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Mid-Season Summary of Forest Pest Conditions in British Columbia

R. L. FIDDICK

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Warm, summer-like weather in April and early May was followed by wet, unseasonally cool weather for the last half of May, June and the first half of July. This did not appear to adversely affect any of the pests, but was certainly of benefit to trees which had been seriously stressed by drought conditions for several years.

Mountain pine beetle continues its depredation of lodgepole pine stands, particularly in the Kootenays. Spruce beetle-caused tree mortality was prevalent in the southeast portion of the Prince George Region.

The spruce budworm infestation in Douglas-fir stands in Vancouver and Kamloops regions continues to expand and intensify and the two-year-cycle budworm population increased in spruce-balsam stands in the interior and the new growth of understory trees has been defoliated over extensive areas. Western hemlock looper, green striped forest looper and saddleback looper appeared with increasing regularity in collections from the coast and interior. Douglas-fir tussock moth appeared again in beating collections from the Kamloops Region but no defoliation has been observed.

Needle diseases of pines and firs were prominent in some interior areas. Stem rust diseases of pines were recognized as serious problems and surveys were commenced to determine their impact on spaced and unspaced stands.

The fall summary will cohtain detailed reports of bark beetle and defoliator infestations after aerial surveys in late July and August and ground appraisal surveys in September.

Pine Pests

MOUNTAIN PINE BEETLE
Dendroctonus ponderosae

In most infestations checked in May and June, beetles had overwintered well and there were sufficient numbers to expand and intensify infestations. As in the past several years the most severe outbreaks continued in the Nelson Forest Region, particularly in the east Kootenay from the International Boundary north along the Flathead River and tributaries to the Mica Dam. Most of the lodge-

pole pine has been killed in the lower Flathead Valley and adjoining side valleys and red trees (1979 - attacked) were evidence of significant expansion of beetle attacks in Michel, Corbin, Morrissey, Lodgepole and Ram Creeks. This represents a serious threat to mature lodgepole pine stands in the Elk River Valley east of Elko. Numbers of beetle-killed lodgepole pine increased along the west side of the Columbia Valley from Columbia Lake to Bugaboo Creek, where large areas of susceptible pine will be threatened in Horsethief Creek, Spillimacheen River, Steamboat Mountain and the Cross and Kootenay River Valleys.

To the west in the Kettle and West Kettle River valleys the beetle populations were high in late May and June and infestations should continue at least at the same level or increase over 1979.

In the Kamloops Region infestations are expected to continue to expand in lodgepole pine stands in the Ashnola River Valley and in the Trout Creek drainage at Thirsk Lake, Bull and Isintok creeks. North of Kamloops, increased numbers of western white pine were killed along the south side of North Barriere Lake and north to Saskum Lake. Continued mortality of lodgepole and western white pine is expected in the Goldbridge area west of Lillooet.

Overwintering beetle mortality in the Cariboo Region was as high as last year, often exceeding 90%; however, as in 1979, populations were still high enough to continue infestations in the areas west of Williams Lake.

In the Prince Rupert Region overwintering mortality was light and infestations will no doubt increase. In mid-July there appeared to be a substantial increase over the previous year in the numbers of trees killed, Some trees may begin changing color quite early; however, detection surveys should be done in late July to insure all trees killed by the previous year's beetle attack have changed color.

TURPENTINE BEETLE, *Dendroctonus valens,* and PINE ENGRAVER, *Ips* spp.

In the Nelson Forest Region an estimated 5000 young ponderosa pine trees, predisposed by fire on 800 ha in early 1979, were killed by engraver beetles and to a lesser extent by ***Ips*** spp. in the Ta Ta Creek - Cherry Creek Range Management Unit. Beetle populations had increased in adjacent stands where thinning and spacing had been carried out in 1978 and earlier.

Groups of 1 to 15 beetle-killed lodgepole pine are common in the Elko-Fort Steele area, often associated with land clearing or development work. A few trees were killed in the Wasa Provincial Park.

