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# The Forest Insect and Disease Situation, Lake States, 1957



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## FOREWORD

Forest insects and diseases are ever-present threats to Lake States timber resources. Past losses in tree growth and mortality are indicative of how destructive such pests have been and may continue to be in the years ahead. To appraise adequately the regionwide insect and disease situation, the Lake States Forest Experiment Station summarizes each year the information on the current status of insect infestations and disease infections.

To prepare such a report it is essential that use be made of all available information. Many individuals, State organizations, and forest industries have been helpful. Their active and willing cooperation is gratefully acknowledged. Special acknowledgment is made of the information and help given by the following.

### Michigan:

Division of Forestry, Conservation Department  
Bureau of Plant Industry, Department of Agriculture  
University of Michigan  
Michigan State University

### Minnesota:

Division of Forestry, Conservation Department  
Office of State Entomologist, Department of Agriculture  
University of Minnesota

### Wisconsin:

Forest Management Division, Conservation Department  
Office of State Entomologist, Department of Agriculture  
University of Wisconsin

Copies of the report may be obtained from the Lake States Station, who collected some of the original material, summarized all information, and processed the report.

Cover: Drawing represents an adult Saratoga spittlebug; photograph shows damage to red pine twigs with bark removed.

THE FOREST INSECT AND DISEASE

SITUATION,

LAKE STATES, 1957

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THE FOREST INSECT AND DISEASE SITUATION

LAKE STATES, 1957

by

Donald C. Schmiede and Ralph L. Anderson<sup>1/</sup>

INTRODUCTION

Insects and diseases play an important part in the reduction of our vast forest resource. Each year they cause large losses in timber growth and result in tree mortality. But that is not all: These agents attack the forest from seed to finished product. Stocking levels are lowered, growth is retarded, and trees are deformed, thus reducing both quality and quantity of forest products. The protection of our forests against these destructive agents is the responsibility of everyone concerned with the national economy.

This report summarizes the information collected by many agencies and individuals on the forest insect and disease situation during 1957 in the Lake States. The most important aspects are presented briefly in the next few pages. For more detailed discussion see sections on The Most Important Forest Insects (or Diseases).

HIGHLIGHTS FOR 1957

Insects

Review of Major Insects

Insect infestations in 1957 were characterized by fluctuations in populations and damage. Weather conditions and parasites play important roles in declines in infestations.

Spruce budworm populations increased again in northern Minnesota, and defoliation was very noticeable over a wider area in the spruce-fir stands along the Canadian border.

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<sup>1/</sup> Entomologist and pathologist respectively, Lake States Forest Experiment Station. The Station is maintained at St. Paul 1, Minn., by the Forest Service, U. S. Department of Agriculture, in cooperation with the University of Minnesota.

Jack-pine budworm infestations declined in many stands because of the influence of natural factors. The acreage sprayed in Wisconsin was reduced very materially from that originally scheduled following appraisal surveys in 1956.

Continued heavy larch sawfly defoliation caused an increase in tamarack mortality in the tamarack bogs in Minnesota. Heavy defoliation was noticeable wherever tamarack occurs in northern Wisconsin and Upper Michigan.

The Saratoga spittlebug remained a serious pest of red pine plantations in Michigan and Wisconsin. Although a hard freeze in mid-May reduced nymphal populations in northern Wisconsin and the western part of Upper Michigan, control operations were necessary on over 12,000 acres of plantations south and east of the "freeze area."

The European pine shoot moth increased its range in Wisconsin and Upper Michigan. Serious damage to plantations occurred throughout the range, particularly in Lower Michigan.

The white-pine weevil caused losses in growth, and reduction in quality in many plantations of white and jack pine and Norway spruce. Reports of attacks on red pine are increasing annually.

The pine sawflies are a threat to all pine plantations. The red-headed pine sawfly is apparently increasing in abundance, and defoliation was reported from numerous places in Michigan and Wisconsin.

Two Insects Are Potential Threats
--------------------------------------

From time to time insects considered of minor economic importance become noticeable in this region or may be collected for the first time.

The European spruce sawfly, an important defoliator of spruce in northern New England and eastern Canada about 20 years ago, was collected in northern Wisconsin for the first time.

The pine root collar weevil is causing increased damage to pine plantations throughout the Lake States. This insect is a primary pest of pines on good sites on light well-drained soils as well as on the poorer sites. As extensive areas of our pine stands reach susceptible size we can expect more damage by this insect.

## Diseases

Most of the common tree diseases causing damage in this region are not subject to as pronounced buildups and declines as are many of the insects. For many diseases, the 1957 situation is essentially unchanged from that for other years during the present decade. In last year's report the overall disease situation in the region was presented.<sup>2/</sup> In this year's report attention will be limited to new diseases, marked changes in prevalence, and other new information on disease situations.

Several New Disease Problems Were Noted in 1957
--

Maple blight caused severe mortality of hard maple in a northeastern Wisconsin area. The cause of this mortality and its future potential for serious damage are unknown. Plans are being made to study the problem.

Black spruce root rot killed about 50 percent of the black spruce transplant stock in three nurseries this summer. The symptoms are those of a root rot, but the actual cause is not known.

Honeysuckle leaf blight was found to be quite severe in some North Dakota nurseries. This disease is caused by Glomerularia lonicerae.

Russian olive root rot was found on much of the stock in a North Dakota nursery. Some of the trees died, but most of them recovered.

Jack pine cankers were noted on the Chippewa National Forest. The cause, distribution, and importance of the disease have not been determined.

Poor vigor of elms was quite prevalent in Minnesota. It is believed that this was caused by abnormally deep freezing of the soil last winter.

A sharp decline in red pine growth was noted in some Upper Peninsula of Michigan plantations. No cause for this decline was apparent.

