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# SURVEY REPORT OF PESTS IN THE PINE RIDGE FOREST NURSERY

## SMOKY LAKE, ALBERTA

Prepared for

ALBERTA FORESTRY, LANDS AND WILDLIFE
ALBERTA FOREST SERVICE

By

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## INTRODUCTION

A survey of insect and disease pests in the Pine Ridge Forest Nursery (PRFN) was made at the request of Dr. Narinder Dhir, Head Genetics Section of the Alberta Forest Service. The survey was conducted on June 17-18, 1991. Arrangements for the schedule of visitation and identification of site specific plant materials to view were made with Kathy Yakimchuk, Neil Barker, and Tjerk Huisman.

## SURVEY PROCEDURES

The following sites with corresponding potential problems within the nursery property were visited, in addition to Region H White Spruce Seed Orchard, located a few km north of the PRFN:

A. Observation and examination of bastard toad flax (Field A-1), an alternate host plant of comandra blister rust.

B. Bareroot-grown seedlings of white spruce and lodgepole pine:
   (a) 1+0 wS seedlings in Field D-10
   (b) 2+0 wS seedlings in Field D-8
   (c) 1+0 pL seedlings in Field C-7

C. Greenhouse container-grown seedlings of white spruce (green houses #2,4,5).

D. Greenhouse potted aspen seedlings.

E. Genetic Plantations:
   (a) E-Section
      (i) E-4, White spruce
      (ii) E-5, Eastern larch; grafted white spruce
      (iii) E-6, Siberian larch cross
      (iv) E-7, Jack pine trial

   (b) B-1 South: Scots pine mini seed orchard, 1987

   (c) B-1 North: White spruce grafted holding plot
       B-1 North: Lodgepole pine plantings

   (d) Reservoir Spruce Clone Bank

   (e) G-Section Plantations:
      (i) G-227, white birch
      (ii) G-225, green ash
      (iii) G-256, aspen trial
      (iv) G-257, poplar arboretum
      (v) G-206, lodgepole pine clone bank
      (vi) G-108, Scots pine
      (vii) G-118, white spruce
      (viii) G-117, G-226, Siberian larch
      (ix) G- ?, black spruce

(x) G-131, pine species (lodgepole, ponderosa, Scots, jack)

(f) F-Section, White Spruce Seed Orchard

(g) Region H White Spruce Seed Orchard

Most diagnoses were made on site. However, a few specimens were brought back to the Northern Forestry Centre for confirmation of identification. No unusual methodologies were deployed in the survey procedures. Where applicable, recommendations for control or pest reduction are given and an indication of pest abundance trend (based on lasts years survey) is suggested.

## RESULTS AND RECOMMENDATIONS

A. A small patch of bastard toad flax was found near the A-1 Field. Appropriate control action will be taken by staff at the PRFN.

B. Bareroot-grown seedlings

(a) 1+0 wS seedlings in Field D-10: **Springtails** (Order Collembola) were observed, though not as abundantly as last year. Some were present on the young seedlings as well as on the ground. They have not as yet been identified to species, but may contribute to feeding injury as has been reported elsewhere (Sutherland et al. 1989). No control action is recommended until positive identification is made and any associated feeding injury is confirmed.

Two specimens of a plant bug were collected that appeared similar in form to the tarnished plant bug (Lygus lineolaris). However, they were identified as a **Geocoris** species (family Lygaeidae) and are not known to cause damage to young seedlings. No control action is recommended.

Some evidence of post emergence **damping-off** disease was observed, probably due to **Fusarium** spp. This fungus had been identified in the bareroot fields last year. The survey did not provide information on the extent of seedling mortality nor its distribution pattern within fields. Specific surveys would have to be designed to provide this kind of information. No specific recommedations are made at this time. However, the cultural control treatment recommendations in Sutherland et al. (1989) are applicable here also.

(b) 2+ wS seedlings in D-8 Field: A heavy infestation of a **wooly aphid** species was present attacking the new leader shoots. The species is unidentified at present but is likley an **Adelges** or **Pineus** sp. The population level in the D-8 Field appeared to be higher than last year. Several adult lady beetles were observed on the seedlings, providing some natural predation of the aphids. No control action was recommended since shoot injury had not been positively identified in previous years, and because the current feeding stage of aphid appears to disappear later in July. However, continued monitoring is recommended.

