



PotlatchDeltic

Nursery Crop Visits – What to Look for and What Questions to Ask Your Grower

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Fall 1982 Noble Fir Cone Collection USFS





Outline:

- ▲ PotlatchDeltic North Idaho Planting Program
- ▲ Nursery Inspection Checklist and Expectations:
 - ▲ Location
 - ▲ Greenhouse vs Outdoor Compound
 - ▲ Primary vs Secondary Needles
 - ▲ Buds
 - ▲ Growing Container and Size
 - ▲ Contract
 - ▲ Genetics
 - ▲ Media
- ▲ Example Inspection and Questions to Ask
- ▲ How to Address Issues

PotlatchDeltic North Idaho Planting Program:

▲ 1990 to 2009

- ▲ 1.9 to 6.5 million per year
- ▲ Majority grown in-house
- ▲ 59 million seedlings

▲ 2010 to present

- ▲ 4.8 to 8.4 million per year
- ▲ All seedlings contract grown
- ▲ 53 million seedlings



Nursery Inspection Checklist and Expectations:

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- 🌲 Genetics
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Location:

▲ Miles from Lewiston to:

- ▲ Boise – 267
- ▲ Klamath Falls – 513
- ▲ Portland – 343
- ▲ Rochester – 377
- ▲ Vernon BC – 361

▲ Travel Time for Inspections

▲ West Side vs East Side



Greenhouse vs Outdoor Compound

Greenhouse:

- ▲ Extended growing season
- ▲ Complete control of growing environment
 - ▲ Heat
 - ▲ Humidity
- ▲ Protected from bad weather events
- ▲ Supplemental Lighting
- ▲ Higher cost

Outdoor Compound:

- ▲ Shorter growing season
- ▲ No control of growing environment
- ▲ Exposed to birds and small mammals
- ▲ May or may not have supplemental lighting
- ▲ Lower cost





Greenhouse



Outdoor Compound with No Supplemental Lighting



Outdoor Compound with Supplemental Lighting



Primary vs Secondary Needles



Outdoor Compound Lodgepole Pine – Primary Needles



Primary vs Secondary Needles



Outdoor Compound Lodgepole Pine with Supplemental Lighting



Greenhouse Ponderosa Pine with Supplemental Lighting





Bud Set

▲ In Pines, exposure to supplemental lighting, will produce different buds



Outdoor Compound LP with No Supplemental Lighting



Greenhouse Ponderosa Pine with Supplemental Lighting



Growing Container and Size

▲ Various Containers Available (but not all used):

▲ Styroblocks

- ▲ Most common in PNW
- ▲ Made of dense Styrofoam
- ▲ 5-6 year life expectancy

▲ Jiffy Plugs

- ▲ Used world wide
- ▲ Soft walled, meshed container
- ▲ One time use

▲ HIKO Tray System

- ▲ Used worldwide
- ▲ High density polyethylene
- ▲ 10+ year life expectancy





Growing Container and Size

Container Size


-  Measured by volume in a single cavity

-  Higher volume containers:

 -  Usually yield larger seedlings

 -  Have fewer seedlings per square foot

 -  Are more expensive

 -  May be too large to allow root to fill all available space in one growing season

