

ASSESSMENT OF PEST CONDITIONS IN FOREST GENETIC INSTALLATIONS
IN THE VICINITY OF GRANDE PRAIRIE, ALBERTA

by

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BACKGROUND

One of us (Volney) was contacted by Mr. Pat Wearmouth of Proctor and Gamble Cellulose Ltd. to assess pest conditions in the forest genetics installations in the Grande Prairie area. We then received a letter and maps from Mr. John Edwards indicating that they were concerned with the condition of two progeny sites and a newly established seed orchard. We visited the Grande Prairie area and accompanied Mr. Edwards to 3 installations on June 13, the seed orchard was visited on the morning of June 14, and joined Mr. Grant Williamson of the Alberta Forest Service in a visit to an installation North of Sexsmith in the afternoon. We were accompanied by Mr. Peter Blake of Canadian Forest Products Ltd. and Dr. Narinder Dhir of the Alberta Forest Service in addition to John and Grant to assess another installation on the lease of Canadian Forest Products Limited on June 15.

The genetics installations were established as a cooperative venture among the above-mentioned agencies (and B.C. Forest Products Ltd. who have now withdrawn). The installations we examined represent part of a larger tree improvement program that is being established in Alberta. Dr. Dhir has provided us with maps of trial locations and will provide a description of the project including the scope and objectives of this program. Each of these installations represent a substantial investment of over \$100,000.00. The values at risk are also substantially higher than would ordinarily be expected because of the biological significance of the trees established in these trials.

We assessed the pest conditions in four types of installation. Three sites were half-sib progeny tests of 400 families of lodge pole pine established in 1981. One site had been established as bulk seed orchard in 1980. Another site is being developed as a seed orchard and was established in 1985. The fourth installation was a spruce provenance test. The pests conditions in each of these installations was assessed by spending at least 1.5 hrs walking through the plantation examining dead, dying, chlorotic, and living trees to detect any significant pest problems.

PESTS OF THE NEWLY ESTABLISHED SEED ORCHARD

At present there are 17,000 seedlings in this orchard, planted in 1985. The intent is to rogue this orchard using information derived from the half-sib progeny tests. A small number of trees have died and were replaced in 1987.

Overall, the survival of trees in this orchard is good although the trees are still young. No serious problems were detected. A survey of the plantation indicated the following problems are present but to a minor degree: Deer browsing, damage to the leader (7.6%), Pineus coloradensis (Gillette) (a wooly aphid on hard pines) (2.8%), trees with dead top - no evidence of pest (2.1%), tree missing (0.7%), tree dead - cause unknown (0.7%), tree from 1987 planting dead (0.7%). Except for browsing by deer, these figures are extremely low and do not warrant concern at present.

PESTS OF THE HALF-SIB TRIALS

Three of these sites were examined. The two on the Proctor & Gamble lease each had approximately 8,000 trees and that on the Canadian Forest Products lease had 4000 trees. The trees are planted at approximately 2 m spacing and were grown for one year in containers prior to planting at these sites in 1981. Each plantation is surrounded by a chain-link fence and is accessible through a gate which is kept locked. To date, there has been some attempt to remove competing vegetation in the two plantations on the Proctor & Gamble lease. In addition to vegetation control, the trees on the Canadian Forest products lease were treated to reduce the risk of further rootcollar weevil (probably Hylobius warreni Wood) attack. This treatment included removing the branches from the lower 50 cm of the stem, removing the duff within 30 cm of the stem and replacing the duff with soil to protect the roots which were exposed in removing the duff. The surviving trees which had been attacked by rootcollar weevils were marked with a flash of red paint on the lower bole.

Many of the problems encountered were common to all three plantations. The principal non-pest problem was the condition of the tree roots. Many of the trees had **deformed and contorted root systems**. Several of these trees have now begun to lean, especially in the plantation treated for rootcollar weevil control. The prognosis for these leaning trees is not good. We expect that these trees will eventually stagnate and/or be subject to uprooting in high winds. Many of the dead trees examined had a deformed root system and those that were examined for rootcollar weevil populations also exhibited this condition. This condition will seriously interfere with the growth and survival of the trees and some thought should be given as to how to interpret the performance data from the trees affected.

