United States
Department of
Agriculture

Forest
Service

**Forest
Pest
Management**

Washington, DC

Forest Insect and Disease Conditions in the United States 1987

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Technical Coordinators

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Robert C. Loomis
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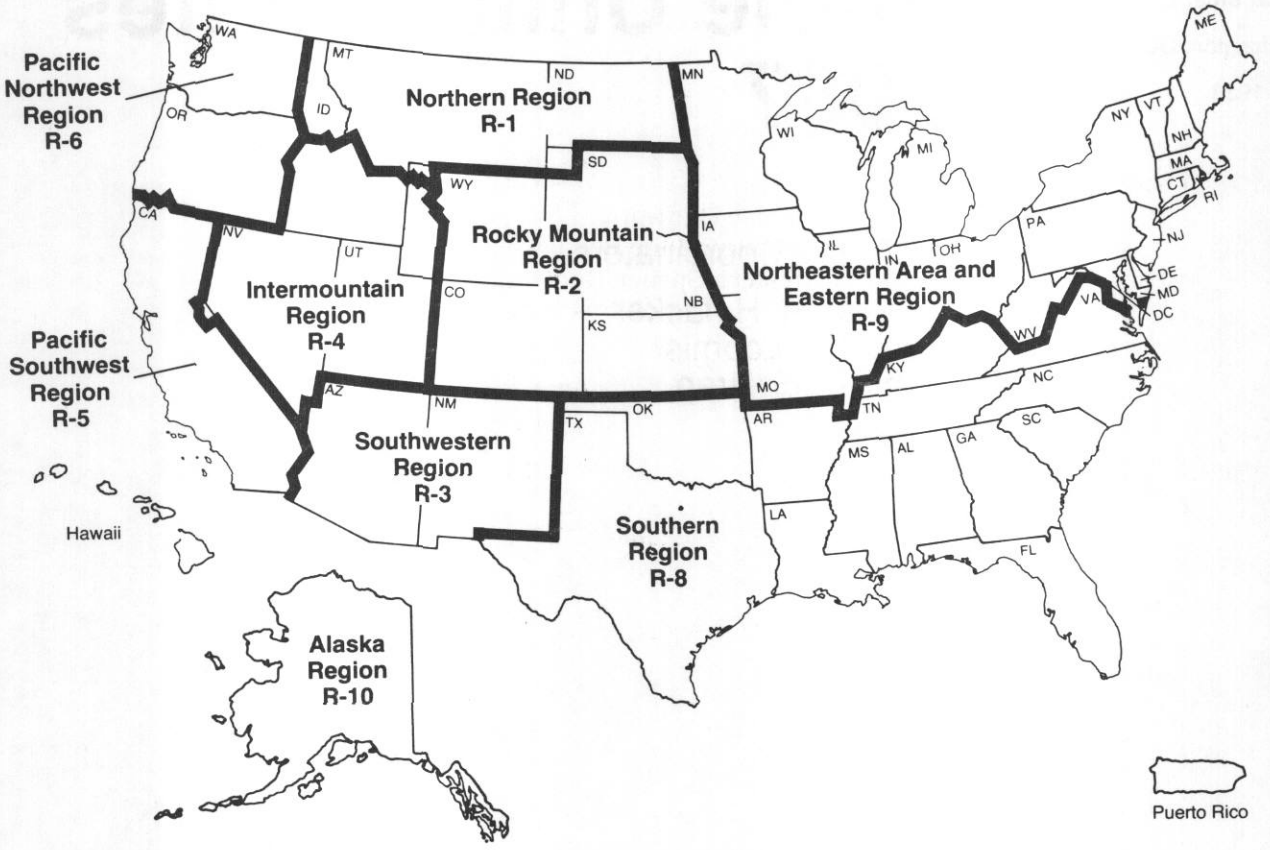
USDA Forest Service Regions and Area



Additional copies of this report are available from the Forest Service, Forest Pest Management, P.O. Box 96090, Washington, DC 20090-6090.

Cover: Image of western spruce budworm larva spinning thread.

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Forest Insect and Disease Conditions in the United States 1987

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Introduction

The 1987 conditions report provides a complete overview of forest insect and diseases in the United States.

The report is a three-part publication summarizing the current status of major insect and disease pests in the United States. Detailed information about pest conditions on all landownerships in the Forest Service Regions are arranged numerically by region—see map on page ii, with the Northern Region (Region 1) first and the Alaska Region (Region 10) last. Each Region has two tables: an insect table followed by a disease table. At the end of the report is a index of common and scientific names of insects and disease-causing organisms.

Forest Pest Management offices nationwide completed the necessary information for lands of all ownerships. This is the 37th year that Forest Pest Management, U.S. Department of Agriculture, Forest Service has published this report. Much of the report 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.

We appreciate the assistance of all State, Federal, and private cooperators who provided information for this report.

For further information about conditions in a particular State, contact the responsible Forest Pest Management staff at the following addresses:

Northern Region (R-1)
P.O. Box 7669
Missoula, MT 59807

Rocky Mountain Region (R-2)
P.O. Box 25127
Lakewood, CO 80225

Southwestern Region (R-3)
Federal Building
517 Gold Avenue, S.W.
Albuquerque, NM 87102

Intermountain Region (R-4)
Federal Building
324 25th Street
Ogden, UT 84401

Pacific Southwest Region (R-5)
630 Sansome Street
San Francisco, CA 94111

Pacific Northwest Region (R-6)
P.O. Box 3623
Portland, OR 97208

Southern Region (R-8)
1720 Peachtree Road, N.W.
Atlanta, GA 30367

Eastern Region (R-9) and
Northeastern Area
370 Reed Road
Broomall, PA 19008

Alaska Region (R-10)
201 E. 9th Avenue
Anchorage, AK 95501

Part 1
National Summary

Gypsy Moth

In 1987, the gypsy moth (*Lymantria dispar*) defoliated 1.3 million acres in the generally infested area of the Eastern United States. This is a decrease of nearly 1 million acres from 1986 and is the first decline since 1984. Most of the reduction in defoliation occurred in the New England States.

Pennsylvania was hardest hit with more than 880,000 acres of defoliation.

The gypsy moth continued its south and westward spread. Ohio was added to the list of States that have general gypsy moth infestations; several northeastern tier counties in the State are infested. The insect became more firmly entrenched in Maryland, Virginia, and West Virginia where defoliation increased significantly. Washington, DC recorded its first gypsy moth defoliation and conducted its first suppression program in 1987.

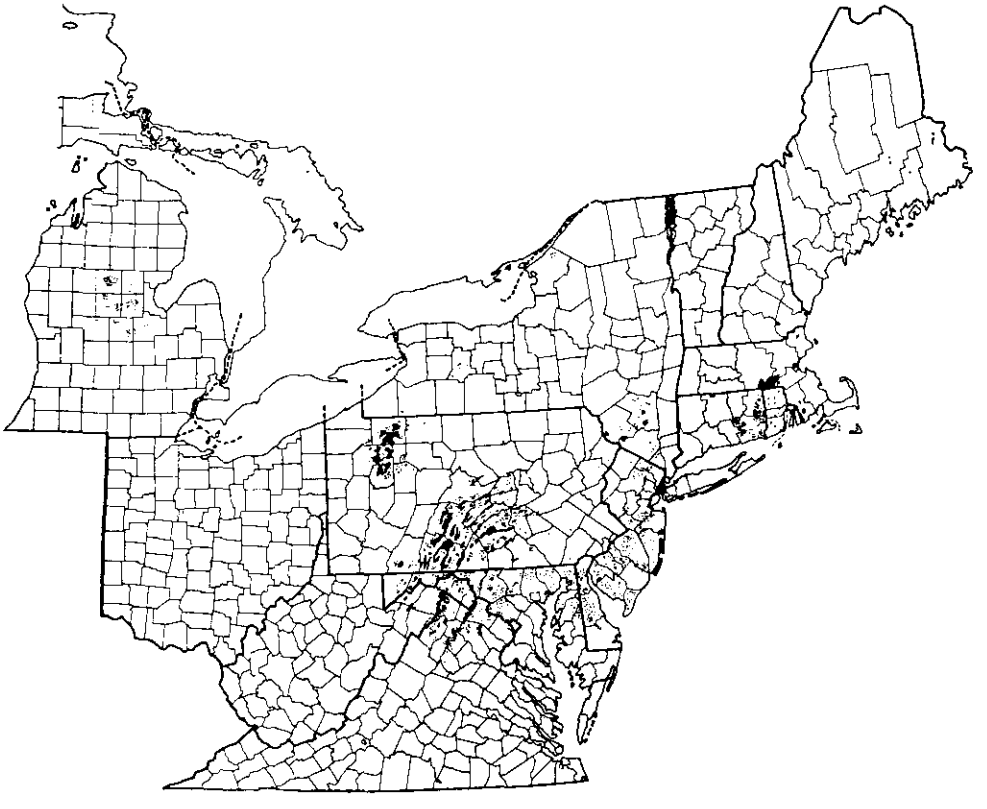
Three large, isolated infestations have been of special concern in the United States: one in Oregon, one in North Carolina, and one in Virginia.

In Oregon the gypsy moth situation continues to improve. Only 80 moths were captured Statewide in 1987; this compares with 613 moths trapped in 1986. Acres receiving eradication treatments in Oregon declined in a similar fashion: 227,000 acres received treatments in 1985, 194,000 acres in 1986, and 12,000 acres in 1987.

An isolated infestation thought to cover about 8,900 acres was treated for the first time in Clay County, North Carolina in 1987. No moths were trapped in the treatment area following the spraying, but an additional area north of the 1987 treatment was found to be infested. About 8,750 acres may be treated in Clay County in 1988.

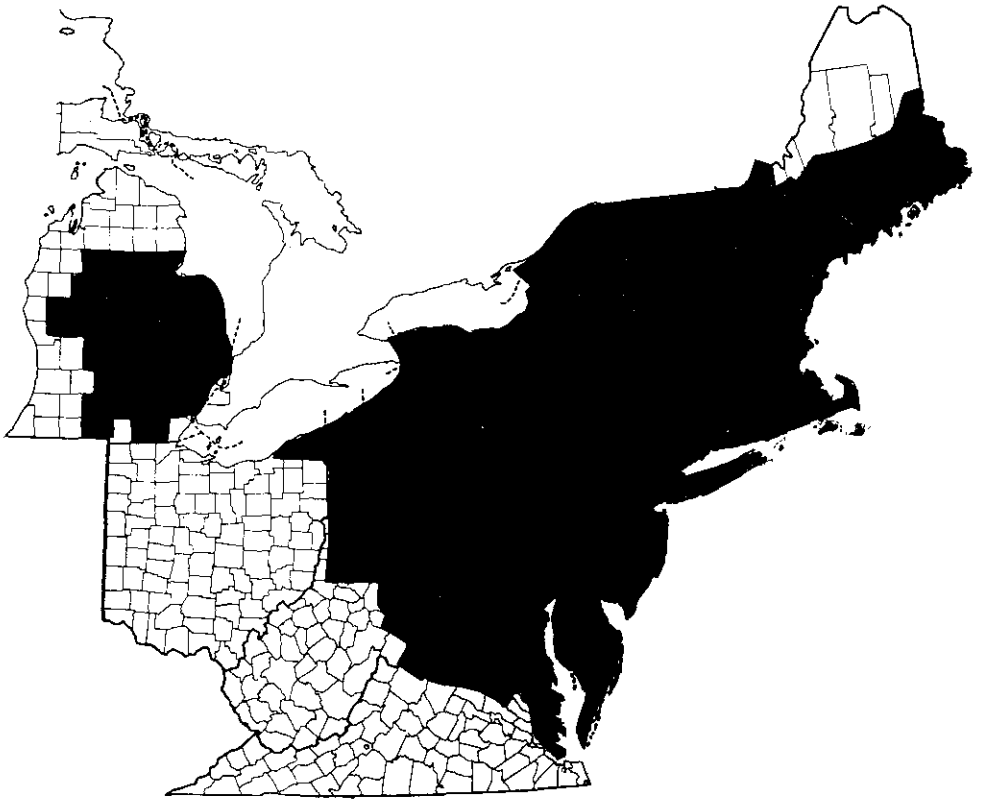
In 1986, a delineating grid of pheromone traps placed by the State of Virginia discovered an isolated infestation covering about 11,000 acres in Giles County, Virginia. Eradication treatments are being considered for 1988.

1987 Gypsy Moth Defoliation

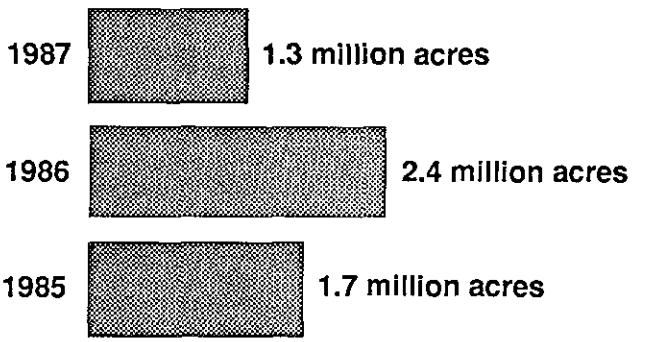


Gypsy Moth

1987 Gypsy Moth Generally Infested Area



Acres Defoliated by Gypsy Moth



Acres of Aerially Detected Defoliation Caused by the Gypsy Moth During 1986 and 1987

State	*1986*	*1987*
Connecticut	237,200	65,400
Delaware	3,100	2,500
Maine	11,600	600
Maryland	58,200	76,800
Massachusetts	343,100	28,700
Michigan	61,400	39,400
New Hampshire	0	300
New Jersey	280,300	95,100
New York	175,400	55,200
Pennsylvania	987,800	880,300
Rhode Island	219,200	5,100
Vermont	0	0
Virginia	27,330	67,700
Washington DC	0	12
West Virginia	8,300	12,600
Total	2,412,900	1,329,712

Southern Pine Beetle

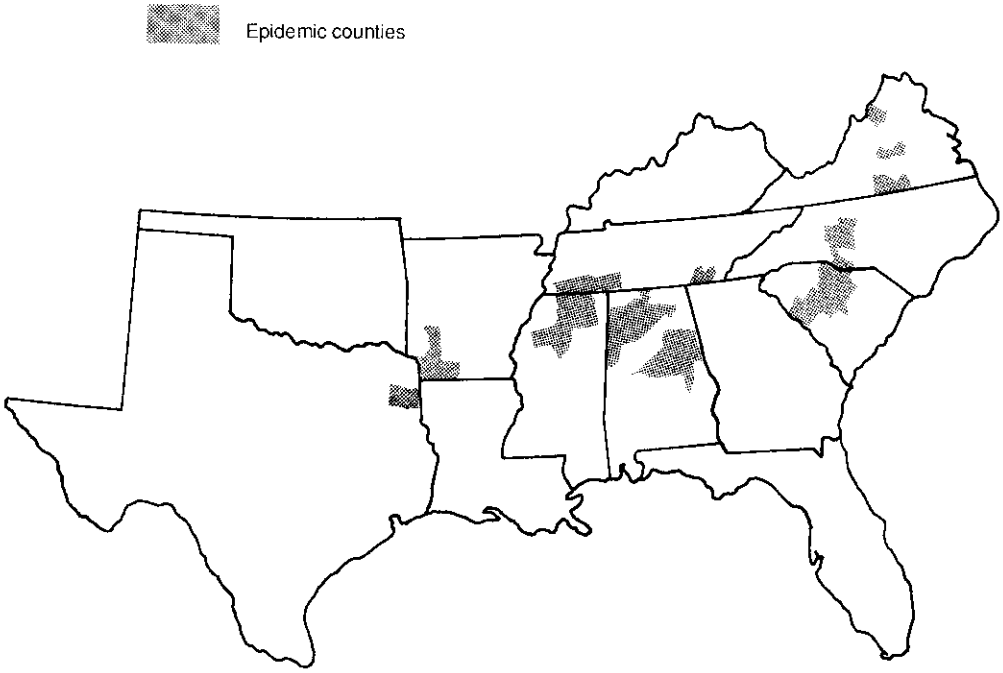
The record southern pine beetle (*Dendroctonus frontalis*) outbreak declined sharply in 1987. Across the South, the total number of spot infestations declined from more than 80,000 in 1986 to about 2,500 in 1987. The numbers of spots by State are listed on page 64.

The number of "outbreak counties" (counties with one or more multiple tree spots per 1,000 acres of host type) also decreased. Only 83 counties in 8 States were in the "outbreak" category in 1987 compared to the 165 counties in 9 States that were reported in 1986. Southern pine beetle affected acreage followed this trend with 13.8 million acres recorded in 1987 compared to 26.4 million acres reported in 1986. Alabama, Mississippi, and South Carolina had the most acreage affected.

The outlook for 1988 appears more promising as populations are generally declining. Only a few areas still anticipate a substantial number of spots to occur. A more accurate prediction will be available after the results of the spring 1988 southwide southern pine beetle pheromone trap survey.

During 1987, southern pine beetle suppression projects occurred on all 7 Ranger Districts of the National Forests in Texas, all 6 Ranger Districts of the Kisatchee National Forest, 6 Ranger Districts on the National Forests in Mississippi, 4 Ranger Districts on the National Forests in Alabama, one Ranger District on the Chattahoochee and Oconee National Forest, and in the States of Alabama, Arkansas, Louisana, Mississippi, North Carolina, Texas, and Virginia.

