

THE ESTABLISHMENT OF MYCORRHIZAE USING EXCISED ROOTS AS INOCULUM

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INTRODUCTION

The Forest Service nursery at McKinleyville, California (Humboldt Nursery) has lost more than 6 million 1-0 Douglas-fir seedlings since 1971. These losses were caused by a fungus Phoma sp., that generally killed all the foliage on the seedlings that were 1 to 3 inches tall at the end of the first growing season. Taller seedlings were attacked but usually survived attacks of this disease, since only the lower foliage was affected. The reason that many of the seedlings were so smaller was the lack of mycorrhizae.

Therefore in 1976 tests were conducted at Humboldt Nursery to determine if introducing mycorrhizal infected roots into seed bed would result in early and increased mycorrhizal infection of seedlings and corresponding increase in seedling height growth the first growing season.

Materials and Methods

In the winter of 1975-76 roots trimmed from 2-0 nursery grown Douglasfir seedlings were packed in shingletoe, placed in paper shipping bags and stored in a cold room at temperatures of 30-34°F.

The next May the roots were washed and then divided into 3 groups and treated as follows: group 1 roots soaked in Truban (30% a.i.) at maximum recommended label concentration for 10-15 minutes, group 2 roots soaked in Dexon (35% a.i.) at maximum recommended label concentration for 10-15 minutes, group 3 roots were washed with water but not treated with a fungicide. The roots were then evenly spread over a 4x5 foot plot and incorporated into the top 2 inches of soil of a nursery bed. The following week the beds were seeded.

The treatments were replicated 3 times. Plots in which no roots were added were included in the study as a control.

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Results

At the end of the first growing season the seedlings growing in the plots in which roots had been added to the soil had 3/4 times greater crown height than the untreated control, 8.83 cm and 2.6cm respectively. The stem caliper of the seedlings growing in the treated plots was also greater than those in the control plot, 2mm and 1mm respectively.

Upon examination of the roots it was determined that 100% of the seedlings growing in the Dexon treated root inoculum and the untreated root inoculum had mycorrhizal infected root tips. 87.5% of the seedlings growing in the Truban treated root inoculum had mycorrhizal infected root tips.

The individual seedlings growing in the root inoculated plots, no matter what the pretreatment was, had 80% of their rootlet tips infected with mycorrhizal fungi. The seedlings growing in the control had only 16% of their rootlet tips infected with mycorrhizal fungi.

The results were encouraging, however, more information is needed especially in the area of rates per acre and operational methods of application on a large scale.