

Lessons Learned from California Department of Food and Agriculture Invertebrate Eradication Programs

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California Department of Food and Agriculture Eradication history in brief

- First eradication program was started in 1914
- Well over 100 programs have been successfully conducted
- Successful program targets include: exotic fruit flies such as medfly, melon fly, oriental, guava, peach, Mexican, and Caribbean fruit flies, gypsy moth, Japanese beetle, hall scale and boll weevil.

California Department of Food and Agriculture Eradication history in brief

- Unsuccessful programs include;
- Red imported fire ant, walnut husk fly, apple maggot, white garden snail, Light brown apple moth and citrus whitefly

The one key to a successful program:

- Based on 35 years of experience the one key to a successful program is:

The one key to a successful
program is:”



The one key to a successful
program:

There is no one key.

Be Clear on why eradicate and not live with the pest

- California eradicates pests to prevent crop losses and quarantines from pests like fruit flies



Be Clear on why eradicate and not live with the pest

- And to prevent increased pesticide use



Be Clear on why eradicate and not live with the pest

- To preserve our natural environment from tree loss and defoliation from pests like gypsy moth or Asian Longhorn Beetle



Be Clear on why eradicate and not live with the pest

- And to prevent increased pesticide use



Be Clear on why eradicate and not live with the pest

- To protect the health of the public from animals like red imported fire ant

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Be clear on why eradicate and not live with the pest

- And to prevent increased pesticide use

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Look before you leap

- You want this when you start a program



Look before you leap

- You do not want this:



When things go wrong

- No Meetings to discuss what to do:



When things go wrong

- Go out and look!



Remember who decides how things work

- Suits and ties do not decide biology



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Remember who decides how things work

