

RESEARCH LABORATORY

Pest Alert



White Pine Needle Browning and Defoliation

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Widespread foliage browning and defoliation has occurred on Eastern white pine (*Pinus strobus*) throughout the Northeast from northern New England through New Jersey and eastern Pennsylvania. Symptoms began to appear in late winter and have intensified during spring months. In many instances, trees are totally defoliated except for current season (2016) foliage that has recently emerged. In most cases, buds, twigs and branches are healthy: the damage appears to be isolated to foliage produced prior to 2016. In most cases, the entire crown is affected but there are trees where only a portion of the crown or just a few branches in an otherwise healthy crown are symptomatic. Some arborists have reported that symptoms began or were more severe on portions of the crown that receive the most sun or that are facing roadways.

This could not be corroborated by Lab staff that performed site inspections in the Northeast. The damage occurs in developed landscapes regardless of exposure but appears to be less prevalent in natural settings. In many instances, severely affected white pines were growing immediately adjacent to trees with little or no damage.



More than 100 foliage and branch samples have been submitted by Bartlett Arborist Representatives or collected by Bartlett Laboratory staff after thorough inspections of symptomatic white pines. Many samples were heavily infested with pine bark adelgid but this pest is not known to cause extensive foliage browning. A small number of samples were infected with fungal pathogens such as *Lophophacidium dooksii* (formerly *Canavirgella banfieldii*), *Septorioides strobi* (previously referred to as *Septoria pini*), and *Lecanosticta acicola* (formerly *Mycosphaerella dearnessii*) that can cause needle blight or needlecast disease. These fungi were not consistently associated with the symptoms occurring this spring: the majority of brown foliage had no evidence of an infectious disease agent or serious insect or mite pest. Outbreaks of needle blight diseases have become increasingly common in recent years but symptoms of these diseases are usually evident on current season needles beginning in June and July. Some forest pathologists have referred to these needle blight diseases as White Pine Needle Damage (WPND).

Due to the widespread nature of the symptoms and the absence of a biotic pest that is known to cause these symptoms, the needle browning and defoliation is likely due to an abiotic (non-living) stress factor or factors. Abnormally dry to moderate drought conditions occurred in the early spring and again in the fall months of 2015 in many areas of the Northeast where white pine is affected. Abnormally dry conditions again occurred in the April

and May, 2016. These drought conditions were not extreme and have occurred many times in the past without causing extensive damage to a native plant species like Eastern white pine.

Temperatures in the past six months have been very abnormal and variable. The average monthly temperature in most areas of the Northeast in November and December was 8° to 15°F or more above normal. Average temperatures were near normal for January and February but most areas experienced near record low temperatures during the second week of February. In coastal areas of New England, temperatures dropped below 0° and reached -10° to -20°F in the interior regions of New York, New Jersey and New England. March and early April had unprecedented warm weather interspersed with subfreezing temperatures. These temperature extremes combined with abnormally dry soil conditions may have influenced winter hardiness of this species that resulted in freezing injury and/or desiccation of white pine foliage.

Prognosis

Most affected trees are producing shoots and foliage from viable buds throughout the crown but shoot growth is minimal and foliage is somewhat dwarfed due to the health impacts from defoliation. Affected trees will likely appear thin for the next two to three years until a full complement of needles are retained and growth resumes normally. Trees will be more sensitive to stress from drought or other weather extremes and will be more prone to secondary insect and disease agents such as bark beetles, borers and canker disease fungi. Protecting the current season growth from further damage from insect pests, disease agents and environmental stress is critical to recovery. If further loss of foliage occurs, trees will likely decline and die. The following remedial treatment program is recommended for affected white pines.

Treatment Program for Defoliated White Pines:

- Mulch the critical root zone and irrigate trees during periods of dry weather to reduce the impacts of drought stress.
- Take soil samples from affected trees and apply mineral nutrients and adjust pH per the soil analysis report to prevent nutrient stress. Apply Phosphite 30 to stimulate host defenses and reduce the likelihood of root disease and possibly other pest infestations.
- Treat pine bark adelgid if present. Monitor the trees for evidence of insect and disease pests and treat as needed.

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