

most severe in the more vigorous trees in the dominant, co-dominant, and intermediate classes. No correlation between bark-beetle trees and weevil attack could be established. No parasitism has been observed but one pupa was found partly eaten, possibly by a rodent.—R. W. Reid.

**The Pine Needle Scale, *Phenacaspis pinifoliae* (Fitch).**

—This insect periodically causes considerable damage to ornamental spruce in Alberta cities. Excellent control was obtained in a particularly severe infestation in Calgary with a spray of Medol emulsifiable summer spray oil and nicotine sulphate. The concentration used was 2 gallons of oil to 100 gallons of water with 1 pint of nicotine sulphate added.

The spray was applied with a power sprayer capable of 450 lbs. pressure at the pump, using a perforated disc nozzle. About 35 trees were sprayed, ranging in height from 10 to 35 feet. The spray was applied between 6 and 9 p.m. on June 8, the temperature dropping from 71° to 56° F. during that period. The following tabulation gives the results of the examination of ten needles from each of ten sprayed trees and from two untreated checks.

<i>Sprayed Trees</i> (100 needles)	
Total number of old scales .....	370
Total number of living eggs .....	22
Total number of dead eggs .....	263
Total number of dead nymphs beneath scales ..	742
Total number of dead nymphs (crawlers) .....	1,219
<i>Unsprayed Checks</i> (20 needles)	
Total number of old scales .....	97
Total number of living eggs .....	5
Total number of dead eggs .....	43
Total number of dead nymphs .....	140
Total number of living nymphs .....	334

Nymphs and eggs counted as dead were only those showing unmistakable desiccation five days after application of the spray. There is some doubt that the eggs recorded as living were, in fact, alive but they were counted as such because desiccation was not apparent. They failed to hatch after 7 days at room temperature.—Geo. R. Hopping.

**Bark-beetles.**—Several small outbreaks of bark-beetles have been investigated in northern Alberta. One at Calling Lake covers about 80 acres of spruce on a logging operation. *Ips perturbatus* Eich. has killed most of the residual spruce and the outbreak was undoubtedly caused by bark-beetles breeding in the slash and then attacking the standing trees. Suitable measures have been suggested to control this outbreak. The same beetle has caused considerable loss of spruce in the town of Athabasca. Most of the infested trees have already been removed and destroyed. The few remaining trees will be cleaned up shortly. *Ips pini* Say has caused some loss in a stand of jack pine, also on property of the town of Athabasca. All infested trees will be cut and burned immediately.—Geo. R. Hopping.

**Lodgepole Needle-Miner Parasites.**—Adult specimens of needle-miner parasites collected in 1951 were forwarded to the Unit of Systematic Entomology in Ottawa for identification. The following determinations were received:

*Phaeogenes* sp. near *epinotiae* Cush., *Apanteles californicus* Mues., *Apanteles* sp. may be *miantonomoi* Vier., *Eubadizon gracile* (Prov.), *Meteorus* n. sp., *Copidosoma* sp.,? new, *Neoderostenus* n. sp., *Spilochalcis* sp., probably *albifrons* (Walsh), *Entedontinae*, probably *Derostenus* sp.

The Biological Control Unit in 1950 listed ten native parasites of the needle miner in Alberta, six of which do not appear in the above list. This brings the total of native parasites in this region to 15. The names of the six parasites not appearing in the 1951 material are:

*Sympiesis* sp., Eulophid sp., *Habrocytus* sp., *Pachyneuron* sp., *Zagrammotoma americanum* Gir., *Phaedroctonus* sp. near *epinotiae* Cush.

All parasites collected thus far have been from full-grown needle-miner larvae. As 1952 is a moth-flight year, we expect to obtain most of the parasite species from mass rearings now in progress. Further information on parasite life-histories is being collected.—R. W. Stark.

**BRITISH COLUMBIA**

**Deterioration of White Spruce and Alpine Fir.**—In October, 1948, a destructive windstorm of short duration was recorded in an extensive spruce-fir stand west and north of Crescent Spur, B.C. (Prince George Forest District). Thousands of acres of white spruce, *Picea glauca* (Moench) Voss, and alpine fir, *Abies lasiocarpa* (Hook.) Nutt., were partially or completely destroyed. This wind-thrown timber immediately created a potential fire hazard and salvage problem.

