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ANNUAL REPORT
1921

The activities of the Forest Entomologists in B.C. are somewhat different from that of the Crop Entomologists. Whereas the latter extend advice and demonstrate methods of control to the Provincial authorities, we are obliged to go still further and assume full control of operations wherever control work is instituted and continued, both in Provincial territory and in the Dominion Forest Reserves.

The Forest Insect Control Projects begin April 1 of each year, and terminate June 30. During that period my time was entirely taken up visiting the various camps and training the rangers and foremen to spot the infested trees, and in supervising the work to insure the destroying of the entire brood of the individual infested trees. Four crews were operating during the above mentioned period in 1921. The number of men per crew varied from 8 to 20 and were located as follows:

20 men at Kingsvale, 17 miles from Merritt
10 men at Midday Creek, 15 miles from Merritt
10 men on Spious Creek, 10 miles from Crawford
8 men at the north end of Adams Lake, or three
Provincial crews and one Dominion.

At the beginning of the work on April 1 it is difficult to be with each crew at the installation of the camps and the need of a permanent assistant was keenly felt.

The following report with attached tables and map was forwarded the Chief Forester at Victoria and a copy placed with the District Forester at Vernon.

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Copy sent Chief
Forester Victoria
10.29.21
Copy in D.F. files

1921

Forest Insect Control
Vernon & Kamloops Districts.

The control of forest insects causing the tremendous loss in the yellow pine (*Pinus ponderosa*) type in the Vernon District of British Columbia has called for drastic measures to prevent the loss. These measures have been financed by the ~~Provincial~~ Government and where the loss was in what is known as the "Dominion Belt" by the Dominion Government.

The Provincial work consists of three phases:

1. Timber sales to lumber companies of infested areas, where the timber is cut under certain rules and regulations.

2. ^{Direct} District Control work, where the Provincial or Dominion Forest Service burn the infested area of trees.

3. Prevention of the multiplication of ^{the} bark beetles that are causing the damage, by burning slash and cull logs.

Two large areas have been subjected to these epidemics, one in the Princeton region, where from 40 to 90% of the standing timber has been killed during the period 1913 to 1919, and the epidemics around Merritt which began about 1917. It was to prevent a repetition of the Princeton loss that control operations were begun in 1920 in the Merritt region with an annual allotment of \$10,000 to the Provincial Forest Branch.

The largest infestation exists on the southwest side of Midday Creek. Three timber sales have been made to the Nicola Pine Mills Co. of Merritt, B.C. to control part of this infestation, one of which has been cut and the other two known as X2076 and X2077 are in operation. The sale known as X2076 must be completed by the fall of 1922 if the spread of the infestation from this particular area is prevented. Direct control work was also begun on the northeast side of the Midday Valley by the Forest Branch on March 5, 1920. This was badly infested, although slightly more recent than that on the southwest side of the creek under timber sale. 3,150 infested trees were cut and burned on this the northeast side of the creek, known as the Midday Control Area in 1920. In the spring of 1921 the work was continued, the 1920 area being re-cleaned and extended (see map attached to this report). The re-infestation amounted to 575 trees with a footage of 113,310 ft. B.M. (as shown in the attached tabulated sheets), as against 556,145 ft. B.M. in 1920, or 20.4% of the original infestation. The infestation, therefore, instead of increasing was reduced 80%. Ordinarily about 40% re-infestation is to be expected the second year. The low rate of re-infestation was probably due, not only to the thorough work done by the Forest Branch, but also to the policy of burn-

Forest Insect Control(continued)

ing the slash and cull logs after they had become infested, on the cut-over area of the Indian Reserve immediately adjoining. At the same time the direct control area was extended, 435 trees being cut on the new area with a total in ft. B.M. of 74,600.

