

Northeastern Wisconsin Forest Health Update

Wisconsin DNR – Division of Forestry

July 15, 2014

Topics covered this month:

Insects:

Banded hairstreak
Basswood defoliation
EAB info
EAB new finds in WI
Gypsy moth
Japanese beetles
Larch casebearer
Large aspen tortrix
Spruce budworm
Tree check month
White spotted sawyer beetles

Other:

Ash w/ thin crowns and previous heavy seed crop
Black cherry leafing out poorly – update
Crazy worms in the news
Firewood movement from out of state
Fishing spiders
Oaks with old leaves still hanging on
Winter damage to insects

Diseases:

Balsam fir needle rust
Dutch elm disease
Hickory mortality
 -Hundred Cankers Disease
Oak wilt

Of Historical Interest:

60 years ago - 1954 –
 Larch casebearer defoliation map
 Spruce budworm
25 years ago – 1989 -
 Twolined chestnut borer
 Twig dieback

Insects

Banded hairstreak – not all insects that feed on trees become problems. I found this cool little caterpillar (less than ½”) on a sample of oak leaves that I collected. I kept the oak leaves and the caterpillar pupated and emerged as a nice Banded Hairstreak butterfly. I’ve never heard of any real defoliation problems from banded hairstreaks.



Banded hairstreak butterfly (above) and caterpillar (left).

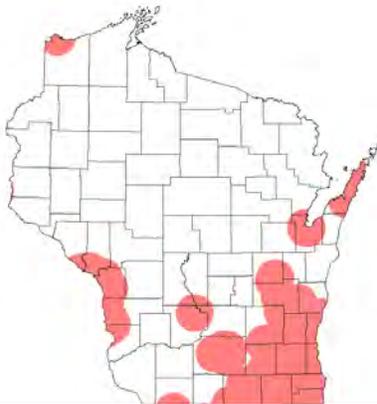
Basswood defoliation – last month I reported on the scarab beetles defoliating basswood. Since then I’ve observed the defoliation in a couple more counties so the latest list is Forest, Langlade, Oconto, and Shawano Counties that are experiencing defoliation on basswood and occasionally beech.



Scarabs defoliating basswood.

EAB info – the map at below shows the 15-mile radius around all known infestations of emerald ash borer in Wisconsin. The Emerald Ash Borer and Forest Management document has been recently updated

https://datcpservices.wisconsin.gov/eab/articleassets/Management_Guidelines_for_Wisconsin_Forests.pdf, but still states that salvage and pre-salvage harvests are recommended within an EAB quarantined county and for all stands within 15 miles of a known infestation, even if currently located outside of a quarantined county. Ash trees should be considered high risk for EAB mortality within the next harvest cycle.



Map showing 15-mile radius around all known EAB infestations in WI.



EAB new finds in WI - In the past month emerald ash borer has been identified in the following areas around the state:

New County Quarantines:

- none

New finds in Counties already Quarantined:

- Dodge & Washington Counties – City of Hartford
- Door County – City of Sturgeon Bay



D-shaped exit holes in bark (left).
Adult emerald ash borer beetles (right).

Gypsy moth – all gypsy moth spraying of Btk (suppression and slow-the-spread programs) is complete for this year, but DATCP has begun spraying of some areas along the western edge of the gypsy moth infested area with pheromone treatments. More info on the location of spray blocks can be found at <http://gypsymoth.wi.gov/> DATCP has all of their gypsy moth traps hung and moths have started to emerge in the southern part of the state.

I did see one lone tree that was completely defoliated by gypsy moth in Fond du Lac County, otherwise I haven’t had many reports of problem areas for gypsy moth.



Counties quarantined for gypsy moth shaded in red.

Japanese beetles - These exotic invasive insects are starting to cause problems in some areas this summer. These insects are occasionally mistaken for EAB because they have some metallic

green coloring near their heads. More commonly people will refer to the Multicolored Asian Ladybeetles as Japanese beetles, but the ladybugs are ladybugs and these critters aren't.

