The Plant Doctor's LANDSCAPE TIPS

By David L. Roberts, Ph.D., *Senior Academic Specialist, College of Agriculture and Natural Resources, Michigan State University*

Photo 1: The chlorotic foliage and decreased, stunted needle and shoot growth (Insert) are often symptomatic of PRCW. Although some literature sources suggest that eastern white pine is not frequently attacked by PRCW, the author has noted (backed by entomologists' confirmations) that white pine is commonly attacked.

Photo 2: This white pine simply wilted and turned brown. Wire baskets, girdling roots and the PRCW all played a role. Secondary attack by bark beetles is also associated with PRCW decline.

Photo 3: This red pine stand in northern Michigan has abundant PRCW activity. Severe attack often results in trunk snap at the ground level (Insert).

PINE ROOT COLLAR WEEVIL

INTRODUCTION:

Like Spruce trees, pines have been encountering a barrage of issues that often leads to their decline and death in both our landscapes and forests. From diseases such as Diplodia Tip Blight, needle blights and rusts to pest problems such as shoot borers, sawflies and trunk borers, pines (Pinus sp.) can contract a variety of issues that can be perplexing and difficult to diagnose and manage. Perhaps one of the more serious issues witnessed in recent years on pines is the Pine Root Collar Weevil (PRCW=Hylobius radicis). The PRCW typically attacks the pine's root collar area just below the soil line (and sometimes slightly above), causing a disruption in the vascular system of the tree. Without adequate translocation of water and nutrients to the branches and foliage, infested trees invariably decline. The PRCW tends to attack pines in stressed locations first and subsequently, once established in the area, may begin attacking healthier trees. Dense stands of pines are frequently at higher risk — for example, the stands of pines planted during the Great Depression by the CCC (Civilian Conservation Corps). Most pine species are susceptible to PRCW.

DIAGNOSIS, SYMPTOMS AND LIFE CYCLE:

Pine trees infested with PRCW exhibit symptoms commonly associated with stress (Photo 1). For example, the needles of affected trees may turn off-color (chlorotic, yellow); in severe cases, needles may wilt and become reddish-brown (Photo 2). Another very important symptom is that shoot growth over the past several years tends to be less and less, as evidenced by the distance between each year's bud scale scars. Drought, soil pH and other stress factors may cause similar symptoms. Or, trees with those stress factors may be predisposed to attack by the PRCW. Some pines severely affected with PRCW may break off at the soil level (Photo 3 and Insert).Whenever a tree is suspected of being infested with PRCW, it is advisable to dig into the soil adjacent to the root collar area. Several clues may indicate PRCW infestations. Often, there is a constriction (or swelling) of the trunk at the junction between the trunk and root transition (Photo 4). In other words, a disruption of that smooth transition from the trunk to the roots may be symptomatic of PRCW attack. Also, it is very common to witness secretions of sap into the soil, resulting in a resin-impregnated soil or "gunky soil blobs" (Photo 5). Depending on the time of year, adult weevils or larvae may be discovered (Photos 6 and 7).

Adult PRCW overwinter in the soil or bark crevices of pine trees. Eggs are laid primarily in the spring but the adult may continue to feed and lay eggs throughout the summer. After the eggs hatch, larvae feed during June and July in the phloem regions where the cambium may be killed, causing the disruption of water and nutrients to the above-ground portions of the tree. Adults typically emerge in August and September.

The PRCW may be confused with other instigators of pine problems. There are other weevils that attack conifers: Pales Weevil, Northern Pine Weevil, etc. There are also a variety of root diseases that may not only cause decline/death but may also release pitch into the surrounding soil. Drought, too much irrigation, flooding, and other environmental and cultural stresses (ex. excess mulch or tight landscape fabric) may mimic PRCW or predispose trees to attack by PRCW.

Photo 4: Note constriction and resin secretions at ground level on this pine—presumably caused by PRCW and secondary attack by bark beetles.

Photo 5: When diagnosing PRCW activity, check for tissue disruption and sap secretions at the trunk/root interface.

Photo 6: Weevils are easily identified from other critters because of their conspicuous proboscis or snout that only a mother could love. Photo credit Alton N. Sparks, Jr., from Invasive.org.

MANAGEMENT OF PRCW:

There are a variety of techniques that can be utilized to manage PRCW. These techniques may be used singly or in combination. Adopting a multipronged approach will generally provide better results.

Cultural: First and foremost, environmental or cultural stress factors should be diagnosed and corrected if practical. Some of these factors include poorly drained soils, too much irrigation, too dense of planting and so forth. Also, carefully scrutinize new transplants; nurseries sometimes have problems with PRCW (Photo 8). In some instances, removing the buildup of duff (needles, mulch, and other organic matter) and couple inches of soil as well as pruning the lower branches from trees may help provide more light, heat and air movement, thereby discouraging colonization of pine trees by the PRCW. Removing old stumps may be advised because the PRCW frequently colonizes stumps left behind after tree removals.

Chemical: Heavy sprays or drenches of chemicals around the root collar area and on the lower trunk have proven to help correct the decline of trees not severely affected by the weevil. If stumps of dead trees are not removed, they can also be drenched to prevent PRCW population buildup. Imidacloprid products and other insecticides may be beneficial for this type of treatment, sometimes reversing the decline from PRCW. In the author's opinion, trunk injections are generally not warranted. Foliar sprays in mid-May and in August may help control adults that feed on shoots. Be sure to follow label directions when applying insecticides.

For more information, please feel free to email David Roberts at robertsd@msu.edu or contact a professional plant health care provider. The author, MSU and MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.

Development of Landscape Tips was sponsored by MSU and MGIA.

MICHIGAN GREEN INDUSTRY ASSOCIATION

MICHIGAN STATE UNIVERSITY

Photo 7: Weevil larvae perform a significant amount of damage to plant tissue. Photo credit: Merle Shepard, Gerald R. Carner and P.A. C Ooi, from Invasive.org.

Photo 8: Nurseries sometimes encounter issues with PRCW and other weevils. Note lower trunk disruption and tunneling on these Scotts pines. Scrutinize plants carefully before purchasing them for installation in landscapes.