Outside of the Midday infestation several other areas are slowly spreading, the principal ones being on Vogt Creek around Kingsvale, consisting of three separate areas of infestation; an area between Spious Creek and Merritt; and the area north of Otter Creek known as the Pike Mt. area. Work was begun on Vogt Creek in the spring of 1921 under the name of the Kingsvale Area. Only one of the three areas was worked on account of lack of funds. The greater part of the infestation on this one area, which lies just above Vogt Creek between the Coldwater and Vogt Creeks, was cut and burned. The infestation is killed in this area and will not return as an epidemic, providing a small amount of re-cleaning is done in 1922. On this, the Kingsvale area, 2840 yellow pines and 105 lodgepole pines were cut and burned this year, with 479,015 ft. B.M. and 7420 ft. B.M. respectively.

More or less epidemic conditions also exist in certain areas in the Douglas fir, white pine and lodgepole. Direct control work was this year begun around Adams Lake, where infested Douglas fir and white pine was burned, (340 white pine and 153 Douglas fir) totalling 493 trees with a footage of approximately 34,000 ft. B.M.(see Melrose Report of September 6, 1921).

Several epidemic areas exist in lodgepole, but these are not in commercial timber, therefore control measures are not at present recommended.

Control operations should begin this next year not later than April 1, 1922, in the Merritt region and about April 15 at Adams Lake. The various crews and their disposition should be as follows:

Midday Valley and area between Merritt and Spious Creek.....	9 men.....	\$3000.00
Vogt Creek..	18 men.....	\$6000.00
Pike Mt.....	15 men.....	\$5000.00
Adams Lake...	8 men.....	\$1500.00
Total.....		\$15,500.00

This is a minimum estimate. An expenditure of any less amount will not check the epidemics in 1922. These estimates are for unworked epidemics. The epidemic areas worked in 1920 and 1921 are controlled and only need an expenditure of about \$2000 in 1922 for maintenance which maintenance will lessen in cost from year to year and almost entirely cease in 1924.

Summarizing the control work to date we have infestations of bark beetles as follows:

Forest Insect Control(continued)

Pinus ponderosa.....Dendroctonus monticolae and
Dendroctonus brevicomis
Pinus contorta.....Dendroctonus monticolae
Pinus monticola....." "
Pseudotsuga taxifolia.Pseudotsugae

A number of Douglas firs were also killed by another bark beetle belonging to the genus Pseudohylesinus. These were mostly of pole and sapling size. A number of mature trees were also killed by a flat-head borer, Melanophila drummondi. In yellow pine occasional trees have also been killed by another flat-head, Melanophila gentilis.

The number of trees worked to date have been as follows:

Midday area.....	1920.....	3150 trees...	556,145 ft. B.M.
Midday area.....	1921.....	1010 "	187,910 ft. B.M.
Kingsvale area...	1921.....	2945 "	486,435 ft. B.M.
		Total.....	7105 " ...1,230,490 ft. B.M.

Ralph Hopping.

RALPH HOPPING

Dominion Forest Entomologist for B.C.

Nov. 24, 1921.

RH/DHW

1921

FOREST INSECT CONTROL
Dominion Reserves

The direct control work under the Dominion Forest Branch has covered the seasons 1920 - 1921 and has been confined to an area known as the Prospect and Spious Valleys, contiguous to the Provincial direct control area of the Midday Valley. In 1920, yellow pines infested with *Dendroctonus* to the number of 3165 were cut and burned. 2647 of these trees scaled 710,532 ft. B.M. In 1921, the control area of 1920 was recleaned and extended, 1322 trees being cut, equalling 491,833 ft. B.M. The re-infested trees occurring in the 1920 area only amounted to 9.8%. This was a reduction of 90.2%, whereas unworked infestations about two miles distant increased over 100%. I, therefore, do not hesitate to say, that over one million feet was saved by this one operation which would have been killed in 1921. There is also little doubt that, if not controlled, the loss on this one area would amount to between five and six million feet in the next five years. The same figures may be applied to the Provincial work of 1920.

