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Forest Insect and Disease Conditions in Alaska in 1979

Forest Insect And Disease in Alaska in 1979. U.S. Department of Agriculture, Forest Service, Alaska Region, Division of State and Private Forestry (Pouch 6606, Anchorage, Alaska 99502). Alaska Region report number 115, August 1980.

Please report or submit samples of forest or urban tree insects or disease to your local ALASKA STATE FORESTRY OFFICE or to one of the following addresses:

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Suite 107
Anchorage, Alaska 99504
(Telephone 907-276-0939)

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State and Private Forestry
P.O. Box 1628
Juneau, Alaska 99802
(Telephone 907-586-7510)

COVER (Front) — Adult spruce budworm (*Choristoneura* spp.)

COVER (BACK) — Spruce budworm larva (*Choristoneura* spp.) feeding on white spruce.

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R-10 (Alaska)
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Forest Insect and Disease Conditions in Alaska in 1979

Conditions in Brief

Bark beetle activity continues to cause the most insect damage to forested areas in Alaska during 1979. Infestations covered 150,000 hectares, an increase of 100,000 hectares over the area infested in 1978. White spruce mortality is occurring on 12,592 hectares of the Chugach National Forest; a 50 percent increase over 1978 infested areas. Approximately 3,525 hectares of white spruce were infested by *Ips* in interior Alaska. Eastern larch beetle infestations have decreased for the third consecutive year. Only 6,472 hectares of scattered larch mortality was detected in 1979.

For the second year, large aspen tortrix populations have remained high in south-central Alaska. In 1979 near Willow, Alaska, 10,834 hectares of defoliated aspen were observed. *Argyrotaenia* spp. defoliated 1,135 hectares of white spruce northwest of Dillingham. Spruce budworm (*Choristoneura* spp.) was again collected in large numbers in localized areas around Anchorage.

In southeast Alaska, populations of the hemlock sawfly and Western black-headed budworm remained at endemic levels during 1979. A third defoliator of western hemlock, the saddleback looper, continued to increase in numbers, particularly south of Frederick Sound. Cedar mortality was observed in small patches throughout the Stikine (Petersburg) Area, the northern part of the Ketchikan Area, and Peril Strait on Chichagof Island.

Hemlock Dwarf Mistletoe, *Sirococcus* shoot blight and needle rust of white spruce continue to be the most damaging tree disease in Alaska.

Status of Insects

Spruce Beetle, *Dendroctonus rufipennis* (Kby)

Alaska spruce beetle (Fig. 1) populations dramatically increased in 1979. Infestations covered approximately 150,000 hectares[1], an increase of 100,000 hectares over the area infested in 1978. White spruce mortality is occurring on 12,592 hectares of the Chugach National Forest; an increase of 6, 391 hectares (50 percent) over the area infested in 1978. The Summit Lake infestation has increased from 326 hectares in 1978 to 2,605 hectares in 1979 (Fig. 2).

A three-year interim report published in January 1979 indicated that the spruce beetle infestation along Resurrection Creek on the Kenai Peninsula (a high value recreation area) was static-to-declining. However, a week-long survey (Fall 1979) into the infestation area indicated a dramatic resurgence in beetle activity. Infestations are now evident throughout 6,226 hectares; an increase of 1,167 hectares over 1978 levels. The number of spruce beetle killed trees and new attacks significantly increased over 1978 levels in almost every diameter class. The commercial volume lost per acre was almost 1,000 board feet more than in 1978. To date, 6,645 board feet per acre of commercial white spruce have been killed by the spruce beetle in four to five years. This represents almost 55 percent of the commercial white spruce volume.

[1]One hectare = 2.471 acres

Figure 1 — Adult spruce beetle, *Dendroctonus rufipennis*.

Elsewhere on the Kenai Peninsula, spruce beetle activity is increasing (Fig. 3). A total of 12,132 hectares of white spruce is infested throughout the Kenai National Moose Range. The Barabara Lake infestation has increased by 1,293 hectares over 1978 levels (3,000 hectares). Three new infestations totalling more than 1,136 hectares were detected near Homer at the southern end of the Kenai Peninsula.

