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THE PURDUE LANDSCAPE REPORT

In This Issue

Needlecast in Colorado Blue Spruce

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Introduction

The Colorado Blue spruce is not native to Indiana and tends to be susceptible to disease. One common disease, caused by the fungus *Rizosphaera kalkhoffii,* results in the defoliation of the tree. If left untreated needlecast can lead to the death of the tree.

Figure 1. Disease tends to start in the lower branches then progresses upwards. Photo by Janna Beckerman, Purdue University.

Symptoms and Signs

Symptoms of needlecast don't develop until two to three years after initial infection. Needles will turn a purplish brown color and fall from the tree. As needles fall the branches of the tree will start to die. The disease typically starts in lower portions of the tree where humidity and temperatures are higher. However, it is not uncommon to see disease develop in patches higher in the tree.

Figure 2. A severely infected Colorado Blue spruce exhibiting purple-brown needles. Photo by Janna Beckerman, Purdue University.

Disease Cycle

Rhizosphaera overwinters in the needles then sporulates in the spring when temperatures become warm and humidity rises. The spores, called pycnidia, form rows of black dots along the length of the needle that are visible to the naked eye.

Figure 3. Closeup view of the Rhizosphaera kalkhoffii fruiting bodies. Photo by Tracey Olson, Pennsylvania Department of Agriculture.

Management

Colorado Blue spruce is highly susceptible to needlecast disease. When possible, plant more resistant varieties. Norway spruce has been shown to be highly resistant while White spruce and its variant, Black Hills spruce are intermediately resistant. Some

cultivars of Colorado Blue spruce might be more resistant than others to needlecast. These include “Hoopsii” and “Fat Albert”.

When planting spruce choose a location with well drained soil that can be kept watered. Properly space and prune trees to promote good air circulation. If infection occurs, remove diseased branches and burn, bury or hot compost them.

Fungicide treatment can control *Rhizosphaera* in one year if it is caught early and proper application occurs. Always follow fungicide label directions when applying. Fungicides that are copper based or contain chlorothalonil are effective against *Rhizophaera* First application should occur when new needles are half elongated, usually in late April or early May. A second application should made three to four weeks later. If the fungus persists or wet and humid conditions occur and third application should be made. If the tree is severely infected, it could take two or more years to control. Reinfection can also occur.

Elm Flea Weevils Shoot Elm : Leaves Full of Holes

(Cliff Sadof, csadof@purdue.edu)

Although the canopy of many newly planted elm trees may look tattered, elms are vigorous growers that can survive the onslaught of defoliating beetles.

Figure 1. Lacebark elm (U. parvifolia ‘Emer II Allee’) looks well despite leaf mines and defoliation by elm flea weevil.

Leaves infested with elm flea weevil have one or more brown areas produced by leaf mines feeding inside the leaves. Leaves may also be peppered with holes in early spring and in late summer. From a distance the accumulation of holes can give a tree a faded appearance. Holes produce by elm flea weevil are less extensive than feeding by Japanese beetles that will begin in a few weeks.

Figure 2. Round holes in tissue between leaf veins left by elm flea weevil.

Figure 3. Leaves that have been skeletonized by Japanese beetles lack distinct rounded holes of elm flea weevil.

Elm flea weevil, *Orchestes steppensis*, is a relatively new pest that was first reported in 2002 in Indiana. as a European species *Orchestes alni*, that replaced elm leaf beetles as the most important early season elm defoliator. Dave Shetlar and James Radl of Ohio State recently identified this pest and determined that it is of Asian origin.

Figure 4. Note small size of adult elm flea weevil (Photo by S. Meyer, Purdue Cooperative Extension Service).

Figure 5. Note think tan femurs (thighs) of the adult weevils are key identification characteristics that help them jump to new leaves. (Photo by J. Obermeyer).

Adult beetles overwinter in the leaf litter and begin flying in search of elm leaves that have just emerged from their buds. Eggs laid in leaves produce the grubs which make June mines. Adults emerge from leaves and feed on leaves until they overwinter. There is one generation per year. This insect is more of a problem on newly planted trees where foliage is low enough to the ground for injury to be noticed. As trees get older and larger the small holes in the leaves and leaf mines are difficult to detect in the vigorously growing trees. This pest is unlikely to harm the health of larger trees.

Soil applied systemic insecticides (imidacloprid) should be applied in the fall to kill leaf miners during the following spring. Spring applications of imidacloprid or dinotefuran reduce, but do not eliminate injury, when they kill leaf miner grubs and adults. Foliar

sprays of broad spectrum insecticides like a bifenthrin or carbaryl directed against adults in spring can reduce mine formation. Elms are pollinated by wind, not bees.