SHADE TREE INSECTS

The report on the Poplar Sawfly is included in Mr. Downes annual report and that of the Satin Moth in Mr. Glendinning's report.

There has been one more shade tree pest of importance, the Douglas Fir Tussock Moth. This is under investigation at the present time. Outbreaks occurred for the first time this year in the virgin forest, many infested areas being found scattered from north of Kamloops to Kelowna. Owing to my other duties, however, I was unable to make a very detailed study of the life history, although considerable data was collected.

IDENTIFICATIONS

Many beetles have been identified this year for Mr. Treherne's department which were damaging fruit trees and truck crops. Several small collections of Coleoptera have been identified, principally for Mr. Hanham of Duncan, B.C., Mr. Frost of Massachusetts, and Dr. Blaisdell of California.

INFESTATIONS

Many outbreaks in the forest have been examined, including the Yahk Tie Reserve for the Canadian Pacific Railway,

the infestations at Adams Lake for the Dominion Forest Branch, a Balsam epidemic south of Penticton and three small lodgepole outbreaks for the Provincial Forest Branch.

Under H.H. Thomas, a survey was completed of the yellow pine infestations in the Princeton and Merritt areas, with estimates of the killed timber and the active infestation. Maps have also been prepared which the Provincial Forest Branch will print and have copies for us in the spring of 1922.

CONTROL

Besides the regular direct control projects, reports of which are included in this general report, a campaign of prevention of epidemics has been started, with Capt. Tyner of the Provincial Forest Branch in charge. Under this campaign, all slash will be burned, and a large percentage has been burned, after all logging operations.

EXPERIMENTS

Temporary assistant George Hopping, besides taking charge of marking trees under the direct control work in the Midday Valley, also caged an infested yellow pine, collected the emerging insects, and has worked up the figures afterwards, mounting over 5000 specimens both from the material collected in the cage and that collected in the open in the Midday Valley. He was able to collect many pairs in copulation, especially in the genus *Leptura*, which will enable us to solve questions in relation to Dr. Swaine's and the writer's systematic work on this group.

From time to time, Coleoptera have been identified, either by the writer or by specialists in the groups they have studied or monographed. These records now amount to 308 species, many of which have not as yet been recorded from B.C.

PUBLICITY WORK

Circular
Bulletin 15 has been extensively distributed throughout B.C., especially among the lumber mills and logging contractors. This has not been done by mail only, but personally by Capt. Tyner in his slash disposal campaign.

Many of the operators have been personally interviewed, and the result of improper methods of logging pointed out. An address was also given before the Canadian Forestry Meeting in Victoria, and every effort made to have the Provincial allotment of \$10,000 for direct control work in 1921 increased to \$20,000 for 1922. At least the Provincial Forest Branch, the Deputy Minister of Lands and the B.C. Logging Associations and operators have strongly backed me up in this request for an increase. Nevertheless, the state of the government finances renders it extremely doubtful if the increase will be granted. Letters have been received and answered.



Dominion Forest Entomologist for B.C.

Dia.	MIDDAY		VALLEY		AREA		G. logs	Ft. B.M.	G. logs	Ft. B.M.		
	1 log	Ft. B.M.	2 logs	Ft. B.M.	4 logs	Ft. B.M.						
8	58	580	16	560								
10	21	315	48	1920	6	450						
12	8	200	30	1350	26	2340						
14	1	30	30	1650	33	3795	3	495				
16	1	35	19	1235	54	8100	23	5175				
18			14	1120	19	3895	13	3770	3	1110		
20	1	65	5	500	19	5035	22	2920	5	2375		
22			2	250	12	4020	11	4895	3	1740		
24			2	320	15	6225	10	5450	4	2760		
26			1	200	2	990	8	5200	5	4125		
28					1	250	4	3020	2	1970		
30	1	425			1	675	2	1750	2	2310		
32					1	785						
34							3	3390				
36									1	1700		
48										4325		
Totals	91	1650	167	9105	189	36560	99	41065	25	18090	4	6840
		Total trees	575		Total Ft. B.M.	113310						