- Animals decide biology



Remember your goal

- Goal is eradication not research or to justify your supervisors ideas



Remember your goal

- Remember your goal and do not forget it

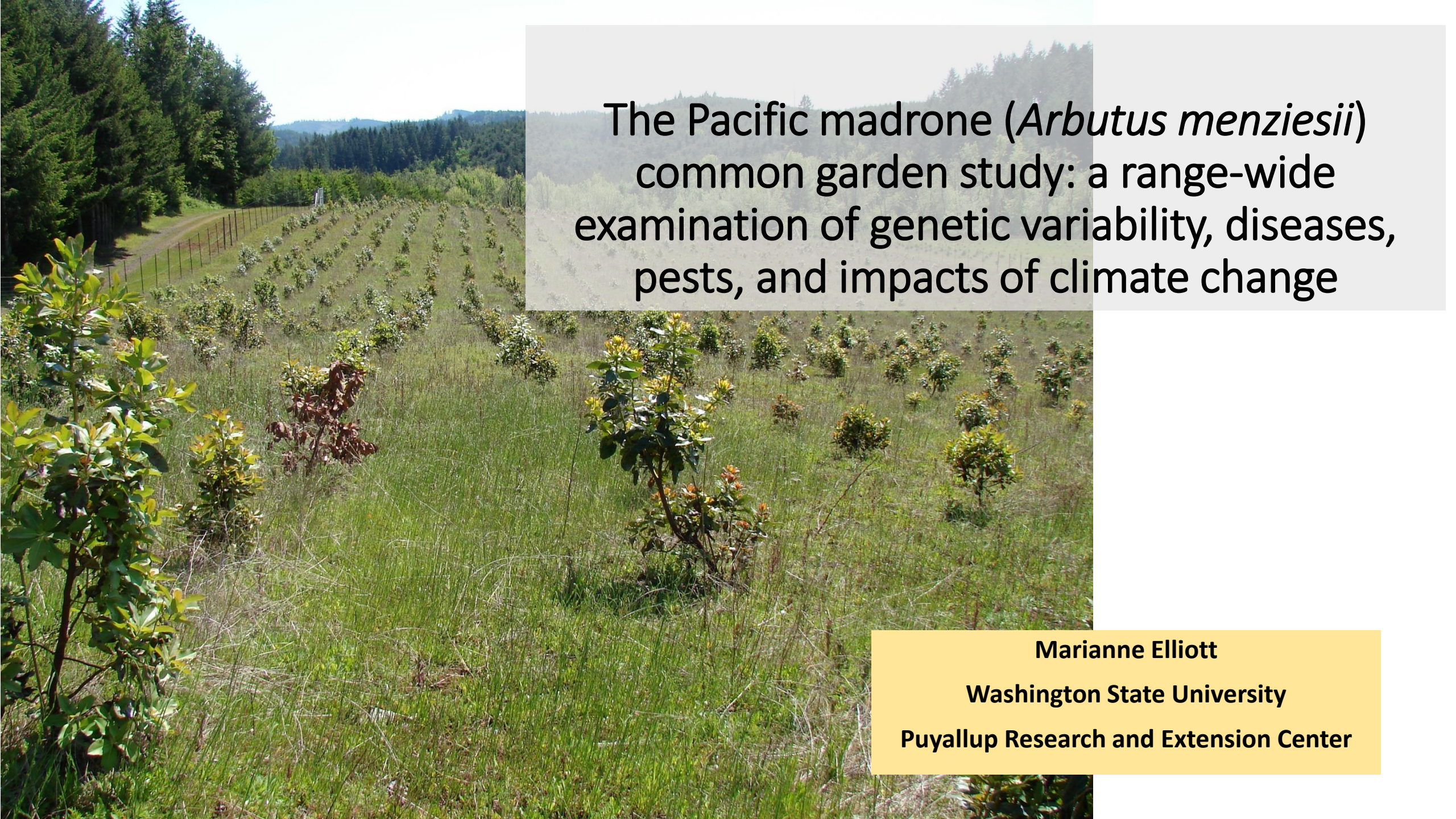


Conclusion

- Look before you leap
- Leave the office and look to see what is going wrong
- The target animal will decide what actions are correct not a group in an office
- Remember your goal
- Be clear about why eradicate

Lessons Learned

Thank You and may any
eradication programs be
successful.



The Pacific madrone (*Arbutus menziesii*)
common garden study: a range-wide
examination of genetic variability, diseases,
pests, and impacts of climate change

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Washington State University

Puyallup Research and Extension Center

Cooperators

- WA: Gary Chastagner & Marianne Elliott (WSU), Connie Harrington (USFS)
- OR: Richard Snieszko, Doug Savin, Jim Hamlin (USFS) Alan Kanaskie (ODF), Paul LeBlanc (BLM), Mark Gourley (Starker Forests)
- CA: Angela Bernheisel & Ed Orre (CalFire), Valerie Hipkins & Jennifer DeWoody (USFS)
- BC: John Russell (BC Ministry of Forests & Range)