In 1978, approximately 26,000 hectares of very light white spruce mortality occurred on the west side of Cook Inlet. In 1979, infestations cover 128,719 hectares throughout this area of which 11,564 hectares are moderate to heavily infested; the remainder being very light (0.5 infested trees/hectare). The area of heaviest infestation occur north of Tuxedni Bay and lower Beluga Lake. This increased spruce beetle activity is probably a result of expanding pockets and emigrating beetles from the Tyonek outbreak of the late 1960's and early 1970's. Salvage operations are continuing on these affected State lands. As of October 1979, a total of 63.4 MMBF of white spruce was harvested on the Westside Salvage Timber Sale. Approximately 80 percent of this volume was beetle killed. Hardwood volume cut was 15.8 MMBF of birch and 14.7 MMBF of cottonwood.

Throughout interior Alaska, spruce beetle activity was detected on 1,558 hectares. The largest infestation (315 hectares) is located approximately 6 km

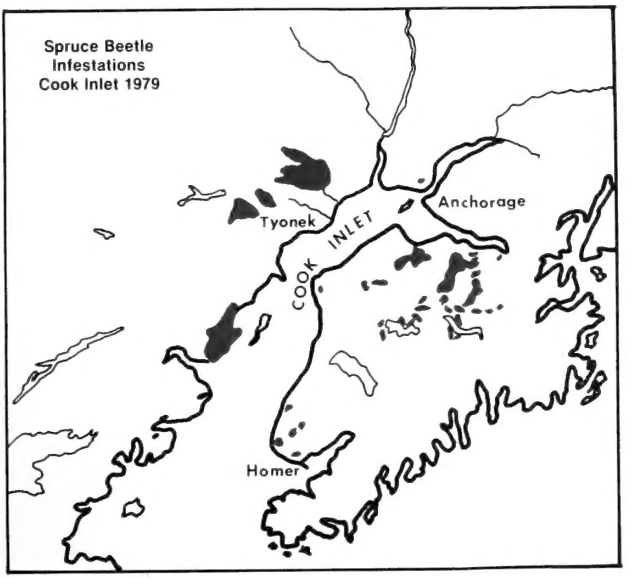

Figure 2 — Spruce beetle in the Cook Inlet, 1979 aerial detection survey.

N.E. of Little Russian Mission along the Kuskokwim River. The 941 hectare infestation, aerially detected in 1978 11 km south of Devil's Elbow on the Kuskokwim River, declined. No beetle activity was observed.

In southeast Alaska, beetles were found in windthrown spruce on Prince of Wales Island. High winds in November, 1978, resulted in scattered patches of blowdown throughout the northern part of the island. While much of the windthrow material will be salvaged before 1981 beetle flight, other areas will require close examination for evidence of spruce beetles moving into standing timber.

1979 spruce beetle infestations by ownership are as follows: National Forest Land — 12,592 hectares; State, private and Cook Inlet Region, Inc., holdings or selections — 133,706 hectares; and other Federal Lands (e.g. Kenai National Moose Range, National Monuments) — 10,652 hectares.

Eastern Larch Beetle, *Dendroctonus simplex* (LeC.)

Eastern larch beetle infestations have decreased in the interior from 14,403 hectares in 1978 to 6,472 hectares in 1979. The largest concentrations of larch beetle activity (4,322 hectares) are occurring southeast of Fairbanks along the Tanana and Teklanika Rivers. Approximately 1,450 hectares of infested larch occur near Anvik along the Yukon River; the same area infested in 1978. Along the McKinley River, just outside the Mount McKinley National Park boundary, 607 hectares of new larch beetle infestations were aerially detected. It appears that most of the susceptible tamarack has been infested in

Figure 3 — Spruce beetle infestation, Cooper Landing on the Kenai Peninsula.

the last four years and larch beetle activity has declined.

Engravers, *Ips pertubatus* (Eichh.)

For the third consecutive year, engraver infestations have increased in interior Alaska (Fig. 4). Approximately 3,525 hectares of white spruce were infested in 1979; an increase of 2725 hectares (77 percent) over the area infested in 1978. The largest infestation, approximately 2070 hectares, was located along the Chandalar River southwest of Venetie. This outbreak undoubtedly originated from the large quantity of white spruce slash left after road construction. Approximately 300 hectares of scattered *Ips* kill was also aerially detected 6 km northwest of Kiana along the Kobuk River.