Both beetles had attacked at least 75% of the butts and stems of ponderosa and lodgepole pine trees, felled during stand thinning operations in 1979-80, over an estimated 100 ha within the 800 ha McGinty Lake Forest / Range Management Unit east of Kimberley.

LODGEPOLE PINE NEEDLE CAST *Lophodermella concolor*

Up to 30% of the 1979 foliage was discolored on most of the lodgepole pine along Granby River Valley, along the Kettle River Road from Crouse Creek to State Creek and along the West Kettle River to Beaverdell. Elsewhere in the Nelson Region up to 85% infection of the needles occurred at Gold Creek near Cranbrook, and in the Fernie-Sparwood area. The needles, infected in 1978, dropped prematurely.

In Prince George Region, severe browning of lodgepole pine in the Ste Marie-Opatcho Lakes area resulted with more than **40%** of the 1979 needles affected on 75% of the trees.

PINE NEEDLE SHEATH MINER *Zellaria haimbacki*

Larvae again caused extensive defoliation of the current year's growth of lodgepole pine in the Clearwater area at Spahats Creek Park, on the west side of Clearwater River from Dutch Lake to Wells Gray Park and in patches of 10 to 80 ha from Clearwater to Vavenby. In the area between Cache Creek and Cornwall Creek, 50 to 75% of the ponderosa pine branch tips were infested.

EUROPEAN PINE SHOOT MOTH *Rhyacionia buoliana*

The cooperative survey for European pine shoot moth was continued with examination of

pine species in cities and towns of the Okanagan Valley and Kamloops. Infested trees were found at 58 locations as follows:

Location	Number of infested trees	
	1980	1979
Summerland	3	17
Kelowna	40	42
Vernon	14	0
Kamloops	1	3

Shoot moths were found in Vernon for the first time since 1976 when 10 infested trees were located and destroyed. None have been found in Peachland or Westbank since 1978 when three infested trees were found in each,

No evidence of shoot moth was found in native stands around the above locations.

Spruce Pests

SPRUCE BEETLE
Dendroctonus rufipennis

In Prince George Region, beetle-killed white spruce trees were prevalent in TFL 30 (Monkman) and in Bowron River Valley at Haggen and Wendle creeks and south to 18 and 14 Mile creeks. The 1979 attacked trees were discoloring in late June and there were indications that the number of trees killed exceeded that of the previous year's attack. At two locations examined in the TFL and two in the Bowron, trees attacked in 1980 were easily found. At Stoney Lake a similar situation exists although, from the ground, the infestation does not appear as widespread. In the Merton, Carp-Weedon lakes areas the beetle population declined in 1978 and in 1980 only the occasional tree was strip-attacked (one side).

In Prince Rupert Region the beetle population declined at the same time as those near Carp Lake and it appears to remain at an endemic level in all areas examined to date. Trap trees felled in the Cranberry-Nass River area were very lightly attacked, at Derrick Lake and at Cranberry junction a moderate attack occurred.

A moderate infestation occurred in standing Engelmann spruce on approximately 40 ha in Upper Miledge Creek north of Blue River in the Kamloops Region. The infestation is three years old and continuing. Near Lillooet, approximately 20 ha of Engelmann spruce were infested at each of Blowdown Creek and McKay Creek. Populations are increasing in the Blowdown Creek area as a result of windthrown trees in leave blocks, but they remain low at McKay Creek where more than 50% of the trees have been killed over the past three years. At Smith River - Young Creek, light beetle attack occurred in windthrown spruce on about 25 ha and in standing trees on the edges of cutblocks in the drainage.

Infested standing and windthrown spruce should be removed from the woods and processed to destroy the beetle broods before the beetles fly in 1981.

Douglas-fir Pests

WESTERN SPRUCE BUDWORM
Choristoneura occidentalis

An average of 23% of the Douglas-fir buds were infested at 15 locations within the infestation in May. East of the Fraser River up to 58% of the buds were infested, indicating moderate to high larval populations at Manning Park, Coquihalla River, Silver-Skagit rivers and Siwash and Gilt Creeks in Vancouver Region. Subsequent larval sampling substantiated the predictions, and moderate to severe defoliation of Douglas-fir will probably occur in these areas. No defoliation is expected in the Pemberton area in 1980.