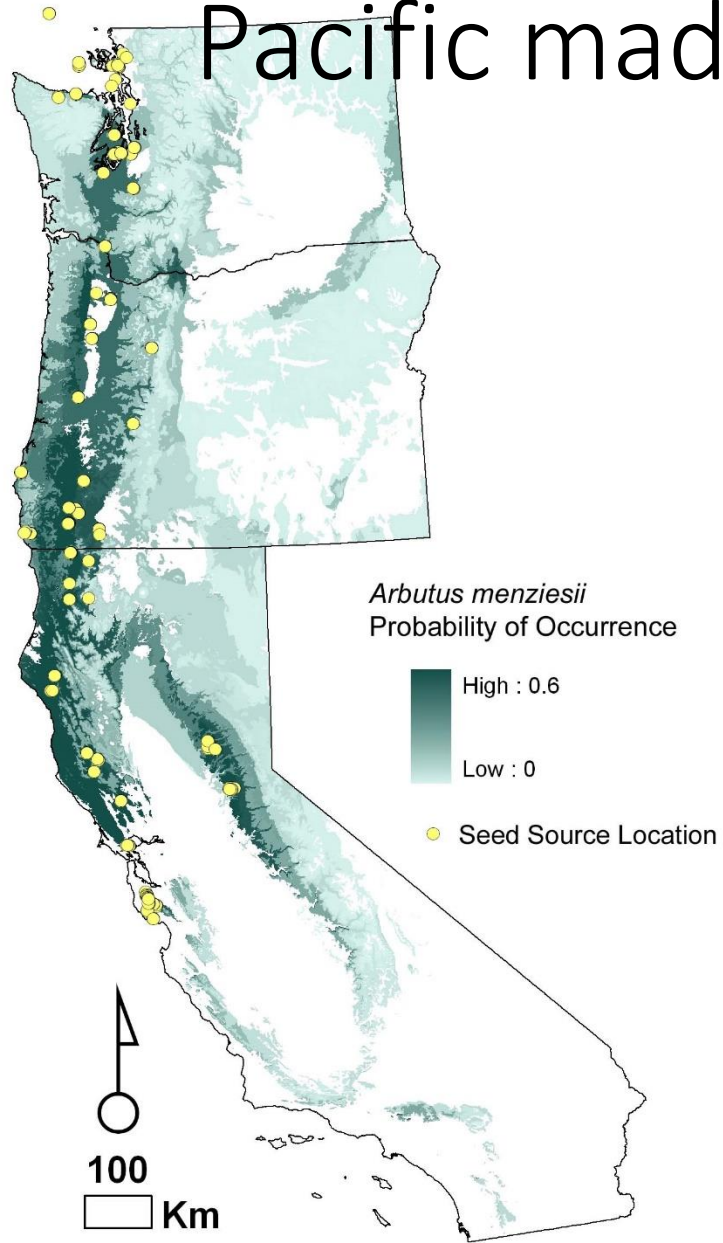
New Website

<http://ppo.puyallup.wsu.edu/pmr/>

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Pacific madrone (*Arbutus menziesii* Pursh)