Dying of oak was noted in northwestern Wisconsin. Although the symptoms are similar to those of oak wilt, the cause is believed to be some other factor.

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<sup>2/</sup> Beckwith, L. C., and Anderson, R. L. 1956. The forest insect and disease situation, Lake States, 1956. U. S. Forest Serv., Lake States Forest Expt. Sta., Sta. Paper 42, 26 pp., illus.



Changes in Prevalence and Severity  
Were Noted for Some Diseases

Birch decadence was not as severe as last year in the Upper Peninsula of Michigan. Most of the affected trees seemed to be holding their own or recovering.

Needle droop of red pine was unusually severe in northern Minnesota, Wisconsin, and some parts of the Upper Peninsula of Michigan. Some plantations suffered serious damage.

A gradual deterioration and dying of white pines appeared to be more prevalent than usual. This is sometimes referred to as needle blight, but the symptoms appear more like those of the chlorotic dwarf disease.

The Status of Some Other  
Diseases Merits Mention

Jack pine - sweetfern rust was found to be prevalent in additional plantations, and some evidence of nursery infection was noted.

Jack pine - comandra rust was found on some jack pine in a localized area. This disease does not appear to be common in the region.

Red pine cankers were found to be prevalent in Upper Peninsula of Michigan plantations that have low tree survival and a generally unsatisfactory appearance. The cause and whether the disease is primary or secondary are unknown.

Heart rot of Russian olive appears to be an important factor limiting the effective life span of this species in shelterbelt plantings.

Hypoxyton canker of aspen continues to cause severe mortality, but very few new infections appeared in 1957.

White pine blister rust damage is localized in the southern parts of the region. Apparent long-distance spread is a problem on some areas in the northern part of the region.

Oak wilt damage appears to be intensifying at a relatively constant rate.

Dutch elm disease has not been found in Minnesota, but there is considerable apprehension about its invading the State.



## THE MOST IMPORTANT FOREST INSECTS IN 1957

The status of the major forest insect pests in the Lake States is outlined in the following pages. Only those of primary importance are discussed in detail. Brief mention is made of some of the less important species.

### Spruce Budworm-- Epidemic Situation Continues

During 1957 populations of the spruce budworm (*Choristoneura fumiferana*) increased considerably in Minnesota. Approximately 660,000 acres of budworm susceptible types were moderately to heavily defoliated, an increase of 36 percent over 1956 (fig. 1). Within the northeastern section of the State extensive stands of spruce and fir have suffered at least 2 years of severe feeding. Surveys carried out in 1957 indicate that these and adjacent stands will be seriously defoliated in 1958.

Severe defoliation was reported in 1957 in Wisconsin for the first time: Scattered small areas were observed from the air in Washburn and Polk Counties. Populations in Michigan remained at a low level. In general, the scattered occurrence and the variation in size, age, stocking, and mixture of balsam fir in stands in Michigan and Wisconsin make the possibility of a widespread outbreak unlikely.

Figure 1.--Areas of defoliation by the spruce budworm in northern Minnesota, 1957; based on aerial survey.



Jack-Pine Budworm--  
Population Declines

The jack-pine budworm (Choristoneura pinus) populations declined in most of the areas in Wisconsin and Minnesota. New areas of light defoliation were found in the Upper Peninsula of Michigan. Many stands in the Lower Peninsula sustained moderate to heavy feeding.

In Wisconsin high larval populations were largely controlled by natural factors. The control program, which was originally set up for some 200,000 acres, was carried out on only about 40,000 acres. Aerial surveys in August indicated that defoliation in the unsprayed areas had been light, except on the periphery of some of the sprayed blocks and in unsprayed scattered stands and areas along streambanks. No control operations are anticipated in 1958 in Wisconsin.

The infestation in Minnesota generally declined and in some instances completely collapsed. Because of this, very little control work was conducted. Approximately 500 acres was sprayed by air in Crow Wing, Hubbard, and Beltrami Counties by the Conservation Department. An additional 500 acres of State land was sprayed in the southern end of Hubbard County by the Conservation Department. Most of this consisted of jack pine plantations that had been severely defoliated in 1956 and contained a high population again in 1957. DDT was used for all the aerial control. Feeding was observed for the first time in the Beltrami Island State Forest and in the Superior National Forest north of Trout Lake and northwest of Virginia. Defoliation was moderate, and no control is contemplated for 1958.

A control operation in 1958, involving about 2,500 acres of jack pine plantations as well as natural stands, has been proposed on the Tawas Ranger District of the Lower Michigan National Forest. Surveys will be carried out in the spring of 1958 to determine the actual acreage needing treatment.

European Pine Shoot Moth--  
Extends Range

The European pine shoot moth (Rhyacionia buoliana) is one of the most serious pests of red and Scotch pine in Michigan and Wisconsin (fig. 2). This pest has increased its range to additional counties in both States during the past year (fig. 3). It can be found in most of the counties in Michigan's Lower Peninsula and in Houghton, Mackinac, Schoolcraft, Luce, and Chippewa Counties in the Upper Peninsula. Natural red pine stands as well as plantations are being attacked.



Figure 2.--Damage to red pine caused by the European pine shoot moth.

Extensive research studies are being conducted on this insect in this country and Canada. Control remains very difficult. Some of the tests using varying amounts of insecticides show promise. The timing of application, dosage rate, and method of application are important factors. Chemical control on limited areas will be conducted in 1958.

Figure 3.--  
General area of  
European pine  
shoot moth in-  
festations,  
Lake States,  
1957.





Saratoga Spittlebug--  
Continues as Major Pest

The Saratoga spittlebug (*Aphrophora saratogensis*) continued as the major pest in red pine plantations in northern Wisconsin and the Upper Peninsula of Michigan.

