SX 85208Q

EXPERIMENTAL FERTILIZER TRIAL

Working Plan
1985

G. Matthews
To: A.E. McDonald

From: Silviculture Branch
Date: 85.02.25
File: 955-21

Subject: SX85208 Q Experimental Fertilizer Trial

Introduction

The 1985 fertilizer trial will confirm results obtained in past years with spruce, will test the suitability of a new low phosphorous experimental fertilizer, and will duplicate nursery use of Osmocote including supplementary use of soluble fertilizers. The trial will also include western red cedar in order to provide cultural guidelines for a specie of increasing importance.

Experimental Design

Each treatment will consist of 5-313A Styroblocks. Treatments should be greenhouse started before being exposed to full light in early summer. Spruce should be sown in early March and cedar in mid-March. All treatments will be based on standard 3 peat:1 vermiculite growing medium containing 3 kg/m³ Green Valley 10 mesh and finer dolomite lime. The medium will not contain trace elements except for 3 Osmocote treatments.

The seedlots to be used are:
Sw (SZ 3110) 93H1/1B3/4177/.914 89%
Cw (SZ 1070) 92J1/1B3/3546/.86 91%

All treatments should be double sown and thinned to one seedling per cavity.

Definitions

Fertilizers will be applied containing standard levels of trace elements (STE) or with special experimental levels of trace elements (XTE), as in the following table.
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<th>Fertilizer</th>
<th>Mg</th>
<th>S</th>
<th>Fe</th>
<th>Cu</th>
<th>Mn</th>
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*Green Valley 20-20-20 and 20-10-20 have the same Standard Trace Element (STE) and Experimental Trace Element (XTE) levels as 10-51-16.
The manufacturers recommended rate for STEM is 0.5% of the weight of fertilizer applied. The rate for This - nursery, ornamental and turf mix, which is a liquid, is a dilution of 1:5000. In this trial the rates may be adjusted to make application levels comparable. FTE 503 is incorporated into the soil medium at 0.13 kg/m³. Osmocote 18-6-12 (9 month release) will be incorporated into the soil medium at 6.5 kg/m³.

Starter fertilizers will be applied for a short time (2-3 weeks) after the initiation of secondary needles. Grower fertilizers will be used until height is achieved. Bud set will be accomplished by discontinuing photoperiod lighting (19 hours), by drought stressing, and changing to finisher fertilizer will depend on the stage of growth of each treatment.

Osmocote treatments, where supplemental with soluble fertilizer, will be supplemented with Green Valley starter, grower or finisher containing standard trace elements.

### Treatments

#### Treatment 1. Control. Standard Green Valley Regime with FeSO4
- **Starter:** 10-51-16 at 75 ppm N (STE)
- **Grower:** 20-20-20 at 125 ppm N (STE)
- **Finisher:** 10-51-16 at 75 ppm N (STE)
- **Amendment:** Ferrous sulphate every second week at 150 g/1000 l.

#### 2. Green Valley - No FeSO4
- **Starter:** 10-51-16 at 75 ppm N (STE)
- **Grower:** 20-20-20 at 125 ppm N (STE)
- **Finisher:** 10-51-16 at 75 ppm N (STE)

#### 3. Green Valley + STEM
- **Starter:** 10-51-16 at 75 ppm N (STE)
- **Grower:** 20-20-20 at 125 ppm N (STE)
- **Finisher:** 10-51-16 at 75 ppm N (STE)
- **Amendment:** Incorporate STEM at % of fertilizer weight with every application.

#### 4. Green Valley + This
- **Starter:** 10-51-16 at 75 ppm N (STE)
- **Grower:** 20-20-20 at 125 ppm N (STE)
- **Finisher:** 10-51-16 at 75 ppm N (STE)
- **Amendment:** Incorporate This at a dilution of 1: with every fertilizer application.

