

This year our pines seem to be thinner than ever before and we are sweeping up oodles of needles. Several of our pines look like they may not make it and one is dead. Briefly, what Bill O. told me was that what is falling now is last year's needles that were infected by one of three fungi or possibly even more than one of the three. The fungus enters when the new growth sprouts in May and if it is wet the needles do not dry and the fungus has an easy time of entering. The fungus sits and develops for a whole year and causes the needles to fall prematurely the following year. So what we have falling now are last spring's affected needles and what will fall next year will be those that are infected this spring. He said it has been noticeably around in Maine for 7 years. The best cure is for us to have drier springs. Fungicides are too expensive and impractical except for small ornamental white pines in your front lawn, so to speak. He said Vermont is being hard hit. No injectionable serum has been developed and so if anyone knows of a giant heat gun or hair dryer that will not blow a fuse, let me know!!!!

I have pasted most of an article from a Vermont source below and attached is a pdf file from the Maine government that Bill O. contributed to. I told him I would send this out to people who might be concerned so hundreds would not tie him up on the phone.

Since there is no solution except heat guns and holy water I told him I would not bother him again. We can also hope that once this fungal flare has had its hayday it will slow down and become a prudent predator, like the gypsy moths and the Japanese beetles and we will keep most of our beloved trees. Bunny

Where is the damage? Brown and yellow foliage on white pines has been observed statewide. Neighboring states have reported similar observations. The damage is generally most severe near bodies of water, at the edge of openings, and on wet sites. It has also been particularly noticeable on dry, steep hillsides. What does the damage look like? One-year old needles changed color suddenly in May, especially on lower branches. Needles on current year shoots are green and most are growing normally. All tree sizes are affected, though the tops of larger trees usually remain green. Symptom severity varies considerably, even between adjacent trees.

Damage is generally more severe near bodies of water. What is causing the damage? The cause of the damage is under investigation but it appears to have been a combination of spring weather and disease fungi.

White pine foliage was affected by the same spring frosts that defoliated hardwoods statewide. With the early warm weather, last year's needles lost their cold-hardiness and were vulnerable to the freezing conditions. It's likely that the foliage was especially vulnerable to freezing temperatures because many needles were already damaged by fungal disease. Thanks to a succession of wet springs, these have been widespread on white pine in Vermont since 2005. At least two different needle cast diseases have been identified on symptomatic pines. One is the Brown Spot Needle Blight caused by *Scirrhia acicola*. The other is a white pine needlecast caused by *Canavirgella banfieldii*.

What will happen to the trees? Although the white pine needle damage looks serious, the trees aren't dying, and their new shoots should grow normally. The impact on tree health is usually not life-threatening because topmost branches are rarely affected.

Trees will look better in early summer, once all the injured needles are cast. Their crowns may look thin. Mortality of lower branches may accelerate. Foliage is the "pump" that draws water into the branches. With little foliage remaining, the water supply to growing shoots may decrease dramatically. Needle damage may initiate decline in wet areas. On these sites, the fungal diseases can be particularly severe and trees are already under stress. Mortality is likely if pines under severe stress are also attacked by bark beetles.

In locations where trees have had up to six consecutive years of needlecast, there have likely been impacts on tree growth and vigor. Late spring weather will play a role in tree recovery. Spores germinate when there is a layer of water on the needles, so emerging needles are much more likely to be infected when spring weather is wet.

Recommendations: Landowners and others concerned about discolored white pines should watch them closely. By July, the symptomatic needles should have dropped, and remaining foliage should be green. If the needles on new shoots are brown, look for other sources of tree stress.

Ross

## Eastern White Pine Needle Damage

Eastern white pine is widespread and highly valued in New England. During the summer of 2010, white pine needle damage was frequently observed throughout New England. Symptoms consisted of yellow and brown discoloration of 1-year-old needles (figures 1 and 2) on both mature trees and regeneration. Trees most severely affected were growing at the edge of bodies of water; in wet areas; and on dry, steep slopes.

This damage has been attributed to two foliar diseases—Canavirgella needle cast caused by the fungus *Canavirgella banfieldii* and brown spot needle blight caused by the fungus *Mycosphaerella dearnessii*. Wet spring weather favors spore formation, dispersal, and infection by both fungi. It is likely that wet spring weather during several consecutive years was conducive to an outbreak of one or both of these diseases (figure 3).

Late spring frost in 2010 may have also contributed to symptom development, further complicating diagnoses. Needle discoloration appeared suddenly in late May 2010, shortly after several episodes of below-freezing temperatures.

Both fungi cause similar symptoms. Lesions in current-year needles begin as spots that develop into brown and yellow bands that continue to expand, causing death to the distal part of the needle (figure 2). The extent of damage for affected needles varies. The bases of needles can remain green, and not all needles in a fascicle may be affected. Dead, brown needle tips can break off, causing tree crowns to look thin a year after initial infection (figure 4). Trees commonly shed needles that are entirely infected, with substantial needle drop occurring in June.