Aerial spraying was conducted on 5,552 acres of Federal land in this area. In the fall of 1956 control was anticipated on about 12,000 acres, but 1957 spring nymphal surveys indicated that widespread population drops occurred in the northern portion, including the Ottawa, Chequamegon, and Upper Michigan National Forests. Only in the southern portion of the Nicolet National Forest did the control acreage remain at the anticipated level. It is believed that population drops in the more northerly area may have been caused by a severe freeze occurring on May 16. Official weather station minimum temperatures on that date ranged from 16° to 22° F. throughout the area.

Heavy infestations in the northeast area of Wisconsin resulted in treatment of 3,879 acres by the Conservation Department. Most of the spraying was in Marinette County, with smaller acreages in Oconto, Langlade, Florence, and Marathon Counties. In Douglas County 153 acres were sprayed.

Control estimates on Federal lands for 1958 total about 8,000 acres. Barring unfavorable weather conditions or other decimating agents, the acreage in the 1958 control program should be about average compared with the operations carried out over the last decade (fig. 4).

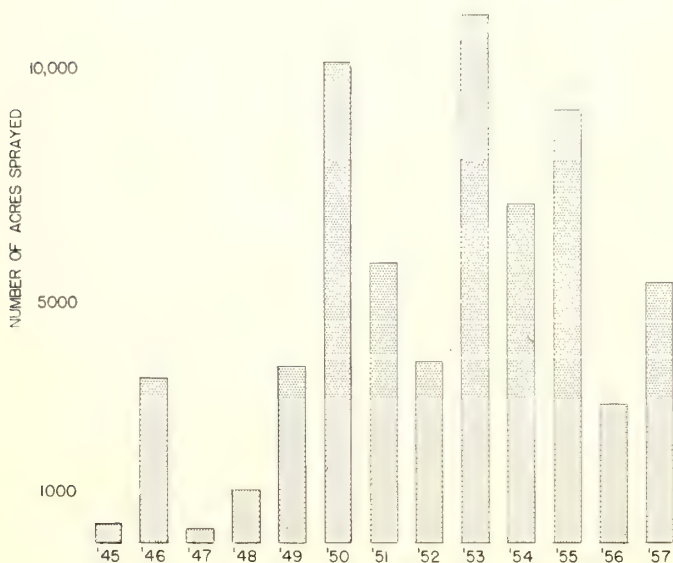


Figure 4.--Acreage sprayed to control damaging Saratoga spittlebug infestations on national forests in northern Wisconsin and the Upper Peninsula of Michigan, 1945-1957.



White-Pine Weevil--  
Causes Degrade and Volume Loss

The white-pine weevil (Pissodes strobi) is a major pest of pine stands. Trees are not killed, but loss in height growth and tree deformity with resultant loss of quality are sustained. Weeviling of over 40 percent of the trees in a stand is common. White pine, jack pine, Scotch pine, and Norway spruce are favored hosts, and recently red pine has also been severely attacked. In Michigan weeviling was reported on red pine in 8 counties in 1957 as compared to 3 counties in 1956. Damage was common on red pine in the northern areas of Wisconsin.

Control by clipping and burning of infested tips was carried out on 300 acres of State land in Michigan in 1957.

Pine Sawflies--  
Populations Increase in Some Plantations

Several species of sawflies of the genera Neodiprion and Diprion infested pine plantations throughout the Lake States. On some areas chemical control was needed.

In Michigan the red-headed pine sawfly (Neodiprion lecontei) population increased greatly during 1957, particularly in the western Upper Peninsula and northwestern Lower Peninsula. The Michigan Conservation Department aerially sprayed with DDT 1,800 acres of red and jack pines on State lands in Antrim, Emmet, and Missaukee Counties. Scattered infestations of the red-headed pine sawfly were reported from several counties in Wisconsin. Heavy damage to a few jack pine plantations resulted in private control action.

The European pine sawfly (Neodiprion sertifer) remains the most important defoliator of young hard pines in the Lower Peninsula. This insect is important to Christmas tree growers, as it consumes the old needles. It is not presently known to occur in Minnesota or Wisconsin.

A few specimens of the European spruce sawfly (Diprion hercyniae) were collected from white spruce at Iron River, Wis. This is believed to be the first collection of this species in Wisconsin. Other sawflies reported doing damage in Wisconsin include the white pine sawfly (Neodiprion pinetum), the jack-pine sawfly (N. pratti banksianae), the red-pine sawfly (N. nanulus nanulus), and Diprion frutetorum.

The introduced pine sawfly (Diprion similis) caused heavy defoliation of white pine in parts of Minnesota and Wisconsin. Heavy parasitism was reported in Wisconsin. This insect was reported this year for the first time in Michigan, small infestations being found in Antrim, Charlevoix, and Kalamazoo Counties.

