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OUTBREAK OF THE WESTERN HEMLOCK LOOPER IN BRITISH COLUMBIA 1992 UPDATE AND FORECAST FOR 1993

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Defoliation of mature to overmature western hemlock - western red cedar stands by the **western hemlock looper**, Lambdina fiscellaria lugubrosa, increased nearly four-fold to 186 000 ha (Table) in 1992. Damage was recorded in 581 separate infestations in four forest regions (Map). Almost half the area was severely defoliated, 40% moderately defoliated and the remainder lightly. The largest increases were 52 000 ha in the Kamloops Forest Region and 39 000 ha in the Nelson region. The increase for the Prince George and Cariboo Forest Regions totaled 44 000 ha. Mostly severe defoliation is forecast to continue in 1993 based on egg sampling at 33 sites in four regions (Map).

Table. Current defoliation by the western hemlock looper in British Columbia. Forestry Canada, Forest Insect and Disease Survey, 1992.

Forest Region	Number of Infestations	Area defoliated (ha) *Light	Moderate	Severe	**Total 1992**	Total 1991
Cariboo	53	-	3900	18 900	**22 800**	5700
Kamloops	149	25 800	43 600	18 600	**88 000**	36 075
Nelson	302	4000	23 800	19 400	**47 200**	8225
Prince George	77	600	3800	23 600	**28 000**	200
Total	**528**	**30 400**	**71 200**	**80 500**	**186 000**	**50 200**

*Light - discolored foliage barely visible from the air, some branch tip and upper crown defoliation.

Moderate - pronounced discoloration, noticeably thin foliage, top third of many trees severely defoliated, some completely stripped.

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Severe - bare branch tips and completely defoliated tops, most trees more than 50% defoliated.

Cariboo Forest Region

The area of defoliation increased fourfold to 22 800 ha from 5700 ha in 1991. Fifty-three separate infestations including 18 990 ha moderate and 5700 ha of severe defoliation were recorded. The infestation extended from the North Arm of Quesnel Lake to Lynx Peninsula near Horsefly and east to the boundary of Wells Gray Provincial Park.

Kamloops Forest Region

Defoliation was recorded over 88 000 ha in 149 infestations, nearly triple the area damaged in 1991. This is the largest looper outbreak ever recorded in the Region. Severe defoliation has occurred for two consecutive years in the Blue River area and Adams River drainage and along Hobson Lake in Wells Gray Park. Infestations expanded in most areas defoliated in 1991. New infestations were mapped in the Clearwater District along the Clearwater and Raft rivers, in Kamloops District in the Barriere Lakes area, in Salmon Arm District along Ratchford Creek and the Seymour and Perry rivers and in the Vernon District along Monashee, Currie and Danforth creeks.

Nelson Forest Region

Defoliation increased nearly six-fold to 47 200 ha in 302 infestations in 1992, the third year of the outbreak. The intensity of defoliation also increased with 92% of the area moderate to severe compared to 55% in 1991. Feeding continued in remaining old growth stands along the Revelstoke and McNaughton Lake reservoirs. Southerly expansion of the outbreak occurred near the Beaver, Tangier, Incomappleux, Halfway and Westfall river drainages, along Pingston, Lardeau and Beaton creeks and near the upper Arrow and Trout lakes. New patches of defoliation were also mapped near Jordan River and along the Illecillewaet River from Mt. Revelstoke National Park to Cougar Brook.

Prince George Forest Region

The area of defoliation increased to over 28 00 ha in 77 infestations, up from only 200 ha in 1991. Over 80% of the area was severely defoliated. In Prince George Forest District defoliation covered approximately 17 500 ha in 53 infestations in the ICHvk2 biogeoclimatic subzone. Feeding was noted as far west as Purden Lake and east to the District boundary. Defoliation in the McBride Forest District was recorded over 11 500 ha in 24 infestations. The majority of the damage occurred in the ICHwk3 biogeoclimatic subzone between Ptarmigan and Snowshoe Creeks. The remaining 4000 ha occurred in the ICHmm subzone along both sides of McNaughton Lake From Grouse Creek south to the district boundary.

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Forecast

Defoliation is forecast to be severe at 24, moderate at 6 and light at 3 locations (Map) based on egg samples from 33 areas in four forest regions. Almost 90% of the sites sampled in the Kamloops Region can expect severe defoliation in 1993. The other regions had slightly lower egg counts with severe defoliation predicted at 73, 60 and 50 percent of the sites in the Nelson, Prince George and Cariboo Forest regions respectively.

Egg parasitism, attributed mostly to Telenomus and Trichogramma spp., averaged 11% (range 0-68%) for all sites. The high incidence of parasitism (avg. 31%) in the Kamloops Region and several locations in the Nelson region may reduce populations and limit the outbreak. Previous outbreaks usually collapsed when egg parasitism reached 30%.

Eggs are separated from lichen using a hot water extraction method developed by FIDS. A lichen sample is immersed in 100^{o}C water and soaked for at least 15 minutes. A series of nested strainers is then used to remove debris. The remaining contents are then extracted onto filter paper using a vacuum and counted with a dissecting microscope.

Impact

Previous infestations have caused extensive top-kill and scattered mortality. During past infestations up to 50% of the trees that had been 90%+ defoliated died, though mortality may not occur for up to 3 years after the outbreak. Mortality has already occurred in parts of the Nelson and Kamloops regions and will be assessed at representative locations after the outbreak.

Mortality plots have been established by FIDS in the Cariboo and Prince George regions to annually monitor the damage to the stands.

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