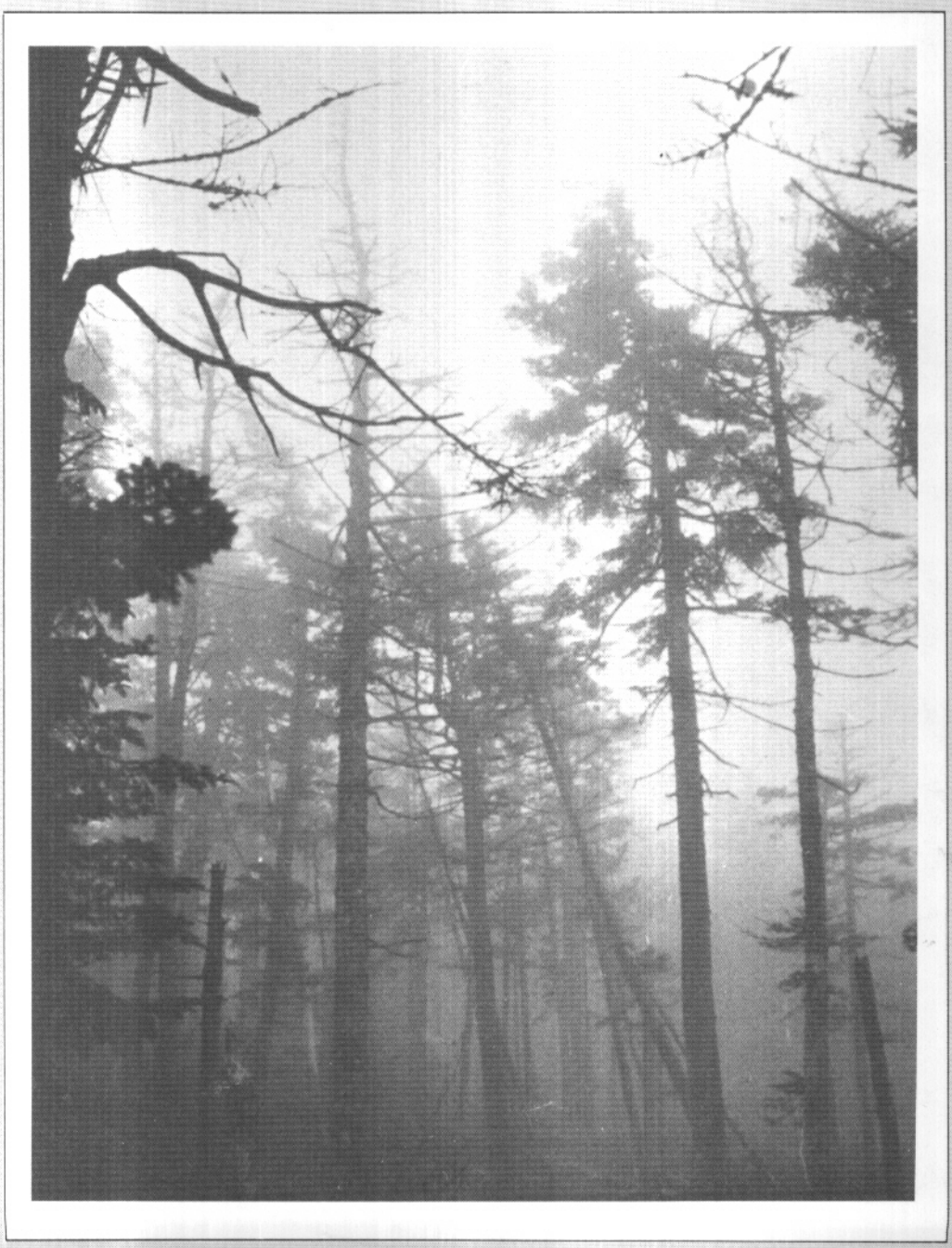
United States
Department of
Agriculture

Forest
Service

**Forest
Pest
Management**

Washington, D.C.

Forest Insect and Disease Conditions in the United States 1985



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May 1986

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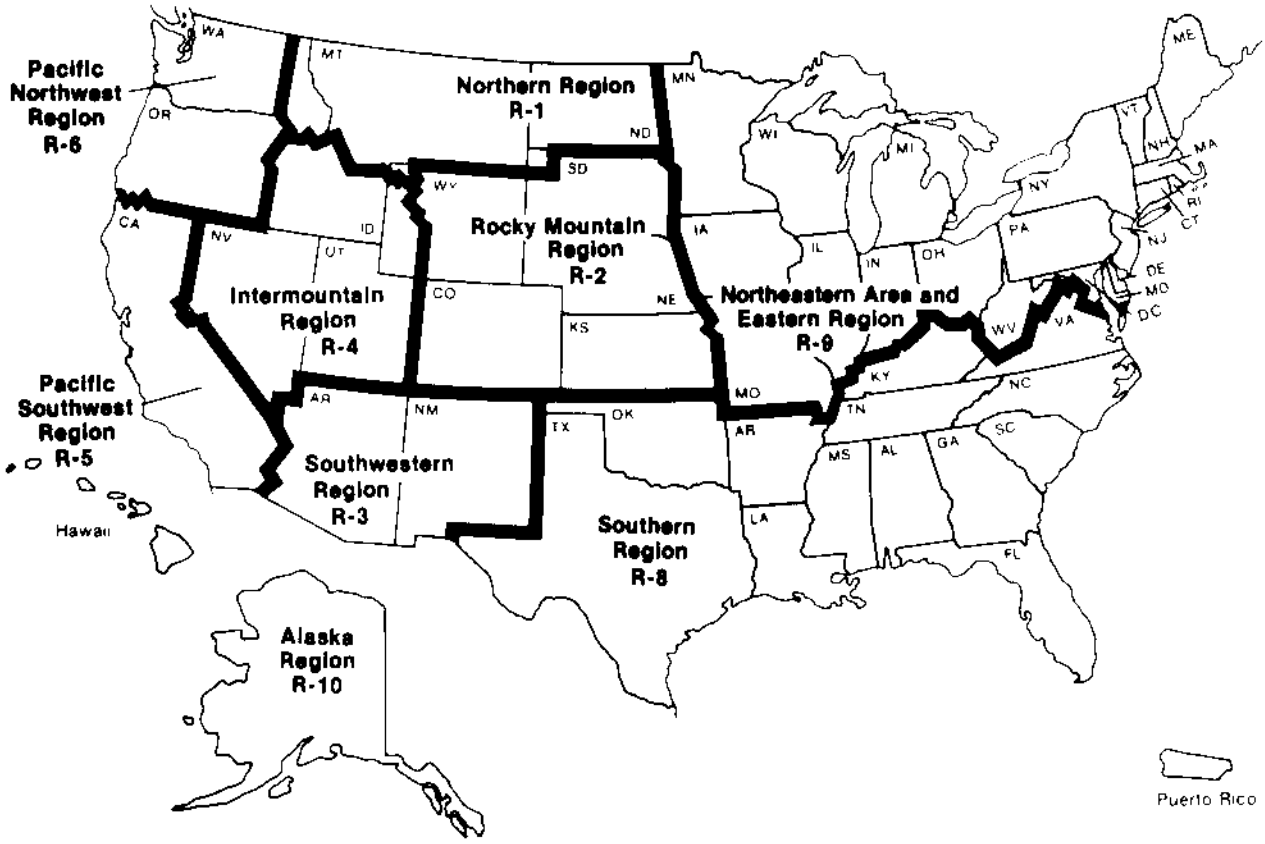
Cover photo: Fir forest on the summit of Mt. Mitchell, NC
May 1984

USDA Forest Service Regions and Area



Preface

This is the 35th year that Forest Pest Management, U.S. Department of Agriculture, Forest Service, has published a report on forest insect and disease conditions. The report provides an overall perspective of pest conditions in the United States during 1985. Continuity of reporting is emphasized so that the status of a particular insect or disease-causing organism can be tracked over time and from one part of the country to another.

The report has three sections. It begins with summaries of the current status of major insect and disease pests (pages 2-10).

These summaries are followed by detailed information about pest conditions on all landownerships in the nine Forest Service Regions. The Regions are arranged numerically, with the Northern Region, Region 1, first (page 12) and the Alaska Region, Region 10, last. Each Region has two tables: an insect table followed by a disease table.

The report ends with indexes of the common and scientific names of insects (pages 88-90) and disease-causing organisms (pages 91-94). The scientific authorities, which are omitted in other parts of the report, are included in the indexes.

Much of the information in this publication is based on special aerial or ground surveys. These surveys record short-term changes in pest activity, and they supplement the tree mortality information gathered in periodic forest resource inventory surveys done by the Forest Service.

As in past years, Forest Pest Management offices nationwide compiled the information for lands of all ownerships. We appreciate the assistance of all State, Federal, and private cooperators who provided information for this report.

Further information about conditions in a particular State or area can be obtained from the responsible staff. The principal Forest Pest Management offices are listed on page ii.

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in the United States
1985

Washington, DC
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Part 1. National Summary

Gypsy Moth

In 1985, the gypsy moth (Lymantria dispar) defoliated 1.7 million acres in the generally infested area of the Eastern United States. Defoliation is predicted to increase again in 1986.

Gypsy moth populations continue to spread south and west. The "front line" of the generally infested area now passes through Virginia, West Virginia, and the Pennsylvania-Ohio border. Parts of the lower peninsula of Michigan are also generally infested. In 1985, Michigan, Virginia, and West Virginia--States with relatively new general infestations--had rapid increases in defoliation.

In Virginia, the front line of the infested area runs through the northern half of Accomack County and extends westward across the Chesapeake Bay to include Stafford County through the

Acres of aerially detected defoliation caused by the gypsy moth in the Eastern United States

State	1984	1985
Connecticut	544	89,544
Delaware	14,203	5,144
Maine	1,892	6,698
Maryland	41,824	83,488
Massachusetts	185,520	414,084
Michigan	6,425	18,460
New Hampshire	0	0
New Jersey	98,695	239,350
New York	33,678	129,820
Pennsylvania	444,900	581,113
Rhode Island	164,600	133,920
Vermont	0	0
Virginia	374	5,200
West Virginia	0	2,470
Total	992,655	1,709,291

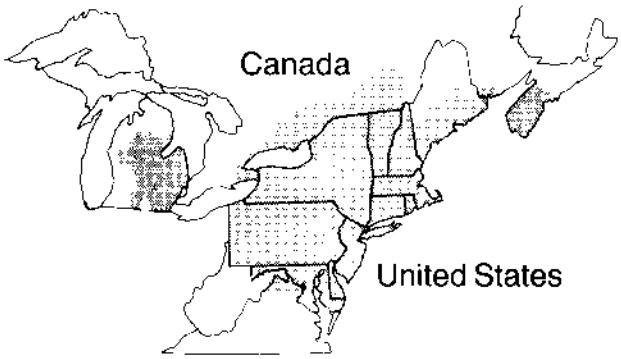
1985 Gypsy Moth Defoliation

northern half of Madison County and west into Page, Clarke, and Frederick Counties

In West Virginia, the line continues through Hampshire, Mineral, and part of Grant Counties; and then into Garrett County, MD, and along the Pennsylvania-Ohio border.

In central Michigan, the generally infested area is bordered by Iosco, Ogemaw, Roscommon, Missaukee, Osceola, Newaygo, Montcalm, Ionia, Eaton, Calhoun, Branch, Jackson, Lenawee, Monroe, Wayne, Macomb, St. Clair, Sanilac, Huron, Tuscola, Bay, and Arenac Counties.

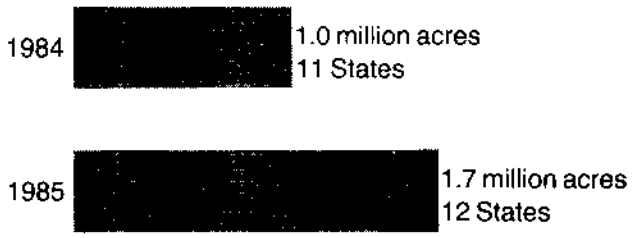
Gypsy Moth: Generally Infested Area in 1985



Outside the generally infested area, 17 isolated infestations were present in 9 States during 1985. States with isolated infestations are Illinois, Indiana, Minnesota, North Carolina, Ohio, Oregon, Tennessee, Washington, and Wisconsin.

In Oregon, gypsy moth populations in the large, 225,000-acre infestation near Eugene were greatly reduced with insecticide treatments.

Acres Defoliated by Gypsy Moth



Southern Pine Beetle

Southern pine beetle (Dendroctonus frontalis) activity increased dramatically in 1985. More than 50,000 infestation spots were reported throughout the South, and 72 counties were classed as "outbreak counties"; that is, counties with one or more multiple-tree spots per 1,000 acres.

Louisiana and Texas had their worst-ever southern pine beetle year. In Louisiana, the National Guard was activated to help private landowners in their control efforts, and beetle activity remained at a high level all year. Late in the year, however, beetle activity declined in east Texas.

Elsewhere, Alabama, Arkansas, Georgia, Mississippi, and South Carolina experienced increasing beetle problems.

Southern pine beetle outbreak counties

Alabama: Barbour, Bullock, Chambers, Chilton, Choctaw, Clarke, Crenshaw, Cullman, Fayette, Greene, Hale, Lamar, Lawrence, Lowndes, Macon, Marion, Monroe, Perry, Russell, Tuscaloosa, Winston

Arkansas: Columbia, Union

Georgia: Baldwin, Bibb, Chattahoochee, Jasper, Jones, Putnam, Stewart, Troup, Upson

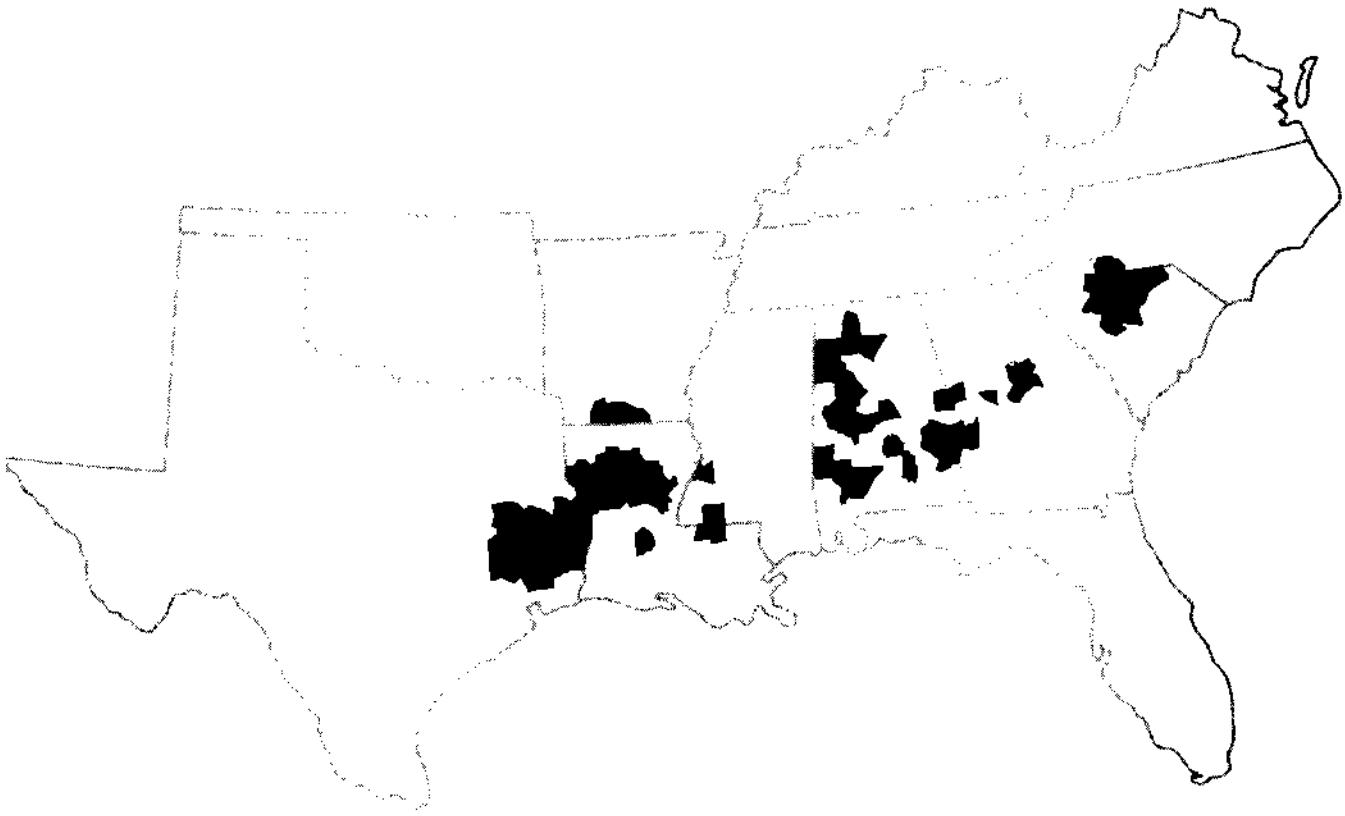
Louisiana: Bienville, Caldwell, Catahoula, De Soto, East Feliciana, Evangeline, Grant, Jackson, La Salle, Natchitoches, Red River, Sabine, St. Helena, Winn

Mississippi: Amite, Claiborne

South Carolina: Chester, Chesterfield, Fairfield, Kershaw, Lancaster, Lexington, Newberry, Richland, Union, York

Texas: Angelina, Hardin, Houston, Jasper, Liberty, Montgomery, Newton, Polk, Sabine, San Augustine, San Jacinto, Trinity, Tyler, Walker

1985 Southern Pine Beetle Outbreak Counties



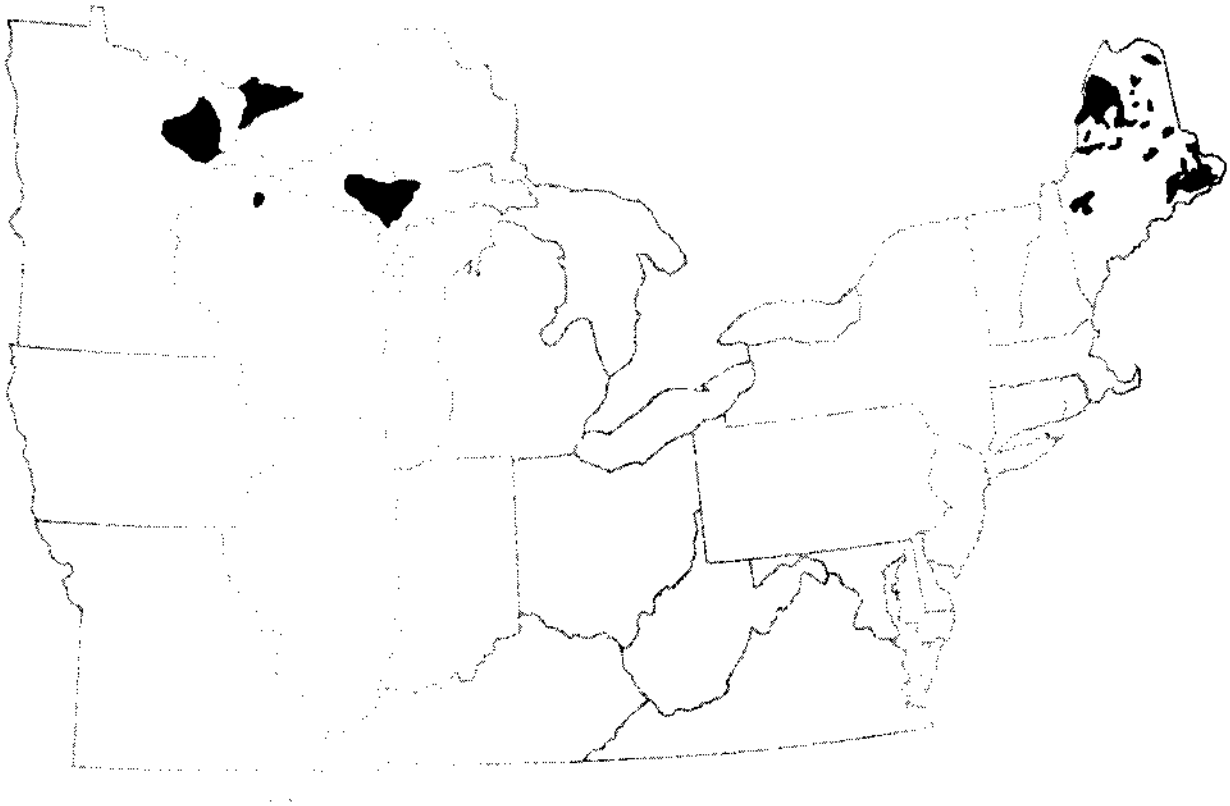
Spruce Budworm

The spruce budworm (Choristoneura fumiferana) defoliated 5.2 million acres in 1985. This continued the general downward trend that began in 1984. Even the Lake States, which had increased defoliation in 1984, reported decreases in 1985. Only New York, which had 275 acres of light defoliation, reported an increase. The downward trend is expected to continue in 1986.