Larch Sawfly--  
Defoliation Over Wider Area

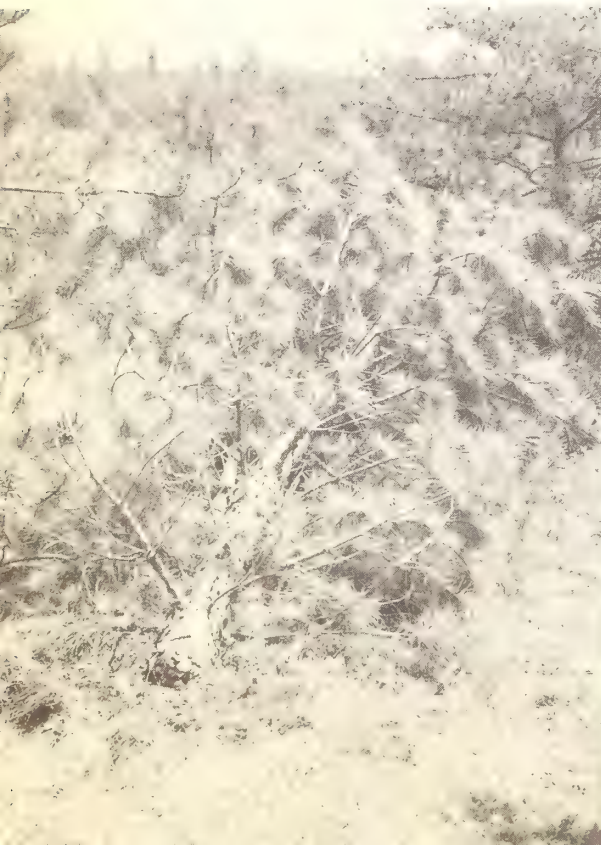
The larch sawfly (*Pristiphora erichsonii*) was reported in most of the tamarack stands in northern Wisconsin and Minnesota. Populations continued to build up in Wisconsin and Michigan.

Severe defoliation occurred in the western part of the Upper Peninsula of Michigan. Defoliation also was reported in the eastern half of the Upper Peninsula and in the northern half of the Lower Peninsula. The buildup was not as rapid as in the previous 2 years, and no mortality has been reported from this State.

Defoliation in Wisconsin was more conspicuous over a larger area than previously, ranging from heavy to complete over most of the tamarack stands in the northern half of the State. Many stands in the east central area were also infested, and some were severely defoliated.

An aerial survey in Minnesota indicated that the total area of defoliation was about the same as in 1956. Tamarack mortality apparently

Figure 5.--Left: A red pine blown over after attack by the pine root collar weevil. Right: A closeup of damage to a second red pine caused by larval feeding of the root collar weevil.



caused by larch sawfly defoliation was first observed in 1954. Since that time surveys have been conducted by the State Entomologist's Office in cooperation with the Lake States Forest Experiment Station to determine the extent and location of mortality. The percent of dead trees for each stand was obtained by 2-inch diameter classes in 1/10-acre plots. The results are summarized in table 1. Tamarack mortality is evident in most of Minnesota's north central bogs. The associated tree species, black spruce and northern white-cedar, have not shown comparable mortality. Death of some trees due to competition and adverse site factors occurs annually, but many of the dead tamaracks are codominants on good sites, indicating that repeated defoliation will cause mortality.

Table 1.--Tamarack mortality in Minnesota, 1957

Plot locations	Number of 1/10-acre plots	Total number of trees <sup>1/</sup>	Number of dead trees	Percent mortality
Warroad	1	24	0	0
Williams	1	34	0	0
Spooner	1	74	11	15
Big Falls	2	104	11	11
Littlefork	1	34	2	6
Hines	1	72	17	24
Dixon Lake Lookout	1	28	5	18
Whipholt	1	75	25	33
Boy River	1	40	1	3
Deer River	1	64	26	41
Talmoon	1	9	0	0
Orr	1	68	6	9
Cook	1	28	10	36
Florenton	2	115	38	33
Aurora	1	23	8	35
Ely	1	25	0	0
Laporte	3	225	73	32
TOTAL	21	1,042	233	22.4

<sup>1/</sup> Includes only tamarack.

Root Collar Weevil--  
Becoming More Important

The pine root collar weevil (Hylobius radialis) has caused heavy damage to Scotch, jack, and red pines in plantations and natural stands (fig. 5). High populations have been reported from the sandy soil types in north-western and central Wisconsin. Heavy infestations were found in jack and Scotch pine plantations in Shawano County. Extensive plantations of jack and red pines were badly damaged by this insect in Burnett County.



Damage has been reported in windbreaks and shelterbelts of red and Scotch pines in Minnesota and Michigan. Minnesota also reports heavy infestations in some jack pine plantations.

White pine is rarely attacked severely and therefore the damage to this species is not economically important.

Gypsy Moth--  
Control Program Successful

The following report covering the gypsy moth (Porthetria dispar (L.)) trapping and control program in Michigan was prepared by the Bureau of Plant Industry, Michigan State Department of Agriculture.

"The aerial spraying phase of the 1957 Gypsy Moth eradication program commenced on May the fifth. Due to unceasing winds and extensive rainfall the job was not completed until the twenty-third.

"The original contract called for the aerielly spraying of 7,573 gallons of a 12-1/2 percent DDT solution applied at the rate of one gallon per acre. After operations were well under way a re-appraisal was made of the amount of wooded acres to be sprayed and the final gallonage applied amounted to 11,025. Of the 19,840 acres treated, 17,280 were on private lands and 1,600 on State lands. In addition to the 19,840 acres treated to eradicate the Gypsy Moth, the contractor also applied the same material at the same dosage and rate of application over local subdivisions and communities for the relief of mosquitos. The total area treated amounted to 11,238 acres, and it is felt that this should also be included as Gypsy Moth control spraying. The total acreage sprayed with a 12-1/2 percent DDT solution would then total 22,348.

"The trapping phase began on the 17th of June and was conducted in the following central Michigan counties: Gratiot, Ionia, Clinton, Shiawassee, Barry, Eaton, Ingham, Livingston, Calhoun, Jackson, and Washtenaw. The current survey was conducted by placing 4,911 traps over an area of 1,977 square miles. An average of 80 square miles was covered by each trap tender. About 200 traps were placed in each of the trap tender's district. These were patrolled at least once each week and new traps were placed when necessary. For the first time since the infestations were found in Michigan no moths were recovered. It is interesting to note that not a single moth has been caught in any of the areas that were aerielly treated since 1954. If the next two years are as successful as the year 1957, it will be relatively safe to assume that the Gypsy Moth has been eradicated in Michigan."