In the Kamloops Region 40% of the buds were infested at **15** locations, with a high of **77%** resulting in high populations in the Cache Creek - Carquille - Pavillion Lake areas and along Marshall

and Gun Creeks west of Lillooet. East of the South Thompson River moderate to high populations were present along Barnard Creek northeast to Penny Lake and east to Indian Gardens Creek. Moderate to severe defoliation should occur in these areas.

In the Cariboo Region moderate to severe defoliation of Douglas-fir occurred again in the Hart Ridge area. Understory trees have been severely damaged. The 1979 and 1980 defoliation caused heavy bud mortality, leaving many trees with only a few years of old foliage. Some mortality will no doubt result. Defoliation in the Maiden Creek, Loon Lake and Scotty Creek areas was light.

DOUGLAS-FIR TUSSOCK MOTH;
Orgyia pseudotsugae

Larvae were found consistently in beating collections from Douglas-fir in the Kamloops and Ashcroft areas and west of Pavillion Lake in the Kamloops Forest Region, but no defoliation occurred. Most collections contained only 2 to 10 larvae but higher numbers of 20 - 30 larvae were taken in collections along Duck Range, near McLure, Scotty Creek, Oregon Jack Creek and near Pavillion. Low numbers of larvae were found in Paxton Valley, Chase Creek and Hedley. Around Vernon small groups of coniferous shade trees on private property were being defoliated, causing homeowners some concern.

The only occurrence of tussock moth recorded in the Kamloops Region in 1979 was on a few nursery trees near Kamloops. This increase in tussock moth populations may be the forerunner of another serious outbreak.

Pheromone baited traps have been placed in Douglas-fir stands at various locations and the fall report will contain the results of this adult trapping program.

BLACK ARMY CUTWORM
Actebia fennica

An infestation of black army cutworm occurred in a 1980 Douglas-fir plantation in the "Jack" fire in the Cottonwood PSYU in the Cariboo Forest Region. From 20 to 100% defoliation of the seedlings occurred on a 10 ha area where other preferred ground cover was sparse. Some seedling mortality on the hill-tops may be expected.

Birds and animal predation of the pupae in the soil has reduced the population to the extent that little feeding is expected in this area in 1981.

Balsam *Fir Pests*

TWO-YEAR-CYCLE SPRUCE BUDWORM
Choristoneura biennis

Populations have been increasing in white spruce-alpine fir stands in the Cariboo, Prince George and Prince Rupert regions for several years. C. *biennis* takes two years to complete its life cycle and the heaviest feeding usually occurs in the even years (i.e., 1980) although at several locations in the East Kootenay the population is "off phase" and final development of the insect to the adult stage occurs in the "odd years," In the first year of development the small larvae feed for only a short period, usually causing only light defoliation. Tree mortality is generally negligible because this respite enables trees to recover somewhat before the next year's heavier feeding.

In the Cariboo region light to moderate defoliation occurred in the Horsefly and MacKay River areas and at Hendrix and Bosk lakes. Some alpine firs were severely defoliated in patches where most of the 1980 foliage has been consumed. Light defoliation occurred throughout the Cariboo Lake - Bowron Lake area.

Populations in the Prince George Region were sufficiently high to defoliate much of the 1980 growth on alpine fir and white spruce in the Stoney Lake area and in the lower Bowron River Valley from near Haggen Creek south to Towkuh Creek. In the Holmes River Valley most new growth of alpine fir was consumed and on June 17 adults were flying.

Up to 90% of the new growth of alpine fir and white spruce was defoliated along the Bell Irving River from the second crossing of Highway 37 south to Meziadin Lake in the Prince Rupert Region. Low larval populations were lightly defoliating alpine fir at Skunsnat Creek in the Kispiox River Valley.

