end of 1957. There was some evidence that trees with light staminate flower production were more lightly defoliated than trees with heavy flower production. This supports earlier similar observations (Bi-Monthly Progress Report 13(1):2-3. 1957). Damage in the form of bare or dead tops and tree killing was light to severe on 18 plantations of Scots pine by the end of the 1957 feeding period. The greatest damage among the Scots pine occurred in three plantations that were planted during the period from 1925 to 1932. These showed 18 to 26 per cent of the trees dead and 38 to 54 per cent of the trees with the upper third of the crown dead or dying. Older trees, planted in 1905 or 1906, are beginning to attain merchantable size. These showed thin tops, but only a trace of mortality. Of 28 jack pine plantations examined, only one showed complete loss of new foliage in 1957, and 5 showed moderate loss of new and old foliage. The remainder were only lightly defoliated, and damage to jack pine has been negligible.

One of the most interesting aspects of the current infestation is an abundance of reproduction of Scots pine. Natural reproduction of this species is uncommon in Manitoba. The opening of the forest canopy as a result of defoliation presumably has encouraged germination of seeds and growth of the seedlings.—W. A. Reeks.

Treating Seedbeds with the New Sterilizer Mylone.—Caution should be exercised in sterilizing seedbeds in forest nurseries. There are two main reasons for this: (1) Once the natural microbiological buffering is lost, damping-off due to reinfestation tends to be more severe than if the soil had not been sterilized. (2) Mycorrhizal flora of soil may be reduced and this perhaps is harmful to seedlings. It may be possible, however, to prevent reinfestation by repeated applications of fungicides that are not seriously toxic to seedlings. It may also be possible that mycorrhizae are not seriously affected, or that in any event they would not offer great advantages to seedlings until these are transplanted from the rich seedbed soil. The solution of these problems should determine what importance soil sterilization will have in nurseries. Regardless of the outcome, this practice has its place when seedbeds are excessively infested by weeds, pathogenic fungi, or nematodes. A new soil sterilizer based on tetrahydro-3, 5-dimethyl-2H-1,3,5-thiadiazine-2-thione is claimed to offer the following advantages: (a) non-toxic powder when dry and thus easy to apply; (b) in moist soils it changes chemically and kills fungi, nematodes, insects, and weeds; (c) evaporates in a few days from warm soil, leaving no toxic residue; (d) contains much nitrogen which is left in the soil to act as a fertilizer.

A formulation of this chemical called Mylone was tested in several locations in replicated combinations with various fungicides. Unfortunately no or little damping-off took place in the controls or elsewhere. However, there is no question of the effectiveness of Mylone on the most important damping-off fungi *Rhizoctonia solani* Kühn and *Pythium* spp. These were killed at low dosages (about 20 p.p.m.) in laboratory tests both in agar and in non-sterile loam soil.

Two tests were conducted in Saskatoon in seedbeds of jack pine (*Pinus banksiana* Lamb.). In one test Mylone was applied at 50, 250, and 500 lb./ac. and raked into clay soil beds mixed with some peat 9 days before sowing in early June. In another test Mylone was similarly applied at 50 and 300 lb./ac. 10 days before sowing in mid June. In this test calcium cyanamide (a well-known sterilizer-fertilizer acting in much the same way as Mylone) was also applied at 100 and 500 lb./ac. No obvious phytotoxicity was found in the seedlings. The numbers and sizes of seedlings did not differ significantly in any of these treatments or in various treatments with no chemicals or with fungicides only. The 500-lb. rate of Mylone however caused a slight decrease in the sizes of the seedlings. This may have been due to temporary phytotoxicity and fertilizing effects from the excessive amount of Mylone.

The ground of these two test sites became heavily infested by various species of weeds. Mylone, especially at 300 and 500 lb. caused a pronounced reduction of weeds. This was still clearly noticeable one month after the applications. Later the plots became infested by weeds, probably seeded from surrounding plots. Fair weed control was exhibited also by the cyanamide treatment at 500, but not at 100 lb. The effect of this chemical on fungi was not studied.—O. Vaartaja.