Forest tent caterpillar--  
Population Increase Predicted  
in Scattered Areas

The forest tent caterpillar (Malacosoma disstria) infestation in Minnesota covered about 255,000 acres in 1957 in south central St. Louis County. The egg mass survey conducted in October 1957 indicates that the population of this insect will probably increase in some stands in 1958.

In Gogebic County, Mich., the infestation remained about the same as in 1956. Feeding by the large aspen tortrix (Archips conflictana) in the same stands added to the severity of defoliation.

Heavy feeding in Wisconsin was centered in parts of Sawyer, Rusk, Price, and Iron Counties. Scattered areas of defoliation were common in the remainder of the aspen areas of northern Wisconsin. Winter egg-band surveys indicate that heavy feeding will be sustained in scattered areas throughout the northern counties in 1958 but the overall population will probably decline slightly. Heavy defoliation of basswood occurred at the Fort Totten Indian Reservation and the Sullys Hill Game Refuge in North Dakota; very high egg-band counts indicate heavy larval populations in 1958.

Hardwood Defoliators--  
Five Species Are Active

The fruit tree leaf roller (Archips argyrospila) defoliated oak on 350,000 acres in the central Lower Peninsula of Michigan. Infestations of this insect were reported as light to medium in Florence, Marinette, and Langlade Counties, Wis. Heavy parasitism was reported from both States, and a population decline is expected.

The red-humped oakworm (Symnerista albicosta) defoliated oak on 44,800 acres in Oceana, Lake, Newaygo, and Muskegon Counties in Michigan's Lower Peninsula. This pest is an annoyance to residents but is not expected to have much effect on the trees.

The large aspen tortrix (Archips conflictana) often occurred with the forest tent caterpillar in aspen stands in Michigan and Wisconsin. Some areas in Michigan's Upper Peninsula were defoliated up to 75 percent by this insect.

A leaf roller (Sparganothis pettitana) and a webworm (Tetralopha sp.) have combined to cause severe defoliation in maple stands in northeastern Wisconsin, especially in Florence County. Feeding in 1957 was apparently lighter than the 2 previous years. Refoliation does not normally occur unless the defoliation is nearly complete. Predator and parasite populations were heavy this past year, and it is believed that the infestation is declining. This is the same area in which many maple trees are dead or dying from a cause as yet unknown.

## THE MOST IMPORTANT FOREST DISEASES IN 1957

The following pages discuss briefly some of the important tree diseases in the Lake States. The discussion is limited to those diseases which are new or showed a definite change in prevalence or for which new information on their status was obtained.

### Maple Blight Is Causing Much Concern

Some dying-back of tops in hard maple has been noted in Wisconsin for several years. This dieback did not seem to be particularly serious in forest stands. In 1957, however, a rapid dying of hard maple appeared on an area in Florence County, Wis. All maple from seedlings to sawlog-size trees in rather small localized patches died during the year. A rough estimate has been made that, in aggregate, all maple died on about 1,000 acres. The cause has not been determined, and it is therefore not known whether this quick dying is related in any way to the less serious dieback noted elsewhere in Wisconsin in previous years. Definite information on the extent to which the problem may occur in other areas of the region has not yet been obtained. A few scattered large maple with similar symptoms died at Dukes, Mich., and a few other areas are suspected of having the blight.

Since the cause is unknown, it is not possible to forecast the future impact of this disease on the northern hardwood type. If the mortality was caused by a pathogen that will increase and spread in future years, the situation is alarming. Plans are being made to investigate the problem. Research will be conducted to determine whether a pathogen is involved, surveys made to determine the distribution of the disease and to evaluate the problem, and studies made of the influence of insects and environmental factors.

### Black Spruce Root Rot Caused Severe Losses

Three nurseries--2 in Minnesota and 1 in Michigan--lost about 50 percent of their black spruce transplant stock this summer. There is no record of such losses occurring in the past. The symptoms are those of a root rot, with the mortality scattered throughout the transplant beds. The mortality is progressive, occurring throughout the growing season. This fall many of the surviving trees showed early symptoms, indicating that further mortality can be expected in this stock next year.

The cause of the root rot is not known. No definite forecast can be made, therefore, as to whether similar losses will occur in the transplant

beds planted in succeeding years. No evidence was found that indicates the losses were caused primarily by physical factors such as weather or nursery practices, although too deep planting appears to have contributed to the situation in one nursery. Some tests will be made with soil fumigants and fungicides. These should provide some indication as to whether a pathogen is involved and may also suggest a control measure.

Leaf Blight of Honeysuckle  
Is Common in North Dakota Nurseries

A leaf blight of honeysuckle was found to be quite severe in some North Dakota nurseries. Affected foliage turns brown and usually becomes rolled or twisted. Foliage loss was severe enough to probably have a considerable effect on growth. This disease was found to be caused by a rather unusual fungus usually referred to as Glomerularia lonicerae. This fungus is a basidiomycete belonging to the genus Herpobasidium.<sup>3/</sup> The basidia emerge from the stomata on the diseased leaves. Although no control has been tried, it is believed that a fungicidal spray would be effective.

A Root Rot of Russian Olive  
Was Found in North Dakota

A root rot of Russian olive was noted in a North Dakota nursery. This root rot was characterized by the occurrence of localized necrotic lesions on the root systems. Although a high percentage of the stock was affected, little damage resulted. A few of the trees died, but during the growing season most of the trees callused over the lesions and appeared to have completely recovered. When first noted about a year ago there was considerable concern about possible damage, but the experience this growing season tends to indicate that the injury was transient in nature.