Map courtesy of Heather Lintz, OSU

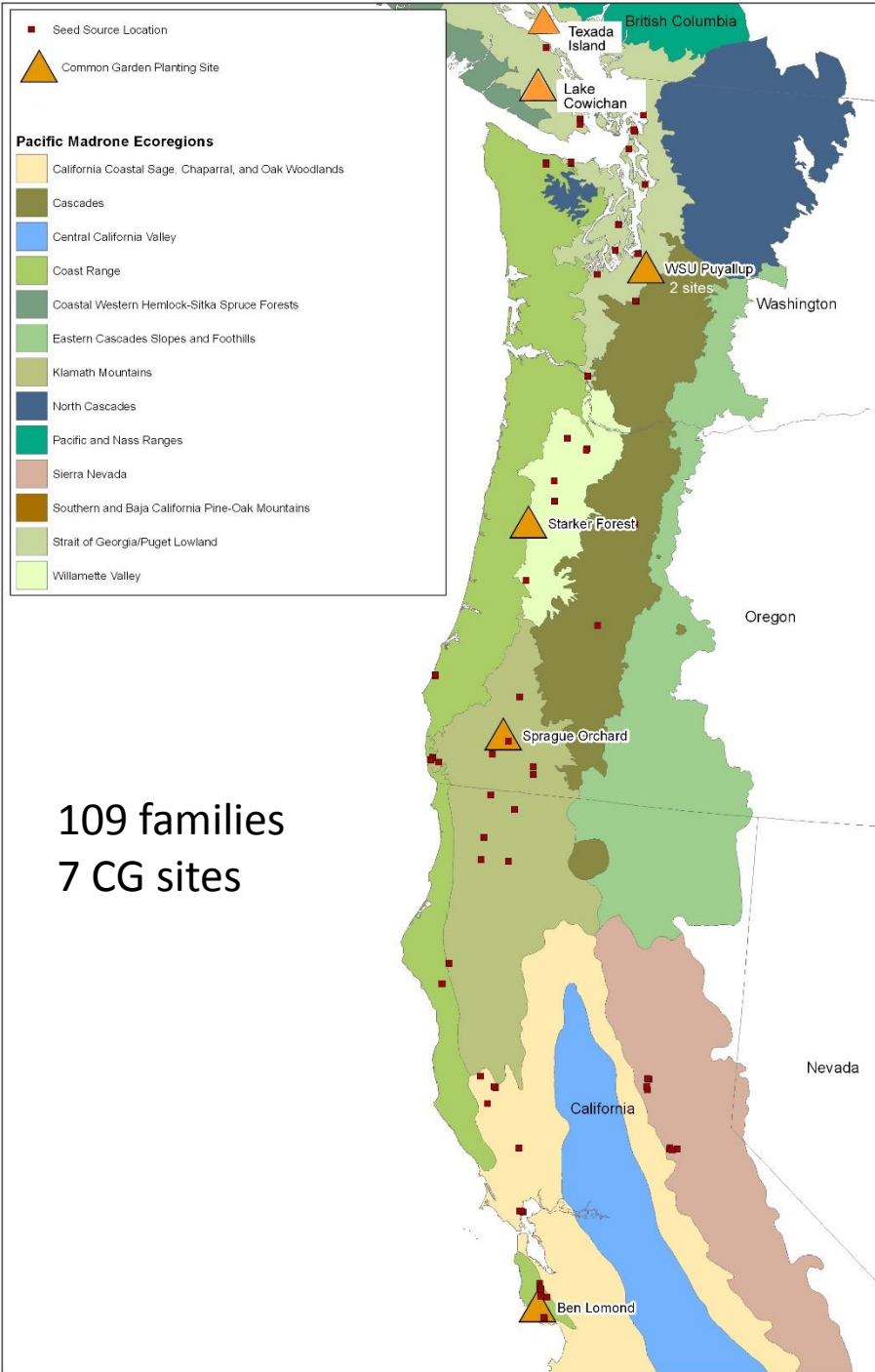


“Ted’s Tree”, the largest madrone in WA State

Pacific Madrone research

- Genetics:
 - Common garden study
 - Isozymes (NFGEL, Placerville CA)
- Phenology/climate (USFS, Olympia WA)