#### 5. Green Valley With Experimental Trace Elements
- **Starter:** 10-51-16 at 75 ppm N (XTE)
- **Grower:** 20-20-20 at 125 ppm N (XTE)
- **Finisher:** 10-51-16 at 75 ppm N (XTE)
6. Green Valley Low Phosphorous Grower with Standard Trace Elements
   Starter: 10-51-16 at 75 ppm N (STE)
   Grower: 20-10-20 at 125 ppm N (STE)
   Finisher: 10-51-16 at 75 ppm N (STE)

7. Green Valley Low Phosphorous Grower With Experimental Trace Elements
   Starter: 10-51-16 at 75 ppm N (XTE)
   Grower: 20-10-20 at 125 ppm N (XTE)
   Finisher: 10-51-16 at 75 ppm N (XTE)

8. Green Valley Grower Only, with Standard Trace Elements
   Starter: 20-20-20 at 75 ppm N (STE)
   Grower: 20-20-20 at 125 ppm N (STE)
   Finisher: 20-20-20 at 75 ppm N (STE)

9. Green Valley Grower Only, with Experimental Trace Elements
   Starter: 20-20-20 at 75 ppm N (XTE)
   Grower: 20-20-20 at 125 ppm N (XTE)
   Finisher: 20-20-20 at 75 ppm N (XTE)

10. Green Valley Low Phosphorous Grower Only, with Standard Trace Elements
    Starter: 20-10-20 at 75 ppm N (STE)
    Grower: 20-10-20 at 125 ppm N (STE)
    Finisher: 20-10-20 at 75 ppm N (STE)

11. Green Valley Low Phosphorous Grower Only, With Experimental Trace Elements
    Starter: 20-10-20 at 75 ppm N (XTE)
    Grower: 20-10-20 at 125 ppm N (XTE)
    Finisher: 20-10-20 at 75 ppm N (XTE)

12. Green Valley Grower Only at High N, with Standard Trace Elements
    Starter: 20-20-20 at 125 ppm N (STE)
    Grower: 20-20-20 at 125 ppm N (STE)
    Finisher: 20-20-20 at 125 ppm N (STE)

13. Green Valley Grower Only at High N, with Experimental Trace Elements
    Starter: 20-20-20 at 125 ppm N (XTE)
    Grower: 20-20-20 at 125 ppm N (XTE)
    Finisher: 20-20-20 at 125 ppm N (XTE)

14. Green Valley Regime at High N, with Standard Trace Elements
    Starter: 10-51-16 at 125 ppm N (STE)
    Grower: 20-20-20 at 125 ppm N (STE)
    Finisher: 10-51-16 at 125 ppm N (STE)
15. Green Valley Regime at High N, with Experimental Trace Elements
   Starter: 10-51-16 at 125 ppm N (XTE)  
   Grower: 20-20-20 at 125 ppm N (XTE)  
   Finisher: 10-51-16 at 125 ppm N (XTE)

16. Peters Forestry ('83) Regime
   Starter: 7-40-17 at 75 ppm N (STE)  
   Grower: 20-7-19 at 125 ppm N (STE)  
   Finisher: 4-25-35 at 75 ppm N (STE)

17. Peters Forestry ('83) + STEM
   Starter: 7-40-17 at 75 ppm N (STE)  
   Grower: 20-7-19 at 125 ppm N (STE)  
   Finisher: 4-25-35 at 75 ppm N (STE)  
   Amendment: Incorporate STEM at % of fertilizer weight with every application.

18. Peters Forestry ('83) Grower Only, with Standard Trace Elements
   Starter: 20-7-19 at 75 ppm N (STE)  
   Grower: 20-7-19 at 125 ppm N (STE)  
   Finisher: 20-7-19 at 75 ppm N (STE)

19. Peters Forestry ('83) Grower only, at High N with standard Trace Elements
   Starter: 20-7-19 at 125 ppm N (STE)  
   Grower: 20-7-19 at 125 ppm N (STE)  
   Finisher: 20-7-19 at 125 ppm N (STE)

20. Peters Experimental Grower only, with standard Trace Elements
    Starter: 10-15-20 at 75 ppm N (STE)  
    Grower: 10-15-20 at 125 ppm N (STE)  
    Finisher: 10-15-20 at 75 ppm N (STE)

21. Peters Experimental Grower only, with Experimental Trace Elements at Rate 1
    Starter: 10-15-20 at 75 ppm N (XTE) (R1)  
    Grower: 10-15-20 at 125 ppm N (XTE) (R1)  
    Finisher: 10-15-20 at 75 ppm N (XTE) (R1)

22. Peters Experimental Grower only, with Experimental Trace Elements at Rate 2
    Starter: 10-15-20 at 75 ppm N (XTE) (R2)  
    Grower: 10-15-20 at 125 ppm N (XTE) (R2)  
    Finisher: 10-15-20 at 75 ppm N (XTE) (R2)