An Unidentified Canker  
of Jack Pine Was Found

A high prevalence of long, narrow cankers was found on pole-size jack pine in a localized area on the Chippewa National Forest. The cause of the cankering has not been determined. Apparently it does not kill pole-size trees, but it does cause some deformation. The distribution of this

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<sup>3/</sup> Gould, Charles J., Jr. 1945. The parasitism of Glomerularia lonicerae (PK) D. and H. in lonicera species. Iowa State Jour. Sci. 19: 301-331.



disease and whether it occurs on smaller trees where it might cause more serious damage are not known. Plans are to give this problem more attention next year to ascertain whether it is of practical importance.

The Vigor of Many Elms  
Was Below Normal

An appreciable reduction in vigor was noted for many elms this year. This was especially true in the southern half of Minnesota and adjacent areas. Many of the trees produced an abnormally heavy seed crop and had small, sparse foliage throughout the growing season. No cause for this condition was immediately apparent. The Canadians have reported what appears to be similar symptoms on elm in the Prairie Provinces.<sup>4/</sup> Their investigation suggests that the injury was due to deep frost penetration. Frost penetration was unusually deep last winter in the Minnesota areas where the injury was noted, and it is assumed to be the probable cause.

A Sudden Growth Reduction Was Noted  
in Some Red Pine Plantations

A sudden and drastic growth reduction was noted in some red pine plantations in the Upper Peninsula of Michigan. The affected plantations had been putting on very satisfactory growth in previous years. This year height growth was limited to from 1 to 3 inches. The condition occurred over the entire area of the plantations, and all trees were affected. A similar but not as drastic a growth reduction was noted in many other plantations. No symptoms of disease or insect injury were seen on the trees. It is not known what caused the condition or whether the condition will persist in the affected plantations. The growing season was unusually dry in some parts of the Upper Peninsula, and it is possible that this may be involved, although no other species showed similar effects.

Birch Decadence  
Was Less Severe in 1957

In past years a rather severe dying-back of yellow birch crowns has appeared in some areas in the Upper Peninsula of Michigan. Limited observations during 1957 did not reveal any further decline of affected trees. Trees that had died back to some extent in previous years seemed to be holding their own or recovering.

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<sup>4/</sup> Hord, H. H. V., Van Groenewoud, H., and Riley, C. G. 1957. Low temperature injury to roots of white elm. Forestry Chron. 33: 156-163.



Needle Droop of Red Pine  
Was Unusually Severe

Severe symptoms of needle droop were noted in some northern Minnesota, Wisconsin, and Upper Peninsula of Michigan plantations (fig. 6). In the affected areas practically all of the trees showed symptoms, but serious damage was found only on trees less than 4 feet tall growing in heavy sod. In some of the areas examined this year many buds had died, and in one area 100 percent of the trees were dead by fall. Needle droop is believed to be caused by a rather sudden drop in available moisture. It is not known whether the needle-droop type of symptoms noted in the area where 100-percent mortality occurred was actually the disease called needle droop or similar foliage symptoms resulting from some undetermined cause. The heavy mortality was limited to trees located in open depressions.

A Gradual Deterioration  
and Dying of White Pine  
Was More Prevalent Than Usual

A condition which results in serious deterioration of scattered, individual white pine trees appeared to be more common in 1957 than in previous years. This condition is referred to by some persons as needle blight. Needle blight does occur in this region, and the typical symptom is a partial dying-back of the needles on individual trees intermixed with normal-appearing trees. This disease is transient and does not appear to cause any appreciable damage. The decline referred to here appears to be a different disease that has much more serious effects. The symptoms are similar to those for the chlorotic dwarf

Figure 6.--Needle-droop symptoms  
on red pine.

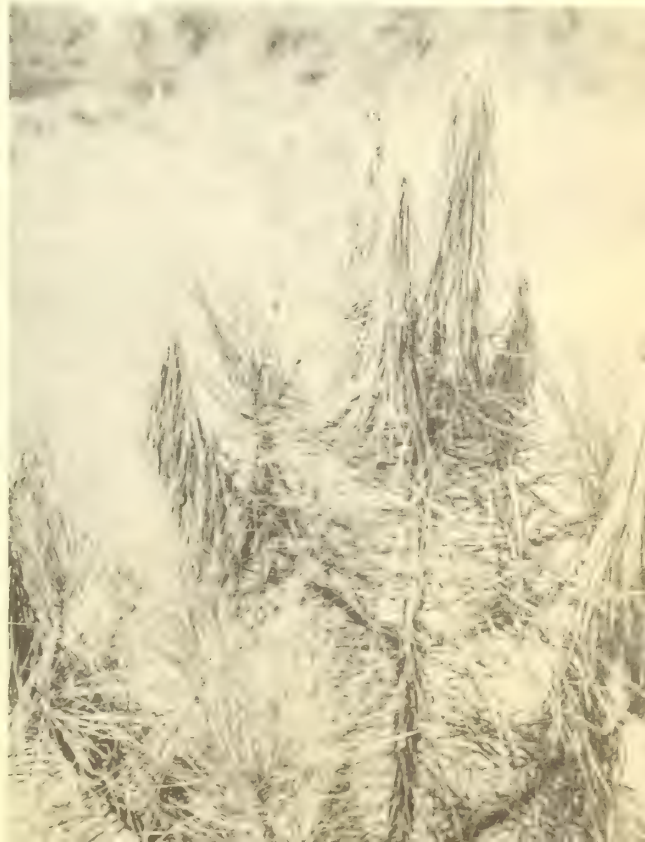




Figure 7.--Cross-section of 60-year-old jack pine with jack pine - sweetfern rust cankers causing severe deformation of the bole. Note advanced decay caused by Fomes pini.

disease of white pine<sup>5/</sup> except that damage occurs on larger trees in natural stands. The decline is progressive, and the trees die within a few years after the first appearance of symptoms. The principal symptom is the sparse and chlorotic foliage. Even during the present year only a few trees are affected in most areas. In Grand Rapids, Minn., a high percentage of the white pine has developed these symptoms and died during recent years. It is not known whether the cause of the condition in Grand Rapids is the same as for that occurring in forest stands.