1987 Southern Pine Beetle Epidemic Counties



Epidemic counties shown in shaded areas

Southern Pine Beetle Outbreak Counties

Alabama: Bibb, Calhoun, Clay, Cleburne, Colbert, Coosa, Cullman, Fayette, Franklin, Lamar, Lauderdale, Lawrence, Limestone, Marion, Marshall, Morgan, Pickens, Randolph, Shelby, St. Clair, Talladega, Tallapoosa, Walker

Arkansas: Columbia, Hempstead, Lafayette, Miller, Pike

Mississippi: Alcorn, Benton, Calhoun, Carroll, Grenada, Lafayette, Lee, Marshall, Montgomery, Pontotoc, Tallahatchie, Tippah, Union, Webster, Prentiss, Yalobusha

North Carolina: Catawba, Davie, Davidson, Edgecombe, Forsyth, Randolph, Rowan, Mecklenburg, Union, Wilson, Yadkin

South Carolina: Charleston, Chester, Colleton, Dorchester, Edgefield, Fairfield, Greenwood, Kershaw, Lancaster, Lexington, McCormick, Newberry, Richland, Saluda, York

Tennessee: Bradley, Chester, Fayette, Hamilton, Hardeman, Hardin, McNairy, Wayne

Texas: Harrison

Virginia: Appomattox, Cumberland, Halifax, Mecklenburg, Rockingham

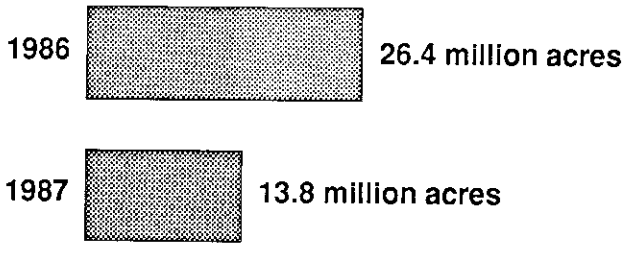
Note: A county is in outbreak status when it has one or more multiple-tree spots per 1,000 acres of host type.

Acres of Southern Pine Beetle Outbreaks During 1986 and 1987*

State	*1986*	*1987*
Alabama	7,529,300	6,034,000
Arkansas	1,372,900	774,000
Georgia	1,839,100	183,000
Florida	0	0
Kentucky	0	0
Louisana	6,431,800	376,000
Mississippi	2,383,200	1,626,000
North Carolina	343,500	555,000
Oklahoma	0	1,000
South Carolina	2,904,200	2,904,000
Tennessee	0	440,000
Texas	3,409,800	475,000
Virginia	175,100	428,000
Total	26,388,900	13,796,000

*Acres of outbreak are acres of host type in outbreak counties, that is, counties having one or more multiple-tree spots per 1,000 acres.

Southern Pine Beetle Outbreak Acres



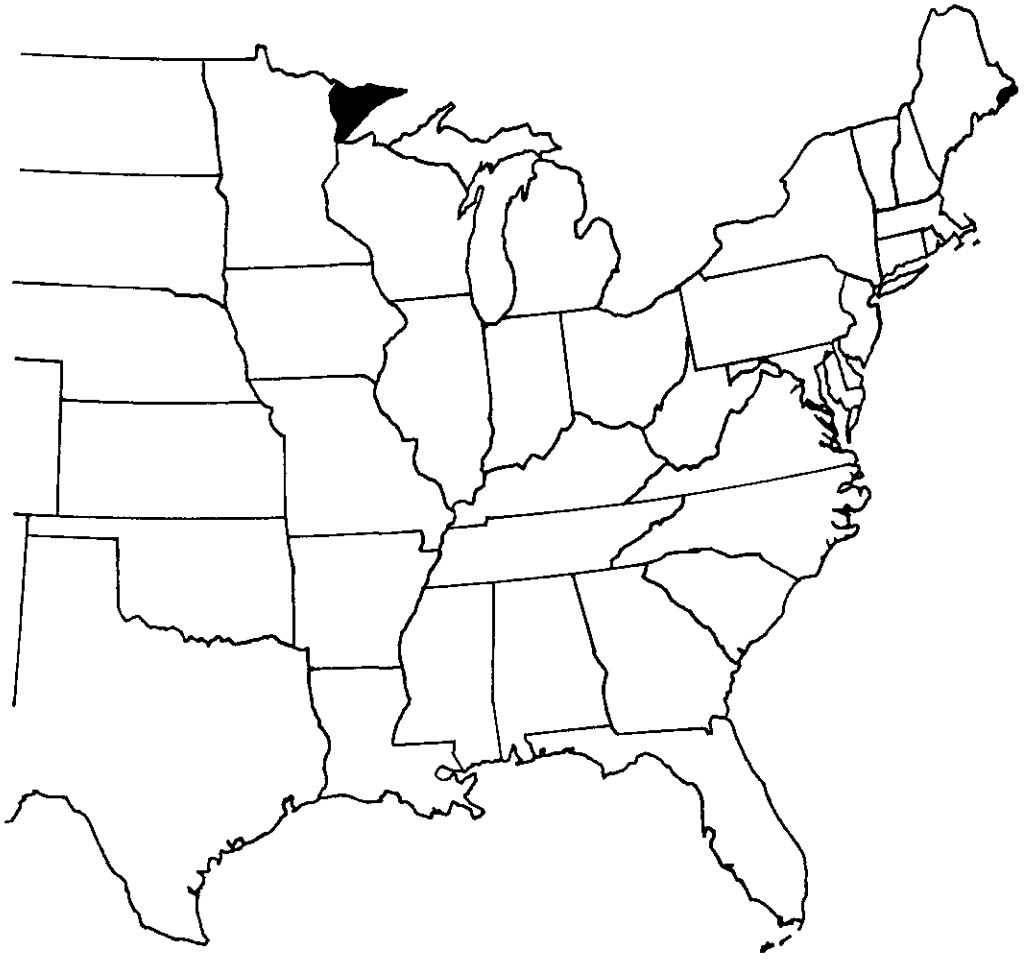
Spruce Budworm

Spruce budworm (*Choristoneura fumiferana*) populations continued their general collapse in 1987. Defoliation dropped from slightly over one million acres in 1986 to less than 700,000 acres in 1987. Minnesota was basically unchanged, with defoliation in the State dropping from 440,000 acres in 1986 to 430,000 acres in 1987. No defoliation was reported from Michigan, New York, New Hampshire, Vermont, and Wisconsin. The most significant change occurred in Maine where defoliation dropped from 600,000 acres in 1986 to 250,000 acres in 1987.

Acres of Aerially Detected Defoliation Caused by the Spruce Budworm During 1986 and 1987

State	*1986*	*1987*
Maine	600,000	250,000
Michigan	1,600	0
Minnesota	440,000	430,000
New Hampshire	0	0
New York	0	0
Vermont	0	0
Wisconsin	0	0

1987 Spruce Budworm Defoliation



Mountain Pine Beetle

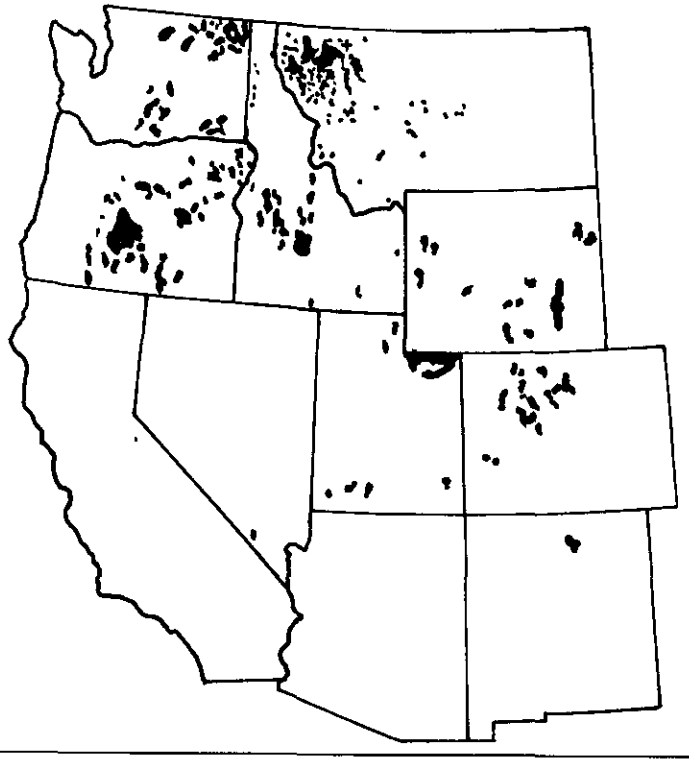
Mountain pine beetle (*Dendroctonus ponderosae*) activity declined drastically in 1987. The number of acres affected by this insect dropped below the 3 million acre mark for the first time since 1974. Only 2.5 million acres were affected in 1987, compared to 3.3 million acres in 1986.

Idaho, New Mexico and Washington were the only States that recorded increases in mountain pine beetle tree killing. Colorado, Utah and Montana experienced large decreases in their mountain pine beetle populations.

Acres of Mountain Pine Beetle Outbreaks During 1986 and 1987

State	*1986*	*1987*
Arizona	50	0
California	20,000	20,000
Colorado	159,500	2,500
Idaho	34,700	48,061
Montana	867,000	694,380
New Mexico	2,000	4,790
Oregon	1,600,000	1,400,000
South Dakota	4,640	2,340
Utah	560,400	97,400
Washington	157,000	158,000
Wyoming	44,870	14,700
Total	3,450,160	2,442,171

1987 Mountain Pine Beetle Outbreak



Western Spruce Budworm

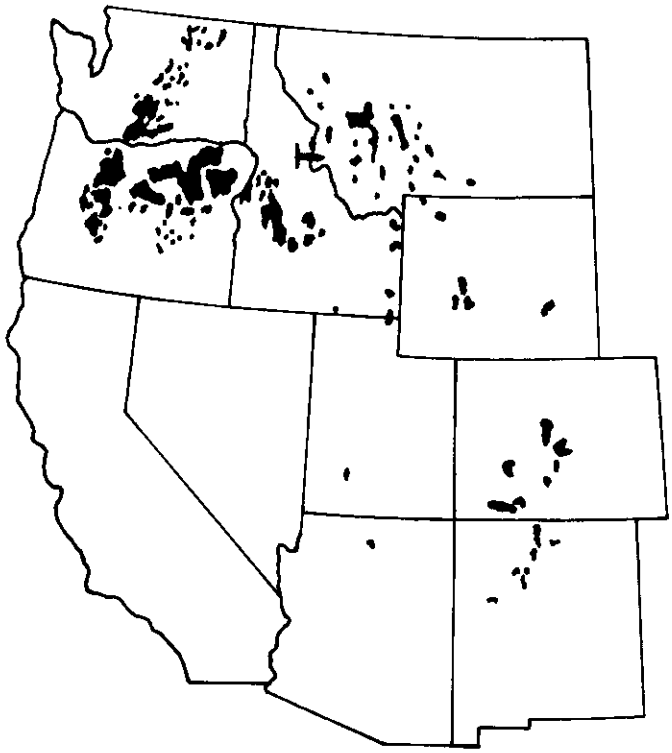
Western spruce budworm (*Choristoneura occidentalis*) defoliation declined from the record 13.2 million acres reported in 1986. In 1987 defoliation by this insect fell to 8.1 million acres: a 5.1 million acre decrease. Defoliation in Idaho and Montana dropped below the 2 million acre mark for the first time in 6 years; the decline in defoliation was especially prominent in Idaho, where defoliation went from 2.5 million acres in 1986 to a little above 800,000 acres in 1987.

Although the western spruce budworm defoliated area declined substantially in Oregon in 1987, the outbreak there is still very intense and damaging.

Acres of Aerially Detected Defoliation Caused by the Western Spruce Budworm During 1986 and 1987

State	*1986*	*1987*
Arizona	86,480	15,520
California	0	0
Colorado	1,080,000	833,000
Idaho	2,916,900	898,215
Montana	2,497,000	1,802,005
New Mexico	382,936	250,420
Oregon	5,600,000	3,700,000
Utah	95,600	37,700
Washington	400,000	400,000
Wyoming	164,500	16,265
Total	13,223,416	7,953,125

1987 Western Spruce Budworm Defoliation



Disease Conditions in the East—1987

In the Northeast, several important diseases were reported causing tree mortality and decline. Tree species affected include beech, oak, elm, ash, maple, spruce, and fir. Beech bark disease continued its spread in Pennsylvania. Increased damage from this disease was also reported in Connecticut, Massachusetts, New Hampshire, and New York. Two areawide diseases, oak wilt and Dutch elm disease, continued much as last year. Oak wilt continued at low levels except in a few areas of Wisconsin and Michigan where damage was severe enough to warrant control. Dutch elm disease, found wherever elms grow, has largely eliminated the shade tree value of this species.

Tree declines caused by interacting biotic and abiotic factors continue to be reported. Ash decline is reported from seven states and is particularly severe in Indiana. Ash yellows, caused by a mycoplasma-like organism, is thought to be an important factor in ash decline and was reported in Wisconsin for the first time. Incidence of maple decline, a particular concern to New York and New England sugarbush and woodlot owners, has changed little from last year. Oak decline was reported following drought in Michigan and gypsy moth defoliation in New York. Fir and spruce decline was reported in six states with several contributing factors suspected. Research efforts are underway

Status of Fusiform Rust During 1987*[2]

State	National Forest	Other Federal	State	Private	Total
			Acres of host type infected, by ownership		
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	86,137	58,260	62,930	1,633,218	1,840,545
Texas	36,500	1,300	1,400	461,800	501,000
Virginia	0	0	804	69,730	70,534
Total	386,229	262,451	211,332	14,392,405	15,252,417
			Percent of host type infected, by ownership*		
Florida	2	8	16	20	18
Georgia	52	49	46	58	57
North Carolina	9	17	30	32	31
South Carolina	30	45	56	40	40
Virginia	0	0	4	4	4

* Slash and loblolly pines having at least 10 percent or more of the trees infected on their main stems or within 12 inches of their main stems.

** Comparison of changes in fusiform rust incidence in North Carolina between 1974-84 showed that the disease increased in intensity and in acres affected at a rate of about 2 percent per year in the high-hazard areas, while remaining constant or declining slightly in the low-hazard areas.

***Data provided only for five states.

[2]Based on following publication: "Estimating fusiform rust losses in five southeast states," by R.L. Anderson, J.P. McClure, N. Cost, and R.J. Vehler; Southern Journal of Appl. For. *10*:237-240.

to better explain possible relationships between air pollution and spruce-fir decline.

Two other diseases of note are Scleroderris canker and dogwood anthracnose. Scleroderris canker, an introduced disease of considerable concern several years ago, remained at low levels in New York, Maine, and Vermont. Dogwood anthracnose, a disease of recent concern, has caused considerable mortality to flowering dogwood in Connecticut, New Jersey, Maryland, New York, and Pennsylvania. This disease was also found in localized areas of Maryland and West Virginia.

In the South, fusiform rust continued as the most damaging disease to southern pines, particularly loblolly and slash pine.

As in 1986, 30 percent (15.3 million acres) of all loblolly and slash pine stands were infected. These stands have at least 10 percent of their trees with a potentially lethal canker—canker on or within 12 inches of the stem.

Status of fusiform rust during 1987 is listed on page 9. These estimates from Forest Inventory Assessment (FIA) remained the same as in 1986 for each state, except South Carolina where acreage decreased approximately 29,000, a change from 48 to 40 percent infected.

For Florida, Georgia, North Carolina, South Carolina, and Virginia the overall five-state loss is estimated at about $36 million—up slightly from last year. Dollar losses by state were based on the most recent FIA data, growth projections and economic models. In 1987, volume lost to fusiform rust on all landownerships was estimated as follows:

	Volume (MCF)
Georgia	14,243.3
Florida	2,116.6
South Carolina	2,370.3
North Carolina	2,624.9
Virginia	352.7

Annosus root rot is the most serious root disease in the South. Results of recent surveys indicate this disease is causing major growth loss as well as mortality on high to medium hazard sites. High hazard sites occupy about 20 percent of the South's soils. These sites have deep sandy soils with good internal drainage.

In 1987, there were reports of a damaging dogwood anthracnose disease which caused defoliation and death over 30,000 acres in the southern Appalachians. Environmental stresses such as drought were believed to be contributing factors in predisposing the host to the pathogen. Surveys are underway to better define disease distribution, incidence and severity.

Oak wilt continued to increase in central Texas where a suppression project was proposed for 1988.

Pitch canker increased dramatically in several seed orchards throughout the South.

Disease Conditions in the West—1987

Root diseases and dwarf mistletoes remain the most damaging disease problems in the West. Root diseases are of particular concern because they are difficult to control and because they intensify from one rotation to the next. They cause tree mortality, butt rot, and growth loss as well as predispose trees to insect attack and windthrow. Recent estimates in Montana, northern Idaho, and California indicate that about 15 percent of the commercial forest land is impacted by root diseases. In Oregon and Washington, as much as 10 percent of Douglas-fir acreage west of the Cascades may be infested and could eventually be removed from full production.

The dwarf mistletoes infect most western conifers on about 22 million acres of commercial forest land. However, most of the volume lost from reduced growth and mortality is caused by only 7 of the 16 species of dwarf mistletoe: those on lodgepole pine, Douglas-fir, western larch, true firs, western hemlock, and the two species on ponderosa pine. In contrast to the root diseases, dwarf mistletoes are relatively easy to control when infected stands are harvested. By removing infected overstory trees, the damaging effects of these parasitic plants can be much reduced on regenerated stands.

Other disease problems commonly reported in 1987 include conifer and aspen stem decays; comandra blister rust and white pine blister rust, of which white pine blister rust had the greatest timber management implications; and numerous foliage diseases whose incidence generally increased except in the Pacific Northwest and Southwestern Regions.

Part 2
Regional Conditions

Northern Region—Insects

Prepared by Jerald E. Dewey

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

Insect	*Host*	*Location*	*Remarks*
Balsam woolly adelgid *Adelges piceae*	Grand fir, subalpine fir	Idaho	Several new spot infestations were detected in 1987 in addition to some increase in the size of existing areas of damage. The outbreak is still mainly confined to the Palouse Ranger District, Clearwater National Forest, and adjacent private land. However, an isolated infested spot was found on private land near Headquarters, ID. Damage is largely confined to trees in "frost pockets."
A Boxelder defoliator *Archips negundanus*	Boxelder	Montana	Although this leafroller occurs widely throughout the United States and Canada, this collection appears to be a new state record for Montana. It severely defoliated numerous boxelder trees in Missoula in 1987.
Cranberry girdler moth *Chrysoteuchia topiaria*	Douglas-fir, western larch	Idaho	This pest continued to be monitored and controlled at the Coeur d'Alene Forest Service Nursery. Moths were caught in pheromone traps from May 27 through September 23. Peak flight occurred the week of July 1 with average trap catches of 41.8 moths per trap. Over 40,000 seedlings were examined during the lifting process in November. Only two damaged seedlings were found, indicating almost 100 percent control was achieved.
California tortoiseshell *Nymphalis californica*	Snowbrush, serviceberry	Idaho, Montana	This butterfly occasionally reaches extreme outbreak proportions, completely defoliating entire hillsides of snowbrush, serviceberry and other broadleaf species. Localized infestations were reported on the Idaho Panhandle National Forests in Idaho, and on the Lolo, Kootenai, and Flathead National Forests in Montana. Outbreaks are usually short lived, lasting only a year or two.

