SURVEY USING PHEROMONE TRAPS, OF *GNATHOTRICHUS SULCATUS* (COL: SCOLYTIDAE) IN TWO VANCOUVER ISLAND DRYLAND SORTING AREAS

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ABSTRACT

Forty-eight traps baited with the aggregation pheromone, sulcatol, were placed in two dryland sorting areas on Vancouver Island, B.C. during 1977. A late summer peak flight of the ambrosia beetle *Gnathotrichus sulcatus*, was recorded in both areas. Trap sites with the greatest catches of *G. sulcatus* showed where suppression traps would be most effective.

An ambrosia beetle *Gnathotrichus sulcatus* (LeConte), is one of three major ambrosia beetle species in British Columbia. It normally attacks recently downed conifers in Pacific Northwest forests (Furniss and Carolin 1977), but may also attack green lumber and can complete its life cycle therein (McLean and Borden 1975a). *G. sulcatus* has been intercepted in export markets (Milligan 1970; Bain 1974), and the presence of boring beetles in export shipments of lumber can result in costly quarantine actions (Graham and Boyes 1950).

McBride (1950) showed that even a light ambrosia beetle attack on better grade logs could cause a considerable loss in lumber values. A further study by McBride and Kinghorn (1960) showed that the average loss was $5.25 per M fbm. Updating this figure to January 1, 1978 values, Dobie (1978) estimated that moderate attack could cause degrade of $5.87 per M fbm (Fir Grade 3 log), to $33.87 per M fbm (Fir Grade 2 log). Degrade and manufacturing losses in the plywood industry as a consequence of the activity of ambrosia beetles, have not been well quantified but are nonetheless serious.

When *G. sulcatus* males attack logs they produce the aggregation pheromone, sulcatol (6-methyl-5-hepten-2-ol), (Borden and Stokkink 1973; Byrne et al. 1974). This pheromone has since been used for surveying and suppressing pest populations in the large Chemainus sawmill (McLean and Borden 1975b, 1977, 1979). In 1977, a fall survey of four MacMillan Bloedel Ltd. dryland sorting areas (DLS) on Vancouver Island, which regularly supply logs to the Chemainus sawmill showed that populations of *G. sulcatus* were present in all the areas. The greatest numbers per trap-day were found at the Shawnigan DLS. Relatively high catches were also recorded at Eve River, Port McNeil and Northwest Bay (Fig. 1). Catches at the Chemainus sawmill during the same period were also high (McLean 1980). The objective of this study was to determine the seasonal and spatial occurrence of *G. sulcatus* in the Shawnigan and Port McNeil DLS.

METHODS

The survey traps, constructed by company personnel, were panels of fibreglass insect screening, 90 x 66 cm, attached top and bottom to 3 x 2 cm lumber, each supported by a dowel 2.5 cm diam. and 1.3 m long, inserted into a 25 cm long iron waterpipe driven into the ground. The screening was coated on both sides with Stikem Special® . Sulcatol was released from an open plastic bottle taped to the support doweling.

The traps were set out at 28 locations in the Shawnigan DLS and at 19 in the Port McNeil DLS, on June 1 and 2, 1978, respectively. Traps were cleared of ambrosia beetles about every 2 weeks and repaired or replaced when necessary. The sulcatol was renewed at the same time. Collections at Port McNeil were concluded on September 30 and at Shawnigan on October 31. The beetles were counted and identified to species and sex in the laboratory.

RESULTS AND DISCUSSION

More than 33,000 *G. sulcatus* were captured at the Port McNeil DLS and over 17,000 at the Shawnigan DLS. The greatest catches at Port McNeil DLS were in late August (13,526) and early September (10,204), and at Shawnigan DLS in mid-September (10,426). The traps were set out too late to disclose the date and magnitude of the spring flight (Prebble and Graham 1957; McLean and Borden 1975b, 1977, 1979).