In the Nelson Region thirteen separate infestations occurred on Engelmann spruce and alpine fir in the East Kootenay. Light defoliation of current year's growth occurred in the White River, Golden and Kootenay Lake areas and the St. Mary's drainage. In the North Fork White River where defoliation has been continuous since 1968, 40% of the buds were killed and of the 60% of the buds that flushed in 1980, 50% were infested,

BALSAM FIR NEEDLE RUST
Pucciniastrum epilobii

Alpine fir trees were infected in varying intensities over much of the host range in the Cariboo and Prince George regions and to a lesser extent in the Kamloops Region.

In the Cariboo Region about 10% (light intensity) of the new foliage was infected from Hendrix Lake - Crooked Lake area to McKay Creek and from Wingdam to Bowron Provincial Park.

Light to severe areas of infection occurred in the Prince George Region with the heaviest in the Bowron River Valley, Stone Creek - Willow River area, Summit Lake - Crooked River area and near Aleza Lake. Some trees were conspicuously discolored and without close examination the damage could easily be confused with spruce budworm feeding.

In the Kamloops Region the most severe discoloration occurred along the upper Barriere River.

Larch Pests

LARCH CASEBEARER
Coleophora laricella

Infestations continued in most western larch stands in the Nelson Forest Region with a new area of light defoliation along the Granby River Valley from Grand Forks to the Kendell Creek junction, and severe defoliation from there to Howe Creek. Elsewhere in the West Kootenay defoliation intensified to severe from Rock Creek to Bridesville and along Rock Creek to McKinney Creek. Some of the larch discoloration in the area resulted from casebearer feeding combined with the needle cast *Hypodermella laricis,* particularly in Fire Valley along Inonoaklin Creek. In East Kootenay defoliation occurred throughout most of the host range, varying from light at the northern limits to severe in the southwest, particularly near Creston, Cranbrook, Elko and Jaffray.

At Anarchist Mountain severe defoliation extended west into the Kamloops Region and defoliation continued at Shuttleworth Creek and Cherryville. New areas of light defoliation were recorded in the Joe Rich . Mission Creek area and at Terrace Mountain.

While the discoloration of infested larch is often very prominent, it is not likely to cause tree mortality. Parasite releases were made at several locations.

LARCH SAWFLY
Pristiphora erichsonii

The infestation continued in western larch stands in the East Kootenay, in the Elk River Valley and from Sparwood to Fernie, although the larval population was much reduced by failure of eggs to hatch or early larval mortality. Defoliation should therefore be much lighter than anticipated. Approximately 465 adult larch sawfly parasites, *Olesicampe benefactor,* were released in western larch stands in early July; 170 at Sparwood, 150 at Olson between Sparwood and Hosmer, and 145 north of Fernie between Fairy and Mutz Creeks. Checks will be made in the next few years to determine if the parasite becomes established.

LARCH NEEDLE CAST
Hypodermella laricis

Widespread prominent discoloration of western larch, caused by this needle cast throughout much of the Nelson Region could be confused with larch casebearer defoliation, since it occurred in much the same area, generally from the valley bottoms to 1200 metres elevation. Areas of significant infection and discoloration in West Kootenay were Fire Valley along Inonoaklin Creek, the west side of the Salmo-Creston Highway, in patches from Eholt to Christina Lake, Lemon Creek to Vallican and Nelson to

Balfour. In East Kootenay infection of western larch was more widespread and of greater intensity, with from 10 to 85% of the foliage affected in patches of 1 ha to 400 ha in Yahk River Valley, lower Bloom Creek, Groat River Valley, Hawkin and Cold creeks and an area around the White - Kootenay River junction.

Reduced increment growth may result from the needle loss, particularly where casebearer feeding occurs in the same stands,

Western Hemlock Pests

WESTERN HEMLOCK LOOPER
Lambdina f lugubrosa

Larvae have been appearing with increasing regularity in collections from western hemlock and western red cedar along the Coast and in the Interior of the Province. The most significant increase occurred along the east side of Coquitlam Lake, where an average of 31 larvae were taken in collections just north of a previous outbreak area (1963-73). No defoliation is expected in 1980. Kamloops and Nelson regions both report consistent low level occurrence of larvae in collections.

