Wisconsin Forest Health Highlights

December 2000

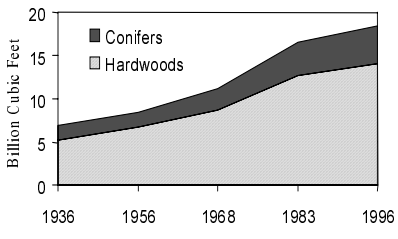
The Forest Health Protection Unit and Regional Forest Pest Specialists provided a wide variety of programs and information on forest pests, and continued to teach integrated pest management principles to DNR foresters, industrial foresters, and private woodland owners. They successfully educated about 5,310 individuals at 97 different training sessions. At the same time, insect and disease detection and evaluation surveys were conducted on approximately 7.8 million acres.

In this issue:

The Resource

—Forests are important to the economy of Wisconsin, not only in the form of wood products, but also in the form of recreation and tourism. The primary and secondary wood products industry is the second largest employer in the state and puts Wisconsin first in the nation in the production of fine paper, sanitary paper products, children's furniture, and millwork. The value of shipment of these products annually exceeds $19.7 billion. Forest and water resources in Wisconsin are a primary tourism attraction for both residents and visitors. The variety of Wisconsin's forest ecosystems support a great diversity of wildlife species, while recreational use of the forests continues to grow and expand.

The area of forestland in Wisconsin has been steadily increasing in recent decades and currently stands at almost 16.0 million acres, representing 46 percent of the total land area. The state now has the most forest land that it has had at any time since the first forest inventory in 1936. Wisconsin's forests are predominately hardwoods, with 84 percent of the total timberland area classified as hardwood forest types. The primary hardwood forest type in the state is maple-basswood, which makes up 5.3 million acres (34%) of Wisconsin's timberland area. Conifer types represent 16 percent of the total timberland area (pine forests - 8%, spruce-fir - 6%, and swamp conifers - 2%).



Exotics

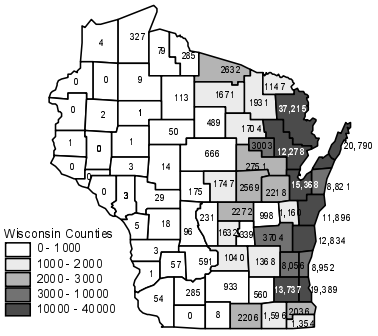
Gypsy Moth

In spring 2000, 80,558 acres were treated in central Wisconsin as part of the Slow The Spread program to retard the expansion of gypsy moth westward. Sixty-three sites for a total of 58,246 acres were sprayed two times with Btk. An additional 13 sites totaling 22,955 acres were treated once with pheromone flakes. In eastern Wisconsin, where gypsy moth is established, the population continues to increase and a few communities have begun to experience defoliation, particularly in oak dominated parkland. Four communities chose to treat limited areas with Btk to prevent defoliation. In Appleton and Green Bay, an aerial application was done of 40 acres each. In Brookfield and Milwaukee, parks departments first treated egg masses with Golden Natur'l Oil, decreasing the population by 50-75%. A ground-based spray of Btk in May was then used to further reduce the population to tolerable levels. Treatments were considered to be very successful in Brookfield and Milwaukee, but less so in Appleton. Cold weather following aerial treatment there may have reduced the efficacy of the spray by discouraging feeding.

Gypsy Moth - Biological control agents

Surveys of larvae in eastern and central counties for infection with *Entomophaga maimaiga*, Nucleopolyhedrosis virus (NPV) and parasitoids

showed all three to be present throughout the eastern and into the central sands region. The presence of *E. maimaiga* in Waupaca, Waushara and Portage counties was surprising as no introductions of this fungus had been made in these counties previously and the local conditions are typically dry.



Gypsy moth trapping results as of Novem-ber 2000, totalling 215,502 moths. (Wisconsin Dept. Trade & Consumer

Trap catch of males indicates populations continue to increase in eastern counties. Numbers are particularly high in north-central and shoreline Marinette and north-west of county, in the Fox River Cities Milwaukee (see map) where pockets of defoliation are likely to be more frequent in 2001. Trap catch also indicated that establishment of gypsy moth has progressed further westward in northern counties and the Upper Peninsula of Michigan than was previously thought.

In response to the threat of defoliation by gypsy moth in 2001, the DNR is offering counties and municipalities to option of participation in a federally cost-shared, state organized suppression program. Blocks of land proposed for aerial treatment with Btk will have to pass certain criteria to be eligible for the suppression program. The program is voluntary, landowners must agree to the treatment and local funds must be provided to match the share contributed by the USDA Forest Service.