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

Insect	*Host*	*Location*	*Remarks*
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Idaho, Montana	Areas infested by Douglas-fir beetle generally decreased in Montana in 1987, but a sharp increase in infested acres occurred in northern Idaho. In the Idaho Panhandle and Clearwater National Forests and adjacent lands, more than 11,000 acres were infested. An estimated 24,000 trees were killed in those stands. On State lands in northern Idaho, another 3,500 acres were infested on which nearly 19,000 trees were killed. Douglas-fir beetle populations have built up in scattered blowdown and have been aided by extremely dry conditions during the past three growing seasons. Ground surveys conducted in several infested stands indicated populations have peaked. Should weather patterns return to normal, we expect a decline in beetle activity in 1988.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir, spruce, true firs	Idaho, Montana	The small infestation of 1986, on the Clearwater National Forest, collapsed due to natural factors. No new outbreaks occurred. Pheromone trap catches in 1987 were some of the lowest recorded since this type of surveying was initiated in 1980. Traps were placed at 173 sites, of which only two sites caught 25 or more moths per trap.
Fir engraver *Scolytus ventralis*	Grand fir, subalpine fir	Idaho	Widely scattered groups of faders totaled 9,600 trees on just over 2,200 acres in northern Idaho. The fir engraver is closely associated with root diseases and drought-stressed trees. The dry conditions experienced in the last few years have aggravated an already chronically serious bark beetle/root disease complex causing significant losses in grand fir stands.

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

Insect	*Host*	*Location*	*Remarks*
Forest tent caterpillar *Malacosoma disstria*	Hardwoods	Idaho, Montana	Defoliation remained heavy in western Montana in 1987. In northern Idaho defoliation intensified somewhat over 1986 levels. Damage was heaviest on cottonwood, alder, aspen, and willow along water courses. Defoliation also occurred on a wide range of ornamental species. A fall egg mass survey indicates a decline in the population in 1988.
Gouty pitch midge *Cecidomyia piniinopis*	Ponderosa pine	Idaho	Heavy tip damage continued throughout much of northern Idaho in 1987. Greatest impact occurs in ponderosa pine plantations that are older than about 10 years.
Gypsy moth *Lymantria dispar*	Conifers, hardwoods	Idaho, Montana, Wyoming	Gypsy moth was reported for the first time in Idaho in 1986 with the capture of a male moth in Sandpoint. In 1987, a total of 22 moths were captured in six traps in Sandpoint, another 11 moths were caught in two traps in Coeur d'Alene, and another moth was collected in Lewiston. No moths were collected in Montana or Yellowstone National Park in 1987. Pheromone trapping will be greatly intensified in northern Idaho in 1988.
Larch casebearer *Coleophora laricella*	Western larch	Idaho, Montana	Larch casebearer populations remained low in 1987. No defoliation was detected during the aerial survey, however, defoliation could have been masked by needle cast fungi in many areas.

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

Insect	*Host*	*Location*	*Remarks*
Lodgepole terminal weevil *Pissodes terminalis*	Lodgepole pine	Idaho, Montana	Surveys conducted in 1987 indicated a general decline in infested terminals in affected stands. Though not all areas known to be infested were sampled, in those which were, few 1987 attacks were observed. We are not certain what combination of site, stand, biological, or climatic factors may have contributed to this population decline, but believe it is only temporary. Many lodgepole pine stands surveyed in western Montana in the past several years have exhibited infestation rates as high as 11 percent for a single year. In some, up to 59 percent of the trees have been attacked at some time.
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, ponderosa pine, other pines	Idaho, Montana	Mountain pine beetle-infested areas continued a Region-wide decline in 1987. Having peaked in 1981 at more than 2.4 million acres, infested acres have gradually declined in response to management activities and depleted host type. In 1987, 707,000 acres were infested throughout the Region. Of that total, 695,000 acres were recorded in Montana. Virtually all pine species serve as hosts to mountain pine beetle. Lodgepole pine, the preferred host, accounted for 665,000 acres of the infested type. Ponderosa pine stands were infested on nearly 39,000 acres; western white pine on 3,100 acres; and whitebark/limber pine totaled almost 1,000 acres. An average of approximately 2.5 trees per infested acre were killed. Some infestations continued to increase. In northern Idaho, infested lodgepole pine stands increased to more than 900 acres on the Idaho Panhandle National Forest. Infested stands on the Nez Perce National Forest increased slightly to 6,700 acres. Major outbreaks still exist on the Kootenai and Flathead National Forests in western Montana; however, both showed Forest-wide decreases in infestation extent.

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

Insect	*Host*	*Location*	*Remarks*
Pine engraver beetle *Ips pini*	Lodgepole pine, ponderosa pine	Idaho, Montana	Due to abnormally dry conditions over the past several growing seasons, second-growth ponderosa pine stands in northern Idaho have experienced increased losses to the pine engraver beetle. Mortality attributable to the beetle was observed on more than 1,500 acres in 1987. In 1986, only 825 acres had been infested. An estimated 10,200 trees were killed in 1987. With the exception of the Flathead Indian Reservation, where faders were noted on 378 acres, only minor amounts of pine engraver-caused mortality were recorded in Montana.
Pine needle sheathminer *Zelleria haimbachi*	Limber pine, lodgepole pine, ponderosa pine	Idaho, Montana	Defoliation declined somewhat in most previously infested areas in Montana. Increase in damage occurred on the Bitterroot National Forest in Montana, and near Elk City, ID (Nez Perce National Forest).
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Idaho, Montana	Since 1984, incidence of spruce beetle-caused mortality in old-growth spruce has declined markedly. In 1987, only a few isolated faders were noted. On the Beaverhead National Forest, a few beetle-killed trees were observed along the West Fork of the Madison River. Surveys in the Bitterroot National Forest showed additional scattered trees killed along a tributary of the Selway River in Idaho. The Flathead National Forest experienced several small groups of faders totaling 38 trees along Hungry Horse Reservoir.
Western balsam bark beetle *Dryocetes confusus*	Subalpine fir	Idaho, Montana	Though from time to time high amounts of mortality in subalpine fir stands caused by western balsam bark beetle are recorded, only small scattered groups were observed in 1987. In Yellowstone National Park, several group kills totaled 227 acres and approximately 125 dead trees. Region-wide, fewer than 1,000 trees were killed on less than 500 acres. Most known infestations of the beetle are associated with root disease-stressed trees.

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

Insect	*Host*	*Location*	*Remarks*
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Idaho	As previously noted, near-drought conditions have left forest stands abnormally susceptible to a range of insect opportunists. Particularly noticeable are increasing populations of western pine beetle in second-growth ponderosa pine stands in northern Idaho. In 1987, more than 1,300 trees were killed on about 460 acres. The largest group, totaling 300 acres and nearly 900 trees, was observed in the Craig Mountains south of Lewiston. The others were in widely scattered groups in drier ponderosa pine sites. Unless a return to normal precipitation occurs, losses to this beetle will likely continue.
Western pine shoot borer *Eucosma sonomana*	Ponderosa pine, lodgepole pine	Idaho, Montana	The shoot borer is a common pest of pine stands, especially ponderosa pine plantations. Its impact is greatest in tree improvement test planations. Infestation rates of new terminal shoots can exceed 50 percent. Five test plantations are being baited with pheromone strips to control this pest; infestation levels have declined to as low as 2 percent in these plantations.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, Engelmann spruce, true firs, western larch	Idaho, Montana, Wyoming	Defoliation declined again in the Region from 2,500,000 acres in 1986 to 1,866,000 in 1987. A reduction in intensity of defoliation also occurred in 1987. Decreased defoliation occurred throughout most areas of Montana and Yellowstone National Park, WY, but increased from about 12,000 acres in northern Idaho in 1986 to almost 64,000 acres in 1987.

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

Insect	*Host*	*Location*	*Remarks*
Whitebanded ash bark beetle *Helesinus* sp.	Green ash	Montana, North Dakota	In addition to continuing activity by this beetle throughout much of North Dakota, it was also reported from numerous locations in Montana including Great Falls, Havre, Lewistown, and Glasgow. Greatest damage is occurring to green ash in communities and shelterbelts. In Montana, most infested trees have previously been weakened by weather damage.

1987 National Conditions Report
Regional Table Information

	Pest	*State*	*Acres infested*
	Mountain pine beetle	Idaho	11,961
		Montana	694,380
		Regional total	*706,341*
	Western spruce budworm	Idaho	63,715
		Montana	1,802,005
		Wyoming	265
		Regional total	1,865,985

Northern Region—Diseases

Prepared by James W. Byler

Northern Region—Status of diseases in Montana, northern Idaho, North 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	Atropellis canker was common in large pole and sawtimbersize trees. It caused defect and some mortality.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine, ponderosa pine	Idaho, Montana	Comandra rust was abundant on lodgepole and ponderosa pines in many parts of Idaho and Montana. It was especially severe on the Beaverhead National Forest in Montana.
Diplodia blight *Sphaeropsis sapinea* (=*Diplodia pinea*)	Ponderosa pine	Idaho, Montana	In recent years, the pathogen has been associated with branch dieback in a number of areas including the Clearwater River in Idaho and the Clark Fork River from Missoula to Thompson Falls in Montana. Damage has been especially severe in Montana near Flathead Lake where tree mortality occurred during the past 2 years.
Dwarf mistletoes			Dwarf mistletoes were present on about 3.1 million acres and were one of the major causes of damage. Lodgepole mistletoe was present on about 1.7 million acres (28 percent of the lodgepole type) in the two States causing about 18.2 million cubic feet of growth loss. Douglas-fir dwarf mistletoe occurred on about 0.6 million acres (13 percent) and caused 13.1 million cubic feet of loss. Western larch dwarf mistletoe occurred on about 0.8 million acres (38 percent) and caused 15.3 million cubic feet of loss. The pathogens have been controlled in most regenerated stands. Damage has increased in some partially cut stands.
Arceuthobium americanum	Lodgepole pine	Idaho, Montana	
Areceuthobium douglasii	Douglas-fir	Idaho, Montana	
Arceuthobium laricis	Western larch	Idaho, Montana	
Stem decays *Phellinus pini* *Echinodontium tinctorium* Others	Various conifers	Idaho, Montana	Decays caused large economic losses. *Phellinus pini* was most damaging to lodgepole pine and western larch. *Echinodontium tinctorium* caused major losses in grand fir and hemlock stands.

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

Disease	*Host*	*Location*	*Remarks*
Western gall rust *Endocronartium harknessii*	Lodgepole pine, ponderosa pine, Scotch pine	Idaho, Montana, North Dakota	This disease was common on hard pines. Damage was sometimes severe enough in some young-growth stands to be a management concern.
White pine blister rust *Cronartium ribicola*	Western white pine	Idaho, northwestern Montana	White pine blister rust precluded the management of western white pine on high-hazard sites and caused extensive tree mortality throughout the range of western white pine. More stands are successfully regenerated each year with rust-resistant white pine. Cankers were pruned from potential crop trees in three pre-commercial white pine stands on the Clearwater National Forest. Severe white bark pine mortality in grizzly bear habitat along the Rocky Mountain Front in Montana was reported.
Root Diseases			
Annosus root disease *Heterobasidion annosum*	Douglas-fir, grand fir, ponderosa pine, subalpine fir, western hemlock	Idaho, western Montana	Root diseases were among the most damaging pests in the Region, causing tree mortality 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). Incidence is greatest in northern Idaho and extreme western Montana. Armillaria root disease and laminated root rot are the two most damaging diseases. These are commonly found in the same stands and trees. A risk-rating procedure developed for the Lolo National Forest showed that the incidence of root disease-caused mortality was statistically greater (59 percent of the stands) in hemlock and grand fir habitat types than in Douglas-fir (34 percent), or subalpine fir (24 percent).
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	

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

Disease	*Host*	*Location*	*Remarks*
Foliage Diseases			
Dothistroma needle blight *Mycosphaerella pini* [*Dothistroma septospora* (=*Dothistroma pini*)]	Austrian pine, lodgepole pine, ponderosa pine, western white pine	Idaho, Montana	The disease was evident on ponderosa pine at a number of northern Idaho locations, including the Wilderness Gateway Campground, Clearwater National Forest. White pine damage continued on the Idaho Panhandle National Forests.
Douglas-fir needle cast *Rhabdocline pseudotsugae*, *Rhabdocline weirii*	Douglas-fir	Idaho, Montana	Incidence was widespread, but damage was usually light.
Elytroderma disease *Elytroderma deformans*	Ponderosa pine	Idaho, Montana	The disease remained severe in a number of pine stands, especially in the Bitterroot Valley, Flathead Indian Reservation, and around Flathead Lake in Montana.
Larch needle blight *Hypodermella laricis*	Western larch	Idaho, Montana	Incidence of both needle diseases was low except in local areas along the Montana-Idaho border where conspicuous symptoms were present.
Larch needle cast *Meria laricis*			
Swiss needle cast *Phaeocryptopus gaeumannii*	Douglas-fir	Idaho, Montana	This needle cast was severe in Christmas tree-growing areas of western Montana.
Vascular Wilts			
Dutch elm disease *Ceratocystis ulmi*	American elm, Siberian elm	Montana, North Dakota	Dutch elm disease continued to spread in urban areas in North Dakota and Montana.
Verticilium wilt *Verticilium dahliae*	Norway maple	Montana	The disease was confirmed in ornamental maples in Bonner, MT, and wilt symptoms were common in Missoula.
Nursery Diseases			
Diplodia blight *Sphaeropsis sapinea* (=*Diplodia pinea*)	Ponderosa pine	Idaho	The disease was common on 1-0 ponderosa pine in one north Idaho nursery.

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

Disease	*Host*	*Location*	*Remarks*
Fusarium root rot *Fusarium* spp.	Douglas-fir, other conifers	Idaho, Montana	A recurring problem in most nurseries throughout the Region. *Fusarium*-associated damping-off and root rot caused the loss of an estimated 27,000 western larch container seedlings at the Coeur d'Alene nursery.
Gray mold *Botrytis cinerea*	Engelmann spruce, lodgepole pine, western larch	Idaho, Montana	Losses were evident in container-grown seedlings, especially on western larch, at nurseries throughout the Region.
Phoma blight *Phoma* spp.	Most conifers	Idaho	Tip blight associated with *Phoma* species occurred at several nurseries in Idaho.
Sirococcus tip blight *Sirococcus strobilinus*	Engelmann spruce, ponderosa pine	Idaho, Montana	Sirococcus tip blight continued at several nurseries in northern Idaho and western Montana.

Rocky Mountain Region—Insects

Prepared by Curtis G. O'Neil

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

Insect	*Host*	*Location*	*Remarks*
Cedar bark beetles *Phloeosinus* spp.	Eastern redcedar	Nebraska	Caused significant damage to red cedar windbreaks in eastern Nebraska.
Dioryctria pine moths *Dioryctria ponderosae*	Ponderosa pine	Nebraska	Continues to be a problem of pines in central and western Nebraska.
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Colorado, Wyoming	The Douglas-fir beetle infestations continue in areas that were heavily defoliated in the recent past. However, some areas the beetle is attacking trees which were not defoliated.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir, spruce	Colorado	Light defoliation occurred in the Rampart Range/Platte River drainage. Pheromone trapping indicates populations are endemic.
European pine sawfly *Neodiprion sertifer*	Pine	Kansas	Reported again in a number of Christmas tree plantations in northwestern Kansas and around Kansas City in the eastern part of the State.

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

Insect	*Host*	*Location*	*Remarks*
Gypsy moth *Lymantria dispar*	Hardwoods	Colorado	Detection surveys in Boulder and Fort Collins trapped 144 and 203 gypsy moth adults, respectively. Other life stages found include: **Fort Collins, CO** 32 females 20 pupae 1 larva 47 new egg masses **Boulder, CO** 15 females 1 pupa 111 new egg masses Detection surveys also caught moths in Wheatridge and Colorado Springs. A single male moth was captured in a campground in Keystone, CO.
		Wyoming	Three male moths were caught. One each in Laramie, Jackson, and west of Cody, in Clark's Fork Canyon.
		South Dakota	A single moth was captured in a campground just outside of Rapid City, SD.
Jack pine budworm *Choristoneura pinus*	Jack pine	Nebraska	Severely defoliated 258 acres in one jack pine stand in the Bessey division of the Nebraska National Forest. Egg mass densities indicate that 1988 larval populations in five stands will be sufficient to cause moderate to severe defoliation of jack pine.
Large aspen tortrix *Choristoneura conflictana*	Aspen	Colorado	Populations appear to be subsiding.

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

Insect	*Host*	*Location*	*Remarks*
Mountain pine beetle *Dendroctonus ponderosae*	Limber pine, lodgepole pine	Colorado, South Dakota, Wyoming	Mountain pine beetle remains at low levels in the Black Hills of South Dakota in 1987. Scattered infestations of 6,500 trees occurred over 2,340 acres (30M cu.ft. mortality). Populations on Casper and Muddy Mountains, WY, remained static. Total loss in Wyoming was 49,000 trees over 12,400 acres (220M cu. ft. mortality.) In Colorado, mountain pine beetle infestations remain low in lodgepole pine. Approximately 40,000 killed trees (184MCF) were tallied mainly in Eagle, Grand, and Summit counties. Mountain pine beetle infestations, along with roundheaded and western pine beetles, killed approximatley 16,000 ponderosa pine (74MCF) on the Uncompaghgre Plateau, CO.
Pine tip moths *Rhyacionia bushnelli*	Austrian pine, Ponderosa pine, Scotch pine	Colorado, Nebraska, Kansas	In Colorado's Black Forest, infestations occurred on 47 acres. In Kansas, damage was severe in many Christmas tree plantations. In Nebraska, tip moth continues to be a problem in many young pine stands throughout the State.
Sugar pine tortrix *Choristoneura lambertiana*	Ponderosa pine, Limber pine	Colorado	Defoliation levels declined in southwestern Colorado.
Pine butterfly *Neophasia menapia*	Ponderosa pine	Colorado	In the Black Forest, 47 acres were defoliated.
Pine engraver beetles *Ips* spp.	Ponderosa pine	Nebraska	Near thinning operations.
Spruce beetle *Dendroctonus rufipennis*	Spruce	Colorado	Remains endemic. Some low populations occur in road right-of-way decks and slash in sale cutting units on the Sulphur Ranger District, Arapaho National Forest and the Holy Cross District of the White River National Forest. The beetles are expected to infest additional slash. Logs are to be processed before the beetles mature.

