Working Plan

CONTAINER TRIAL:

RNX 7604

by

Rodger Braulin
INTRODUCTION

- a study of the suitability of washed coarse silicon sand and perlite as production seed cover for container seedlings.
- a continuation of RNX 7512.

OBJECTIVE

- to determine the effect of sand, grit and perlite seed covers of varying depths on seed germination and seedling growth.

TREATMENT

- see WORKPLAN: Appendix I

<table>
<thead>
<tr>
<th>INCHES</th>
<th>CENTIMETERS</th>
<th>CUBIC CM.</th>
<th>NO COVER</th>
<th>SAND</th>
<th>GRIT</th>
<th>PERLITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>4S</td>
<td>4G</td>
<td>4P</td>
<td></td>
</tr>
<tr>
<td>0.33</td>
<td>0.85</td>
<td>4.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.66</td>
<td>1.69</td>
<td>8.2</td>
<td>8G</td>
<td>8G</td>
<td>8P</td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td>2.54</td>
<td>12.0</td>
<td>12S</td>
<td>12G</td>
<td>12P</td>
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</tbody>
</table>

** The treatment "NO COVER" served as a control for the covered treatments.

Seedlings required:
- Treatments --------------- 10
- Cavities/treatment ------ 240
- Replications -------------- 3
- Seedlings/Seedlot = 7,200
- Number of Seedlots ------ 3
- Total seedlings = 21,600

SEEDLOTS

Dfc
- 92H03/B1/2048/914N -- Shawatun Creek
  Dewdney Sz = 1060
  Germination = 86%
  Total seeds/gram = 93
  Viable "" = 80

Sw
- 93302/E3/1828/762M -- Hixon Creek
  Sz = 6010
  Germination = 80%
  Total seeds/gram = 400
  Viable "" = 320
SEEDLOTS.....

Hw
- 93MO4/83/1837/701M -- Kitwanga
  Sz -- 1150
  Germination -- 63.5%
  Total seeds/gram -- 649
  Viable "" -- 412

The Western Hemlock seedlot required double sowing due to the low germination percentage.

METHOD

General -- see WORKPLAN: Appendix I
Specific --
  1) fertilizer schedules: see Appendix II
  2) diary: see Appendix III
  3) treatment location diagram: see Appendix IV
  4) germination counts extended to ensure completion of germination

RESULTS

DATA TABLES & GROWTH GRAPHS : Appendix V
CLIMATE INFORMATION : NOT AVAILABLE
PHOTOGRAPHIC RECORD : Appendix VII

Discussion

a) The table of germination percentage in appendix V shows:
  1) Df germinated very well at the standard production cover depth of 0.33 inch for all three materials. Increasing the depth caused germination to drop-off with the following percentages from 0.33 to 1.00 inch:
     Perlite -- 69%
     Grit -- 69%
     Sand -- 49%
  2) Sw germinated most favorably under 0.33 inch of cover in the material order of grit, sand, and perlite. The material increase resulted in an individual decline in germination of:
     Sand -- 70%
     Grit -- 69%
     Perlite -- 60%
  3) Hw also germinated the best at the 0.33 inch depth in the order of grit, sand, and perlite. Increased cover depth gave the following alignment of materials from germination decrease:
     Grit -- 83%
     Sand -- 80%
     Perlite -- 75%
Discussion...

b) The morphological assessment data tabled in appendix V will show:
1) Df seedlings attained the worst height and top/root ratio under 1.00 inch of the three cover materials but did the best under the 0.66 inch depth. Root collar diameter was seen to increase with cover increase from 0.33 to 1.00 inch.
2) Sw seedlings experienced an increase in height with increase in cover under the grit and sand but decreased their top/root ratio. Root collar diameter also increased with cover depth. Increased perlite depressed height and diameter with no ratio effects.
3) Hw seedlings were depressed in height, top/root ratio, and root collar diameter by the increase in cover depth of all three materials. Sand produced the best all-round seedling and perlite the worst.

c) Examination of the seedling growth graphs in appendix V reveals:
1) Df seedlings had their growth increased, over that of the standard depth treatments, by more cover but decreased by the greatest depth. This was true for all materials.
2) Sw seedlings showed increased growth with increased cover depth of grit and sand. Perlite also increased growth with depth until the extreme caused a reduction.
3) Hw seedlings reduced their growth with increase in cover depth of all three materials with perlite being the most affected.