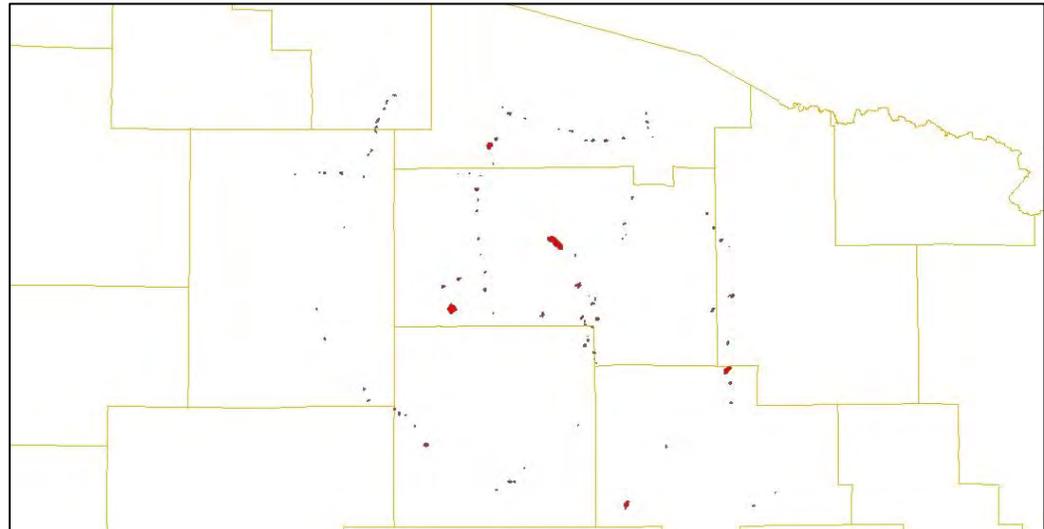
Japanese beetle adults feed on the flowers and leaves of over 300 species of plants including trees, shrubs, and herbaceous plants. They can do significant defoliation. The larval stage of Japanese beetle is a white grub that lives in the soil and feeds on plant roots. University of Wisconsin Extension has more info at <http://hort.uwex.edu/articles/japanese-beetle> including information on the damage caused by the adults, the damage caused by the white grubs, and what control measures are useful.



Larch casebearer – last month my update included info on the wide spread defoliation by larch casebearer in eastern Price County, Lincoln, Langlade, Oneida, Vilas, and Forest Counties, and scattered patches in Marinette County. Those defoliated stands are now starting to re-foliate.

Adults casebearer moths are tiny, and are out now, mating and laying eggs. Those eggs will hatch towards the end of the month and the tiny caterpillars will begin feeding on the

needles. Because they're tiny, they usually do minimal damage late in the season, but with large populations we'll have to keep our eye on it to see just how much defoliation occurs. Larch casebearer overwinters as a tiny caterpillar and is able to start feeding early in



Larch casebearer defoliation. Just over 8,000 acres of defoliation was mapped both on the ground and from the air. Thanks to Mike Hillstrom for making time for the aerial survey.

the spring as soon as the weather warms up. They use a mined out needle as a protective house and appear as small tan pointy things on the needles of the tree. Repeated defoliation can weaken the tree making it susceptible to attack by Eastern Larch Beetle.

I created a one page (front and back) document with more information about larch casebearer defoliation. If I haven't sent it to you already and you'd like a copy, drop me an email (Linda.Williams@wi.gov).



Larch casebearer defoliation. Photos above are of the same stand (red pine in background is same in both photos). Left is from June 10 following severe defoliation, Right is from July 15 as the trees are just starting to send out new needles.

Large aspen tortrix – one small area of severe aspen defoliation caused by large aspen tortrix was located east of Pembine in Marinette County. There is one generation per year, but it is the caterpillar that overwinters. Adult moths are out and lay eggs mid-June through July. The eggs hatch and caterpillars will feed through the remainder of the summer, then find a protected place where they'll spin a silk hibernaculæ to



Large Aspen Tortrix pupal case and webbing on aspen leaf. Photo by Jim Ivacko.

protect them through the winter.

When spring arrives the caterpillars emerge early and feed on the buds, then once leaves emerge they will feed on the leaves, folding them and tying them with silk to form a protected area to feed and pupate. Outbreaks tend to be short-lived, with natural reasons causing sudden collapses.