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, white fir	Colorado, Wyoming	Populations continue to subside in Colorado and Wyoming. An estimated 848,000 acres were visibly defoliated. Population levels declined for the fourth consecutive year. Pheromone traps were deployed to detect the presence of budworm in 1987.
Western tent caterpillar *Malacosoma californicum*	Aspen	Colorado	Populations continued to decline to endemic levels on the Rio Grande National Forest.

Rocky Mountain Region—Diseases

Prepared by David W. Johnson

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 Wyoming, it causes mortality and growth loss equal to approximately 10 million cubic feet. Presuppression surveys were conducted on 3,554 acres on three National Forests. Silvicultural control was conducted on 4,468 acres on eight 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. Approximately 10,000 acres of the Black Forest northeast of Colorado Springs was surveyed by the Colorado State Forest Service. Landowner concern about the disease in this area has been strong.
Thyronectria austro-americana	Honeylocust	Kansas	Continues to be a problem in windbreaks.
Botryodiplodia spp.	Juniper	Kansas	Identified in the State for the first time by two Kansas State University pathologists.
Phomopsis or *Tubercularia* sp.	Russian olive	South Dakota	For the last few years, has caused mortality in shelterbelts. Incidence highest in areas affected by drought and grasshopper populations.

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

Disease	*Host*	*Location*	*Remarks*
Botryodiplodia hypodermia	Siberian elm	South Dakota	Elm decline continues throughout the State. Herbicide damage is suspected as one stress factor predisposing trees to infection by this fungus.
Root Diseases			
Armillaria spp.	Subalpine fir, Engelmann spruce	Colorado	Clusters of small centers of Armillaria root rot are reported on several hundred acres near Turquoise Lake and May Queen Campground on the Pike-San Isabel NF, CO.
Heterobasidion annosum	Jack pine	Nebraska	Continues to be identified at new locations within the Coyote sale on the Nebraska National Forest.
Foliage Diseases			
Anthracnose *Gnomonia leptostyla*	Walnut	Kansas	Incidence was high in the eastern half of Kansas. Trees lost most of their leaves prematurely and only late developing leaves were unaffected and remained on the trees in late Aug. and Sep.
Apiognomonia veneta (=*Gnomonia platani*)	Sycamore	Kansas	Was very severe in many areas of northeastern Kansas. An extended cool period during the spring delayed bud break and favored the disease.
Ciborinia whetzelli *Marssonina populi*	Aspen	Colorado	Although found throughout Colorado, aspen were most heavily infected in the southwest quadrant of the State. These diseases created great aesthetic concern.
Sphaeropsis sapinea (=*Diplodia pinea*)	Ponderosa pine, Austrian pine	Kansas, Nebraska	Continues to be a problem in windbreaks and urban plantings. However, in Nebraska infection was light in 1987, because there was little rainfall during the period when new shoots were highly susceptible.
Scirrhia acicola	Scotch pine	Kansas	Continues to increase in Christmas tree plantations.
Lophodermella concolor, *Lophodermella montivaga*	Lodgepole pine	Colorado	Was noticeable on trees throughout the Sulphur Ranger District, Arapaho National Forest.

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

Disease	*Host*	*Location*	*Remarks*
Phomopsis juniperovora *Cercospora sequoiae* *Kabatina juniperi*	Eastern redcedar, Rocky Mountain, juniper	South Dakota, Nebraska	Continues to be a problem in windbreaks.
Dothistroma pini	Austrian pine	Nebraska	Continues to be a problem in young pine plantings in eastern Nebraska.
Wilts and Decline			
Ceratocystis ulmi	Elm species, including American elm	Colorado, Nebraska, South Dakota	Remains top priority for control in Colorado's urban forests where disease incidence appears to have decreased. In South Dakota, the disease continues to kill 6 to 10 percent of the American elms in communities without management programs.
Pine wood nematode *Bursaphelenchus xylophilus*	Scotch pine	Kansas	Reported for the first time in Johnson County, although known in other areas.
Undetermined	Juniper	Kansas	Continual problem in windbreaks. Symptoms usually include tip dieback, branch mortality, or complete death of trees. Causal agent still undetermined.
Nursery Diseases			
Tip blight (causal agent unknown)	Russian-olive	South Dakota	1-0 seedlings at Big Sioux Nursery continue to be damaged by a tip blight of unknown etiology. The blight is kept under control by regular applications of Benomyl alternated with Bordeaux mixture. Pathogenicity tests with *Fusarium acuminatum*, *Alternaria* sp. and bacteria isolated from diseased tissue have not resulted in any tip blight symptoms.
Damping-off *Fusarium* spp.	Scotch pine, ponderosa pine	South Dakota	Heavy losses occurred in some study plots at Big Sioux Nursery.
Powdery mildew	Chokecherry	Nebraska	Mildew, which developed in midsummer, caused no significant growth loss by fall-lifting for 1-0 chokecherry.

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

Disease	*Host*	*Location*	*Remarks*
Chemical burn	Lodgepole pine	Nebraska	Uneven distribution of chemical fertilizer which was not watered in, resulted in clumps of stunted and reddened seedlings.
Phoma blight *Phoma* spp.	Ponderosa pine	Nebraska	Infection by *Phoma* spp. and necrosis of seedling stems occurred under soil-buildup caused by torrential rains in late June.
Sprout dieback (unknown cause)	Aspen	Colorado	Sudden mortality of few to several year-old sprouts is scattered in aspen stands. Preliminary observations indicate association with wet sites.

Southwestern Region—Insects

Prepared by Terrence J. Rogers

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 in the Southwest increased from 1,940 acres in 1986 to 5,020 acres in 1987. Most of the Douglas-fir beetle-caused tree mortality occurred on the Carson and Santa Fe National Forests and the Taos Pueblo Indian Reservation in northern New Mexico in areas with a previous history of severe western spruce budworm defoliation. Some minor Douglas-fir beetle related tree mortality was also detected on the Coconino National Forest, AZ. Estimated volume loss Regionwide—154,000 cubic feet.
Large aspen tortrix *Choristoneura conflictana*	Aspen	New Mexico	Collectively, the large aspen tortrix defoliated approximately 21,440 acres of host type Regionwide. Large aspen tortrix infestations were most conspicuous on the Carson, Cibola, and Santa Fe National Forests in New Mexico and the Navajo Indian Reservation in Arizona.
Mountain pine beetle *Dendroctonus ponderosae*	Ponderosa pine	Arizona, New Mexico	Mountain pine beetle activity in the Southwest increased over two fold from 2,050 acres in 1986 to 4,790 acres in 1987. Most of the infestations detected occurred on the Carson National Forest, Taos Pueblo Indian Reservation, and nearby State lands in northern New Mexico. Elsewhere throughout the Region mortality was minor. Estimated volume loss Regionwide—106,850 cubic feet.
Pandora moth *Coloradia pandora*	Ponderosa Pine	Arizona	This insect defoliated approximately 720 acres of the Grand Canyon National Park. Defoliation, minor in 1987, is not expected to occur again until 1989.

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

Insect	*Host*	*Location*	*Remarks*
Pine engraver beetles *Ips* spp.	Ponderosa pine	Arizona, New Mexico	*Ips* beetles caused approximately 2,990 acres of tree mortality Regionwide. The largest areas of *Ips*-caused tree mortality occurred on the San Carlos Apache Indian Reservation, AZ, where groups of up to 30 or more fading trees were detected. Elsewhere, *Ips*-related tree mortality was minor. Estimated volume loss Regionwide—39,450 cubic feet.
Spruce beetle *Dendroctonus rufipennis*	Englemann spruce	Arizona, New Mexico	Acres of spruce beetle activity in 1987 (1,240 acres) remained unchanged from 1986 (1,220 acres). Most of the spruce beetle activity detected occurred on the Carson National Forest (Pecos Wilderness), NM. Elsewhere, on the Santa Fe National Forest, NM, and the Fort Apache Indian Reservation, AZ, spruce beetle-caused tree mortality was minor. Estimated volume loss Regionwide—85,000 cubic feet.
True fir bark beetles *Scolytus* spp. Western balsam bark beetle *Dryocetes confusus*	True firs	Arizona, New Mexico	These bark beetles caused widely scattered individual and small group tree mortality on about 1,265 acres. Estimated volume loss Regionwide—71,800 cubic feet.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Arizona, New Mexico	Western pine beetle-caused tree mortality was minor and widely scattered on approximately 325 acres throughout the Region. Estimated volume loss Regionwide—44,250 cubic feet.

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

Insect	*Host*	*Location*	*Remarks*
Western spruce budowrm *Choristoneura occidentalis*	Douglas-fir, white fir, spruce	Arizona, New Mexico	Western spruce budworm defoliation in the Southwestern Region decreased from 469,416 acres in 1986 to 265,940 acres in 1987. Most of the defoliation damages detected in the Region occurred on the Carson (168,760 acres), and Santa Fe (52,680 acres) National Forests, and adjacent nearby State lands (21,100 acres) in New Mexico, and the Kaibab (15,520 acres) National Forest in Arizona. Smaller areas of defoliation were also detected on the Cibola (2,840 acres) and Lincoln (1,480 acres) National Forests and the Jemez (1,680 acres) and Jicarilla (1,880 acres) Indian Reservations, NM. Conservative estimates place current year's volume loss attributed to budworm at 1.9 million cubic feet Regionwide.
White fir needle miner *Epinotia meritana*	White fir	Arizona	The white fir needle miner defoliated a total of 1,120 acres of white fir on the Coconino and Kaibab National Forests, AZ. Damage was insignificant.

Southwestern Region—Diseases

Prepared by Helen M. Maffei

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* was responsible for the most common cull and defect in aspen. This white trunk rot, widespread throughout the host type, caused significant losses, especially in mature stands. Cull volumes may equal as much as 60 percent of the total volume.
Comandra blister rust *Cronartium comandrae*	Mondell pine, ponderosa pine	Arizona	Comandra blister rust occurred in the Payson and Prescott areas on exotic Mondell and the native ponderosa pines. Damage has been restricted to individual trees, but the possibility exists that the disease may spread to nearby Christmas tree plantations.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, Engelmann spruce, ponderosa pine	Arizona, New Mexico	Dwarf mistletoe infestation caused a significant decrease in yield on commercial and noncommercial forest lands. Approximately 46 percent (2.2 million acres) of the total commercial acreage (4.8 million acres) was infested; losses in wood production may exceed 25 million cubic feet of commercial timber in New Mexico and Arizona. As a point of reference, the estimated total standing volume of commercial conifers is approximately 202 million cubic feet.
Fir broom rust *Melampsorella caryophyllacearum*	True firs	Arizona, New Mexico	Fir broom rust was widely distributed in subalpine, corkbark, and white firs and caused occasional top breakage. The impact of the disease appears to be unsually high on Sandia Peak, Cibola National Forest, NM. There, bole cankers and associated breakage is wide-spread, and infected trees are experiencing moderate mortality.

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

Disease	*Host*	*Location*	*Remarks*
Powell limb rust *Peridermium filamentosum*	Ponderosa pine	Arizona	Powell limb rust was found in mature and overmature ponderosa pine in scattered locations on the Fort Apache Indian Reservation. The disease caused minor damage to infected trees and was mainly a concern when identifying leave and seed trees in infected stands.
Red ring rot *Phellinus pini*	Douglas-fir, ponderosa pine, spruce, true firs	Arizona, New Mexico	*Phellinus pini* is indigenous to mature and overmature stands of pine and mixed conifers. Scattered in distribution, losses and damage were 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 was scattered in mature and overmature stands of mixed conifers but caused insignificant losses.
Spruce broom rust *Chrysomyxa arctostaphyli*	Spruce	Arizona, New Mexico	Spruce broom rust was scattered throughout the host type but was of little commercial significance.
Stem cankers *Cenangium singulare* *Ceratocystis fimbriata* *Cryptosphaeria populina* *Hypoxylon mammatum*	Aspen	Arizona, New Mexico	Canker fungi caused significant reductions in the yield of mature aspen stands. Damage included tree mortality from girdling cankers, top breakage, cull, and decay. Many stands have over 30 percent infection with one or more of these stem canker fungi.
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 were responsible for approximately 10 percent reduction in yield of infected stands. Losses may be as high as 25 percent in some seriously infested stands. *Armillaria* spp. accounted for 80 percent of the root disease damage in conifers; other root pathogens were responsible for the remaining 20 percent. The Southwest loses an estimated 4.8 million cubic feet annually to root rot.
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 was scattered throughout the Southwest. Losses were insignificant in commercial timber.
Ganoderma applanatum	Aspen	Arizona, New Mexico	Scattered throughout the host type, the fungus caused windthrow and standing cull.
Foliage Diseases			
Elytroderma disease *Elytroderma deformans*	Pinyon pine, ponderosa pine	Arizona, New Mexico	Elytroderma disease was widely distributed but at low levels.
Marssonina blight *Marssonina populi*	Aspen	New Mexico	This blight has decreased to insignificant levels in 1987. Although there were still small patches of infected trees on the Santa Fe and Carson National Forests; it was not widespread enough to be a significant problem or to affect fall coloration.
Sycamore anthracnose *Gnomonia plantani*	Sycamore	Arizona	This disease was reported this summer on several sycamore on the Coronado National Forest. Damage was insignificant.
Lophodermella needle cast *Lophodermella cerina*	Ponderosa pine	Arizona, New Mexico	Ponderosa pine of all ages were reported as infected with this needle cast on the Carson, Lincoln, and Gila National Forests, NM, and the Fort Apache Indian Reservation, AZ, this summer. Damage was limited to individual and small groups of trees.
Fir needle disease *Lirula abietis-concoloris*	White fir	New Mexico	Scattered infections of this disease were reported on the Carson National Forest this summer. Damage was insignificant.
Abiotic declines	White fir	Arizona, New Mexico	Abiotic declines—possibly a result of off-site planting have been reported in residential areas, administrative sites, and parks.
Leaf scorch	Elm and various ornamentals	Arizona	Leaf scorch has been widely reported on a variety of woody landscape plants throughout the summer.

Intermountain Region—Insects

Prepared by Julie Weatherby

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

Insect	*Host*	*Location*	*Remarks*
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Idaho, Utah, Wyoming	Activity increased in 1987; 12,600 trees were killed on National Forest lands. Increases in beetle activity occurred on the Boise, Payette and Targhee National Forests, ID; and on Bridger-Teton National Forest, WY. Significant infestations are concentrated in the Deep Creek Range southwest of Pocatello, ID.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir	Idaho	No new defoliation was observed. Pheromone trap catches at Dewey Peak in the Owyhee Mountains remained high.
Eurytomid wasp *Eurytoma* sp.	Ponderosa pine	Idaho	Infestations were noted in ponderosa pine plantations on the Boise National Forest.
Gouty pitch midge *Cecidomyia piniinopis*	Pines	Idaho	Isolated infestations were found in pine regeneration on the New Meadows Ranger District, Payette National Forest.
Gypsy moth *Lymantria dispar*	Hardwoods	Idaho	One male gypsy moth was caught in a pheromone trap near Cascade.
Jeffrey pine beetle *Dendroctonus jeffreyi*	Jeffrey pine	Nevada	Minor activity was detected on the Toiyabe National Forest.
Locust borer *Megacyllene robiniae*	Black locust	Idaho	About 124 black locusts in Boise were killed by the locust borer.
Magdalis weevil *Magdalis lecontei*	Ponderosa pine	Idaho	Minor defoliation was observed on ponderosa pine growing on Harris Creek Summit, Boise 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 decreased from 1.5 millon trees in 1986 to 181,300 trees in 1987. Significant infestations occurred on the Boise, Challis, Salmon and Sawtooth National Forests, ID; the Ashley and Wasatch-Cache National Forests, UT; and the Bridger-Teton National Forest, WY.

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

Disease	*Host*	*Location*	*Remarks*
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 increase in activity was noted throughout southern Idaho. Pine engraver beetles intermixed with western pine beetles killed 9,900 trees throughout the Region.
Pine needle sheathminer *Zelleria haimbachi*	Lodgepole pine	Idaho	Defoliation by this insect, along with the sugar pine tortrix, was noted on trees on the Boise, Payette, Sawtooth and Targhee National Forest.
Prescott scale *Matsucoccus vexillorum*	Ponderosa pine	Idaho	Infestations intermixed with pine needle sheathminer and sugar pine tortrix were noted in the Big Deer Creek drainage on the Sawtooth National Forest.
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Idaho, Utah, Wyoming	Epidemic populations continue to cause significant mortality on the Payette National Forest, ID. Approximately 15,900 infested trees were detected in 1987. Smaller infestations are present on the Boise National Forest, ID; the Bridger-Teton National Forest, WY; and the Fishlake, Manti-LaSal and Uinta National Forests, UT.
Spruce bud scale *Physokermes piceae*	Spruces	Idaho	Infestations of spruce bud scales have been detected on ornamental spruces scattered throughout southern Idaho.
Sugar pine tortrix *Choristoneura lambertiana*	Pines	Idaho	This insect, often associated with pine needle sheathminer, continued to cause scattered defoliation of both lodgepole and ponderosa pines.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Idaho	Significant tree mortality caused by a complex of bark beetles, including the western pine beetle, was detected on the Boise, Payette, and Salmon National Forests.
Western pineshoot borer *Eucosma sonomana*	Ponderosa pine	Idaho	Scattered infestations were noted in ponderosa pine plantations on the Boise and Payette National Forests.

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

Disease	*Host*	*Location*	*Remarks*
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, spruce, true firs western larch	Idaho, Utah, Wyoming	Conifers on about 873,600 acres were defoliated in 1987, compared to 3.1 million acres in 1986. Infestations declined in acreage and intensity on the Boise, Caribou, Challis, Payette, Salmon, Sawtooth and Targhee National Forests, ID; and on the Dixie, Fishlake and Wasatch-Cache National Forests, UT.