A low incidence of dead or dying seedlings, with associated root collar girdling, was observed and is believed due to the **strawberry root weevil, Otiorhynchus**

ovatus (L.). The incidence at the time of the survey appeared less than last year but could increase as the summer progresses. No control action is warranted but the seedlings should be monitored periodically.

(c) 1+0 pL seedlings in C-7 Field: A light incidence of post emergence damping-off disease was observed. No control recommendations are being made at this time. Further surveys of this disease may be requested at the discretion of staff at the PRFN, but should be planned one year in advance.

C. Greenhouse container-grown seedlings of white spruce

Damping-off disease was observed but was very light; the main problem in Greenhouses 2,4 and 5 appeared to be with fungus gnats, possibly Bradysia sp. Control of the gnats is difficult since the larvae live in the soil and would require insecticidal treatment applied as a soil drench to be effective. Sanitation control recommendations given in Sutherland et al. (1989) would be helpful in reducing populations. Evidence of seedling injury caused by the gnats was not observed. However, as pointed out in Sutherland et al. (1989), the adult gnats have been shown to be carriers of pathogenic fungi such as Botrytis and Fusarium.

D. Greenhouse Potted Aspen Seedlings

Fungus gnats were present in this greenhouse as well and some injury may have occurred as a result of larval feeding in the roots. Sanitation control measures as described in Sutherland et al. (1989) would be helpful. If insecticidal drench treatment is contemplated, a few seedlings should be tested first on a trial basis to reduce any risk of phytotoxicity.

A twig blight, caused by the fungal pathogen, Venturia tremulae Aderh., was present causing the so-called "shepherds crook" disease of some terminal shoots. The infected shoots should be pruned off and removed from the site.

E. Genetic Plantations

(a) E-Section:

(i) E-4: A low incidence of the white pine weevil, Pissodes strobi (Peck) was present on some white spruce leaders and some late-spring frost or winter injury occurred on some current years growth. Control by pruning treatment for the white pine weevil is recommended.

(ii) E-5: Some stem injury characteristic of hail damage was observed on eastern larch, while frost injury and white pine weevil leader kill were present on some grafted white spruce. Control by pruning treatment should be applied for the white pine weevil.

(iii) E-6: No injury was observed on the Siberian larch in this sectin of the plantation.

(iv) E-7: There was a low incidence of the northern pitch twig moth, Petrova albicapitana (Busck), present on the main stems of some jack pine. The blisters may be easily destroyed by opening them and removing the single larva

present.

(b) B-1 South: No injury was observed in the Scots pine mini seed orchard.

(c) B-1 North: A number of the grafted white spruce trees in this Section had produced cones this year, some of which were infected with the **spruce cone rust, Chrysomyxa pirolata** Wint. This fungus requires an alternate host plant species of wintergreen (Orthilia spp., Pyrola spp. and Moneses spp.) to complete its life cycle. Infected cones may not produce viable seed and should be discarded. The rust spores on the cones, however, will not infect seeds from healthy cones. Control action is not recommended at this time.

Galls on some spruce shoots, caused by the **spruce gall aphid [Adelges lariciatus** (Patch)], were present and may be removed by hand picking.

On the lodgepole pine trees in this Section, the **lodgepole terminal weevil, Pissodes terminalis** Hopping, caused light injury to leaders. Light incidence of a **needle cast disease** [probably **Lophodermella concolor** (Dearn.)] was present as well as some light injury attributed to squirrels. No control action is recommended.

(d) Reservoir Sruce Clone Bank: Two colonies of a **web-spinning sawfly, Cephalcia**, probably **provancheri**, caused light injury to foliage. These can be easily hand removed. The **spruce coneworm, Dioryctria reniculelloides** Mutuura & Monroe, caused light external feeding injury to a few cones and does not require control treatment. Neither of these insect species was observed last year. A few galls were observed caused by the **Cooley spruce gall adelgid, Adelges cooleyi** (Gillette). The galls may be hand picked. A light incidence of defoliation caused by the **yellowheaded spruce sawfly, Pikonema alaskensis** (Rohwer) occurred on one or two trees. Control of the larvae by insecticidal application should be considered while the larvae are small since persistence and buildup of the sawfly will likely occur in subsequent years.

A light incidence of the **spruce cone rust** was noted on a few cones. These should be dicarded since they are not likely to contain viable seeds.