- Pathology
 - Disease resistance
 - Host-fungus index
- Transplanting methods
- Your study

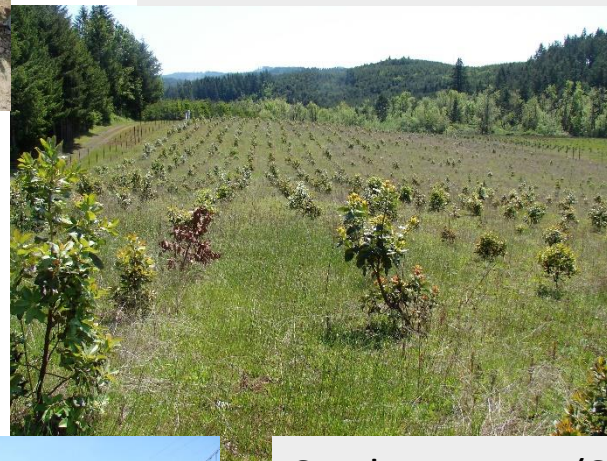




Puyallup Valley (PV)



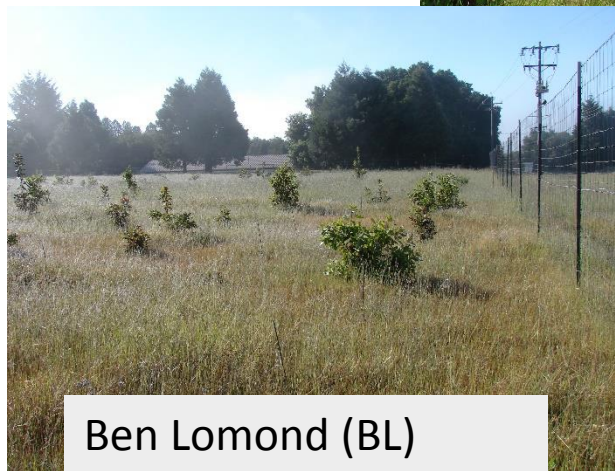
Puyallup Hill (PH)



