

PROVINCE OF BRITISH COLUMBIA

FOREST INSECT SURVEY

G. T. SILVER AND D. A. ROSS

Forest Biology Laboratory, Forest Zoology Unit, Victoria and Vernon, B.C.

INTRODUCTION

This year, for the first time, the survey activities of the British Columbia laboratories located at Victoria and Vernon are presented as a combined report. It is hoped that this will be an improvement for those interested in forest insect conditions in the Province as a whole.

Much assistance was obtained from the British Columbia Forest Service and private companies. Aerial reconnaissance over the spruce budworm and the black-headed budworm infestation areas, as well as other parts of the Province was made possible.

The survey of insect diseases was continued in 1954 with some changes in methods. Apparently diseased insects were classified into three categories: (1) dead in the field; (2) dead upon arrival at the insectary; (3) died during insectary rearing. The lowest incidence of disease was found in dead insects collected in the field.

Polyhedral viruses were the most important diseases found, the most outstanding being a polyhedrosis of the forest tent caterpillar. A high percentage of these insects from the interior of the Province was infected. Other viruses affected a large number of Douglas-fir tussock moth and Western tent caterpillar larvae. The pathogenic fungus *Beauveria* was found in a few spruce budworm larvae. A significant number of western hemlock looper larvae from one point near Prince George were affected by a virus disease.

Insect collections made in 1954 totalled 4,582, a decrease of 1,804 from 1953. The Victoria laboratory received 1,974 collections and the Vernon sub-laboratory 2,608. The reduction is attributable to the late spring, and to subsequent adverse weather conditions. Collections received during 1954 were distributed among the principal tree species as follows:

Coniferous trees	Collections	Broad-leaved trees	Collections
Douglas fir.....	1,266	Poplar—	
Hemlock—		Trembling aspen.....	119
Western hemlock.....	892	Silver poplar.....	3
Mountain hemlock.....	6	Balsam poplar.....	1
	898	Miscellaneous poplars.....	6
			129
Spruce—		Alder—	
Engelmann spruce.....	190	Red alder.....	92
White spruce.....	174	Miscellaneous alders.....	29
Sitka spruce.....	144		121
Black spruce.....	23		
Western white spruce.....	13	Willow.....	79
Colorado spruce.....	2	Birch.....	57
Miscellaneous spruce.....	63	Black cottonwood.....	22
	609	Garry oak.....	14

INTRODUCTION—Concluded

Coniferous trees	Collections	Broad-leaved trees	Collections
Pine—		Alder— <i>Concluded</i>	8
Lodgepole pine.....	266	Maple.....	116
Ponderosa pine.....	181	Miscellaneous broad-leaved trees....	
Western white pine.....	42		
Miscellaneous pines.....	4	Total.....	546
	493	No host specified.....	120
Fir—			
Alpine fir.....	199		
Amabilis fir.....	83		
Grand fir.....	16		
Miscellaneous firs.....	14		
	312		
Cedar—			
Western red cedar.....	190		
Yellow cedar.....	3		
Miscellaneous cedars.....	2		
	195		
Larch—			
Western larch.....	90		
Tamarack.....	18		
	108		
Other coniferous trees.....	35		
Total.....	3,916		
GRAND TOTAL—4,582			

IMPORTANT INSECTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)—The outbreak of the 1-year-cycle spruce budworm in the Lillooet and Fraser-Nahatlatch river valleys reported in 1953 remained at a high level in 1954. Through co-operation with the British Columbia Forest Service and Canadian Forest Products the extent of the infestation was mapped from the air. The total area affected was about 113 square miles, of which 24 square miles were in the Nahatlatch-Fraser River region. The damage extends from the valley floors to altitudes of 2,000 to 3,000 feet. Douglas fir is the principal host. The present infestation is in its second, and in some areas, in its third year of heavy defoliation. The younger trees have suffered the most damage. This year's terminals, as well as most of 1953 and 1954 adventitious shoots were completely defoliated in some areas. There was also some tip and shoot killing. Larval parasitism amounted to about 8 per cent. The most numerous parasite was *Glypta fumiferanae* (Vier.), followed by *Apanteles* sp. Egg parasitism averaged 7.5 per cent. No diseased larvae were found. Egg counts averaged 221 masses per 100 square feet of foliage. As the hatch was approximately 75 per cent, a heavy initial population is anticipated for 1955.

