NEW JERSEY FOREST SERVICE – 2021

Forest Health Highlights – 11/17/2021

The Resource

New Jersey is the most densely populated state in the nation and yet the forest covers approximately 2 million acres (42 percent) of the state's 4.1 million acres. Forest cover represents the largest single land use with a diversity of forest tree species, with pitch pine and white oak/red oak/hickory representing the two dominant forest types by area in the state. The northern counties, such as Sussex, Warren, Hunterdon, and Morris are dominated by northern hardwoods, white pine, Eastern hemlock, mixed oak and a variety of other species including isolated stands of red spruce. The southern counties such as Cape May, Atlantic, Cumberland, and Burlington are dominated by southern yellow pines such as pitch and shortleaf and to a lesser extent Virginia and loblolly. Various oak species such as southern red, scarlet, chestnut and white are also prevalent. In an urban state such as NJ it is critical to maintain forested areas and to manage them properly. Through forest health monitoring and sustainable planning, action can be undertaken to minimize or eliminate the detrimental effects of forest health related issues.

Forest Pest Issues

Agrilus smaragdifrons

In 2015-2016, the NJ Forest Service and NJ Department of Agriculture identified *Agrilus smaragdifrons* in EAB green funnel traps. The earliest record of *A. smaragdifrons* in NJ is from a photo report in Hudson County in 2011, but no specimen was collected. *A. smaragdifrons* is native to Asia and uses ailanthus as its primary host. At this time, it does not appear to cause significant damage to ailanthus, however, there might be potential to use *A. smaragdifrons* as a vector to disperse *Verticillium nonalfalfae*, a biocontrol to control for ailanthus.

In 2015-2016, *A. smargidfrons* was identified as by-catch in EAB funnel traps in Somerset and Burlington Counties. In 2021, the NJFS expanded the survey area and deployed traps in for *A. smaragdifrons* in Sussex, Morris, Passaic, and Hunterdon Counties. *A. smaragdifrons* was detected in Morris, Passaic, and Hunterdon Counties. None were captured in Sussex County.

Figure 1. *Agrilus smaragdifrons* captured in an EAB trap in 2021.

Anthracnose

Anthracnose is caused by several species of fungi that affect the leaves of trees. Cool, wet, springs encourage anthracnose spores to proliferate, which can cause more server leaf damage. In general, anthracnose is not a serious forest health threat, but repetitive years of heavy anthracnose damage can negatively impact tree health. Anthracnose was observed on numerous species this year, most likely due to the wet spring.

Asian Longhorned Beetle (ALB)

The Asian longhorned beetle (*Anoplophora glabripennis)* is native to eastern China and Korea and was first discovered in North America in 1996 in Brooklyn, NY. ALB has since been detected in additional locations in New York, Illinois, Ohio, Massachusetts, and New Jersey. ALB was first detected in New Jersey in 2002 in Hudson County (Jersey City). In 2004, additional ALB populations were detected in Middlesex (Carteret and Woodbridge) and Union (Linden and Rahway). The main hosts of ALB include maples, willows, ash, and poplars.
The Middlesex and Union County ALB quarantine zone was deregulated in 2013. ALB is now considered to be eradicated from these areas. No additional ALB infestations were found in 2021.

Bacterial Leaf Scorch (BLS)

Although BLS (*Xylella fastidiosa*) is a bacterial disease that is considered native to NJ, it was first observed causing tree damage and mortality around 1985 in the southern half of the state, mainly affecting trees in the Red Oak family.
In NJ, BLS leaf scorch symptoms become visible in early to mid-August, and is predominately found on red oaks, although it can be detected in other species including sweetgum, elm, and maple. BLS is a slow tree killer, often taking 10 or more years for an infected tree to succumb but causing gradual canopy decline and dieback over that time. Although antibiotic trunk injection treatments are available to treat BLS, these treatments must be done on an annual basis and treatments are most effective when done either prior to soon after infection.
Currently, BLS is found statewide and continues to cause wilting and tree mortality.

