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http://maine.gov/dacf/mfs/forest_health/index.htm

Forest & Shade Tree - Insect & Disease Conditions for Maine October 6, 2016

This is the last edition of the *Forest & Shade Tree - Insect & Disease Conditions for Maine* report for 2016. Although the leaves are falling and the growing season is coming to a close, it is important to keep in mind some fall tree care tips to ensure your trees overwinter in good health. For example, roots will continue to grow until soil temperatures fall to a consistent 40° F. Thus, to encourage root growth and prevent winter desiccation injury (especially winter burn in conifers) fall watering is important. Further, cleaning up leaf debris and pruning dead wood from trees decreases overwintering spots for some diseases and insects that can harm trees in spring. Wrapping the lower stem of high-value young and thin-barked trees will discourage rodents from feeding on the bark and causing serious injury. Consider ways of protecting the regeneration of desirable tree species in your wood lot so they escape deer browsing during the winter months. Following these basics will help to ensure a positive start to the 2017 growing season.

Browntail Moth Alert

Over 63,000 acres of forest in Sagadahoc County and surrounding towns were defoliated by the tiny, early instar larvae of browntail moth (*Euproctis chrysorrhoea*) in August and September. These larvae are less than 1/4" in length but are so numerous this year that in some cases they defoliated the same trees twice in a single season. Those trees were stripped in June, re-foliated with a stunted second flush of leaves due to lack of water or still-feeding browntail caterpillars, and then skeletonized in late-summer by the new generation of browntail. Add in the stress of the drought and the trees were severely stressed this summer.

In addition, browntail larvae and damage were found all the way south to Eliot in York County and north to Waterville and Winslow in Kennebec County. Moths were found in Millinocket (Penobscot County), Monson (Piscataquis County) and Roque Bluffs (Washington County) in July. This means people and deciduous trees (especially oak and apple) across the southern half of the state could feel the effects of browntail. Next year, outside the heavily infested area, this would most likely be just spot infestations, a tree or a few trees.

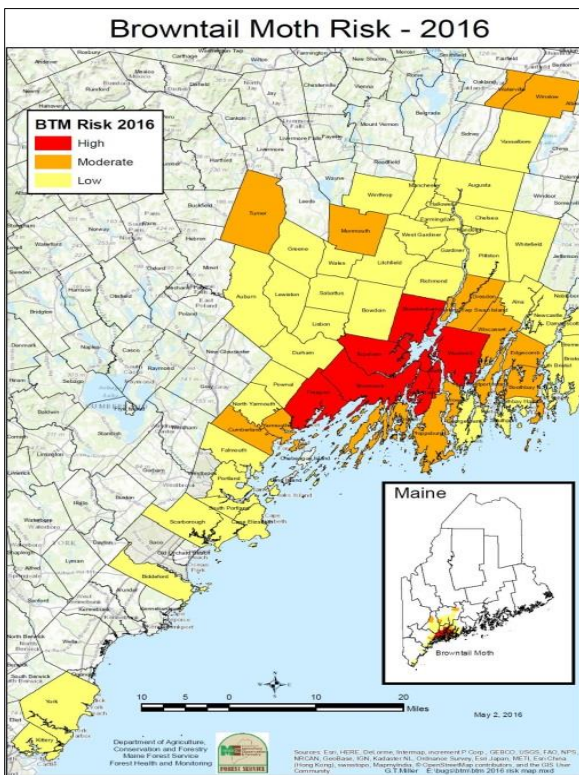


Browntail larvae preparing for winter (photo: Maine Forest Service).

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Browntail moth overwintering webs at the tips of branches. Silk wrapped around leaves and tied to branches (photo: Maine Forest Service).

What to look for this winter especially in apple, crabapple, other fruit trees and oaks:

Look on the TIPS of branches for leaves webbed together with bright white silk into a very tight web

usually 3–6 inches long. If you pull the web apart there are dozens to hundreds of tiny caterpillars inside. (These are not the filmy webs found on fruit trees, ash, maple and elm in late summer. Those webs are made by the fall webworm and the larvae are gone by now.) If the browntail moth overwintering webs are within reach then they can be cut out and destroyed.

For people in areas infested with browntail moth use caution when raking, weed-whacking, leaf blowing, removing brush, etc., as the toxin in the browntail moth hairs stays active for up to three years.

The Maine Forest Service will be conducting a winter web survey to get a general overview of how far the browntail has spread and how intense it will be. We welcome reports of browntail webs outside the area generally infested in 2016 (map above).

