LIME AMENDMENT TRIAL

FINAL REPORT

R.G. Matthews 1983
REPORT SX 82209Q

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TITLE Lime Amendment Trial

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Final Report
SX 822090
Lime Amendment Trial

Objective

A finer lime source, Greenleaf, was compared to the standard 12 mesh and finer Green Valley dolomite. Additional applications of ferrous sulphate and manganese sulphate were assessed for their ability to correct chlorosis.

Experimental Design

Each treatment consisted of 3 PSB 211 Styroblocks. Seedlots tested were lodgepole pine 2620 and coastal Douglas fir 2048. Treatments 1-24 are P1, treatments 25-48 are Douglas fir.

Treatment 1
Control. Standard 3:1 peat-vermiculite containing 3 kg/m³ 12 mesh and finer Green Valley dolomite. This treatment received standard soluble fertilizers but no iron or manganese supplements.

Treatment 2
Same as Treatment 1 except ferrous sulphate was applied bi-weekly at 150 g/1000 l = 30 ppm Fe.

Treatment 3
Same as Treatment 1 except manganese sulphate was applied bi-weekly at 50 g/1000 l = 12 ppm Mn.

Treatment 4
Same as Treatment 1 except both manganese sulphate and ferrous sulphate were applied bi-weekly.

Treatments 5-8
Repeated Treatments 1-4 using Green Valley 12 mesh and finer dolomite at 5 kg/m³.

Treatments 9-12
Repeated Treatments 1-4 using Green Valley 12 mesh and finer dolomite at 1 kg/m³.

Treatments 13-16
Repeated Treatments 1-4 using Greenleaf dolomite at 3 kg/m³.

Treatments 17-20
Repeated Treatments 1-4 using Greenleaf dolomite at 5 kg/m³.

Treatments 21-24
Repeated Treatments 1-4 using Greenleaf dolomite at 1 kg/m³.

Treatments 1-24; P1 2620
Treatments 25-48 repeat treatments 1-24 using Fdc 2048.
Observations were made of general vigour and color. Samples were assessed for dry weights at the end of the growing season.

Results

Bar graphs of the final dry weights are attached. During the growing season it was observed that color and vigour were improved with additional applications of either ferrous sulphate or manganese sulphate and the darkest color was achieved when both were applied.

Lodgepole Pine

With both Green Valley and Greenleaf lime, height growth and top weights were increased dramatically with additional applications of ferrous sulphate or both ferrous and manganese sulphates. This effect was less pronounced with manganese sulphate by itself. There was no apparent effect on growth from using 3, 5 or 1 kg/m³ of lime, either Green Valley or Greenleaf.

Douglas fir

The same trend to increased heights with FeSO₄ applications occurred as in pine, but with smaller percentage increases. The effect of lime type and rate on root weights was inconsistent.

Conclusions

The effect on height growth observed with ferrous sulphate applications also occurred in the fertilizer trial SX 82206Q. This is likely a phenomenon related to the use of Green Valley fertilizers and has no relation to lime rates utilized in this trial.

The relationship of lime type and rate, soil pH, water pH, seedling color and dry weights continues to be confounding. Increased lime rates above 3 kg/m³ and finer ground limes often result in high soil pH and classic iron chlorosis symptoms. Tendencies to light foliage color in this trial did not particularly result in reductions in root weights.

In coastal nurseries having good quality water, Greenleaf lime could be substituted for Green Valley at 3 kg/m³ or less. In interior nurseries or nurseries having high calcium and magnesium content in their water, Greenleaf lime should be introduced more continuously and at lower rates.

Although the addition of ferrous sulphate has been useful in maintaining good color and preventing iron chlorosis, its effect on morphology must be questioned. Often, increases in heights are undesirable, especially if there is no proportionate increase in root weights. If the use of lower lime rates can avoid chlorosis problems while producing an appropriate soil pH, it may be advantageous to eliminate ferrous sulphate applications, even if the color of crops is less pleasing aesthetically.

G. Matthews
Nursery: PFRC
Seedlot: 2048
Reg. No.: 1060 92H03/81/2048/0.91
Facility: Outside Compound
Sown: May 21, 1982
Misc.: Treatments 25 thru 36

Random Sample Height
Static Sample Height
Root Collar Diameter
Top Weight
Root Weight

Height (cm)
Top Weight (g)

Treatment
F.S. 734
25 26 27 28 29 30 31 32 33 34 35 36
RNX 82209
Nursery: PFRC
Seedlot: Fs. 2048
Reg. No.: 1060 92H03/B/2048/0.91
Facility: Outside Compound
Sown: May 21, 1982
Misc.: Treatments: 37 thru 48

Random Sample Height
Static Sample Height
Root Collar Diameter

Height (cm)

Top Weight
Root Weight

Top Weight (g)

F.S. 734
37 38 39 40 41 42 43 44 45 46 47 48

Treatment