Intermountain Region—Diseases

Prepared by Jim Hoffman

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	Decay occurs in most aspen stands in the Region.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine, ponderosa pine	Idaho, Utah, Wyoming	Infections mainly occur on ponderosa pine in Idaho, Utah and Wyoming and on lodgepole pine across southern Idaho.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, lodgepole pine, ponderosa pine, western larch, Jeffrey pine	Idaho, Nevada, Utah, Wyoming	These continue to be the most widespread and frequently observed pests in southern Idaho. Suppression projects removed infected overstory trees from 5,283 acres.
Red ring rot *Phellinus pini*	Western larch, true firs, spruce, Douglas-fir, pines	Idaho, Utah, Wyoming	This fungus occurs throughout the Region in stands of mature conifers. Infection intensity is highly variable.
Rust-red stringy rot *Echinodontium tinctorium*	Grand fir, white fir, subalpine fir	Idaho, Nevada	Decay caused by this fungus is common in mature and overmature stands of true firs.
Stalactiform blister rust *Cronartium coleosporioides*	Lodgepole pine	Idaho, Utah, Wyoming	This rust occurs in localized areas of host type across the Region. Heavy infection has been noted in several areas.
Western gall rust *Endocronartium harknessii*	Lodgepole pine, ponderosa pine	Idaho, Utah, Wyoming	Gall rust occurs throughout host types. Infection levels are highly variable.
Root Diseases			
Annosus root disease *Heterobasidion annosum*	Douglas-fir, lodgepole pine, ponderosa pine, true firs	Idaho, Nevada, Utah, Wyoming	This fungus occurs as a root and butt rot of true firs. Also, it frequently causes a root rot in young ponderosa pines and infrequently in lodgepole pine and Douglas-fir.
Armillaria root disease *Armillaria* spp.	Douglas-fir, grand fir, pines, spruce	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, infection levels increase following thinning in lodgepole pine stands.

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

Disease	*Host*	*Location*	*Remarks*
Schweinitzii butt rot *Phaeolus schweinitzii*	Douglas-fir, ponderosa pine	Idaho	Decay is common in mature and overmature forests, especially those having a recent fire or logging history. The fungus is often found associated with other root diseases and bark beetles.
Tomentosus root disease *Inonotus tomentosus*	Douglas-fir, spruce, subalpine fir	Idaho, Utah	The fungus is commonly found with *P. schweinitzii* as a root and butt rot of pole-size Douglas-fir and spruce in southern Idaho. Infection may result in occasional mortality.
Foliage Diseases			
Douglas-fir needlecast *Rhabdocline* spp.	Douglas-fir	Idaho	Heavy infection levels were noted in the fall of 1987 throughout the range of the host in central and southeastern Idaho. Defoliation levels will be high during early 1988.
Elytroderma disease *Elytroderma deformans*	Ponderosa pine	Idaho	High levels of infection were noted in stands on Little Donner Summit, Cascade, ID and in Manhattan Creek, Idaho City, ID.
Fir broom rust *Melampsorella caryophyllacearum*	Subalpine fir	Idaho, Utah, Wyoming	Infection occurs scattered throughout the host type, but high infection levels have been noted in forested areas south of Twin Falls and Burley, ID.
Fir needle cast *Lirula* spp.	Subalpine fir, grand fir	Idaho	Infected stands were found on the Council and Weiser Ranger Districts of the Payette National Forest
Larch needle cast *Meria laricis*	Western larch	Idaho	Incidence and severity of infection throughout the host type in west-central Idaho was low level.
Limber pine needle cast *Lophodermella arcuata*	Limber pine	Wyoming	Heavy infection of limber pine was aerially detected on 1,500 acres on the Bridger-Teton National Forest.
Marssonina blight *Marssonina populi*	Aspen	Idaho, Utah, Wyoming	Scattered incidence of light intensity was noted throughout most of the host range. Moderate to heavy infections were observed on the Wasatch-Cache, Ashley and Manti-LaSal National Forests, UT.

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

Disease	*Host*	*Location*	*Remarks*
Spruce broom rust *Chrysomyxa arctostaphyli*	Engelmann spruce	Idaho, Utah, Wyoming	Infection occurs scattered throughout the host type. It is common in eastern Idaho.

Pacific Southwest Region—Insects

Prepared by John W. Dale

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

Insect	*Host*	*Location*	*Remarks*
A coconut palm weevil *Rhobdoscelus asperipennis*	Coconut palm	Palau	Still common in the State of Peleliu in southern part of the Republic. No control measures carried out.
A longhorned grasshopper *Segestes unicolor*	Coconut palm, other palms	Palau	Populations have not declined and damage effects are evident throughout Palau.
A shorthorned grasshopper *Valanga nigricornis*	Banana, citrus	Palau	Damage is common and the insect remains a problem.
A shortnosed weevil *Lophothetas* sp.	Banana, mango; many forest and ornamental trees	Palau	The weevil continues to be a problem.
A thrips *Pseudanaphothrips* sp.	Norfolk Island pine	Oahu and Hawaii Islands	First detected in 1986. Feeding occurs within the male cones.
A woolly whitefly *Aleurothrixus floccosus*	Citrus, guava	Guam	This insect was introduced into Guam in the early 1980's from Hawaii. Parasites and treatment of infested trees with white mineral oil are current controls.
An armored scale *Furcaspis oceanica*	Coconut palm, *Pandanus* sp., nipa palm	Federated States of Micronesia, Palau	Heavy damage to coconut and Pandanus palms continues on Palau. Searches for biological control agents are underway.
Balsam twig aphid *Mindarus abietinus*	White fir	Northern California	Large populations appeared on 2-0 white fir seedlings at the Placerville Nursery, El Dorado County.
Black citrus swallowtail *Papilio polytes*	Citrus	Palau	Heavy defoliation continued on some small plants.
Citrus flower moth *Prays citri*	Citrus	Palau	The immature stages feed on flowers and cause galls in the fruit rind; the amount of damage is variable.
Citrus leafminer *Phyllocnistis citrella*	Citrus	Palau	Remains common and causes heavy damage to citrus leaves; common on seedlings.

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

Disease	*Host*	*Location*	*Remarks*
Coconut beetle *Brontispa* sp.	Coconut palm	Guam	Beetles occur between the tightly compressed leaflets of new spikes. Damage tends to be more severe in younger palms because of the time required for new spikes to open.
Coconut rhinoceros beetle *Oryctes rhinoceros*	Coconut palm	Palau	Still a problem. The introduction of *Baculovirus oryctes* and *Scolia ruficornia* have not reduced populations to acceptable levels.
Coconut scale *Aspidiotus destructor*	Avocado, betel palm, breadfruit, cacao, coconut palm, guava, pandanus palm, soursop	Guam, Federated States of Micronesia, Palau	The scale is widespread in Guam, but is more prevalent in the central area. Size and height of host plants make control difficult. Research for biological control agents continues in the Federated States of Micronesia. Very common in Palau on avocado and betel palm. Damage is spotty in the absence of biological control agents, one of which is effective when present.
Douglas-fir engraver *Scolytus unispinosus*	Douglas-fir	Northern California	Top-kill of mature trees occurred in several areas of Humboldt and Mendocino Counties, and mortality of sapling and pole-sized trees occurred in Mendocino County.
Douglas-fir tussock moth *Orgyia pseudotsugata*	White fir	Central and northern California	An outbreak has developed, with several discrete areas of light to heavy defoliation ranging in size from 25 to 200 acres, mostly on ridge tops and upper slopes. Gross acreage is 5,000 to 10,000 acres in Plumas County. Fifty acres of light defoliation were found in El Dorado County.
Douglas-fir twig weevil *Cylindrocopturus furnissi*	Douglas-fir	Northern California	Damage was limited primarily to unthrifty trees within abandoned plantations in Mendocino County.
Eucalyptus borer *Phoracantha semipunctata*	Eucalyptus	Southern California	A substantial number of trees were killed by this borer in the city of Industry, Los Angeles County; the insect did appear to increase its range in 1987.

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

Disease	*Host*	*Location*	*Remarks*
Fir engraver *Scolytus ventralis*	White fir, red fir	California	Heavy mortality of white fir occurred around South Lake Tahoe, El Dorado County, and mortality continued in the red and white fir of Trinity County. However, stress caused by subnormal precipitation in 1986/87 did not result in widespread reports of fir mortality from engravers.
Fruit-piercing moth *Othreis fullonia*	Citrus, guava, coral tree	Hawaii, Northern Mariana Islands	First reported in Hawaii in 1985, this insect is a problem in coral tree (*Erythrina variegata*) plantings, and poses a threat to native Erythrinas and other related native species in the forest. It causes severe damage to fruit in the Northern Mariana Islands.
Gouty pitch midge *Cecidomyia piniinopis*	Ponderosa pine	Northern California	Damage occurred in a number of young plantations. It also caused severe defoliation in saplings, poles and small sawtimber in three stands in Siskiyou County.
Gypsy moth *Lymantria dispar*	Hardwoods, ornamentals	California	Single male moths were trapped in six counties in 1987. The only site treated for eradication was at Encino, Los Angeles County. No sites are proposed for eradication in 1988. Seven male moths were trapped in Josephine County, Oregon, just 20 miles north of Del Norte County, California.
Hibiscus mealybug *Nipaecoccus vastator*	*Leucaena* spp., coconut palm	Guam, Northern Mariana Islands	On Guam, the mealybug is found on almost all kinds of trees and palms, but are more abundant on coconut and tangantangan. Populations are below economic level on Saipan, Tinian, and Rota as a result of the introduction of a hymenopterous parasite from Hawaii.
Jeffrey pine beetle *Dendroctonus jeffreyi*	Jeffrey pine	California	Increased mortality occured in Garner Valley, San Bernardino County.
Lodgepole needleminer *Coleotechnites milleri*	Lodgepole pine	Yosemite National Park	Populations were at their lowest levels in 20 years; populations were low even in refuge areas.

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

Disease	*Host*	*Location*	*Remarks*
Mango shoot caterpillar *Penicillaria jocosatrix*	Mango	Guam	Larvae feed on young leaves and occasional poor mango production is attributed to the damage.
Melon fly *Dacus cucurbirtae*	Avocado, citrus, figs, mango	Guam, Northern Mariana Islands	Economically significant populations are now well established on Guam, Rota, Tinian and Saipan. Eradication on Rota will be attempted by the Agricultural Research Service in 1988.
Modoc budworm *Choristoneura retiniana*	White fir	Northern California	Light to moderate defoliation occurred on 25,000 acres in the Warner Mountains and the Manzanita mountain area of Modoc County.
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, ponderosa pine, sugar pine	Central and northern California	Reports were limited to densely stocked pockets of ponderosa pine. Mortality continued in Yosemite National Park.
Nantucket pine tip moth *Rhyacionia frustrana*	Monterey pine	Central and southern California	The moth now occurs in Kern, Orange, San Bernardino, San Diego, Fresno, Alameda and Santa Cruz Counties.
New Guinea sugarcane weevil *Rhobdoscelus obscurus*	Betel palm, coconut palm	Palau	So far, the infestation is limited to sugarcane; no palms have been attacked.
Palau coconut beetle *Brontispa palauensis*	Coconut palm	Palau	The beetle is common and there are signs that the infestation is slowly increasing, mostly in young coconut palms.
Pine engraver beetles *Ips* spp.	Pines	California	Mortality and top-killing caused by pine engravers were reported from plantations of ponderosa pine in Siskiyou and Placer Counties, stands of sawtimber ponderosa pine in Lake and Placer Counties, and in Mendocino County as a result of trees left after road construction.
Poinciana looper *Pericyma cruegeri*	Flame tree, young Albizia, and other leguminous species	Guam, Northern Mariana Islands, Palau	On Guam and Rota, Northern Mariana Islands, this insect is the most important pest of poinciana. Feeding begins with the onset of the rainy season, which makes control difficult. In Palau, activity was at its lowest level since introduction.

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

Disease	*Host*	*Location*	*Remarks*
Redbanded thrips *Selenothrips rubrocinctus*	Avocado, cashew, cacao, mango	Palau	Leaf scarification is common on all hosts.
Red turpentine beetle *Dendroctonus valens*	Pines	California	This remained the most common scolytid beetle in Yosemite National Park. In Santa Cruz County, the beetle and the Monterey pine Ips, *Ips mexicanus*, were associated with the death of Monterey pines infected by pitch canker disease.
Spiraling whitefly *Aleurodicus dispersus*	Cassava, fruit trees, ornamentals, shade trees	Federated States of Micronesia, Palau	The whitefly has spread throughout the island of Pohnpei. Biological control agents that become effective in about six months have been introduced. In Palau, damage varied by location and has been reduced by biological control agents.
Sugar pine tortrix *Choristoneura lambertiana*	Lodgepole pine	Northern California	Defoliation in the Warner Mountains, Modoc County, declined to light and moderate in 1987.
Tangantangan psyllid *Heteropsylla incisa*	Tangantangan and other *Leucaena* species, *Samanea saman*	Guam, Hawaii, Northern Mariana Islands, Palau	Discovered in Hawaii in 1984, the population fluctuates with flushes of new foliage and is controlled by coccinellids. In the Mariana Islands, populations also fluctuate significantly with the passage of typhoons. No control is presently effective. In Palau, populations have declined because of diminished numbers of the host plant
Tent caterpillar *Malacosoma* sp.	Bitterbrush	Northern and eastern California	An infestation in Inyo and Mono Counties continued for the fourth year, covering 15,000 acres. Virus infections have not caused significant population reduction.
Western pine beetle *Dendroctonus brevicomis*	Coulter pine, ponderosa pine	California	The few reports of spring activity were related to overstocking and underburning. Activity was increasing in the Sierra Nevada and Cascade Mountains by late summer and fall. Approximately 1500-2000 pines were fading in scattered spots across McCloud Flats, Siskiyou County.
Western yellowjacket *Vespula pensylvanica*	Native insects and animals, man	Hawaii	A localized public health concern.

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

Disease	*Host*	*Location*	*Remarks*
White fir needleminer *Epinotia mertiana*	White fir, red fir	Central and northern California	Light to heavy defoliation was reported on 5,000 to 6,000 acres scattered throughout the Sierra Nevada Mountains and northward to Modoc County.

Pacific Southwest Region—Diseases

Prepared by Gregg A. Denitto

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

Disease	*Host*	*Location*	*Remarks*
Stem and Branch Diseases			
Botryosphaeria canker *Botryosphaeria ribis*	Ceanothus, chamise, manzanita	Southern California	Dieback has increased in foothills of San Gabriel Mountains. It is believed that air pollution and moisture stress predispose plants to attack by the fungus.
Citrus canker *Xanthomonas* sp.	Citrus	Guam	Disease prevalent on citrus trees on Guam. It is believed it also occurs on other native species. Symptoms include brown lesions on leaves, stem, and bark.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, pine, true firs	California	Infected conifers on 2.3 million acres of commercial forest land. Caused growth loss and mortality of trees. Estimated that 100 million cubic feet of mortality involved dwarf mistletoes. Suppression projects were carried out in recreation areas on the Lake Tahoe Basin Management Unit, Angeles National Forest, and Kings Canyon National Park.
European mistletoe *Viscum album*	Hardwoods	Sonoma Co., California	Infestation limited to Santa Rosa Sebastopol area.
Fusicoccum canker *Fusicoccum* sp.	Pacific madrone	El Dorado and Santa Cruz Co., California	Canker that killed stem and branches of host.
Oak twig dieback *Cryptocline cinerascens* *Diplodia quercina*	Oak	Central and northern California	These fungi caused concern in residential areas and research continued into control measures.
Pitch canker *Fusarium moniliforme* var. *subglutinans*	Aleppo, Bishop, Italian stone, Monterey pines	Central coastal California	Identified in 7 locations. The largest infestation covers approximately 23 square miles. Research on this disease in California is continuing.
Sclerophoma canker *Sclerophoma semenospora*	Douglas-fir	Humboldt Co., California	An annual canker, associated with frost damage, found on saplings and poles in plantations and natural stands on the Six Rivers National Forest.

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

Disease	*Host*	*Location*	*Remarks*
True mistletoe *Phoradendron* spp.	Cottonwoods, oaks, sycamores, other native and introduced hardwoods	California	Infection was common in many native hardwood stands in California. These parasitic plants have caused a decline of vegetation in many high-use recreation areas.
White fir mistletoe *Phoradendron bolleanum* subsp. *pauciflorum*	White fir	Central and southern California	Infestations were severe in some stands in the southern Sierra Nevada and in southern California. Mistletoe was involved in 15 to 20 percent of the white fir mortality on the San Bernardino National Forest.
Western gall rust *Endocronartium harknessii*	Lodgepole pine	Northern California	This rust disease is widespread on lodgepole pines in north central and northeastern California. It was killing seedlings and branches of larger trees over a wide area.
White pine blister rust *Cronartium ribicola*	Sugar pine, western white pine	Central and northern California	This disease has been reported throughout the Sierra Nevada and northern mountains. Planting of non-resistant sugar pine is being curtailed because of the disease.
Root Diseases			
Annosus root disease *Heterobasidion annosum*	Conifers, some hardwoods	California	About 1.4 million acres of pine type and 0.6 million acres of true fir type are infested by this disease. It was involved in the mortality of approximately 19 million cubic feet of timber. In recreation forests, it has been associated with tree failures, property damage, and injury to forest visitors. Two new hosts were discovered in California: Monterey cypress and red alder.
Armillaria root disease *Armillaria* spp.	Conifers, hardwoods	California	Armillaria root disease was associated with mortality of trees that were under stress.
Black stain root disease *Ceratocystis wageneri*	Douglas-fir, ponderosa pine, singleleaf pinyon pine	California	This disease was found on 2 naturally regenerated ponderosa pines in an area harvested 8 years previous because of black stain root disease.
Flame tree root disease *Phellinus noxius*	Flame tree	Guam, Northern Mariana Islands	Site-specific mortality on Rota; scattered on a wider range of sites on Saipan.