Beech Bark Disease (BBD)

BBD is a disease-insect complex between a fungus (*Neonectria faginata and N. ditissima*) and the beech scale insect (*Cryptococcus fagisuga*), native to Europe. Its main host is American beech. BBD was accidentally introduced to Nova Scotia in the 1890s on an ornamental beech imported from Europe. BBD was first detected in New Jersey in 1935, and by the 1960's, BBD was well established in the New England states.
The majority of beech found in the northern counties have been infested and infected by both the scale and fungus, respectively. At this time, no BBD has been found in central or southern NJ. Also, scale has not yet been identified in the southern half of the state, however, some small scale populations have been identified in the central counties.
Although there are no effective treatments for BBD, researchers have found American beech trees that exhibit resistance to BBD. These trees are tested for resistance then grown in orchards to serve as future sources of seeds for American beech restoration efforts.

Beech Leaf Disease

Although the causal agent of BLD has not yet been determined, BLD has been found to be directly linked to a nematode, *Litylenchus crenatae mccannii*. BLD symptoms include dark striping within the leaf mid-veins, clearly visible when leaves are held up against the light. The progression of BLD eventually causes necrotic leaf tissue and defoliation, leading to branch dieback and eventual tree mortality.

A Bergen County resident reported a suspect beech tree on their property in the summer of 2020. Leaves from their tree was sent for testing to USDA-ARS in Beltsville, MD, which later confirmed the presence of the nematode, *Litylenchus crenatae mccannii*. During this same time period, a member of the public submitted suspect leaves from a public park in Essex County to the Rutgers Plant Diagnostic Lab which were also determined to be BLD.

Figure 2. Leaf infected with beech leaf disease (BLD).

The NJFS is participating in a multi-state grant to establish long-term monitoring plots to measure and track the progression of BLD. Unfortunately, due to COVID-19, the plots were not established for the 2020 field season. However, in 2021, long term monitoring plots were established at 12 sites in 11 Counties (Burlington, Cape May, Essex, Hunterdon (2), Mercer, Middlesex, Morris, Passaic, Salem, Sussex, and Union). iButtons were placed at 4 locations across the state (Cape May, Middlesex, Morris and Passaic Counties). During data collection at these plots, as well as additional visual surveys and reports, BLD was detected in 9 additional counties in 2021 (Hunterdon, Mercer, Monmouth, Morris, Passaic, Somerset, Sussex, Union, and Warren). In addition, the BLD site detected in Essex County in 2020 visually appears to have increased BLD affected trees and BLD caused defoliation. Since plot data was not collected in 2020, there is no data to quantify this change.

Butternut Canker

Butternut canker is caused by the fungus *Ophiognomonia clavigignenti-juglandacearum (OCJ)*, first discovered in Wisconsin in 1967. The fungus has since spread throughout the native range of butternut (*Juglans cinerea*) causing widespread tree mortality. Although the origin of OCJ is unknown, it is believed to be non-native to the US.

In NJ, butternut is classified as an S1 species, critically imperiled with very few individuals in the state, most likely due to the impacts of butternut canker. On a national level, research is on-going to seek canker resistant/tolerant parent trees and conserve native genetics, however, to