Cottonwood Leaf Beetle, *Chrysomela scripta* F.

Leaf beetle populations were low in southeast Alaska. No visible defoliation was detected from the air. However, several homeowners in the Mendenhall Valley north of Juneau reported moderate defoliation of ornamental cottonwoods.

Cedar Mortality

Small patches of dying Alaska yellow cedar and western red cedar were readily visible throughout the central third of southeast Alaska. Discolored and dying trees usually appear in small groups, rarely exceeding 5 hectares in size. In 1979, the combined area of these small patches totalled over 250 hectares, comparable to levels in

Figure 4 — White spruce mortality due to *Ips* beetles along seismic line, Yukon Flats.

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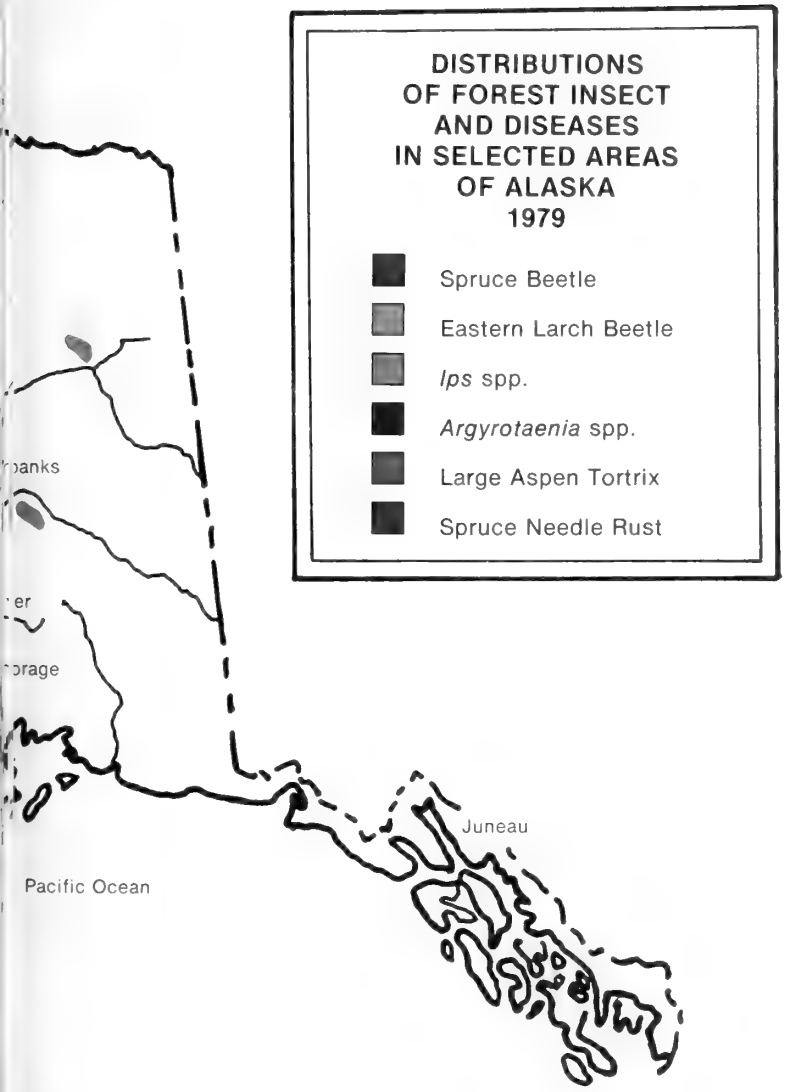
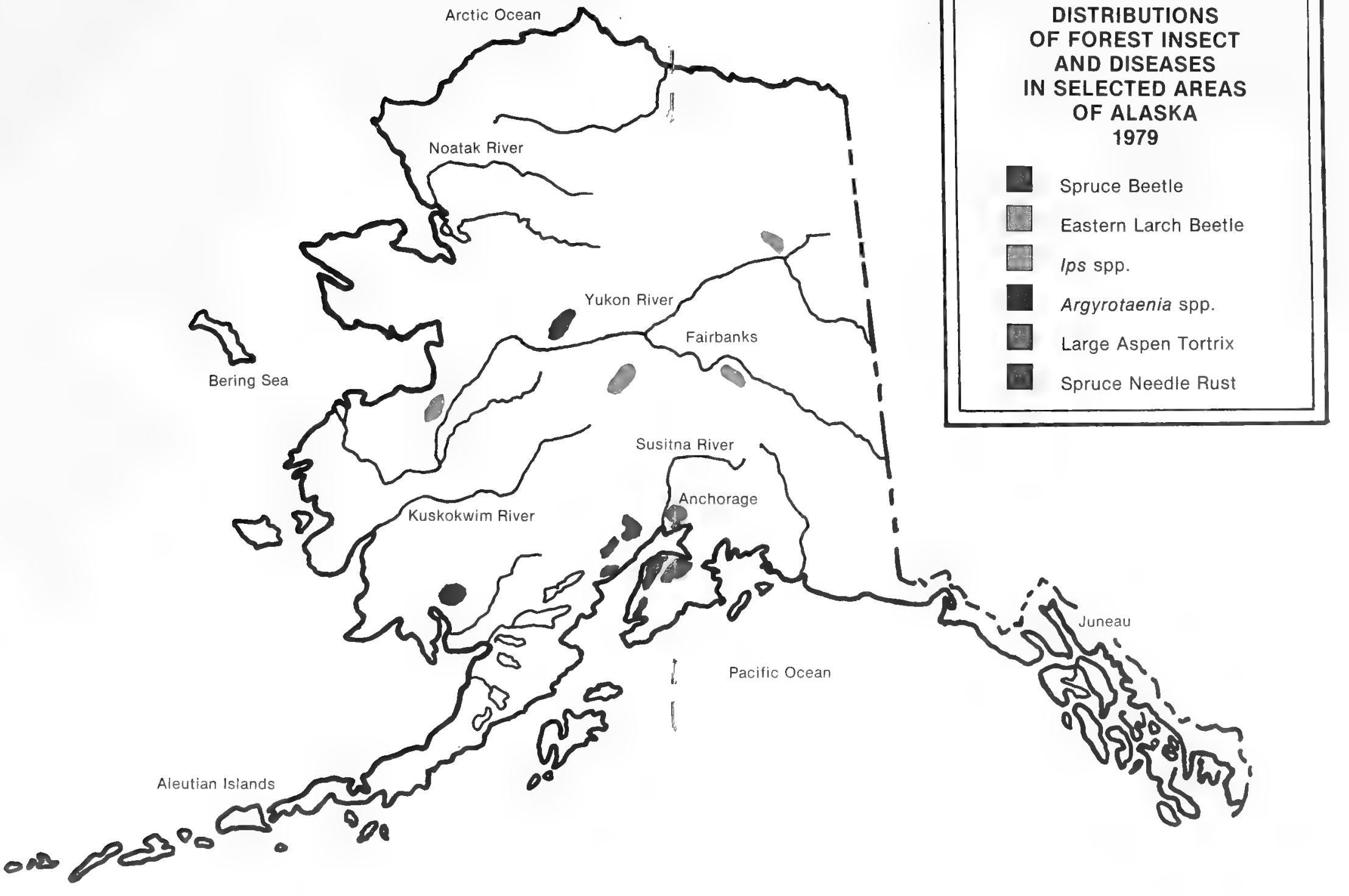


General Distribution of Selected Forest Insects and Diseases of Alaska, 1979.



1978. Currently, the most severly affected areas are the Stikine Area (Fig. 5), the northern part of Prince Wales Island, and Peril Strait of the Chatham Area. Root disease, environmental factors, and *Phloeosinus* bark beetles are suspected as interacting causes of cedar mortality, but to date, a causal agent has not been identified. The problem will be evaluated in greater depth during 1980.

Willow Leaf Miner, *Rhynchaenus rufipes* (LeC.)