The population level of 1-year-cycle budworm in Fountain Valley near Lillooet decreased again and is no longer of importance.

The 2-year-cycle spruce budworm outbreak at Babine Lake showed signs of subsiding. Defoliation was lighter this year than in the last heavy feeding year of 1952. Two new smaller outbreaks were reported at Star Lake, north of Burns Lake, and at McKendrick Creek, north of Smithers.

During 1954, a flight year, the 2-year-cycle budworm recurred in infestation proportions in extensive tracts of spruce and alpine fir in the Prince George Forest District. Defoliation was general on the west slope of the Rockies from

Pine Pass, where it was particularly severe, south to Table River, and in the Clearwater Valley where heavy mortality of alpine fir was evident. Patches of timber in the badly burned Peace Pass were also infested.

Light defoliation occurred along the length of the Crooked and Pack river valleys and over most of the uplands between the Crooked and Parsnip rivers, south to Averil Mountain.

West of the Parsnip and Crooked rivers, defoliation occurred along the ridges at elevations from 3,000 to 5,000 feet from the vicinity of Carp Lake northward to the eastern slope of the Wolverine Range, about 30 miles southwest of Finlay Forks. The severe infestation that is crossed by the Nation River Mine Road abated somewhat within the main stand of overmature timber but in the surrounding young forest discoloration was more conspicuous than in previous years. Scattered outlying patches of infestation occurred as far west as Trembleur and Inzana lakes.

The populations declined over a large part of the Wells-Bowron Lake area where defoliation was severe in 1952, but a high population level persisted in the vicinity of Wells, with localized increases west to Wingdam. Discoloration of alpine fir on the slopes north of Sinclair Mills was discernible and a light infestation occurred between 3,000 and 4,000 feet elevation in a residual stand of alpine fir southwest of McBride. Collections: Victoria 126, Vernon 221.

Douglas-fir Beetle, *Dendroctonus pseudotsugae* Hopk.—The Douglas-fir beetle continued its seemingly relentless destruction of groups of trees throughout the Province.

In the Prince George Forest District, some 8 miles northwest of Quesnel, the infestation which in the last three years killed the major portion of a residual stand of Douglas fir in a logged area, disappeared except in a few scattered groups of trees. South of Quesnel, beetle attacks increased in severity, particularly west of the Fraser River. During the past three years a spectacular increase has occurred, particularly within and adjacent to recently-logged stands along the ridge paralleling the Fraser River southwest of Buck Ridge Settlement. Though destruction has been less severe east of the Fraser it increases yearly; small groups of infested trees were scattered from Australian south to Macalister, the heaviest concentrations occurring in the southern portion.

In the Kamloops Forest District spot infestations were too numerous to list completely. They were particularly abundant and severe in the following regions: between Soda Creek, Lac La Hache and Canim Lake; on the east side of the North Thompson River from Barriere to Kamloops; and between Bestwick and Falkland.

There were fewer infestations in the Nelson Forest District than in the Prince George and Kamloops districts. The spot infestations north of Fairmont Hot Springs, along the east side of Windermere Lake, remained active, as did infestations in the West Kettle River Valley. A few new spot infestations appeared in the Kettle River Valley.

On Vancouver Island the infestation near Cumberland was unchanged with no new attacks reported. Almost continuous patches of infested, dying, and dead Douglas fir were found on both sides of Buttle Lake, and smaller areas of "red tops" extend to Upper Campbell Lake. In these infestations healthy trees were sometimes attacked in preference to weakened and damaged trees. In the Nimpkish Valley the 1953 kill has been estimated at 50 million board feet. Spot infestations were noted in the Lillooet and Fraser River valleys, Vancouver Forest District.

Mountain Pine Beetle, *Dendroctonus monticolae* Hopk.—During 1954 there was no apparent change in the general status of this insect. Beetles continued to take an impressive toll of white and lodgepole pine timber in various parts of the southern interior of British Columbia.