The fungi can be told apart by their spore-producing structures, which can be seen with the naked eye or with a hand lens. *C. banfieldii* produces elongated (15-52 mm), black sexual fruiting structures (figure 5). In contrast, *M. dearnessii* produces small (< 3 mm), black fruiting structures (figure 6). These fungi can also be differentiated by the shape and color of their spores.

The pathogenic fungus *C. banfieldii* was first described in 1996. Its symptoms had been observed as early as 1908, but had been attributed to other fungi and later, to ozone damage. Needles infected by *C. banfieldii* are often colonized by other secondary fungi, further complicating disease diagnoses. Canavirgella needle cast occurs

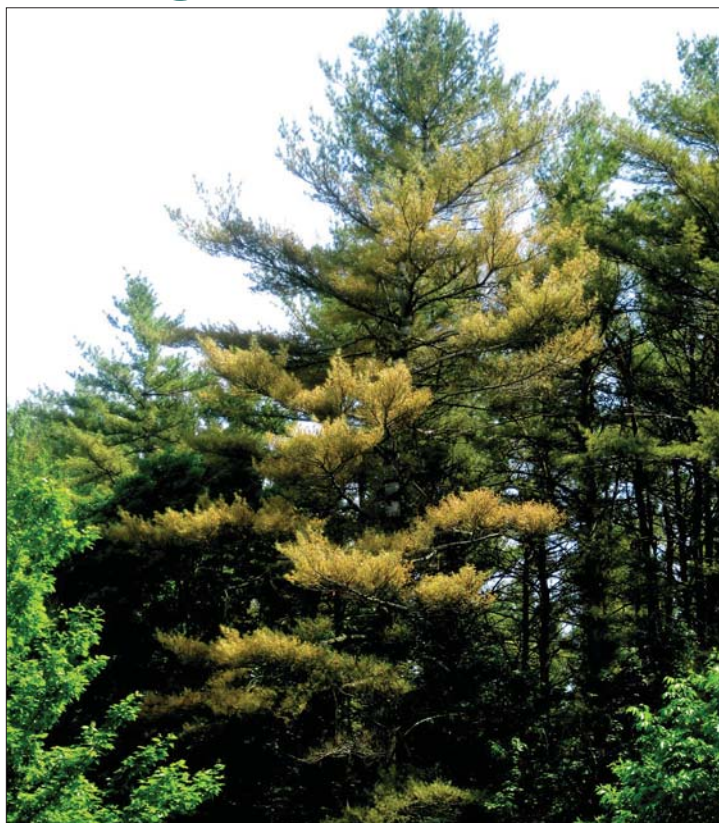


Figure 1. Mature eastern white pine with yellowing needles.



Figure 2. One-year-old needles with damaged tips on eastern white pine regeneration.





Figure 3. Aerial photograph of Vermont forests with damaged eastern white pines.



Figure 4. Damaged eastern white pines with thinning crowns.

throughout the range of eastern white pine, but damage has typically been limited to fewer than 0.1 percent of trees. Damage has been consistently observed in Maine since 2006. Mortality caused by this disease has not been documented, and the effects of repeated defoliation caused by the fungus on white pine are unknown. Control measures have not been investigated.

Brown spot needle blight is widely distributed throughout the world and affects many pine species. It damages and can kill nursery trees, regeneration, and young tree plantations. Strategies to control this disease in nursery settings include spraying with protectant fungicides, increasing spacing among plants to improve ventilation, and avoiding pruning during wet spring and fall weather when spores are present. Using fungicides on forest trees is not recommended.



Figure 5. Infected pine needle with a spore-producing structure of the pathogen *Canavirgella banfieldii*.

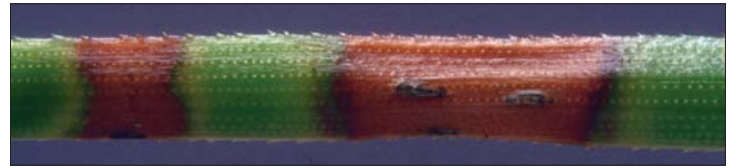


Figure 6. Infected pine needle with a spore-producing structure of the pathogen *Mycosphaerella dearnessii*.

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#### Photographs:

Figures 1, 2: William D. Ostrofsky, Maine Forest Service

Figures 3, 4: Barbara Burns, Vermont Department of Forests, Parks & Recreation

Figure 5: Sharon Douglas, The Connecticut Agricultural Experiment Station

Figure 6: Edward L. Barnard, Florida Department of Agriculture and Consumer Services, [Bugwood.org](http://Bugwood.org)

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