Increment Reduction of Scots Pine Following Two Years of Defoliation by the Jack-pine Budworm.—The jack-pine budworm, *Choristoneura pinus* Free., was first recorded in pine plantations in the Spruce Woods Forest Reserve in 1954 (Bi-Monthly Progress Report 13 (1): 2-3, 1957). Populations remained at low levels in 1955, but in 1956 and 1957 Scots pine plantations were heavily attacked by this species. A damage appraisal survey was conducted at the end of the 1957 feeding period and many trees showed dead or dying tops (Bi-Monthly Progress Report 14 (1), 1958). Four sample trees were selected for an oblique sequence analysis of growth increment, using the partial sequence method described by Mott, (Mott, Nairn, and Cook. Forest Science 3 (3): 286-304, 1957). The sample trees had been stripped of both old and new foliage and from 3 to 4 feet of the main leaders were dead or dying. Discs were taken at the mid point of each internode in the top 12 feet of the crown, and at 4-foot intervals to the 1-foot stump.

Figure 1A shows the average oblique sequence of the trees for the years 1952 to 1957. The growth patterns are similar to those that have been shown for other species of conifers to which this method of analysis has been applied. The Scots pine shows a striking reduction in increment in 1956, the first year of attack, indicating that this species is very sensitive to budworm defoliation.

Figure 1B illustrates the most seriously affected of the sample trees; there was no 1957 radial growth in the top 14 feet of the crown. This tree would probably have died soon after two years of severe defoliation by the jack-pine budworm. Additional studies on mortality and recovery will continue in this area.—R. M. Prentice and L. D. Nairn.

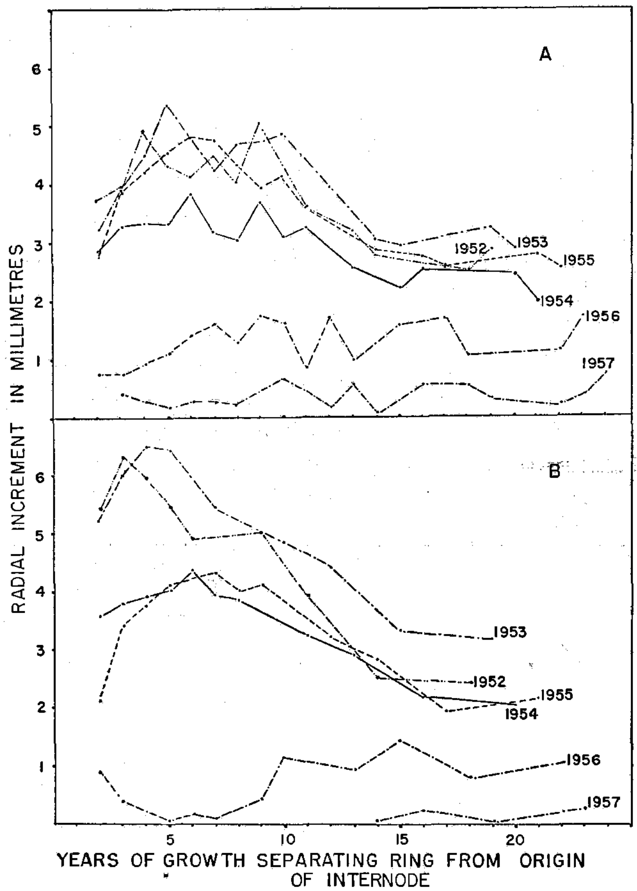

Fig. 1 Radial growth of Scots pine severely defoliated by jack-pine budworm in 1956 and 1957, plotted by the oblique sequence method. A. Average of four sample trees. B. Single tree showing the most drastic increment reduction.