In the Kamloops Forest District, one of the major areas of current beetle activity occurred on Shuswap Lake, notably between Cape Horn and Albas, and at Beach Bay. North of Beach Bay, a cruise strip through a stand of white pine averaging 10 inches D.B.H. tallied as follows: 45 stems not infested; 29 attacked during 1954; 19 attacked during 1953; and 30 stems destroyed prior to 1953. A newly reported infestation occurred in decadent white pine near Mud Lake, and in pole-sized lodgepole and white pine near Blue River Post Office. Beetle populations persisted in white pine in the Revelstoke, Big Bend Highway, and Upper Arrow Lake regions mentioned in the 1953 Report.

An association of *Dendroctonus monticolae*, *D. valens* Lec., and *D. brevicornis* Lec. infested some 35 acres of ponderosa pine about Little Shuswap Lake. About 50 per cent of the trees were attacked.

The mountain pine beetle infestation at Adra, near Penticton, currently covers about 160 acres of small lodgepole pine trees. The attack which began in 1951 has spread to mature and semi-mature ponderosa pine trees.

The infestation in ponderosa pine stands in the Aspen Grove region of the Kamloops Forest District occurred in widely scattered groups of trees. Mortality will no doubt continue during the next few years, although there was a decrease in population level at Alleyne Lake. Typically, attack was restricted to the more mature or decadent trees.

In the Nelson Forest District, the Windermere infestation continued to spread both eastward and westward in lodgepole pine stands. Expansion slowed at Frances and Forester creeks, and Steamboat Mountain. Beetle-infested trees were seen along the mountainside west of Whitetail Lake. The Arrowhead, Nakusp, and Grand Forks infestations increased in size.

In the Prince George Forest District, the minor infestations at Puntchesakut Lake continued.

Spruce Bark Beetles, *Dendroctonus* spp.

Engelmann Spruce—In the Nelson Forest District, the small infestations at Van, Little Jim, and Lamb creeks, were eliminated as a result of logging operations. At Lamb Creek the stumps were peeled as a further precaution. Infestations of Engelmann spruce beetles were discovered during 1954 in areas about Bloom, Hawkins, and Sundown creeks. In the Bloom Creek Valley up to 50 infested trees occurred in a single small group; in the Hawkins Creek Valley the maximum was 100 infested trees in a group. A considerable number of beetle-killed and recently infested trees were located about the headwaters of Priest River. The site of heaviest attack was along the valley bottom of Nun Creek where groups of 30 to 50 infested trees were common. Adjacent to logged areas at the east end of Boundary Lake, small numbers of infested trees occurred along the watercourses. A small outbreak at Granite Creek, near Salmo, appears to have been controlled by woodpeckers. A. Larsen reported small active infestations of Engelmann spruce beetles at Oscar Creek, near Ymir, and along Grohman Creek north of Nelson.

The infestation near Princeton, first reported in 1953, was inactive; 187 mature and semi-mature Engelmann spruce trees on an area 4 by 26 chains were killed by *Dendroctonus* beetles.

White Spruce.—In the Prince George Forest District, a light infestation was discovered in a mature white spruce stand in Ptarmigan Creek Valley. Apparently the outbreak originated about three years ago in patches of blow-down and has spread to the standing timber. Small infestations were observed in the valleys of Kenneth, Hungary, and Slim creeks. A trace of beetle activity persisted near Sinclair Mills.

Western Hemlock Looper, *Lambdina fiscellaria lugubrosa* (Hlst.)—Hemlock looper population levels increased considerably throughout the Province in 1954, and attained epidemic proportions in some of the mature and overmature hemlock and hemlock-cedar stands between 52 and 54° latitude in the eastern section of interior British Columbia.

In the Prince George Forest District an infestation about a mile long and one-quarter mile wide occurred in an overmature hemlock stand on a low ridge between Eaglet Lake and Fraser River. In some portions of this stand the upper crowns of dominant hemlock trees, as well as scattered white spruce, Douglas fir, and alpine fir trees were almost stripped. Intermediate and understory alpine fir were heavily defoliated, and a few trees up to 10 inches D.B.H. were completely denuded.

