SOIL AERATION TRIAL

Working Plan
1985

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From: Silviculture Branch

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Subject: Sx 85209 Q Soil Aeration Trial

Introduction

Improvements in soil mixing in 1984 apparently did not improve the quality of stock or the per cent of request delivered in interior spruce. Many root systems fail to develop any heavy rooting and plug quality is the main cause of culling. We continue to observe the phenomenon of vigorous root development on plugs that have been pulled and replaced in containers. If soil aeration is a problem, it may be due to the higher water retention of Fisons-Western peat moss from Seba Beach, Alta., or to the basic design of styroblocl, containers. This trial will attempt to determine if increased soil aeration will enhance root activity and dry weights.

Experimental Design

Each treatment will consist of 3 - 313A Styroblox. Treatments will be greenhouse started before being exposed to full light in early summer. Most treatments will be based on standard 3:1 Peat-vermiculite growing medium containing 3 kg/m³ 10 mesh and finer dolomite lime. Some treatments using materials supplied by Fisons will be based on Manitoba peat, and commercial pre-mixes containing perlite. Perlite trials in the past have not enhanced growth, however they probably have not been watered to the requirements of this faster drying mix. This trial will attempt to water perlite mixes adequately. Fisons Western Seba Beach peat will be used in all treatments unless stated otherwise.

The seedlots to be used are:

Sw (SZ 3110) 93H11/B3/4177/.914  89%
Cw (SZ 1070) 92J11/B3/3546/.86  91%
Fdc (SZ 1090) 92M10/B3/7752/.46  92%

All treatments should be double sown and thinned to one seedling per cavity. All treatments will be fertilized with Green Valley products:

Starter:  10-51-16 @ 75 ppm N
Grower:  20-20-20 @ 125 ppm N
Finisher: 10-51-16 @ 75 ppm N
1. Standard soil mix loaded to standard 0.09 g/ml compaction by dry weight.

2. Standard soil mix loaded to 0.075 g/ml compaction by dry weight.

3. Standard soil mix using Fisons Western Manitoba peat.

4. Growing medium comprised of Fisons Western Seedling Mix.

5. Growing medium comprised of Fisons Western Basic Mix.

6. Growing medium comprised of Fisons Western Complete Mix.

7. Standard growing medium with a core of soil removed from the center of the plug from below. This core should extend to within 2 cm of the upper soil surface.

8. Medium comprised of 3 peat to 1 perlite. This treatment should be watered and fertilized to its own drying regime requirements.

9. Medium comprised of 3 peat to 1 perlite which will be watered and fertilized with the same frequency as the control.

10. Standard growing medium having air delivery tubes up the center of each cavity from below. Air will be supplied under pressure to positively aerate the interior of the growing medium.

11. Standard soil mix. Every second fertilizer application will be replaced with a commercial fertilizer called "Oxygen Plus".

12. PSB 313A blocks whose total height has been reduced by 1 cm.

13. PSB 313A blocks whose total height has been reduced by 2 cm.

14. PSB 313A blocks whose total height has been reduced by 3 cm.

15. PSB 313A blocks whose total height has been reduced by 4 cm.

16. PSB 313A blocks whose total height has been reduced by 5 cm.
Requirements

For Each Specie

16 treatments x 3 reps = 48 - 313A Styroblocks
x 198 cavities/block = 9504 cavities
x 2 seeds/cavity = 19000 seeds

Sw 4177 @ 454 seeds/gram = 45 grams
Cw 3546 @ 796 seeds/gram = 27 grams
Fdc 7752 @ 104 seeds/gram = 190 grams

Total Block Requirements

16 treatments x 3 reps x 3 species = 144 - 313A Styroblocks
- 4 treatments x 3 reps x 3 spp = 36 blocks loaded to standard .09 g/ml density
- 1 treatment x 3 reps x 3 spp = 9 blocks reduced in height 1 cm.
  Standard density.
- 1 treatment x 3 reps x 3 spp = 9 blocks reduced in height 2 cms.
  Standard density.
- 1 treatment x 3 reps x 3 spp = 9 blocks reduced in height 3 cms.
  Standard density.
- 1 treatment x 3 reps x 3 spp = 9 blocks reduced in height 4 cms.
  Standard density.
- 1 treatment x 3 reps x 3 spp = 9 blocks reduced in height 5 cms.
  Standard density.
- 1 treatment x 3 reps x 3 spp = 9 blocks loaded to .075 g/ml density.
- 1 treatment x 3 reps x 3 spp = 9 blocks using Manitoba peat.
- 1 treatment x 3 reps x 3 spp = 9 blocks using Seedling mix.
- 1 treatment x 3 reps x 3 spp = 9 blocks using Basic mix.
- 1 treatment x 3 reps x 3 spp = 9 blocks using Complete mix.
- 2 treatments x 3 reps x 3 spp = 18 blocks 3 peat: 1 perlite
  144 blocks total

Observations Required

In July, or when plugs are extractable, 5 plugs per treatment should be removed and observations of root activity recorded. In late 1985, all treatments will be processed for morphological description.

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