CONCLUSIONS

The germination, morphological, and growth information have resulted in the following conclusions:
a) The grit cover produced the best germination at the standard production depth of 0.33 inch with sand being the next best and perlite the poorest. Increased depth did not provide any clear indication of one material's superiority.
b) The perlite provided the least acceptable seedlings, within the three species tested, upon increase in cover depth. Grit and sand were very close in seedling quality, regardless of treatment of species.
c) The perlite cover proved to decrease seedling growth for all species, and especially Hw, as its depth was increased. The effects on growth of the grit and sand varied little from each other and such was the case even at increased cover depth.

RECOMMENDATIONS

1) While the sample seedlings were being processed for morphological assessment, it was noted that the treatments with 0.66 inch cover depth had plugs with greater compaction of soil mix, and a correspondingly heavier root system, than the treatments with 0.33 inch cover depth. This relation was also notable, and to a greater extent, between the treatments of 0.66 inch of cover and those of 1.00 inch of cover. It is a certainty that the styrobloeks were loaded without regard to the variation in dowelling depth required for the trial treatments. The resulting increase in plug compaction between the treatments have invalidated the results of this trial and, possibly, may explain some of the inconsistencies observed. Thus, it must be recommended that this trial be repeated.
APPENDIX I

WORKPLAN

1. Fertilizer Type -- all treatments solubly fertilized according to species schedules.

2. Sowing Dates -- Dfc sown March 19
   -- Sw sown March 22
   -- Hw sown March 29

3. Sowing and Handling -- Blocks were loaded, dowelled to appropriate treatment cavity depth, sown and covered by Kim BARTLETT and Rob HAGEL.

4. Measurements --
   a) germination counts for each treatment and replication at:
      - 2 weeks after sowing
      - 3 "
      - 4 "
      - 5 "
      - 6 "
   b) height measurements of 15 random seedlings per replication at 3 week intervals.
   c) morphological assessment of the same 15 seedlings at the termination of the test.
The material being used at the present time to cover seed in containers is granite grit supplied by International Marble and Stone Co. at a cost of $45.00 per ton f.o.b. Sirdar, B.C. Target Concrete Products Ltd. of Burnaby supply a washed coarse silicon sand at $25.00 per ton at their plant. Test work in 1975 indicated that this material could be used as an alternate cover to grit. Further investigation is required to confirm this and to determine if the depth of either sand or grit effects germination and growth of seedlings.

Another potential cover is perlite which is to be compared with the sand and grit.

Objective

To determine the effect of sand, grit and perlite seed covers of varying depths on seed germination and seedling growth.

Treatments

<table>
<thead>
<tr>
<th>Seed Cover Volume (2A Cavity)</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In.</td>
</tr>
<tr>
<td></td>
<td>.333</td>
</tr>
<tr>
<td></td>
<td>.666</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>
Codes

1st number - volume of cover in cu. cm.

2nd letter - cover material

S - Sand
G - Grit
P - Perlite

Seedlots

F 92H03/B1/2048/914M - Shawatum Creek
   Dewdney SZ - 1060
   Germination - 86%
   Total seeds per gm - 93
   Viable seeds per gm - 80

Sw 93G08/E3/1828/762M - Hixon Creek
   SZ - 6010
   Germination - 80%
   Total seeds per gm - 400
   Viable seeds per gm - 320

Hw 93M04/B3/1837/701M - Kitwanga
   SZ - 1150
   Germination - 63.5%
   Total seeds per gm - 649
   Viable seeds per gm - 412

Number of Blocks/Seedings

Sand - 3 treatments x 1-2A block x 3 reps x 3 species = 27 blocks
   = 6480 cavities

Grit - 3 treatments x 1-2A block x 3 reps x 3 species = 27 blocks
   = 6480 cavities

Perlite - 3 treatments x 1-2A block x 3 reps x 3 species = 27 blocks
   = 6480 cavities

Total 81 blocks
   = 19,440 cavities

Amount of Seed Required

F Lot 2048 (single sowing)
9 treatments x 3 reps x 240 cavities x 1 seed/cavity + 2% surplus = 6610 seeds
+ Control (no cover)
6610 seeds ÷ 93 = 71 gms.