Belts of light to medium defoliation were noted from the air south of the Fraser River from Lunate Creek to lower Slim Creek, and in upper Slim Creek Valley. Other localities in the Prince George District where larvae were particularly numerous were: southwest of McBride, Fyfe Lake, north of Hixon Creek, and south of the Fraser River near Penny. At the latter place, the sparse understory of spruce, alpine fir, and hemlock was quite severely defoliated; the upper third of some 20-foot hemlock trees was stripped. Scattered mature spruce and alpine fir trees were discolored. Diseased larvae were numerous in this outbreak.

Hemlock looper population levels increased slightly in overmature cedar-hemlock stands traversed by the Big Bend Highway. A slight decrease was detected in the Kamloops Forest District.

Hemlock looper larvae were found commonly throughout the coastal areas. The largest numbers were found at Scully Creek in the Prince Rupert Forest District where hemlock was the preferred host. Collections: Victoria 152, Vernon 227.

Black-headed Budworm, *Acleris variaria* (Fern.)—Several notable changes occurred in black-headed budworm infestations in the Prince Rupert Forest District. The heavy attack that has been recorded along the Portland Canal from Stewart to the Nass River mouth, and including Alice Arm, collapsed in 1954. Only occasional larvae were collected. In the Ecstall River, Skeena River Valley, Kitsumgallum Lake, Lava Lake, and Nass River areas, the outbreak persisted but at a lighter degree than in 1953. The only increase in the district was in a small area between Terrace and Lakelse Lake. In the Queen Charlotte Islands the population remained generally at last year's level with increases in a few localities. The only noticeable defoliation was at Masset, Graham Island, and Tasu, Moresby Island.

Heavy spot infestations were found on Vancouver Island at Holberg and Beaver Cove. A medium infestation was present at Sayward where dead trees from a past outbreak are still present. Only a few larvae were collected here in 1953.

There was little change in the population density of this budworm in the interior of the Province and no noticeable defoliation was recorded. Collections: Victoria 427, Vernon 156.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.—During 1954 important changes occurred in the status of forest tent caterpillar outbreaks in B.C. Varying degrees of population decline were apparent in the Interior. Further expansion of infestations occurred in relatively few areas.

No noteworthy defoliation was reported in the eastern portions of the Nelson Forest District; the infestations of recent years collapsed, apparently through the action of a virus disease. In the western portion of the Nelson Forest District, some infestations increased, others decreased. The infestation in the Monashee Range, near Boulder Creek, expanded, particularly toward Whatshan Lake. The medium to heavy outbreak at Summit Lake increased from an area of 250 acres in 1953 to some 1,200 acres in 1954. The two infestations in the vicinity of Arrowhead declined from heavy in 1953 to medium in 1954. One, to the north of Arrowhead, was about 6 miles long and 2 miles wide; the other, to the west, extended over 1,000 acres along Pingston Ridge. Between New Denver and Retallack, a distance of 16 miles, the infestation was general, although the defoliation varied from light to heavy. The Granby River infestation collapsed about midsummer.

Medium to heavy infestations recurred in the trembling aspen belts about Williamson Lake, Revelstoke, and in the discontinuous patches of aspen along the western part of the Big Bend Highway. During the late larval instars, however, a virus disease and other natural control factors greatly reduced caterpillar numbers. For example, an aspen stand of some 40 acres on Mount McPherson was almost completely defoliated, but when an attempt was made to collect pupae, only a few specimens could be found. The status of the infestation about Bear Lake at 3,500 feet remained unchanged; defoliation of aspen trees on a 30-acre area ranged from 30 to 100 per cent.

Forest tent caterpillar infestations in western portions of the Kamloops Forest District are incompletely known. It is known, however, that infestations of varying degree occurred during 1954 about Horsefly Lake (over an area of 5 square miles), Beaver Lake, south of Quesnel Lake, and on the Williams Lake-Horsefly road. Scattered patches of infested aspen trees were noted in the Soda Creek area as well.

In the Prince George Forest District, the trend in 1954 was toward lighter infestations. Only a few areas infested during 1953 failed to be at least lightly defoliated. In contrast, from Quesnel south to Macalister and in the vicinity of Prince George, the attack increased in intensity, although there was not any great extension of infestation boundaries. Scattered light to medium defoliation was noted between Quesnel and Woodpecker. The infestations between McBride and Mount Robson changed little since 1953; blocks of trees up to several hundred acres in extent at McBride and near Dunster were almost completely stripped of their leaves.