 -  May be more susceptible to root issues early on

Styroblock Containers

| <i>ID CODE</i> <i>cavities/ml</i> | <i>BLOCK</i> <i>number</i> | <i>METRIC</i> <i>number</i> | <i>BLOCKS</i> <i>per bundle</i> | <i>CAVITY TOP DIA.</i> <i>in.</i> | <i>CAVITY DEPTH</i> <i>in.</i> | <i>VOLUME PER CAVITY</i> <i>cu. in. ml</i> | | <i>CAVITIES</i> <i>per sq. ft.</i> |
|--------------------------------------|-------------------------------|--------------------------------|------------------------------------|--------------------------------------|-----------------------------------|---|-----|---------------------------------------|
| 448/17 | 1* | 207A | 37 | 0.7 | 2.8 | 1.0 | 17 | 197.4 |
| 240/18 | 2S | 206A | 41 | 0.9 | 2.5 | 1.1 | 18 | 105.8 |
| 240/40 | 2A | 211A | 23 | 0.9 | 4.5 | 2.4 | 39 | 105.8 |
| 240/50 | 3A | 213A | 20 | 0.9 | 5.1 | 3.0 | 49 | 105.8 |
| 198/60 | 4A | 313A | 20 | 1.1 | 5.2 | 3.7 | 60 | 87.3 |
| 180/60 | * | 309A | 27 | 1.1 | 3.7 | 3.7 | 60 | 79.3 |
| 160/60 | 4S | 310B | 25 | 1.2 | 4.1 | 3.3 | 54 | 70.5 |
| 160/65 | 4 | 313B | 21 | 1.2 | 5.0 | 3.9 | 65 | 70.5 |
| 160/90 | Super 4 | 315B | 17 | 1.2 | 6.0 | 5.5 | 90 | 70.5 |
| 128/80 | | 410C | 25 | 1.9 x 1.4 | 4.0 | 4.9 | 80 | 56.4 |
| 112/80 | 6S | 410A | 25 | 1.4 | 4.1 | 4.9 | 80 | 49.4 |
| 112/95 | | 412B | 22 | 1.4 | 4.6 | 5.8 | 95 | 49.4 |
| 112/105 | 6 | 415B | 17 | 1.4 | 5.8 | 6.6 | 108 | 49.4 |
| 91/130 | 8L | 415C | 17 | 1.5 | 6.0 | 7.9 | 130 | 40.1 |
| 77/125 | 10S | 412A | 22 | 1.7 | 4.6 | 7.6 | 125 | 34.0 |
| 77/170 | 10 | 415D | 17 | 1.7 | 6.0 | 10.0 | 164 | 34.0 |
| 60/220 | 15S | 512A | 22 | 2.0 | 4.7 | 13.4 | 220 | 26.5 |








Styro 60 for Grafted Larch





Contract

Important Points to Remember:

-  Read your contract every year
-  As Customers, we ask Nursery to provide a certain seedling. Nursery has complete control over how the seedling is grown.
-  Target Specifications \neq Contract Minimum Specifications
-  Review Inventory Reports and Scatter Diagrams
-  Relationship with Nursery is a Partnership

Genetics

- ▲ Genetically improved seedlings grow differently than woods run seed:
 - ▲ Higher germination
 - ▲ Even crop
 - ▲ Grow faster





Media

▲ Each Nursery will use a different media mix.
Components may include:

- ▲ Peat Moss
- ▲ Perlite
- ▲ Vermiculite
- ▲ Douglas-fir sawdust
- ▲ Coir
- ▲ Slow release fertilizer
- ▲ Lime





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- ▲ How to Address Issues

Example Inspection and Questions to Ask

- ▲ June/July and October
- ▲ Make an appointment
- ▲ Have your paperwork
- ▲ Check in at Office
- ▲ Follow safety rules
- ▲ Have fun!



Example Inspection and Questions to Ask

How many miles to next nursery?

What is average height?

If I am in K-Falls then today must be Tuesday.

I wish Abbie was here!

Any planned improvements to greenhouses?

Any problems so far?

What is that smell?

Are you using supplemental lighting?

When's lunch?

What should I be looking for??

How many greenhouse do they have?

What are the inventory numbers?

How do I pull a seedling out of block?

What is Grower's Name?

What was germination?

What is average caliper?

Arrival At Nursery Look Around



- ▲ Older facility
- ▲ New Roof
- ▲ Walls and structure in good repair
- ▲ No weeds next to greenhouse

Look Around

- ▲ Unused equipment neatly stored
- ▲ No weeds or garbage in open areas
- ▲ Propane tank barricaded



Look Around

- ▲ Nursery investing in upgrading structures to grow higher quality seedlings.