The highest catches at Port McNeil DLS were from trap sites 1, 7, 8 and 16. (Fig 2). When the catch for each trap was expressed as a percentage of the total for each collecting period, traps 7 and 8 were seen to have captured a significantly greater proportion of beetles than other traps (Scheffe's Test, $P < 0.05$). Traps 7 and 8 were close to a pile of mixed cull logs and slabs which may have already been infested by *G. sulcatus* and so

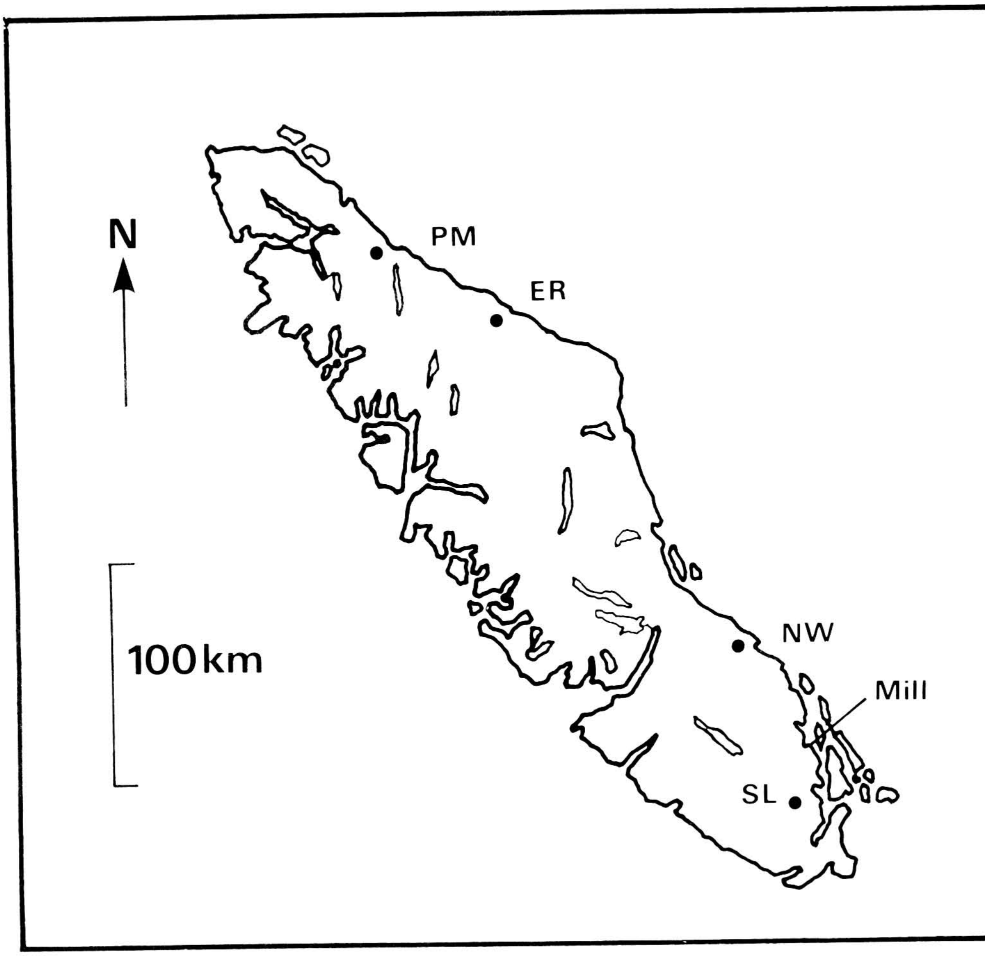

Figure 1: Map of Vancouver Island showing locations of the Chemainus sawmill and dryland sorting areas surveyed with sulcatol-baited traps in the fall of 1977. PM = Port McNeil, ER = Eve River, NW = Northwest Bay and SL = Shawnigan.

produced additional brood beetles. Tree species in the pile included western hemlock, amabilis fir, western red cedar and yellow cedar (G. Farris[1], pers. com.). Although the DLS was resurfaced during mid-August and there were few logs in the sort area, 1100 beetles were captured, a similar number to catches in previous weeks. A check of the sex ratio of 100 beetles from each of the forest and DLS sides of traps 4 and 7 in the September 1 and 2 collection, showed the same proportion of males and females on each side of the trap indicating that there were no sex-related differences between the two populations of different origins of the *G. sulcatus*. The ratios of ♀:♂ for traps 4 and 7 were 1.75 and 1.15 respectively. Female *G. sulcatus* are more responsive to sulcatol than the males (Borden and Stokkink 1973) so that the higher proportion of females on trap 4 may indicate that it was further from the source of beetles than trap 7.