The accompanying table gives the average number of egg masses per tree for samples taken at the localities designated, and the probable infestation intensity, at least of early-instar larvae, for 1955.

FOREST TENT CATERPILLAR EGG SURVEY BASED ON THE EXAMINATION OF THREE TREMBLING ASPEN TREES AT EACH POINT

Location	Average D.B.H.	Average crown length (feet)	Average number of egg masses per tree	Infestation forecast for 1955
<i>Nelson Forest District</i>				
Nicholson.....	6		0	Trace
3 miles N. of Brisco.....	6		0.3	Trace
Spillimacheen.....	6		0.3	Trace
Sproat Mountain (Sidmouth).....	6		17	Medium
Summit Lake.....			32	Heavy
Granby River.....	4		0	Trace
Sandon.....			4	Light
Zincton.....			17	Medium
<i>Kamloops Forest District</i>				
Mount McPherson.....	5	26	0.3	Trace
Horsefly Lake.....	5	15	46	Heavy
<i>Prince George Forest District</i>				
Reid Lake.....	6	27	45	Heavy
Woodpecker.....	5	18	16	Medium to heavy
Yardley Lake.....	6	20	6	Light
Dragon Lake.....	6	18	38	Heavy
Barlow Creek.....	6	17	6	Light
Beaverley.....	5	27	41	Heavy
Cottonwood River Bridge.....	6	19	8	Light

Egg-mass counts and general observations indicate that forest tent caterpillars will recur at least in medium infestation proportions in a few scattered localities in the western part of Nelson and Kamloops forest districts, and in some portions of the Prince George Forest District. Little defoliation may be expected in the eastern part of Nelson and Kamloops forest districts. Collections: Victoria 11, Vernon 43.

Douglas-fir Needle Miner, *Contarinia* sp.—In the Kamloops Forest District, heavy infestations of a needle miner occurred on both young and mature Douglas fir trees. At Peachland and Westbank approximately 75 per cent of the current year's needles were mined. By September the needles turned yellow and many shrivelled prematurely. Areas near Hedley and Osoyoos were infested to a lesser degree. Stands located at Squilax, Cilista, Anglemont, and Carlin along Shuswap Lake were heavily infested, with 40 to 95 per cent of the needles mined. The damage in these areas showed up as a purple discoloration of the foliage, easily mistaken for needle blight. Light infestations where 5 to 30 per cent were mined occurred along the North Thompson River from Barrier through Vavenby.

Heavy infestations in the Nelson Forest District occurred at Pend-d'Oreille River near Waneta, and at Edgewood, with 75 per cent of the needles mined. Lighter infestations, ranging from 5 to 15 per cent of the needles mined, occurred at Grand Forks, Cascade, Creston, Yahk, and Needles.

Mined Douglas fir needles were noted in much of the Quesnel Forest Ranger District, Prince George Forest District. Samples taken near Quesnel had about 50 per cent of the needles mined.

Silver-spotted *Halisidota*, *Halisidota argentata* Pack.—This moth is now prevalent on the southern half of Vancouver Island, the Gulf Islands, and the southern mainland. The heaviest populations were found near tidewater and below 1,300 feet. Up to 14 colonies were found on a single tree, but the usual

number was one to five. The sudden increase in numbers is very significant as natural enemies usually control the insect. Parasitism was too low in 1954 to effect any control. The preferred host is Douglas fir, but hemlock, grand fir, lodgepole pine, and cedar were also attacked. Collections: Victoria 14.

Sawflies, *Neodiprion* spp.—No noteworthy infestations were reported. Although these sawflies were widespread the number per collection dropped significantly. In several areas where collections of over 200 larvae were common in 1953, none were found this year. Collections: Victoria 278, Vernon 469.

Satin Moth, *Stilpnotia salicis* (L.).—The satin moth infestation at Currie Lake, near Kamloops, extended to three other small groves of trembling aspen. Another group of infested trees was discovered in the Lac du Bois area north of Kamloops. All of these groves were heavily defoliated.