Inspection

- ▲ You will be accompanied by Nursery Personnel
- ▲ When you enter
 - ▲ Pause
 - ▲ Take a deep breath
 - ▲ Look around
 - ▲ Look down length of greenhouse at crop
- ▲ Remember, if you find any problems, the Nursery will already know about them









First Inspection What I Look For:

- ▲ Feel of greenhouse environment
- ▲ Unpleasant odors
- ▲ Discrepancies in the crop
 - ▲ Fill rate of blocks
 - ▲ Color
 - ▲ Even crop height
 - ▲ Signs of disease or insects
 - ▲ Weeds
- ▲ Root development





Topics to Cover During 1st Inspection


- ▲ In-house germination percentages
- ▲ Transplanting?
- ▲ Average height and caliper of the crop
- ▲ Any problems with the crop to this point
- ▲ What pesticides have been applied to the crop
- ▲ Fertilizer regime
- ▲ Supplemental lighting





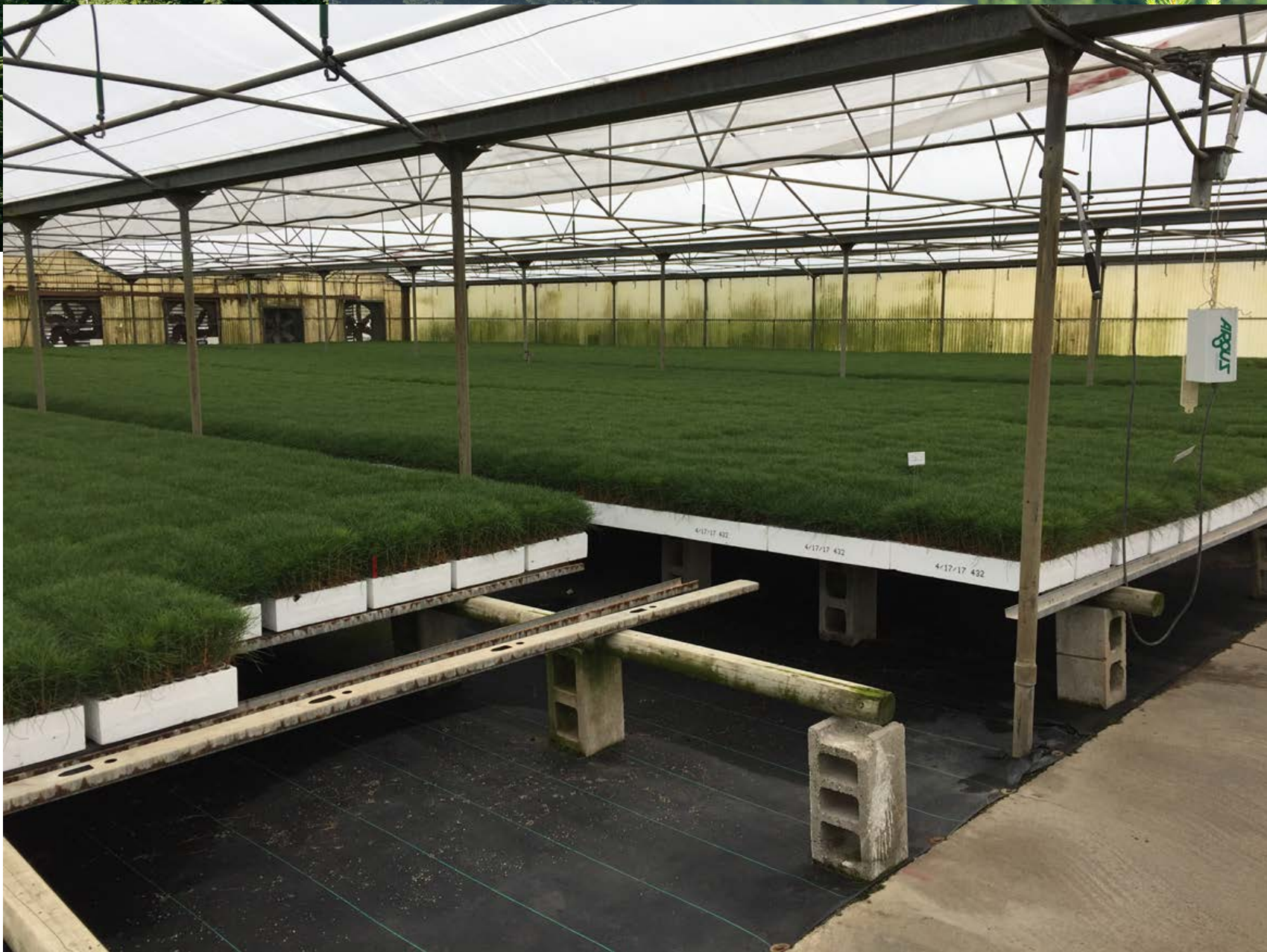






Second Inspection – What I look For:

- ▲ Is this how you want the final product to look?
- ▲ Final height and caliper
- ▲ Bud set
- ▲ Root system
- ▲ Lignification
- ▲ Color
- ▲ Diseases?
- ▲ Weeds?
- ▲ Nursery cleanliness (even during production time)











Topics to Cover During 2nd Inspection:

- ▲ Average height and caliper. Meet contract specs?
- ▲ Inventory
- ▲ Adjustments to contract specifications?
- ▲ Packing start date
- ▲ Cull standards
- ▲ Pre-package fungicide treatments
- ▲ Chilling hours
- ▲ Copies of frost hardiness tests
- ▲ Box counts
- ▲ Freezer storage

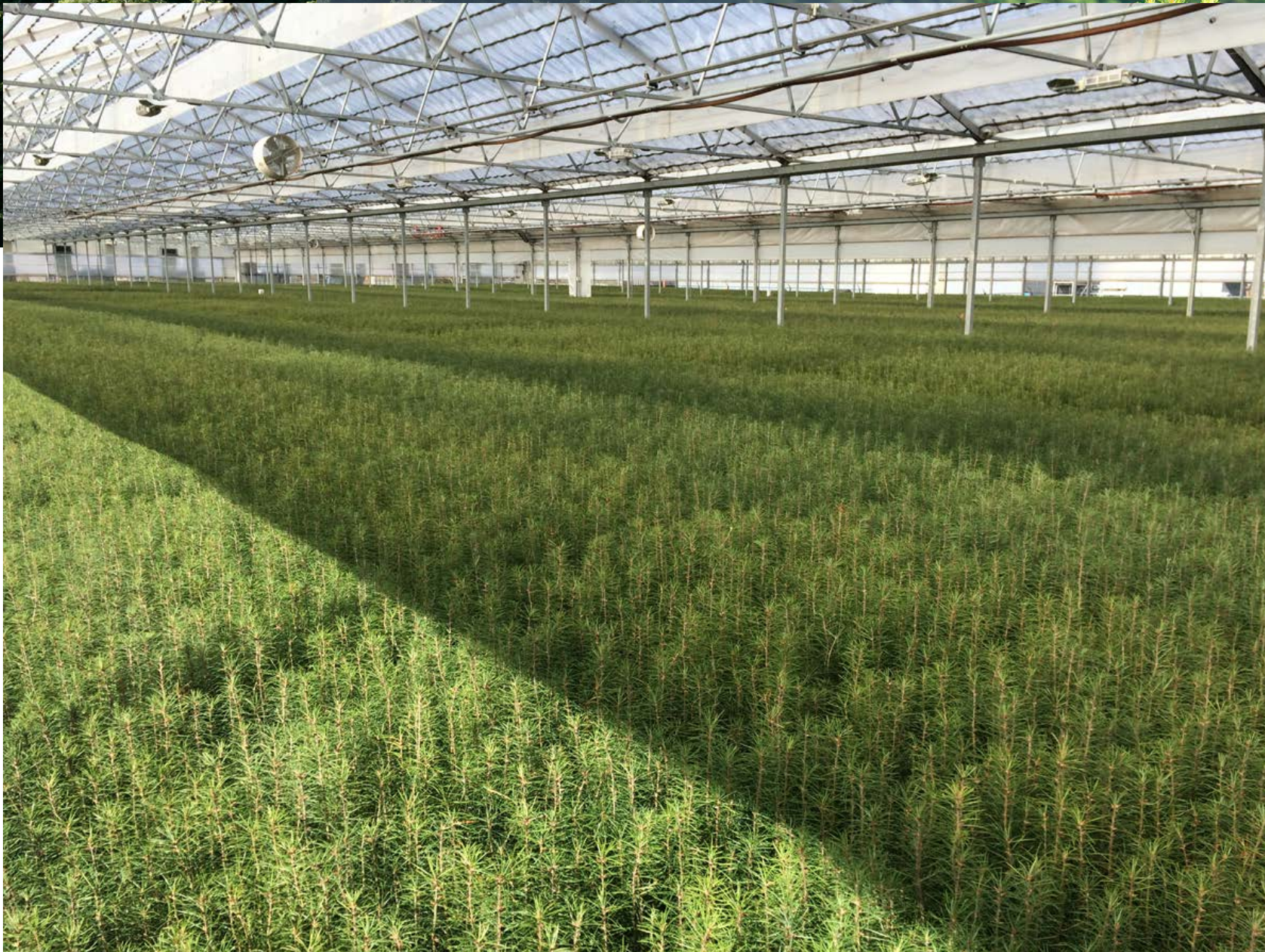






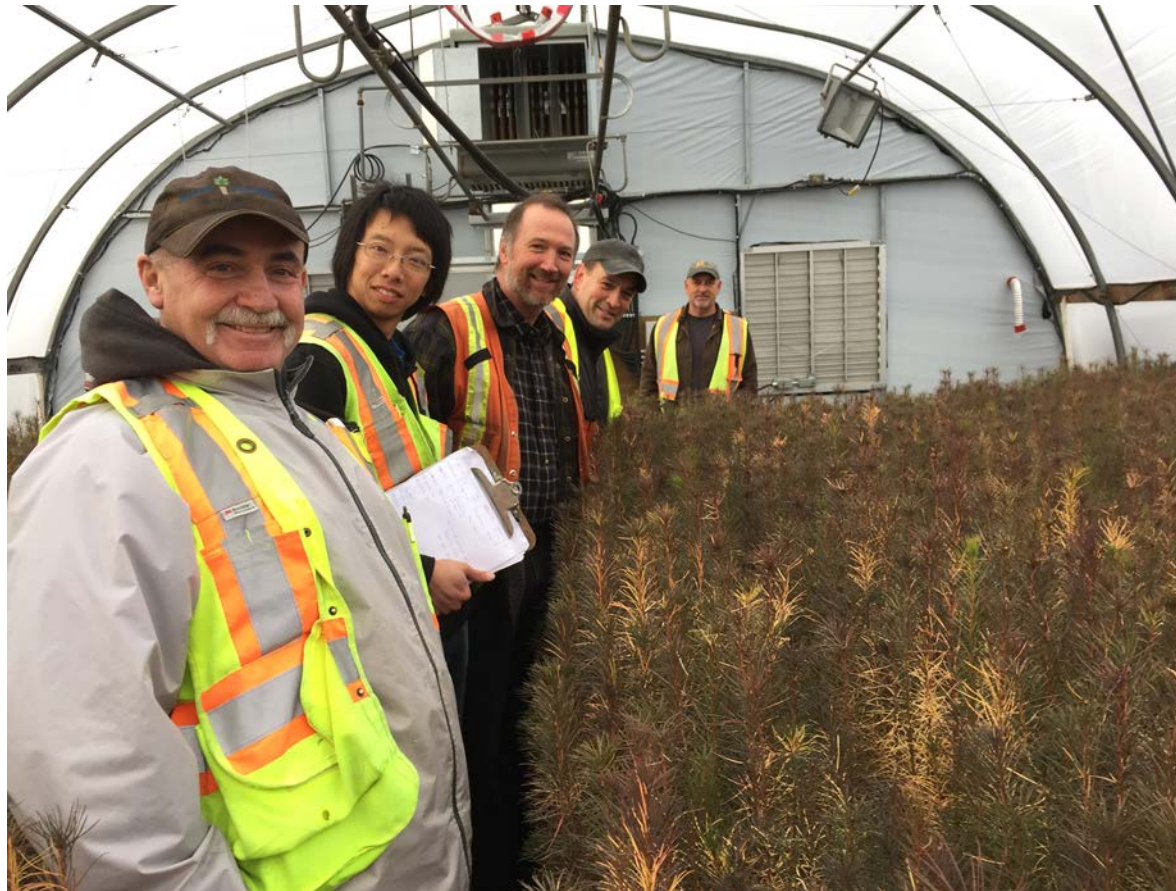








All Smiles After A Good Inspection





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How to Address Issues



- ▲ What is problem?
- ▲ How much of crop is effected?
- ▲ Timing
- ▲ Nursery plan?