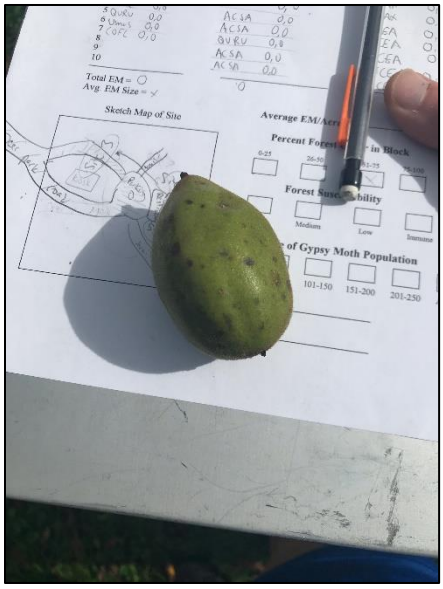

Figure 3. Butternut fruit

date, no resistance has been identified. In addition, the natural hybridization of butternut and Japanese walnut (*Juglans ailantifolia*) creates a hybrid often referred to as a "buartnut", which are less susceptible to butternut canker than pure butternut trees. Because buartnuts are able to survive butternut canker infections, they are more likely to be found in the landscape than pure butternut trees.
The NJFS has been working cooperatively with the Office of Natural Lands to locate and assess the few known butternut populations in NJ. Four butternut trees located at 2 sites were submitted for identification to the USFS NRS at Purdue University. Three of the trees came back as hybrids (buartnuts) and 1 came back as a pure butternut. The pure butternut did have visible cankers on the bole of the tree, however, was not tested to confirm the presence of butternut canker. Additional sites were visited that had butternut trees, but they appeared to be the hybrid buartnuts.

Brood X (17 Year Cicada)

In 2021, NJ experienced the mass hatching of the Brood X cicada (*Magicicada septendecim, M. cassinii, and M. septendecula*). Areas in Hunterdon and Mercer Counties were most heavily impacted, although it is likely additional counties had cicada activity. Although cicadas in general do not cause significant forest health issues, we did receive numerous questions regarding the branch tip dieback caused by the female egg laying damage.

Figure 4. An adult cicada, an emerging adult, and an abandoned juvenile exoskeleton.

Emerald Ash Borer (EAB)

The EAB (*Agrilus planipennis*) is native to north-eastern Asia and was first discovered in North America in 2002 in Michigan. Its main host are ash trees (*Fraxinus sp.*) but is also known to infest white fringetree (*Chionanthus virginicus*). To date, EAB has been detected in 35 states, including New Jersey in 2014. Currently 17 counties in NJ have confirmed EAB detections.

In 2020, there were no new counties with EAB detections. The entire state is included under the state and federal EAB quarantine.
The NJFS continued to treat ash trees to protect them from EAB infestation through the use of a USFS suppression grant. 62 trees were treated by a contractor at 7 sites (Spruce Run, Prall House, Voorhees, Ringwood, Jenny Jump, Washington Crossing, and Batsto. 31 ash trees were treated in-house, which included a black ash stand, at 3 sites (Whittingham, Trout Brook, and Hermitage).

Figure 5. Ash log with numerous EAB galleries beneath the bark.

The NJSFS and NJDA also worked cooperatively to release three parasitoids, Oobius, Tetrastichus, and Spathius were released in 6 locations in 4 counties: Warren, Morris, Union, Monmouth (3). EAB biocontrol recovery trapping occurred at 3 locations in 2021 (Rancocas in Burlington County, Goat Hill in Hunterdon County, and Blackwells Mills in Somerset County). Trap collections were submitted to NJDA for parasitoid identification and are currently being screened.
In 2021, there were no new counties with EAB detections, but ash mortality is becoming more prevalent in infested areas.

Fall Webworm

Fall webworm (*Hyphantria cunea*) is native to North America and generally does not pose a serious threat to tree health. Because leaf feeding by caterpillars take place late in the season, most impacted trees are able to recover this defoliation.
Fall webworm are most easily identified by their tent-like webs on the ends of the branches that appear in late summer.
Fall webworms were observed in the state.