A great flight of satin moths, presumably from one of the above-mentioned areas, descended on the City of Kamloops late in July. They clustered about electric signs and brightly-lighted windows. Eggs were deposited indiscriminately but very few of the larvae became established on poplar trees.

In Victoria several silver poplar trees were completely defoliated. This is the first appearance of the satin moth in this region for some years. Collections: Victoria 3, Vernon 6.

Western Tent Caterpillar, *Malacosoma pluviale* (Dyar).—The outbreak at Pitt Meadows, Vancouver District, persisted this year. Alder and apple trees in the Columbia Valley were completely defoliated. Heavy defoliation occurred in the southern part of Vancouver Island and the Gulf Islands. Light infestations persisted in the southern interior of the Province. Collections: Victoria 57, Vernon 25.

Spotless Fall Webworm, *Hyphantria textor* Harr.—Webs were more numerous in 1954 than during the previous year. They were particularly abundant along roadsides in the eastern portion of the Kamloops Forest District and in the Nelson Forest District, except in the Grand Forks area, where a decline occurred. Collections: Vernon 10.

Ugly-nest Caterpillar, *Archips cerasivorana* (Fitch).—Larvae stripped roadside choke cherry bushes between Fairmont and Shuswap Creek in the Invermere area, Nelson Forest District. Collections: Vernon 1.

Saddle-backed Looper, *Ectropis crepuscularia* (Schiff.).—The saddle-backed looper populations in the Blue River area declined from the fairly heavy infestation proportions attained during 1953. By mid-summer 1954, larvae were still fairly numerous, but no defoliation was apparent. Collections: Victoria 39, Vernon 73.

Pine Needle Scale, *Phenacaspis pinifoliae* (Fitch).—The infestation of needle scales in the area between Oyama and Penticton was somewhat less severe than during 1952 and 1953. In the Kelowna area, many of the ponderosa pine trees bearing a heavy scale population were in poor condition. A few of the infested trees appeared to be dying; all examined contained bark beetles. It is probable that the weakened condition of scale-infested trees made them subject to bark-beetle attack. Collections: Victoria 1, Vernon 2.

Poplar Leaf-miner, *Phyllocnistis populiella* Chamb.—This species was abundant again throughout much of northern British Columbia. Also it was in heavy infestation proportions along the southern part of the North Thompson River Valley. Collections: Victoria 5, Vernon 2.

False Hemlock Looper, *Nepytia* sp.—False hemlock loopers were slightly more abundant in the eastern portion of the Kamloops Forest District in 1954 but there was no noticeable defoliation. The population density remained unchanged or decreased slightly in the remainder of the Kamloops Forest District and in the Nelson Forest District. Collections: Vernon 223.

Douglas-fir Tussock Moth, *Hemerocampa pseudotsugata* McD.—There was a small increase in larval numbers at Cascade although no defoliation was apparent. Elsewhere the Douglas-fir tussock moth maintained quite low population levels. A polyhedral virus disease caused high mortality in reared larvae collected near Cascade. Collections: Vernon 23.

Larch Sawfly, *Pristiphora erichsonii* (Htg.).—Larch sawfly population levels remained low in southern British Columbia. This sawfly is most common on western larch between Sand and Snowball creeks in the Granby River Valley. It was collected for the first time and in light infestation proportions on eastern larch in swamps north of Cluculz Lake, Prince George Forest District. Collections: Vernon 13.

Striped Alder Sawfly, *Hemichroa crocea* (Fourc.).—Populations persisted on Vancouver and Salt Spring islands, Vancouver Forest District, and on Graham Island in the Queen Charlotte Islands. Defoliation was light. Collections: Victoria 13, Vernon 2.

Lodgepole Needle Miner, *Recurvaria* sp.—A light infestation persisted in a young lodgepole pine stand near Squilax. This infestation is restricted to the area between Shuswap and Little Shuswap Lakes. Collections: Vernon 2.

Large Aspen Tortrix, *Archips confictana* (Wlk.).—Larvae caused medium to heavy defoliation of the trembling aspen stands between Mile 80 and Mile 140 on the Alaska Highway. About 50 acres of pole-sized aspen trees 4 miles north of Vanderhoof were 80 per cent defoliated. The infestation about Lac la Hache persisted. Collections: Vernon 4.