At the Shawnigan DLS, many more *G. sulcatus* were captured on the traps around the southwest margin than in other areas (Fig. 3). Traps 18-21 captured 8487 beetles, or about half of the total. No statistical analysis of the data was made because of many missing data resulting from accidental destruction of some traps. The southwest margin would be the most shaded during the late afternoon when *G. sulcatus* is most active (Rudinsky and Daterman 1964). *G. sulcatus* flies when temperatures are above 25°C and light intensities are below 2000 fc (Rudinsky and Schneider 1969). The physical parameters of this part of

[1]/Port McNeil Division, MacMillan Bloedel Ltd.

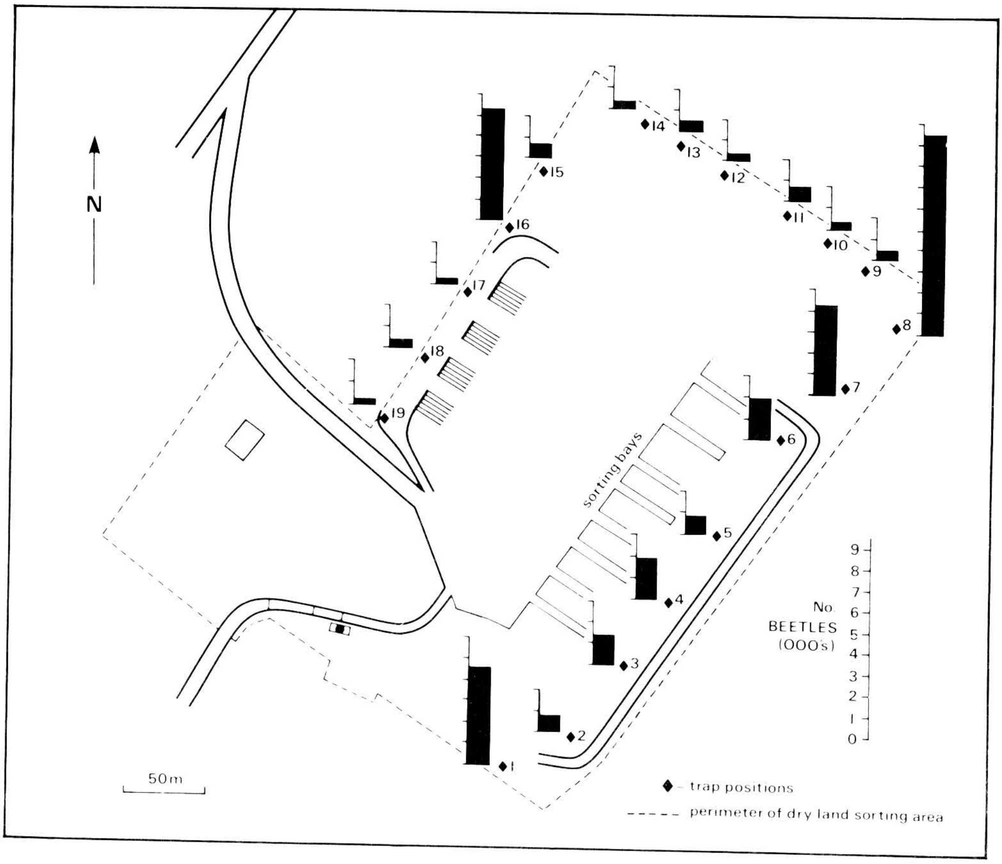

Figure 2: Map of the Port McNeil dryland sorting area (DLS) showing location of 19 sulcatol-baited sticky traps. Height of histogram indicates total catch of **G. sulcatus** at each trap from June 2 to September 30, 1978.

the margin at flight time may have contributed to the increased numbers of beetles captured.

The traps confirmed the occurrence of the late summer peak flight and identified sites of major *G. sulcatus* activity around two dryland sorting areas. Suppression traps (McLean and Borden 1979) could be set out on these sites to intercept flying *G. sulcatus* and so protect logs in the DLS and reduce the numbers of *G. sulcatus* being transported to the sawmill. A reduced number of survey traps should also be operated to check whether the population of *G. sulcatus* populations are similarly distributed from year to year.