LDD

Lymantria dispar dispar is native to Europe and was introduced in Massachusetts in 1869, for silkworm production. Unfortunately, insects escaped captivity and continue to spread. The LDD was first detected in NJ in 1920 in Somerset County, and today LDD populations have been detected statewide. In efforts to combat LDD, biological controls and suppression efforts have been implemented. The NJ Department of Agriculture has released numerous predatory and parasitic insects from 1963-1986 as a means of biological control against LDD. In 1981, New Jersey faced its worst LDD defoliation incident, where over 800,000 acres were impacted. NJ

continues to survey and monitor for LDD via aerial survey and egg mass surveys. The LDD have a wide host range, but highly prefer oak trees.
LDD defoliation increased in 2021. Based on the New Jersey Department of Agriculture's aerial survey detection program, 10,199 acres were acres were defoliated by gypsy LDD in 2021, a 9,196 acre increase from the 2020 defoliation report. The majority of the defoliation is seen in the southern part of the state, particularly Burlington and Cape May Counties. A spray program on state DEP lands is proposed in 2022 in Burlington County.

Figure 6. Defoliation caused by LDD moth.

In 2020, there was no suppression program on state lands, and there was a 50-acre suppression program on municipal lands in Cape May County.

Hemlock Woolly Adelgid (HWA)

HWA (*Adelges tsugae*) is native to east Asia, and was first discovered in the eastern United States in 1951 near Richmond, Virginia. HWA was first detected in NJ in 1978 in Burlington County. HWA mainly affects Eastern hemlock trees by feeding on the new growth. Numerous biological controls have been released starting in 1998 with predacious insects including *Sasajiscymnus tsugae, Scymnus sinuanodulus,* and *Laricobius nigrinus*. Nearly all hemlock in New Jersey, approximately 25,000 acres, has been infested with HWA to some extent. Eastern hemlock is designated as a priority forest resource in the NJ Statewide Forest Resource Assessment & Strategies. In 2012, the NJSFS was awarded a grant to chemically treat on select hemlock areas and to prepare a hemlock resource assessment. Treatments began in the spring 2011 and continued in 2012, 2013, 2014, and 2015. In 2021, no hemlocks were treated,

Figure 7. Hemlock needles infested with HWA.

Figure 8. Hemlock cones

however HWA populations were visualy observed and appear to be increasing. No treatments are planned at this time. In 2021, the NJFS collected hemlock cones from 30 trees, for the state nursery to bank and propagate NJ native hemlock seeds. It was a good cone year! Hemlock cones were also shipped to CamCore (NCSU) and the USDA Forest Service for seed banking and possible genetic/resistant testing.

Oak Shothole Leafminer

The oak shothole leafminer, *Japanagromyza viridula* synonym *Agromyza viridula*, is a native fly that has recently become more prevalent in the Mid-Atlantic states, although its range extents as far north as Maine and as far south as Florida. Not much is known about this fly or the reason for this increase in activity. The "swiss cheese" holes visible on white and red oak leaves are created by the female fly, when the oak leaves start to break bud. The female punctures the leaf with her ovipositor creating a small hole where she can feed on the leaf fluids. As the leaves grow and expand, so do the holes, creating a "swiss cheese" appearance.

Oak shothole leafminer leaf damage has become more prevalent in NJ since 2019. In 2020, due to COVID-19, visual surveys were limited, however, the NJFS utilized social media to request photo submissions from the general public of oak shothole leafminer leaf damage. In 2021, NJFS continued to receive reports of oak shothole leafminer. 2 additional counties were confirmed in 2021 - Camden and Morris Counties.

Oak Wilt

Oak wilt (*Bretziella fagacearum*) is a fungus that causes rapid mortality in oak trees in July and August. Oak trees in the red oak family are more susceptible than those in the white oak family, but both can be infected with the fungus. Trees can die within weeks or months after infection. Oak wilt has not yet been detected in NJ but has been detected in neighboring states including New York and Pennsylvania.

The NJFS continues to cooperate with the Rutgers Plant Diagnostic Lab to outreach to municipalities, tree care professionals, shade tree volunteer groups, etc., requesting any suspect oak wilt tree samples be submitted to the Rutgers Plant Diagnostic Lab. A USFS oak wilt grant will help fund the testing of approximately 200 oak wilt samples. A suspect oak wilt sample was submitted to the Rutgers Plant Diagnostic Lab in Essex County in July 2021. An aerial survey was conducted in the summer along the NY border, but no suspect oak wilt trees were observed.