A Willow Leaf-miner, *Lyonetia saliciella* Busck.—This willow leaf-miner occurred in heavy infestation proportions for the third successive year in western portions of the Nelson Forest District. The main infestation extends from Nakusp to Inonoaklin Crossing, a distance of some 60 miles.

Pitch Nodule Maker, *Petrova albicapitana* (Busck).—About 45 per cent of the 1-inch D.B.H. lodgepole pine stems in a small stand near Squilax were infested by this insect.

Filbert Worm, *Melissopus latiferreanus* (Wlshm.).—A moth reared from native hazel nuts collected at Castlegar during 1952 has been recently identified as the filbert worm, an exotic species. In recent years specimens have been reared from Garry oak galls on Vancouver Island.

Spruce Tip Moths, *Zeiraphera* spp.—These insects appeared in unusual numbers in several areas this year. In the northern part of Vancouver Island defoliation of spruce was evident for about 2 miles along the Zeballos River Valley. At Pine River bridge, Prince George Forest District, 145 larvae were collected in one sample. Collections: Victoria 8, Vernon 63.

LIST OF COLLECTORS

Co-operators

Adams, G. N.
Anderson, F. W.
Anderson, O. J.
Anderson, W. R.
Angly, R.
Antonelli, K.
Antonelli, M.
Antonenko, J.
Arlidge, J. W. C.
Atkinson, H. E.
Aylett, R. W.

Bailey, J. D.
Bailey, J. F.
Baker, F. M.
Banks, E.
Barbour, H. T.
Barker, H.
Barret, R. J.
Bates, A.
Baxter, L.
Bazan, G. E.
Beall, A. C.
Beckett, D. A. E.
Benteli, S.
Black, W.
Bodman, C. O.
Boydell, J.
Braathen, R.
Brash, W. E.
Brewis, D. W.
Briggs, B. T.
Brooks, F. T.
Brooks, T.
Brown, A. S. B.
Bryant, W. A.
Bugslag, C.
Bullen, J. G.
Burbridge, D.
Burns, E. J.

Campbell, H. W.
Carr, W. S.
Chamberlin, L. C.
Chingey, H.
Clark, J. D.
Clifford, R. I. T.
Clifton, R.
Collier, R.
Collins, B. G.
Conroy, J. H.
Cook, L. E.
Corrigan, R. W.
Cosens, A. S.
Cowell, W. C.
Crosby, D. N.

DeWitt, D. O.
Dobbin, C. D.
Doerksen, H.
Donaghy, F. W.
Donnelly, R.
Durrell, G.

Eddie, H. M., and Sons Ltd.
Eidsvik, H.
Evans, O. H.

Fellers, V. A.
Fenger, T. F.
Field, W. J.
Fisher, S.
Flundra, J.
Fraser, S.
French, C. L.
Frost, S. C.
Fuller, L.

Gale, J. T.
Gamble, L. J.
Garon, D.
Gibbs, T. L.
Gibson, R.
Gierl, J. B.
Gilgan, N. P.
Gilmour, A. M.
Ginnever, A. F. W.
Gissing, A.
Glassford, R. J.
Glenn, J.
Gordon, E.
Goudie, W. R.
Graham, P.
Green, J. A.
Greenhouse, J. P.
Griffith, D.
Griffiths, P. F.

Haley, K.
Hall, J. G.
Halliday, C. T.
Hamann, L. O.
Hamblin, R. A.
Hambrook, J.
Hamilton, D.
Hannah, M.
Harvie, T.
Hazlett, H. B.
Hellenius, R. A.
Henderson, C. L.
Henderson, J. E.
Henderson, W. T.
Hewitt, E. W.
Hewlett, W. A.
Hickey, W. C.
Hill, A. F.
Hill, F. R.
Hilsden, D. R.
Hilton, B.
Hoffman, J.
Hogan, J. A.
Hollingshead, S. B.
Hope, L. S.
Hopkins, H. V.
Horne, J.
Hough, W. S.
Howard, W.
Huffman, C. H.
Hulme, G.
Huva, G. G.

Ingham, W. E.
Ivens, J. H.