Large Aspen Tortrix defoliation. Photo by Jim Ivacko.

Spruce budworm - defoliation from spruce budworm on spruce and balsam fir has shown up in Florence, Marinette, and Vilas Counties.

Spruce budworm is a native insect that periodically has outbreaks that can cause extensive tree dieback and mortality. Regional budworm outbreaks occur every 30-50 years and can last 10-15 years. The first significant defoliation we noticed in these counties was in 2012.



Spruce budworm caterpillar.

Balsam fir is the species most heavily damaged by spruce budworm and repeated defoliation can cause top dieback and mortality. More info on spruce budworm can be found here <http://www.na.fs.fed.us/spfo/pubs/fidls/sbw/budworm.htm> and the following is from this pub:

Budworm outbreaks develop and gain momentum in the Northeastern United States only when there is a large proportion of mature and overmature balsam fir in the forest. Management practices including a greater use of balsam fir, regulating age classes to prevent the occurrence of over-mature balsam fir over large areas, and favoring or planting less susceptible species such as spruce make conditions generally unfavorable to the budworm and may materially reduce the risk of an outbreak.

In the Lake States, young balsam fir trees (1.5- to 4.6-m tall) growing next to mature balsam fir or white spruce stands often support heavy overwintering populations of the budworm.

Vegetative buds, mined by spruce budworm larvae previously blown in or dropped from the overstory balsam fir, provide suitable hibernation sites for the next generation. Larvae are able to survive the winter and continue the infestation on these young trees the following year. One way to prevent infestations in young trees growing under a mature balsam fir and white spruce overstory is to remove the overstory trees and replant the stand with non-susceptible species such as white pine. Insecticides can be applied to adjoining mature stands to protect the young stands nearby.



Messy defoliation caused by spruce budworm. Webbing holds clipped needles, frass, and pupal cases.



Spruce budworm defoliation on young spruce, Marinette County.



Spruce budworm adult moths, showing color variation.

Tree check month – August is “Tree Check Month”. Previously this was referred to as Asian Longhorned Beetle Awareness Month. So with August on its way, take a moment to check your trees for exotic insects. More info at <http://asianlonghornedbeetle.com/get-involved/tree-check/>

White spotted sawyer beetles – this native longhorn beetle is often mistaken for Asian Longhorned Beetle (ALB), but white spotted sawyer, sometimes called pine sawyer, is a native insect. How can you tell the difference between our native beetle and ALB? First of all size, ALB is a big burly beetle, while our native sawyer beetle looks slim in comparison, second, ALB has a very smooth shiny appearance with distinct white spots on black wing covers, where our native sawyer beetle will appear pitted or dusty, and the white spots may be less distinct or absent, and finally, our native beetle will have a nice white dot “between its shoulders” where the wing covers meet, and ALB does not have this.



White spotted sawyer adult.

Pine sawyer larvae develop in weakened or recently dead (or harvested) conifers. Larvae first feed in the phloem layer then progress to inner wood. They will pupate within the tree and chew their way out leaving large round exit holes. Adults feed on needles and the bark of twigs. If you experienced conifer mortality from the 2012 drought (or continue to experience mortality from the effects of the drought), you should be seeing these beetles soon as adults have started to emerge.

Diseases

Balsam fir needle rust – balsam fir in Florence, Forest, Oneida, and Vilas Counties are looking a little pale right now. Balsam fir needle rust is infecting current year needles. Balsam fir needle rust has white pustules that emerge from the lower surface of infected needles, those needles will then turn pale yellow, and this combination of white pustules and pale yellow needles gives the trees a pale ghostly cast. All rust fungi require a second host to complete their life cycle, and balsam fir needle rust requires a fern as the second host. The fungus produces spores on ferns in the spring. This fungus does well in years when we have a cool wet spring, like this year. Unfortunately we have several things impacting balsam fir needles this year, including winter damage, spruce budworm defoliation, and now balsam fir needle rust. Infected needles will drop prematurely.



