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WESTERN SPRUCE BUDWORM IN BRITISH COLUMBIA 1992 AND FORECAST FOR 1993

J. Hodge, P. Koot, B. Erickson, A. Stewart and R. Turnquist
Forest Insect and Disease Survey

DEFOLIATION

Based on aerial surveys, western spruce budworm, **Choristoneura occidentalis**, defoliation decreased 11% to 341 700 ha in British Columbia, mostly in the Kamloops and Nelson regions. A four-fold increase occurred in the Vancouver Region and a slight increase in the Cariboo Region. Severe, moderate, and light defoliation was mapped over 1%, 27% and 72% of the area respectively.

CARIBOO FOREST REGION

Increased larval populations resulted in 550 ha of light defoliation of all-aged Douglas-fir in the Kelly Lake-Cavanaugh Creek area west of Clinton. This is less severe than the moderate defoliation predicted from egg mass sampling in 1991. Elsewhere in the region there was no defoliation; only small numbers of larvae (1-5) were common in beating collections.

KAMLOOPS FOREST REGION

Defoliation of Douglas-fir by budworm declined nearly 20% to 320 000 ha, in 550 separate patches. Most of the decline occurred in the Okanagan TSA with the remainder in the Kamloops TSA. Increases occurred in the Lillooet and Merritt TSA's. Both areas of severe and moderate defoliation decreased; severe to 2200 ha from 49 650 ha and moderate to 87 200 ha from 224 050 ha. The majority of the feeding led to light defoliation of Douglas-fir, with an increase to 230 600 ha from 112 300 ha in 1991. This decrease in feeding intensity will lessen the impact on Douglas-fir stands throughout the Region. Aerial application of Bacillus thuringiensis (Bt) spray by the British Columbia Forest Service contributed to defoliation reduction on 35 000 ha of managed stands in four forest districts.

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NELSON FOREST REGION

Defoliation in the Boundary TSA declined to trace levels, not visible during aerial surveys, in areas similar to 1991 when 4000 ha were mapped from Anarchist Mountain to northeast of Grand Forks. Current light to moderate defoliation of understory and lower crowns was observed in the Phoenix Mountain area. Expected severe feeding as determined by bud counts in May was reduced by larval mortality attributed to disease, parasitism and predation.

VANCOUVER FOREST REGION

The area of Douglas-fir stands defoliated by western spruce budworm increased four-fold to 21 130 ha from 5850 ha in 1991. There were 14 230 ha of light, 5420 ha of moderate and 1480 ha of severe defoliation. This is both the largest area defoliated and the first time that severe defoliation has been recorded during this current outbreak, which is in its seventh consecutive year.

PARASITISM AND DISEASE

Larval parasitism and disease incidence were determined from late-instar collections throughout British Columbia. Parasitism levels averaged 9%, up from 6% in 1991, and ranged from 3% to 22%. The highest levels were found near Glenrosa, in the South Okanagan. Presence of a nucleopolyhedrosis virus (NPV) was greater than 50% in the Apex-Yellow Lake area, and at Paul and Stump lakes in the Kamloops Region. At Fountain Valley, also in the Kamloops Region a fungus, Beauveria sp., killed 80% of the larvae sampled.

Although parasite levels and incidence of disease are not extremely high, they should continue to help reduce western spruce budworm populations, particularly in the Kamloops Region.

FORECAST

The average number of egg masses collected per $10m^2$ of foliage at 42 sites in four regions, was 77% fewer than in 1991 (Table). This indicates a general population decrease for all four regions. The defoliation forecast is light at 23 sites, mostly in the Thompson and Okanagan valleys in the Kamloops Region, moderate at 16, severe at only one, and nil at two sites.

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CARIBOO FOREST REGION

An average of 12 male moths were caught in five pheromone-baited "Multipher" traps placed near Bridge Lake in a population monitoring plot, down from 18 last year. Egg mass sampling at Cavanaugh Creek indicates light defoliation in 1993, down from 104 last year.

KAMLOOPS FOREST REGION

Based on an 82% decrease in egg mass numbers from 1991, egg mass samples from 30 locations in the Region predict severe defoliation at one site, moderate at 13, light at 15 and no defoliation at one site (Figure). These predictions preclude adverse climatic conditions which could reduce overwintering larval survival rates.

The number of egg masses collected at 10 sites in the Kamloops TSA decreased 84% from 1991 levels and predict severe defoliation at one site (Shumway Lake), moderate at four, light at four and no defoliation at one site. Stands near Shumway lake, Duffy and Beaton creeks and near Monte Lake, already severely impacted by successive years of budworm feeding, will continue to deteriorate following additional defoliation in 1993.

Egg mass sampling conducted at 13 sites throughout the Okanagan TSA predicts no severe defoliation, moderate at five sites and light at eight. In the North Okanagan-Shuswap, moderate defoliation will prevail with some light patches, whereas the South Okanagan can expect mostly light defoliation, with some moderate. Although feeding intensity has decreased, volume losses as a result of numerous years of defoliation will continue in many stands, particularly near Monte Lake, Glenrosa, Mount Kobau, Anarchist Mountain, Darke Lake, and the Apex-Yellow Lake area.

Following the trend elsewhere in the Region, egg mass sampling in the Lillooet TSA indicates a 66% decrease from 1991 figures. Moderate defoliation is predicted at three of six sites sampled and light at the remaining three. A high incidence of fungal disease in larvae reduced populations at Fountain Valley and resulted in a prediction of only light defoliation in 1993.

Egg masses collected near Peter Hope Lake in the Merritt TSA predict moderate defoliation in 1993, and may result in minor branch dieback and top-kill of immature Douglas-fir in that area. Populations north and west of Merritt are expected to continue, although no egg masses were collected from the area.

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NELSON FOREST REGION

Pheromone trap moth catches and egg mass counts declined by an average of 36% and 90%, respectively, from 1991, reflecting the larval mortality and subsequent reduced moth flight. Relatively minor defoliation is expected to continue in 1993.

VANCOUVER FOREST REGION

An average of 50 egg masses/10m2 of foliage (range 35-73) were collected at seven locations, six north of Pemberton and one near Boston Bar, down 48% from an average of 81 (range 21-174) in 1991. Despite declining populations, defoliation is predicted to continue, but at mainly light levels in 1993.

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