Research on resistant elms from the National 10 year elm trial show a wide variation in susceptibility to this pest. Studies conducted in Ohio, Kentucky and Indiana indicate that Holmstead and Frontier hybrid elms are particularly susceptible to defoliation by both the elm flea weevil and the Japanese beetle. Valley Forge and Princeton elms are two American elms that are resistant to these pests. Accolade, Emerald Sunshine, Morton Stalwart are two hybrid elms that are also relatively resistant to these beetles.

Links: For more information

Best Elms to grow based on the 10 Year National Elm Trial

Biology of elm flea weevil

Sycamore Anthracnose – Don't let the rains get you down

(John Bonkowski, jbonkows@purdue.edu)

Like anthracnose diseases of other shade trees, sycamore anthracnose is a very common occurrence in the landscape (Figure 1). Symptoms of sycamore anthracnose normally develop as small spots or dead areas centered along the veins of leaves or along leaf margins (Figure 2). Under conducive conditions these spots expand, killing more leaf tissue and causing premature leaf drop. However, damage can be pretty severe in prolonged wet, cool weather like we have been experiencing (Figure 3).

Extensive twig or shoot blight occurs when young, growing shoots are killed, leaving affected stems leafless until dormant buds farther down, below the dead tissue, are able to develop and push out new leaves (Figure 4). This type of damage causes the tree limbs to look deformed or gnarled due to the repeated infections and twig death caused by this disease (Figure 5). It is commonly observed that the very top of the tree remains unaffected. New leaves developing in early to mid-summer, in warmer and drier conditions, will usually escape the disease.

Figure 1-Anthracnose on sycamore in downtown Lafayette, IN

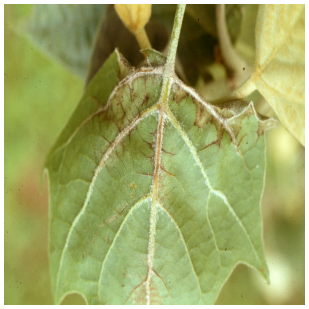

Figure 2-Sycamore leaf with veinal and marginal necrosis.

Figure 3-Severe anthracnose on sycamore in Purdue University Campus, causing delayed leaf flush.

Cankers may form on small branches, as evidenced by cracking and sunken bark (Figure 6). They do not usually kill the branch unless they occur at the base and completely girdle it. On younger trees, cankers can form on the main trunk which can threaten the life of the tree, but this is not normally an issue for established, mature trees.

The anthracnose fungus survives the winter in infected tissue on the tree and in dead twigs and leaves that have fallen to the ground. The spores of the fungus can be moved by wind and rain in the spring to initiate infection on young leaves and shoots (Figure 7). Since the fungus is present on the plant already from a previous infection, you can expect the disease to occur on the same plant in subsequent years.

Figure 4-Sycamore branch with twig blight.

Figure 5-Sycamore branches with gnarled and deformed appearance.

Figure 6-Sycamore branch with a canker developing from an infected bud

Defoliation, twig death and branch cankers can harm the tree, but this disease does not normally cause tree death. Repeated years of severe infection will reduce tree vigor and heavy twig blight may affect the appearance of tree branching. However, healthy and vigorous trees will be able to tolerate yearly infections of this disease. Providing adequate fertilization for growth and irrigation to prevent drought stress will improve the plant's ability to weather new infections and to grow after the damage has been already done. On young trees the infected or blighted tissue can be pruned out, where practical, to remove a potential inoculum source for the next year.

Fungicides are not recommended for current year symptoms because by the time you see symptoms it is too late to protect against new infections. They need to be applied at bud break the following year to prevent infections of newly forming leaves and of young, growing shoots. In landscape and residential settings, chemical spray applications are not practical due to the size of the trees and the high potential for pesticide drift. Fungicide injections have not been found to be effective for managing this disease on larger trees and so are not recommended.

Figure 7-Fungal structures growing on infected tissue.

Figure 8-Relatively healthy London plane tree beside an anthracnose afflicted sycamore

Figure 9-Anthracnose symptoms on London plane tree

Eastern sycamores (*Platanus occidentalis*) are susceptible to this disease and will likely suffer more severe symptoms compared to the oriental plane tree (*P. orientalis*) which has been found to be resistant. London plane trees (*P. x acerifolia*) can vary in their susceptibility to this disease because they are hybrids of the eastern sycamore and oriental plane tree, but many London plane trees show good resistance (Figure 8, 9). To find more information on the London plane tree, please use the following link: http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=285140&isprofile=1&gen=platanus

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