1979 aerial surveys detected 1576 hectares of defoliated willow along the Innoko River, due east of Anvik (Fig. 6). Ground inspection of the affected area showed that a small weevil was responsible for the defoliation. The weevil was identified as *Rhynchaenus rufipes,* a new State record for Alaska. This species occurs from Newfoundland to Aklavik, Northwest Territories (now to northern Alaska). Larvae mine leaves of willow, elm, alder, apple, cherry and birch.

Argyrotaenia spp.

1979 aerial surveys detected 1135 hectares of heavy white spruce defoliation approximately 50 km northwest of Dillingham between Lake Kulik and Grant Lake. A ground check of the affected area revealed an undetermined species of *Argyrotaenia* (Fig. 7). All the white spruce new growth and portions of the old growth were defoliated on all age classes (Fig. 8).

Argyrotaenia comprise more than 40 species in North America: several are foliage feeders of western conifers. The adults are quite similar to *Choristoneura* but are smaller. Efforts will be continued to delineate the *Argyrotaenia* species and the impact of this defoliator on white spruce.

Figure 5 — Old, accumulated cedar mortality, Wrangell Island.

Spruce Budworms, *Choristoneura* spp.

Similar to last year, ground surveys detected visible budworm damage to white spruce in many residential and park areas of Anchorage. To date, budworms have been collected from Cooper Landing, Hope (Kenai Peninsula), Anchorage, Copper River Basin and Fairbanks. No damage has been detected in these areas with the exception of Anchorage. Spruce budworm life history studies were undertaken thoughout the 1979 field

Figure 6 — Willow leaf miner defoliation.

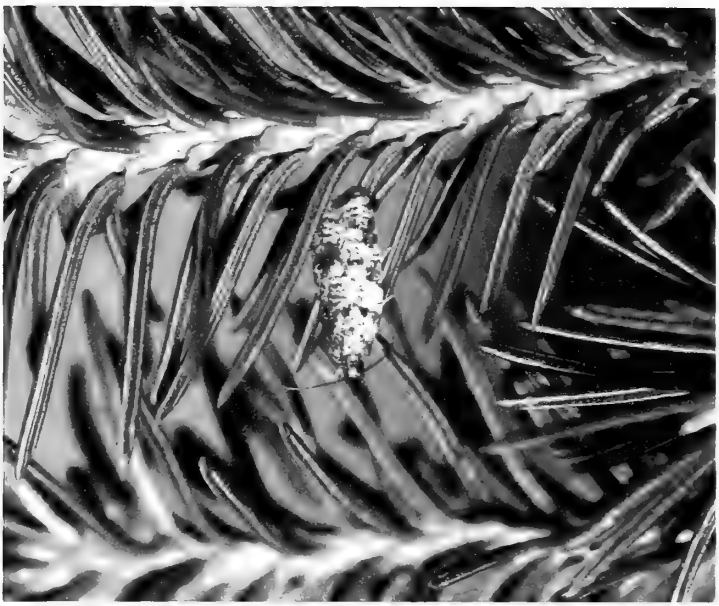


Figure 7 — Adult *Argyrotaenia*.

Figure 8 — Defoliation of white spruce new growth by *Argyrotaenia*.

season. Preliminary results indicate a possible species complex. Five percent of the laboratory reared larvae entered a second diapause, although almost universal in *C. biennis* Free., it is not totally diagnostic, as this behavior occurs occasionally in three other budworm species. However, adult coloration and isoenzyme frequencies are close to those found for *C. orae* Free. and *C. occidentalis* Free. Efforts will be continued to delineate the budworm species and the impact of this defoliator complex.

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)

For the second year, tortrix populations have remained high (Fig 9). 1979 surveys detected almost total defoliation of quaking aspen on 10,834 hectares; an increase of 2,287 hectares (21 percent) over the area defoliated in 1978. Most of the infestation is still located approximately 5 km west-southwest of Willow. An additional area of light to moderate defoliation was observed west of the confluence of the Yentna and Susitna Rivers. Tortrix populations are increasing in both the Anchorage Bowl and interior aspen forests. However, defoliation still remains light in these areas. Surveys near Willow in the Spring and Fall of 1979 indicated that sixteen percent of the aspen have died and 16 percent were top-killed probably as a result of 3 to 4 consecutive years of 90-percent-plus defoliation.