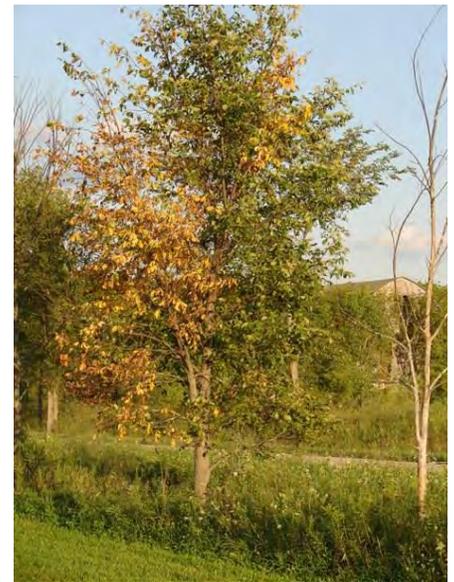
White "fringe" emerging from the undersides of needles are the pustules that produce the spores of the rust fungus.



From a distance the tips of the balsam fir branches infected with Balsam Fir Needle Rust appear pale, white or yellow (left). Close up photo (right) shows many needles infected and turning yellow.

Dutch Elm Disease - symptoms, including whole tree yellowing and wilting are showing up. This exotic fungal disease is spread by the elm bark beetle and can spread underground through root grafts as well. Since bark beetles are generally not attracted to smaller trees (sapling to small pole size) people often get their hopes up that their small elms have “escaped” and will survive and grow to maturity. Unfortunately, as soon as the trees are large enough for the bark beetles to be attracted to them the trees may become infected with dutch elm disease. The first symptom you will see is usually a single branch on which the leaves turn yellow and die. The rest of the tree will die shortly. Elm trees attempt to fight the fungus by walling off the portion of the tree where the fungus is located but this can lead the tree to self-induced water deprivation and death.

There are some disease resistant cultivars (those crossed with other elm species) and some disease “tolerant” cultivars available, which tolerate the disease without killing themselves.



Tree being affected by dutch elm disease.

Hickory mortality – Hundred Cankers Disease ... that’s the name that has been give to the mortality problem that we started to see in hickory in about 2005 ... Hundred Cankers Disease. Jenny Juzwik, with the US Forest Service, did a lot of research on this, as did others, but the field research is wrapping up. It was determined that the native hickory bark beetle is a main player in the mortality, as well as a wilt fungus, *Ceratocystis smalleyi*. The bark beetles introduces the fungus, which causes a rapid decline of the crown of the tree, epicormic branches sprout but quickly wilt, and the tree is dead within about a year. Two recent papers that have come out related to this problem are:

Park, J.H.; Juzwik, J. 2014. *Ceratocystis smalleyi* colonization of bitternut hickory and host responses in the xylem. *Forest Pathology* doi: 10.1111/efp.12098. [to be published in June 2014 hard-copy issue]

Abstract: Colonization of *Carya cordiformis* sapwood by *Ceratocystis smalleyi* and subsequent host defence responses following artificial inoculation were investigated using anatomical and histological techniques. Hyphae of *C. smalleyi* were observed in all sapwood xylem features confirming the ability of the pathogen to invade and colonize the xylem tissues of the host species. The fungus was isolated from within and at the margins of discoloured sapwood areas at 2 and 12 months after inoculation. General host defence responses that included vessel occlusion with gels or tyloses, lipid accumulation, and production of phenolic compounds were observed in xylem tissues of inoculated *C. cordiformis* stems. Pectic substances, lipids, and to a rare extent, phenolic compounds were detected in vascular gels. The lipid-rich barriers observed likely prevent lateral expansion of the fungus in the sapwood. Furthermore, lack of fungus sporulation within vessels may restrict axial spread of the fungus. *C. smalleyi* appears to be a limited vascular wilt pathogen of bitternut hickory based on these observations and previously reported sap flow reduction correlated with multiple infections in artificially inoculated trees.

Park, J-H.; Juzwik, J.; Cavender-Bares, J. 2013. Multiple *Ceratocystis smalleyi* infections associated with reduced stem water transport in bitternut hickory. *Phytopathology* 103:565-574.