KINGSVALE AREA

Yellow Pine

Dia.	1 log	Ft. B.M.	2 logs	Ft. B.M.	3 logs	Ft. B.M.	4 logs	Ft. B.M.	5 logs	Ft. B.M.	6 logs	Ft. B.M.
8	816	8160	20	700								
10	266 334	4960	184	7360	10	750						
12	66	1650	220	9900	17	1530						
14	18	540	144	7920	55	6325	1	165				
16	11	385	105	6825	89	13350	4	900				
18	1	50	66	5280	85	17425	14	4060				
20	1	65	37	3700	74	19610	21	7560				
22	1	85	13	1625	56	18760	13	5785				
24			15	2400	85	35275	32	17440				
26			6	1200	61	30195	56	36400	12	9900		
28	1	180			19	11020	27	20385	13	12805		
30					7	4725	20	17500	7	8085	1	1410
32					2	1570	7	7000	10	13250		
34					3	2715	6	6780	2	3010		
36			1	850			7	8855	6	10200	1	2150
38					1	1175	1	1410	5	9550	1	2435
40					1	1325	4	6480	2	4230	1	2750
42							1	1850	2	4630		
48									3	9600	1	4325
52									1	4000	1	5500
Totals	124	15105	811	47760	565	165750	214	136570	63	89260	6	18570
	1181	Total	Trees	2840		Total Ft.		142570		B.M. 479010		

KINGSVALE AREA
Lodgepole Pine

8-1	24	10	240
8-2	1	30	30
10-1	9	15	135
10-2	18	50	900
12-2	15	65	975
12-3	2	115	230
14-2	17	85	1445
14-3	6	145	870
16-2	3	110	330
16-3	3	185	555
18-3	5	220	1100
20-3	1	270	270
22-3	1	340	340
	105 Total trees		7420 Total Ft. B.M.

1922

ANNUAL REPORT FOR 1922.

To Ottawa.

On my return from Ottawa in the latter part of May, 1922, I immediately established crews at Pike Mountain and Voght Creek of approximately 20 men each. This was for the control of the infestation in Yellow Pine (*Pinus ponderosa*) which had greatly increased during the past year on Voght Creek due to the unburned tops, cull logs etc. left on the area just below the infestation, and also to the bark beetles bred in the unyarded logs which were left on the area and which prevented the burning of the slash. In addition, crews were also established at Coutlee Plateau and at Adams Lake. The total expenditure during the direct control work covering April, May and June was approximately \$15,500.00 by the Provincial Government. The Federal Government also established a control crew on Spious Creek and cleaned up the lower part of the area worked on in 1920 and 1921.

With an allotment of \$150.00 cages were built to contain three infested trees, a Yellow Pine (*Pinus ponderosa*), a Lodgepole Pine (*Pinus contorta*), and a Douglas Fir (*Pseudotsuga taxifolia*). These cages were built during the latter part of July and the emerged insects collected daily during the following ten weeks. The results will be embraced in a separate, detailed report. 17,495 insects were recovered from the Yellow Pine cage alone, many of which were interesting parasites.

Besides the regular inspections of the camps, the condition of slash on numerous logging operations was examined and recommendations made to the Provincial Forest Branch of the methods of disposal. Biological data has also been collected on about 56 experiments, many of which were small breeding experiments of caged portions of infested coniferous trees.

We have found that direct control work on infestations reduces the infestations 80%. If no work is done on an epidemic infestation an increase results of from 100 to 150%, according to careful checks made from 100% cruises of several areas. In some cases the increase in one year has been 200%, depending largely upon the number of years the epidemic has been running. On this basis the work of 1922 has resulted in a saving of 5 1/2 million feet of timber, worth at a stumpage valuation of \$1.50 per 1000 feet, \$8,000.00. This is only the actual saving for one year, which can be definitely fixed. I do not hesitate to say that without the control work in the Midday Valley in 1920 the loss in six years (up to 1925), if no control work had been done, would have amounted to \$30,000.00. It cost \$6,000.00 to prevent this. Furthermore I consider this a very conservative estimate.