How to Address Issues



How to Address Issues



How to Address Issues



How to Address Issues



How to Address Issues



How to Address Issues



How to Address Issues

1st Example

A Tale of Two Nurseries...



How to Address Issues

1st Example

A Tale of Two Nurseries...



How to Address Issues

1st Example

A Tale of Two Nurseries...



How to Address Issues

2nd Example

Current Issue



How to Address Issues

2nd Example

Fall Inspection



How to Address Issues

2nd Example

Fall Inspection



How to Address Issues

2nd Example

Fall Inspection



How to Address Issues

2nd Example

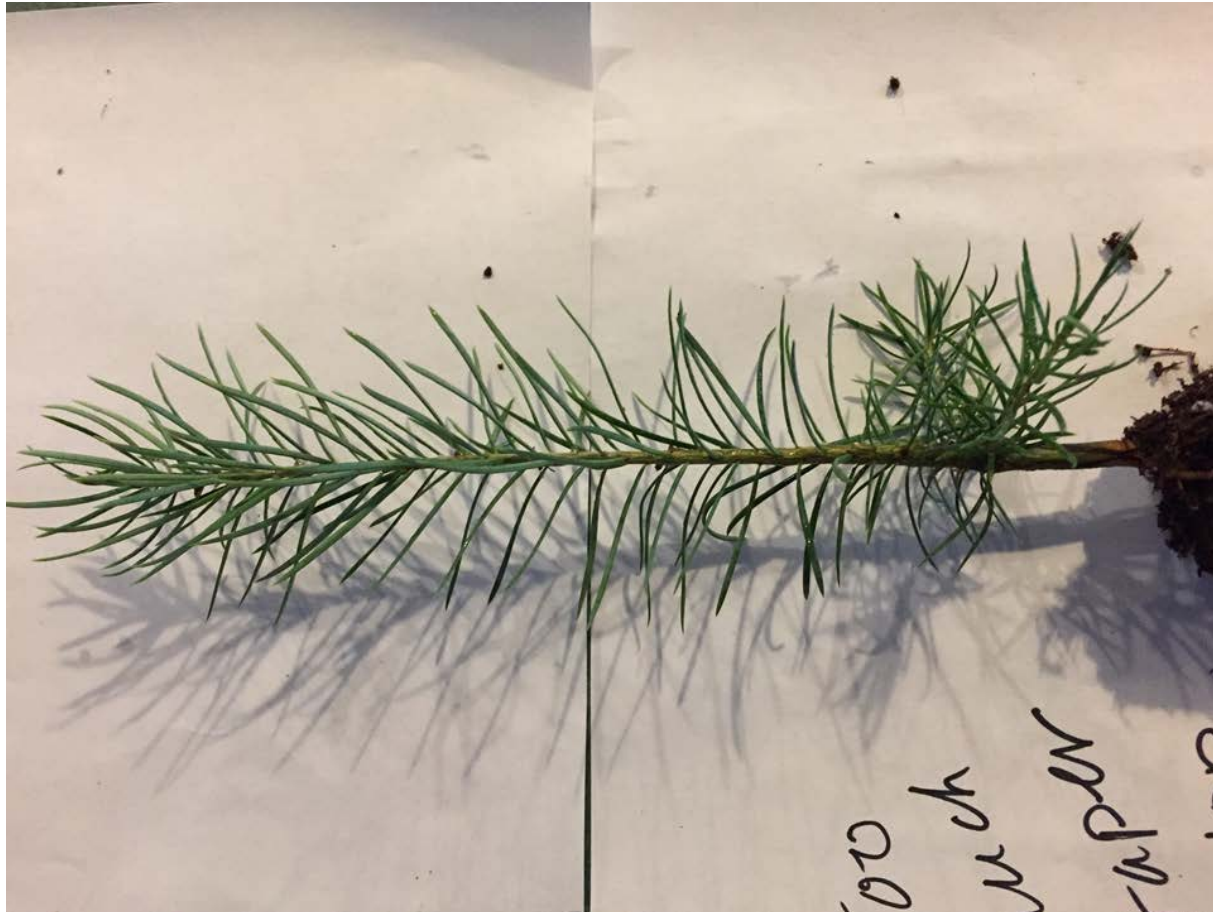
Fall Inspection



How to Address Issues

2nd Example

Fall Inspection





How to Address Issues 2nd Example Waiting on Packout Numbers

- ▲ DF finished packing on January 23rd
- ▲ Average daily temperature from January 1st to January 26th was 42 F
- ▲ Questions:
 - ▲ Were the daily temperatures high enough to effect dormancy?