Acres of aerially detected defoliation caused by the spruce budworm in the Eastern United States

State	1984	1985
Maine	5,500,000	4,800,000
Michigan	192,394	93,810
Minnesota	361,600	307,273
New Hampshire	930	0
New York	0	275
Vermont	0	0
Wisconsin	22,050	15,000
Total	6,076,974	5,216,358

1985 Spruce Budworm Defoliation



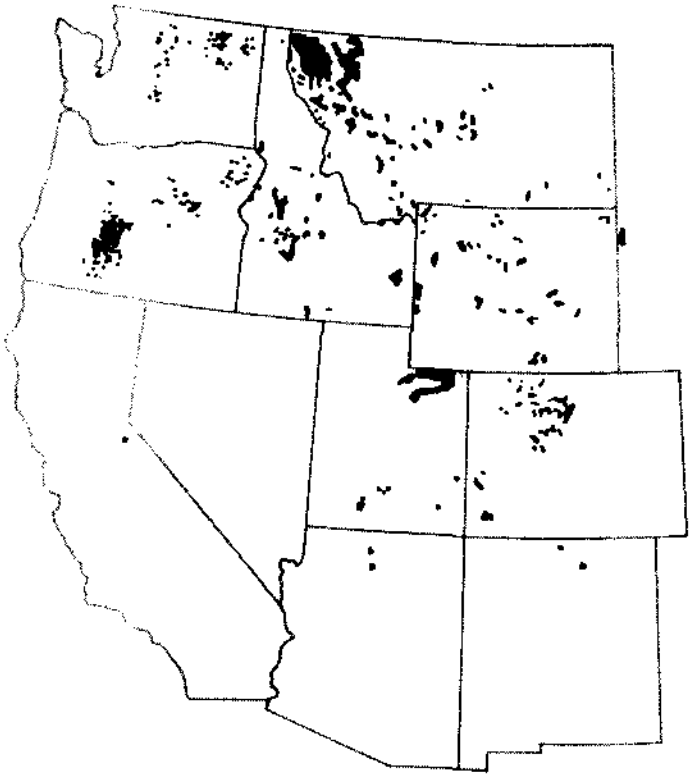
Mountain Pine Beetle

In 1985, mountain pine beetle (Dendroctonus ponderosae) activity remained high. Outbreaks, which covered 3.6 million acres in 1983 and 3.3 million acres in 1984, occurred on 3.34 million acres in 1985.

Acres of lodgepole, ponderosa, and other pines with mountain pine beetle infestations were as follows:

Northern Region	
Montana	933,000
Northern Idaho	8,000
Total	941,000
Rocky Mountain Region	
Colorado	260,000
Eastern Wyoming	104,000
South Dakota	7,000
Total	371,000
Southwestern Region	
Arizona	100
New Mexico	900
Total	1,000
Intermountain Region	
Southern Idaho	19,000
Utah	477,000
Western Wyoming	11,000
Total	507,000
Pacific Southwest Region	
California	20,000
Total	20,000
Pacific Northwest Region	
Oregon	1,400,000
Washington	100,000
Total	1,500,000

1985 Mountain Pine Beetle Outbreak Areas



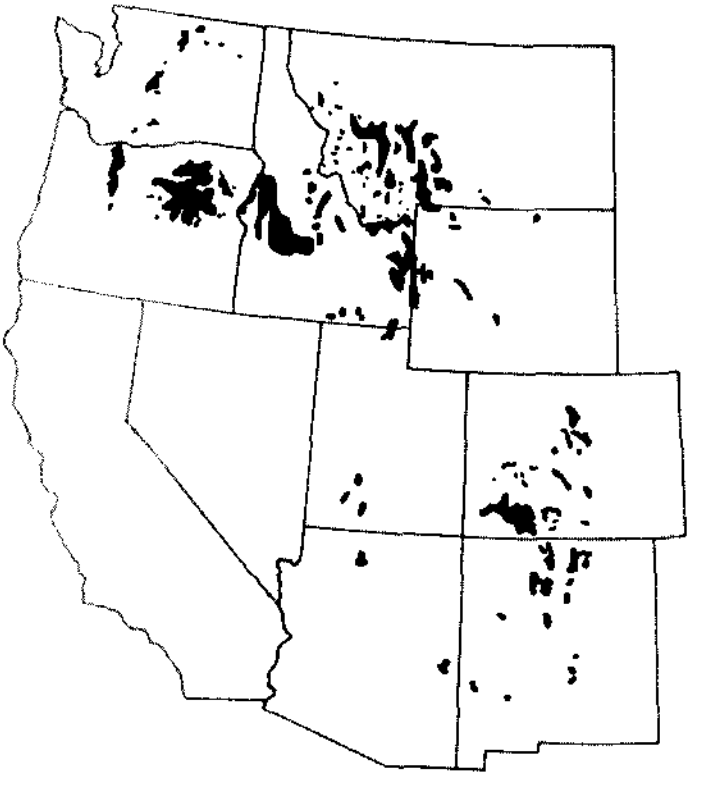
Western Spruce Budworm

In 1985, western spruce budworm (Choristoneura occidentalis) defoliation increased to a record 12.8 million acres. The Pacific Northwest Region reported an especially large increase. In the Northern Region, defoliation topped the 2-million-acre mark for the fourth year in a row.

The acres of aerially detected defoliation attributed to the budworm in each Region and State follow:

Northern Region	
Montana	2,675,000
Northern Idaho	11,000
Total	2,686,000
Rocky Mountain Region	
Colorado	1,567,000
Eastern Wyoming	22,000
Total	1,589,000
Southwestern Region	
Arizona	102,640
New Mexico	529,484
Total	632,124
Intermountain Region	
Southern Idaho	2,620,300
Utah	87,600
Western Wyoming	198,500
Total	2,906,400
Pacific Southwest Region	
California	0
Total	0
Pacific Northwest Region	
Oregon	4,567,390
Washington	415,290
Total	4,982,680

1985 Western Spruce Budworm Defoliation



Disease Conditions in the East

In the South, fusiform rust (Cronartium quercuum f. sp. fusiforme) severely damages southern pine forests. Estimates derived from the most current Forest Inventory and Analysis data indicate that considerable fusiform rust infection occurs on over 15 million acres of slash and loblolly pines. In 1984, about 14.9 million acres were infected. In 1985, the estimates were revised for three States: Florida, South Carolina, and Virginia. As a result, the estimate of total acreage infected increased to 15.3 million acres.

At least 10 percent of the trees on these 15.3 million acres have potentially lethal fusiform rust infections either on or within 12 inches of their main stems.

In 1981, a systematic procedure for predicting fusiform losses was established. The system uses the most recent Forest Inventory and Analysis data, growth and yield formulas, and other mathematical equations to estimate dollar losses. This loss assessment procedure has been used in Florida, Georgia, North Carolina, South Carolina, and Virginia.

In these States, losses due to fusiform rust had been calculated at $31 million per year. However, when the estimates of infected acreage were revised in Florida, South Carolina, and Virginia during 1985, the total monetary

Acres of slash and loblolly pine stands infected with fusiform rust. About 10 percent or more of the trees are infected on their main stems or within 12 inches of their main stems--1985 *

State	Landownership class				Total by State
	National Forest	Other Federal	State	Private	
Alabama	61,900	20,100	20,100	1,938,900	2,041,000
Arkansas	6,500	1,200	800	50,400	58,900
Florida	6,210	10,856	25,159	1,006,814	1,049,039
Georgia	37,328	139,619	36,170	5,083,927	5,297,044
Louisiana	61,300	15,700	31,400	1,461,700	1,570,100
Mississippi	86,500	6,700	6,800	1,585,200	1,685,200
North Carolina	3,854	8,716	25,769	1,100,716	1,139,055
South Carolina	73,081	60,093	35,937	1,700,040	1,869,151
Texas	36,500	1,300	1,400	461,800	501,000
Virginia	0	0	0	45,516	45,516
Total	373,173	264,284	183,535	14,435,013	15,256,005

* This 1985 table contains revised estimates for Florida, South Carolina, and Virginia.

Losses in loblolly and slash pines attributable to fusiform rust in 1985 *

State	Mortality (cordwood)		Quality loss (sawtimber)		Total
	Loblolly	Slash	Loblolly	Slash	
			1,000 dollars		
Florida	823	490	340	1,130	2,783
Georgia	8,728	3,778	7,980	3,200	23,686
North Carolina	3,107	0	116	0	3,223
South Carolina	3,464	227	1,751	49	5,491
Virginia	0	0	44	0	44
Total	16,122	4,495	10,231	4,379	35,227

* Values are stated in present value terms, discounted at 4 percent.

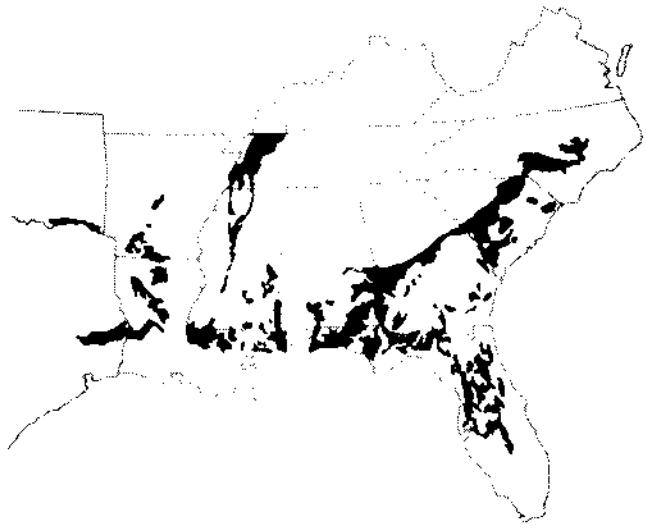
loss estimate was also revised. The losses due to fusiform rust in these five States increased to $35 million.

Annosus root disease (Heterobasidion annosum) remains a serious problem in the South. Disease hazard is greatest on deep, sandy soils with good internal drainage. On these high-hazard soils, which occur on about 20 percent of the South's land base, mortality is the normal result of infection.

Decline and mortality of several tree species were reported again this year, especially decline and mortality of oak in the South and of ash, beech, birch, fir, larch, maple, oak, and spruce in the Northeast. Environmental stress, coupled with pest activity, appears to be contributing to many of the reported tree decline problems. The possible effects of man-caused stress, such as atmospheric deposition, are also being investigated.

High-Hazard Soils

Pines growing in these areas are normally killed if they become infected with annosus root disease.



Disease Conditions in the West

In the West, root diseases and dwarf mistletoes (Arceuthobium spp.) were the most damaging diseases. Other important conifer diseases included foliage diseases, whose incidence was down; stem rust diseases, of which white pine blister rust has the greatest timber management implications; and stem decay, which continued to cause considerable damage in old-growth conifer stands.

Average annual losses caused by dwarf mistletoes

Region/State	Area infested	Volume lost
	1,000 acres	1,000 cubic feet
Northern Region		
Montana	2,416	33,250
Northern Idaho	713	13,420
Rocky Mountain Region *		
Colorado	638	5,800
Eastern Wyoming	361	4,960
Southwestern Region *		
Arizona	982	8,140
New Mexico	1,793	16,570
Intermountain Region		
Southern Idaho	2,511	28,860
Utah	461	4,750
Nevada	62	580
Western Wyoming	276	3,290
Pacific Southwest Region		
California	2,200	120,000
Pacific Northwest Region		
Oregon	4,885	76,560
Washington	3,575	55,440
Alaska Region	1,500	11,000
Total	22,373	382,620

* National Forest System lands only.

Average annual root disease-caused mortality

Region	Area affected *	Mortality by landownership		Total Volume
		National Forest	Other	
	1,000 acres	1,000 cubic feet		
Northern Region	3,300	54,400	26,300	80,700
Rocky Mountain Region	38	127 **	NA ***	127
Southwestern Region	1,140	2,900	1,860	4,760
Intermountain Region	56	1,400	215	1,615
Pacific Southwest Region	8,133	12,298	7,100	19,398
Pacific Northwest Region	2,220	51,453	80,478	131,931
Total	14,887	122,578	115,953	238,531

* Area where root diseases are a management concern.
** A partial estimate for one forest type only.
*** NA = data not available.

Part 2. Regional Conditions

Northern Region—Insects

Northern Region—Status of insects in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming

Insect	Host	Location	Remarks
Balsam woolly adelgid *Adelges piceae*	Grand fir, subalpine fir	Idaho	Even though the infested area remained unchanged during 1985, damage increased on grand fir, and scattered mortality of subalpine fir has occurred.
Black pineleaf scale *Nuculaspis californica*	Ponderosa pine	Idaho	Damage along the Clearwater River drainage west of Orofino continued, but at a lower level.
Cranberry girdler moth *Chrysoteuchia topiaria*	Douglas-fir, western larch	Idaho	Since 1980, girdler moth larvae have caused tap root damage to Douglas-fir and western larch seedlings at the USDA Forest Service Nursery in Coeur d'Alene, ID. In 1984, pesticide applications reduced damage to below 1 percent. Pheromone trap catches for 1985 were 5.3 moths per trap, down from 39.0 in 1984. No root damage was found during the November lift.
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Idaho, Montana, Wyoming	Following a large increase in 1984, beetle activity returned to near the 1983 level. One exception was an increase on parts of the Cabinet Ranger District in northwestern Montana.
Douglas-fir needle midge *Contarinia pseudotsugae*	Douglas-fir	Idaho	Damage began in 1982 along Priest River Valley. During 1985, defoliation was most noticeable in the Palouse area.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir, spruce, true firs	Idaho, Montana	Throughout the Region, pheromone trap catches of adult moths decreased. No ornamental tree defoliation or aerially detected defoliation was reported. However, the outbreak around Potlatch, ID, continued to build. Trap sites having over 50 moths per trap increased from 2 in 1984 to over 20 in 1985. Larval population densities of over 10 larvae per 1,000 square inches of foliage were found in several areas. The outlook for 1986 is a population increase with visible defoliation common.

Northern Region—Status of insects in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming—Continued

Insect	Host	Location	Remarks
Fir engraver Scolytus ventralis	Grand fir, subalpine fir	Idaho	Engraver damage went nearly undetected in 1985 and is now well below the levels recorded over the past several years.
Forest tent caterpillar Malacosoma disstria	Hardwoods	Montana	Along the south end of Flathead Valley, very heavy defoliation occurred in alder, birch, willow, and aspen. Damage was also reported in urban trees and shrubs around Missoula.
Gouty pitch midge Cecidomyia piniinopis	Ponderosa pine	Idaho	Chronic tip damage caused by this insect has been common along the Clearwater River between Selway and Lewiston. Very heavy damage occurred at the Long Mountain seed orchard near Rathdrum. Lighter damage extends south to Coeur d'Alene and north to Sandpoint.
Gypsy moth Lymantria dispar	Hardwoods	Idaho, Montana	No moths were caught in pheromone-baited traps in northern Idaho or Montana. Surveillance trapping will continue in 1986.
Hemlock sawfly Neodiprion tsugae	Engelmann spruce, subalpine fir, western hemlock	Idaho	Hemlock sawfly defoliation was recorded along the Canadian border in northern Idaho. Several thousand acres of western hemlock, subalpine fir, and Engelmann spruce were damaged. Some hemlock trees were top killed along Boundary Creek.
Larch budmoth Zeiraphera improbana	Western larch	Montana	This outbreak was first detected in 1983. Damage decreased in 1984. During 1985, the infestation spread to over 151,000 acres. Most of this occurred on the Kootenai and Flathead National Forests. Scattered damage was reported on the Stillwater State Forest and Flathead Indian Reservation.

Northern Region—Status of insects in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming—Continued

Insect	Host	Location	Remarks
Larch casebearer Coleophora laricella	Western larch	Idaho, Montana	Larch casebearer defoliation decreased throughout northern Idaho. In Montana, defoliation increased on the Flathead Indian Reservation and southeastern portion of the Flathead National Forest. Defoliation was heaviest along the South Fork of the Flathead River and the northern portion of the Swan River Valley.
Lodgepole terminal weevil Pissodes terminalis	Lodgepole pine	Montana	Weevil infestations continued to impact lodgepole pine regeneration throughout western Montana. Stands surveyed on the Gallatin and Beaverhead National Forests in 1984 exhibited infestation rates as high as 83 percent. Surveys conducted on the Flathead National Forest in 1985 showed nearly every tree had been attacked at some time during the past 10 years in 20-year-old stands on the Tally Lake Ranger District. Long-term impact from infestations of this magnitude has not been determined. Evaluations will continue in 1986.

