

Pennsylvania

Forest Health Highlights



January 2001

The Resource

Pennsylvania covers a land area of 25,333 square miles and is 59 percent forested. Seventy-five percent of the forest land in the State is privately owned by 513,900 landowners. Yet with a population of 12 million people, forest landowners account for only 4 percent of the total population. Forests provide not only timber, but also, watershed protection, wildlife habitat, and recreational benefits for all Pennsylvanians.

Weather Conditions

The drought conditions throughout Pennsylvania lasted from July 1998 to December 1999. Favorable precipitation and moderate temperatures during the 2000 growth period were beneficial for the recovery of Penn's Woods. The long-term drought impact was difficult to ascertain because anticipated tree mortality and crown dieback in drier sites (ridge tops, steep slopes, southern aspects) were not readily apparent during 2000.

Several conditions masked the long-term impacts of the drought on the tree health. A major outbreak of gypsy moth occurred mainly in the oak forests of the Ridge and Valley Regions of the central and southern parts of the State. Additionally, mid-May moisture and temperatures were conducive to leaf anthracnose diseases on chestnut, white and red oaks, white ash, and sycamore throughout the entire State. Fortunately, these diseases were serious only for sycamore, which sustained a fifth-consecutive year of early leaf damage, but from which most individual trees recover. Other foliar diseases that benefited from the spring moisture included *Phomopsis* tip blight on junipers, *Blumeriella* leafspot on black cherry seedlings, anthracnose on maple seedlings, and severe outbreaks of apple scab on susceptible cultivars of crabapple and fruit trees.

The most enduring consequences of the drought on trees are likely to be the numerous canker and die-

back diseases in conjunction with sedentary scale insects that can persist for several years in certain stands. Several examples include *Leucostoma (Cytospora)* fungi on *Salix*, *Prunus* and various coniferous species, and *Botryosphaeria* canker on various hardwood tree and shrub species. In one instance, twig dieback on drought-stressed American beech in Somerset County near Johnstown was associated with a localized infestation of oystershell scale. These diseases and insects, together with the weather conditions, are important factors influencing the overall condition of Pennsylvania's forests.

Forest Pest Issues

Insect Defoliators – While defoliation by most insects was observed to varying degrees throughout the Commonwealth, the greatest extent of defoliation was recorded in the central portion of the State.

The spring defoliation season was greatly advanced by above-normal temperatures exceeding 90 degrees for several days in early May. Consequently, leaf expansion and lepidopteran larval development were accelerated resulting in an increase in early season defoliation. Aerial and ground surveys in late June detected health-related problems on more than a million forested acres, an increase of 700,000 acres over 1999. Most notable, **gypsy moth** defoliation increased 34 percent to a total of 837,594 acres. In addition, defoliation by **oak leaftier** and **oak leafroller** totaled 10,053 acres in Tioga County. Half of this outbreak was treated with *Bacillus thuringiensis kurstaki* in the spring to protect high-risk oak stands in the Tioga State Forest and Leonard Harris State Park. Defoliation was lower in treatment areas. Post treatment observations of oak leaftier life stages suggest that no further suppression is needed in 2001. Other spring defoliators included the **eastern tent caterpillar** (2,500 acres) and **leafhoppers** (2,521 acres).

Late-season defoliation was common in many areas. While an exact acreage of **locust leafminer** damage is not usually determined because black locust is such a ubiquitous tree species, this chrysomelid beetle was so pervasive this year that an estimate was set at one million acres. In addition, **fall webworm** defoliated about 90,000 acres, primarily in roadside and urban tree settings. The 123,900 acres of defoliation caused by the **orangestriped oakworm** was of concern because this damage in many areas coincided with earlier gypsy moth defoliation. Other damaging insects observed during 2000 include **oak skeletonizer**, **saddled prominent**, **walkingstick**, and various other **Lepidoptera**.