GREEN-STRIPED FOREST LOOPER
Melanolophia imitata

The number of larvae increased in collections from western hemlock and western red cedar on the Queen Charlotte Islands, the Mainland coast north of Prince Rupert and between Prince Rupert and Terrace. Highs of 43 larvae and 23 larvae were found at Giekie Creek on Graham Island and Tuck Inlet respectively. These populations are not high enough to cause noticeable defoliation; however, *M. imitata* populations can rise very rapidly, generally remain high for one year, and then collapse. However, in that one year, growth loss and tree mortality can be pronounced.

Previous damaging infestations occurred on the west and north coast of Vancouver Island in 1968 -1970 and on the Queen Charlotte Islands in 1963 - 64.

SADDLEBACK LOOPER
Ectropis crepuscularia

This insect also increased in western red cedar and western hemlock stands on the Queen Charlotte Islands with the highest numbers at Dolomite Narrows, 42 larvae and Eden Lake, 26 larvae, No defoliation was visible in the area. The only recorded outbreak of this insect occurred around Kitimat from 1960 to 1962.

Increases have occurred periodically since then along the mainland coast in 1966 and at Eden Lake on the Queen Charlotte Islands in 1969 - 71, but populations subsided with little evident damage.

SAWFLY ON HEMLOCK
Neodiprion sp.

The infestations on western hemlock and amabilis fir at Big Tree Creek and Keta and Haihte Lakes on Vancouver Island appear to be continuing. However, larvae were quite small in early June and current defoliation was not visible. These areas will be examined and sampled at a later date.

Pests *of* Young Stands

With recent emphasis on intensive forestry practices such as spacing of young stands, extra effort has been directed to the pests affecting these stands. Lodgepole pine is particularly susceptible to several diseases which directly affect the commercial potential of the trees, e.g., dwarf mistletoe, western gall rust, Atropellis canker and Stalactiform blister rust. In addition, root diseases may reduce density of trees in a given area and probably increase the trees' susceptibility to secondary beetle attack.

A detailed report on pest problems associated with management of young stands will be included in the fall summary. The forest manager should be aware of pests and survey stands designated for treatment so that spacing may eliminate or reduce the number of infected trees and not create or intensify a problem.

Animal Damage

Seedlings and sapling size lodgepole pine, birch and willow were killed by rabbit and porcupine feeding for several kilometres along the Telegraph Creek road in the Prince Rupert Region. Bark was chewed off from 15 cm above ground level to 2 metres up the bole. Scattered dead and dying pines, killed by porcupines, were visible along the Nass River above Canyon City and at the confluence of the Nass and Kinskuck Rivers.

In the Yukon feeding by varying hares killed up to 30% of the lodgepole pine in patches between Carmacks and Ross River, Damage to young trembling aspen stands was widespread throughout the Yukon with trees up to 8 cm girdled.

In the East Kootenay, top girdling by squirrels, and upper stem girdling and bark stripping by porcupines continues in immature lodgepole pine stands with the heaviest damage in Cold Creek east of Yahk, Moyie River and Spruce Tree Creek, where more than 100 stems per hectare have been girdled in the past few years. In some stands this may be beneficial as a natural thinning and spacing agent.

Deciduous Tree Pests

LEAF BLOTCH MINERS, *Lyonetia* sp. and BIRCH SKELETONIZER, *Bucculatrix canadensisella*

Prominent discoloration of western white birch trees, resulting from feeding by *Lyonetia* sp., occurred from McBride east to the Alberta border and from Tete Jaune Cache south to Hugh Allen Creek,

In the eastern portion of the Nelson Region all of the foliage of most white birch trees was discolored by the birch skeletonizer from Invermere north to and including the Golden area. These stands have been infested for the last 6 - 7 years but the trees should not be permanently damaged.