Northern Region—Status of insects in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming—Continued

Insect	Host	Location	Remarks
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, ponderosa pine, other pines	Idaho, Montana, Wyoming	Throughout the Region, there were over 856,000 acres with bark beetle-caused mortality recorded in lodgepole pine. Another 85,000 acres had mortality recorded in ponderosa, whitebark, and western white pines—an increase during 1985. Most of the increase occurred in ponderosa pine type east of the Continental Divide. In northern Idaho, mountain pine beetle activity decreased in lodgepole pine, ponderosa pine, and western white pine. However, areas of new damage found in 1984 on the Red River and Elk Ranger Districts, Nezperce National Forest, continued to expand. In Montana, beetle activity in lodgepole pine decreased on all National Forests east of the Continental Divide. Nearly static conditions in lodgepole pine occurred on the Lolo and Kootenai National Forests and in Glacier National Park. Beetle activity in lodgepole pine expanded on the Flathead National Forest and Flathead Indian Reservation. In ponderosa pine, mortality increased in most areas east of the Divide. The largest increase occurred on the Lewis and Clark National Forest and the Crow Indian Reservation. West of the Divide a major increase in ponderosa pine mortality occurred on the Kootenai National Forest. Activity decreased in whitebark/limber pine in western Montana.
Pine engraver *Ips pini*	Pines	Idaho, Montana	A drought during July 1985 favored the buildup of this bark beetle in ponderosa pine stands. By mid-September, group killing was conspicuous throughout western Montana. Heaviest damage was reported along the Clark Fork and Blackfoot River drainages. Winter snow damage caused a buildup in scattered stands on the Sioux Ranger District, Custer National Forest.

Northern Region—Status of insects in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming—Continued

Insect	Host	Location	Remarks
Pine looper *Nacophora mexicanaria*	Ponderosa pine	Montana	This looper caused heavy defoliation on nearly 3,200 acres in the Ekalaka Hills, Sioux Ranger District, Custer National Forest. Fall surveys indicate a probable decline in 1986.
Pine needle sheathminer *Zelleria haimbachi*	Limber pine, lodgepole pine, ponderosa pine	Montana	Defoliation by this insect continued its upward trend throughout Montana. The largest area of damage in 1985 occurred on the Custer National Forest and on the west side of Glacier National Park. Light to moderate damage was common in lodgepole pine stands. Ponderosa pine damage was confined to the Flathead Valley and south to Evaro Pass. Ponderosa pine along the Clark Fork River from Missoula to Superior was also damaged. Lodgepole pine stands were heavily infested in the Boulder River drainage on the Gallatin National Forest.
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce, other spruces	Idaho, Montana	Without exception, spruce beetle-caused mortality declined in all infested areas throughout the Region. For the most part, a similar trend occurred in 1984.
Western balsam bark beetle *Dryocoetes confusus*	Subalpine fir	Montana, Wyoming	The only area where activity of this beetle increased was on the Lolo National Forest. Elsewhere, populations declined in 1985.
Western pine shoot borer *Eucosma sonomana*	Ponderosa pine	Idaho, Montana	Western pine shoot borer exists at various population levels in susceptible ponderosa pine throughout the Region. As many as 50 percent of the trees are infested in some stands. In several ponderosa pine test plantations in northern Idaho and western Montana, pheromone-impregnated plastic strips have been applied for 3 years to disrupt mating; both terminal damage and infestation rates have been reduced.

Northern Region—Status of insects in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming—Continued

Insect	Host	Location	Remarks
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, Engelmann spruce, true firs	Idaho, Montana, Wyoming	Throughout Montana and northern Idaho, western spruce budworm-caused defoliation in Douglas-fir, Engelmann spruce, and true firs increased from 2.3 million acres in 1984 to 2.7 million acres in 1985. This increase is the fourth consecutive year that defoliation exceeded 2 million acres. The buildup during 1985 was probably influenced by the above average warm and dry weather during June and July. In Montana, where the most persistent outbreaks occur, defoliation jumped by almost 400,000 acres. In northern Idaho, budworm populations continue to increase. These increases follow several years of no visible defoliation, which ended in 1984.

Northern Region—Diseases

Northern Region—Status of diseases in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Atropellis canker *Atropellis piniphila*	Lodgepole pine	Idaho, Montana	In Montana, damage is common on the Helena National Forest and the Flathead Indian Reservation. In Idaho and elsewhere in Montana, isolated areas of lodgepole pine are infected.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine, ponderosa pine	Idaho, Montana	Comandra rust is common on lodgepole and ponderosa pines in many parts of both States.
Cytospora canker *Valsa abietis* [*Cytospora abietis*]	Douglas-fir	Idaho	Severe damage to sapling Douglas-fir occurred on Elk City Ranger District as a result of the development of cytospora cankers following hail damage in 1980. As many as three-fourths of the trees in Douglas-fir plantations are dead or dying.
Diplodia blight *Sphaeropsis sapinea* (= *Diplodia pinea*)	Ponderosa pine	Idaho, Montana	The pathogen was associated with severe branch dieback near Missoula and Polson, MT.
Dwarf mistletoes			
Arceuthobium americanum	Lodgepole pine	Idaho, Montana	Dwarf mistletoes infest about 3.1 million acres in Montana and Idaho. Nearly 47 million cubic feet of growth are lost annually on lands of all ownerships. Most of the losses on lands managed for timber can eventually be eliminated through appropriate silvicultural treatments.
Arceuthobium douglasii	Douglas-fir	Idaho, Montana	
Arceuthobium laricis	Western larch	Idaho, Montana	
Western gall rust *Endocronartium harknessii*	Lodgepole pine, ponderosa pine, Scotch pine	Idaho, Montana, North Dakota	This disease is common on hard pines. It is occasionally severe enough on native species to be of management concern.
White pine blister rust *Cronartium ribicola*	Western white pine	Idaho, northwestern Montana	White pine blister rust precludes the management of western white pine on high-hazard sites. More rust-resistance white pine is being planted as seed becomes available.

Northern Region—Status of diseases in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming—Continued

Disease	Host	Location	Remarks
ROOT DISEASES			
Annosus root disease *Heterobasidion annosum*	Douglas-fir, grand fir, ponderosa pine, subalpine fir, western hemlock	Idaho, western Montana	Root diseases are the most important long-term disease problems in the Northern Region's forests. They are management concerns on about 1.9 million acres in northern Idaho and 1.4 million acres in Montana (about 15 percent of the Region's commercial forest land). Annosus root disease-caused tree mortality was found in 1985 on the Flathead Indian Reservation and all National Forests west of the Continental Divide. Armillaria root disease is widespread and damaging in Douglas-fir and true fir stands west of the Continental Divide. In other species, it commonly kills trees in stands that are less than 30 years old. Black stain root disease is frequently found, but the damage it causes is unknown. Laminated root rot is the most damaging rot in Douglas-fir and grand fir on the Idaho Panhandle National Forests and on adjacent forests in Montana. Schweinitzii butt rot is common in older Douglas-fir stands.
Armillaria root disease *Armillaria* spp.	Douglas-fir, other conifers	Idaho, Montana	
Black stain root disease *Ceratocystis wageneri* [*Verticicladiella wageneri*]	Douglas-fir, lodgepole pine, ponderosa pine	Idaho, Montana	
Laminated root rot *Phellinus weirii*	Douglas-fir, grand fir, western redcedar, other conifers	Idaho, Montana	
Schweinitzii butt rot *Phaeolus schweinitzii*	Douglas-fir other conifers	Idaho, Montana	
FOLIAGE DISEASES			
Dothistroma needle blight *Mycosphaerella pini* [*Dothistroma septospora* (=*Dothistroma pini*)]	Austrian pine, lodgepole pine, ponderosa pine	Idaho, Montana	Incidence was still evident around the Wilderness Gateway Campground, Clearwater National Forest.
Douglas-fir needle cast *Rhabdocline pseudotsugae*	Douglas-fir	Idaho, Montana	Incidence was widespread, but damage was relatively light.
Rhabdocline weirii	Douglas-fir	Montana	Severe in sheared Christmas trees on Murphy Lake Ranger District, Kootenai National Forest.
Elytroderma disease *Elytroderma deformans*	Ponderosa pine	Idaho, Montana	The disease was severe in a number of pine stands in the Bitterroot Valley, Flathead Indian Reservation, and around Flathead Lake in Montana.

Northern Region—Status of diseases in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming—Continued

Disease	Host	Location	Remarks
Larch needle blight *Hypodermella laricis* Larch needle cast *Meria laricis*	Western larch	Idaho, Montana	Except in local areas, incidence of both needle diseases was low.
Needle cast of lodgepole pine *Lophodermella montivaga*	Lodgepole pine	Montana	*Lophodermella montivaga* causes severe needle cast in high-elevation stands in Yellowstone National Park and adjacent stands on the Gallatin National Forest.
Swiss needle cast *Phaeocryptopus gaeumannii*	Douglas-fir	Idaho, Montana	This needle cast was severe in cut wild Christmas trees on Murphy Lake Ranger District and is showing up on Flathead National Forest in Montana.
White pine needle cast *Lecanosticta* sp.	Western white pine	Idaho, Montana	The disease was common on Bonners Ferry Ranger District, Priest River Experimental Forest, and on the Wallace Ranger District in Idaho and on the Yaak Ranger District in Montana.
VASCULAR WILTS			
Dutch elm disease *Ceratocystis ulmi*	American elm, Siberian elm	Montana, North Dakota	Dutch elm disease is still prevalent in Billings and Missoula, MT, and in North Dakota.
NURSERY DISEASES			
Fusarium root rot *Fusarium* spp.	Douglas-fir, other conifers	Idaho, Montana	Fusarium root rot caused mortality and tip dieback in regional nurseries. The rot was most serious on Douglas-fir, but was also present on Engelmann spruce, true fir, western larch, and several pine species. Damage was especially common on containerized stock.
Gray mold *Botrytis cinerea*	Engelmann spruce, lodgepole pine, western larch	Idaho, Montana	Losses were evident in container-grown seedlings of western larch, lodgepole pine, and Engelmann spruce at the Coeur d'Alene Nursery. Gray mold also caused losses at several private nurseries in Montana.

Northern Region—Status of diseases in Montana, northern Idaho, North Dakota, northwestern South Dakota, and National Park Service lands in northwestern Wyoming--Continued

Disease	Host	Location	Remarks
Larch needle cast *Meria laricis*	Western larch	Idaho	Incidence was very low on bareroot western larch at the Coeur d'Alene Nursery due to the warm, dry weather.
Lodgepole needle dieback	Lodgepole pine	Idaho	Extensive tip dieback of 2-0 bareroot lodgepole pine seedlings became evident during late spring. Cause of the symptoms may have been fertilizer burn or excessive drying.
Phoma blight *Phoma* spp.	Most conifers	Idaho	Tip blight associated with *Phoma* species occurred at several nurseries.
Sirococcus tip blight *Sirococcus strobilinus*	Engelmann spruce, ponderosa pine	Idaho, Montana	Sirococcus tip blight continued to cause damage at a private nursery near Bonners Ferry, ID, although losses were less than during previous years. The disease was also found on container-grown Engelmann spruce at the Coeur d'Alene Nursery and in several nurseries in Montana.
Western gall rust *Endocronartium harknessii*	Ponderosa pine	Montana	This rust was found on bareroot stock in several nurseries.

Rocky Mountain Region—Insects

Rocky Mountain Region—Status of insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming

Insect	Host	Location	Remarks
Ash borer/lilac borer *Podosesia syringae*	Green ash, lilac	Nebraska, South Dakota	Several shelterbelts were moderately to heavily infested throughout Nebraska and South Dakota. Ornamentals were severely affected near Omaha.
Bronze birch borer *Agrilus anxius*	Birch	Colorado, South Dakota	Reports of this pest have been increasing for several years and continued to increase during 1985.
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Colorado, Wyoming	Increased mortality continues in Colorado and Wyoming.
Douglas-fir pole beetle *Pseudohylesinus nebulosus*	Douglas-fir	Colorado	Scattered occurrence along the Front Range.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir, spruce	Colorado	Light to moderate defoliation on ornamental spruce. Heavy defoliation occurred in the Rampart Range/Platte River drainage
European pine sawfly *Neodiprion sertifer*	Scotch pine	South Dakota	One small infestation on ten trees in Minnehaha County.
Fall webworm *Hyphantria cunea*	Numerous Hardwoods	Colorado, Nebraska, South Dakota	Was common throughout the Region.
Grasshoppers Numerous species	All species	Nebraska, South Dakota	Populations became so high in the north-central part of South Dakota that entire shelterbelts were stripped. Grasshoppers, coupled with dry weather, have virtually eliminated some tree species in scattered shelterbelts.
Gypsy moth *Lymantria dispar*	Hardwoods	Colorado, South Dakota	In Colorado, 2,662 traps were set out. One trap from Boulder had 10 moths. The five traps from Fort Collins each contained one moth. In South Dakota, lone males were trapped in Custer State Park and near Keystone. No moths were captured from areas where moths had been trapped in previous years.

Rocky Mountain Region—Status of insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming—Continued

Insect	Host	Location	Remarks
Honeylocust podgall midge *Dasineura gleditchiae*	Honeylocust	South Dakota	Becoming more common throughout the State. One belt of 400 trees had virtually every tree infested.
Large aspen tortrix *Choristoneura conflictana*	Aspen	Colorado	Light defoliation reported, primarily in southwest Colorado. Extensive defoliation of aspen along the southern Front Range near Cucharas Pass. Nearly 21,000 acres of aspen showed visible defoliation.
Metalic pine pitch nodule moth *Petrova metallica*	Ponderosa pine	Colorado, South Dakota	In eastern South Dakota, damaged terminals were found in virtually every planting over 5 years old. Scattered in Colorado.
Mountain pine beetle *Dendroctonus ponderosae*	Limber pine, lodgepole pine, ponderosa pine	Colorado, South Dakota, Wyoming	Mortality remained widespread but went down in lodgepole pine and remained static in ponderosa pine. Increases occurred in limber pine in Wyoming.
Pine budworm *Choristoneura lambertiana*	Ponderosa pine	Colorado	Extensive defoliation in southwestern Colorado was visible on 215,000 acres of mixed type.
Pine butterfly *Neophasia menapia*	Ponderosa pine	Colorado	Spotty populations in ponderosa pine in southwest Colorado.
Pine engravers *Ips* spp.	Ponderosa pine	Nebraska, South Dakota	An outbreak, which started on the north facing foothills of the Black Hills in 1984, expanded during 1985. Spots ranged from 2-150 trees. In Nebraska, engravers were associated with scorched trees and thinning operations.
Pine needleminer *Coleotechnites ponderosae*	Ponderosa pine	Colorado	Static to decreasing along the Front Range. Most notable defoliation near the Big Thompson Canyon area.
Pine needle scale *Chionaspis pinifoliae*	Spruce, Pine	South Dakota	Scattered trees with light to heavy infestations throughout western South Dakota.

Rocky Mountain Region—Status of insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming—Continued

Insect	Host	Location	Remarks
Pine needle sheathminer Zelleria haimbachi	Ponderosa pine	Colorado	Undetermined damage near Pagosa Springs and north of Durango. Found with other defoliators in southern Colorado.
Pine stem aphids Cinara spp.	Ponderosa pine, Scotch pine	South Dakota	Spring infestations causing branch mortality, dieback, and reduced growth in belts in north-central South Dakota.
Pine tiger moths Lophocampa ingens Lophocampa argentata subalpina	Pinyon/juniper	Colorado	Populations were widespread in the Durango area, and about 5,000 acres were infested near Colona.
Pine tip moths Rhyacionia spp.	Austrian pine, ponderosa pine	Nebraska, South Dakota	Populations in eastern South Dakota increased. Twelve shelterbelts covering 28 acres were moderately to heavily infested.
Ponderosa twig moth Dioryctria ponderosae	Ponderosa pine	Nebraska	A problem in central and western part of Nebraska.
Spring cankerworm Paleacrita vernata	Numerous Hardwoods	Colorado, South Dakota	A few shelterbelts and ornamental trees were heavily infested. However, populations in South Dakota seem to be declining. About 100 acres near Sterling, CO, were infested.
Spruce beetle Dendroctonus rufipennis	Spruce	Colorado	Spruce beetle-caused mortality affecting 50-100 trees has been detected north of Dillon. The outbreak on the Rio Grande National Forest is over.
Twig beetle Pityophthorus aquilus	Ponderosa pine	Colorado	Seven percent of tips of ponderosa pine on several hundred acres were infested northeast of Durango.

Rocky Mountain Region—Status of insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming—Continued

Insect	Host	Location	Remarks
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, Engelmann spruce, true firs	Colorado, Wyoming	Extensive light to moderate defoliation continued to occur throughout central and northern parts of the Front Range. The most prominent, continuous defoliation, however, occurred on a 923,000-acre area in southern Colorado. Visible defoliation elsewhere in Colorado has dropped to 644,000 acres. In Wyoming, infestations have decreased to 22,000 acres of moderate or low level of defoliation. Most infestations occurred on the Wind River Indian Reservation.
Western tent caterpillar *Malacosoma californicum*	Aspen, bitterbrush, serviceberry	Colorado	In southwestern Colorado, severe defoliation was significantly reduced. In 1985, 31,000 acres of aspen were defoliated. Further reductions, predicted on the basis of egg mass surveys, are expected in 1986. Large aspen tortrix populations are expected to increase and compound defoliation activity where the two insects overlap.

Rocky Mountain Region—Diseases

Rocky Mountain Region—Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Comandra blister rust *Cronartium comandrae*	Lodgepole pine	Wyoming	Continues as the most serious disease of lodgepole pine on the Wind River Ranger District, Shoshone National Forest, where more than half of the mature trees are infected and 85 percent of infected trees have dead tops.
Dwarf mistletoes			
Arceuthobium americanum	Lodgepole pine	Colorado, Wyoming	Remains the most important disease on Federal lands in the Region. Found on about 518,000 acres in Colorado and 361,000 acres in eastern and central Wyoming, it causes mortality and growth loss equal to approximately 10 million cubic feet. Silvicultural control was conducted on 5,546 acres on seven National Forests.
Arceuthobium vaginatum subsp. *cryptopodum*	Ponderosa pine	Colorado	Approximately 20 percent of the host type is infested. Annual losses amount to over 885,000 cubic feet. Most common in the *Pinus ponderosa/Muhlenbergia montana* habitat type.
Nectria canker *Nectria* sp.	Honeylocust	Colorado	Reported on 0.5 and 3.5 percent of urban trees in Greeley and Berthoud, CO, respectively.
Poplar cankers *Dothichiza populea* *Valsa sordida* [*Cytospora chrysosperma*] *Phomopsis macrospora*	Cottonwood, hybrid poplars, lombardy poplar	South Dakota	Common Statewide.
Russian olive canker *Phomopsis* or *Tubercularia* sp.	*Russian olive*	South Dakota	For the last 2 years, increased reports of mortality in shelterbelts. Incidence highest in areas affected by drought and grasshopper populations.
Siberian elm canker *Botryodiplodia hypodermia*	Siberian elm	South Dakota	Elm mortality continues to increase and decline is becoming more severe. Concern is growing in many communities.