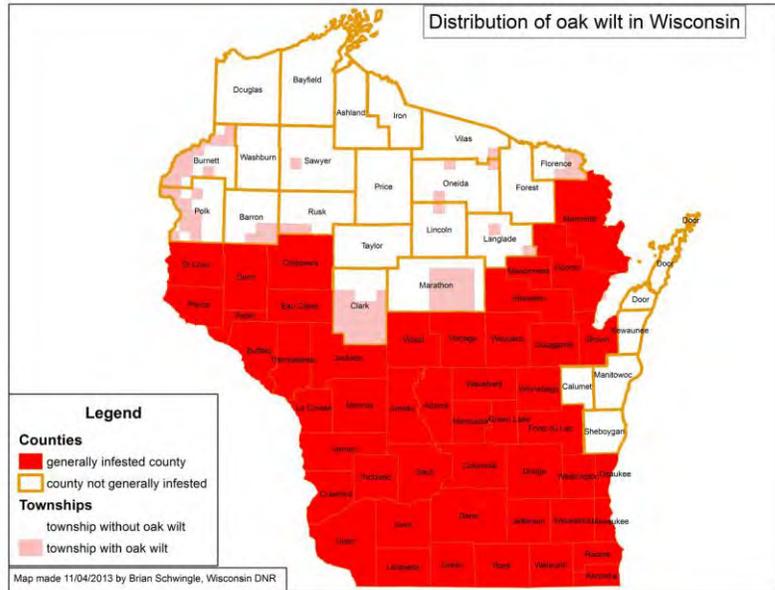
Abstract: Hundreds of cankers caused by *Ceratocystis smalleyi* are associated with hickory bark beetle-attacked bitternut hickory exhibiting rapid crown decline in the north-central and northeastern United States. Discolored sapwood colonized by the fungus commonly underlies the cankers. Field studies were conducted to test the hypothesis that *C. smalleyi* infections cause vascular system dysfunction in infected trees. Fifty *C. smalleyi* inoculations made at 1.8 to 3.8 m in height on stems of healthy bitternut hickory trees (13 to 28 cm in diameter at 1.4 m in height) resulted in extensive canker formation and sapwood discoloration 12 to 14 months after treatment compared with water-inoculated and noninoculated controls. Sap flow velocity (midday) was significantly lower in the infected trees compared with that in the controls. Sap flow velocity also was inversely correlated with the proportion of bark area with cankered tissues and with tylose abundance in the youngest two growth rings. Tylose formation in current-year vessels associated with *C. smalleyi* infections is likely responsible for much of the water transport disruption. It is hypothesized that multiple stem infections of *C. smalleyi* and the resulting xylem dysfunction contribute to crown wilt development in bitternut hickory exhibiting rapid crown decline.

For additional information on Hundred Cankers Disease, you can check out updates that have been posted over the years:

A good summary: http://www.nrs.fs.fed.us/pubs/gtr/gtr-nrs-p-117papers/18-juzwik_2012-chfc.pdf
http://www.fs.fed.us/foresthealth/fhm/posters/posters09/assessment_etiology_hickory_decline.pdf
<http://www.iowadnr.gov/Portals/idnr/uploads/forestry/Forest%20Health/HickoryDeclineUpdate11.pdf>
http://files.dnr.state.mn.us/publications/fid/2010/dec/fid_2010HealthHighlightsMN.pdf

Oak wilt – symptoms of oak wilt are showing up. I noticed fully wilting trees in Marinette County on July 7. Look for leaves that suddenly wilt and drop from the tree. Oak wilt is a non-curable fungal disease specific to oaks. Trees in the red oak family will die quickly from this disease while trees in the white oak family will die more slowly with a branch or portion of the crown becoming infected.

Trees infected with the oak wilt fungus this year are currently turning off-color, dropping their leaves, and will soon be dead. Leaves that drop to the ground will still be partially green closest to the petiole. Once a tree is infected with oak wilt the fungus will begin to spread outward from the roots of the infected tree through root grafts and into the roots of neighboring trees. In this way, over several years, a pocket of dead oaks will be created and the disease will continue to spread through the roots unless something is done to break the root grafts, or, it will stop when the disease runs out of oaks in that area. A good brochure about oak wilt, including the biology of the disease and how it is spread, can be found at <http://learningstore.uwex.edu/assets/pdfs/G3590.pdf> or check out the oak wilt info on the DNR website at <http://dnr.wi.gov/topic/ForestHealth/OakWilt.html> which includes the online interactive guide for determining oak wilt risk related to harvesting oak stands.