 - ▲ Was there active root growth?
 - ▲ Had the seedlings broken bud?
- ▲ 75 seedlings were randomly selected and sent to UI Pitkin Nursery for Root Growth Potential testing
- ▲ Seedlings were inspected a day after they arrived at Pitkin
- ▲ And the results are.....

How to Address Issues

2nd Example

February – 1st Issue



How to Address Issues

2nd Example

February – 1st Issue



How to Address Issues

2nd Example

February – 1st Issue



How to Address Issues

2nd Example

February – 1st Issue



How to Address Issues

2nd Example

February – 2nd Issue



How to Address Issues

2nd Example

February – 2nd Issue



How to Address Issues

2nd Example

February – 2nd Issue



How to Address Issues

2nd Example

February – 2nd Issue



How to Address Issues

2nd Example

February – 2nd Issue



How to Address Issues

2nd Example

February – 2nd Issue





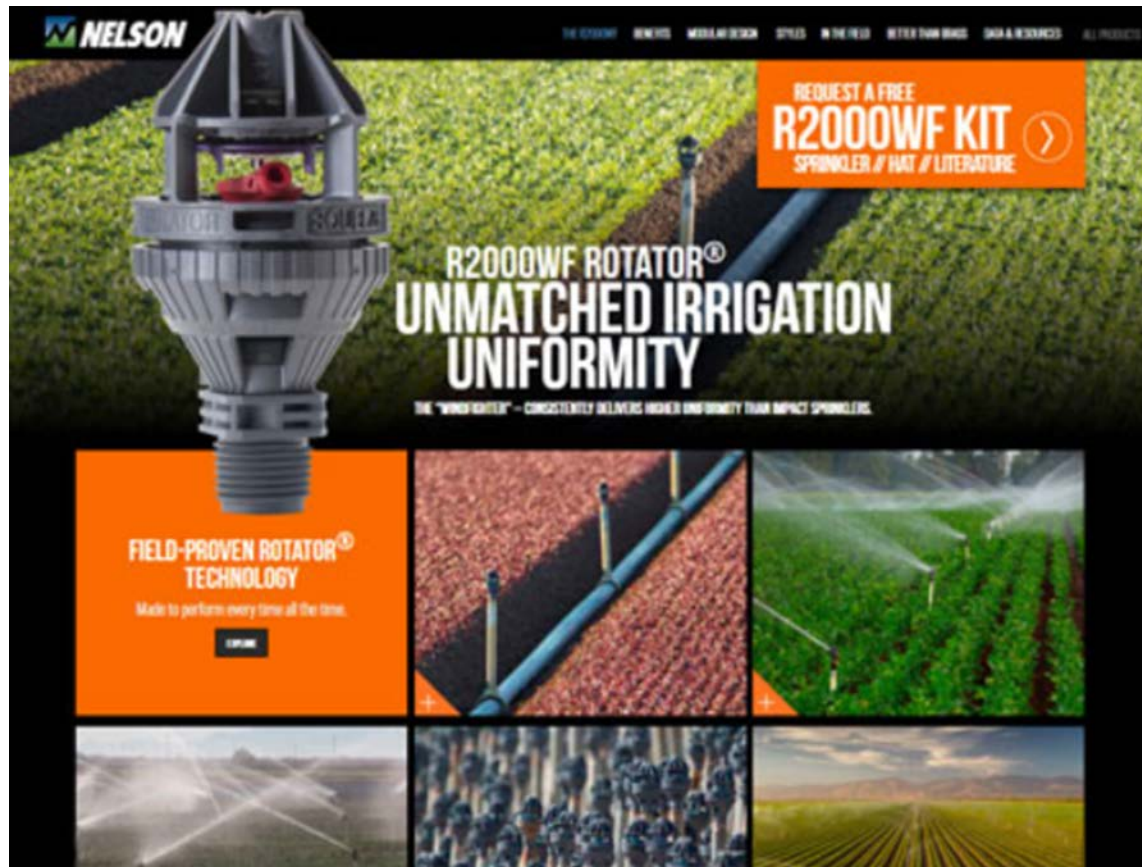
How to Address Issues 2nd Example Now What??