Jack Pine - Sweetfern Rust  
Is Common in Some Plantations

During the year a number of small pole-size jack pine in plantations were examined, and jack pine - sweetfern rust (Cronartium comptonia) was prevalent in some plantations; as many as 20 to 40 percent of the trees had rust cankers on the lower portion of the bole. Although this rust usually does not kill pole-size trees, it does cause serious deformation and very possibly early development of red rot (fig. 7). The age of the infections and their basal location suggest that the trees were infected at an early age, either as nursery stock or shortly after planting. It was noted that some of the affected plantations had been planted in the same

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<sup>5/</sup> Swingle, Roger U. 1944. Chlorotic dwarf of eastern white pine. Plant Disease Reporter 28: 824-825.

year with stock from the same nursery. This rust can kill small trees, and nursery infection could cause considerable early mortality in plantations. The rust apparently does not produce obvious symptoms on 2-0 stock; hence, culling of nursery stock would be difficult. Studies are under way to determine the importance of this rust and the role of nursery infection.

Jack Pine - Comandra Rust  
Was Found in One Area

Cankers caused by the jack pine - comandra rust (Cronartium comandrae) were found on a few trees in one locality in Minnesota. This rust does not appear to be common or widespread in the region. The alternate host is bastard toad flax. The cankers are quite similar to those caused by the jack pine - sweetfern rust, but the rust can be distinguished by the unusual shape of the aeciospores. In areas where bastard toad flax is present it should not be assumed that all rust cankers on jack pine are caused by the jack pine - sweetfern rust, which has sweetfern as the usual alternate host.

A Canker Is Very Prevalent  
in Poor Red Pine Plantations

Poor survival and a generally unsatisfactory condition of the remaining trees is characteristic of some red pine plantations in the Upper Peninsula of Michigan. Observation indicates that the trees commonly are affected with a canker disease, with many of the trees having multiple infections. The cause of the cankers is unknown. Whether the canker is primarily responsible for the poor condition of these plantations or whether it has developed because of poor tree vigor resulting from other factors has not been determined. The cankers are difficult to detect, as there are no easily recognized superficial symptoms. The necrotic cankered areas are not surrounded by callus formation, which indicates that they apparently develop rapidly.

Heart Rot Appears Important  
in Russian Olive

Russian olive is a preferred species for shelterbelt plantings in North Dakota. Although the tree grows very satisfactorily on the Plains, the life span of the species does not appear to be as great as it should be in many situations. This apparently is a result of early development of heart rot, which weakens the stem and eventually causes the tree to break off. It is believed that this heart rot is caused by Fomes ellisianus (Polyporus fraxinophilus var. ellisianus).



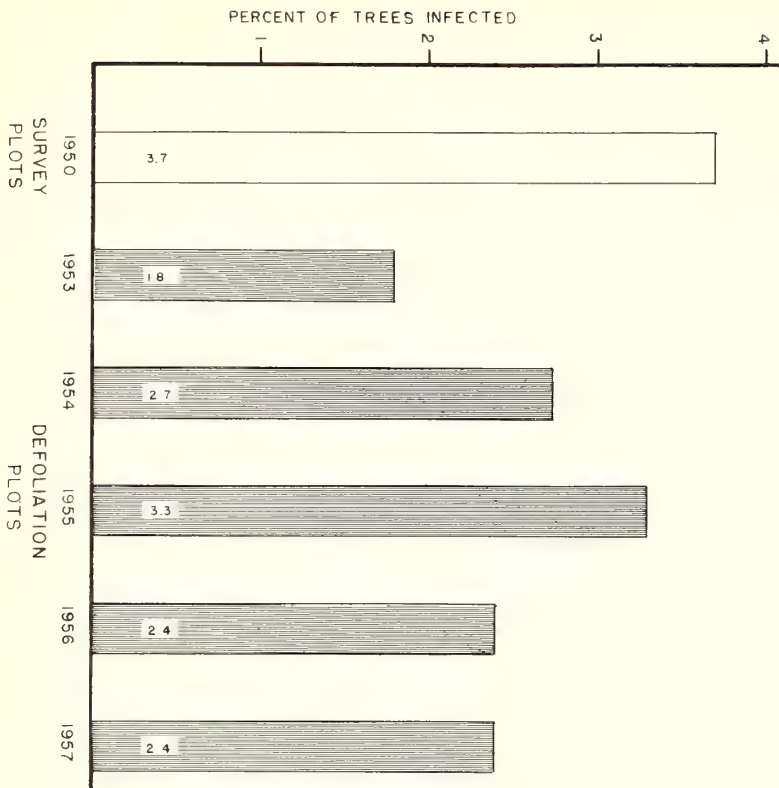


Figure 8.--Hypoxylon canker population trends, Lake States, 1950-1957. The plots for 1953 to 1957 are called "defoliation" plots because they were also used to study the forest tent caterpillar.

**Hypoxylon Canker Continues to Cause Severe Mortality**

Additional survey information on Hypoxylon canker of aspen caused by Hypoxylon pruinaum was obtained during the year by remeasurement of many permanent sample plots. The data substantiate previous findings that this disease kills about 1 to 2 percent of the standing aspen volume per year. The annual loss probably exceeds 1,000,000 cords per year. The prevalence of cankers in aspen stands was the same as for 1956 (fig. 8). Probably the most outstanding factor noted during the year was the low population of new infections found on the plots. If the current low rate of infection continues, there will be a decline in canker population. There is no basis, however, for predicting future trends. As far as is known, a buildup such as was experienced in 1955 could occur again at any time.