Leaf Rollers, *Epinotia solandriana* L.

Populations of this defoliator decreased to endemic levels. No visible defoliation was detected during the 1979 aerial surveys in comparison to the 5,969 hectares detected in 1978.

Blotch Miner, *Lithocolletis ontario* (Free.)

Populations of aspen blotch miners dramatically decreased from the 209,000 hectares aerially detected in 1977 and 1978. No visible defoliation was detected in 1979.

Western Black-Headed Budworm, *Acleris gloverana* (Weshm.)

Black-headed budworm populations continued to remain at endemic levels throughout southeast Alaska in 1979. Defoliation was visible from the air in only one location — Hecata Island (located west of Prince of Wales Island, south of Kosciusko Island). Approximately 100 hectares of western hemlock were moderately defoliated in two patches bordering Cone Bay on the west side of the island. From an analysis of growth rings, it appears that the infestation on Hecata Island is recent. Larval counts taken during the annual permanent plot defoliator survey showed that budworm population levels were lower than in 1978, but larvae were collected in more locations. Populations at Calder Bay were comparable to 1978 levels, but

declined considerably in Tuxekan (northern Prince of Wales Island). The western blackheaded budworm is expected to remain at endemic levels in 1980, with possible localized buildups in the northwest corner of Prince of Wales Island and Kosciusko Island.

Hemlock Sawfly, *Neodiprion tsugae* (Midd.)

Hemlock sawfly populations remained endemic in 1979, with no visible defoliation from the air. A slight upward population trend was observed, as larvae were collected from nearly one-third of the 84 sampling points throughout southeast Alaska's hemlock forests. Larval counts, although low, were the highest since 1975, and may increase further in 1980.

Saddleback Looper, *Ectropis crepuscularia* (Denis & Schiff.)

For the second consecutive year, saddleback looper populations increased, attaining their highest levels in ten years. Larvae were collected in nearly half of the 84 permanent sampling locations, including three plots north of Frederick Sound. This defoliator still remains endemic; however, populations may continue to increase, representing a potential threat to western hemlock in the southeast.

Other Loopers

Other geometrid larvae associated with western hemlock in 1979 included the green-striped forest looper (*Melanolophia imitata* (Walker)), the Columbia brindle looper (*Anthelia hyperborea* Hlst.), and *Hydriomena irata* Swett.. All three defoliators were found in low numbers during the larval survey, but were widely distributed. The green-striped and Columbia brindle looper were predominately collected south of Frederick Sound, while *Hydriomena* occured from Lynn Canal south throughout the north half of Prince of Wales Island. In general, these looper populations are expected to remain endemic.

Hardwood Defoliation

Hardwood defoliation due to unknown causes covered approximately 15,960 hectares. The majority of the defoliation was scattered throughout Alaska's interior hardwood forests. Moderate to heavy defoliated balsam poplars (approximately 4868 hectares) was detected from Kashwitna Lake south to the confluence of the Yentna and Susitna Rivers. An additional 3907 hectares of defoliated willow and popular were detected along the Yukon River near the village of Beaver. Likewise, 1880 hectares of defoliated willow and poplar were observed west and northwest of Fort Yukon along the Yukon and Porcupine Rivers. An undetermined number of hectares were defoliated by Morning Cloak (*Nymphalis antiopa* L.) in the vicinity of the new Delta farming project.

If this defoliation continues next year, ground evaluations will be undertaken to determine the causal agent(s).

Status of Diseases

Spruce Needle Rust, *Chrysomyxa ledicola* Lagerh.

Spruce needle rust declined by 281,939 hectares over 1978 levels. Approximately 27,000 hectares of needle rust were detected in 1979. The severe 1978 outbreak located northwest and east of Ruby declined by more than 50 percent. The scattered rust damage located in 1978 along the upper Porcupine River was not detected in 1979.