With an asked for allotment of \$150.00 three infested trees of different species were cut and enclosed in cheese cloth cages. These were a Yellow Pine (*Pinus ponderosa*), 24" D.B.H.; a Lodgepole Pine (*Pinus contorta*), 18" D.B.H.; and a Douglas Fir (*Pseudotsugae taxifolia*), 22" D.B.H. Unfortunately the Douglas Fir chosen was the result of an early attack of the present year and aside from a few secondary insects very little emergence resulted, and what did emerge was probably from the *Dendroctonus* adults which had attacked the tree about one week before it was caged. The collection of bark beetles and other insects from the other two cages was remarkable, about 6,682 emerging from the

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Snohomish
Dec. 19-1922

Lodgepole Pine and 17,495 from the Yellow Pine.

Collections were made from the cages every day over a period of about ten weeks and all possible data collected. Uninfested, uncaged trees of the above three species were also felled and check data collected. The detailed results will be embraced in a separate report. These cages will be recovered in the spring in order to determine whether any considerable portion of injurious species hold over until the second year. For this purpose, that is, the continuation of the experiments already begun and also the caging of other species of coniferous trees, an annual allotment of \$200.00 is requested for a period of at least three years.

An effort has been made this year to collect portions of all the species of trees infested and a large number have already been caged and the injurious beetles bred.

Aside from the regular epidemic outbreaks, situated around Merritt, and for which provision has already been made for control work, various increases in bark beetle infestations have been noted where small groups of infestation have increased in the number of infested trees. This is noticeably so around Nicola Lake and on the Coldwater River below Midday Creek. One or two small spots on One Mile Creek and in the Aspen Grove country are also slightly increasing. These areas are all in Yellow Pine (*Pinus ponderosa*). Lodgepole Pine infestations have broken out above Chute Lake, east of Penticton and also near Lorna. The latter is apparently confined to about a mile square of virgin timber and cannot spread unless it jumps a considerable distance over burned areas. This area is being watched. The Chute Lake area has just been discovered and no examination has as yet been made.

Four areas in Yellow Pine were also reported from the Cranbrook District and examined. Although the epidemics were fairly serious they were all on land which will finally be entirely cleared for agricultural purposes, three of them being on cut-over areas, and none of them threatening any body of virgin timber. It was therefore not considered advisable to recommend the expenditure of any monies for control.

Two epidemics in True Fir (*Abies lasiocarpa*) were inspected. These were found to be attacked and killed by *Dryocetes confusus* Sw., but owing to their inaccessibility no control work has been recommended.

The Tussock Moth outbreak on the Douglas Fir (*Pseudotsuga taxifolia*) seemed to be still continuing in the city of Vernon as many young larvae were found this spring. The whole area within the city limits was immediately sprayed with arsenate of lead under my supervision. Either due to the spraying or to some unknown cause they immediately disappeared. This doubt is expressed as outside unsprayed areas, epidemic in 1921, also failed to develop, and the infestation has dropped out of existence. As this is a new species of Tussock Moth and the first record of its appearance in epidemic form, its time of reappearance is problematical.

Besides the regular field work which occupies a large part of the field season, such as numerous examinations of slash and small reported infestations, 7595 specimens have been mounted, labeled and many of them identified and approximately 30,000 collected. Much of the material consists of bark beetles bred out in the cages, the commoner species of which will be used for Riker Mounts such as Dendroctonus, Ips, Pityogenes and Pseudohylesinus.

From April 1st to Dec. 1st, 1922, a period of 8 months, the following letters and packages have left this office:

Letters - 142.

