SX 85210Q

DOUGLAS FIR NEEDLE DIEBACK TRIAL

Working Plan
1985

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To: A.E. McDonald

From: Silviculture Branch
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Re: SX 85 210 Q Douglas Fir Needle Dieback Trial

Introduction

Needle dieback in Douglas fir continues to occur in nurseries in British Columbia and in the United States in spite of efforts by many to determine the cause of the problem. Severe effects and mortality seem to be minimized by sowing early in the season and by other efforts to keep temperatures low during the early growth phase. These include frequent misting or watering and raising sidewalls daily to keep growing temperatures low. As reported previously, damage seems to be related to the soil medium and particularly to individual soil batches. There is still a strong correlation of damage to green stemmed seedlings but not to those having bright red stems. There seems to be varying proportions of green and red stemmed seedlings in different nurseries. The following trial will attempt to eliminate some of the suspected causes and possibly provide new directions to be investigated more thoroughly.

Experimental Design

Each treatment, except for germination flats, will consist of 9 Styroblocks or other containers. Three of each treatment will be transported to Green Timbers nursery and grown there. Six blocks of a seedlot from Green Timbers will be returned to Saanich Test Nursery to be grown there. The seedlot to be used is: Fdc (SZ 1090) 92M10/B3/7752/.46 92%.

All treatments should be double sown and thinned or sampled to one seedling per cavity. All treatments should be grown in a shelterhouse or greenhouse where there is an extreme of daily temperature ranges and where daily maximum temperatures will be highest. All treatments will be fertilized using Green Valley products.

Starter: 10-51-16 at 75 ppm N
Grower: 20-20-20 at 125 ppm N
Finisher: 10-51-16 at 75 ppm N
Treatments

Treatment 1. Standard 3 peat to 1 vermiculite soil mix using Fison's Seba Beach (Alta.) peat, and 3 kg/m³ Green Valley 10 mesh and finer dolomite lime. The container will be 313A Styroblocks (198).

2. Same as Treatment 1, except using Fison's Manitoba source peat.

3. Same as Treatment 1, except the blocks will be leached for 24 hours prior to seeding.

4. Same as Treatment 1, except the dolomite lime will be replaced with 2 kg/m³ of either Greenleaf or Kaiser 65 dolomite lime.

5. Same as Treatment 1, except the dolomite lime will be replaced with 2 kg/m³ Agricultural lime (CaCO₃).

6. Same as Treatment 1, except the rate of dolomite lime will be increased to 4 kg/m³.

7. Same as Treatment 1, except the soil mix will also include Osmocote 18-6-12 at 6.5 kg/m³.

8. Same as Treatment 1, except the blocks will be drenched with Ca(NO₃)₂ prior to seeding and every two weeks throughout the growing season in addition to regular fertilizers.

9. Same as Treatment 1, except the blocks will be drenched with CuSO₄ at 50g/1000 L prior to seeding and every two weeks throughout the growing season in addition to regular fertilizers.

10. An attempt will be made to germinate and grow seedlings in a medium containing no peat moss, e.g. a mixture of fine vermiculite, perlite and hydrogel.

11. Seedlings will be germinated and grown on slabs of mineral wool, similar to those used in Europe for tomato and cucumber production.

12. Same as Treatment 1, except trace levels of pentachlorophenol will be watered into the cavities soon after germination.
13. Same as Treatment 1, except soil mix will be sterilized in an autoclave prior to loading and seeding.

14. A similar number of trays should be sown using Castle and Cook Techniculture trays.

15. Large quantities of seed will be germinated in flats using soil mix as in Treatment 1. Upon germination, some green stemmed seedlings will be checked for pathogens at the discolored area often seen where the stem enters the soil medium. Larger quantities of green, reddish-brown and red stemmed seedlings will be collected for tissue analysis. Each group will be separated into roots, stems, and foliage for analysis.

Observations Required

Besides those tests already mentioned, the treatments will be monitored closely and the number and severity of occurrences of typical dieback symptoms will be recorded. Daily maximum and minimum temperatures should be recorded and related to the incidence of symptoms. Further media and tissue analysis may be conducted if results indicate the need.

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