To: Don Summers  
Manager, Nursery Extension

From: Allan McDonald

Date: 92-03-02

Our File:

Your File:

RE: SX92203 - A COMPARISON OF CELLULOSE ACETATE WITH PEAT: VERNICULITE MEDIA IN DIFFERENT CONTAINERS AND UNDER DIFFERENT GROWING REGIMES

INTRODUCTION

Cellulose acetate, a man made fibre commonly found in the tobacco industry as cigarette filters and the garment industry as fabric, has been used successfully in past container trials as a growing medium. Celanese Canada, a major supplier of this material, originally suggested its application in conifer seedling culture, and their support has made joint trials at Saanich Test Nursery possible. Currently, results from these trials are being used at the MacMillan Bloedel nursery in Yellow Point to grow a production crop of seedlings in cellulose acetate for both MacMillan Bloedel and Fletcher Challenge field foresters.

The major problem experienced in using this media is the result of the drainage characteristics of the material. Water tends to drain from the top half of the plug very quickly after irrigation but remains in the bottom portion for a long period. This results in a growth lag until there is adequate rooting in the bottom of the cavity to obtain sufficient nutrient for optimum plant growth. Because the material is now in production, Celanese Canada has been striving to make the material more "user friendly" with regard to its water management characteristics. Their engineers feel that a shorter plug (8 cm) will remain more uniformly wet after irrigation. They have also produced a higher fibre density material which should drain more slowly at the surface.

This trial will investigate the effects of the altered cavity depth and fibre density, as well as subirrigation on the drying characteristics. In addition, Copperblock\(^1\) plugs will be tried in an effort to encourage more root formation in the top of the cavity.

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1) Copper coated styrofoam blocks made by Beaver Plastics\(^\circ\)
MATERIALS AND METHODS

The trial will be conducted from April to November, 1992 at the B.C. Ministry of Forests' Saanich Test Nursery in Saanichton, B.C. Seedlots from six conifer species are to be double-sown into PSB 313 Styrofoam containers (160 cavities per container, 62 ml/cavity). In the peat moss media treatments, the styroblocks will be loaded with the standard 3 peat:1 vermiculite media, incorporating 2 kg/m$^3$ 12 mesh and finer dolomite lime, and 0.75 kg/m$^3$ Micromax$^2$. The cellulose acetate treatments will be loaded with acetogro® medium by Celanese Canada, and shipped to Saanich Test Nursery for sowing.

The seedlots to be used are:

<table>
<thead>
<tr>
<th>Spp</th>
<th>Seedlot</th>
<th>Zone</th>
<th>Grid, class, elev.</th>
<th>Germination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sw</td>
<td>04177</td>
<td>(MRB)</td>
<td>93H11/B3/04177/0.91</td>
<td>95% 436 s/g</td>
</tr>
<tr>
<td>Fc</td>
<td>16501</td>
<td>(CSM)</td>
<td>92D08/B3/16501/0.40</td>
<td>94% 99 s/g</td>
</tr>
<tr>
<td>Cw</td>
<td>20202</td>
<td>(1050)</td>
<td>92H04/B2/20202/0.23</td>
<td>91% 816 s/g</td>
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<tr>
<td>Pl</td>
<td>03679</td>
<td>(TOD)</td>
<td>92J15/B3/03679/1.32</td>
<td>94% 351 s/g</td>
</tr>
<tr>
<td>Hw</td>
<td>18752</td>
<td>(1010)</td>
<td>92F15/B3/18752/0.42</td>
<td>94% 422 s/g</td>
</tr>
<tr>
<td>Ba</td>
<td>07941</td>
<td>(M)</td>
<td>92L06/B3/07941/0.06</td>
<td>76% 35 s/g</td>
</tr>
</tbody>
</table>

Fertilizers to be used are Plant Prod 12-17-29, calcium nitrate, and magnesium sulphate and they will be applied at either 100 ppm Nitrogen as "growers" or 75 ppm Nitrogen as "finishers" on all species. An exception will be the cellulose acetate treatments which will receive ammonium sulphate to bring the application rate up to 125 ppm Nitrogen if and when growth characteristics indicate that it is necessary. STEM$^2$ will be applied throughout the season at 0.5% of the fertilizer weight. Treatments will be irrigated as required by the type of media, generally 2 or 3 times per week for peat:vermiculite and daily for the cellulose acetate.

Each conifer species will be grown in the following media:
1. Control: 3:1 peat:vermiculite soil mix
2. Cellulose acetate
3. High density cellulose acetate
4. 8 cm depth cellulose acetate plugs
5. 8 cm depth 3:1 peat:vermiculite
6. Cellulose acetate in Copperblock® containers

$^2$Trace element supplement produced by Sierra Chemical Co.

$^3$Soluble Trace Element Mix produced by Peters Fertilizer Co.
7. 3:1 peat:vermiculite in Copperblock® containers
8. Cellulose acetate - daily subirrigation
9. 8 cm depth cellulose acetate - normal subirrigation

The treatments will be set out in a random complete block design with 5 replicates/treatment.

EVALUATION

Static sample data, in which the same sample seedlings are measured at intervals throughout the season, will be collected and used to generate growth curves. Random samples collected at the end of the year will be processed for morphological comparison. Tissue analysis samples are to be collected during the growing season and analyzed for tissue nutrient levels. Conductivity and pH will be measured on soil samples collected over the summer to ensure that adequate soil conditions are maintained.

During the growing season, observations will be made on the incidence of disease and general appearance (colour differences, growth) of the seedlings. At the end of the year, all seedlings are to be graded as per standard Ministry specifications. The number of seedlings culled on the basis of height, root collar diameter, root development or incidence of disease will be recorded.

Statistical analysis (PC SAS ANOVA and various multiple stage tests) is to be performed on the morphological data. Duncan's, Student- Neuman-Keul's, and T tests will be used to examine groupings of height and root collar diameter.

Allan McDonald
Saanich Test Nursery

cc. Drew Brazier
    Susan Zedel
    Bev Wells
    Curt Clarke