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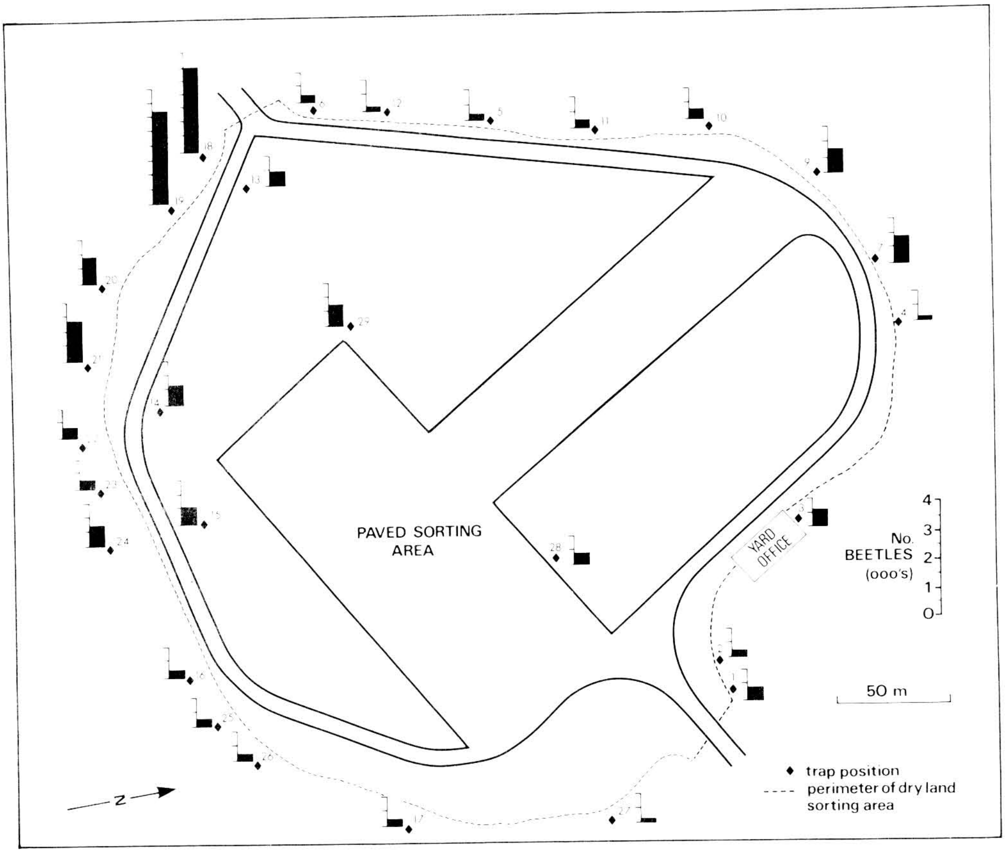

Figure 3: Map of the Shawnigan dryland sorting area (DLS) showing location of 28 sulcatol-baited sticky traps. Height of histogram indicates total catch of G. sulcatus at each trap, from June 1 to October 31, 1978.

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TWO SPECIES OF LEPIDOPTERA ASSOCIATED WITH SEMI-AQUATIC UMBELLIFERAE, AND THEIR PARASITES, IN BRITISH COLUMBIA

A survey of defoliators of aquatic and semi-aquatic plants was made as part of a larger study of the possible effects plants might have on the development and survival of mosquito larvae. The family Umbelliferae was of interest because of the known toxic semi-aquatic members (e.g. water hemlock) and because members are commercial crops. It was thought possible that shared species of defoliators and their associated parasites might be found.

Larval Lepidoptera were collected in Richmond and Pitt Meadows, B.C. from *Heracleum lanatum* Michx., cow parsnip, and *Cicuta douglasii* (DC.) Coult. and Rose, water hemlock, which is toxic to animals. The larvae were reared in the laboratory. *Depressaria pastinacella* (Duponchel) was reared from cow parsnip and *D. angustati* Clke. from water hemlock. It appears that this is a new host record for *D. angustati* as the only literature reference reports that the type specimens were taken from *Lomatium angustatum* (Coult. and Rose) (Clark, 1941, Proc. U.S. Nat. Mus. 90:33).

No parasites emerged from the 200 larvae of *D. pastinacella* that were reared. This is unfortunate as the species can cause economic damage to parsnip and carrot seed crops. Two species of parasites (6 specimens of *Oncophanes betulae* Mues. from a single larva and 1 *Phaeogenes* sp. from a second larva) emerged from the 35 *D. angustati* larvae that were laboratory reared. — **N D. P. Angerilli, Pestology Centre, Simon Fraser University, Burnaby, B.C.**