Rocky Mountain Region—Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming—Continued

Disease	Host	Location	Remarks
Spruce cytospora canker *Leucostoma kunzei* (=*Cytospora kunzei*)	Blue spruce	South Dakota	There has been an increase in requests from private landowners regarding this disease on urban and shelterbelt trees.
Thyronectria canker *Thyronectria austro-americana*	Honeylocust	Colorado	Continues as an urban tree problem along the Front Range, killing 1-2 percent of trees annually.
Western gall rust *Endocronartium harknessii*	Lodgepole pine	Colorado	A survey of a naturally regenerated stand on the Estes-Poudre Ranger District, Arapaho and Roosevelt National Forest, indicated damaging main stem galls on 39 crop trees per acre and branch galls on an additional 19 trees per acre.
ROOT DISEASES			
Armosus root disease *Heterobasidion annosum*	Jack pine	Nebraska	Confirmed at a new location on the Nebraska National Forest. With the recent emphasis on timber management and subsequent intensive inventory surveys, other centers may also be discovered.
Armillaria root disease *Armillaria* spp.	Lodgepole pine, ponderosa pine	Colorado, South Dakota	A survey of a naturally regenerated lodgepole pine stand on the Estes-Poudre Ranger District, Arapaho and Roosevelt National Forest, revealed little loss to the disease over a 26-year study. Initially, annual losses were estimated at 2 percent, but have steadily declined since 1960 to less than 0.4 percent. All recent mortality has been in suppressed noncrop trees. The stand is fully stocked. A random selection of 63 ponderosa pine stands on the Black Hills National Forest revealed an 89 percent incidence of root disease. A significant association ($p=.10$) between mountain pine beetle and *Armillaria* was found in the northern, but not in the southern, Black Hills.

Rocky Mountain Region—Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming—Continued

Disease	Host	Location	Remarks
Black stain root disease *Ceratocystis wageneri* [*Verticicladiella wageneri*]	Pinyon	Western Colorado	Aerial and ground surveys since 1975 have shown disease centers in pinyon in Mesa Verde National Park and west of the Continental Divide. Results from seven plots established in 1978 indicate the disease is still active in the Park. In these plots, 33 percent of the trees have been killed since 1978, an average of 3 trees per plot per year. If the current rate of mortality continues, 55 percent of the stocking will be lost by 1988.
FOLIAGE DISEASES			
Anthracnose Species unknown	Hardwoods	South Dakota	Wet, warm weather in the southeastern part of the State resulted in an increase in this disease. Fifteen acres of shelterbelts and almost one thousand trees were reported as severely infected.
Ash leaf rust *Puccinia sparganioides*	Green ash	South Dakota	Heavier than normal infections in scattered shelterbelts. At least 14 acres were heavily infected.
Diplodia blight *Sphaeropsis sapinea* (=*Diplodia pinea*)	Austrian pine, ponderosa pine	Nebraska, South Dakota	Branch dieback and tree mortality common in windbreaks and urban plantings in Nebraska; also found in an eastern South Dakota windbreak.
Ink spot *Ciborinia whetzeli*	Aspen	Colorado	Noted on the Rio Grande and San Juan National Forests. Locally heavy infestations. Reports down from 1984.
Juniper blight *Phomopsis juniperovora* *Cercospora sequoiae* *Kabatina juniperi*	Eastern redcedar, Rocky Mountain juniper	Nebraska, South Dakota	Scattered areas in Nebraska reported. More frequent reports in South Dakota than last year.

Rocky Mountain Region—Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming—Continued

Disease	Host	Location	Remarks
Needle casts of lodgepole and ponderosa pine			
Species unknown	Lodgepole pine	Colorado, Wyoming	Noted on the Fraser Experimental Forest near Fraser, CO. Common on the Hayden Ranger District, Medicine Bow National Forest, and west of Dubois, WY.
Lophodermium sp.	Lodgepole pine, ponderosa pine	South Dakota, Wyoming	Increased number of reports in the Black Hills on ponderosa pine. On lodgepole pine, needle cast found mostly in canyons adjacent to the Bighorn National Forest.
VASCULAR WILTS			
Dutch elm disease *Ceratocystis ulmi*	Elm species, including American elm	Colorado, Nebraska, South Dakota	Remains top priority in Colorado's urban forests. The Colorado State Forest Service received 726 positive samples. Continues to be a problem throughout Nebraska. In South Dakota, disease confirmed in four more counties. Only Harding County has no confirmed cases of Dutch elm disease. It continues to kill 6–10 percent of the remaining American elm where there are no management programs.
NURSERY DISEASES			
Frost damage	Blue spruce	South Dakota	Pockets of damage due to late spring frost occurred at the Big Sioux Conifer Nursery.
Fusarium root and cortical rot *Fusarium* spp.	Ponderosa pine	South Dakota	High populations of *Fusarium* spp. in nursery beds at the Big Sioux Conifer Nursery were implicated in the loss of potted nursery stock and shelterbelt plantings.
Storage mold *Cylindrocarpon* sp.	Black walnut	Nebraska	Fluctuating temperatures in the State-owned storage facility on the Bessey Nursery encouraged mold growth that resulted in destruction of portions of tap roots of large numbers of black walnut. Because of the size of the tap roots, most of the outplanted seedlings survived.

Rocky Mountain Region—Status of diseases in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming—Continued

Disease	Host	Location	Remarks
Tip dieback and leafspot complex of *Fusarium*, *Alternaria*, *Ascochyta*, and bacterial species	Russian olive	South Dakota	About 100,000, 2-0 seedlings were culled at the Big Sioux Conifer Nursery.
ABIOTIC			
Drought	Many species	South Dakota	Drought and hot, dry winds affected trees. Symptoms ranged from leaf scorch to mortality of newly planted conifers.
	Eastern redcedar, Rocky Mountain juniper	South Dakota	Dry spring and low soil moisture caused widespread mortality of stock from the Big Sioux Conifer Nursery and the Bessey Nursery outplanted in western South Dakota.
Hail damage	Several species	South Dakota	An estimated 10 acres in Walworth County and 600 acres in Pennington County were damaged by hail.
Herbicide damage	All species	South Dakota	Continues as a major problem in the eastern half of South Dakota.
Winter damage	Conifers	South Dakota	Several acres of shelterbelts in numerous locations in south-central South Dakota showed winter burn and kill.
OTHER			
Conifer needle mottling and stippling	Douglas-fir, ponderosa pine, Rocky Mountain juniper, white fir	Colorado	Mottling and stippling of conifer foliage were discovered north of Durango. Symptoms found on foliage from the previous years and developed on 1985 foliage by fall. Analysis revealed only minor bleaching of surface tissues. No tree decline or mortality has occurred. Cause unknown.
Ponderosa pine decline	Ponderosa pine	South Dakota	Unexplained decline and mortality of 20- to 80-year-old pines in shelterbelts in southeast South Dakota. Diplodia blight, fluctuating water tables, and an infestation of pitch nodule makers may all be involved.

Southwestern Region—Insects

Southwestern Region—Status of insects in Arizona and New Mexico

Insect	Host	Location	Remarks
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Arizona, New Mexico	Douglas-fir beetle activity changed little from 1984 to 1985. In New Mexico on the Carson National Forest and the Taos Pueblo Indian Reservation, tree mortality was heaviest in areas defoliated by the western spruce budworm.
Large aspen tortrix *Choristoneura conflictana*	Aspen	Arizona, New Mexico	In New Mexico, defoliation caused by the large aspen tortrix and, to a lesser degree, the western tent caterpillar was less extensive on the Carson and Santa Fe National Forests and decreased to undetectable levels on the Lincoln National Forest.
Western tent caterpillar *Malacosoma californicum*			In Arizona, defoliation caused by the western tent caterpillar decreased on the Coconino National Forest and was at low levels or absent in other areas.
Mountain pine beetle *Dendroctonus ponderosae*	Ponderosa pine	Arizona, New Mexico	Pine mortality caused by this bark beetle increased slightly in 1985. In northern New Mexico, areas of concentrated mortality occurred on the Carson National Forest and Taos Pueblo Indian Reservation, while scattered mortality occurred on the Santa Fe National Forest. Scattered mortality also occurred on the Kaibab Plateau in northern Arizona on National Forest and Park Service lands.
Pandora moth *Coloradia pandora*	Ponderosa pine	Arizona	No visible defoliation was detected on the Kaibab Ranger District in 1985, indicating that the outbreak there has ended. A new area of defoliation totaling approximately 760 acres has appeared in the Grand Canyon National Park near Cape Royale on the North Rim. Most likely, defoliation will be visible there again in 1987.

Southwestern Region--Status of insects in Arizona and New Mexico--Continued

Insect	Host	Location	Remarks
Pine engravers *Ips* spp.	Pines	Arizona, Nex Mexico	Overall, *Ips*-caused tree mortality decreased in 1985. On the San Carlos Indian Reservation in Arizona, mortality decreased to negligible levels. Significant decreases also occurred on the Fort Apache Indian Reservation and the Apache-Sitgreaves National Forests. An exception to the general trend occurred on the Coconino National Forest, which had the greatest amount of tree mortality due to *Ips* beetles in the Region.
Spruce beetle *Dendroctonus rufipennis*	Spruce	Arizona, New Mexico	Throughout the Region, acres of spruce mortality increased. In Arizona, significant mortality was detected on the Fort Apache Reservation and Apache-Sitgreaves National Forest and, in New Mexico, on the Carson and Santa Fe National Forests. Population samples taken on the Fort Apache Indian Reservation indicated that the outbreak there is declining.
True fir bark beetles Western balsam bark beetle *Dryocoetes confusus* *Scolytus* spp.	True firs	Arizona, New Mexico	Tree mortality resulting from these bark beetles was scattered throughout the Region, generally occurring in small groups of 1 to 10 trees. Highest concentrations of mortality were detected on the Carson and Santa Fe National Forests in New Mexico and the Coconino National Forest in Arizona, often in wilderness or other areas not managed for timber. Root diseases are commonly associated with this mortality and may predispose the trees to beetle attack.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Arizona, New Mexico	Although populations are considered to be at endemic levels, this beetle continued to cause mortality of ponderosa pine throughout the Region. Mortality was typically scattered and limited to individual or small groups of trees at any given location.

Southwestern Region—Status of insects in Arizona and New Mexico—Continued

Insect	Host	Location	Remarks
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, spruce, true firs	Arizona, New Mexico	Defoliation caused by the western spruce budworm occurred on 632,124 acres in 1985, a slight decrease from the 692,100 acres reported in 1984. In northern New Mexico, defoliation remained widespread on the Carson, Santa Fe, and Cibola National Forests. In southern New Mexico, defoliation on the Lincoln National Forest and Mescalero Apache Indian Reservation decreased substantially, possibly due in part to a suppression project conducted there in 1984. Small pockets of defoliation were detected on the Gila National Forest. In Arizona, there was an increase in the number of acres defoliated on the Kaibab Plateau and new areas of defoliation were detected on the Apache-Sitgreaves National Forest.

Southwestern Region—Diseases

Southwestern Region—Status of diseases in Arizona and New Mexico

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Aspen trunk rot *Phellinus tremulae*	Aspen	Arizona, New Mexico	*Phellinus tremulae* is responsible for the most common cull and defect in aspen. This white trunk rot, widespread throughout the host type, causes significant losses, especially in mature stands. Cull volumes may equal as much as 50 to 60 percent of the total volume.
Comandra blister rust *Cronartium comandrae*	Mondell pine, ponderosa pine	Arizona	Comandra blister rust on Mondell pine (*Pinus eldarica*) has been reported from the Payson and Prescott areas. It has recently been found on both the exotic Mondell and the native ponderosa pines in both cities. Damage has been restricted to individual trees, but the disease could spread to nearby Christmas tree plantations.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, Engelmann spruce, ponderosa pine	Arizona, New Mexico	Dwarf mistletoes caused significant reductions in growth and yield on commercial and noncommercial forest lands. Conifers on over 2.7 million acres of commercial forest land are infected; dwarf mistletoes caused an estimated loss of 25 million cubic feet of timber in Arizona and New Mexico in 1985.
Fir broom rust *Melampsorella caryophyllacearum*	True firs	Arizona, New Mexico	Fir broom rust is widely distributed in subalpine, corkbark, and white firs, but causes little real damage. Bole infections in the Sandia Ski Area, Cibola National Forest, NM, were responsible for some top breakage.
Powell limb rust *Peridermium filamentosum*	Ponderosa pine	Arizona	Limb rust is found in mature and overmature ponderosa pine in scattered locations on the Fort Apache Indian Reservation. The disease causes minor damage to infected tres and is mainly a concern when identifying leave and seed trees in infected stands.

Southwestern Region—Status of diseases in Arizona and New Mexico—Continued

Disease	Host	Location	Remarks
Red ring rot *Phellinus pini*	Douglas-fir, ponderosa pine, spruce, true firs	Arizona, New Mexico	*Phellinus pini is indigenous in mature and* overmature stands of pine and mixed conifer, but its damage is minimal in most stands. It has also been found on immature pine and mixed conifers in suppressed conditions.
Rust-red stringy rot *Echinodontium tinctorium*	Spruce, true firs	Arizona, New Mexico	This fungus is scattered in mature and overmature trees. It is indigenous and causes insignificant losses in mixed conifers.
Spruce broom rust *Chrysomyxa arctostaphyli*	Spruce	Arizona, New Mexico	Spruce broom rust is scattered throughout the host type but is of little commercial significance.
Stem cankers *Ceratocystis fimbriata* *Hypoxylon mammatum* *Cenangium singulare* *Cryptosphaeria populina*	Aspen	Arizona, New Mexico	Canker fungi caused significant reductions in vigor and yield of mature aspen stands, resulting in tree mortality from girdling cankers and in top breakage, cull, and degrading. In many stands, 30 percent or more of the stems are affected.
ROOT DISEASES			
Annosus root disease *Heterobasidion annosum*	Douglas-fir, ponderosa pine, spruce, true firs	Arizona, New Mexico	In Arizona and New Mexico, root and butt rot pathogens are responsible for an approximate 10-percent reduction in growth and yield. Losses may be as high as 25 percent in some seriously infected stands. *Armillaria* accounts for 80 percent of the damage and volume loss in conifers; other root pathogens are responsible for the remaining 20 percent. The Southwest loses an estimated 20 million board feet annually to root diseases.
Armillaria root disease *Armillaria* spp.	Douglas-fir, ponderosa pine, true firs	Arizona, New Mexico	
Schweinitzii butt rot *Phaeolus schweinitzii*	Douglas-fir, true firs	Arizona, New Mexico	
Tomentosus root rot *Inonotus tomentosus*	Ponderosa pine, spruce	Arizona, New Mexico	

Southwestern Region—Status of diseases in Arizona and New Mexico—Continued

Disease	Host	Location	Remarks
Black stain root disease *Ceratocystis wageneri* [*Verticicladiella wageneri*]	Pinyon pine, ponderosa pine	Arizona, New Mexico	Black stain root disease is very scattered the Southwest. Losses are insignificant in commercial timber.
Ganoderma applanatum	Aspen	Arizona, New Mexico	Scattered throughout the host type, the fungus causes windthrow and standing cull.
FOLIAGE DISEASES			
Elytroderma disease *Elytroderma deformans*	Pinyon pine, ponderosa pine	Arizona, New Mexico	Infection and damage caused by needle cast and leaf diseases remained at endemic levels. Widely scattered areas of marssonina blight were reported from the Carson National Forest, NM. Elytroderma disease was again found to be widely distributed, but at low levels, on the Coconino and Kaibab National Forests, AZ.
Conifer-aspen rust *Melampsora medusae*	Aspen	Arizona	
Marssonina blight *Marssonina populi*	Aspen	New Mexico	
Shepherd's crook *Venturia tremulae*	Aspen	Arizona, New Mexico	
ABIOTIC			
Winter damage	Pinyon pine	Arizona	An extensive area of "red belt" was reported on the North Kaibab Ranger District, Kaibab National Forest. Damaged trees over several thousand acres, exhibited considerable branch dieback, but mortality should be limited and insignificant.

Intermountain Region—Insects

Intermountain Region--Status of insects in southern Idaho, Nevada, Utah, and western Wyoming

Insect	Host	Location	Remarks
Armyworm *Spodoptera* sp.	Douglas-fir, Engelmann spruce, Jeffrey pine, lodgepole pine, western larch	Idaho	Populations defoliated seedlings at Lucky Peak Forest Nursery.
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Idaho, Utah, Wyoming	Group killing of Douglas-fir occurred on the Boise, Payette, Sawtooth, and Targhee National Forests, ID; Uinta National Forest, UT; and Bridger-Teton National Forest, WY. Activity increased in 1985: 4,400 trees were killed. The majority of the mortality occurred on the Bridger-Teton National Forest.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir	Idaho	No new defoliation was observed.
Gypsy moth *Lymantria dispar*	Hardwoods	Idaho	Populations were not detected by pheromone trapping in 1985.
Larch casebearer *Coleophora laricella*	Western larch	Idaho	Defoliation was noted infrequently on the Payette National Forest.
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, ponderosa pine, other pines	Idaho, Utah, Wyoming	Mountain pine beetle activity decreased throughout the Region. Tree mortality declined from 3.3 million trees in 1984 to 987,000 trees in 1985. However, epidemic populations continue to cause significant mortality on the Ashley and Wasatch-Cache National Forests, UT, and the Bridger-Teton National Forest, WY.
Pine butterfly *Neophasia menapia*	Ponderosa pine	Idaho	Defoliation was not noted, but small numbers of adults were observed in ponderosa pine stands.
Pine engraver *Ips pini*	Pines	Idaho	A significant decrease in activity was noted. Fewer than 600 trees were killed on the Boise and Salmon National Forests.

Intermountain Region—Status of insects in southern Idaho, Nevada, Utah, and western Wyoming—Continued

Insect	Host	Location	Remarks
Pine needle sheathminer *Zelleria haimbachi*	Lodgepole pine	Idaho	Infestations of this insect, along with the sugar pine tortrix, were noted defoliating lodgepole pine on over 56,000 acres of the Targhee National Forest.
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Idaho, Utah, Wyoming	Mortality increased dramatically on the Payette National Forest, ID. Approximately 2,600 infested trees were detected in aerial surveys. Ground surveys indicated that an estimated 13,775 trees are infested. Infestations on the Bridger-Teton National Forest, WY, and Uinta National Forest, UT, continued to increase slightly.
Sugar pine tortrix *Choristoneura lambertiana*	Pines	Idaho	This insect, along with the pine needle sheathminer, defoliated lodgepole pine on 56,000 acres of the Targhee National Forest. Elsewhere, scattered defoliation of both lodgepole and ponderosa pines was noted.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Idaho, Nevada	Very few trees were killed by this insect. On the Toiyabe National Forest, NV, significant tree mortality occurred in several campgrounds on the Las Vegas Ranger District.
Western pine shoot borer *Eucosma sonomana*	Ponderosa pine	Idaho	Scattered infestations were noted.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, spruce, true firs, western larch	Idaho, Utah, Wyoming	Conifers on about 2.9 million acres were defoliated in 1985. Infestations expanded on the Boise, Caribou, Challis, and Sawtooth National Forests, ID; Wasatch-Cache National Forest, UT; and Bridger-Teton National Forest, WY. Defoliation remained static on the Payette, Salmon, and Targhee National Forests, ID.
Western tussock moth *Orgyia vetusta*	*Ceanothus*, willows	Idaho	Activity was insignificant in 1985.