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

Disease	*Host*	*Location*	*Remarks*
Port-Orford-cedar root disease *Phytophtora lateralis*	Port-Orford-cedar	Northern California	Planted cedars in the town of Trinidad were confirmed to have the disease.
Foliage Diseases			
Elytroderma disease *Elytroderma deformans*	Jeffrey pine, ponderosa pine	California	Increased observations of symptoms in historically active areas.
Mango scab *Elsinoe mangiferae*	Mango	Guam	This fungus attacks young leaves, flower heads, twigs, and fruits. It causes a wrinkling, distortion, and dropping of leaves and fruit.
Vascular Wilts			
Dutch elm disease *Ceratocystis ulmi*	Elm	San Francisco Bay Area	Dutch elm disease incidence decreased and was confined to the Bay area. Infection was confirmed and treated on 210 trees.
Nursery Diseases			
Black smothering disease (unidentified fungus)	Citrus	Yap	This unidentified fungal disease is epidemic in several areas on the island. It is killing seedlings and some mature trees. It is a problem primarily in nursery situations.
Fusarium hypocotyl rot *Fusarium oxysporum*	Douglas-fir	Humboldt Nursery, California	Fusarium hypocotyl rot was reported on 1-0 Douglas-fir, but did not cause significant damage.
Phomopsis canker *Phomopsis occulta*	Douglas-fir	Humboldt Nursery, California	Minor damage of 2-0 Douglas-fir was reported caused by this disease.

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

Disease	*Host*	*Location*	*Remarks*
Other			
Air pollution effects Ozone	Jeffrey pine, ponderosa pine	Central and southern California	A survey of pines around Lake Tahoe found slight injury symptoms at over half of the plots scattered around the lake. Ozone injury plots on the Sierra National Forest were reevaluated (previously examined in 1985). Symptoms increased on 62 percent of the plots, decreased on 19 percent, and remained unchanged on 19 percent. Overall, injury to trees remains in the slight and moderate categories.
Bud rot *Phytophthora palmivora*	Coconut palm, ifil, joga	Guam	Causes bud rot, leaf drop, and wilt. Mainly a disease of coconut palm as bud rot.
Cadang-cadang Yellow mottle virus	Coconut palm	Guam	This disease has spread in the Pacific in a short time. It has caused a serious decline in copra production where it occurs. Symptoms include gradual yellowing, necrosis at the base of the petioles, tree stunting, leaf dieback, and tree mortality. There is no known method of control. Because coconut is an important food, this is a very important disease on Guam.
Joga decline (unknown cause)	Joga	Rota	This disease is found in the high limestone forests on the island. Symptoms include defoliation and branch dieback. The cause is unknown, but the current drought may be exacerbating the condition.
Rhizopus rot *Rhizopus artocarpi*	Jackfruit	Guam	This fungus attacks the immature fruits, starting from the tip and progressing to the base of the fruit. It occurs more abundantly during the rainy season.
Winter drying Environmental conditions	Coulter, Jeffrey, ponderosa, sugar pines, white fir	California	Numerous reports from scattered locations were received of winter drying and desiccation of needles. The limited snow cover may have contributed to this condition by exposing foliage to solar radiation and drying winds.

Pacific Northwest Region—Insects

Prepared by Sarah Groove

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 increased significantly east of the Cascade Range: losses in Douglas-fir occurred on 22,560 acres (1.4 million cubic feet); an increase from 245,730 cubic feet in 1986. The greatest damage in 1987 was on the Colville and Kaniksu National Forests. West of the Cascades, losses increased significantly. Damage was reported on 16,030 acres in 1987 compared with 3,670 acres in 1986; volume loss increased to 1.4 million cubic feet from 0.8 million cubic feet in 1986.
Douglas-fir bud moth *Zeiraphera hesperiana*	Douglas-fir	Oregon	No defoliation was observed.
Fir engraver *Scolytus ventralis*	True firs	Oregon, Washington	Fir engraver activity continued to increase 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 24,570 acres (639,000 cubic feet) as compared to 15,920 acres (315,200 cubic feet) in 1986.
Gypsy moth *Lymantria dispar*	Conifers, various hardwoods	Oregon, Washington	In Oregon, only 80 moths were trapped in 1987, down from the 613 moths detected in 1986. In Clackamas County, 12 moths were trapped, 7 in Josephine County, 41 in Lane County, 1 in Marion County, and 19 in Multnomah County. The eradication area has shrunk from an initial 227,000 acres in 1985, to 194,000 acres in 1986, to only 12,000 acres in 1987. Eradication projects were conducted in Clackamas, Douglas, Lane, Marion, and Washington Counties in 1987.

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

Insect	*Host*	*Location*	*Remarks*
Modoc budworm *Choristoneura retiniana*	Douglas-fir, true firs	Southern Oregon	Modoc budworm defoliation continued to decrease in southern Oregon in true fir stands on the Fremont and Winema National Forests. Acres of visible defoliation decreased from 281,910 in 1986 to 63,200 in 1987.
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, but increased on the Okanogan National Forest. In Oregon, losses have decreased slightly on the Deschutes, Fremont, and Winema National Forests. Losses increased on the Willamette, Wallowa-Whitman, and Umpqua National Forests. Approximately 1.6 million acres were infested during 1987. Oregon had 1.4 million infested acres; Washington had 158,000 acres. In 1986, 1.76 million acres in these two states were infested. Beetle losses in 1987 involved 1.3 million acres (39 million cubic feet) of lodgepole pine; 295,000 acres (3.9 million cubic feet) of ponderosa pine; 38,000 acres (2.6 million cubic feet) of western white pine; and about 1,000 acres of various other pine species. Losses are expected to remain the same in south-central Oregon but to increase in north-central Washington.
Pine engraver *Ips* sp.	Ponderosa pine	Oregon, Washington	Pine engraver activity decreased to 7,440 acres. Most of the activity was on the Ochoco National Forest.
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Oregon, Washington	Spruce beetle activity increased in Oregon and Washington. Losses occurred on 31,830 acres (5.4 million cubic feet) in 1987 compared to 24,500 acres (1.8 million cubic feet) in 1986. The outbreak on the Wallowa-Whitman National Forest accounts for 26,000 acres (5.2 million cubic feet) of the infested areas.

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

Insect	*Host*	*Location*	*Remarks*
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Oregon, Washington	Tree mortality caused by the western pine beetle increased in Oregon and Washington from 2.6 million cubic feet in 1986 to 2.8 million cubic feet in 1987. Greatest losses occurred on the Malheur 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 decreased from 6.0 million acres in 1986 to 4.1 million acres in 1987. In Oregon, budworm decreased on the Malheur, Mt. Hood, Willamette, Deschutes, Ochoco, and Umatilla National Forests; on the Warm Springs Indian Reservation; and on intermingled State and private lands. Defoliation continues to increase on the Wallowa-Whitman National Forest. In Washington, the size of the budworm infestation on the Okanogan and Wenatchee National Forests and adjacent State and private lands decreased. Defoliation was reported for the first time in this outbreak on the Colville National Forest.

Pacific Northwest Region—Diseases

Prepared by Craig L. Schmitt

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 plants are declining. However, dwarf mistletoes still caused an estimated loss of 132 million cubic feet of timber in Oregon and Washington in 1987. 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 occurred in younger stands of thin-bark species, which are susceptible to wounding during stand entries. Wounding of residual trees 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.

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

Disease	*Host*	*Location*	*Remarks*
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 170 million cubic feet. A root disease model that operates as part of the Stand Prognosis Model is being tested. Currently, the model can be used to project losses caused by Armillaria root disease and laminated root rot. All field data has been collected on a multi-pest survey of selected stands on the Wallowa-Whitman NF.
Annosus root disease *Heterobasidion annosum*	Western hemlock, white fir, ponderosa pine	Oregon, Washington	Annosus root disease is responsible for extensive losses in many partially 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. Annosus root disease was found affecting stands on the Wallowa-Whitman NF, but at lower levels of severity than Forests in southern Oregon. Severity is expected to increase with time. Annosus root disease is being observed with increasing frequency in ponderosa pine stands on very dry sites in southeast Oregon.
Armillaria root disease *Armillaria* spp.	Various conifers	Oregon, Washington	The most serious losses to this disease occurred east of the Cascades. Losses west of the Cascades were usually confined to stressed stands, such as off-site plantings. Direct control through stump and root removal is being practiced in severely infected stands in eastern Washington.

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

Disease	*Host*	*Location*	*Remarks*
Black stain root disease *Ceratocystis wageneri* [*Verticicladiella wageneri*]	Douglas-fir	Oregon, Washington	In southwestern Oregon, this was by far the most commonly encountered disease in Douglas-fir plantations. It appeared to be especially damaging where disturbances had occurred, especially in roadside Douglas-firs cut back by mechanical choppers. Losses were 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 was also severe in some East Side grand and white fir stands.
Port-Orford-cedar root disease *Phytophthora lateralis*	Port-Orford-cedar	Southwestern Oregon	Port-Orford-cedar root disease continued to cause widespread mortality of Port-Orford-cedar in southwestern Oregon.
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 relatively low because of dry springs and falls in the past 3 years.
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 was scattered, with less than 1 percent of crop affected in most nurseries. Fungicide applications were helpful when cankers were above ground and not covered with soil collars.

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

Disease	*Host*	*Location*	*Remarks*
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 1987.
Phytophthora root rot *Phytophthora* spp.	Douglas-fir, other conifers	Oregon, Washington	Moderately dry weather throughout summer, fall, and winter caused disease severity to be relatively low in 1987. Seedbed seedling damage was confined primarily to nursery beds with poor drainage or compaction layers in the rooting zone.

Southern Region—Insects

Prepared by Patrick J. Barry

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*
Black turpentine beetle *Dendroctonus terebrans*	Southern pines	Regionwide	Drought stress and late spring wildfires pre-disposed many forest stands to moderate losses.
Coneworms *Dioryctria amatella* *Dioryctria clarioralis* *Dioryctria disclusa* *Dioryctria merkeli*	Southern pines	Regionwide	Populations of *D. merkeli* decreased across the south as evidenced by pheromone trap catches. Certain treated seed orchards and sources continue to sustain significant losses caused by *D. clarioralis* and *D. merkeli*. *D. amatella* and *D. clarioralis* continue to cause low to moderate damage across the south.
Fall webworm *Hyphantria cunea*	Various hardwoods	Alabama, Arkansas, Texas	Populations in Alabama were low Statewide; high throughout Arkansas; and widespread in central Texas on pecan trees.
Forest tent caterpillar *Malacosoma disstria*	Tupelo gum, other hardwoods	Alabama, Louisiana, North Carolina	One case involving 1 tree in Alabama. Partial to complete defoliation occurred on 460,000 acres in south Louisiana. This has resulted in a growth loss of 125,000 cords valued at $625,000. Also, heavy and widespread defoliation, especially in the swamps, bottomlands, and other drainage areas of eastern North Carolina.
Fruittree leafroller *Archips argyrospila*	Baldcypress	Louisiana	Severe defoliation (>60 percent of crowns turn red) was restricted to 35,000 acres in the Atchafalaya Basin. Light (<60 percent) defoliation occured on an additional 25,000 acres. This resulted in a growth loss of 1,050,000 board feet valued at $84,000.

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*
Gypsy moth *Lymantria dispar*	Various hardwoods	Arkansas, Georgia, Kentucky, Oklahoma, South Carolina, Tennessee, Texas	Six adult moths were trapped in one trap in Aransas County in Texas. One male moth was trapped in Arkansas. Repeated hitchhiker incidents found across the State of Oklahoma: follow-up trapping has not revealed an infestation. Six adult moths were trapped in 13,151 traps set in Georgia. Eight adults were captured in 4,509 traps deployed in Kentucky. Tennessee captured 64 moths in 9,220 traps. A total of 642 moths were captured in 3,241 traps in South Carolina; most of these at Surfside Beach in Horry County. None of these four states had eradication projects in 1987.
Ips *Ips* spp.	Southern pines	Georgia	Ips bark beetles are affecting shade trees in urban areas throughout the state. Approximately 3,200 trees have been killed by this pest due to the drought.
Loblolly pine sawfly *Neodiprion taeda linearis*	Loblolly pine	Alabama, Tennessee	Two trees defoliated in Russell County, Alabama. Highest populations in over 15 years in southern half of west Tennessee.
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. About 1.3 million loblolly seedlings were damaged in a nursery.
Oak leaf skeletonizer	Chestnut oak	Georgia	This insect defoliated or skeletonized about 1,000 acres of host type on the Pickens-Dawson County line.
Pine engravers *Ips* spp.	Southern pines	Regionwide	Activity in seed orchards resulted in N.C. and Ga. limited tree mortality. Activity and tree mortality were high throughout the Southeast in drought-stressed areas. High levels of mortality also occurred in late spring where the trees were severely stressed by wildfire.
Pine sawfly	Southern pines	Arkansas, Oklahoma	Caused significant damage in pine plantations throughout Oklahoma. A few trees were damaged in southern White County, Arkansas.

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*
Redheaded pine sawfly *Neodiprion lecontei*	Slash pine, loblolly pine	Florida, Texas	A 240-acre slash pine plantation was treated in Clay Co. This population was present in the plantation over a year. Sixty acres of 5-year-old loblolly pine in Van Zandt County, Texas was devastated.
Seedbugs *Leptoglossus corculus* *Tetyra bipunctata*	Southern pines	Florida, Louisiana, Mississippi, North Carolina, South Carolina, Texas	Moderate populations caused scattered seed losses, except in Florida where high populations of *T. bipunctata* were found on unprotected sand pine. Inventory monitoring on two federal seed orchards and observations in private orchards in Texas indicated high populations of *T. bipunctata*.
Slash pine thrips *Gnophothrips fuscus*	Slash pine	Florida	Minimal seed and cone losses reported.
Southern pine beetle *Dendroctonus frontalis*	Southern pines	Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia	Southern pine beetle losses declined sharply in 1987. Losses declined for the second year in a row in Texas, with the number of infestations decreasing greatly in the northeast portion of the State. Louisana also had a sharp decline. Northwest Mississippi continued to have a large number of spots and will probably have continued high losses. Spot infestations by State follow. The States of Florida, Georgia, Louisana, and Oklahoma reported spots, but had no counties in outbreak status.
Texas leafcutting ant *Atta texana*	Southern pines	Louisiana, Texas	Serious losses continued in pine plantations on deep sandy soils.

Number of Spots

	1986	*1987*
Alabama	8,126	2,398
Arkansas	5,429	1,950
Florida	29	125
Georgia	15,799	2,493
Louisana	19,723	1,925
Mississippi	9,942	5,706
North Carolina	6,553	2,476
Oklahoma	0	8
South Carolina	7,409	1,317
Tennessee	?	2,356
Texas	8,538	819
Virginia	839	1,950
	82,387	23,523

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*
Variable oakleaf caterpillar *Heterocampa manteo*	Oak	Arkansas	Heavy defoliation in central-north central part of State.
Walkingstick *Diapheromera femorata*	Oaks	Oklahoma	Walkingstick defoliation was light in Oklahoma this year.
White pine conebeetle *Conophthorus coniperda*	Eastern white pine	North Carolina, Tennessee, Virginia	Beetle populations caused damage in orchards in Tenn. and N.C. Cone mortality approached 75 percent in untreated blocks on the USFS Beech Creek Orchard. High populations are predicted for 1988. A small scale test using a late spring fire produced favorable results. More testing is planned for 1988.
Balsam wooly adelgid *Adelges piceae*	Fraser fir	North Carolina, Tennessee, Virginia	Populations of this exotic pest continue to kill firs throughout the spruce/fir areas. Most of the mature firs have been killed by the adelgid, except on Mt. Rogers in Virginia and on top of the highest peaks.
Periodical cicada *Magicicada septendecim*	Hardwoods	North Carolina, Georgia, Tennessee, Virginia	Brood X of the periodical cicada emerged in north Georgia, east Tennessee, western North Carolina, and northern Virginia. Damage was limited to twig mortality in most areas.
Pine spittlebug *Aphrophora parallela*	Pine	North Carolina	Populations were very heavy, especially in the mountainous area of the State. No control is usually recommended, except on ornamentals or in nurseries.

Southern Region—Diseases

Prepared by Charles E. Affeltranger

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			
Butternut canker *Sirococcus clavigignenti-juglandacearum*	Butternut	Throughout range of butternut	Since 1966, disease has killed 77 percent of the butternut in North Carolina and Virginia.
Canker rot *Inonotus hispidus Strumella coryneoidea*	Oaks	Alabama, Georgia, Mississippi, North Carolina, Tennessee, Virginia	Recreation area trees damaged in western North Carolina. Five National Forest areas affected. Approximately 800 trees hazardous to recreationists in one area.
Chestnut blight *Cryphonectria parasitica* (=*Endothia parasitica*)	Native chestnuts, exotic chestnuts	Throughout host ranges	Large trees have been eliminated. Damage to sprouts continued, as did research efforts into reducing the virulence of the disease-causing organism. Butt swell and rot result on scarlet oak in some areas.
Cytospora canker *Cytospora* sp.	Cottonwood	Extreme western Oklahoma	Common on trees occurring along major streams. Aggravated by severe moisture stress due to drought and lowering of water table which has nearly eliminated forest cover from many areas.
Fusiform rust *Cronartium quercuum* f. sp. *fusiforme*	Loblolly pine, slash pine	Regionwide, except Kentucky, Puerto Rico, Tennessee, U.S. 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 $36 million. Over 600 million trees are stem infected in the Southeast. The disease was reported from southeast Texas in 1987. Evaluation in Louisiana indicated as much as 50 percent of unthinned slash pine can be lost in first 15 years.