Hemlock Woolly Adelgid – Early winter surveys found overwintering mortality of hemlock woolly adelgid (HWA) in some areas exceeded 90

Special Issues

percent. The 1999 drought may have affected host suitability and subsequently impacted overwintering HWA. Additionally, the brief periods of extreme temperature shifts that were observed in early February may have contributed to early winter HWA decline. However, despite their decline, HWA populations returned to outbreak levels in most areas by early summer. Although, the overall acreage affected by HWA did not increase significantly in 2000, Union County was added to the 34 counties in eastern Pennsylvania with HWA infestations.

A predaceous ladybird beetle, *Pseudoscymnus tsugae*, was released against HWA for the first time in Franklin County, Pennsylvania, in 1999. Evaluations in 2000 recovered beetles near the release site, indicating successful overwintering and possible establishment. Another 10,000 adult beetles were obtained in cooperation with the USDA Forest Service and released in May and June 2000 at two sites in Pike and Wayne Counties. Beetle survival was excellent at both plots, and the beetles reproduced in the Pike County plot. Additional releases of this species and research in the Poconos with the predaceous Chinese ladybird beetle, *Scymnus sinuanodulus*, is planned for 2001.

Elm Yellows – The three-year survey to detect elm yellows in Pennsylvania was completed in 2000. Elm yellows was found in 59 of Pennsylvania's 67 counties. During the survey, no elm yellows symptoms were observed in counties adjacent to the Delaware River. Elm yellows and Dutch elm disease continue to be prevalent throughout Pennsylvania and represent the primary agents killing elms.

Chestnut Blight – Field evaluation of blight resistance in American chestnut from source trees throughout Pennsylvania began with the planting of one-year-old seedlings at four locations on state forest lands in Jefferson, Pike, Clinton, and Bedford Counties. Annual evaluations of seedling growth and canker development will help select seed sources for inclusion in a national program to develop chestnut blight-resistant hybrids of American chestnut.

Sugar Maple Decline – Does foliar nutrition and insect defoliation predispose sugar maple to decline on the Allegheny Plateau of northern Pennsylvania? Foliar levels of magnesium and manganese and defoliation history were found to be important factors influencing sugar maple health. Cooperative studies with the USDA-Northeast Forest Research Station since 1985 found that liming northern hardwood stands improve the growth, crown vigor, and foliar nutrient levels of sugar maple. Soil base cations play an important role in sugar maple decline. High base cations exist on glaciated sites and unglaciated lower topographic positions where sugar maples are healthiest; whereas, low base cations exist on unglaciated summits, shoulders, or upper backslopes where sugar maples exhibit moderate-to-severe decline.

Forest Tree Nursery Disease – Penn Nursery has increased the production of healthy, quality seedlings using procedures involving compost amendments to reduce soil-borne diseases while reducing the use of agricultural chemicals. Since 1982, studies have characterized the etiology and control of *Cylindrocladium* root rot and seedling blight in nursery production beds. Application of a granular soil fumigant followed by incorporation of municipal sewage compost and used mushroom compost have reduced *Cylindrocladium* and other soil-borne pathogens within infested nursery beds. These studies are scheduled to end in 2001, and a manual of recommended nursery management practices will be developed.

Forest Regeneration – Ameliorating the effects of deer browse on tree seedlings in regeneration areas has been the goal of the Bureau of Forestry for the last five years. A total of 477 deer enclosure fences have been erected, which afford protection to approximately 17,922 acres. In 2000, 360 acres were fertilized by air and 180 acres by ground application to assist the growth of black cherry, thereby enabling it to outgrow the competing vegetation and deer browsing. The competing effects of fern cover on tree regeneration were reduced by herbicides on 2,778 acres, mowing on another 303 acres.

To further reduce deer browse on regeneration, the Bureau and Game Commission will study how varying degrees of hunting pressure influence how well forests recover from varying degrees of deer-browsing impacts. Several large (greater than 15,000 acres) contiguous blocks of forested habitat that have been severely impacted by deer browsing are proposed for the study.

For More Information



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