The most noticeable problem with these trees is the prevalence of **rootcollar weevil** attack. The species involved is probably Hylobius warreni Wood. The populations of the weevil appear to be highest in the plantation on the CANFOR lease where as many as 30% of the trees may have been attacked. The other plantations also have dead trees but the incidence of attack could not be estimated because not all trees were examined in the root collar area. The treatment in the one plantation can only be regarded as experimental as no trials of this sort have been reported for Warren rootcollar weevil. This plantation should be monitored to provide information on the efficacy of the treatment. Further research on rootcollar weevil control in these situations seems warranted. The above-mentioned root deformities may have contributed to the success of rootcollar weevil attacks.

Some of the trees are infected with **western gall rust** (Endocronartium harknessii J.P. Moore (Y. Hirat.)). A small percent of the trees have stem galls and an even smaller number have galls which were gnawed by rodents. Whether control of western gall rust should even be considered in these trials is moot. Presumably the performance of trees in these trials is to be evaluated even though they have been subjected to environmental factors,

including pests, likely to interfere with growth and survival. A recommendation on control can be made when information on the objectives with regard to pests is received.

Although the lodgepole pine terminal weevil (Pissodes terminalis Hopping) is common in the plantations and on the surrounding trees, the damage is still of low incidence. These weevils damage the terminal shoot and severely limit height growth. Because they damage only the highest shoots on a tree, repeated attack on the same tree can result in seriously deformed stems. A further consideration is that the weeviled terminal is a point of weakness in the stem when the tree recovers from the attack. Because of this the stems of weeviled trees and those mined by the pitch nodule maker (see below) are prone to breakage in stormy weather. Removal and disposal of infested leaders before the adults emerge has been advocated to reduce weevil populations.

Armillaria root rot was detected in the plantation on the Canfor lease as well as on a tree just outside the fence. Any practice which promotes vigorous growth of the trees should overcome most of the infections in the stand. Unfortunately the deformed root systems and attacks by the rootcollar weevil can only increase the likelihood of these trees being colonized by the pathogen. There is no known direct control for infected trees.

Other pests present in the plantations were the pitch nodule maker (Petrova sp.) and the hard pine adelgid (Pineus coloradensis). The hard pine adelgid infestation is not considered important in any of these plantation. The pitch nodule maker populations are low but these insects may interfere with leader growth if they mine the bark of the stem. Again the principal injury is the introduction of a point of weakness in the stem. No control is necessary for these pests.

THE BULK SEED ORCHARD

A bulk seed orchard of trees planted in 1980 was thinned in 1987. Approximately 20,000 trees remain in this orchard. Most of the less thrifty trees have been removed and there was little incidence of pests in the remaining stands. There was some evidence of mechanical damage to the lower trunk of some trees due to hail, some western gall rust, and the rootcollar weevil. This orchard should be monitored to detect the build up of pest populations.

THE SEXSMITH SUPPLEMENTAL SPRUCE PROVENANCE SITE

This site is located north of Sexsmith and consists of a provenance trial in a fenced compound surrounded by a 66 ha spruce plantation. Only the pests of the provenance trial will be discussed here. However, it should be noted that pest conditions within the plantation, will influence what happens in the provenance trials. Both the plantings were of white spruce.

The most common pest of this trial was the **spruce bud midge** (Rhabdophaga swainei Felt) and the damage was also prevalent in the surrounding plantation trees. The midge larvae damage the terminal bud of the leader and so interfere with height of trees. Repeated attacks can severely limit the growth of the trees as no dominant leader is formed.

Several of the trees in the trial had **dead tops**. The lower crowns (within 30 cm of the ground) remain alive. It is thought that this may be due to extreme weather conditions before the snow disappeared.

There was evidence of several other pests in the plantation but their incidence was extremely low. The **white pine weevil** (Pissodes strobi (Peck)), **wooly aphid** (Adelges sp.) **galls**, **spruce bud moth** (Zeiraphera canadensis Muut. & Free.), an unknown **sawfly** (possibly the **yellow headed spruce sawfly** (Pikonema alaskensis Roh.)), and an **unknown weevil** (Pissodes sp.) which formed chip cocoons on the lower stem were all detected by their characteristic damage. In addition there was some **mechanical damage** to the trees and there was **frost damage** on some of last year's shoots on some trees.

The sawfly damage was from previous years and no sawfly damage was evident this year.

This trial should be monitored annually to record the incidence of pests on the trees.