More detailed information can be found at:

http://www.maine.gov/dacf/mfs/forest_health/invasive_threats/browntail_moth_info.htm

Insects

Balsam Woolly Adelgid (*Adelges piceae*)—Balsam woolly adelgid (BWA) is an invasive insect that has been in North America for decades. These adelgids attack only fir trees but their impact can be serious. The tiny sucking insects feed either on the trunk (trunk phase) of the trees and/or on the fast growing terminal shoots (gout phase). The insertion of their mouthparts into the host tissue causes the tree to produce abnormal cells in the current growth ring—with larger, resin-filled cells—that are very poor at conducting water (an important normal function of that tissue).

Heavy trunk populations can kill trees in two to three years, while the shoot feeding causes “gouting” or swelling of the twigs that stunts branch growth and the trees decline slowly over a number of years. The population has been low



Balsam woolly adelgid trunk phase (Photo: A. Wopat, Weyerhaeuser).

for the past ten years but recent warmer winter temperatures may be allowing it to resurge. The dry conditions this spring and summer will exacerbate impact from this pest. The trunk phase has been reported from a number of locations in Franklin, Kennebec, Oxford, Penobscot Piscataquis and Washington Counties.

Landowners with fir and Christmas tree growers should take some time to inspect their trees for BWA. Targeted removal of trees with moderate to heavy trunk phase will reduce BWA populations in forest stands. Growers seeing BWA damage on Christmas tree crop may want to remove infested fir from surrounding woodlands to lessen the impact on production trees.



Balsam woolly adelgid gout phase. (Photo: Maine Forest Service).

Boxelder Bug (*Boisea trivittata*) – The boxelder bug is a species of true bug that feeds primarily on the seeds of boxelder and other maple species. It is not considered a pest of trees, but in these cooler days of early autumn, huge congregations of the bugs may gather in sunny areas prior to seeking overwintering sites. The adults (mostly black with red wing margins) and nymphs (mostly red) mass together. They do not cause damage to either trees or structures, but in their quest for hibernation sites, they may enter houses and become a nuisance. If you find them in your house, it is best to look for cracks around doors or windows where they may have entered and seal them. Vacuum or sweep up and remove boxelder bugs that make it indoors--insecticide use against these trespassers is not recommended or effective.



Boxelder bug adults and nymphs (Photo: Raymond Merrow).



Evidence of woodpecker feeding on ash (Photo: Maine Forest Service).

Watching for **Emerald Ash Borer** (*Agrilus planipennis*) (with the help of woodpeckers) – This is probably the best time of year to watch for signs of the invasive woodborer, emerald ash borer (EAB). EAB is just across our borders in New Hampshire and Massachusetts, and we expect to find it in Maine soon. During the winter until the trees start to leaf out in the spring, woodpeckers often find and feed on overwintering EAB larvae, which are nice and fat and make good eating at this time of year. As the birds feed, they flick off the gray outer bark, and expose the light-blond inner bark, leaving a distinctive signature (although not unique to woodpeckers feeding on EAB). It is primarily the smaller woodpeckers, like the hairy and the downy, that feed on EAB; although even smaller birds like nuthatches do as well. When you are out and about, watch for signs of woodpecker feeding on ash and let us know if you see any. If you can, take a picture of any feeding you see on ash and pass it on to us.

Fir Coneworm (*Dioryctria abietivorella*) – A Christmas tree grower in northern Aroostook County reported significant damage to balsam fir leaders in plantation trees. Larvae were found mining the terminal cluster of buds early in the season and later boring into the terminal shoots. The grower estimated that at least one in fifty trees in the plantation was damaged. Fir coneworm will infest the cones and shoots of a wide-range of conifer species. A bumper-crop of cones in surrounding forest trees in 2015 may have led to the problem in the Christmas tree plantation this year. The grower mitigated damage with corrective pruning when getting the trees ready for market. To aid in population reduction, pruning before the caterpillars leave the shoots and destruction of the infested material should accompany corrective pruning where possible.



Gypsy moth egg mass
(Photo: Maine Forest Service)

Gypsy Moth (*Lymantria dispar*) – Control of next year’s gypsy moth populations on ornamental trees can begin now. You may still see stray moths until a hard frost, but peak activity has passed. As you conduct work around your home, take note of any the buff-colored egg masses. You can scrape and soak the egg masses or treat them with horticultural oil in place. If you are finding lots of egg masses (more than you can count on your fingers) around your home let us know— photos, about how many, in what size plot of land, and where—your information can help us focus survey efforts to areas we might not otherwise visit. Please let us know if you think you have found egg masses outside the gypsy moth quarantine area

(http://www.maine.gov/dacf/mfs/forest_health/quarantine_information.html).