Starker Forest (SF)



Sprague Orchard (SO)



Ben Lomond (BL)

Nursery data

~7800 plants in nursery grown
from seed 2/2009

Nov. 2011

Height

Stem diameter

Leaf area - avg

Leaf color

Disease:

Shoot blight

Leaf blight

Leaf spot

Rust

New foliage

Red foliage

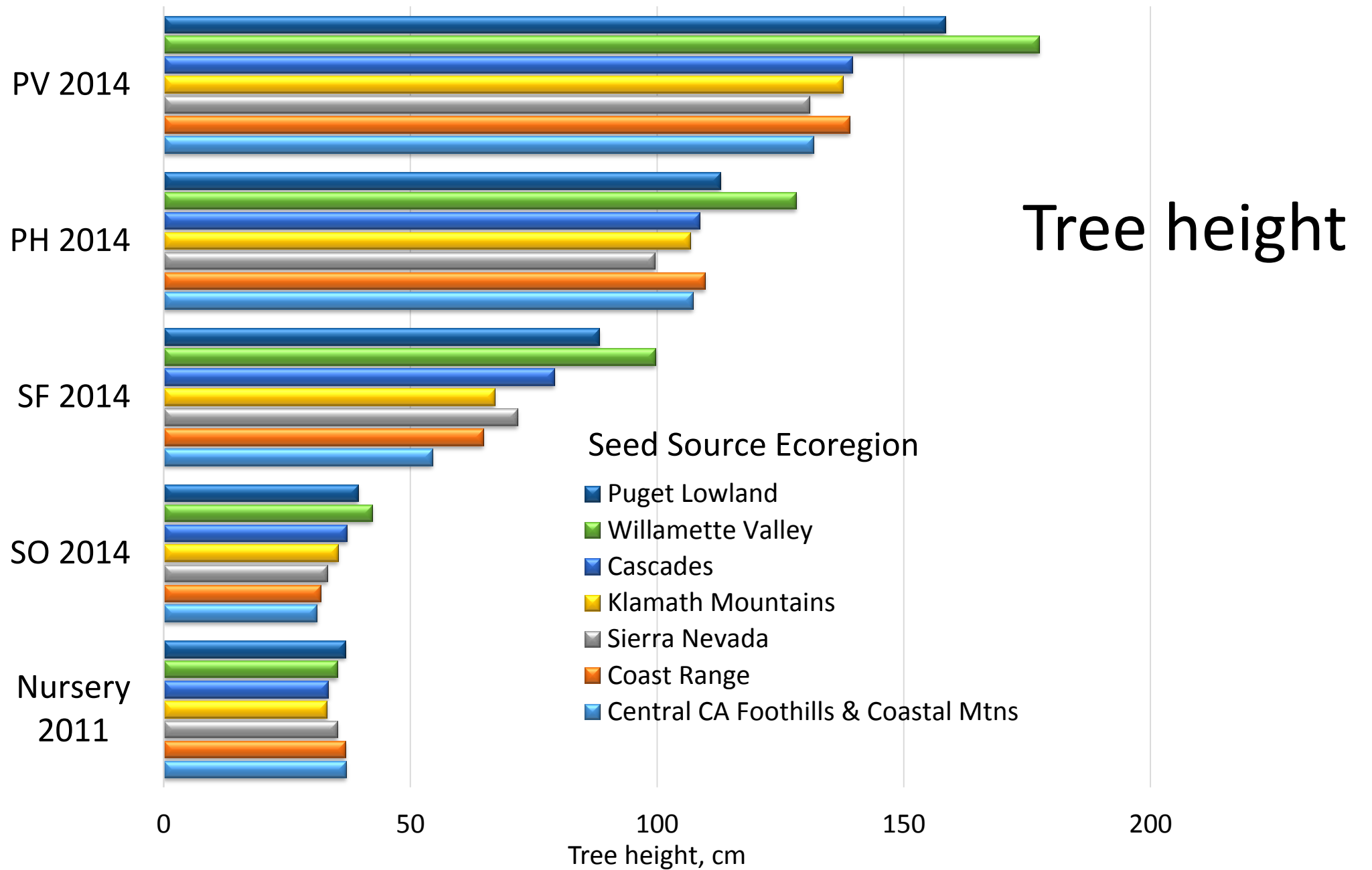


Correlate nursery attributes
with behavior in field

Data collected at CG sites 2012-2014



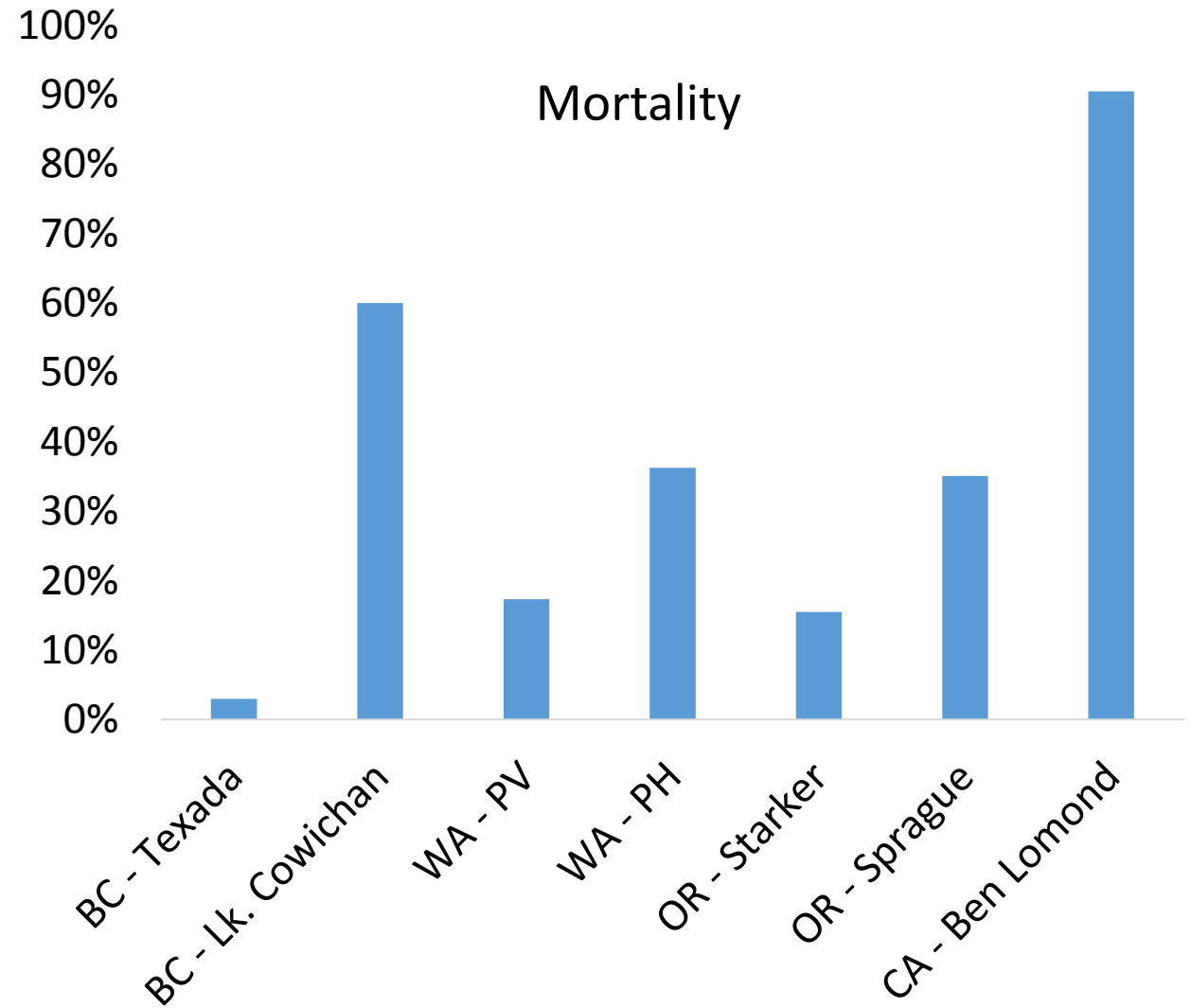
Plant Condition	1=Alive, 2=dieback, 3=wilting, 4=dead, 5=missing
Total ht (cm)	height in cm
# leaders	number of leaders
New Growth	Immature on terminals: 0= none (default), 1= bud swell, 2=new leaves
Frost Damage	0=none, 1=related to immature flushes, 2=shoot dieback, affecting less than half of the tree, 3=shoot dieback, affecting more than half of the tree, 4=whole tree, may be dead
Blight Severity	Severity of symptoms on most severely impacted current season leaf: 0=none (default), 1=slight (<25% of leaf area affected), 5=moderate (25-50% of leaf area affected), 25=severe (>50% of leaf affected)
Blight Incidence	Whole tree: 1= <25 % of leaves with severity rating 2= 25-50% of leaves 3= 51-75% of leaves 4= 75% of leaves
Comments	1= leaf rust present 2=chewing insect damage present 3= variegated foliage present 4= browse damage evident 5=burrowing varmint damage 6=reddish-green, fully-expanded foliage 7=basal sprouts 8=multiple flushes on leader 9=flowering