Distribution of oak wilt. From the WI DNR Oak Wilt page <http://dnr.wi.gov/topic/ForestHealth/OakWilt.html>



Leaves dropped from tree dying from oak wilt.

Other/Misc.

Ash with thin crowns and previous heavy seed crop – I look at a lot of ash with thin crowns, and usually expect to see EAB, but in many cases this year, all I’m finding is a bunch of seed petioles, on branches with no leaves, or very few leaves. In some cases the buds, if there were buds, did not break and the tree sent out epicormics just to have some leaves on the branch. So what happened here? Did the trees put all of their



resources into seeds last year and those branches had nothing left for leaves so that very few buds were even set? I'm not sure but that's kind of what it looks like. Will they recover? Perhaps. Will they continue to decline? Depends on the growing conditions we have the rest of the year.



Thin ash crowns. Petioles from old seeds remain on branches that have few leaves (right and top), and old petioles with flowergalls from mites are present on male trees (left).

Black cherry leafing out poorly – last month I reported that black cherry in some areas in Shawano, Oconto, and Oneida Counties were leafing out poorly. I have not revisited all of the sites but the trees that I have seen recently haven't done much to fill in their crowns with additional leaves. So they still look very thin. With that in mind they should continue to be monitored for attack by Peach Bark Beetle which can attack stressed black cherry trees.



Crowns of a black cherry that leafed out poorly this spring.

Crazy worms in the news – have you heard about crazy worms? They truly are crazy, twisting and jumping, dropping their tails to distract you, and doing great damage to the soil that they live in. They have been found at the UW Madison arboretum

<http://www.jsonline.com/news/wisconsin/asian-crazy-worm-is-latest-invasive-species-in-state-b99311904z1-267228811.html>

Firewood movement from out of state – from Christopher Deegan, WI DATCP Plant Protection Section Chief. The interstate movement of firewood is primarily regulated by federal plant pest quarantines, like those for gypsy moth and emerald ash borer. USDA-APHIS has jurisdiction over these rules, which also effect the movement of out-of-state firewood into

Wisconsin. Untreated firewood, regardless of the state of origin, cannot be moved from a quarantined area into a non-quarantined area.

DATCP also strongly discourages the movement of any untreated out-of-state firewood into Wisconsin's quarantined counties. Untreated firewood carries a high risk of transporting numerous insect pests and diseases with it, some of which may not be present yet in Wisconsin. Commercial firewood producers and distributors are encouraged to contact DATCP for firewood certification. Private individuals are urged to consider local sources and other alternatives to out-of-state firewood.

Fishing spiders – wow, am I ever getting a lot of reports and samples of fishing spiders this year! I guess it's just a good year for them. The Dark Fishing Spider and the Six Spotted Fishing Spider are probably the most commonly spotted in Wisconsin.

Dark Fishing Spiders can get fairly large in size with a



Dark Fishing Spider with egg sac. Photo by Chris Plzak.

leg span of up to 3 inches. They often live next to water, and can catch small fish and tadpoles to eat, but they can range inland as



Dark Fishing Spider.

well to hunt and lay their eggs. More info on Dark Fishing Spiders can be found at

<http://www.spiders.us/species/dolomedes-tenebrosus/>

and the Six Spotted Fishing Spider <http://www.spiders.us/species/dolomedes-triton/> Be sure to page down and read the lifecycle info for each one ... it's fascinating!

Oaks with old leaves still hanging on

– in many northern counties there are STILL scattered oak trees that have some of last years' leaves hanging on into the month of July with no signs that they'll be falling off anytime soon. I've looked at a number of these trees and in most cases I find that the terminal bud is dead or partially dead, and a lateral bud, or even a bud further down the twig ends up being the first leaves on the branch. In general I would say that the crowns have filled out ok, it just took them a lot longer because so many buds were dead.



