

New Jersey Forest Health Highlights



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The Forest Resource

About 42 percent of New Jersey's 4.2 million acres are forested. To maintain the health and sustainability of 1.8 million forested acres, the New Jersey Forest Service faces many challenges. Issues, such as exotic invasive pests, native pest infestations, and the continued threat of bacterial leaf scorch to red oaks, are a few of the challenges to New Jersey's forests.

Exotic Pest Issues

Gypsy Moth — The dramatic increase in infestations of gypsy moth this year may signal the start of a fourth outbreak cycle in New Jersey. This defoliator has been in the State for such a long time that many people consider it a native pest of the numerous hardwood tree species and a few conifer species. However, the gypsy moth is actually a European species, first introduced to Massachusetts in the late 1860s. Little more than a hundred years later, New Jersey's forests experienced defoliation for the first time. Since then, this pest has gone through three distinct outbreak cycles in New Jersey. The first cycle peaked in 1973 when 258,000 acres were defoliated. The second and most damaging cycle occurred in 1981 when 780,000 acres were defoliated. A third cycle peaked in 1990 when 431,000 acres were defoliated, but gypsy moth populations experienced a steady decline through the 1990s, primarily because of the gypsy moth specific fungal pathogen, *Entomophaga maimaiga*.

The gypsy moth fungus spread throughout the gypsy moth populations in the east and had a major influence on gypsy moth infestations for most of the 1990s. Population densities were dramatically reduced to a point where egg masses were difficult to find in certain areas. It appears that soil moisture differences under extreme site conditions may have a role in the survival of this fungus. Outbreak observations during 2000 in the Sussex, Morris, and Hunterdon Counties, indicate that the fungus disease

appears to have a greater influence on reducing gypsy moth in the mesic sites compared to the xeric sites. In the mesic sites, the gypsy moth fungus may exist in soil moisture conditions more favorable for both the primary infection from overwintering fungal spores germinating on small larvae, and for the secondary infection of large larvae by spores produced from the primary infection. By contrast, on more xeric sites, such as dry, rocky ridges, the fungus may have difficulty germinating and maintaining high-spore densities. At these sites, the gypsy moth larvae caused more defoliation, completed their development, found physical conditions suitable for laying eggs, thereby ensuring that the outbreak would continue a second year.

Ground surveys conducted in northern New Jersey in late summer and fall of 1999, discovered small, discrete hot spots which had the potential to coalesce in a major outbreak in the coming years. Results from the 2000 aerial survey substantiated this potential problem by mapping 132,762 acres of gypsy moth defoliation, a hundred-fold increase from the 1,380 acres defoliated in 1999. The extent of the defoliation this year can be characterized in terms of intensity as follows: 48,268 acres as moderate (25-50 percent); 47,170 acres as heavy (51-75 percent); severe (76-100 percent).

As a consequence of the limited number of established, smaller infestations in 1999, few municipalities participated in the voluntarily gypsy moth suppression in 2000. The State and private forest lands in Burlington and Salem Counties, which were aerially sprayed with *Btk* in May 2000, totalled 385 acres. Ground and aerial checks in the spray blocks showed good foliage protection (5-30 percent defoliation inside a block compared with 50-100 percent outside in untreated areas). Gypsy moth egg mass surveys conducted in Atlantic, Bergen, Burlington, Camden, Hunterdon, Morris, Passaic, Salem, Sussex, and Warren Counties indicate that growing gypsy moth populations throughout New Jersey will result in an increase in gypsy moth suppression next year. The greatest risk for substantial tree loss from the gypsy moth infestations will be found where abundant egg masses have been reported in various hot spots and areas of previous defoliation.