Multicolored Asian Lady Beetle

—An imported species of lady beetle, the multi-colored Asian lady beetle, was prominent this fall throughout Wisconsin. One important factor in the exceptionally high numbers seen this year may be the introduction into the state of the soybean aphid which subsequently provided a large food base for this predatory beetle.

Many lady beetles were also found indoors as they congregated and searched for a place to hibernate. The Wisconsin DNR received several calls from the public. People were concerned about biting, yellow/orange spit, and odor.

European Buckthorn

—This exotic brush species continues to invade oak woodlots in the southeastern and south central counties where it displaces many species of native wild flowers and under story shrubs and prevents reproduction of native tree species.

Hardwood Pests

Forest Tent Caterpillar

—Scattered heavy defoliation on oak, aspen, ash, birch and crabapple trees was observed in Lincoln, Oneida, and Vilas counties. Reports of migrating caterpillars were also received from Florence, Forest, and Langlade counties. Some areas have been infested for two consecutive years. Sites with heavy defoliation included downtown areas and homeowners' yards, prompting numerous phone calls. Defoliated trees produced a second set of leaves by early summer. The city of Rhinelander sprayed insecticide on street trees in the downtown area in mid-May. Millions of moths were also spotted in late June to early July in many parts of northern Wisconsin, especially in downtown areas and gas stations where lights were on at night. An aerial survey conducted in late June showed approximately 101,195 acres infested by forest tent caterpillars in Forest, Lincoln, and Oneida counties. An egg mass survey is scheduled this winter to predict defoliation by forest tent caterpillars for 2001.

Oak Wilt

—More oak wilt pockets were found this summer in Spread Eagle, Florence Co. All of the new sites were located within one mile from the sites that were detected last year. The presence of oak wilt in Florence Co. was first confirmed in 1999. In July of 2000, the Public Service Commission passed administrative code PSC 113, which restricts pruning and cutting of oak in counties with oak wilt during the April 15 - July 1. The code applies to electric utilities regulated by the PSC, which includes investor-owned and municipal utilities. Coop-run utilities are not regulated by PSC.

The code can be viewed by accessing the PSC website www.psc.state.wi.us, clicking on PSC 113 and search-

ing for 113.0511. The code has also been published in the Administrative Register # 535 dated July 31, 2000.

Larch Casebearer

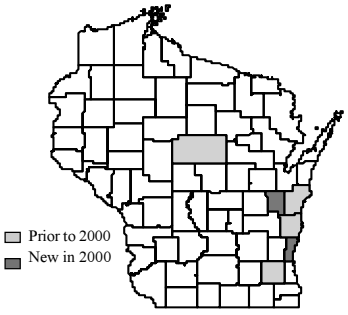
—A moderate to severe infestation on tamarack was again observed this spring in Oneida County. A light to moderate infestation was seen throughout northeastern Wisconsin. Some areas were infested for two to three years. Infested trees started to reflush in late May.

Bruce Spanworm

—In both 1998 and 1999, bruce spanworm caused severe defoliation in pockets of sugar maple in Forest and Florence counties, with most trees recovering well. This spring, a combination of bruce spanworm and linden looper caused a light defoliation on young sugar maple with mortality of mature trees in some sites. The level and extent of the mortality will be monitored.

Ash Yellows

—Ash yellows was confirmed in two new locations in the forests of Wisconsin this year. This disease was observed initiating decline and killing large pole to small sawlog white ash trees in a 5-acre woodlot in Ozaukee County. Brooms or masses of densely clustered branches were common on infected trees. The presence of these brooms has not previously been a common sign of infection in Wisconsin's forests. Ash yellows was also confirmed in Calumet County. This stand was a privately-owned woodlot with a mix of ash, sugar maple and black cherry. Symptoms such as thin crowns, chlorotic leaves, epicormic branches and brooms were common in the stand.



Map of Wisconsin counties where ash yellows has been found.

Ash yellows is a relatively recently discovered disease and is caused by a phytoplasma. This organism invades the tree's phloem and causes dieback and eventual mortality. These two new locations bring the total observations to six. Ash yellows has now been confirmed in the following counties: Calumet, Marathon, Manitowoc, Ozaukee, Sheboygan, and Waukesha (see map).