Packages- 14.

My correspondence from January 1st to April 1st, 1922 is included in the records of the Ottawa office.

The number of MSS pages typed has approximated 180.

In conclusion I wish to express my pleasure in the efficient work performed by the assistants to this office, Messrs W.L. Cutler, H.H. Thomas, and Geo.R. Hopping, and especially the careful work done by Mr. Cutler.

The attached summary of the direct control work for 1920, 1921, 1922 has been tabulated as a matter of record and will be continued from year to year.

DEC. 15TH, 1922.

APPROX. NO. OF AVERAGE TOTAL FT. % OF
 ACRES TREES FT.B.M. OF INTERESTED REFINERS-
 YEAR WORKED WORKED PER TREE TIMES BURNED TATION

NAME OF PROJECT	YEAR WORKED	ACRES WORKED	NO. OF TREES WORKED	AVERAGE TOTAL FT.	% OF INTERESTED REFINERS	
HILDAY VALLEY	1920	4000	3150	177	556,145	
(RECLEANED)	1921	4000	575	200	113,310	20.4%
(EXTENDED)	1921	700	435	171	74,600	
INTERESTED TREES NOT WORKED	1922	4700	498	212	105,414	16.7%
KINGSVALE	1921	1280	2945	165	486,435	
VOGHT VALLEY	1922	1440	4502	199	893,658	
PIKE MT.	1922	1572	2619	399	1,045,091	
COUTLER	1922	72	536	419	224,768	
ADAMS LAKE	1921		493	69	34,335	
ADAMS LAKE	1922		415	86	35,717	

16198 3569473

Annual Report.

Vernon, B.C.

Nov. 14th, 1922.

Chief Forester,

Victoria, B.C.

Dear Mr. Caverhill,-

I have just finished an inspection trip of the infested areas in the Cranbrook district.

While these areas are real epidemics, they are for several reasons not serious, and do not demand immediate attention. I would not suggest spending any money on them for the present, if at all.

There were four areas examined. The three near Ft. Steele are on alienated land, cut over and not near or threatening any body of commercial mature timber. The fourth, about two miles beyond Phillip's Bridge on the Elk River, while in commercial timber is only in a small area of Yellow Pine and is attacked by *Dendroctonus brevicornis* only which does not attack any other species of tree. Of *Dendroctonus monticolae* I could not find a trace in any part of the district I examined.

I hope to have a full report ready for you by

Mr. Caverhill.

January 1st. covering the Insect Control work to date as I shall not go to Ottawa this winter.

Control work should begin in the spring of 1923 about March 15th or earlier if the weather will permit. The number of men on each crew will depend largely on the season. If we are able to put on five crews, I believe the bulk of the epidemic infestation will be controlled this coming year. For 1924 will remain the recleaning of these areas and the control of small outbreaks in the Aspen Grove and One Mile regions which in three years from now will assume large proportions, but can then be controlled at a small percentage of the cost if not worked until say 1926.

The amounts recommended for the work of these five crews are as follows :

1. Coutlee Plateau.....	\$ 3000.
2. Widday Valley (X2076).....	\$ 3500.
3. Voght Creek.....	\$ 6000.
4. Pike Mountain.....	\$ 5000.
5. Adams Lake.....	<u>\$ 2500.</u>
TOTAL.....	\$20,000.

3.

Mr. Caverhill.

I would call your attention to the reinfestation on the areas which we have already CONTROLLED, which amounts to about ten per cent of the original epidemics ; and to that of the UNCONTROLLED areas which increased one hundred and fifty per cent of last year's infestation.

I therefore hope you will be able to get the necessary appropriation, as the loss of mature timber in this, the only considerable stand of Yellow Pine in B.C., is far greater than that of any loss from fire in this timber type.

Sincerely yours,

Dominion Forest Entomologist for B.C.

Pacific 1921-1923
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1922-23

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