Hemlock Woolly Adelgid (HWA) — The spread of this exotic insect, which threatens 26,000 acres of eastern hemlocks in northern New Jersey, was temporarily checked by cold weather in 2000. The cold winter temperatures caused over 95 percent HWA mortality in areas with elevations above 950 feet and in plant Zone 5. The high HWA mortality will eliminate the heavy feeding experienced by hemlock stands over the past several years and allow the trees to grow new shoots. Unfortunately, the laboratory-rearing program for the HWA predatory beetle, *Pseudoscymnus tsugae*, may be adversely affected because finding viable HWA populations in the field on which to raise the beetle was

far more difficult in 2000. Although HWA populations statewide have been significantly reduced by the combination of this cold weather and the drought of 1999, there has been a tendency for HWA to quickly rebound as hemlocks respond with new shoot growth. The only hope for New Jersey's hemlocks under the threat of the HWA is likely to be the predatory beetle. With HWA populations as low as they ever have been in the State, the opportunity now exists for the predator to exert its greatest influence on HWA. Previously, HWA populations had a tremendous head start on the predator and so diminished its chances to successfully control this most serious threat to the survival of hemlock in New Jersey.

Native Pest Issues

Variable oakleaf caterpillar — Large, noticeable infestations appeared during mid-summer in oak forests along the Garden State Parkway. This native insect had not been abundant enough to cause that much damage in four decades. Aerial-sketch mapping was conducted by a New Jersey Bureau of Plant Industry staff entomologist from a helicopter provided by the New Jersey Division of Parks and Forestry, Forest Fire Service. Severe defoliation caused by variable oakleaf caterpillars was delineated on 595 acres in three areas of Ocean County near Barneget. The largest area covered 435 acres in Union Township, followed by 110 acres in Stafford Township, and 50 acres in Eagleswood Township. Because the variable oakleaf caterpillar is a late-season defoliator of oak, its damage is not likely to result in tree mortality. However, homeowners still expressed concern about the loss of foliage in trees valued for shade during heat of the summer. Because the infestation this year was only detected around the time caterpillars finished feeding on August 15th, there was little opportunity for homeowners to reduce damage by spraying. However, homeowners are advised to watch for the moths of this pest next July when they are laying eggs on oak foliage. By being aware that this pest is likely to damage oaks next

summer, homeowners can plan to treat their trees when the variable oakleaf caterpillars are small (about half an inch) to keep the leaves from being eaten.

Orange-striped oakworm — During mid-September, oak trees over thousands of acres in coastal New Jersey also were defoliated by migrating caterpillars of the orange-striped oakworm. Trees were most heavily defoliated in residential areas of Lacey and Stafford Townships in Ocean County and in Galloway and Egg Harbor Townships in Atlantic County. Because this native insect is another late summer defoliator, it rarely leads to tree loss. Homeowners, wanting to reduce the nuisance posed by this insect, can apply insecticides until the third week of September when the caterpillars enter the soil. The greatest threat from this, and other summer defoliators, lies in the increased fire danger that their defoliation causes. The lack of leaves makes it possible for sunlight to reach and quickly dry the forest floor.

Special Pest Issues

Bacterial Leaf Scorch — This disease complex continues to be a serious health threat to oaks in southwestern New Jersey. Leaf discoloration and dieback in the crowns of pin, scarlet, and northern red oaks were first evident over 10 years ago in urban settings. Approximately one quarter of the State may be presently affected. Aerial surveys in 2000 determined that the disease was concentrated more in urban areas than woodlands. An extensive ground survey in Moorestown, New Jersey, this year determined that about 30 percent of the urban oaks had symptoms of bacterial leaf scorch.

Bacterial leaf scorch is a wilt disease of trees in the red oak group caused by the bacterium, *Xylella fastidiosa*. The bacterium is transmitted to healthy trees by feeding leafhopper and spittlebug insects moving from diseased trees or perhaps any understory herbaceous plants, such as goldenrod, blackberries, and clover. The bacterium enters the tree at the feeding site, rapidly colonizes the water-conducting tissues of the infected tree, thereby physically interrupting water transport. Additional bacterial toxins and host tyloses further disrupt water conductivity. Characteristically, leaves of infected trees first show brown margins with a "watersoaked" zone between live and dead tissue. The entire leaf changes color from the tip toward the petiole and eventually dies. Leaf scorch on oak first appears on the outer and upper main branches. Symptoms of this disease develop more rapidly during hot weather.

For More Information



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