Peach bark beetle *(Phloeotribus liminaris)*

This tiny bark beetle attacked mature black cherry in late summer after emerging from logging slash resulting from a September 1999 harvest. Many large-diameter tops produced ideal host material for the beetle population to build up. This years late summer attacks on the residual cherry produced many conspicuous globules of gummy pitch. Dissection revealed large numbers of adult beetles that had bored into the live bark but did not reach the cambium. It is too early to know if they will successfully attack next spring.

This species is native to Wisconsin; it is a pest of peach orchards in southeastern U.S. The adult is tiny — 1 ½ to 2 millimeters long. It occasionally attacks black cherry that is under stress. It has not previously been reported as a pest of black cherry in Wisconsin and it is unknown if this incident represents the beginning of a new pest problem. Utilization of the logging slash as much as possible would be a wise practice until we learn more about this bark beetle.

Fall Cankerworm

—The fall cankerworm caused light defoliation of hardwoods over a large area of south central Wisconsin and pockets of heavy defoliation of oaks on dry sites in Sauk and Columbia counties.

Butternut Canker

—Preliminary results from the cooperative butternut project on the Menomonee Reservation were reported in the 1999 WI DNR Forest Health Annual Report. The focus of the study is a comparison of seedling growth rates on different habitat types and canopy gap openings with the long-term objective of increasing the chances for fast-growing trees to reach reproductive maturity before being killed by *Sirococcus clavigigneti -juglandacearum*, the cause of butternut canker.

Initial results indicate significantly better height and diameter growth on mesic sites and mid-size openings. Decreased growth in very small openings may have been due to inadequate sunlight, whereas slow growth on the largest plots was probably a result of high levels of vegetative competition. Mortality rates were highest on the driest and poorest sites, again probably correlated with high competition. If current growth rates on the mesic sites can be sustained, several trees will be at least 11 meters high at age 20 when they will have reached reproductive maturity.

In the future, the trees will be measured every 5 years for height, diameter, and presence of cankering. Of special interest will be the age of initial seed production on the various sites.

Conifer Pests

White pine blister rust

—The question of the validity of risk zone maps for white pine blister rust was addressed this year in a comparison study of disease incidence across Wisconsin's four risk zones (Van Arsdel 1968). Stem cankers occurred on an average of 4.8% of surveyed trees, while branch cankers were observed on another 3%. Levels of rust were significantly higher for trees bordering the edge of plantations where the alternate host, *Ribes*, was present in adjacent woods or fencerows. The proximity of *Ribes* proved to be the most significant determinant of rust levels, whereas risk zone was not significant. The average incidence of blister rust was significantly higher in risk zone 4 but varied widely within each of the 3 lower risk zones. Habitat type was a good predictor of rust incidence. This is probably due to the occurrence of *Ribes* on predominantly mesic sites and its almost total absence on drier sites.

This information contributed to the rewriting of the management guidelines for white pine blister rust in the DNR silviculture handbook. Further work is planned in the upcoming field season and will focus on risk zone 3.

(Van Arsdel, E.P. 1968. Growing white pine with improved blister rust control. Dept. of Nat. Res., Madison, WI. 4 p.)

Annosus Root Rot

—*Heterobasidion annosum* (Annosus Root Rot) was first reported in 1993 as a cause of mortality in a red pine plantation in Adams County. As of December, 1999 a total of 8 "pockets" (infection centers) had been found in four counties in Wisconsin (figure 1). An aerial survey was conducted in February, 2000 covering approximately 1,250 square miles in southern and central Wisconsin. Numerous potential pockets of mortality were located and are currently being ground checked for *H. annosum.* Additional potential infestations observed along Interstate 90-94 and/or reported by DNR forest health specialists are also being checked for the presence of *H. annosum*. Thirty pockets, in addition to those already reported, have been ground checked this year and all were negative for *H. annosum*.

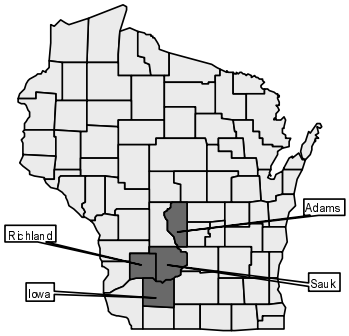


Figure 1. Annosum has been found in 4 counties in Wisconsin as of 1999.

An intensive survey was conducted on the Sauk County forest and an additional 32 infection centers were confirmed. An eradication trial is planned for the Sauk County forest and the Arena school forest in Iowa County for the spring of 2001.

