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**ASSESSMENT OF PRINCE ALBERT TREE NURSERY SOILS  
FOR DISEASE PATHOGENS**

by  
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## **Background:**

Prince Albert Nursery has experienced problems in the past several years with bare root-grown jack pine seedlings yellowing and then dying. Diseased seedlings were sent to NoFC in June of 1991 for diagnosis. They did not have any detectable root rot; however, the soil was found to have both Fusarium and Pythium species present (see File Report NOR-11-09-9101). Jack pine seedlings that were sent later in the summer were found to have Fusarium root rot.

The author was requested by J. Matthews, Research Officer, Saskatchewan Parks and Renewable Resources, Forestry Branch, to perform a "pathogen analysis" on soil samples collected from nursery beds at Prince Albert Nursery. The following is a report on the assessment of these soils for populations of Fusarium and Pythium species.

## **Material and Methods:**

Three fields at Prince Albert Nursery were sampled, Field 47 (white spruce, 2+0 stock), Field 39 (white spruce, 2+0 stock), and Field 21-1 (jack pine, 2+0 stock). Six inch soil cores were collected by Nursery personnel from root rot affected sites and root rot unaffected sites in each field. The soils were sent to the Northern Forestry Centre for "pathogen analysis".

The soils were assayed for Fusarium and Pythium populations by dilution plating techniques on selective media (Nash Snyder media and CMPVP media). Colony forming units (CFU) were estimated from these dilution platings, 3 replications were made per dilution. Isolation were made of the different Fusarium and Pythium colonies and identifications were made.

## **Results and Discussion**

The results of the pathogen analysis are summarized in Table 1. Field 21 had no detectable Fusarium populations in the affected soils but did in the unaffected soils. Both the unaffected and the affected sites had detectable Pythium populations. The affected site had the greatest Pythium population. Field 39 had detectable Fusarium populations in three of the four sites. The highest population was found in affected site 3. Pythium spp. were only detected in affected site 4. Field 47 had Fusarium populations

in all four sites. The highest population was found in site 1, where damaged seedlings were found. No Pythium species were detected in this field.

Several Fusarium isolates were sent off for identification. They have been identified as Fusarium avanceum. The Pythium species have not been identified to the species level.

In Field 21 Fusarium species were not found in the affected sites but were found in the nonaffected sites. The reason for this is uncertain. There is increasing evidence that shows that Fusarium root rot of conifers maybe caused by Fusarium species that are present on the seed coat. There is a possibility that the affected seedlings site 1 were damaged by Pythium since the Pythium populations were greatest in the two affected sites. In Field 39 the affected sites had the greatest Fusarium and Pythium populations. In Field 47, the area that had damaged seedlings also had the greatest Fusarium populations.

**Table 1** Fusarium spp. and Pythium spp. populations of selected bareroot jack pine field at Prince Albert Nursery.

	Site Condition	<u>Fusarium</u> spp.	<u>Pythium</u> spp.
<b>Field 21</b>			
site 1	unaffected	1300 <sup>1</sup> ± 580	670 ± 600
site 2	unaffected	3300 ± 1530	333 ± 580
site 3	affected	0	1330 ± 1153
site 4	affected	0	1330 ± 1154
<b>Field 39</b>			
site 1	unaffected	0	0
site 2	unaffected	333 ± 580	0
site 3	affected	3000 ± 2000	0
site 4	affected	333 ± 580	1000 ± 1000
<b>Field 47</b>			
site 1	damaged seedlings	1000 ± 1000	0
site 2	near damaged seedlings	333 ± 580	0
site 3	normal seedlings	667 ± 580	0
site 4	normal seedlings	667 ± 580	0

<sup>1</sup> Mean of three replications ± standard deviation

## Conclusion

High Fusarium soil populations were associated with affected sites in Field 39 and 49 but not in Field 21. High Pythium populations were associated with soil in affected areas in Field 21 and in one site<sup>4</sup> in Field 39. Pythium species may be playing a role in the root disease of the conifers growing in these fields.