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*
Eastern gall rust *Cronartium quercuum*	Shortleaf pine	Alabama	Damage to urban stand.
Hypoxylon canker *Hypoxylon atropunctatum*	Hickory, oak	Regionwide	Common on drought stressed or weakened trees on forest sites and urban environments. Has become more widespread because of extended drought. Suppression efforts in Oklahoma include removal of diseased trees, disposal of the wood, and maintaining "healthy" forests.
Leyland cypress canker *Seiridium cardinale*	Leyland cypress	South Carolina	The canker was found in South Carolina in orchard trees, rooted cuttings, and field plantings. Some trees had dozens of cankers and were killed by the fungus.
Pitch canker *Fusarium moniliforme* var. *subglutinans*	Southern pines, especially loblolly and slash pines	Alabama, Arkansas, Florida, Louisiana, Mississippi, North Carolina, Texas	Widespread on slash and shortleaf pines. Sporadically severe on loblolly. Killed Virginia and eastern white pine saplings in North Carolina. Damage to urban stands.
Slime flux *Erwinia* spp. and other bacteria	Cottonwood, oak	North Carolina, Texas	Severe on overmature trees previously storm-damaged and pruned.
Stem decay Basidiomycetes	All species, especially hardwoods	Regionwide	Continued to be a serious problem. More common in fire- and storm-damaged stands.
Phellinus pini	Virginia pine, eastern white pine	Georgia, Tennessee	Old growth sawtimber affected. Timber sale volume underestimated due to high incidence and severity in some localities.
Phellinus weirianus	Black walnut	Oklahoma	Heart rot is a major cause of degrade and loss.
Twig canker *Fusarium* sp. and Ambrosia beetle, *Xylosandrus compactus*	Laurel oak	Georgia	Large, transplanted urban trees suffering dieback from beetle/fungus complex.
Sphaeropsis sapinea (=*Diplodia pinea*)	Spruce pine	Florida	New report.
White pine blister rust *Cronartium ribicola*	Eastern white pine	North Carolina, Virginia	Found above 3,000 feet and was only serious in localized 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*
Root Diseases			
Annosus root disease *Heterobasidion annosum*	Southern pines, eastern white pine	Regionwide	Annosus was the most serious root disease in the South. Damage reported again in thinned stands in Alabama, Florida, Louisiana, Mississippi, North Carolina, South Carolina, and northeast Texas. Current surveys showed that the disease may cause a major growth loss, as well as mortality on high- to moderate-hazard sites. High-hazard soils occur on about 20 percent of the South's land base. Eastern white pine progeny tests had 5 to 10 percent mortality in Georgia. In Arkansas, the disease may worsen when southern pine plantations are thinned.
Littleleaf disease poorly-drained, eroded soils, *Phytophthora cinnamomi*, and *Pythium* spp.	Loblolly pine, shortleaf pine	Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee	Most severe in Piedmont in natural stands growing on eroded, heavy clay soils. Surveys showed considerable growth loss to 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 were severe or trees overmature. This year, mortality may have been higher because of the severe spring drought.
Root decline *Verticicladiella procera*	Eastern white pine, loblolly pine	Georgia, North Carolina, Tennessee, Virginia	A serious problem in Christmas tree plantations. May be insect vectored. Often associated with other root diseases.
Foliage Diseases			
Anthracnose *Gnomonia* sp. *Discula* sp. (=*Gloeosporium* sp.) *Kabatiella* sp. (=*Gloeosporium* sp.) *Apiognomonia* sp. (=*Gnomoni* sp.)	Hardwoods, especially ash, dogwood, maple, sycamore, and walnut	Regionwide	Anthracnose can cause premature defoliation and shoot dieback. The wet spring resulted in moderate to high levels of incidence during 1987. Impact seldom severe.

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*
Brown spot *Mycosphaerella dearnessii* (=*Scirrhia acicola*)	Longleaf pine, loblolly pine	Throughout longleaf range, Tennessee	Locally severe in regeneration areas, but can be controlled by using prescribed fire and fungicidal root dips or by planting genetically resistant stock. Foliage in a mature stand in Florida was severely affected. Loblolly regeneration in Tennessee severely affected.
Dogwood mortality (anthracnose) *Discula* sp.	Flowering dogwood	Northern Georgia, Western North Carolina	A disease of flowering dogwood, new to the South, was detected on 30,000 acres of northern Georgia and parts of three counties in western North Carolina. The disease is causing premature defoliation and tree death in much of the affected area.
Needle casts of pine *Lophodermium* spp. *Ploioderma* spp.	Pines	Regionwide	Pole- and sawtimber loblolly pines lost all second year needles in isolated Tennessee outbreaks. In Christmas tree plantings in Georgia, South Carolina, Mississippi, and Tennessee, the disease was common but was being controlled with fungicides.
Oak leaf blister *Taphrina caerulescens*	Red oaks	Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Texas	Scattered but not severe. Unsightly on urban trees. Fewer reports of this problem than in past years.
Pine needle rust *Coleosporium* spp.	Pines, especially loblolly	Regionwide	Widespread in portions of Tennessee, North Carolina, and Mississippi.
Powdery mildew *Uncinula macrospora* *Microsphaera sp.*	Elm, oak	Tennessee	Increased incidence over previous years.
Vascular Wilts			
Dutch elm disease *Ceratocystis ulmi*	Elms	Throughout host range	Reported on scattered urban trees in North Carolina, Tennessee, and Virginia. Recorded in nine northern Louisiana parishes and two northeastern Texas counties from 1983-87. In central and western Oklahoma, kills trees along water courses and seriously limits elms for shelterbelt use.

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*
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	Mountain states maintain low-level survey efforts. Reported on live and Spanish oaks in 35 central Texas counties in urban and rural areas where disease is increasing. Suppression efforts are proposed for 1988.
Sycamore leaf scorch xylem-limited bacteria	Sycamore	Florida, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia	Widespread late in growing season. Oak occasionally affected.
Verticillium wilt *Verticillium albo-atrum*			Reported from elm in Ouachita Parish, Louisiana.
Nursery Diseases			
Charcoal root rot *Macrophomina phaseolina*	Loblolly pine	Florida	A section of beds in one nursery had damage ranging from 1 to 5 percent of seedlings, with areas of 40 percent mortality. The disease intensified suddenly as a result of abnormally high temperatures and extended drought. Fumigation problems may have contributed.
Cylindrocladium root rot *Cylindrocladium* spp.	Eastern white pine	North Carolina	Chronic low-level infection at one nursery. In high-level infection areas, soil fumigation gave adequate control.
	1-0 black walnut, 1-0 yellow-poplar		Localized spots with 15 percent mortality.
Damping-off *Cylindrocladium* spp. *Fusarium* spp. *Phytophthora* spp. *Pythium* spp. *Rhizoctonia* spp.	Many conifers and hardwoods	Regionwide	Chronic losses typified by reduced and irregular density in the seedbeds. Retarded by pre- and post-plant fungicide drenches.

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 blight *Botrytis cinerea*	Virginia pine	North Carolina	Foliage blight progressed to stem lesions in densely stocked bare-root seedbeds. About 200,000 affected trees were culled.
Fusarium root rot *Fusarium* spp.	Eastern white pine, Virginia pine, and loblolly pine	Regionwide	Persistent problem in poorly drained beds. At least 40,000 loblolly pine lost in one bareroot nursery and 5 percent (75,000 seedlings) of Virginia pine lost in a container nursery in Alabama.
Fusiform rust *Cronartium quercuum* f. sp. *fusiforme*	Loblolly pine, longleaf pine, slash pine	Eastern Texas to eastern Virginia	Forty percent incidence in recently established nursery. Otherwise excellent control achieved with applications of systemic fungicide (Bayleton) to seed and foliage.
Nematode damage *Belonolaimus* sp. *Criconemoides* sp. *Hoplolaimus* sp.	Loblolly pine	Louisiana	Mortality and growth loss in one nursery. Thirty thousand seedlings not plantable.
Pitch canker *Fusarium moniliforme* var. *subglutinans*	Eastern white pine	North Carolina	Some seedlots of container-grown seedlings had 30 to 50 percent mortality.
Rhizoctonia needle blight *Rhizoctonia* spp.	Eastern white pine, loblolly pine, slash pine	South Carolina, Virginia	Large areas of mortality in young seedlings where density was high and fumigation inadequate.
	Longleaf pine	Alabama, Florida, Georgia, Louisiana	Needle necrosis and bud death in nurseries with deep, sandy soils and inadequate mulch. Loss of 200,000 seedlings in one 1986 crop.
Rhizoctonia needle blight *Rhizoctonia* sp.	Longleaf pine	Alabama	Loss of 200,000 seedlings in 1986 crop and scattered mortality in two nurseries.
Sphaeropsis sp. (=*Diplodia*)	Eastern white pine	Virginia	Scattered incidence in one nursery.
Tip blight *Phoma* sp.	Loblolly pine	Arkansas, Alabama, Florida, Georgia, Kentucky, Louisiana, North Carolina, South Carolina, Tennessee, Texas, Virginia	Forking results. Reduced incidence over past years may be related to mulching and insect controls. Scattered mortality and damage in several nurseries in Arkansas and Alabama with 23,000 seedlings culled.

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*
Seed Orchard Diseases			
Brown spot needle blight *Mycosphaerella dearnessii* (=*Scirrhia acicola*)	Sand pine	Florida	Seedling seed orchard had some families with heavy incidence. First report on sand pine.
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 that was sometimes severe. Caused branch, flower, conelet, and cone mortality. Damage was clonal. Associated with pine sawyer maturation feeding in North Carolina shortleaf. Stored white pine cones found infected in Virginia. Present in 90-100 percent of longleaf clones in two orchards in Louisiana and Mississippi where incidence increased for past five years. May have predisposed longleaf pine in one orchard to bark beetle mortality in 79 trees worth $2600. Inventory monitoring results on the Erambert federal seed orchard in Mississippi indicate that pitch canker accounted for approximately 8% of the cone and conelet mortality in the N. Alabama loblolly seed source.
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.
Other			
Air pollution effects (ozone)	Eastern white pine	North Carolina	Fourteen percent of stands had trees with ozone symptoms in 13 counties in western North Carolina.
Atmospheric deposition symptom	Bioindicators, such as yellow-poplar, blackberry, ash, sweetgum	Georgia, North Carolina, South Carolina, Virginia	Surveys in these areas showed that about 50 percent of the sensitive species showed some air pollution symptoms.

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*
Drought	Mixed hardwoods, loblolly pine, slash pine	Louisiana, North Carolina, Tennessee, Virginia	Caused marginal leaf scorch, premature defoliation, fall colors, and some mortality. High mortality and damage to 1987 plantings on Conservation Reserve Program and industrial lands in three Louisiana parishes. In one parish fifteen plantations and 1,791 acres were involved.
Frost damage	Loblolly pine	Arkansas	Mortality and damage on industrial pine plantings. Approximately 24,000 two- to five-year old saplings were affected.
Oak decline	Oak, especially the red oak group and chestnut oak	Regionwide	Severe decline and mortality have been widely reported for the past 7 years. The problem was most severe on upland sites with shallow, rocky soils. Drought was a major contributing factor. Decline severity varies considerably from site to site. Damage may be decreasing in Arkansas but is increasing in North Carolina.
Oak mortality	Oak species, especially southern red and post oaks	Texas	Early April freeze and a droughty summer stressed oaks before fungi and non-infectious diseases caused mortality in east Texas.
Spruce-fir decline and mortality	Fraser fir, red spruce	North Carolina, Tennessee, Virginia	The balsam woolly adelgid has been killing Fraser fir since it was introduced into spruce-fir areas more than 25 years ago. Atmospheric deposition has been suggested as a contributing factor.
Storm damage	Many species	North Carolina, Tennessee, Virginia	Ice and wet snow storms caused local tree damage, primarily in the mountains. Roads were closed in some areas due to fallen trees.
Unknown	Shortleaf pine	Arkansas	Five to 8-year old progeny test saplings constricted at groundline and leaning. Possibly a root rot problem. Thirty to forty high value trees involved.

Eastern Region/Northeastern Area—Insects

Prepared by Charles L. Hatch

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	Wisconsin	Heavy to severe defoliation continued in two general areas in north and northeastern Wisconsin. Defoliation was said to be the worst ever in the northeastern part of the state where the problem is expected to increase. Although acreage was not reported this year, more than 200,000 acres were involved in 1986. About 37,000 acres were defoliated again this year on the Nicolet National Forest.
Bruce spanworm *Operophtera bruceata*	American beech, sugar maple	Maine, Michigan, New Hampshire, Vermont, Wisconsin	This is the third year that the Bruce spanworm and other associated defoliators have been active in Michigan's Upper Peninsula. However, observations in East Iron County found no measurable impact from repeated defoliations. In Wisconsin, the spanworm continued to decline in Florence and Forest counties where light to moderate defoliation was reported on approximately 100,000 acres. Populations remained at low and declining levels throughout Maine, New Hampshire, and Vermont.

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*
Fall cankerworm *Alsophila pometaria*	Hardwoods	Maine, Massachusetts, Michigan, Pennsylvania, West Virginia, Wisconsin	In Wisconsin, larvae emerged before oak leaves developed; consequently, boxelder and elms were heavily defoliated in Marquette and Columbia counties. However, pockets of light defoliation did occur on some oak in Columbia County. Overall, activity was greater than in the past, but is expected to decrease in the future. Once again the fall cankerworm, in association with the linden looper and bruce spanworm, contributed to heavy defoliation of hardwoods and aspen across the upper peninsula in Michigan. In Pennsylvania, there were 1,165 acres defoliated for the first time in Juniata and Mifflin counties. The pest is expected to continue to decline into 1988. Light to heavy defoliation was found in Grant and Preston counties, West Virginia. Also, more than 2,500 acres of moderate to severe defoliation were reported on the Monongahela National Forest. The infestation on the Monongahela is expected to continue through 1988. In Massachusetts, approximately 3,700 acres were moderately defoliated on Cape Cod. Populations declined in Norfolk and Duke counties and increased in Barnstable County. In Maine, populations generally stayed low during 1987, and are expected to remain low in 1988.

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	Maine, Michigan, Minnesota, Vermont, Wisconsin	An outbreak of forest tent caterpillar started with a small pocket of defoliation in Langlade County, Wisconsin in 1986. This has now increased with heavy defoliation reported in 1987. Approximately 160,000 acres of moderate to heavy defoliation occurred in Minnesota; this is a three fold increase over 1986. In the past, damage had been centered around the Brookston area; it has now moved as far north as Tower, Minnesota. The problem is expected to continue on into 1988. In Michigan, the largest areas of defoliation were mapped near Ontonogan, Marquette, and Sault Ste. Marie with more than 300,000 acres reported defoliated by the Bruce spanworm, fall cankerworm, linden looper, and/or forest tent caterpillar, alone or in combination. Maine and Vermont's forest tent caterpillar populations remained down. There was no noticeable defoliation. Nearly 375,000 acres and 20,000 acres were defoliated on the Ottawa and the Nicolet National Forests respectively. Also, on the Shawnee NF, 4,500 acres were treated with *B.t.* This pest is expected to remain at high population levels in 1988.

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*
Gypsy moth *Lymantria dispar*	Oaks, other hardwoods	Areawide	Defoliation caused by the gypsy moth decreased from 2.4 million acres in 1986 to 1.3 million acres in 1987. This is a 46 percent decline. Again, Pennsylvania recorded the most defoliation of any state—880,000 acres. This is down from a 1986 high of nearly one million acres of defoliation. The greatest decrease in defoliation occurred in the New England States. Massachusetts reported only 28,000 acres defoliated compared to 343,100 acres in 1986. Connecticut, at 65,400 acres, was down from 237,200 acres. Rhode Island reported only 5,000 acres of defoliation compared to 219,200 acres last year. The State of Delaware had a modest decrease to 2,500 acres of severe defoliation in southern New Castle and Kent counties. This was down from the 3,100 acres in 1986. No defoliation was reported from Vermont. Maryland, New Hampshire, Virginia, and West Virginia were the only states to record significant increases in defoliation during 1987. Maryland from 58,000 acres to 76,000 acres; Virginia from 27,300 acres to 67,700 acres; West Virginia from 8,300 acres to 12,600 acres; and New Hampshire from 0 to 300 acres. The District of Columbia, reporting 12 acres of defoliation during 1987, conducted its first aerial suppression program. *B.t.* was applied to 2,000 acres within the capitol city area. In Wisconsin, the number of male moths trapped increased from 33 in 1986 to 73 in 1987. Possible new infestations were found in Dane, Door, Marinette, Ozaukee, and Washington counties.

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*
Gypsy moth *Lymantria dispar*—continued			Indiana is currently using mass trapping techniques in an effort to eradicate an established population on three acres in Koscuisko County. A total of 79 male moths (55 in Koscuisko County) were captured in 15 counties. Gypsy moths were again trapped on the Huron-Manistee National Forest in Michigan. There was a three fold increase in the number of moths trapped on the Tawas District. Elsewhere on the forest, catches were about the same as last year. During 1987, male moths were captured almost statewide in Ohio with egg masses scattered throughout Ashtabula, eastern Lake, northern Geauga, and Trumbull counties. In Missouri, five male moths were captured. Iowa reported finding its first egg mass, the first indication of an active infestation in this state.

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	The Jack pine budworm caused light to heavy defoliation on 83,000 acres in Hubbard, Beltrami, Becker, Cass, and Wedena counties in Minnesota. This is down from more than 140,000 acres affected in 1986 and continues the decline that started in 1985. Following an unexpected collapse in 1986, populations are again building in many areas of Michigan's Upper Peninsula. This resurgence of budworm populations suggests a potentially serious epidemic over the next 2-3 years. Aerial sketch maps indicate light defoliation in the Baraga Plains in Baraga County, and moderate defoliation of the jack pine type shared by Schoolcraft and Luce counties. The hardest hit areas were in Schoolcraft County. Approximately 3,800 acres were defoliated on the Chippewa National Forest during 1987. In addition, 2,000 acres were defoliated on the Ottawa NF where the problem is said to be complicated by building bark beetle populations. The health of jack pine is poor for large portions of the type on the Chippewa, Hiawatha, Ottawa, and Nicolet National Forests where most stands are older.
Saddled prominent *Heterocampa guttivitta*	Hardwoods	Michigan, New Hampshire, Vermont	Larvae of this pest were observed throughout the State of Vermont and populations are said to be increasing. In New Hampshire, egg surveys are planned to be conducted in potential hot spots where populations are reported to be increasing. There was no defoliation reported from Michigan in 1987, nor is the pest expected to cause any problems in 1988.

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, Wisconsin	Eastern spruce budworm populations continued to decline throughout the Lake States in 1987. Defoliation, once again, was negligible in Michigan and Wisconsin; while in Minnesota, there were 430,000 acres of light defoliation reported. This is relatively unchanged from 1986. Extremely low populations continued through the New England States. Maine reported 249,000 acres defoliated in 1987. However, populations have collapsed in all but the southeastern part of the State. No defoliation was observed in New Hampshire, New York, or Vermont. Except for the Superior National Forest, there was very little or no spruce budworm caused defoliation reported from the National Forests in the Lake States during 1987. On the Superior, 221,000 acres were defoliated. About 3,500 acres of heavy spruce mortality were reported on the Gunflint District. This loss was attributed to a combination of frost and the spruce budworm damage. Pheromone trap catches from the Superior indicate a slight increase in populations for 1988. There was no suppression action taken in 1987 and there is none planned for 1988.