Intermountain Region—Diseases

Intermountain Region—Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming

Disease	*Host*	*Location*	*Remarks*
STEM AND BRANCH DISEASES			
Aspen trunk rot Phellinus tremulae	Aspen	Idaho, Nevada, Utah, Wyoming	Evidence of infection may be found in most aspen stands throughout the Region.
Comandra blister rust Cronartium comandrae	Lodgepole pine, ponderosa pine	Idaho, Utah, Wyoming	This rust occurs infrequently on lodgepole pine. Three planted ponderosa pine stands infected with the rust have been found in southern Idaho.
Cytospora canker Valsa sordida [Cytospora chrysosperma]	Aspen	Idaho, Nevada, Utah, Wyoming	Cankers are common on aspen throughout the Region, causing branch, top, and entire tree mortality.
Dasyscyphus canker Dasyscyphus sp.	Lodgepole pine, ponderosa pine	Idaho	This weak pathogen occasionally causes branch and top-kill of sapling-sized pine, generally those stressed by other agents.
Dwarf mistletoes Arceuthobium spp.	Douglas-fir, Jeffrey pine, lodgepole pine, ponderosa pine, western larch	Idaho, Nevada, Utah, Wyoming	These are the most widespread, frequently observed pests in the Intermountain Region, infesting over 3 million acres. Annual losses exceed 30 million cubic feet.
Powell limb rust Peridermium filamentosum	Ponderosa pine	Utah	Infection was detected in stands on the Dixie National Forest. Demonstration areas have been established with Utah State University to evaluate a damage rating system.
Red ring rot Phellinus pini	Douglas-fir, pines, spruce, true firs, western larch	Idaho, Utah, Wyoming	Infection is widespread on most conifer species. In some stands, up to 50 percent of the volume may be affected.
Rust-red stringy rot Echinodontium tinctorium	Grand fir, subalpine fir, white fir	Idaho, Nevada	Infection is common in old-growth stands of true firs.
Stalactiform blister rust Cronartium coleosporioides	*Lodgepole pine*	Idaho, Utah, Wyoming	*The fungus is widespread throughout the* host type in Idaho. Very heavy infection levels occur in localized areas.

Intermountain Region—Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming—Continued

Disease	Host	Location	Remarks
Western gall rust *Endocronartium harknessii*	Lodgepole pine, ponderosa pine	Idaho, Utah, Wyoming	The rust occurs throughout the host types, but the disease is only regarded as a problem in young stands where infections girdle or cull potential stem growth.
ROOT DISEASES			
Annosus root disease *Heterobasidion annosum*	Douglas-fir, lodgepole pine, ponderosa pine, true firs	Idaho, Nevada, Utah, Wyoming	Detection of annosus root disease increased throughout the Region. Infection often results in mortality of young pines and Douglas-fir and in butt rot of true firs.
Armillaria root disease *Armillaria* spp.	Douglas-fir, grand fir, pines	Idaho, Utah, Wyoming	While evidence of *Armillaria* may be found throughout southern Idaho, in most instances it functions as a weak pathogen or saprophyte. In Utah, parasitic infections of *Armillaria* were found on mature lodgepole pine and Engelmann spruce killed by mountain pine beetle and spruce beetle, respectively.
Black stain root disease *Ceratocystis wageneri* [*Verticicladiella wageneri*]	Pinyon Pine	Idaho, Nevada, Utah	This disease was found for the first time in Idaho's pinyon pine/juniper stands in the Albion Mountains near Utah. Confirmation by culturing is pending. New areas of infection were also detected on the Humboldt and Toiyabe National Forests, NV, and on the Manti-LaSal National Forest, UT.
Schweinitzii butt rot *Phaeolus schweinitzii*	Douglas-fir, ponderosa pine	Idaho	Decay is common in old-growth forests, especially those having a fire or logging history. The fungus is often found associated with other root diseases and and bark beetles.

Intermountain Region—Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming—Continued

Disease	Host	Location	Remarks
Tomentosus root rot *Inonotus tomentosus*	Douglas-fir, spruce, subalpine fir	Idaho, Utah	Decay is often found in southern Idaho, frequently in conjuction with rot caused by *P. schweinitzii*. The fungus was found killing suppressed seedling-sized Douglas-fir in the Stoddard Creek Campground, Targhee National Forest, ID. In Utah, this disease was detected in several additional areas on the Dixie National Forest, where the fungus has been found surviving in stumps for at least 20 years.
FOLIAGE DISEASES			
Dothistroma needle blight *Mycosphaerella pini* [*Dothistroma septospora* (=*Dothistroma pini*)]	Ponderosa pine	Idaho	Severe defoliation and occasional seedling mortality continued in the only confirmed area of infection of this fungus: the confluence of the Middle Fork of the Payette River and Lightening Creek.
Douglas-fir needle cast *Rhabdocline pseudotsugae*	Douglas-fir	Idaho	Epidemic infection, in conjunction with western spruce budworm feeding, caused severe defoliation and mortality to all size classes of trees on the Targhee National Forest. Light to moderate disease incidence was found elsewhere.
Elytroderma disease *Elytroderma deformans*	Ponderosa pine	Idaho	Epidemic incidence of the disease was noted throughout the host type in southern Idaho.
Fir broom rust *Melampsorella caryophyllacearum*	Subalpine fir	Idaho, Utah, Wyoming	The disease occurs scattered throughout the host type, but infections approaching 95 percent incidence have been noted in stands south of Twin Falls, ID, on the Sawtooth National Forest.
Fir needle cast *Lirula* spp.	Subalpine fir, grand fir	Idaho	Infection was noted in several drainages on the Council Ranger District, Payette National Forest.
Larch needle cast *Meria laricis*	Western larch	Idaho	Incidence and severity of infection in the host type on the Boise and Payette National Forests appear to be increasing after several years of very low incidence.

Intermountain Region—Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming—Continued

Disease	Host	Location	Remarks
Marssonina blight *Marssonina populi*	Aspen	Idaho, Utah, Wyoming	Scattered incidence of light to moderate intensity was noted throughout the host type. Severe defoliation associated with aspen leaf miner activity was noted on the Targhee National Forest, ID. In Utah, severe defoliation was noted on the Uinta and Wasatch-Cache National Forests.
Needle cast of lodgepole pine *Lophodermella concolor*	Lodgepole pine	Idaho	Moderate to severe infection was noted in drainage bottoms on the Boise and Payette National Forests and in the Sawtooth National Recreation Area.
Needle rust of fir *Pucciniastrum* spp.	True firs	Idaho	Infection remained at light levels on firs.
Needle rust of pinyon pine *Coleosporium crowellii*	Pinyon pine	Nevada	Severe infection was noted on the Humboldt and Toiyabe National Forests. The epidemic was correlated with above normal precipitation during the past two growing seasons.
Septoria leaf spot *Septoria* sp.	Aspen	Idaho	This fungus was found causing moderate defoliation of aspen.
Spruce broom rust *Chrysomyxa arctostaphyli*	Engelmann spruce	Idaho, Utah, Wyoming	The perennial brooms occur throughout the host type. In some areas, numerous brooms may be found on individual trees.
Western pine-aster rust *Coleosporium asterum*	Lodgepole pine	Idaho, Utah	Occasional infections of moderate severity were noted throughout southern Idaho and on the Ashley National Forest, Utah.
VASCULAR WILTS			
Dutch elm disease *Ceratocystis ulmi*	*Ulmus* spp.	Idaho, Utah	Thirty-eight trees out of a population of around 2,200 elms were infected and subsequently removed in Boise, ID.
NURSERY DISEASES			
Frost damage	Douglas-fir, Engelmann spruce, western larch	Idaho	A hard, late April frost killed terminal buds on thousands of 2-0 Douglas-fir, Engelmann spruce, and western larch at the Lucky Peak Forest Nursery.

Intermountain Region—Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming—Continued

Disease	Host	Location	Remarks
ABIOTIC			
Frost damage	Engelmann spruce	Utah, Wyoming	Several consecutive nights of below freezing temperatures during late June killed new shoots on high elevation spruce from Togwotee Pass in Wyoming to the Aquarius Plateau in southern Utah.
Hail damage	Ponderosa pine	Idaho	Hail caused branch flagging of young pine in a 50-acre plantation 10 miles northeast of Burgdorf, ID.
Heat defoliation	Douglas-fir, true firs, spruce	Idaho	Subnormal precipitation, compounded by above average temperatures in the winter, spring, and summer, resulted in discoloration and premature loss of old-growth needles in July and early August.
Winter damage	Lodgepole pine, ponderosa pine, true firs	Idaho	Red-brown foliage was much in evidence early in the year on saplings on the Boise, Payette, and Targhee National Forests.

Pacific Southwest Region—Insects

Pacific Southwest Region—Status of insects in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia

Insect	Host	Location	Remarks
A tip borer	Mahogany	Federated States of Micronesia	Seedlings damaged in nurseries on Ponape in the Eastern Caroline Islands.
A western spruce budworm *Choristoneura carnana californica*	Douglas-fir	Northern California	The infestation in Trinity and Shasta Counties remained at 130,000 acres; 88,000 acres were treated. The condition of the infested area was much improved 6 weeks later.
Chinese rose beetle *Adoretus sinicus*	Polynesian chestnut	Northern Mariana Islands	The beetle caused defoliation on Saipan in the Marpi Commonwealth Forest.
Coconut beetle *Bronthispa* sp.	Coconut	Guam	The coconut beetle damages spikes before they emerge, causing irregularly formed fronds. In cases where the beetle reaches the bud, bacteria will act on the feces and cause rot. This will, in turn, severely stunt the tree or cause mortality in younger coconuts.
Coconut scale *Aspidiotus destructor*	Avocado, coconut	Guam	The scale is common and especially damaging along Marine Drive in Padre Palomo Park.
Douglas-fir tussock moth *Orgyia pseudotsugata*	White fir	Central and northern California	In 1985, activity continued at about the same or slightly higher levels: four early instar larvae per 1,000 square inches of foliage at 16 of 41 plots, but only one late instar larva per 1,000 square inches for the same areas. Although not visible from the air, light feeding damage to new foliage was observed at 12 locations in the central Sierra Nevadas. There was a slight decrease in the percentage of plots averaging 20 or more moths per trap; however, 4 percent of the plots had traps with catches of more than 55 moths per trap, which was the highest level in 7 consecutive years of monitoring.

Pacific Southwest Region—Status of insects in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia—Continued

Insect	Host	Location	Remarks
Fir engraver *Scolytus ventralis*	Firs	California	Activity was evident at several locations in the central Sierra Nevada Mountains (Madera, Fresno, and Alpine Counties). Increased white fir mortality was also apparent in the Lake Tahoe Basin.
Fruit piercing moth *Eudocima fullonia*	Citrus, guava	Northern Mariana Islands	Severe damage to fruit of citrus and guava as well as some damage to banana, mango, starfruit, soursop, eggplant, and tomato.
Fruittree leafroller *Archips argyrospila*	California black oak, other hardwoods	Southern California	Activity declined to scattered locations of light defoliation near Lake Arrowhead, San Bernardino County. Moderate to heavy defoliation covered about 3,000 acres between Camp Seeley and Silverwood Lake.
Gypsy moth *Lymantria dispar*	Hardwoods, ornamentals	California	Egg masses or pupal cases were found on three properties, and 28 male adults were trapped in 10 counties. These 1985 figures were only slightly higher than the 25 male adults and two properties in 1984. Only two sites, Fremont (Alameda County) and Felton (Santa Cruz County), were treated to eradicate gypsy moth. (Five sites were treated in 1984.)
Jeffrey pine beetle *Dendroctonus jeffreyi*	Jeffrey pine	California	Mortality from this bark beetle occurred in the Lake Tahoe Basin (El Dorado County, CA, and Douglas County, NV) and near Truckee, Nevada County. Activity levels were down somewhat from 1984.
Jeffrey pine needleminer *Coleotechnites* sp.	Jeffrey pine	Southern California	The infestation in southern California declined to 1,000 acres of light defoliation in San Bernardino County. In northern California, however, an infestation near Portola, Plumas County, expanded considerably to 25,000 acres.

Pacific Southwest Region—Status of insects in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia—Continued

Insect	Host	Location	Remarks
Jumping plant-lice *Heteropsylla* sp.	Leucaena	Guam, Hawaii, Northern Mariana Islands	Recently introduced on Guam, this insect is now prevalent in the central part of the island and has spread north to Anderson. The most affected area is at Naval Station, where lush stands of leucaena were turned into brown, bare trees. In Hawaii, this 1984 introduction continues to be a problem of leguminous trees, expecially leucaena species. A new introduction to the Northern Mariana Islands in 1985 caused extensive damage to *Leucaena leucocephala*, which is common throughout the Marianas. The introduced *Leucaena* varieties are only minimally affected.
Lodgepole needleminer *Coleotechnites milleri*	Lodgepole pine	Yosemite National Park	Larval surveys showed the population of the chronic outbreak in Tuolumne Meadows area, Yosemite National Park, to be at its lowest level in over two decades. However, the mountain pine beetle is now attacking trees weakened by previous lodgepole needleminer defoliation and causing extensive mortality.
Melon fly *Dacus cucurbitae*	Avocado, citrus, figs, mango	Northern Mariana Islands	Population has slowly increased on Rota since it was reintroduced in 1981. USDA Agricultural Research Service is conducting a male annihilation pilot test on Rota.
Modoc budworm *Choristoneura retiniana*	White fir	Northern California	The Modoc budworm caused slight to heavy defoliation of white fir over 50,000 acres in the Warner Mountains and the Manzanita Mountain area of Modoc County. In some stands, all of the 1985 foliage and many of the buds were damaged. Top dieback is likely in some trees because of the cumulative effect of this defoliation and the moderate to heavy defoliation caused by the white fir needleminer in these same areas.

Pacific Southwest Region—Status of insects in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia—Continued

Insect	Host	Location	Remarks
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, ponderosa pine, sugar pine	Central and northern California	The mountain pine beetle killed numerous lodgepole pines over 15,000 to 20,000 acres at Tuolumne Meadows, Yosemite National Park, which had been defoliated for several years by the lodgepole needleminer. Lodgepole pines were also killed in Alpine and Madera Counties. The mountain pine beetle, along with other bark beetles, also caused mortality of ponderosa pine in Modoc County and lodgepole pine at the Sierra Summit Ski Area, Fresno County.
Pacific oak twig girdler *Agrilus angelicus*	Live oaks	Southern California	The twig girdler was associated with extensive branch and twig dieback of live oaks in Santa Barbara and San Luis Obispo Counties. Subnormal precipitation may have been responsible for increased activity.
Pine engravers *Ips* spp.	Pines	California	Pine engravers were primarily associated with attacks by other bark beetles in Fresno, Napa, Alpine and Siskiyou Counties. However, the creation of early-season logging slash led to pine mortality at locations in Lassen and Shasta Counties. Attacks on ornamental pines were quite common and appeared to be associated with the dry spring of 1985.
Poinciana looper *Pericyma cruegeri*	Flame tree	Guam, Northern Mariana Islands	In some parts of Guam, trees were totally defoliated by this looper. The trees recovered, but some dieback of twigs and small stems did occur. On Rota, Northern Mariana Islands, the annual population buildup from September to November continued to severely affect host trees.

Pacific Southwest Region—Status of insects in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia—Continued

Insect	Host	Location	Remarks
Scarab beetle *Serica anthracina*	Douglas-fir, ponderosa pine	Northern California	Adults defoliated about 33 percent of the newly planted Douglas-fir seedlings in a 12-acre progeny test plantation near Foresthill (Placer County). Scarab larvae killed newly planted ponderosa pine seedlings in scattered areas on McCloud Flat (Siskiyou County). Vegetation management appears to be the key to preventing further damage.
Spiraling whitefly *Aleurodicus dispersus*	Fruit trees, ornamentals, shade trees	Northern Mariana Islands	Biological control agents were introduced in 1983, but infestation remained moderate to heavy on Saipan and Rota.
Sulfur butterfly *Eurema hecabe*	Albizia	Northern Mariana Islands	Moderate defoliation of albizia in mixed forest as well as in the Saipan biomass plantation.
Tangantangan mealybug *Nipaecoccus vastator*	*Leucaena* sp.; fruit trees, ornamentals, shade trees	Guam, Northern Mariana Islands	Has a great influence on the appearance of Guam's leucaena stands. Endemic on Saipan, Tinian, and Rota.
Tent caterpillar *Malacosoma* sp.	Bitterbrush	Northern and eastern California	The 20,000- to 25,000-acre outbreak in Modoc County subsided in the spring of 1985, but substantial bitterbrush mortality resulted, particularly to 50- to 70-year-old decadent plants. The infestation in Inyo and Mono Counties continued over about 1,000 acres.
Western pine beetle *Dendroctonus brevicomis*	Coulter pine, ponderosa pine	California	Tree killing by this bark beetle was confined to localized areas scattered throughout California. Overstocking, logging disturbance, root disease, and pruning were associated with the beetle activity.

Pacific Southwest Region--Status of insects in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia--Continued

Insect	Host	Location	Remarks
Western pine shoot borer *Eucosma sonomana*	Ponderosa pine	Northern California	Fifty percent leader mortality of 15- to 20-year-old ponderosa pine was reported from a 60-acre plantation of mixed species in Siskiyou County. Occasional dead terminals occurred in 5- to 10-foot ponderosa pine in a progeny test plantation in the same county. The combination of western pine shoot borer and stress caused by dry spring weather appeared to be responsible. Both leader mortality and stunted growth caused concern about progeny test results.
Western yellowjacket *Vespula pensylvanica*	Pollinators and other insects; small forest animals; man	Hawaii	Introduced in 1978, this insect remains a threat to pollinators, native insects, and other small forest animals.
White fir needleminer *Epinotia meritana*	White fir	Northeastern California	This insect caused moderate to heavy defoliation over 10,000 acres that are also infested by the Modoc budworm. The cumulative effect will be top dieback in some trees.