Sirex woodwasp

Sirex *(Sirex noctillio)* is a woodwasp that is native to Europe, Asia, and north Africa. It was first discovered in North America in New York in 2004 in a trap. Sirex is considered a major pest of pines, including Scots, Austrian, red, loblolly, and white.

No sirex traps were hung in 2021. Some visual observations were made, but no signs of Sirex were detected.

Southern Pine Beetle (SPB)

Although considered a native insect, SPB (*Dendroctonus frontalis*) has the potential to cause widespread tree mortality. In 2001, southern pine beetle was officially recorded in NJ as causing tree damage and mortality in Cumberland and Cape May Counties. In 2002, surveys estimated 1,270 acres impacted by SPB, with some individual SPB spots measuring 250 acres. Since this discovery, the NJFS has continued to monitor and survey for SPB populations via trapping, aerial survey, and select ground verification. In addition, suppression measures are implemented to control SPB populations and reduce tree mortality, where appropriate. In 2010, SPB populations increased again, causing widespread tree mortality in Atlantic, Cape May, Ocean, and Cumberland Counties, affecting over 14,000 acres.

Damage from SPB is identified by pine tree crown color change from yellow, red, to brown, typically over contiguous areas. In NJ, SPB mainly affects Pitch pine (Pinus rigida), Shortleaf pine (P. echinata), and Virginia pine (P. virginiana), but has been observed infesting Norway spruce (Picea abies) and white pine (Pinus strobus).

In 2021, aerial survey detected approximately 684 acres impacted by SPB, a decrease of 788 acres from 2020. SPB is mainly found in the southern half of the state, with small, isolated spots in the western part of the Pinelands.

In 2021, approximately 18 SPB traps were deployed across the state. Trap catches were sent to USFS Morgantown for screening. Very few SPB were detected.

In 2021, the NJSFS oversaw two contractors conduct pre-commercial thinning for SPB prevention at two sites: Wharton State Forest (13 Acres) and Double Trouble State Park (34 Acres).

Figure 9. Thinned pine stand for SPB prevention.

Spotted Lanternfly

SLF (*Lycorma delicatula*) is native to China, Bangladesh, and Vietnam. The first North American detection was in Pennsylvania in 2014, and has since been detected in Virginia,

Delaware, and New Jersey. SLF has a wide host range that includes ailanthus, black walnuts, grape vines, apple trees, and numerous other trees, vines, shrubs, and plants.
SLF was officially detected in NJ in the summer of 2018 in Warren, Mercer, and Hunterdon Counties. Currently 13 counties are under state quarantine: Burlington, Camden, Essex, Gloucester, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Salem, Somerset, Union, and Warren. USDA APHIS and NJ Department of Agriculture are working together to survey and delimit the infestation area. Treatment with herbicide and pesticides on ailanthus trees began in summer and fall of 2018 and continued in 2019 and 2021.
SLF is present in 20 of the 21 NJ Counties. Established populations of SLF have not yet been confirmed in Cape May County. The NJ Department of Agriculture and the USDA APHIS are the lead agencies in the statewide SLF program.

Thousand Canker Diseases (TCD)

TCD is a disease-insect complex between a fungus (*Geosmithia morbida*) and the walnut twig beetle (*Pityophthorus juglandis*), believed to be native to the western states. Although WTB and Geosmithia are commonly found on western walnuts, it does not pose a threat to these trees. however, in black walnut, TCD causes cankers, dieback, and eventual tree death. NJ has been trapping for WTB and conducting visual surveys for TCD, but neither have been detected in the state. Trapping locations are strategically placed near known TCD detections in PA and MD.
In 2021, 6 traps were deployed in 4 counties (Passaic, Hunterdon (3), Burlington, and Salem). Trap collections were submitted to NJDA entomologist for identification. To date, no WTB have been identified.