**White Pine Blister Rust Prevalence Is Related to Microclimate**

Studies of the white pine blister rust (Cronartium ribicola) are providing substantial evidence that prevalence of the rust varies appreciably. In southern Wisconsin blister rust causes serious damage only in very



localized situations that are characterized by a microclimate unusually favorable for rust infection. In other locations white pine can be grown with little danger of serious damage. In this area the high-hazard locations can be recognized by topographic features and the characteristics of the tree crown canopy. Elevation above sea level is also very important. Below 800 feet there is little rust anywhere. Between 800 feet and 1100 to 1200 feet rust is localized by microclimatic factors, and above 1200 feet it tends to be general, occurring on all sites, and sometimes is severe.

Observations indicate that a similar situation apparently prevails in much of the Lower Peninsula of Michigan and in southeastern Minnesota.

In the northern parts of the region, rust infection is much more general and severe. Apparent long-distance dissemination has been noted in some localized areas in this part of the region. Studies of the problem have provided tentative conclusions indicating that the air circulation pattern is such as to carry rust spores far greater than usual distances from Ribes in nearby swamps.

Oak Wilt Damage  
Is Intensifying

No change in the distribution of oak wilt, caused by Ceratocystis fagacearum, has been reported during the past year. A 3-year survey of counties in Minnesota and Wisconsin where oak wilt is well established indicates a relatively constant rate of intensification from year to year. An average of about 1.6 new infection centers became established each year per 100 acres of oak type. Over 50 percent of the old established infection centers show active wilt in any given year, and the average radial spread of all infection centers is about 4 feet.

Dutch Elm Disease  
Has Not Been Found in Minnesota

The presence of the Dutch elm disease, caused by Ceratocystis ulmi, in Wisconsin has caused considerable concern in Minnesota. To date, however, no evidence of the disease has been found in Minnesota.

During the past year 1,285 specimens were received for laboratory diagnosis in Wisconsin.<sup>6/</sup> Three hundred seventy-six were confirmed as Dutch elm disease in trees from 46 communities in 7 counties. The 7 Wisconsin counties now known to have the disease are Jefferson, Waukesha, Racine,

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<sup>6/</sup> Reported by E. L. Chambers, Chief, Division of Plant Industry, Wisconsin Department of Agriculture.

Kenosha, Walworth, Rock, and Milwaukee. The laboratory diagnosis in Wisconsin revealed almost as many trees infected with Verticillium sp. as were infected with Dutch elm disease and about 50 percent as many infected with Dothiorella ulmi. Verticillium and Dothiorella are fungi that cause symptoms that are easily confused with Dutch elm disease. The high prevalence of these diseases emphasizes the need for laboratory diagnosis of trees suspected of having Dutch elm disease. Wisconsin has an intensive control program under way and is quite optimistic about slowing up the spread of the disease.

Michigan also has a strong Dutch elm disease control program and a considerably larger population of infected trees to deal with.

Cause of Oak Mortality in Northwestern Wisconsin Is Unknown
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Oak have been reported as dying in localized patches in the following northwestern Wisconsin counties: Burnett, Sawyer, Washburn, and Polk.<sup>7/</sup> The symptoms are similar to those of oak wilt, but the oak wilt fungus, Ceratocystis fagacearum, has not been isolated. It is believed that the mortality results from some other unknown cause. The disease has not caused widespread killing, but its potential for damage is not known. Mortality from this disease was first noted 3 years ago.

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<sup>7/</sup> Reported by Donald Renlund, Wisconsin Conservation Department, and also observed by Station personnel.







## SOME RECENT STATION PAPERS

- The Market for Domestic Charcoal in Wisconsin, by John R. Warner and William B. Lord. Sta. Paper 46, 15 pp., illus. 1957.
- Natural Regeneration on a 2-Acre Mixed-Oak Clear Cutting Five Years After Logging, by Harold F. Scholz and A. J. DeVriend. Sta. Paper 48, 11 pp., illus. 1957.
- Deterioration of Sugar Maple Following Logging Damage, by Gene A. Hesterberg. Sta. Paper 51, 58 pp., illus. 1957.
- A Record of the Timber Cut from Forests of the Lake States, 1954, by Arthur G. Horn. Sta. Paper 53, 47 pp., illus. 1957.
- Marking Guides for Northern Hardwoods Under the Selection System, by Carl Arbogast, Jr. Sta. Paper 56, 20 pp., illus. 1957.
- Managing Red Pine for Poles in Lower Michigan, by Paul C. Guilkey. Sta. Paper 57, 21 pp., illus. 1958.
- Proceedings, Third Lake States Forest Tree Improvement Conference, September 17, 18, 1957. Sta. Paper 58, 87 pp., illus. 1958.

### Silvical Characteristics of:

- Red Pine, by Paul O. Rudolf. Sta. Paper 44, 32 pp., illus. 1957.
- Black Spruce, by M. L. Heinselman. Sta. Paper 45, 30 pp., illus. 1957.
- Rock Elm, by Harold F. Scholz. Sta. Paper 47, 16 pp., illus. 1957.
- Quaking Aspen, by R. O. Strothmann and Z. A. Zasada. Sta. Paper 49, 26 pp., illus. 1957.
- Sugar Maple, by R. M. Godman. Sta. Paper 50, 24 pp., illus. 1957.
- Tamarack, by Eugene I. Roe. Sta. Paper 52, 22 pp., illus. 1957.
- American Elm, by Paul C. Guilkey. Sta. Paper 54, 19 pp., illus. 1957.
- White Spruce, by Hans Nienstaedt. Sta. Paper 55, 23 pp., illus. 1957.
- Slippery Elm, by Harold F. Scholz. Sta. Paper 59, 14 pp., illus. 1958.