Heavy browning of birch occurred throughout the Barriere Lakes area in Kamloops Region.

BRUCE SPANWORM, *Operophtera bruceata* and LARGE ASPEN TORTRIX, *Choristoneura conflictana*

Defoliation of trembling aspen stands by the bruce spanworm and large aspen tortrix was widespread in the Chetwynd, Dawson Creek and Fort St. John areas and north along the Alaska Highway from Trutch to Fort Nelson and Kledo Creek in the Prince George Region.

In Prince Rupert Region trembling aspen and willow were 50 to 100% defoliated by O. *bruceata* for 3 km along the Hazelton-Kitwanga Road and willow was lightly defoliated around Hazelton.

In the Yukon moderate to severe defoliation of trembling aspen by C. *conflictana* occurred near Carmacks, Stewarts Crossing to McQuesten, near Pelly River Crossing and north of Mayo. Defoliation was lighter at Teslin, west of Whitehorse and at Beaver Creek.

WINTER MOTH *Operophtera brumata*

Defoliation of deciduoys trees and shrubs was again widespread on southern Vancouver Island, throughout Victoria and nearby municipalities of Esquimalt and Colwood, and north throughout the Saanich Peninsula to Brentwood and Sidney. Defoliation was not recorded north of Colwood.

Parasites were released in 1979 at 31 locations on southern Vancouver Island, and in 1980 additional parasites were released at 27 locations within the infested area. It will take several years to determine how well the parasites become established.

Other Noteworthy Insects and Diseases

Insect / Disease	Host(s)	Forest Region	Locality	Remarks
Acleris gloverana Blackheaded budworm	Fir, alpine	Prince Rupert	Morice L.	30% of new growth defoliated over small area.
Cryptorhynchus lapathi Poplar and willow borer	Willow	Nelson	Kinnaird	Severe damage to ornamental trees.
Contarinia sp. Douglas-fir needle midge	Douglas-fir	Nelson	Columbia R. Valley	1980 needles infested. Aphids often associated.
Elatobium abietinum Spruce aphid	Spruce, Sitka	Prince Rupert	Alliford Bay Sandspit	Defoliation of shoreline trees.
Hylobius warreni Warrens collar weevil	Pine, lodgepole	Prince Rupert	Nilkitkwa L. Perow burn	Small groups of 1 - 5 young trees attacked.
Leptomelanconium cinereum Needle cast of pine	Pine, ponderosa	Nelson	Elko-Roosville Bull R. Baynes L.	Infection persists in areas of severe 1979 infection.
Melampsora medusae Needle rust	Larch, western	Nelson	Blueberry Cr.	60% to 90% of needles infected.
Orgyia antiqua Rusty tussock moth	Douglas-fir	Vancouver	Clearbrook	Low populations in Grant Park.
Phyllocalpa bozemani Poplar sawfly	Cottonwood, black	Nelson	Fort Steele - Wildhorse Cr.	All leaves rolled and skeletonized on trees along watercourse.
Pissodes strobi Spruce weevil	Spruce, white	Prince George	Aleza L., Davie L Yardley L.	9 to 18% of current terminal leaders attacked.
Pyrrhalto carbo Willow leaf beetle	Willow	Nelson	Carnes Cr. to Bigmouth Cr.	90% of leaves skeletonized.
Scolytus ventralis Fir engraver beetle	Douglas-fir	Nelson	Radium	Contributed to mortality of 1000 Christmas trees on **40** ha.
Scythropus californicus Weevil	Pine, ponderosa	Nelson	Elko-Cranbrook Fort Steele Canal Flats	Up to 100% of 1979 needles attacked on half the trees.
Venturia macularis Shoot and leaf blight of aspen	Aspen, trembling	Prince Rupert	Eastern half of Region	Foliage browning in scattered patches.
Vespamima sequoiae Pitchmoth	Pine, lodgepole	Nelson	Mather - Lost Dog Cr.	Pitch globules common on 60 year old trees on 20 ha.

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