Pacific Madrone Provenance Trial

2014 Assessment of **BLM Sprague** site
(Trial assessed Oct 16, 2014)
**Draft Report** 10/26/2014
Photos: R.Sniezko
Objective

- Provide the first baseline data on range-wide genetic variation in adaptive traits (e.g. growth) and resistance to pathogens for this wide-ranging species.
  - 105 families collected from 7 ecoregions were planted in five locations in California (1), Oregon (2), and Washington in fall 2011/winter 2012; and a slightly different subset in BrCol (2) in 2014 (see some details at http://puyallup.wsu.edu/ppo/madrone/research/common_garden/index.html )
Oregon Pacific Madrone: Sources for Seed

- 105 families represented
- 7 Ecoregions represented

http://puyallup.wsu.edu/ppo/madrone/research/common_garden/

Map: from Marianne Elliott?)
Assessments

• OR trials assessed in fall 2012, 2013, and 2014
• CA trial with extreme mortality (drought) in 2012 (no further assessments to date?)
• WA trials assessed in 2012 and 2013?
• 2 British Columbia trials recently established – one has high drought related mortality
2014 Assessment (Oregon sites)

- **Assessment Team 2014**: Bob Danchok, Brian Luis, Sally Long, Richard Sniezko (all 3 days); Juli Sticha, Rachel Zitomer, Lisa Foster (Oct 15 & 16); Angelia Kegley (Oct 20) – all USFS Dorena GRC.

- Samples of dead trees (mainly roots) collected from both sites to send to Gary Chastagner (to test for *Phytophthora*) – **11 samples from SF site, 13 samples from BLM Sprague site**.

- See 2013 & 2012 Sniezko powerpoint reports for comments & photos from previous assessments
| **2014 Oregon Pacific Madrone**  
| **Site Assessments** (OR sites, Oct 2014) |
| **Plant Condition** |
| 1 = alive |
| 2 = dieback** |
| 3 = wilting |
| 4 = dead |
| 5 = missing |

| **Total ht (cm):** total height of seedling |

| **# leaders:** 1 is default, 2=forked, 3= >2 leaders |

| **Leader branching:** 0 = no (default) |
| 1 = branching |

| **new growth*:** Active new growth on terminals |
| 0 = none (default) |
| 1 = buds swollen to a large degree |
| 2 = flushing buds |

| **blight sev:** severity of symptoms on most severely impacted current season leaf |
| 0 = none |
| 1 = slight (<25% of leaf area affected) |
| 2 = moderate (25 to 50% of leaf area affected) |
| 3 = severe (>50% of leaf area affected) |

| **blight inc:** whole tree |
| 1 = <25 of leaves with severity rating |
| 2 = 25-50% of leaves |
| 3 = 51-75% of leaves |
| 4 = >75% of leaves |

**Blight total:** %of total leaf area affected

**Comments**

| 1 = leaf rust present |
| 2 = chewing insect damage present |
| 3 = variegated foliage present |
| 4 = browse damage evident |
| 5 = Burrowing varmint activity around tree |
| 6 = Reddish-green fully expanded foliage |
| 7=basal sprouts |
| 8=2nd flushing |

*very little in 2014, but 2nd flushing was common at Starker site

**2.1, 2.2, and 2.3 used to denote increasing levels of dieback from minor to whole main stem
BLM Sprague Orchard site

• Relatively little growth on most seedlings – tallest ~80cm - many of taller trees near the road, especially Block 3; but a # of trees are very small - in the 6 to 15 cm height range (many with dieback and basal sprouts)
• Very little leaf blight (even less than Starker Forests)
• Some insect damage (more than at Starker Forest site)
• A few trees with a few leaves showing variegation (less than at Starker site)
• ‘2nd flushing’ uncommon (unlike Starker Forest site)
• Many trees with dieback and sprouting at/near the base – trees will show shorter height in 2014
• Many dead trees showed little or no 2014 growth
• More trees with ‘reddish’ foliage here than at Starker site
• Native madrone in area
• *Phytophthora* noted in area for decades (in adjacent sugar pine seed orchards)- dead madrone seedlings collected for testing – sent to G.C. at WSU
• Trial assessed 10/16/2014
Sprague site

• Drought year in 2013 (driest on record?)
• Extreme cold event in Dec 2013.
• Mortality often clumped at this site – high and notable in Block 4 and to lesser extent in Block 3.
• Contact Jim Hamlin or Richard Sniezko (Forest Service) or Gary Chastagner/Marianne Elliott (WSU) for more info on this and the other linked trials; John Russell for information on the British Columbia trials
• See website http://puyallup.wsu.edu/ppo/madrone/ for some background on trial
Madrone among the grass at Sprague site
Seedlings with green, and with reddish foliage
Dieback (on left) and dead (on right) seedlings
Top dieback with basal sprouting on CC3-2 seedling (4105, 4106.jpg)
Insect chewing
dieback
Insect chewing on leaves
Relatively small new growth typical of many trees at this site (4133.jpg)
dieback
Dieback (with sprouts, on left)
dieback
Some dieback
View from adjacent sugar pine orchard (which has 1 madrone tree)
Madrone in area surrounding the field trial
To Do

• Data validation
• Compile unified dataset over assessment dates and sites
• Update Row-Col (X-Y) ‘maps’ showing mortality (different color per year)
• Basic summary info (e.g. mean height by family & source)
Recommendations

• The leaf blight was generally low at both Oregon sites, and there was little or no rust (most/all 2013 leaves were fallen) – a Spring assessment would likely be needed to pick up more in genetic variation trends for these two traits.
• Cooperators: BLM (Sprague) and Starker Forests provide sites for the two Oregon trials
• Thanks to the many people contributing seedlots to the project
• Pacific madrone Provenance Trial Team Contacts:
  – WSU (Gary Chastagner/Marianne Elliott);
  – USFS, **NFS**: (Jim Hamlin, Richard Sniezko), **PNWRS**: Connie Harrington
  – ODF (Alan Kanaskie)
  – British Columbia Ministry of Forests (John Russell)
Pacific madrone publications

• **A First Look at Genetic Variation in Resistance to the Root Pathogen *Phytophthora cinnamomi* using a Range-wide Collection of Pacific Madrone (*Arbutus menziesii*)**
  Marianne Elliott, Gary Chastagner, Annie DeBauw, Gil Dermott, and Richard A. Sniezko

• **Range-wide Genetic Variability in Pacific Madrone (*Arbutus menziesii*): Examining Disease Resistance, Growth, and Survival in a Common Garden Study**
  Marianne Elliott, Gary A. Chastagner, Gil Dermott, Alan Kanaskie, Richard A. Sniezko, and Jim Hamlin