23. Peters Experimental Grower only, at High N with Standard Trace Elements
    Starter: 10-15-20 at 125 ppm N (STE)  
    Grower: 10-15-20 at 125 ppm N (STE)  
    Finisher: 10-15-20 at 125 ppm N (STE)
24. Peters Experimental Grower only, at High N with Experiment Trace Elements at Rate 1
   Starter: 10-15-20 at 125 ppm N (XTE) (R1)
   Grower: 10-15-20 at 125 ppm N (XTE) (R1)
   Finisher: 10-15-20 at 125 ppm N (XTE) (R1)

25. Peters Experimental Grower only, at High N with Experimental Trace Elements at Rate 2
   Starter: 10-15-20 at 125 ppm N (XTE) (R2)
   Grower: 10-15-20 at 125 ppm N (XTE) (R2)
   Finisher: 10-15-20 at 125 ppm N (XTE) (R2)

26. Plant Prod Forestry ('83) Regime
   Starter: 11-41-8 at 75 ppm N (STE)
   Grower: 20-8-20 at 125 ppm N (STE)
   Finisher: 8-20-30 at 75 ppm N (STE)

27. Plant Prod Forestry ('83) + STEM
   Starter: 11-41-8 at 75 ppm N (STE)
   Grower: 20-8-20 at 125 ppm N (STE)
   Finisher: 8-20-30 at 75 ppm N (STE)
   Amendment: Incorporate STEM at % of fertilizer weight with every application.

28. Plant Prod Forestry Grower Only, with Standard Trace Elements
   Starter: 20-8-20 at 75 ppm N (STE)
   Grower: 20-8-20 at 125 ppm N (STE)
   Finisher: 20-8-20 at 75 ppm N (STE)

29. Plant Prod Forestry Grower only, with Experimental Trace Elements
   Starter: 20-8-20 at 75 ppm N (XTE)
   Grower: 20-8-20 at 125 ppm N (XTE)
   Finisher: 20-8-20 at 75 ppm N (XTE)

30. Plant Prod Forestry Grower only, at High N with Standard Trace Elements
    Starter: 20-8-20 at 125 ppm N (STE)
    Grower: 20-8-20 at 125 ppm N (STE)
    Finisher: 20-8-20 at 125 ppm N (STE)

31. Coast Agri Regime with Standard Trace Elements
    Starter: 12-45-10 at 75 ppm N (STE)
    Grower: 16-20-20 at 125 ppm N (STE)
    Finisher: 12-20-24 at 75 ppm N (STE)
    (12-20-24 = 1 part 12-45-10; 2 parts 12-8-31).

32. Coast Agri Grower only with Standard Trace Elements
    Starter: 16-20-20 at 75 ppm N (STE)
    Grower: 16-20-20 at 125 ppm N (STE)
    Finisher: 16-20-20 at 75 ppm N (STE)
33. Coast Agri Grower only, at High N with Standard Trace Elements
   Starter: 16-20-20 at 125 ppm N (STE)
   Grower: 16-20-20 at 125 ppm N (STE)
   Finisher: 16-20-20 at 125 ppm N (STE)

34. Osmocote 18-6-12 (9 month) at 6.5 kg/m³ and FTE 503 at 0.13 kg/m³. No supplements.
   Starter: None
   Grower: None
   Finisher: None

35. Osmocote 18-6-12 (9 month) at 6.5 kg/m³ and FTE 503 at 0.13 kg/m³. Supplement with Starter and Finisher.
   Starter: 10-51-16 at 75 ppm N (STE)
   Grower: None
   Finisher: 10-51-16 at 75 ppm N (STE)

36. Osmocote 18-6-12 (9 month) at 6.5 kg/m³ and FTE 503 at 0.13 kg/m³. Supplement with Starter, Grower, and Finisher.
   Starter: 10-51-16 at 75 ppm N (STE)
   Grower: 20-20-20 at 125 ppm N (STE)
   Finisher: 10-51-16 at 75 ppm N (STE)

37. Osmocote 18-6-12 at 6.5 kg/m³ with no FTE and no Supplement.
   Starter: None
   Grower: None
   Finisher: None

38. Osmocote 18-6-12 at 6.5 kg/m³ with No FTE. Supplement with Starter and Finisher.
   Starter: 10-51-16 at 75 ppm N (STE)
   Grower: None
   Finisher: 10-51-16 at 75 ppm N (STE)

39. Osmocote 18-6-12 at 6.5 kg/m³ with no FTE. Supplement with Starter, Grower and Finisher.
   Starter: 10-51-16 at 75 ppm N (STE)
   Grower: 20-20-20 at 125 ppm N (STE)
   Finisher: 20-51-16 at 75 ppm N (STE)

40. Osmocote 18-6-12 at 6.5 kg/m³ with no FTE, but with STEM. No supplements
   Starter: None
   Grower: None
   Finisher: None
   Amendment: Apply STEM with each watering at the same rate as in other STEM amendments.
41. Osmocote 18-6-12 at 6.5 kg/m³ with no FTE, but with STEM.
Supplement with Starter and Finisher.
Starter: 10-51-16 at 75 ppm N (STE)
Grower: None
Finisher: 10-51-16 at 75 ppm N (STE)
Amendment: Apply STEM with each watering at the same rate as in other STEM amendments.