Eastern Region/Northeastern Area—Diseases

Prepared by Margaret Miller-Weeks and William Jackson

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* *Nectria galligena*	American beech	Connecticut, Massachusetts, New Hampshire, New York, Pennsylvania, West Virginia	This disease is caused by injury from scale insect infestation followed by disease organism infection. Both the disease causing organism *N. coccinea* var. *faginata* and the associated scale insect *C. fagisuga* continued to spread to the west and southwest in Pennsylvania. Pockets of heavy infestations and mortality were again reported to be increasing in Connecticut, Massachusetts, and New Hampshire. The disease is increasing in severity in western New York and is now considered to be the second most important disease in that State. In some areas *N. galligena* has proven to be important in this pest complex. Beech bark disease was present on approximately 2,800 acres of the Allegheny National Forest. The disease was also causing mortality on the Monongahela National Forest where numerous pockets of dying trees were reported from the Greenbriar Ranger District.
Dogwood anthracnose *Discula* sp.	Flowering dogwood	Connecticut, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, West Virginia	Dogwood anthracnose continues to cause mortality of flowering dogwood throughout Connecticut and New Jersey, and portions of Maryland, New York and Pennsylvania. The disease has been found in localized areas in Massachusetts, and West Virginia. In 1984, about 33 percent of the flowering dogwood were dead at Catochin Mountain Park (Maryland). Presently, greater than 95 percent of the flowering dogwood are dead.

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*
Diplodia blight *Sphaeropsis sapinea* (=*Diplodia pinea*)	Austrian pine, jack pine, red pine, scotch pine	Connecticut, Maine, Massachusetts, Michigan, Missouri, Ohio, Rhode Island, West Virginia	Diplodia tip blight continued to be a problem in the Northeastern Area during 1987. The disease was found scattered throughout the States of Ohio and West Virginia. Connecticut, Maine, Massachusetts, and Rhode Island also reported scattered occurrences with substantial problems in some areas. Moderate and low levels of Diplodia blight were evident on individual trees in urban and windbreak plantings in Missouri. Some mortality was evident statewide and is expected to continue in 1988 on older pines. In Michigan, there were many reports of damage from the Lower Peninsula. Most significant was a 40 acre red pine planting in Roscommon County that experienced 50-60 percent top kill and 30 percent mortality.
European larch canker *Lachnellula willkommii*	Eastern larch	Maine	There was no change in Maine from 1986. The disease is spreading slowly and there were no new infected townships reported in 1987. Infection is still heavy at the two epicenters located in the towns of Cutler/Jonesboro and Friendship.

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, New York, Vermont, Wisconsin	There have been no new sites of Scleroderris canker detected in Maine within the past several years. However, a slight resurgence of infection was found in the Aurora area of Hancock County. The incidence and severity of the disease has been declining in New York since peaking in the mid 1970's. Only a few acres of moderate infections were reported in 1987. A state quarantine remains in effect in the Adirondack region. In Vermont, no new towns were added to the state quarantine area which is in the northern portion of the state. Areas heavily infected in the past show little or no infection. A very light and scattered infection was found on a 640 acre 13 year-old plantation in Bayfield County, Wisconsin. There was also a very light infection found on a 40 acre plantation in Douglas County.
Vascular Wilts			
Dutch elm disease *Ceratocystis ulmi*	Elm	Areawide	Dutch elm disease continued to be found in the Northeastern Area wherever elm grows. This disease is considered the most single important shade tree problem in West Virginia where the incidence is high throughout the state. Mortality of elms is also reported to be high in western New York during 1987. Reports from Ohio and Indiana show the disease to be statewide.

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 wilt *Ceratocystis fagacearum*	Oaks	Areawide	Aerial surveys in Wisconsin showed an increase in the number of infection centers. Four new centers were detected in eastern Marinette County. In Menominee County, five new centers were confirmed around Legend Lake where intensive control measures were initiated. This includes burning or burying infected wood. The disease is expected to continue spreading in southern Wisconsin. Oak wilt control efforts have continued in the Shakey Lakes Area of Menominee County, Michigan. The disease is also increasing in Minnesota where control involved clearcutting and treating stumps on eight acres of state land. During 1987, aerial surveys were conducted over areas of high oak wilt incidence in West Virginia. A total of 133 diseased trees were spotted in the southwestern counties. In Indiana, the disease is said to be more noticeable in the northwest than in other areas of the State.

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*
Other			
Ash decline, dieback, and mortality	Ash	Indiana, Iowa, New York, Ohio, Pennsylvania, Vermont, Wisconsin	The cause of ash decline is not fully understood by scientists. Some possible causes are: drought, winter injury and ash yellows—a mycoplasma-like organism. Ash decline was reported to be at epidemic levels in northern Indiana where the disease was found in Posey, Union, Wayne, Sullivan, and Clay counties. Ash decline was also common in New York and Vermont. In Vermont, the disease occurred in over 1,370 acres involving five towns in Bennington County. In Ohio, ash decline is expected to become more evident throughout the other northern counties in the future. Ash yellows was confirmed to be causing mortality of white and green ash in small woodlots in Geauga, Ottawa, and Van Wert counties. Ash decline also has been observed for the past seven years in Iowa involving a seven county area in the east-central part of the state. In Pennsylvania, the disease is occurring in Cumberland, York, Adams, and Mifflin counties. In Wisconsin, two trees were confirmed as being infected with ash yellows. One tree was in Waukesha County, the other was in Marathon County. This is the first report of the disease in Wisconsin.
Birch decline	Yellow birch, paper birch	Maine, New York, Vermont	Birch decline has peaked in eastern and western Maine. In New York, approximately 2,000 acres are affected in the Adirondacks, but is decreasing in severity. Surveys in Vermont found that many trees have improved in 1987.

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*
Larch decline and mortality	Larch	Maine, Vermont	Although most common to the southern half of Maine, larch decline is now scattered statewide. In Vermont, 53 acres of the decline were aerially mapped in the Northeast Kingdom where the disease is beginning to reappear in previously infested stands. Increasing damage was most noticeable in Orange, Caledonia, Orleans, and Essex counties.
Maple decline and mortality	Maple	Michigan, New York, Vermont	There has been little change since last year. In Vermont, many maple trees that exhibited dieback in the recent past appear to be recovering this year. Nevertheless, the malady continues to be a concern to sugarbush owners and woodlot owners. There are localized areas in New York reporting an increase in severity. The decline is also a continuing problem in Michigan's Upper Peninsula.
Oak decline and mortality	Oak	Michigan, New York, Minnesota	Declining oak trees are scattered in some areas of the Upper Peninsula in Michigan following severe drought conditions. Oak decline was also found in southern New York and associated with heavy defoliation by the gypsy moth. In Minnesota, declining oaks were first observed in 1986. The area involves 7,000 acres in central Itasca County and is reported this year to be increasing.
Spruce-fir decline and mortality	Spruce fir	Maine, Massachusetts, New Hampshire, New York, Vermont, West Virginia	Some New England States, New York, and West Virginia continue to find decline and mortality. Massachusetts reports winter damage, insect and disease damage, and other factors as probable causes for the decline in the western part of the State. Red and black spruce continue to decline in areas throughout the Adirondack region in New York. Areas in western Maine exhibit symptoms similar to those found in the White Mountains of New Hampshire and the Green Mountains of Vermont.

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		
Frost		Connecticut	A late spring frost in 1987 injured maples, oaks, and conifers in Connecticut.
Drought		Indiana, Michigan	Drought conditions existed in southern portions of Indiana during 1987. As a result, some light mortality to hardwoods is expected. Also, reports from Michigan state that extremely dry conditions have cause significant loss to many tree species in the Lower Peninsula.
Hail storms		Vermont	Vermont reported suffering hail damage to some areas during the spring and summer of 1987.
Snow and winter injury		Massachusetts, New York, Vermont	A severe October snowstorm caused serious damage to hardwoods in western Massachusetts, eastern New York, and southern Vermont. More than 160,000 acres were affected in Vermont alone. Damage occurred in scattered locations within this area where the most severe impact was to red oak, beech, poplar, hickory, and ash.

Alaska Region—Insects

Prepared by Edward H. Holsten

Alaska Region—Status of insects in Alaska

Insect	*Host*	*Location*	*Remarks*
Cottonwood leaf beetle *Chrysomela* sp.	Balsam poplar and black cottonwood	Southeast Alaska	Leaf beetle populations remained high in 1987. 1,000 acres were defoliated along the Takhin River near Haines. On the outer coast of Glacier Bay National Park, 450 acres of black cottonwood were defoliated.
Engraver beetle *Ips perturbatus*	White spruce	Interior Alaska	*Ips* populations decreased in 1987 near Fairbanks. Infestions are scattered over 3,294 acres with pockets of heavy mortality on 1,000 acres.
Gypsy moth *Lymantria dispar*		South-central Alaska	One adult male was captured in a trap baited with Gypsy moth lure in a camper park in Anchorage. Traps in other parts of the State did not catch any moths.
Hemlock sawfly *Neodiprion tsugae*	Western hemlock	Southeast Alaska	Damage declined from 18,000 acres in 1986 to 12,900 acres in 1987. Most of this acreage (11,010) consisted of topkill and tree mortality, with light to moderate defoliation on the remaining 1,890 acres.
Large aspen tortrix *Choristoneura conflictana*	Quaking aspen	Interior Alaska	Tortrix populations decreased in 1987 throughout interior Alaska. Aerial surveys detected almost 166,231 acres of defoliated aspen vs. 350,000 acres in 1986. Populations are expected to decrease next year.
Leaf roller *Epinotia solandriana*	Paper birch	Interior and south-central Alaska	Apparent leaf roller defoliation was detected on only 350 acres in 1987; down from 10,000 acres detected in 1986.
Spear-marked black moth *Rheumaptera hastata*	Paper birch	Interior Alaska	Black moth populations were static in 1987. In 1987, 25,707 acres of defoliated birch were detected vs. 19,000 acres detected in 1986.

Alaska Region—Status of Insects—Continued

Disease	*Host*	*Location*	*Remarks*
Spruce beetle *Dendroctonus rufipennis*	Lutz, Sitka and white spruce	Throughout Alaska	1987 infestations covered 285,110 acres, 80,000 acres less than in 1986. Infestations are continuing on 32,461 acres of the Chugach National Forest and on 63,099 acres of the Kenai National Wildlife Refuge. Spruce beetle populations are expanding slightly in Glacier Bay National Park where nearly 18,000 acres have been infested. In Yakutat, about 900 acres of Sitka spruce have been infested near old windthrow salvage units. More than 78,000 acres of white spruce are currently infested along the Yukon River south of Galena.
Spruce budworm *Choristoneura* sp.	Sitka spruce	South-central Alaska	5,000 acres of white spruce were lightly defoliated in south-central Alaska near Copper Center. Populations are expected to decrease in 1988.
Spruce bud midge *Rhabdophaga swainei*	Black and white spruce	South-central Alaska	Bud midge damage is prevalent on open grown regeneration throughout the Kenai Peninsula. In many cases, multiple leaders result.
Western black-headed *Acleris gloverana*	Western hemlock	Southeast Alaska	Budworm populations increased in 1987, but still remain at low levels. The second-growth hemlock stand defoliated in 1986 on Tuxekan Island now has top-kill covering about 80 acres.
Willow defoliation Tortricidae	*Salix* sp.	Interior Alaska	Defoliation of willow was detected on more than 18,000 acres along the Nushagak and Yukon Rivers. The causal agent has yet to be identified.

Alaska Region—Diseases

Prepared by Paul E. Hennon

Alaska Region—Status of diseases in Alaska

Disease	*Host*	*Location*	*Remarks*
Stem and Branch Diseases			
Hemlock dwarf mistletoe *Arceuthobium tsugense*	Western hemlock	Southeast Alaska	Hemlock dwarf mistletoe continues to be the most destructive disease of old-growth western hemlock throughout southeast Alaska. Recent research indicates that infection levels in young stands are lower than previously suspected, but this is being monitored.
Spruce broom rust *Chrysomyxa arctostaphyli*	White, Lutz, black, and Sitka spruce	Interior and south-central Alaska	Broom rust infects spruce where it grows near the alternate host, kinnikinnik (*Arctostaphylus uva-ursii.*) The rust fungus causes perennial infections that result in large, dense clusters of branches. Top kill or mortality sometimes occurs.
Western gall rust *Endocronartium harknessii*	Shore pine	Southeast Alaska	Gall rust continues to cause spherical galls on branches and main boles of shore pine, but trees do not typically die. Another fungus, *Nectria macrospora*, colonizes and kills many of these galls which results in death of infected branches.
Hemlock canker *Xenomeris abietis*	Western hemlock	Southeast Alaska	The incidence of this canker was lower this year than previous years. In the past several years, *Xenomeris* killed small hemlocks and lower crowns (up to 40 feet) of larger hemlocks along some thirty miles of roads on Prince of Wales Island.
Stem cankers *Encoelia pruinosa* *Ceratocystis fimbriata* *Cryptosphaeria populina* *Cytospora chrysosperma*	Hardwoods, especially aspen, birch, and poplar	South-central and interior Alaska	Every year in Alaska, Canker fungi cause early mortality and promote decay in mature hardwood stands. Future work will document the canker fungi on birch.

Alaska Region—Status of diseases in Alaska—Continued

Disease	*Host*	*Location*	*Remarks*
Stem decays Many Basidiomycetes	All tree species	Throughout Alaska	Wood decay of living trees continues to be one of the most important losses of wood volume in Alaskan forests. A variety of species cause decays. The problem is particularly serious in old-growth forests where slow growing decay fungi have ample time to cause significant losses.
Root Diseases			
Tomentosus root rot *Inonotus tomentosus*	White and Lutz spruce	South-central and interior Alaska	*I. tomentosus* causes significant decay in roots and lower boles of spruce which results in lower wood volumes and hazardous trees. It is apparently colonizing and killing the sapwood and cambium on the roots of some live spruce and may be contributing to the spruce beetle epidemic.
Schweinitzii butt rot *Phaeolus schweinitzii*	Sitka, white, and Lutz spruce	Southeast and south-central Alaska	Decay in roots and butts of large trees causes loss of wood volume and creates potentially hazardous trees.
Armillaria root disease *Armillaria* spp.	All tree species	Throughout Alaska	In Alaska, *Armillaria* attacks the roots and lower boles of trees already stressed by some other factor.
Foliage Diseases			
Spruce needle cast *Lirula macrospora*	Sitka spruce	Southeast and south-central Alaska	This needle cast was common on second growth Sitka spruce stands throughout southeast and south-central Alaska. *Lirula* infects current-year needles, but observable symptoms do not appear until needles are one-year old. It was at damaging levels in young stands on Kodiak Island.
Hemlock needle rust *Pucciniastrum vacinii*	Western hemlock	Southeast Alaska	Hemlock needle rust occurred at moderate levels (higher than last year).
Spruce needle rust *Chrysomyxa ledicola*	Sitka, white, Lutz, and black spruce	Throughout Alaska	Spruce needle rust was detected on thousands of acres near King Salmon (Alaska Peninsula), but occurred at low levels throughout the remainder of Alaska.

Alaska Region—Status of diseases in Alaska—Continued

Disease	*Host*	*Location*	*Remarks*
Cedar leaf rust and cedar leaf blight *Gymnosporangium nootkanensis* *Didymascella thujina*	Alaska-yellow cedar and western red cedar	Southeast Alaska	*Gymnosporangium* on Alaska-yellow cedar and *Didymascella* on western red cedar occurred at low levels this year. They neither severly defoliated nor killed cedar trees.
Shoot blight of Alaska-yellow cedar *Apostrasseria* sp.	Alaska-yellow cedar	Southeast Alaska	This newly discovered fungus commonly attacks naturally regenerating cedar. Terminal and lateral shoots are killed back about 10cm on seedlings and saplings. The fungus does not attack mature trees.
Sirococcus shoot blight *Sirococcus strobilinus*	western hemlock, Sitka spruce	Southeast Alaska	The incidence of *Sirococcus* remained about the same as last year. Hemlock is attacked more than spruce. Unthinned stands have the highest infection levels and most infections are concentrated in lower portions of the live crown.
Other			
Alaska-yellow cedar decline	Alaska-yellow cedar	Southeast Alaska	Alaska cedar decline persists as one of the most important forest diseases in southeast Alaska. Some form of abiotic stress is suspected as the causal agent. Decline has been occurring, primarily on wet sites, for about a hundred years. Some 260,000 acres of decline have been delineated during aerial detection surveys. This year, dying trees were particularly concentrated on western Chichagof Island.
Hemlock fluting	Western hemlock	Southeast Alaska	Fluting on the boles of hemlock continues to be a problem throughout southeast Alaska. Fluted hemlocks have deeply incised groves and ridges extending vertically along their boles. Flutting may be triggered by growth release.
Spruce blowdown	White spruce	Interior Alaska	4,500 acres of white spruce blew down during the winter around Klutina Lake near Copper Center. The potential for spruce beetle outbreak is high.

Alaska Region—Status of diseases in Alaska—Continued

Disease	*Host*	*Location*	*Remarks*
Porcupine *Erethizon dorsatum*	Sitka spruce, western hemlock	Southeast Alaska	Porcupine damage was noted in several precommercially thinned stands of spruce and hemlock through Mitkof, Etolin, and Wrangell Islands. Procupine feeding is generally patchy, with groups of 15-30 trees being killed or severely wounded.
Brown bear *Ursus arctos*	Alaska-yellow cedar	Southeast Alaska	Brown bears continue to scar the bases of Alaska-yellow cedar on Baranof & Chichagof Islands. Trees with old scars have wood decay columns that will limit the value of butt logs.

Part 3
Index

Index—Insects

The common and scientific names of the insects come from "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 Forest Insects" (Miscellaneous Publication 1339; 1977) and "Insects of Eastern Forests" (Miscellaneous Publication 1426; 1985).

Index—Diseases

The common and scientific names of the disease-causing organisms are based on 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).

In addition, the names in this index have been reviewd by the Center for Forest Mycology Research at the Forest Service's Forest Products Laboratory in Madison, WI.

The scientific names of the disease-causing organisms may change. Synonyms of recently changed names are in parentheses in the tables; anamorphs are shown in brackets. This differentiation is not made in the index.

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