Pacific Southwest Region—Diseases

Pacific Southwest Region—Status of diseases in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Bacterial canker *Xanthomonas* sp.	Citrus	Guam, Northern Marisna Islands	This disease is common on the citrus trees in Guam. Stems and twigs of citrus growing in the wild are affected. Similar blotches on leaves and stems are found on some forest trees also and may be of the same pathogenic origin.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, pines, true firs	California	Dwarf mistletoes infect conifers on 2.2 million acres of commercial forest land in California and are associated with the deaths of some 312,500 trees annually. Suppression projects were carried out in pine stands on the Sequoia and Plumas National Forests and in campgrounds on the Lake Tahoe Basin Management Unit and in Sequoia and Kings Canyon National Parks.
True mistletoes *Phoradendron* spp.	Oaks, sycamores, cottonwoods, other native and introduced hardwoods	Central and southern California	Infection is widespread in many high-use recreation areas.
White fir mistletoe *Phoradendron bolleanum*	White fir	Southern California	Infestations are severe in some white fir stands in National Forests in southern California.
White pine blister rust *Cronartium ribicola*	Sugar pine	Central and northern California	New infections were found on private lands in Mendocino County, at Latour State Forest and Blodgett Experimental Forest, on the Tahoe and Sierra National Forests, and in Sequoia and Kings Canyon National Parks.
ROOT DISEASES			
Armosus root disease *Heterobasidion annosum*	Conifers	California	One of the principal root diseases of pines and true firs in California, annually destroying some 19 million cubic feet of timber. In recreation forests, armosus root disease has been associated with tree failures, property damage, and injury to forest visitors.

Pacific Southwest Region—Status of diseases in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia—Continued

Disease	Host	Location	Remarks
Black stain root disease *Ceratocystis wageneri* [*Verticicladiella wageneri*]	Douglas-fir, pines	Central and northern California	Black stain was reported killing ponderosa pines on the Modoc National Forest and infecting Douglas-fir at McArthur-Burney Falls State Park.
Flame tree root disease *Phellinus noxius*	Flame tree	Guam, Northern Mariana Islands	The fungus attacks the lower portion of the stem, and its fruiting body is usually found at ground level. Disease also noted on other leguminous species, both in gardens and in forests. Causes some site-specific mortality on Rota, but is less host-specific and more scattered on Saipan.
Laminated root rot *Phellinus weirii*	Douglas-fir	Northern California	Its known range is confined to a few sites in Humboldt County.
Port-Orford-cedar root disease *Phytophthora lateralis*	Port-Orford-cedar	Northern California	The disease is still confined to the Smith River watershed.
FOLIAGE DISEASES			
Dothistroma needle blight *Mycosphaerella pini* [*Dothistroma septospora* (=*Dothistroma pini*)]	Monterey pine	Hawaii: islands of Kauai and Maui	
Elytroderma disease *Elytroderma deformans*	Jeffrey pine, ponderosa pine	California	Widespread, but no increase in severity; new infections were reported on the Lassen and Sequoia National Forests.
Needle casts of true fir *Lirula abietis-concoloris* *Virgella robusta*	White fir	Central and northern California	These fungi caused low levels of defoliation throughout the Sierra Nevada.
Pine needle rust *Coleosporium* sp.	Singleleaf pinyon pine	Southern California	Reported near Holcomb Valley on the San Bernardino National Forest.
NURSERY DISEASES			
Fusarium oxysporum	Sugar pine	Northern California	Pathogen caused a hypocotyl rot at the Placerville Nursery, resulting in a 6-8 percent loss of 1-0 stock.

Pacific Southwest Region—Status of diseases in California, Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and the Federated States of Micronesia--Continued

Disease	Host	Location	Remarks
Phoma blight *Phoma eupyrena*	Douglas-fir, red fir	Northern California	Low disease incidence in 1985 at the Humboldt Nursery was thought to be due to lower than normal rainfall.
Sirococcus tip blight *Sirococcus strobilinus*	Jeffrey pine, ponderosa pine, Sitka spruce	Northern California	Fungus caused minor losses of 1-0 Sitka spruce and 2-0 ponderosa and Jeffrey pines at the Humboldt Nursery.
ABIOTIC			
Air pollution effects	Jeffrey pine, ponderosa pine	Central and southern California	Slight to moderate ozone injury was present from southern California north to the Tahoe National Forest in the central Sierra Nevada. Levels of ozone injury generally declined in severity from south to north. Over the last 2 years, injury to pines in trend plots on the Sierra National Forest remained unchanged at a slight to moderate level.
OTHER			
Cadang-cadang, or yellow mottle viral decline	Coconut	Guam	This decline is potentially serious as coconut is the predominant vegetation and essential to the islanders' daily lives. Fronds of affected trees turn yellow, and trees gradually die. As yet, no control is known.
Needle loss	Lodgepole pine	Sierra Nevada	Unusually heavy needle loss was noted over a 300-mile range from the Lassen to the Sierra National Forests. Pines were unaffected on dry sites or over 7,000 feet elevation. No insect or disease pests were found to explain this phenomenon.
Phytophthora dieback *Phytophthora palmivora*	Ifil (*Intsia bijuga*) and *Eleocarpus joga*	Guam	This pathogen also causes bud rot, leaf drop, and wilt in coconut and palms. It was reported 2 years ago, and its level of infestation has not increased since then.

Pacific Northwest Region—Insects

Pacific Northwest Region—Status of insects in Oregon and Washington

Insect	Host	Location	Remarks
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Oregon, Washington	Douglas-fir beetle damage was up east of the Cascade Range: losses in Douglas-fir occurred on 10,670 acres (245,730 cubic feet). However, current damage levels are still far below what they were in the 1970's. The greatest damage in 1985 was on the Wallowa-Whitman National Forest in the Snake River National Recreation Area. West of the Cascades, losses decreased significantly. Although damage was reported on 17,720 acres in 1985 compared with 11,000 acres in 1984, volume loss fell from 2.2 million cubic feet in 1984 to 1.2 million cubic feet in 1985.
Douglas-fir bud moth *Zeiraphera hesperiana*	Douglas-fir	Oregon	Light to heavy defoliation was reported on 99,860 acres of mature Dougas-fir. Most of the defoliation was on the Siuslaw National Forest and adjoining State, private, and Bureau of Land Management lands. Smaller areas of defoliation occurred on the Willamette National Forest. This is the first reported defoliation caused by this insect since the mid-1960's.
Fir engraver *Scolytus ventralis*	True firs	Oregon, Washington	A substantial increase in fir engraver activity was noted in Oregon and Washington. Most of the fir engraver damage occurred on sites infected with either laminated root rot, armillaria root disease, or annosus root disease, diseases which weaken true firs, making them susceptible to beetle attacks. Total losses occurred on 11,470 acres (198,020 cubic feet) as compared to 4,080 acres (79,500 cubic feet) in 1984.

Pacific Northwest Region—Status of insects in Oregon and Washington—Continued

Insect	Host	Location	Remarks
Gypsy moth *Lymantria dispar*	Conifers, various hardwoods	Oregon, Washington	Adult trap catches increased in Washington from 161 in 1984 to 175 in 1985. An eradication project was conducted in Bellingham, WA, utilizing the inherited sterility technique. In Oregon, adult trap catches were over 19,000 in 1984 but 1,537 in 1985. An eradication project using *B.t.* was conducted in Lane County on 227,000 acres. A 200,000-acre eradication project is proposed for 1986.
Modoc budworm *Choristoneura retiniana*	Douglas-fir, true firs	Southern Oregon	Modoc budworm defoliation increased in southern Oregon in true fir stands on the Fremont and Winema National Forests. Acres of visible defoliation increased from 483,630 in 1984 to 503,400 in 1985. Results of the fall 1985 egg mass survey indicate continued defoliation in 1986.
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, ponderosa pine, western white pine, other pines	Oregon, Washington	In Washington, losses continued at about the same level. In Oregon, losses have intensified on the Deschutes, Fremont, and Winema National Forests in Oregon. Losses decreased on the Wallowa-Whitman, Malheur, and Umatilla National Forests, primarily because the most suitable host trees have already been killed. The 1985 beetle losses occurred on 1.3 million acres (49.6 million cubic feet) of lodgepole pine; 188,000 acres (3.8 million cubic feet) of ponderosa pine; 19,930 acres (814,350 cubic feet) of western white pine; and about 680 acres of various other pines. Intense losses are expected to continue in south-central Oregon and north-central Washington and to decrease elsewhere.
Pine engraver *Ips* sp.	Ponderosa pine	Oregon, Washington	Pine engraver activity increased to 2,720 acres. Most of the activity was on the Ochoco National Forest.

Pacific Northwest Region—Status of insects in Oregon and Washington—Continued

Insect	Host	Location	Remarks
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Oregon, Washington	Spruce beetle activity in Engelmann spruce stands in Oregon and Washington was very low this year. Losses occurred on 1,500 acres (18,300 cubic feet). A major outbreak is developing on the Wallowa-Whitman National Forest near Halfway, OR.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Oregon, Washington	Tree mortality caused by the western pine beetle increased in Oregon and Washington from 780,600 cubic feet in 1984 to 4.9 million cubic feet in 1985. Greatest losses occurred on the Deschutes National Forest.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir Engelmann spruce, true firs, western larch	Oregon, Washington	In the Pacific Northwest Region, visible defoliation caused by the western spruce budworm increased from 3.1 million acres in 1984 to 5.0 million acres in 1985. In Oregon, budworm continued to increase on the Malheur, Wallowa-Whitman, Mt. Hood, Deschutes, Ochoco, and Umatilla National Forests; on the Warm Springs Indian Reservation; and on intermingled State and private lands. In Washington, the size of the budworm infestation on the Okanogan National Forest and adjacent State and private lands increased in 1985. Defoliation discovered on the Wenatchee National Forest in 1984 expanded in 1985. Results of the fall 1985 egg mass survey indicate continued defoliation in 1986. In 1985, 40,000 acres were treated with *B.t.* on the Malheur National Forest.

Pacific Northwest Region—Diseases

Pacific Northwest Region--Status of diseases in Oregon and Washington

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Dwarf mistletoes *Arceuthobium* spp.	Various conifers	Oregon, Washington	As stand management intensifies, losses due to this group of disease-causing organisms are declining. Dwarf mistletoes caused an estimated loss of 132 million cubic feet of timber in Oregon and Washington in 1985. Programs for handheld programmable calculators are being used to project reductions in yield and perform economic analyses for dwarf mistletoe-infected lodgepole pine in central Oregon.
Stem decay	Various conifers	Oregon, Washington	Stem decay fungi still consume enormous volumes of wood. Most losses occur in younger stands as wounding of residual trees during stand entries both activates dormant infections and creates excellent infection courts. Programs for handheld calculators have been developed to estimate percentages of infection and decay in white and grand fir understories, two of the most defective species in the Region.
White pine blister rust *Cronartium ribicola*	Sugar pine, western white pine	Oregon, Washington	Annual losses of western white and sugar pines from blister rust in Oregon and Washington are estimated to be 15 million cubic feet. Additional training and followup on use of handheld programmable calculator programs for predicting infection hazard occurred during 1985.
ROOT DISEASES	Various conifers	Oregon, Washington	Root diseases are among the most serious pest problems in Oregon and Washington forests. The incidence of root disease is increasing, often in direct response to human activity. Annual losses to root diseases on all ownerships are estimated at over 130 million cubic feet.

Pacific Northwest Region—Status of diseases in Oregon and Washington—Continued

Disease	Host	Location	Remarks
Armosus root disease *Heterobasidion annosum*	Western hemlock, white fir	Oregon, Washington	Armosus root disease is responsible for extensive losses in many partial-cut white fir stands in southern and eastern Oregon. Most loss is due to outright tree mortality. Evidence points to extensive infection throughout eastern Oregon and Washington. Losses in western hemlock stands can be minimized by short (100-year) rotations and wound prevention.
Armillaria root disease *Armillaria spp.*	Various conifers	Oregon, Washington	The most serious losses to this disease occur east of the Cascades. Losses west of the Cascades are usually confined to stressed stands, for example, off-site plantings. Direct control through stump and root removal is being practiced in severely infected stands in eastern Washington.
Black stain root disease *Ceratocystis wageneri* [*Verticicladiella wageneri*]	Douglas-fir	Oregon, Washington	In southwestern Oregon, this is by far the most commonly encountered disease in Douglas-fir plantations. It appears to be especially damaging where disturbances have occurred, especially in roadside Douglas-firs cut back by mechanical choppers. Losses are also greater on tractor-logged sites, which have greater soil compaction, than on cable-logged sites.
Laminated root rot *Phellinus weirii*	Douglas-fir, grand fir, white fir	Oregon, Washington	Laminated root rot is estimated to have removed about 5 percent of the Douglas-fir type west of the Cascades from full production. The total acreage infested may be closer to 10 percent of the Douglas-fir. Damage is also severe in some grand and white fir stands with true fir overstory.
Port-Orford-cedar root disease *Phytophthora lateralis*	Port-Orford-cedar	Southwestern Oregon	Port-Orford-cedar root disease continues to cause widespread mortality of Port-Orford-cedar in southwestern Oregon.

Pacific Northwest Region—Status of diseases in Oregon and Washington—Continued

Disease	Host	Location	Remarks
FOLIAGE DISEASES			
Dothistroma needle blight *Mycosphaerella pini* [*Dothistroma septospora* (=*Dothistroma pini*)]	Douglas-fir, lodgepole pine, ponderosa pine	Oregon, Washington	The incidence of several foliage diseases was reduced from the 1984 level.
Douglas-fir needle cast *Rhabdocline pseudotsugae*			
Elytroderma disease *Elytroderma deformans*			
NURSERY DISEASES			
Douglas-fir canker diseases *Phoma eupyrena* *Fusarium roseum* *Botrytis cinerea* *Phomopsis* spp.	Douglas-fir	Oregon, Washington	Damage is scattered, with less than 1 percent of crop affected in most nurseries. Fungicide applications are helpful when cankers are above ground and not covered with soil collars.
Fusarium root and hypocotyl rots *Fusarium oxysporum*	Various conifers	Oregon, Washington	Scattered losses for most species; continued heavy mortality in sugar pine.
Larch needle cast *Meria laricis*	Western larch	Washington	Dry weather and fungicide treatments resulted in little infection or defoliation during 1985.
Phytophthora root rot *Phytophthora* spp.	Douglas-fir, other conifers	Oregon, Washington	Unusually dry weather throughout summer, fall, and winter caused disease severity to be lower in 1985. Seedbed seedling damage is confined primarily to low, poorly drained areas of nursery beds.

Southern Region—Insects

Southern Region—Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands

Insect	Host	Location	Remarks
Bagworm *Thyridopteryx ephemeraeformis*	Eastern redcedar, loblolly pine, Virginia pine, white pine	Georgia, North Carolina, South Carolina, Tennessee, Virginia	High populations and widespread defoliation in localized areas.
Balsam woolly adelgid *Adelges piceae*	Fraser fir	North Carolina, Tennessee, Virginia	Continued to cause significant mortality throughout the range of Fraser fir in the southern Appalachians, except on Mt. Rogers, Virginia. However, the outbreak has spread throughout Cabin Ridge and Wilburn Ridge in the Mt. Rogers National Recreation Area.
Black turpentine beetle *Dendroctonus terebrans*	Southern pines	Regionwide	Drought stress and late spring wildfires predisposed many forest stands to moderate losses.
Coneworms *Dioryctria amatella* *Dioryctria clarioralis* *Dioryctria disclusa* *Dioryctria merkeli*	Loblolly pine	Regionwide	Populations of *D. disclusa* and *D. merkeli* continued to increase across the South as evidenced by pheromone trap catches. Despite the increasing *D. disclusa* populations, losses caused by this species have been minimized with accurately timed pesticide applications. Certain treated orchards sustained significant losses caused by *D. merkeli*. Losses of over 3,000 bushels of cones have been reported from individual orchards. *D. amatella* and *D. clarioralis* continued to cause low to moderate damage across the South.
Eastern tent caterpillar *Malacosoma americanum*	Black cherry, other Rosaceae	Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia	High population levels and widespread defoliation of individual trees throughout each State.

Southern Region—Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Insect	Host	Location	Remarks
Fall webworm *Hyphantria cunea*	Various hardwoods	Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia	Populations continued at high levels. Widespread defoliation reported in late summer.
Forest tent caterpillar *Malacosoma disstria*	Tupelo gum, other hardwoods	Alabama, Louisiana, North Carolina, South Carolina	Moderate to heavy defoliation in localized areas of the coastal area of North and South Carolina. Partial to complete defoliation occurred on 441,000 acres in south Louisiana.
Fruittree leafroller *Archips argyrospila*	Baldcypress	Louisiana	Noticeable defoliation (entire crowns turn red) was restricted to 15,000 acres in Atchafalaya Basin. Light defoliation on an additional 40,000 acres.
Grasshoppers *Melanoplus* sp.	Dogwood, red oak, hickory	Tennessee	Localized heavy defoliation in Cumberland County.
Gypsy moth *Lymantria dispar*	Various hardwoods	North Carolina, South Carolina, Tennessee, Virginia	The northern tier of counties in Virginia were generally infested. The quarantine line has been extended to the south and now includes the northern half of Madison County east to Stafford County west to Page County and the northern one-fourth of Accomack County. Defoliation in Virginia this year amounted to 5,200 acres. Isolated infestations are present in all four States.
Hickory bark beetle *Scolytus quadrispinosus*	Hickory	Tennessee	Combined with hickory decline, the hickory bark beetle caused scattered tree mortality in middle and east Tennessee.
Introduced pine sawfly *Diprion similis*	Eastern white pine	North Carolina, Tennessee, Virginia	Populations continued at low levels in all three States.
Larch sawfly *Pristiphora erichsonii*	Larch	North Carolina	Populations continued at low levels, causing light defoliation on a few trees in Buncombe County.

Southern Region—Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Insect	Host	Location	Remarks
Loblolly pine sawfly *Neodiprion taedae linearis*	Loblolly pine	Arkansas, Louisiana, Mississippi, Tennessee, Virginia	Moderate defoliation occurred in the western-middle part of Tennessee; light defoliation in localized areas of Virginia. Populations reduced in Louisiana and Arkansas. In Mississippi, scattered defoliation occurred over 87,000 acres in Copiah, Hines, Rankin, and Simpson Counties.
Locust leafminer *Odontota dorsalis*	Black locust	Kentucky, North Carolina, Tennessee, Virginia	Scattered moderate to heavy defoliation.
Looper complex Linden looper *Erannis tiliaria* Eastern oak looper *Phigalia titea* Fall cankerworm *Alsophila pometaria*	Oaks	Virginia	Populations were at very low levels, with only localized areas of light defoliation.
Maple petiole borer *Caulocampus acericaulis*	Sugar maple	Tennessee	In many parts of Davidson County, the wind severed the bored-out leaf petioles, and trees were prematurely defoliated.
Nantucket pine tip moth *Rhyacionia frustrana*	Loblolly pine, shortleaf pine, Virginia pine	Regionwide	Moderate populations occurred throughout all States. Some severe damage was observed in Virginia pine Christmas tree plantations.
Periodical cicada *Magicicada septendecim*	Various hardwoods	Arkansas, North Carolina, Tennessee	Caused localized severe flagging of various hardwood trees.
Pine colaspis *Colaspis pini*	Loblolly pine	Mississippi	Losses reported in pine regeneration in Copiah County.
Pine engravers *Ips* spp.	Southern pines	Regionwide	Activity locally high in drought-stressed areas. High levels of mortality also occurred where the trees were severely stressed by wildfire. Tree mortality due to *Ips* was also present in seed orchards in Florida and North Carolina.