Leaves from last year remain on the tree. The petioles are tattered but still hanging on.



Terminal buds on many of these branches did not break, and the tree had to utilize a bud further down the twig. In most cases old petioles from last years' leaves remain firmly attached.

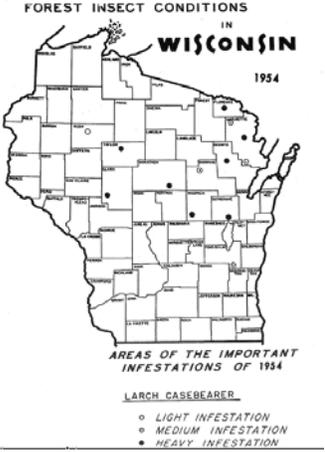


Winter damage to insects – in the past few updates I've mentioned various ways that the bitterly cold winter temps this past winter affected various tree species around the state. I've recently gotten several questions related to insects that basically ask "if the trees were so effected, weren't the insects too?". In many cases the answer is no. The excellent snow cover that stayed throughout the season protected many insects that overwinter at the base of trees, under the leaf litter, or in the top layers of the soil. Additionally, the temperatures got cold and stayed cold, so insects didn't emerge early (say in March) only to be hit by another freeze ... this year they simply stayed in their overwintering spots until it was time to emerge.

Of Historical Interest

60 years ago, in 1954 –

- Larch casebearer areas of important infestations of 1954 – map at right showing areas of heavy, medium, and light infestation.
- Spruce Budworm – *Choristoneura fumiferona* (Clem.)
Cast pupal skins were found by the U.S. Forest Service on numerous branch tips on balsam fir west of Shawano.



25 years ago, in 1989 –

- Twolined Chestnut Borer – *Agrilus bilineatus* (Weber). Oak mortality skyrocketed in many areas. In Adams, Columbian, Marquette and Green Lake Counties, oak mortality doubled in areas that were heavily defoliated in the spring by the fall cankerworm. In Menominee County, 487,900 board feet of borer-killed oak was scheduled for harvest in the areas treated for forest tent caterpillar. Additional mortality was noted but was not economically salvageable. Areas of heavy mortality occurred in Douglas, Washburn, Sawyer, Polk, and Burnet Counties. Widespread mortality of 50 to 70 percent occurred in scrub oak stands in southern Douglas County. Young oaks defoliated by the forest tent caterpillar in Sawyer and Washburn counties suffered almost total mortality. Scattered dead oaks were common throughout Westcentral Wisconsin. Heavy mortality occurred in disturbed sites including logging and construction sites.
- Twig Dieback – *Botryosphaeria quercuum* (Schwein.) Sacc. Twig dieback of pole and sawtimber-sized black and red oak was frequently observed along Highway 73 and County Highway Z in Wood County. Symptoms included lesions and small cankers on twigs and small branches which caused wilting and browning of fully expanded leaves. This flagging is similar to that caused by the oak twig pruner and cicada. Pynidia developed in the bark lesions and were frequently observed on affected twigs.

Contact Us

Forest Health Staff - contact info for each Forest Health Specialist can be found our webpage at

<http://dnr.wi.gov/topic/ForestHealth/staff.html>

Report EAB:

by phone 1-800-462-2803

by email

DATCPEmeraldAshBorer@wisconsin.gov

visit the website

<http://emeraldashborer.wi.gov/>

Report Gypsy Moth:

by phone at 1-800-642-6684

by email dnrfgypsymoth@wisconsin.gov

visit the website

<http://www.gypsymoth.wi.gov/>



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Note: This pest update covers forest health issues occurring in Northeastern Wisconsin. This informal newsletter is created to provide up-to-date information to foresters, landowners, and others on forest health issues. If you have insect or disease issues to report in areas other than northeastern Wisconsin please report them to your local extension agent, state entomologist or pathologist, or area forest pest specialist.

Pesticide use: Pesticide recommendations contained in this newsletter are provided only as a guide. You, the applicator, are responsible for using pesticides according to the manufacturer's current label directions. Read and follow label directions and be aware of any state or local laws regarding pesticide use.