Blowdown areas adjacent to logging and sawmill operations were established as timber sales. Other areas, however, were classed as inaccessible to operators for several years. The question then arose as to how long these stands would remain salvageable. Since there was no reference in the available literature to blowdown spruce or fir, the B.C. Forest Service requested the Unit of Forest Pathology at Victoria to carry out a study of the deterioration of these trees.

In 1950, a study was initiated in the Crescent Spur area and was planned to extend over a 10-year period. The objectives of the study were (1) to determine the maximum period of salvage prior to complete destruction of the merchantable timber; (2) to determine the relative importance and identity of the decays present; and (3) to determine the annual rate of radial penetration of the respective decays.

Twenty ¼-acre plots were established in the blowdown area and all trees 6 inches d.b.h. and over were tagged. Trees classed as wind-thrown numbered 584 and comprised 324 fir and 260 spruce. These trees were further classified as uprooted and broken. Spruce were found to be more subject to uprooting than to breakage, but a reverse relationship was found in the case of fir. In the majority of instances the breakage in fir was not attributed to the presence of heartrots, but to mechanical failures in the wood structure.

To date, the radial penetration of decay in these trees has been relatively slow. Analysis of 8 spruce and 14 fir in 1950, two years after the blowdown occurred, indicated an average radial penetration of 0.4 inches for each species. The following year, the analysis of 22 spruce and 32 fir indicated an average radial penetration of 0.95 inches in spruce and 0.5 inches in fir. In one year, the penetration in spruce had increased 123 per cent while that in fir had only increased 25 per cent.

The principal decay fungi found associated with the deterioration of both species, in order of their importance and degree of penetration, are *Stereum sanguinolentum* Alb. & Schw. ex Fr., *Polyporus abietinus* Dicks. ex Fr., and *Fomes pinicola* (Sw.) Cke. It is of interest to note that *Stereum sanguinolentum* is also responsible for a major heartrot in living spruce and fir in this region. Although several other fungi have been isolated, none have proved to be of importance in deterioration to date.

Present plans call for a further sampling of 50 to 60 trees annually for the next seven years. It is felt that by that time sufficient data will have been collected in the blowdown area to fulfil the objectives of the study.—N. T. Engelhardt.

**Chemical Control of Ambrosia Beetles.**—During May, a control project was carried out at Cowichan Lake, Vancouver Island, B.C., to protect approximately 1,200,000 board feet of high-grade Douglas-fir peeler logs from attack by ambrosia beetles (pinworms). These logs were cut during the winter months and by May 10 had not been attacked by beetles. The logs were placed in bag booms in the lake, to be held until late summer or autumn, at which time they will be peeled for plywood veneer. During this waiting period, the logs in the booms are subject to severe ambrosia beetle attack. The outer layer of the logs, which contains the bulk of the volume of the log and the highest quality face veneer, suffers the greatest loss from beetle attack and is consequently suitable only as core sheets in plywood.

The company concerned purchased the chemicals which were mixed and applied under the supervision of the Victoria Forest Zoology Laboratory. The material used was 1 pound of benzene hexachloride (36 per cent gamma isomer) dissolved in 4 pounds of Velsicol AR-50 with 24 ounces of Antarox A-400 as an emulsifier. Water was added to this concentrate to make 9 gallons of the diluted spray. The spray was applied at the rate of approximately 1 gallon to 100 square feet of bark surface on the logs.

The chemicals and pumps were set on a log raft which could be towed readily from boom to boom. Five men were required to apply the spray, mix chemicals, and operate the pumps. They were suitably protected with rubber clothing, rubber gloves, eye-shields, and gas-masks. The whole operation took two days or approximately ten man-days.

The total cost of applying the spray was approximately 25 cents per thousand board feet of lumber, 11 cents of this being the cost of materials and the remaining 14 cents the cost of labour. A representative of the Dominion Fisheries Department Biological Station at Departure Bay, B.C., was present to observe the effect of the spray upon fish and other fresh-water organisms. Three small fish were poisoned but the fisheries biologist felt that the toxic effect of the spray was not very serious.