Red pine pocket decline

—Research on this phenomenon continued through the University of Wisconsin, Dept. of Entomology. The number of reports of observations of these pockets increased in the west-central region. Mortality and decline continue to be most common in plantation-grown red pine between 20-40 years of age. Affected stands have typically been thinned at least once.

Current research has shown the continued presence of the root disease organism *Leptographium* sp. along with root collar weevils, pine bark beetles and turpentine beetles. Research is focusing on the populations of insects and their natural enemies in affected and nonaffected stands. Efforts are underway to develop silvicultural and cultural management recommendations based on the latest research results.

Jack pine budworm

—Although light defoliation occurred this year in Adams, Juneau, and Monroe counties, levels were down dramatically from the last 2 years. In Adams County, defoliation was scattered south of Highway 21. Juneau County had light defoliation south of Highway 21, east of 8th ave., and north of County highway A. Monroe County had some defoliation southeast of Cataract and west of Fort McCoy (County Highway I, II and Delaware Ave.)

Weather Damage

Wind and Hail Storms

—On May 12, 2000, a wind and hailstorm hit southern Waushara, northern Marquette and central Manitowoc counties. Meteorologists called it a **thunderstorm super cell moist micro burst**. Golf ball-sized hail and winds up to 110 mph were reported. Damage to oak, aspen, sugar maple, red and white pine and bottomland hardwoods was scattered throughout approximately 167,000 acres. Injuries included multiple wounds and stripping of the bark from the large hailstones. Seedling and sapling-sized trees were typically injured so brutally, they died within 2 months following the storm. Ten to twenty-year old conifers also suffered significantly and started to die late in the summer. Pole to sawlog-sized trees of all species affected also incurred a significant number of hail wounds. Red pines desiccated quickly and browning foliage was commonly observed 2 months after the storm. Many of the affected red pines are expected to die within the next year. White pines appeared to have faired the multiple injuries better. Some browning of foliage was observed but more white pines than red pines are expected to survive through the winter.

The fungus, *Sphaeropsis sapinea*, known to proliferate on hail-damaged red pine, was observed in Waushara County approximately 2 months after the storm. Red pines that do survive will be faced with the threat of dieback and cankers initiated by *S. sapinea*. The frequent rains that came throughout the summer helped prevent the build up of bark beetles. No outbreaks or significant damage from bark beetles were observed.

In Manitowoc County,[1] the high winds caused pole to sawlog-sized hardwoods with tight codominant stems and branch unions to split. These trees now have significant wounds and will be susceptible to decay. In addition to the loss of branches and splitting of the stem, young tender buds and young foliage was stripped from the trees. Many of these trees refoliated but only produced a small number of sub-normal sized leaves. Basswood appeared to have refoliated more vigorously than sugar and red maples. Survival of these severely affected maples is expected to be low. Salvage cuts have been initiated throughout the damaged area. Bottomland hardwoods including silver maple and willow not only suffered from wind damage and hail wounds but were also injured by the large amount of rain that fell with the storm. This storm, followed by continuous rain throughout the growing season, left many bottomland hardwoods sitting in several feet of water for several months. These trees did not refoliate and high levels of mortality are expected in 2001. West-facing windows in many homes in the area were blown out and several barns were damaged. Straight-line winds leveled some forests, leaving trees totally stripped of their leaves and bark severely damaged by large hail (figure 2). Wildlife was also reported killed in the storm. Governor Thompson declared the townships a disaster area.

On August 14, 2000, a similar storm, also with golf ball-sized hail, damaged timber on approximately 25,500 acres in Douglas County. Winds as high as 60 mph were recorded. The damage was scattered throughout the 25,500 acres and injured species include red, jack, white pine and aspen. Since this storm hit later in the growing season, buds were tougher and damage to the buds appears to be less severe than from the spring storm. Other injuries included multiple stem wounds on all affected species, loss of foliage and some branch breakage.

Plots have been established in Waushara and Douglas counties to track the rate of mortality and detect the presence of other organisms such as bark beetles and S. sapinea that may pose a threat to residual healthy trees.

High-speed straight-line winds also ripped through central Juneau County, just north of New Lisbon, on June 1, 2000. Hardwoods, including oak and aspen were damaged through main stem breakage or uprooting. Approximately 90% of the damaged trees were hardwoods and 10% conifers (white and red pine). The path of the storm covered approximately 6,215 acres. Damage was discontinuous throughout the affected area. Salvage efforts were initiated immediately and are ongoing.

[1] Contact the website: http://www.saintnazianz.homepage.com/ for more information on Manitowoc County storm.

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