Sw Lot 1828 (single sowing)
6610 seeds ÷ 400 = 17 gms.

Hw Lot 1837 (double sowing)
9 treatments x 3 reps x 240 cavities x 2 seeds/cavity + 2% surplus = 13,220 seeds
= 13,220 seeds ÷ 649 = 21 gms.

Cultural Methods

(1) Sow a definite number of seeds as given above in each cavity March 16th.

(2) Fertilize in accordance with the attached standard schedule.

Growing Location

Either the glass greenhouse or the plastic test house can be used for this test.

Measurements

(1) Germination counts for each treatment and replication to be made:

- 2 weeks after sowing
- 4 weeks after sowing
- 6 weeks after sowing

To make counting easier, germinants should be marked with coloured tooth picks representing germination period.

(2) The height of 15 random seedlings to be measured at 2-week intervals.

(3) Dry weights of tops and roots of the 15 random seedlings measured for height to be taken at termination of test.
(4) Diary to be kept given nutrient treatment dates, measurement dates and any significant information as to germination seedling growth, etc.
TARGET INDUSTRIAL SILICA SANDS
80 lbs. per Bag

PRODUCT DESCRIPTION

Industrial silica sands are sold in various sizings. These sands are suitable for sandblasting, ferro-cement work, epoxy concrete, and fillers for various usages.

QUALITY

Our various industrial silica sands comply with relevant Canadian Government Specifications Board, American Society for Testing Materials and American Standards Association Specifications. They are well shaped, accurately graded materials of high quality.

GRADATIONS AVAILABLE

1. **Coarse Industrial Sand**: 100% passing U.S.S. #8 sieve, and more than 95% retained on U.S.S. #16 sieve.

2. **Fine Industrial Sand**: 100% passing U.S.S. #12 sieve and more than 95% retained on U.S.S. #50 sieve.

3. **Super-fine Industrial Sand**: 100% passing U.S.S. #40 sieve and more than 95% retained on U.S.S. #200 sieve.

MINEROLOGY & CHEMISTRY

<table>
<thead>
<tr>
<th>Mineral</th>
<th>%</th>
<th>Chemicals</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartz</td>
<td>60</td>
<td>Silica</td>
<td>85</td>
</tr>
<tr>
<td>Feldspar</td>
<td>20</td>
<td>Calcium Oxide</td>
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</tr>
<tr>
<td>Chlorite</td>
<td>10</td>
<td>Alumina</td>
<td>8</td>
</tr>
<tr>
<td>Iron Oxide</td>
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<td>Iron Oxide</td>
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</tr>
<tr>
<td>Hornblende</td>
<td>5</td>
<td>Magnesium Oxide</td>
<td>2</td>
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QUANTITY REQUIREMENTS

Each bag contains 80 lbs. net weight.
DATE:  Feb. 25/76

FILE NO.  

SUBJECT:  Seed required for RN27044  
SEED COVER TEST  

ATTENTION OF:  Mary Hamilton  

REMARKS:  Please identify the following seed 
for sowing about Mar 16th or later.  

1)  F Lot 2048  (SINGLE SOWING)  
\[
\frac{6610 \text{ SEEDS}}{93} = 71.9 \text{ uv.} + 75.9 \text{ uv.}  
\]

2)  SW Lot 1828  (SINGLE SOWING)  
\[
\frac{6610 \text{ SEEDS}}{100} = 17.9 \text{ uv.} + 20.9 \text{ uv.}  
\]

3)  NW Lot 1837  (DOUBLE SOWING)  
\[
\frac{13220 \text{ SEEDS}}{649} = 21.9 \text{ uv.} + 25.9 \text{ uv.}  
\]

[Signature]