42. Osmocote 18-6-12 at 6.5 kg/m³ with no FTE, but with STEM.
Supplement with Starter, Grower and Finisher.
Starter: 10-51-16 at 75 ppm N (STE)
Grower: 20-20-20 at 125 ppm N (STE)
Finisher: 10-51-16 at 75 ppm N (STE)
Amendment: Apply STEM with each watering at  % of fertilizer weight.
### Summary of Fertilizer Treatments

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<tr>
<th>Treatment Description</th>
<th>ppm N</th>
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<tr>
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<tr>
<td>1. Green Valley + FeSO4 (STE)** - Control</td>
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<td>2. Green Valley Regime (STE)</td>
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<td>3. Green Valley + STEM (%)(STE)</td>
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<td>5. Green Valley Regime (XTE)</td>
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<td>16. Peters Forestry ('83) Regime (STE)</td>
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<td>17. Peters Forestry ('83) Regime + STEM (%) (STE)</td>
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<td>26. Plant Prod Forestry ('83) Regime (STE)</td>
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<td>27. Plant Prod Forestry ('83) + STEM (%) (STE)</td>
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<td>28. Plant Prod 20-8-20 only (STE)</td>
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<td>29. Plant Prod 20-8-20 only (XTE)</td>
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<td>30. Plant Prod 20-8-20 only (STE) High N</td>
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*S - Starter  **STE - Standard Trace Elements  
G - Grower  XTE - Experimental Trace Elements  
F - Finisher
| 31. Coast Agri Regime (STE) | SGF 75 125 75 |
| 32. Coast Agri 16-20-20 only (STE) | G 75 125 75 |
| 33. Coast Agri 16-20-20 only (STE) High N | G 125 125 125 |
| 34. Osmocote 18-6-12 + FTE | - 0 0 0 |
| 35. Osmocote 18-6-12 + FTE | SF 75 0 75 |
| 36. Osmocote 18-6-12 + FTE | SGF 75 125 75 |
| 37. Osmocote 18-6-12 No FTE | - 0 0 0 |
| 38. Osmocote 18-6-12 No FTE | SF 75 0 75 |
| 39. Osmocote 18-6-12 No FTE | SGF 75 125 75 |
| 40. Osmocote 18-6-12 No FTE + STEM (%) | - 0 0 0 |
| 41. Osmocote 18-6-12 No FTE + STEM (%) | SF 75 0 75 |
| 42. Osmocote 18-6-12 No FTE + STEM (%) | SGF 75 125 75 |
Requirements

For Each Species

42 treatments x 5 reps = 210 - 313A Styroblocks
x 198/block = 41580 cavities
x 2 seeds/cavity = 83160 seeds

Spruce 4177 @ 454 seeds/gram = 185 grams
Cedar  3546 @ 796 seeds/gram = 110 grams

Total Requirements

- 330 PSB 313A loaded with 3:1 Peat-vermiculite containing 3 kg/m³
  Green Valley 10 mesh and finer dolomite lime.

- 30 PSB 313A loaded with 3:1 Peat-vermiculite containing 3 kg/m³
  Green Valley 10 mesh and finer dolomite, 6.5 kg/m³ Osmocote
  18-6-12 and 0.13 kg/m³ FTE 503.

- 60 PSB 313A loaded with 3:1 Peat-vermiculite containing 3 kg/m³
  Green Valley 10 mesh and finer dolomite, 6.5 kg/m³ Osmocote
  18-6-12, but no FTE.

Observations Required

Samples for tissue analysis should be submitted at the change from
"Grower" to "Finisher" fertilizer applications and at the conclusion of
fertilizer applications. All treatments will be processed for morphological
description in late 1985. Subjective observations such as differences in
color and difficulty in achieving terminal bud set should be recorded.

G. Matthews
Silviculture Branch

GM/1j