You can send this information to allison.m.kanoti@maine.gov or call (207) 827-1813.

Hemlock Woolly Adelgid (*Adelges tsugae*) – Hemlock woolly adelgid (HWA) has now been confirmed in three towns around Sebago Lake: Raymond, Frye Island, and Standish (Cumberland County). Winter is a good time of year to examine your trees for HWA, as their growth of waxy ‘wool’ makes them more visible. Remember that winter is the safest time to cut down and transport infested trees, because no mobile stages are present. You will minimize the risk of spreading HWA if you conduct your silvicultural practices on infested hemlock before April.

Tracking Winter Moth (*Operophtera brumata*) – When you are out in the woods this fall and winter keep an eye out for large numbers of moths. If you are east of Rockland or in towns removed from the coast and seeing numbers of moths we encourage you to collect and submit samples to the lab (mailing address above). We know winter moth can be found along the southern coast and would like to know if it has spread inland. Also we are looking for the Bruce spanworm (*Operophtera bruceata*) outbreaks. This insect is a native that is closely related to the invasive winter moth and we would like to be able to study what keeps it under control.



Male winter moths rest around an outside light (Photo: Maine Forest Service).

Diseases and Injuries

Armillaria Root Disease

A recent site visit to a wood lot in Waterford brought to light a tree health issue linked to chronic tree stress that is likely more common than many people realize: *Armillaria* root disease. Although the *symptoms* of this root disease can be obvious and severe, the *signs* of the fungal pathogens causing *Armillaria* root disease are often cryptic and difficult to find and confirm.



A sign of Armillaria root disease: white fans of fungal tissue (mycelial fans) growing under the bark and parasitizing the tree (Photo: Maine Forest Service).

During the Waterford site visit crown dieback and mortality were observed among many of the hemlock trees in a general area in close proximity to a river. The symptoms of concern were occurring in a uniform pattern in the crowns of the trees, with no visible signs of environmental, fungal or insect attack to the needles, branches or main stem (with the exception of a few trees that appeared to have been attacked by hemlock borer).

This pattern of symptoms is typically attributable to damage localized at the root collar zone or the underground roots. Upon closer inspection of the lower portions of several symptomatic hemlocks and removal of some bark from the lower stem and root flares, extensive white fungal growth (mycelial fans) was observed, consistent with *Armillaria* root disease.

Species of *Armillaria* (commonly referred to as shoestring rot due to the flat black strings of fungal tissue it produces under the bark of trees at its more mature stages) can be readily found in the forest – the fungus is not only a parasite, but is capable of living on dead wood as a decay fungus (saprophyte). There are several closely related species of *Armillaria* that can cause disease in trees, but few are aggressive enough to kill a tree on their own. Rather, mortality associated with *Armillaria* fungi is very commonly linked to sources of chronic stress that weaken trees allowing *Armillaria* to become established. At Waterford, site history was discussed with the landowner and it was mentioned that the site where the trees were in poorest health had been frequently flooded over the past several years. If the soil was inundated for an extended amount of time on several occasions during the growing season, several years in a row, this certainly could constitute a source of chronic stress that could very likely have made the stressed trees susceptible to attack, decline and mortality from an *Armillaria* root disease pathogen. This highlights the importance of considering longer term site history when assessing tree health problems. Although the year the trees died (2016) was a very dry year at the site, repeated inundation of the root zone over the past several years was likely the underlying factor leading to *Armillaria* root disease and mortality.

Natural Fall Needle Shedding

This time of year you may notice on most conifer species* that the leaves/needles on twigs and branches furthest from the branch tips/buds (the oldest needle age classes) are turning pale yellow to orange and may be shedding onto the ground. Unless clear signs of injury or wilting are visible, there is no cause for alarm. This is very likely simply due to the natural phenomenon of seasonal leaf drop and not an insect or disease problem. Although conifer needle disease pressure has been high during the past few years



Hemlock trees showing whole crown symptoms, indicating a possible causal agent at the root zone (Photo: Maine Forest Service).

(see ‘White Pine Health’ section) premature defoliation from those disease agents typically happens in June and July.



Typical seasonal needle drop by (top) mugo pine; (bottom) white cedar (Photo: Maine Forest Service).

The theory behind seasonal needle drop is that conifers shed older needles to ‘balance their energy budget’, so to speak. The older needles are shed because they represent a greater energy cost in terms of maintenance than they generate through photosynthesis. The energy that the tree no longer has to spend on maintenance of older, shed needles is instead invested in next season’s new growth, which will be more photosynthetically productive.

