

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 Sustane 4-6-4 all-organic Root Zone Feeder Pack and Sustane 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 Sustane 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 6.)
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, fertilizers and herbicides and minimizing weed pressure in the non-target area between rows.



5 MONTHS AFTER PLANTING

FIGURE 1 - ROOT FORMATION AND GROWTH



UNTREATED CONTROL



SUSTÅNE TREATED

FIGURE 2 - PLANT COLORATION



UNTREATED CONTROL



SUSTÅNE TREATED

FIGURE 3 - NOBLE FIR - PHOTOS TAKEN 5 MONTHS AFTER PLANTING



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

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



SUSTÅNE 4-6-4 RZFP TREATED



SUSTÅNE 16-4-8 RZFP TREATED



**UNTREATED
CONTROL ROW**

**SUSTÅNE
TREATED ROW**

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

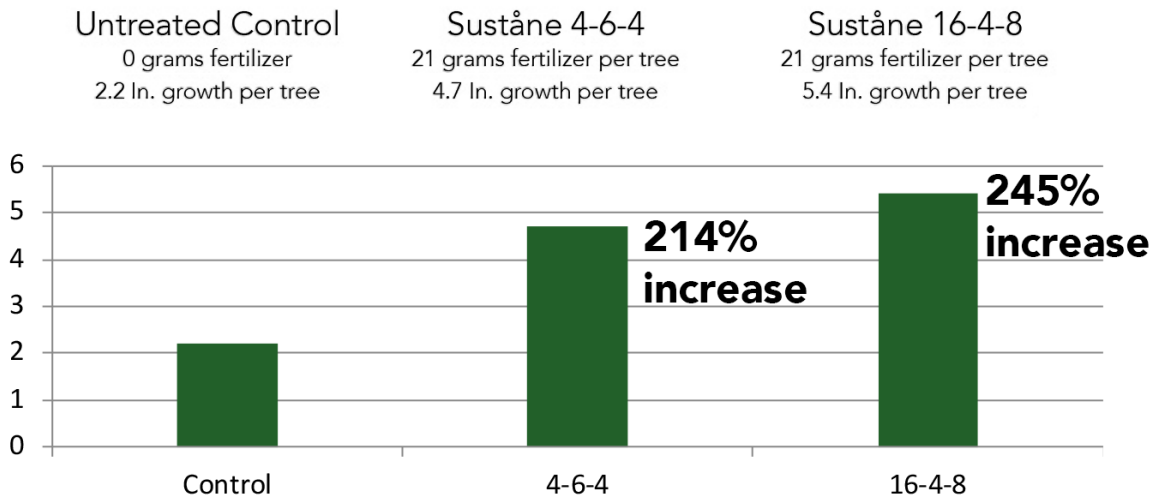


FIGURE 8 - TOP PERFORMERS



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



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



Benefits of Natural Organic 4-6-4 Sustâne® Root Zone Feeder Packs

- Assures controlled dose applications
- Can be used to brew a high-quality compost tea.
- Easy and safe to use.
- Made from Sustâne nutrient-dense compost-based fertilizer
- One to two applications per plant per growing season.
- Low burn potential, nutrients release gradually over time.
- In permeable biodegradable paper filter packets.
- No measuring, no special equipment, no waste.
- For use with all types of flowers, trees, and shrubs
- Conveniently feeds plants in pots and outdoor beds
- Feeds and activates beneficial microbes that improve nutrient availability to plants
- Promotes healthy soils which may suppress soil-borne diseases and pathogens
- Permeable biodegradable paper filter packets

4-6-4 Root Zone Feeder Pack Guaranteed Analysis

Total Nitrogen (N).....	4%
0.4% Ammoniacal Nitrogen	
0.4% Water Soluble Organic Nitrogen	
3.2% Water Insoluble Organic Nitrogen*	
Available Phosphate (P ₂ O ₅).....	6%
Soluble Potash (K ₂ O).....	4%
Calcium (Ca).....	4%

Derived from aerobically composted turkey litter, feather meal, and sulfate of potash.

**3.2% slowly available nitrogen derived from aerobically composted turkey litter and feather meal*

Also contains non-plant food ingredients:

Contains 50,000 Colony Forming Units (CFU's) per gram of the following species:

<i>Bacillus amyloliquefaciens</i>	10,000 CFU's per gram
<i>Bacillus subtilis</i>	10,000 CFU's per gram
<i>Bacillus pumilus</i>	10,000 CFU's per gram
<i>Bacillus licheniformis</i>	10,000 CFU's per gram
<i>Bacillus megaterium</i>	10,000 CFU's per gram

4-6-6 Natural & Organic Root Zone Feeder Packs

Item ID: 80-20-2020

Package Size (50) 21gram bags

Units / Case 5 Bags (50) /case (250 paks per case)

Units / Pallet 96 cases / pallet



Benefits of Natural Organic 4-6-4 Sustane® Root Zone Feeder Packs

- For use with all types of flowers, trees, and shrubs
- 50% Sustane All Natural Nutrient-Dense Compost Based Fertilizer
- 50% coated 8-month Controlled Release Fertilizers
- Feeds and activates beneficial microbes that improve nutrient availability to plants
- Promotes healthy soils which may suppress soil-borne diseases and pathogens
- No measuring, no special equipment, no waste, easy and safe to use
- Assures controlled dose applications
- One application per plant per growing season
- Low burn potential, nutrients release gradually over time.
- Conveniently feeds plants in pots and outdoor beds
- Permeable biodegradable paper filter packets

16-4-8 Root Zone Feeder Pack Guaranteed Analysis

Total Nitrogen (N).....	16%
0.2% Ammoniacal Nitrogen*	
1.8% Nitrate Nitrogen*	
2.6% Water Insoluble Nitrogen**	
11.0% Urea Nitrogen*	
0.4% Other Water Soluble Nitrogen	
Available Phosphate (P ₂ O ₅).....	4%
Soluble Potash (K ₂ O).....	8%
Calcium (Ca).....	2.75%
Magnesium (Mg).....	0.75%
Sulfur (S).....	1.00%
Iron (Fe).....	0.25%
Manganese (Mn).....	0.05%

Derived from aerobically composted turkey litter, polymer coated urea, polymer coated potassium nitrate, polymer coated monoammonium phosphate, ureaform, feather meal, and sulfate of potash.

*12.7% controlled release nitrogen derived from polymer coated urea, polymer coated potassium nitrate, and polymer coated monoammonium phosphate.

**2.6% slow release nitrogen derived from aerobically composted turkey litter, ureaform, and feather meal.

16-4-8 Root Zone Feeder Packs

Item ID: 80-50-2020

Package Size (50) 21gram bags

Units / Case 5 Bags (50) /case (250 paks per case)

Units / Pallet 96 cases / pallet