(e) G-Section Plantations

(i) G-227, White birch: There was one, and possibly two, unknown species of **birch leafminers.** Neither species caused significant injury and may be more of a curiosity. There was also a low incidence of a **leafroller** species (Lepidoptera) causing minor injury.

(ii) G-225, Green ash: Some shoots of green ash showed symptoms of light injury from **late spring frost.**

(iii) G-256, Aspen trial: The **aspen serpentine leafminer, Phyllocnistis populiella** Chambers, was present in low numbers and an unidentified **leafroller** species; neither caused significant injury. The **twig blight disease (Venturia tremulae)** caused top kill of aspen as well as on some triploid poplar. These may be pruned off and discarded.

(iv) G-256, Poplar arboretum: Light injury caused by insect species included the **aspen serpentine leafminer**, an unidentified **leafminer** species and a **gall-forming wasp**; all injury was minor. Two diseases causing minor injury included **twig blight disease** (**Venturia** sp.) and a **leaf spot disease**, probably **Mycosphaerella** sp. This disease is characterized with brown spots on the leaves. No control treatment should be necessary this year.

(v) G-206, Lodgepole pine clone bank: The insect species identified included the **lodgepole terminal weevil** (**P. terminalis**), **the northern pitch twig moth** (**P. albicapitana**), and evidence of a **pitch moth** (probably **Synanthedon** sp.). Control treatment as described above for the **terminal weevil** and the **twig moth** should be consisdered while the **pitch moth** should be monitored. Stem injury caused by **yellow-bellied sapsuckers** (**Sphyrapicus varius varius**) was also evident and may be remedied by wrapping the damaged portion of stem or other appropriate means. A light infection of **needle cast disease** (**Lophodermella** sp.) was present on some trees but requires no control treatment.

(vi) G-108, Scots pine: No insect or disease pests were identified.

(vii) G-118, White spruce: No insect or disease pests were identified.

(viii) G-117, G-226, Siberian larch: Some light **late-spring frost** injury was evident on a few trees and a **needle rust** infection was collected on a few needles. The latter was caused by a **Melampsora** sp., which is a rust disease that causes injury to aspen and poplar leaves and utilizes Larix spp. as an alternate host plant. All injury was insignificant and not requiring control treatment.

(ix) G- ?, Black spruce: Four trees were found infected and killed by **Armillaria root rot** [**probably Armillaria ostoyae (Romag.) Herink**], all in a single patch. The dead trees should be removed and destroyed, including the roots. The inoculum source of the fungus may be an old root left buried in the soil; this should be located and removed if possible.

(x) G-131, Pine species (lodgepole, ponderosa, Scots and jack: **Winter injury** recognized as browning of the 1990 needles was common on the ponderosa pine. One lodgepole pine tree had been attacked by the **white pine weevil** (**P. strobi**), a somewhat unusual occurrence on this host. The attacked portion of leader should be pruned off and destroyed before adult weevil emergence. Several Scots and jack pine trees had attacks by the **northern pitch twig moth**; these should be removed by hand.

(f) F-Section, White Spruce Seed Orchard

**White pine weevil** (**P. strobi**) was the most significant pest in this site, causing top-kill on 15-20 trees in the current year. This infestation appeared to have increased over last year, although total numbers of attacked leaders were not recorded since some pruning treatment had already taken place. The infested leaders should all be pruned off and destroyed before early July. When pruning, care should be taken to prune low enough on the leader to include all developing larvae under the bark.

A relatively high incidence of the **spruce gall adelgid**, **Adelges lariciatus** (Patch), was present on the orchard trees; their injury is largely cosmetic.

The need for their removal and control is at the discetion of the PRFN staff. However, the control of the aphid does not seem practical because of high populations in the nursery and surrounding forests.

(g) Region H White Spruce Seed Orchard

A light infection of **spruce cone rust, C. pirolata**, occurred on a few of the cones that were present, even though the trees are still very small. Since the source of infection comes from alternate host plants outside of the plantation, the observation suggests that removal of surrounding alternate host plants may not be a viable control option, especially for young plantation-grown trees.

**Late spring frost** injury was common on shoots of some of the trees, indicating frost pockets or higher susceptibility to frost of some genetic seed sources.

Mature larvae of the **forest tent caterpillar, Malacosoma disstria** Hubner, were common on many of the spruce trees and had invaded the plantation from the surrounding aspen stands. However, there was little evidence of any feeding activity. No control action is recommended.

## REFERENCES

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