- ▲ Pull seedlings for immediate frost hardy tests.
- ▲ Freezer store seedlings for one month, then Root Growth Potential (RGP) testing.
- ▲ Second frost hardy test completed at time of RGP.
- ▲ Contacted nursery to discuss issue and how to proceed. Nursery will:
 - ▲ Pull sample from freezer storage
 - ▲ Grade seedlings
 - ▲ Pot up seedlings
 - ▲ Research what to expect when out planted
- ▲ Based on results of tests, determine whether or not to out plant the seedlings.

How to Address Issues

3rd Example

Sprinklers



NELSON THE ROTATOR NEW KIT MODULAR DESIGN STYLE IN THE FIELD BETTER THAN BANG DATA & RESEARCH ALL PRODUCTS

REQUEST A FREE R2000WF KIT SPRINKLER / PART / LITERATURE

R2000WF ROTATOR®
UNMATCHED IRRIGATION UNIFORMITY
THE "WIND-KATLER" - CONSISTENTLY DELIVERS HIGHER UNIFORMITY THAN IMPACT SPRINKLERS.

FIELD-PROVEN ROTATOR® TECHNOLOGY
Made to perform every time all the time.

EXPLORE

The advertisement features a large image of the R2000WF Rotator sprinkler head on the left. The background is a collage of images showing the sprinkler in use in various agricultural settings, including a field of green crops, a field of red soil, and a field of green crops with multiple sprinklers. The text is white and orange, providing clear information about the product and its benefits.



How to Address Issues

3rd Example - Sprinklers From the Start

- ▲ Cherrylane Seed Orchard Douglas fir crop, mid-elevation.
- ▲ First inspection revealed seedling height had highs and lows, typically associated with sprinkler pattern.
- ▲ Shared my observation with Grower and explained that if the issue continued, there would be root problems at my 2nd inspection.
- ▲ Second inspection:
 - ▲ Chlorotic seedlings
 - ▲ High and low seedling height
 - ▲ Very small bud set
 - ▲ Dead roots in short seedlings
 - ▲ My estimation of loss, approximately 25-30%.

How to Address Issues

3rd Example – Sprinklers

Now What?

- ▲ Start asking questions:
 - ▲ How much water applied each irrigation?
 - ▲ Sprinklers checked at each irrigation?
 - ▲ Crop checked for a leach after each irrigation?
 - ▲ If no leach, then what was protocol?
- ▲ Show Grower what you will accept at packout.
- ▲ Schedule pathogen tests on sample seedlings.
- ▲ Root Growth Potential test on seedlings.



Communication!!



How to Address Issues

3rd Example – Sprinklers Results

- ▲ Grower culled heavily at packout.
- ▲ 30% of seedlings culled.
- ▲ Even with culling, RGP had low root counts.
- ▲ Out planted packed seedlings.
- ▲ Preliminary feedback from field indicates fairly good survival.
- ▲ Decision made not to grow at this facility in near future.

Ultimate Goal



Ultimate Goal





Any Questions?

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