Southern Region--Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Insect	Host	Location	Remarks
Pine leaf adelgid *Pineus pinifoliae*	Red spruce, white pine	North Carolina	Galls found on spruce, the alternate host, and flagging of white pine branches occurred in the summer. Damage to white pine heavy where alternate host present.
Pine webworm *Tetralopha robustella*	Loblolly pine, shortleaf pine	Arkansas	Populations increased in 1-year-old pine plantations.
Reproduction weevils Pales weevil *Hylobius pales* Pitch-eating weevil *Pachylobius picivorus*	Southern pines	Arkansas, Florida, North Carolina	Losses reported in regeneration areas in southwest Arkansas, Florida, and in Davidson County, NC.
Scales *Toumeyella* spp.	Southern pines	Regionwide	The sporadic outbreaks of tortoise scales declined, but these species continued to cause damage to shortleaf pine orchards.
Pseudophilippia quaintancii	Southern pines	Alabama	Outbreaks have declined in the Southeast. Only one seed orchard in southern Alabama reported significant population levels.
Seedbugs *Leptoglossus corculus* *Tetyra bipunctata*	Southern pines	Florida, North Carolina, South Carolina	Moderate populations caused scattered seed losses.
Slash pine thrips *Gnophothrips fuscus*	Slash pine	Florida	Minimal seed and cone losses reported.
Southern pine beetle *Dendroctonus frontalis*	Southern pines	Regionwide	This was a record year for activity in Texas and Louisiana. Texas had 16,600 infestations or spots, but by late 1985, beetle activity seemed to drop off. Louisiana reported 22,000 spots. The epidemic seemed to be moving east. Activity increased in Alabama (1,772 spots), Arkansas (435 spots), Georgia (744 spots), Mississippi (5,606 spots), and South Carolina (2,760 spots). North Carolina also reported 400 spots. Even Florida had southern pine beetle activity and reported 11 spots.

Southern Region—Status of insects in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Insect	Host	Location	Remarks
Texas leafcutting ant *Atta texana*	Southern pines	Louisiana, Texas	Serious losses continued in pine plantations on deep sandy soils.
Twolined chestnut borer *Agrilus bilineatus*	Oaks	Kentucky, Tennessee	Activity was found in declining oak stands scattered throughout Kentucky and in middle and east Tennessee.
Variable oakleaf caterpillar *Heterocampa manteo*	Oak	Mississippi	Localized defoliation in Itawamba County.
Walkingstick *Diapheromera femorata*	Oaks	Oklahoma	Localized defoliation in Le Flore County.
Whitemarked tussock moth *Orgyia leucostigma*	Laurel oak, live oak, southern red oak, water oak, various ornamentals	North Carolina, South Carolina	Caused scattered, localized problems in coastal areas.
White pine aphid *Cinara strobi*	Eastern white pine	North Carolina, Virginia	Locally heavy populations caused branch dieback.
White pine cone beetle *Conophthorus coniperda*	Eastern white pine	North Carolina, Tennessee, Virginia	Increased activity, with damage ranging from 40 to 100 percent. Large population buildup expected for 1986.
White pine weevil *Pissodes strobi*	Eastern white pine	Tennessee	Beginning to be a problem in Christmas tree plantations in northeastern Tennessee.
Yellow-poplar weevil *Odontopus calceatus*	Yellow-poplar	Tennessee	Leaf browning and defoliation of yellow-poplars occurred in Anderson, Campbell, Knox, Overton, and Union Counties. Yellow-poplar scattered over 40,000 acres were more than 50 percent defoliated.

Southern Region—Diseases

Southern Region—Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Canker rot *Inonotus hispidus* *Strumella coryneoidea*	Oaks	Alabama, Georgia, Mississippi, North Carolina	Is a serious problem in localized areas.
Chestnut blight *Cryphonectria parasitica* (=*Endothia parasitica*)	Native chestnuts, exotic chestnuts	Throughout host ranges	Damage continued, as did research efforts into reducing the virulence of the disease-causing organism.
Fusiform rust *Cronartium quercuum* f. sp. *fusiforme*	Loblolly pine, slash pine	Regionwide, except Kentucky, Puerto Rico, Tennessee, Virgin Islands	Continued as the most serious disease of southern pines. Fusiform rust stem infections occur on at least 10 percent of the pines growing on about 15 million acres. Annual losses in FLorida, Georgia, North Carolina, South Carolina, and Virginia are estimated at $35.2 million.
Hypoxylon canker *Hypoxylon atropunctatum*	Oaks	Regionwide	Common on stressed or weakened trees in low-quality forest sites and urban environments.
Nectria canker *Nectria* sp.	Black walnut, yellow-poplar	Kentucky, Tennessee	Common on selected sites, causing serious degrade losses.
Pitch canker *Fusarium moniliforme* var. *subglutinans*	Southern pines, especially loblolly and slash pines	Alabama, Arkansas, Florida, Louisiana, Mississippi, North Carolina	Endemic in slash pine plantations in Florida and in loblolly pine plantations on peat soils in eastern North Carolina.
Slime flux *Erwinia* spp. and other bacteria	Oaks	Kentucky, North Carolina, South Carolina, Tennessee	Unusually high incidence following the 1984 December freeze.
Stem canker *Fusarium solani*	Teak	Puerto Rico, Virgin Islands	Ubiquitous in plantations. Incidence averaged 25 percent of the stems. Considerable lumber degrade results because termites infest the cankers.

Southern Region—Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Disease	Host	Location	Remarks
Stem decay Basidiomycetes	All species, especially hardwoods	Regionwide	Continued as a serious problem. More common in fire-damaged stands.
White pine blister rust Cronartium ribicola	Eastern white pine	North Carolina, Virginia	Found above 3,000 feet and was only serious in localized areas
ROOT DISEASES			
Armosus root disease Heterobasidion annosum	Cedar, southern pines	Regionwide	Armosus was the most serious root disease in the South. Damage reported in thinned stands in Alabama, Florida, Louisiana, Mississippi, North Carolina, and South Carolina. Current surveys show the disease may cause a major growth loss, as well as mortality on high-hazard sites. Disease hazard soils occur on about 20 percent of the South's land base.
Littleleaf disease complex of site factors, Phytophthora cinnamomi, and Pythium spp.	Loblolly pine, shortleaf pine	Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee	Worst in Piedmont in natural stands growing on eroded, heavy clay soils. Surveys show considerable growth loss on older loblolly pines growing on high-risk sites. Low incidence elsewhere throughout the South.
Root decay Armillaria spp. Inonotus circinatus Phaeolus schweinitzii Ganoderma lucidum	Most conifers, hardwoods	Regionwide	Common in forest stands and urban environments, especially where stresses are severe or trees overmature. Ganoderma lucidum reported on mahogany in Florida for the first time.
Root decline Verticicladiella procera	Eastern white pine, loblolly pine	Georgia, North Carolina, Tennessee, Virginia	In North Carolina, disease may be causing top dieback in loblolly plantations. Losses continued in white pine stands in the southern Appalachians. Disease appeared more common on stressed trees. Was a serious problem in Christmas tree plantations.

Southern Region—Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Disease	Host	Location	Remarks
FOLIAGE DISEASES			
Actinopelte leaf spot *Actinopelte dryina*	Oak	Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia	Caused leaf spots and premature leaf drop. Probably associated with drought.
Anthracnose *Gnomonia* sp. *Discula* sp. (=*Gloeosporium* sp.) *Kabatiella* sp. (=*Gloeosporium* sp.) *Apiognomonia* sp. (=*Gnomoni* sp.)	Hardwoods, especially ash, dogwood, maple, sycamore, and walnut	Regionwide	Premature defoliation and shoot dieback may result. Incidence high again this year because of wet spring, but impact was low.
Brown spot *Mycosphaerella dearnessii* (=*Scirrhia acicola*)	Longleaf pine	Throughout host range	Severe locally, but can be controlled by prescribed fire and genetic resistance.
Conifer-aspen rust *Melampsora medusae*	Poplars	Throughout host range	Caused minor damage to mature trees in localized areas.
~~Dothistroma needle blight~~ *Mycosphaerella pini* [*Dothistroma septospora* (=*Dothistroma pini*)]	~~Austrian~~ pine	Oklahoma	Still common in urban areas and shelterbelts. Primarily esthetic damage.
Needle casts of pine *Lophodermium* spp. *Ploioderma* spp.	Pines	Regionwide	Widespread because of wet spring; but impact slight, except in Christmas tree plantings in Georgia and South Carolina.
Oak leaf blister *Taphrina caerulescens*	Red oaks	Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Texas	Scattered but not severe. Unsightly on urban trees.
Pine needle rust *Coleosporium* spp.	Pines	Regionwide	Premature needle cast may result; low impact.

Southern Region—Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Disease	Host	Location	Remarks
VASCULAR WILTS			
Dutch elm disease *Ceratocystis ulmi*	Elms	Throughout host range	Reported on scattered urban trees in North Carolina, Tennessee, and Louisiana.
Elm phloem necrosis (elm yellows), mycoplasmalike organism	Elms	Alabama	Continued to kill scattered urban trees.
Mimosa wilt *Fusarium oxysporum* f. sp. *perniciosum*	Mimosa	Throughout host range	Urban trees killed.
Oak wilt *Ceratocystis fagacearum*	Oaks	Arkansas, Kentucky, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia	Active infection centers increased in Virginia and Texas. Low incidence elsewhere.
Pinewood nematode *Bursaphelenchus xylophilus*	Japanese black pine	Georgia	Killing ornamental trees.
Sycamore leaf scorch xylem-limited bacteria	Sycamore	Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia	Widespread late in growing season.
NURSERY DISEASES			
Anthracnose *Gloeosporium* sp.	Yellow-poplar	Mississippi	Low-level, persistent problem.
Cylindrocladium root rot *Cylindrocladium* spp.	2-0 white pine	North Carolina	Caused 10 percent or more mortality in one field, involving over 100,000 seedlings, Edwards Nursery, Morganton.
	1-0 yellow-poplar, 1-0 black walnut		Caused 50 percent or more mortality in localized seedling beds.

Southern Region—Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Disease	Host	Location	Remarks
Damping-off *Fusarium* spp. *Phytophthora* spp. *Pythium* spp. *Rhizoctonia* spp.	Many conifers and hardwoods	Regionwide	Spotty, high incidence of postemergence damping-off in one South Carolina nursery; reduced seedbed density below desired levels. Chronic losses elsewhere.
Fusarium root rot *Fusarium* spp.	Loblolly pine	Arkansas, Texas	Persisted as a minor problem in poorly drained beds.
Fusiform rust *Cronartium quercuum* f. sp. *fusiforme*	Loblolly pine, slash pine	Regionwide, except Kentucky, Tennessee	Good control achieved with fungicide treatments.
Rhizoctonia needle blight *Rhizoctonia* sp.	Eastern white pine, loblolly pine, longleaf pine	Florida, North Carolina, South Carolina, Virginia	Caused widespread damping-off, stem and bud mortality, and foliage blight. Seemed to be more common in cool, wet areas.
Tip blight *Phoma* sp.	Loblolly pine	Florida, Georgia, Kentucky, Louisiana, North Carolina, South Carolina, Tennessee, Texas	Forking and brushing widespread east of the Mississippi River.
White grubs	2-0 Fraser fir	North Carolina	Caused 10 percent or more mortality in localized seedlings beds, Linville Nursery, Crossnore.
SEED ORCHARD DISEASES			
Pinewood nematode *Bursaphelenchus xylophilus*	Sand pine, slash pine	Florida	Killing trees in a sand pine orchard; incidental in a slash pine orchard.

Southern Region—Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Disease	Host	Location	Remarks
Pitch canker *Fusarium moniliforme* var. *subglutinans*	Southern pines, especially slash pine and loblolly pine	Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Texas	Orchards have sustained sporadic damage based on clone of host.
Root diseases *Armillaria* spp. *Armillaria tabescens* (=*Clitocybe tabescens*) *Heterobasidion annosum* *Inonotus circinatus* *Verticicladiella procera*	Eastern white pine, shortleaf pine	North Carolina, South Carolina	Low incidence, but chronic occurrence of symptoms and mortality in seed orchards.
Fusarium solani	Yellow-poplar	North Carolina	Severe infection has caused the loss of some clones. About one-third of the orchard is infected.
ABIOTIC Air pollution effects Ozone	Eastern white pine, other conifers	Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia	Tip burn damage to about 23 percent of white pine stands.
Unknown	Mixed hardwoods, conifers	North Carolina	Localized injury has occurred near a chemical waste disposal incinerator.
Storm damage	Many species	Alabama, Louisiana, North Carolina, Virginia	Old trees along the coast were most severely affected. Hurricanes Bob, Danny, Elena and Juan all caused severe local tree damage primarily in coastal areas.

Southern Region—Status of diseases in Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia; and Puerto Rico and the Virgin Islands—Continued

Disease	Host	Location	Remarks
Winter damage	Many species	Regionwide	Tree mortality, branch dieback, and stem injuries resulted from record December 1984 cold. Ornamentals planted outside their natural range were most severely affected.
OTHER			
Oak decline	Oaks, especially the red oak group and chestnut oak	Regionwide	Severe decline and mortality have been widely reported for the past 5 years. The problem is most severe on upland sites on shallow soil over rock. Drought is a major contributing factor. Decline severity varies considerably from site to site.
Spruce/fir mortality	Fraser fir, red spruce	North Carolina, Tennessee, Virginia	The balsam woolly adelgid has been killing Fraser fir since it was introduced into that spruce/fir area more than 25 years ago. Recently, atmospheric deposition has been suggested as a possible contributing factor to reported spruce mortality and decline.
Tree decline	Many hardwoods, conifers	Regionwide, especially Georgia, North Carolina, South Carolina, Tennessee	Severe drought conditions have caused widespread growth reduction, dieback, and mortality, especially in older age classes. Recreation and urban areas are hardest hit. Other contributing factors in these high-use areas include soil compaction, vandalism to trees, and storm damage.

Eastern Region and Northeastern Area—Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin

Insect	Host	Location	Remarks
Basswood thrips *Sericothrips tiliae*	Basswood	Minnesota, Wisconsin	In Minnesota, basswood defoliation varied from light to moderate on 500,000 acres of mixed northern hardwoods. Scattered mortality of understory trees is beginning to occur. In Wisconsin, light to moderate defoliation continued to occur in Sawyer, Rusk, and Washburn Counties. Activity is increasing in the northeastern part of the State.
Bruce spanworm *Operophtera bruceata*	American beech, oak, sugar maple	Maine, Michigan, New Hampshire, Pennsylvania, Vermont, Wisconsin	Populations of spanworm were evident in hardwood stands in central and northern Maine. But although light defoliation was seen on the ground, no defoliation was seen during aerial surveys. In the Upper Peninsula of Michigan, where this insect occurred with the fall cankerworm, small scattered areas of complete defoliation were noted in mixed hardwoods. In New Hampshire, populations caused some understory defoliation, but no defoliation was visible from the air. Populations are expected to remain low in 1986. In Pennsylvania, oak and maple defoliation was evident on 3,000 acres in Potter County—down from the 5,000 acres reported in 1984. A further decrease is expected in 1986. In Vermont, light defoliation was detected in Orleans and Washington Counties. In Wisconsin, an increase in moderate to heavy defoliation occurred on 30,000 acres in Forest, Florence, and Menominee Counties.
Fall cankerworm *Alsophila pometaria*	Hardwoods	Michigan, New York, Pennsylvania, West Virgina, Wisconsin	Nearly 100,000 acres of mixed hardwoods, predominantly oak and maple, were defoliated areawide this year. Michigan and Wisconsin reported building populations and heavy defoliation on almost 35,000 acres. In Pennsylvania, 65,000 acres were affected as populations continued to increase. Populations were down in New York and West Virginia.

Eastern Region and Northeastern Area—Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin—Continued

Insect	Host	Location	Remarks
Forest tent caterpillar Malacosoma disstria	Aspen, other hardwoods	Illinois, Maine, Michigan, Minnesota, New York, Pennsylvania, Vermont	Forest tent caterpillar populations were generally small. Minnesota reported about 15,500 acres of aspen defoliation in an area defoliated for 9 consecutive years. In Illinois, a 1,000-acre infestation that began in 1984 appeared to be declining. Maine, New York, and Vermont continued to evaluate poplar and sugar maple mortality caused by the 1978–82 outbreak.
Gypsy moth Lymantria dispar	Oaks, other hardwoods	Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, Wisconsin	Moderate to heavy defoliation increased from 1 million acres in 1984 to 1.7 million acres in 1985—about a 70 percent increase. Pennsylvania, Massachusetts, and New Jersey recorded the most defoliation (1.2 million acres). Defoliation in Connecticut and Maryland also increased. In Michigan, defoliation increased to 18,460 acres. West Virginia and Maine reported continued expansion, but on a smaller scale. Defoliation decreased in Rhode Island (133,920 acres in 1985) and in Delaware (5,144 acres in 1985). No defoliation was visible during aerial surveys in Vermont and New Hampshire. Iowa, Illinois, Indiana, Minnesota, Missouri, and Wisconsin continued their detection and eradication programs. These States report male moth captures that range from 6 to 126 moths. Losses reported by Delaware, Maryland, and New Jersey totaled 44.5 million board feet of sawtimber and 46,300 cords of wood.

Eastern Region and Northeastern Area—Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin—Continued

Insect	Host	Location	Remarks
Jack pine budworm *Choristoneura pinus*	Jack pine	Michigan, Minnesota, Wisconsin	In Michigan's Upper Peninsula, populations continued to build: 2,380 acres of severe defoliation were mapped. This figure does not reflect a decrease in activity but rather a refinement in mapping accuracy. The 100,000 acres of moderate to heavy defoliation in northern lower Michigan is a significant decrease from the 600,000 reported in 1984 and further collapse is expected. In central Minnesota, a 45,000-acre infestation continued to intensify and expand. The 200,000-acre infestation in northeastern Minnesota also expanded in 1985, but population collapse is expected in the Virginia, MN, area where the budworm has been active for 4 years. The 30,000-acre infestation in northwestern Wisconsin is expected to continue its decline, but the fate of the 7,500-acre infestation in Jackson County is uncertain.
Saddled prominent *Heterocampa guttivitta*	Hardwoods	Maine, Michigan, Vermont	Populations remained low in Maine and Vermont, but appeared to be building in Michigan. Nearly 5,000 acres were defoliated in Michigan. Partial defoliation occurred on almost three sections of hardwoods in the Upper Peninsula's Marquette County. In the Lower Peninsula, 3,300 acres on the Sleeping Bear Dunes National Seashore and nearby offshore islands were defoliated. Populations are expected to increase.