Seasonal needle drop can be expected to be more noticeable in Maine this year, as more needle age classes are shed due to the droughty summer conditions in the southern half of Maine. Likewise, in northern areas that have experienced higher than normal rainfall, needle drop may also be more noticeable, as high soil moisture, like drought, is a source of stress that tends to increase seasonal shedding of conifer needles.

**Deciduous conifers like larch species and dawn redwood will lose all of their needles (leaves) in fall and refoliate each spring.*

White Pine Health

Despite overall drier weather conditions this year, the severity of white pine needle diseases was still significant in many parts of Maine in 2016. Further, the impact of the several preceding years of high needle disease severity is becoming increasingly visible as reduced shoot growth, reduced diameter, an overall thin appearance of crowns, branch dieback and in some cases mortality. This type of chronic stress can be an inciting factor leading to a spiral of decline. Damage from one or more agents causes a greater susceptibility to other insect and disease agents that can lead to further insect and disease issues, leading in this case to increased incidence of mortality in the white pine resource. This situation is concerning and white pine health will continue to be a focus in 2017.



An example of the thin appearance of white pine crowns resulting from the casting of 2nd- and 3rd-year blighted needles (Photo: Maine Forest Service).

Due to the long-term impacts on white pine health seen in Maine and throughout New England, funding is currently being sought from the US Forest Service to formally assess the present state of white pine health, determine how trees are reacting to the stress, the impact on white pine regeneration and what might be done to improve future conditions for white pine in the region.

Things Beyond Our Scope that We Still Get Questions About

Squirrel Damage – Oak branches about 8–18 inches long chewed off usually at an angle are the work of squirrels after the acorns.

Branches broken off by squirrels (photo: Maine Forest Service).



Calendar of Division and Related Events

October 20th, 9-11, Spruce Budworm Outbreak in NB and Maine: Monitoring & Citizen Science, Augusta. Join Rob Johns of Natural Resources Canada to learn about biology, and economic impact of the eastern spruce budworm, the mass migration event that occurred in New Brunswick in July, and the application and safety of pesticide mechanisms for budworm control. He will also cover the early intervention strategy being implemented in New Brunswick including the Budworm Tracker initiative. Allison Kanoti of the Maine Forest Service will provide an update on conditions and monitoring in Maine. All are welcome but due to space constraints pre-registration is required (<http://sprucebudwormmaine.eventbrite.com>, or call (207 581-3794).

October 22nd, 1-3 pm, Friends of Dr. Edith Marion Patch, Page Farm and Home Museum University of Maine, Orono. *Everything You Always Wanted to Know About Invasive Insects - But Were Afraid to Ask... featuring Browntail Moth coming soon to a forest near YOU!* Join us to learn about the insects that are creeping, crawling, and winging their way into Maine. How are they being monitored? How are they affecting our environment? What role can we play in managing this invasion? The presentation will be followed by refreshments.

October 26th, 6pm, Downeast Lakes Land Trust History & Heritage Lecture, Grand Lake Stream School Bldg. *Aliens and Super Heroes of the Forest Insect World.* Celebrate Halloween early! Be prepared to be creeped out, frightened and amazed by the forest insect world around us. Tales of body snatching, alien terrors for trees and the superheroes of the forest await you. This talk has been approved for 1 CEU for SAF CF and Maine Licensed Foresters as well as Licensed Pesticide Applicators. Details on-line at: <https://www.downeastlakes.org/news-events/events/>

January 10-12th 2017, State of Maine Agricultural Trades Show, Augusta, ME. Keep an eye on the developing program for this annual event in Augusta. As the date draws closer, you will find links to the program on our Department's homepage: <http://www.maine.gov/dacf/index.shtml> under "Events".

March 8-10, 2017, Northeastern Forest Pest Council, Bangor, ME. The Northeastern Forest Pest Council's 79th annual meeting will be held in conjunction with the New England Society of American Forester's meeting at the Cross Insurance Center in Bangor, ME this year. The agenda will include sessions on emerald ash borer with a perspective from New Hampshire; forest tent caterpillar, gypsy moth and spruce budworm—all of which caused notable defoliation in the member-region in 2016; white pine issues including insects and diseases; and range expansions of indigenous and exotic pests such as southern pine beetle and balsam woolly adelgid. Those who have attended the meeting in the past will recognize the *Gerald N. Lanier Graduate Student Session* and the State and Province Updates. Information will be posted on-line: <https://sites.google.com/site/northeasternforestpestcouncil/meetings>.

Conditions Report No. 5, 2016

On-line: http://maine.gov/dacf/mfs/publications/condition_reports.html

DEPARTMENT OF AGRICULTURE CONSERVATION & FORESTRY

Maine Forest Service - Forest Health and Monitoring

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