BRITISH COLUMBIA

Decay in Young Western Larch in British Columbia.—The incidence of infection by wood-rotting fungi and the amount of cull resulting from decay in stands of young western larch are often very high. Since this tree forms a substantial part of the forest inventory of southeastern British Columbia, some concern has been shown regarding its apparent decadence at young ages. At the request of the British Columbia Forest Service, the Victoria Forest Biology Laboratory made a limited study of young larch in the Monashee region of the Province near Lumby. The purpose of the study was threefold, namely, to find out what types of rot occur in larch, to identify the fungi associated with these rots, and to find out at what ages western larch is severely infected.

The sample consisted of ½ acre of a mixed stand of western larch (site index 90), Douglas fir, and lodgepole pine. The stand was two-storied and had originated following two fires, about 55 and 100 years ago. The sample area had a northern exposure and a slightly sloping topography. The soil was fluvio-glacial in origin, strongly podzolized, had extreme drainage, and was compacted at about 16 inches below the surface. One hundred and forty-three larch having a diameter of at least 2 in. (outside bark measurement at 4.5 ft.) were felled and sectioned into short lengths. Although the ages of trees ranged from 28 to 90 years and the average age was 60 years, two distinct age groups were represented in the sample, namely, trees less than 55 years and trees more than 70 years. The average age of each group was 42 and 83 years. The average size of the trees sampled was 6 in. in diameter and the range of sizes was from 2 to 12 in.

About 12 per cent of the trees in the younger age group were infected by wood-rotting fungi, whereas 58 per cent of the trees in the older age group were infected. The over-all level of infection was 22 per cent. Less than 1 per cent of the gross wood volume of the younger age group was decayed, whereas the older age group was about 12 per cent decayed. The over-all loss in wood volume from decay was 6.4 per cent. The age of the youngest infected tree was 28 years. Both the intensity of infection and the amount of rot in western larch increased with increasing size and age of trees. While the amount of rot in trees of ages 75 years and less was not significant, the level of infection remained above 10 per cent down to the 45-year age class.

Five species of fungi, namely, *Fomes pini* (Thore) Lloyd, *Corticium galactinum* (Fries) Burt, *Fomes pinicola* (Sw.) Cooke, *Coniophora puteana* (Schum. ex Fries) Karst., and *Stereum sanguinolentum* Alb. & Schw. ex Fries, were isolated from decayed wood representing most of the rot volume. Three of these fungi, namely, *Corticium galactinum, Coniophora puteana,* and *Stereum sanguinolentum* are newly recognized wood rotting organisms of western larch in British Columbia. About 88 per cent of the rot was white pocket rot associated with *Fomes pini.* This fungus was isolated from trees of ages from 81 to 90 years. It formed fruit bodies on trees of ages from 87 to 90 years and formed blind conks on an 82-year old tree. Branch stubs and trunk scars formed entrance courts for *Fomes pini,* whereas the remaining fungi were isolated only from decayed wood close to scars. *Corticium galactinum* and *Coniophora puteana* were associated with root and butt scars, whereas *Fomes pinicola* and *Stereum sanguinolentum* infections were located higher above ground. White pocket rot associated with *Fomes pini,* white pitted rot associated with *Corticium galactinum,* and an unknown white mottled rot together comprised 93 per cent of the rot volume. Brown cubical rot associated with *Fomes pinicola* and *Coniophora puteana* and brown laminated rot associated with *Stereum sanguinolentum* accounted for the remaining volume of rot.

Within the limits of the sample obtained, western larch can be infected at ages less than 30 years and more than 50 per cent of the trees in a stand can be infected at ages less than 75 years. The early establishment of *Fomes pini* in western larch, whereby more than one-third of the 80-year-old and older trees in a stand can be infected, assures the early decadence of this species in some areas. The size of the existing inventory of western larch, apart from its value in relation to other species, would appear to justify a more detailed study of the pathology of this species than that made at Lumby.—G. P. Thomas and A. L. Johnson.

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O. H. M. S.

D. C. EIDT, FI.
FOREST BIOLOGY LABORATORY,
COLLEGE HILL,
FREDERICTON, N.B.

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