A substantial increase in needle rust was observed on the Kenai Peninsula. 16,351 hectares of rust infected white spruce were detected in 1979 vs. 250 hectares in 1978. Up to 90 percent of the current year's needles on all age classes of white spruce were infected (Fig. 10). The largest area of infection extends from Clam Gulch south to the village of Ninilchik. Two consecutive warm and wet summers undoubtedly contributed to this increase in needle rust activity. If 1980 summer weather follows that of 1978 and 1979, there may be a serious effect on the following year's growth induced by this rust.

Likewise, spruce needle rust was prevalent throughout southwest Alaska. Infected trees were highly visible from King Salmon to the Lake Clark region.

Figure 9 — Large aspen tortrix larva, *Choristoneura conflictana*. Note parasitic fly maggot on the larva.

Flood Damaged White Spruce

2,497 hectares of white spruce were killed by flooding along the Yukon River south of Anvik (1890 hectares) and 607 hectares along the Chichitnak River, south of the Taylor Mountains.

Hemlock Dwarf Mistletoe, *Arceuthobium tsusense* (Rosend.) G.N. Jones.

Hemlock dwarf mistletoe remains the most damaging tree disease in southeast Alaska. A high percentage of old growth stands between Haines and Ketchikan are infected. Recent research on hemlock dwarf mistletoe in southeast Alaska and observations made this field season suggest that earlier recommendations aimed at minimizing adverse effects of this mistletoe, based on pathogen spread and intensification in British Columbia (Vancouver Island), Washington, and Oregon, may not be appropriate for Alaska. The parasite seems to be intensifying in young stands at much lower rates in Alaska. An intensified effort will be made by both Research and FI&DM to gain a greater understanding of this parasite's life cycle and impact to hemlock in Alaska.

Sirococcus Shoot Blight, *Sirococcus strobilinus* Preuss.

Sirococcus shoot blight is found throughout southeast Alaska with epicenters located in western hemlock reproduction at Thomas Bay and Yakutat.

Cull Survey

Cull surveys aimed at determining defect and mortality agents were initiated in the Susitna River Basin. A two year cooperative project (State of Alaska, Soil Conservation Service, and the Renewable Resources Evaluation Group of the Pacific Northwest Forest Experiment Station) will provide a much needed site specific inventory of insect and disease problems on State and Private lands located in the vicinity of the proposed capitol site.

Figure 10 — Spruce needle rust.

Submitting Insects and Diseases for Identification

People interested in obtaining positive identification of insect and disease specimens should submit samples to specialists. The following procedures for the collection and shipment of specimens should be used:

Specimen Collection:

1. Several specimens should be collected.
2. Adequate information: The value of an insect or disease specimen depends on the information regarding its collection.
    a. Where the specimen was collected: nearest Post Office or town, elevation, aspect, and so forth.
    b. When the specimen was collected.
    c. Who collected the specimen.
    d. Host description (age, species, and general appearance).
    e. General condition of the surrounding area (firs, blowdown, logging, and so forth).
3. Personal opinion of the problem is very helpful.

Shipment of Specimens:

1. General:
    a. Pack specimens in such a manner that breakage will be minimal.
2. Insects: Specimens sent through the mail should be packed to withstand rough treatment.
    a. Larvae and other soft-bodied insects should be shipped in small screw-top vials or bottles containing at least 70 percent isopropyl (rubbing) alcohol. Make certain the bottles are sealed well. Include in each vial adequate information, or a code, relating the sample to the written description and information. Labels inserted in the vial should be written on with pencil or India ink. Do not use ballpoint pen, as the ink is not permanent.
    b. Pupae and hard bodied insects may be shipped either in alcohol or in small boxes. Specimens should be placed between layers of tissue paper in the shipping boxes. Pack carefully and make certain that there is very little movement of material within the box. Do not pack insects in cotton.
    c. Adult moths, butterflies and fragile insects should be carefully placed between layers of tissue paper before packing.
3. Needle Diseases:
    a. Do not ship in plastic bags. Sprinkle lightly with water before wrapping in newspaper.

Shipping:

1. Ship as quickly as possible. If samples cannot be shipped rapidly, store them in a refrigerator.
2. Include address inside shipping carton.
3. Mark: "FRAGILE: INSECT-DISEASE SPECIMENS ENCLOSED: FOR SCIENTIFIC PURPOSES ONLY: NO COMMERCIAL VALUE".

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