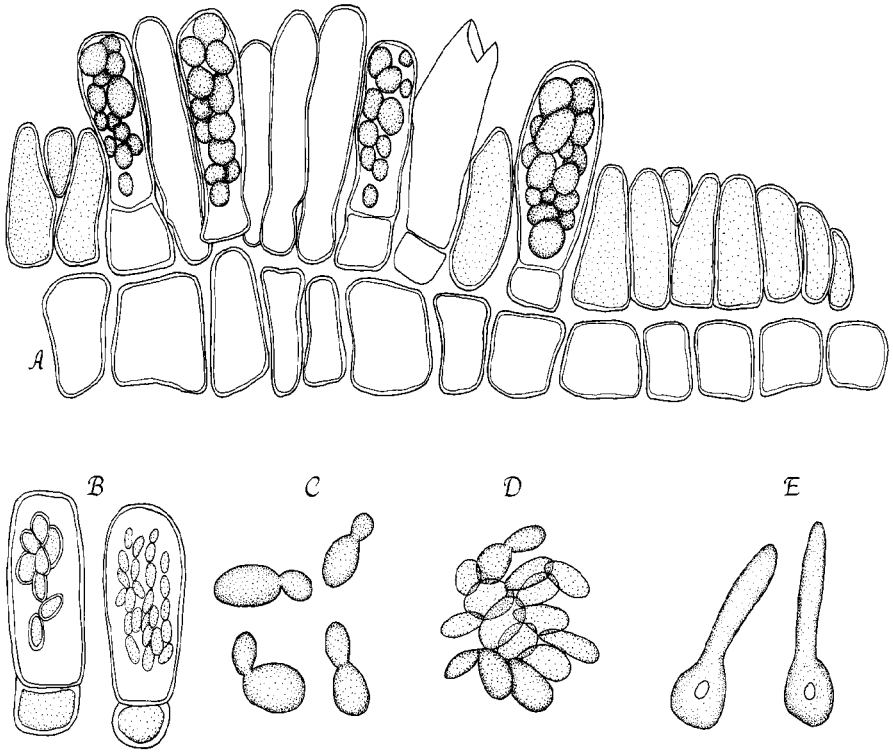

Figure 3. Taphrina deformans, peach leaf curl fungus under high-power lab microscope: (A) vertical section of upper surface of peach leaf showing layer of epidermal cells and compact, palisade layer of asci, some containing ascospores, which ruptured the leaf cuticle; (B) two asci, one with 8 ascospores, other ascospores are budding; (C) ascospores budding (form secondary spores or conidia); (D) late budding of ascospore; (E) two ascospores germinating.

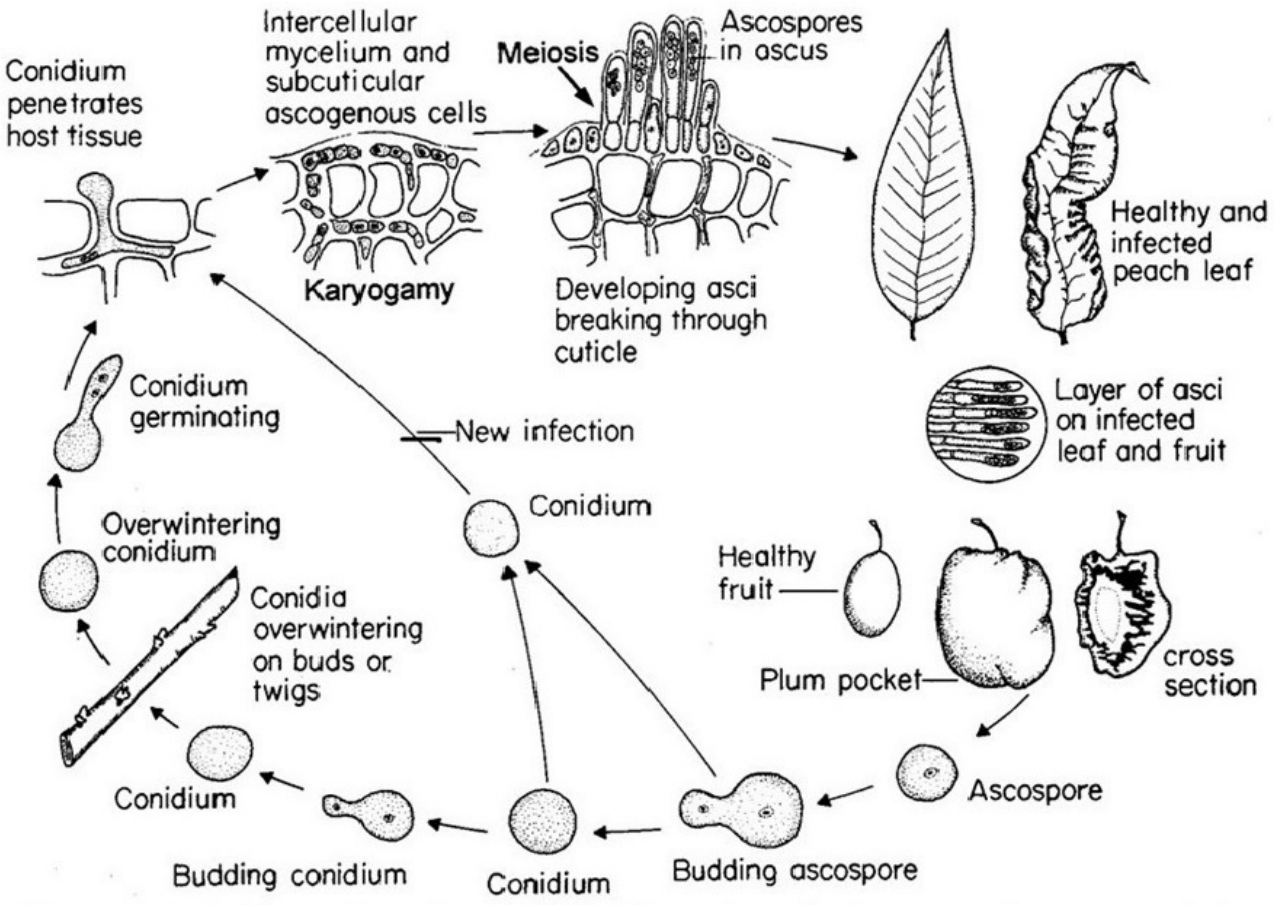

Figure 4. Life cycle of peach leaf curl and plum pocket caused by Taphrina species. Source: G.N. Agrios, Plant Pathology.