Eastern Region and Northeastern Area—Status of insects in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin—Continued

Insect	Host	Location	Remarks
Spruce budworm *Choristoneura fumiferana*	Balsam fir, spruce	Maine, Michigan, Minnesota, New Hampshire, New York, Vermont	Populations in Maine, New Hampshire, and Vermont declined for the second straight year. Maine reported 4.8 million acres infested with 1.2 million acres of moderate to severe defoliation. In 1984, Maine reported 5.5 million acres of defoliation, with 1.9 million acres of moderate to severe defoliation. An estimated 300,000 acres contain mortality of greater than 50 percent and an additional 700,000 acres contain scattered fir mortality of about 10 percent. Budworm populations in New Hampshire, New York, and Vermont are at or near endemic levels. New York reported 275 acres of light defoliation; New Hampshire and Vermont found no visible defoliation during aerial surveys. Further decline is expected. Vermont estimates spruce-fir mortality due to previous defoliation at 14,430 cords for 1985, a marked reduction from the 94,150 cords reported in 1984. In the Lake States, populations declined in the Upper Peninsula of Michigan and remained static in Minnesota and Wisconsin. Michigan, which had 93,810 acres of defoliation compared with almost 200,000 acres in 1984, expects further declines until endemic levels are reached within the next few years. Minnesota detected 307,273 acres of defoliation; nearly 260,000 acres were moderately to severely defoliated. This is a 15 percent reduction from 1984 and further declines overall are expected, even though populations in the extreme northeast will probably continue at high levels. Wisconsin reported 15,000 acres of severe defoliation.

Eastern Region and Northeastern Area—Diseases

Eastern Region and Northeastern Area—Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Beech bark disease *Cryptococcus fagisuga*; *Nectria coccinea* var. *faginata*	American beech	New England, New Jersey, New York, Ohio, Pennsylvania, West Virginia	The distribution of this disease remained essentially the same as it was in 1984. Beech mortality continued in New England, New York, Pennsylvania, and greatly increased in West Virginia.
Diplodia blight *Sphaeropsis sapinea* (=*Diplodia pinea*)	Austrian pine, jack pine, red pine, Scotch pine	Indiana, Minnesota, Missouri, Rhode Island, Wisconsin	This disease occurs throughout Indiana, Missouri, and Rhode Island, where it is a perennial problem, particularly on Austrian pine. However, incidence and damage have been lower in the past 2 years. In Minnesota, 200 acres in Roseau County along the Canadian border are severely infected, resulting in 10 percent tree mortality and 60 percent moderate to heavy branch and top mortality. In Wisconsin, 5,000 acres of red and jack pines are affected. Survey results reveal an 8 percent infection rate and 1 percent tree mortality. No major spread is expected.
European larch canker *Lachnellula willkommii*	Larch	Maine	The area of the 6,500-acre infestation is clearly defined. An estimated 1,500 acres are heavily infested with both stem and branch cankers; the remaining 5,000 acres contain only branch cankers. A slow spread into the less dense, scattered stands of larch is expected. Cooperative surveys by Maine Forest Service, the Animal and Plant Health Inspection Service, and Forest Pest Management showed that approximately 22,867 acres of larch type exist in a 30-mile-wide coastal band. State and Federal quarantines are being implemented.

Eastern Region and Northeastern Area—Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin—Continued

Disease	Host	Location	Remarks
Scleroderris canker Gremmeniella abietina	Eastern white pine, Jack pine, red pine, Scotch pine	Maine, Michigan, New York, Vermont, Wisconsin	The situation in Maine has stabilized at approximately 50 acres infected. No new sites have been found for several years, and no significant losses occurred in 1985. In Michigan, infections have been reported in association with frost pockets in Luce and Schoolcraft Counties where some mortality of 1- to 3-foot-tall trees has occurred. In New York, the area involved has not been determined, but Lewis County reported 1,500 acres of moderate infections and 500 acres of severe infections. Although the amount of infection declined in 1985, the course of the disease is uncertain. A quarantine remains in effect in New York. In a survey conducted in southern Vermont, no infected trees were found. However, the disease was found in previously uninfected areas in northern Vermont. A total of 122 plantations are known to be infected; the infected area involves 820 acres of red pine and 150 acres of Scotch pine. In Wisconsin, the disease has been reported from 11 counties. The incidence and severity appear to be remaining static.
White pine blister rust Cronartium ribicola	Eastern white pine	Maine, New York, Vermont, West Virginia	In Maine, this disease is under control on over 1.8 million acres in the Ribes eradication area. Little or no infection was found on lands that historically have had a continuing control program. In New York, the affected area is undetermined, but the disease appears to be on the increase. Vermont reports continued heavy damage causing some losses in young Christmas tree plantations. In West Virginia, almost 415,000 acres of State and private lands and an additional 145,000 acres of National Forest lands now fall within the Ribes control area.

Eastern Region and Northeastern Area—Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin—Continued

Disease	Host	Location	Remarks
VASCULAR WILTS			
Dutch elm disease *Ceratocystis ulmi*	Elm	Areawide	Losses continue in Maine where only scattered, isolated trees remain unaffected. In Missouri, the disease is widespread, affecting both forest and urban trees, but losses were down slightly from 1984. This disease is a serious problem of both forest and shade trees in West Virginia, where losses were high in 1985.
Oak wilt *Ceratocystis fagacearum*	Oaks	Indiana, Iowa, Michigan, Minnesota, Missouri, Pennsylvania, Wisconsin	Oak wilt is widespread in Indiana, Iowa, and Missouri; infection levels are low to moderate and some tree mortality occurs each year. The situation is essentially static in these States, but continued losses are expected. In southwestern Pennsylvania, losses and incidence of the disease have been decreasing over the past few years. Michigan reported infections affecting almost 1,000 acres in Grand Traverse and Roscommon Counties. A smaller area of 30 acres in the Upper Peninsula's Menominee County is also infected. In Minnesota, the Twin Cities metropolitan area and southeastern portions of the State are affected. In Wisconsin, five counties in the southern two-thirds of the State are affected. The number of epicenters in Menominee and Shawano Counties increased from 11 to 55. In Michigan, Minnesota, and Wisconsin where oak wilt is expected to continue to be a serious problem, suppression activities include sanitation, salvage, chemical root graft barriers, and vibratory plowing of root grafts.

Eastern Region and Northeastern Area—Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin—Continued

Disease	Host	Location	Remarks
ABIOTIC			
Weather-related injury	Various species	Iowa, Minnesota, Pennsylvania	April, May, and June in Iowa were the driest months on record and the State had only scattered rainfall the rest of the growing season. The seriousness of this Statewide drought cannot be determined until 1986. In northcentral Minnesota, winds damaged aspen and jack pine on 2,000 acres, causing estimated losses of 25,000 cords. In Pennsylvania, 21 tornadoes destroyed timber on 72,750 acres, causing losses estimated at $94 million. Salvage of approximately 50 percent of the damaged timber is anticipated.
OTHER			
Ash decline and mortality	Ash	Indiana, Iowa, New York, Vermont	Ash decline occurs throughout Indiana but especially in the northern third of the State. No mortality estimates are available, but the current level of decline is expected to continue in 1986. In northeastern and southwestern Iowa, seven counties are affected. Moderate infection levels seem to be increasing. In New York, 218,200 acres of moderate to heavy mortality were reported from Clinton, Jefferson, and St. Lawrence Counties. Dieback occurred Statewide. Dieback continued in Vermont and appeared to be increasing at upper elevations.
Birch decline	Paper birch, yellow birch	Michigan, New York, Vermont, Wisconsin	In Michigan, the most severe decline occurred on low, wet sites in Baraga and Iron Counties. The 1983 drought probably affected the decline. In New York, increasing decline has been reported from Lewis and Herkimer Counties. In Vermont, birch decline was more noticeable than usual, particularly in the Camel's Hump area. In northeastern Wisconsin, over 30,000 acres are affected. Twig and branch dieback, leaf wilting, and defoliation involving up to 60 percent of the tree crowns occurred.

Eastern Region and Northeastern Area—Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin—Continued

Disease	Host	Location	Remarks
Hardwood decline	Hardwoods	Iowa, New Hampshire	In Iowa, moderate to heavy decline was found for the first time on shagbark hickory in five counties. New Hampshire reported 2.5 million acres of a hardwood decline affecting several northern hardwood species; red oak, sugar maple, and birch appeared to be the most severely affected. The areas with twig dieback often coincide with past defoliation by insects, such as the Bruce spanworm, the gypsy moth, and the saddled prominent. Other areas, however, have no history of defoliation. Corings taken in Coos County showed reduced radial growth that began 6 years ago.
Larch decline and mortality	Larch	Maine, New York, Vermont	In New York, this disease has been increasing; larch have been dying for the past 5 years. Some areas now have severe mortality. In Vermont, 544 acres of primarily light mortality were mapped in the northeast during the annual aerial survey. In Maine, mortality increased as larch beetle populations associated with the decline also increased.
Maple decline and mortality	Maple	New York, Pennsylvania, Vermont	In northern New York, decline of sugar maple has been a long-term problem. Heavily tapped trees on wet sites that have been grazed by cattle may be more susceptible. Moderate to severe red maple decline occurs with increasing severity on 130,000 acres in Herkimer and Lewis Counties; severe crown thinning and some tree mortality have occurred. In northern Pennsylvania, moderate to heavy sugar maple mortality was reported on 3,356 acres. This decline is related to past insect defoliation, particularly on marginal sites. In Vermont, maple decline increased this year, especially in the northern counties. Surveys found 8,400 acres of decline, 5,000 acres of which were unrelated to forest tent caterpillar.

Eastern Region and Northeastern Area—Status of diseases in Connecticut, Delaware, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia, and Wisconsin—Continued

Disease	Host	Location	Remarks
Oak decline and mortality	Oak	Iowa, Maryland, Missouri, New York	Oak decline occurred throughout Iowa; Bremer and Lucas Counties have moderate to severe damage, probably due to dry weather. In Maryland, dieback and mortality related to various stress factors occurred on scattered oaks throughout the State. The decline in Missouri is believed to be caused by drought, followed by secondary insect and disease agents. Scattered forest and ornamental oaks were affected in 1985 following the droughts of 1980, 1983, and 1984. In New York, oak decline has followed gypsy moth defoliation wherever it occurs. Root rot diseases and bark beetle attacks are common on trees that have been heavily defoliated. Mortality can be very high, and better quality oak seems to be more vulnerable.
Spruce decline and mortality	Spruce	New Hampshire, New York, Vermont	In New York, over 5.1 million acres are presently affected by red spruce decline. Moderate to heavy mortality has occurred on 326,000 acres of spruce-fir and mixed wood types in the northern part of the State. Fewer reports of new areas were received in 1985. Red spruce decline remained common in high-elevation sites, as well as on certain well-drained, lower elevation stands. Over 168,000 acres in New Hampshire and 50,000 acres in Vermont were reported to have moderate to heavy tree mortality. Permanent spruce decline monitoring plots were established in New Hampshire, New York, and Vermont by the USDA Forest Service in cooperation with the States. Spruce beetle, eastern dwarf mistletoe, and a variety of other factors were found to be associated with the mortality.

Alaska Region—Insects

Alaska Region—Status of insects in Alaska

Insect	Host	Location	Remarks
A western spruce budworm *Choristoneura orae*	White spruce	South-central Alaska	Budworm populations increased over 1984 levels; however, only minor defoliation occurred. Decreased defoliation and lower population levels are expected in 1986 as the majority of the larvae will enter their second diapause. Defoliation was not observed in southeast or interior Alaska.
Cottonwood leaf beetle *Chrysomela walshi*	Balsam poplar, black cottonwood	Southeast and interior Alaska	Populations of cottonwood leaf beetles were substantially higher in 1985 than in previous years. Specifically, populations were high in the Mendenhall Valley (Juneau) and near Delta Junction in interior Alaska.
Engraver beetle *Ips perturbatus*	White spruce	Interior Alaska	Populations remain at endemic levels. However, a slight increase in engraver activity was noted in 1985: 1,050 acres were infested.
Hemlock sawfly *Neodiprion tsugae*	Western hemlock	Southeast Alaska	In southeast Alaska, the hemlock sawfly was the most significant forest pest in 1985, but populations and defoliated acres declined from 1984 levels. Scattered to heavy top-kill and mortality caused by the hemlock sawfly were evident on nearly 7,800 acres. An additional 9,000 acres showed light to moderate defoliation.
Large aspen tortrix *Choristoneura conflictana*	Quaking aspen	Interior Alaska	Tortrix activity decreased significantly in 1985. No defoliation was noted in south-central Alaska. However, 2,185 acres of aspen were defoliated near Fairbanks in interior Alaska.
Leaf roller *Epinotia solandriana*	Paper birch	South-central Alaska	In 1985, leaf roller populations increased to detectable levels on the Kenai Peninsula and the west side of Cook Inlet where 31,371 acres of defoliated birch were aerially detected.

Insect	Host	Location	Remarks
Spearmarked black moth *Rheumaptera hastata*	Paper birch	Interior Alaska	After 2 years of heavy and widespread defoliation, black moth populations declined rapidly. In 1985, 35,195 acres were defoliated compared with 307,089 acres in 1984. This decline conforms to the historical pattern of outbreaks, which build up and collapse quickly.
Spruce beetle *Dendroctonus rufipennis*	Sitka spruce, white spruce	South-central and southeast Alaska	Infestations covered 256,000 acres in 1985; a 40 percent decrease from acreage infested in 1984. White spruce mortality decreased on the Chugach National Forest from 54,790 acres last year to 31,621 acres in 1985. Likewise, spruce mortality decreased on the Kenai National Wildlife Refuge where 43,326 acres are infested. Spruce beetle populations in Glacier Bay National Park in southeast Alaska are still expanding; 12,200 acres are now infested. No spruce beetle activity was noted in interior Alaska.
Spruce bud midge *Rhabdophaga swainei*	Black spruce, white spruce	South-central Alaska	Bud midge damage (bud killing and deformation) has been prevalent on open grown regeneration throughout the Kenai Peninsula. In many cases, multiple leaders result.
Spruce needle aphid *Elatobium abietinum*	Sitka spruce	Prince William Sound and southeast Alaska	Spruce needle aphid populations declined in 1985, in part because of the cold weather in January throughout most of southeast Alaska.
Western blackheaded budworm *Acleris gloverana*	Western hemlock	Prince William Sound	Blackheaded budworm defoliation declined significantly in Prince William Sound: 667 acres were defoliated compared with 8,849 acres in 1984. The cool, damp spring and summer contributed to this decline. Budworm populations remained at endemic levels in southeast Alaska. Although larval numbers increased slightly in some areas, no defoliation was detected in the aerial survey.

Alaska Region—Diseases

Alaska Region—Status of diseases in Alaska

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Decay	Redcedar, Sitka spruce, western hemlock	Southeast Alaska	Wood decay continues to be one of the most important causes of volume loss in Alaskan forests. A variety of genera and species are involved. The problem is particularly acute in old-growth forests where slow growing decay fungi have ample time to cause significant losses.
Hemlock canker *Xenomeris abietis*	Western hemlock	Southeast Alaska	A canker disease killed small hemlocks and the lower crowns of large hemlocks. This disease was not found in second-growth stands, but was always found in the understory and lower branches of old trees in old-growth stands within several hundred feet of roads.
Hemlock dwarf mistletoe *Arceuthobium tsugense*	Western hemlock	Southeast Alaska	This seed-bearing parasite continued to be the most destructive disease of old-growth western hemlock. Recent studies indicate that mistletoe infection levels are much lower in young-growth stands than previously suspected.
Western gall rust *Endocronartium harknessii*	Shore pine	Southeast Alaska	This rust fungus causes perennial round galls on shore pine throughout southeast Alaska. This year a second fungus, *Nectria macrospora*, was found attacking these galls and killing limbs from the gall outward.

Disease	Host	Location	Remarks
FOLIAGE DISEASES			
Sirococcus tip blight *Sirococcus strobilinus*	Sitka spruce, western hemlock	Southeast Alaska	The incidence of this disease increased markedly throughout southeast Alaska over levels recorded in recent years, probably as a result of the cool, moist spring. The disease was most severe in unthinned, immature stands where cool, moist air stagnates.
Spruce needle cast *Lirula macrospora*	Sitka spruce	Southeast Alaska	This needle cast fungus occurred at increased levels this year, primarily on Sitka spruce in second-growth stands. *Lirula* probably infects the current year's needles, but observable symptoms do not become apparent until these needles are 1 year old.
Spruce needle rust *Chrysomyxa ledicola*	Sitka spruce, white spruce	Throughout Alaska	Spruce needle rust was more abundant throughout Alaska in 1985: 1,402 acres were infected in interior Alaska. Because only the current year's needles are attacked by this fungus, infected trees will not be greatly affected unless they receive heavy infection for several consecutive years.
OTHER			
Alaska-cedar decline	Alaska-cedar	Southeast Alaska	Alaska-cedar decline persists as one of the most important forest diseases in southeast Alaska. The patterns of tree death and apparent absence of a pathogen suggest that some form of environmental stress may be the cause of the problem. To date, over 10,000 acres of forests have been affected by Alaska-cedar decline.
Brown bear damage	Alaska-cedar	Southeast Alaska	Brown bears caused basal scars on Alaska-cedar. Approximately half of the cedars in some areas have at least one basal scar. Wood behind and adjacent to older scars is often decayed—a condition that causes substantial cull in butt logs if these stands are logged.

Alaska Region—Status of diseases in Alaska—Continued

Disease	Host	Location	Remarks
Hemlock fluting	Western hemlock	Southeast Alaska	Fluting of western hemlock is common throughout southeast Alaska and seriously downgrades logs. Most fluting occurs within half a mile of the shoreline. The cause of the fluting is unknown.
Porcupine damage	Sitka spruce, western hemlock	Southeast Alaska	Porcupine damage was noted in young stands following precommercial thinning. In some cases, 10 percent of the crop trees had been girdled and killed.

References for the common and scientific names of the insects include the publications entitled "Common Names of Insects and Related Organisms," published in 1982 by the Entomological Society of America, and two U.S. Department of Agriculture publications: "Western Forests Insects" (Miscellaneous Publication 1339; 1977) and "Insects of Eastern Forests" (Miscellaneous Publication 1426; 1985).

References for the common and scientific names of the disease-causing organisms include the compendium entitled "Common Names for Tree Diseases in the Western United States and Western Canada" by Hawksworth, Gilbertson, and Wallis (a 1985 supplement to the proceedings of the 32nd annual Western International Forest Disease Work Conference) and "Diseases of Forest and Shade Trees of the United States" by George Hepting (Agriculture Handbook 386; 1971).

Scientific names of the disease-causing organisms change as additional taxonomic studies are made. Synonyms of recently changed names are in parentheses in the tables; anamorphs are shown in brackets.

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