#### PURPOSE:

Evaluate plant establishment and growth results under field conditions in Oregon of two Christmas tree species: Noble Fir (Abies procera) and Douglas Fir (Pseudotsuga menziesii) comparing Suståne 4-6-4 all-organic Root Zone Feeder Pack and Suståne 16-4-8 6-month Root Zone Feeder Pack fertilizer formulations (each at 21 grams per seedling) against an untreated control.

## TEST SITE:

John Tillman Farm, Northwest Plantations, Elma, Washington

Field demonstrations examined the efficacy of 4-6-4 Organic and 16-4-8 6-month Organic + Controlled Release Root Zone Feeder Pack fertilizers. Each Feeder Pack contains 21 grams of fertilizer. The packs are water-permeable and biodegradable paper. One Feeder Pack per seedling was planted in the tree root zone during mechanical planting of Noble Fir and Douglas Fir seedlings in early March.

# CONCLUSIONS:

- 1. Installation of Suståne Root Zone Feeder Packs (RZFP) at planting are safe on seedling tree roots. (See Figure 1.)
- 2. RZFP's significantly enhanced seedling root mass and new leader growth. (See Figure 1.)
- 3. Difference in growth between the RZFP and the untreated control was apparent and significant at 5 months after planting. (See Figure 2.)
- 4. Individual growth differences were as much as 385% between the RZFP-treated seedling and the untreated control (i.e. 6.75 inches new growth vs. 1.65 inches new growth) at 5 months after planting. (See Figures 3 and 6.)
- 5. By the end of Year 1 growing season Sustane 4-6-4 RZFP demonstrated 214% growth increase of Noble Fir leader and Sustane 16-4-8 RZFP demonstrated a 245% increase growth compared against the untreated control (4.7 inches, 5.4 inches and 2.2 inches respectively) averaged over 14 replications. (See Figure 6.)
- 6. Top performing seedlings generated as much as 23 to 24 inches of new growth in Year 1. (See Figure 8.)
- 7. Tree canopies after three years growth (following only one 21-gram RZFP applied at planting) increased about 200% over the untreated control. (See Figure 7.)
- 8. Sustane biodegradable 21-gram Root Zone Feeder Packs applied one time at planting reduced time to harvest by two to three years compared against non-fertilized seedlings.
- 9. Fertilizer treatment was confined to the individual tree root zone, reducing treatment costs for labor, fertilizes and herbicides and minimizing weed pressure in the non-target area between rows.



# **5 MONTHS AFTER PLANTING**

- 1. Installation of Suståne Root Zone Feeder Packs (RZFP) at planting are safe on seedling tree roots. (See Figure 1.)
- 2. RZFP's significantly enhanced seedling root mass and new leader growth. (See Figure 1.)
- 3. Difference in growth between the RZFP and the untreated control was apparent and significant at 5 months after planting. (See Figure 2.)

FIGURE 1 - ROOT FORMATION AND GROWTH



UNTREATED CONTROL



SUSTÅNE TREATED

# FIGURE 2 - PLANT COLORATION



UNTREATED CONTROL



SUSTÅNE TREATED

4. Individual growth differences were as much as 385% between the RZFP-treated seedling and the untreated control (i.e. 6.75 inches new growth vs. 1.65 inches new growth) at 5 months after planting. (See Figures 3 and 4.)





**UNTREATED CONTROL: 1.75" GROWTH** 

SUSTÅNE TREATED: 6.75" GROWTH

FIGURE 4 - DOUGLAS FIR - PHOTOS TAKEN 5 MONTHS AFTER PLANTING



UNTREATED CONTROL

SUSTÅNE TREATED

FIGURE 5 - DOUGLAS FIR - PHOTOS TAKEN 5 MONTHS AFTER PLANTING



# UNTREATED CONTROL ROW

SUSTÅNE TREATED ROW

5. By the end of Year 1 growing season Sustane 4-6-4 RZFP demonstrated 214% growth increase of Noble Fir leader and Suståne 16-4-8 RZFP demonstrated a 245% increase growth compared against the untreated control (4.7 inches, 5.4 inches and 2.2 inches respectively) averaged over 14 replications. (See Figure 6.)

FIGURE 6 - DOUGLAS FIR - PHOTOS TAKEN 5 MONTHS AFTER PLANTING



SUSTÅNE 4-6-4 RZFP TREATED



SUSTÅNE 16-4-8 RZFP TREATED

6. Tree canopies after three years growth (following only one 21-gram RZFP applied at planting) increased about 200% over the untreated control. (See Figure 7.)



Figure 7: Photo taken 3 years after planting. Side by side comparison with UNTREATED trees in the left row, Suståne TREATED trees in the right row.

# **One Year Growth Results on Noble Fir**

Suståne Fertilizer Planter Pack Trials

14 Trees Per Row ■ Total Leader Length Year 1

John Tillman Farm, Northwest Plantations, Elma, Washington



#### **FIGURE 8 - TOP PERFORMERS**



SUSTÅNE 16-4-8 RZFP - 23 INCHES NEW GROWTH FIRST YEAR



SUSTÅNE 4-6-4 RZFP - 24 INCHES NEW GROWTH FIRST YEAR