Janning, H. A.
Janzen, M. T.

Jeffrey, D. S.
Jones, G. G.
Jones, R. W.

Kaby, J.
Kast, K. H.
Keefe, R. R.
Kerr, R. J.
King, E. M.
Kohn, J. M.
Kuijt, J.

Larsen, A. J.
Larsen, L.
Layton, A. T.
Lee, A. G.
Levangie, L.
Litterick, J. P.
Little, J. O.
Long, H.
Lonneberg, M.
Lorentsen, L. H.
Lowe, J. B.

MacAskie, I. B.
MacPherson, A. C.
McArthur, E. J.
McDaniel, R. W.
McDonald, J.
McDonald, L. E.
McDougall, R.
McInroy, K. N.
McKenzie, G. A.
McKinnon, C. G.
McPhee, W.
McQueen, L.
McRae, M. A.
Macalister, J. S.
Mackie, B. A.
Madhosingh, C.
Magee, K. W.
Mastin, T.
Mayson, H. G.
Metcalf, G.
Mickelbury, J.
Mitchell, G. W.
Mitchell, J. G.
Mizon, C. W.
Moillet, J. L.
Monteith, M. E.
Moore, W.
Moran, M. L.
Morley, K. A.
Mudge, M. H.
Munro, D. W.
Murray, J.

Nadin, P. A.
Nichol, A.
Nielsen, P.
Norberg, R.
Norbirg, H. P.

Old, G. F.
Olson, S.
O'Meara, A. V.
Ordinall, J.
Ormond, L. D. D.

LIST OF COLLECTORS—Concluded

Osborne, H.
Oxley, R. J.

Paquette, O.
Parsey, R. R.
Paterson, T. R.
Peat, S. S.
Pement, E.
Peterson, E. E.
Petty, A. P.
Philcox, J. M.
Pidgeon, H.
Pinder, J.
Porter, H. E.
Potter, W. G.

Raven, J. H.
Rawlins, W. P.
Reaney, R. J. C.
Reid, E. W.
Reith, W. D.
Rhodes, J.
Richardson, G.
Richmond, D. M.
Ritcey, R. W.
Robinson, J.
Robinson, J. H.
Roethel, H.
Rockwell, I.
Rogers, G. A.
Ross, A. I.
Rourke, R. J.

St. Laurent, J. C.
Sandberg, N. H.
Sanders, J.
Schmidt, J. T.
Schutz, A. C.
Sherwood, L. C.
Shires, F. M.
Simmons, C. F.
Smale, F.
Smith, A.
Sorenson, N.
Specht, G.
Speer, R. C.
Spiers, K.
Storey, M.
Strimboldt, T.
Stroud, C. W.
Sutherland, I. L.
Sweet, R. L.
Sykes, S. J.
Symes, A. E.

Taft, L. G.
Teindle, T. J.
Thomas, P. R.
Thomas, R. W.
Thornton, S.
Threatful, N.
Tourond, A. L.

Uphill, W. T.

Forest Biology Division

Grant, J.

Harvey, E. G.
Hughes, J. M. T.

Jones, G. M.

Mathers, W. G.
Molnar, A. C.

Obana, J. Y.

Porter, W. A.

Richmond, H. A.
Robertson, K. W.

Van Westerborg, D.
Vaughan, E. G.
Vivian, R. K.

Wager, J. C.
Wagner, C. J.
Waldon, W.
Waller, T. G.
Wallis, E. H.
Ward, J. G.
Warren, D.
Wassholm, T. G.
Webb, R. A.
Webster, J. B.
Weinard, H. P.
Wejr, S. E.
Weller, J. B.
Whelan, C. S.
Whitecross, A. F.
Wilkinson, D.
Williams, C. M.
Williams, T. I.
Wilson, R. S.
Winkworth, A. V.
Wittner, D. J.

York, G. M.

Zacharkiw, M.

Ross, D. A.
Ruppel, D. H.

Sager, S. M.
Salisbury, P. J.
Sellars-St. Clare, E.
Silver, G. T.
Simms, W. G.
Smith, D. N.
Sugden, B. A.

Taylor, D. W.
Thomson, M. G.

Wallington, L. M.
Walters, J.