Drought mortality at Ben Lomond, May 2015

Phytophthora root disease at Puyallup Hill, Jan 2015



Genetic variability in madrone



Differences in leaf shape and size



Red and green mature foliage

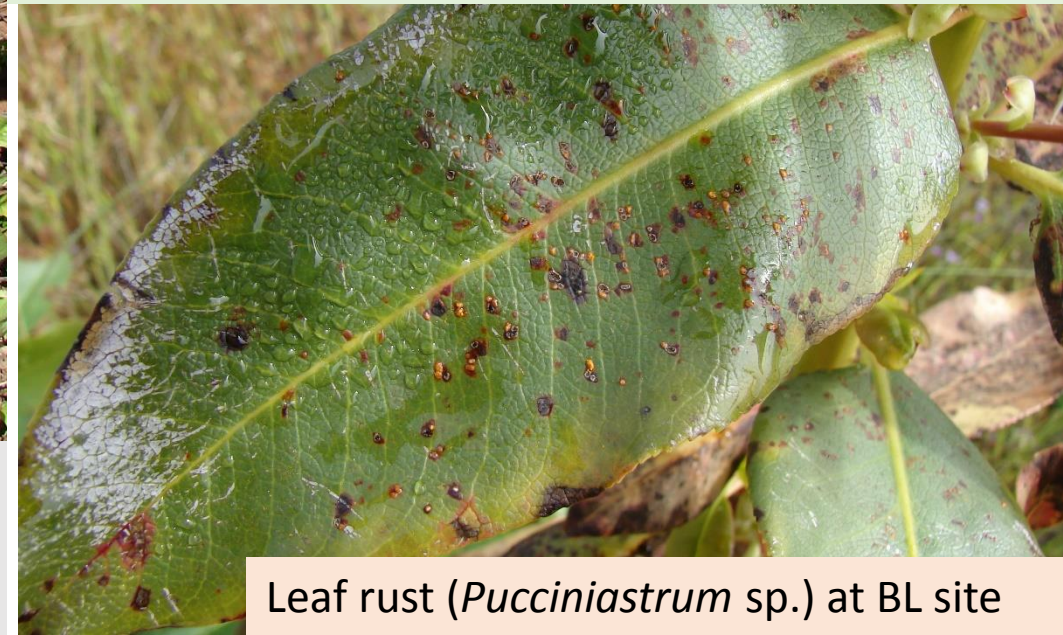
Diseases



Dieback caused by
Neofusicoccum
arbuti at SF site

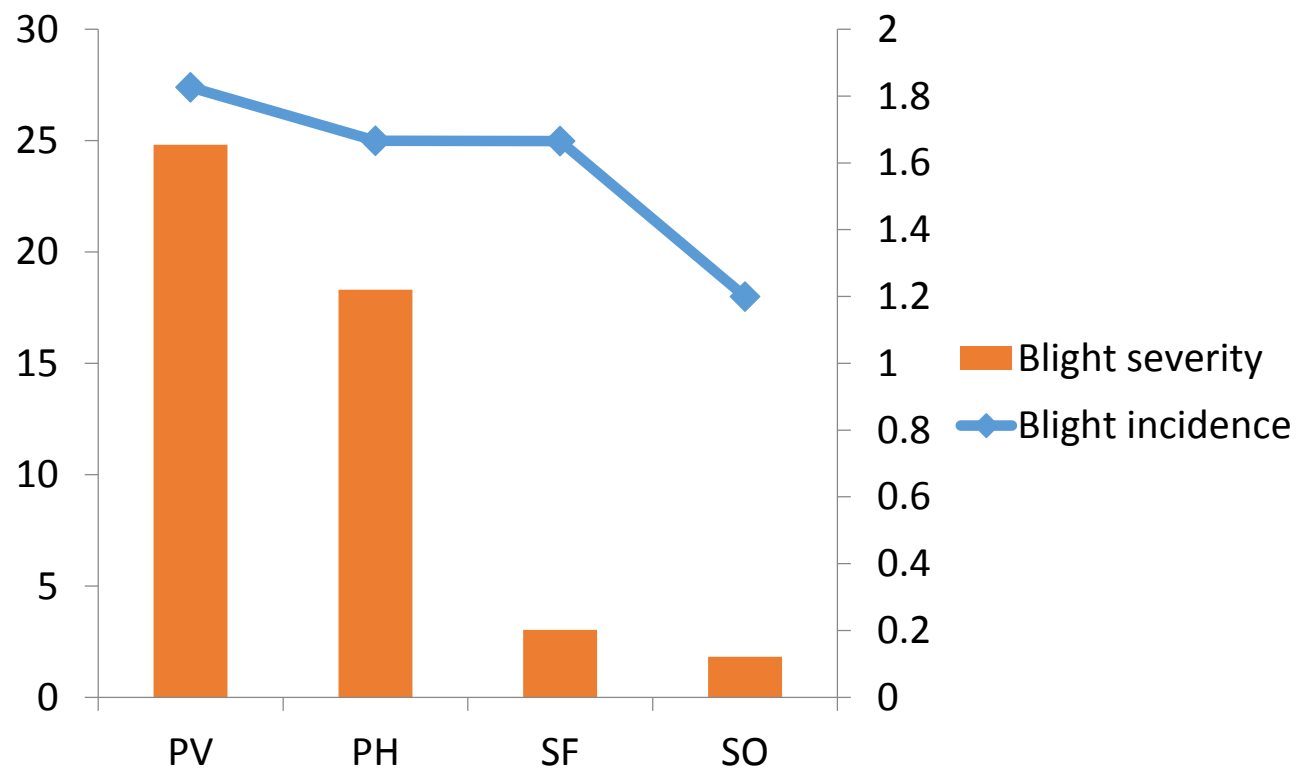


Phytophthora root disease (*P. megasperma*) at PH site



Leaf rust (*Pucciniastrum* sp.) at BL site

Leaf blight



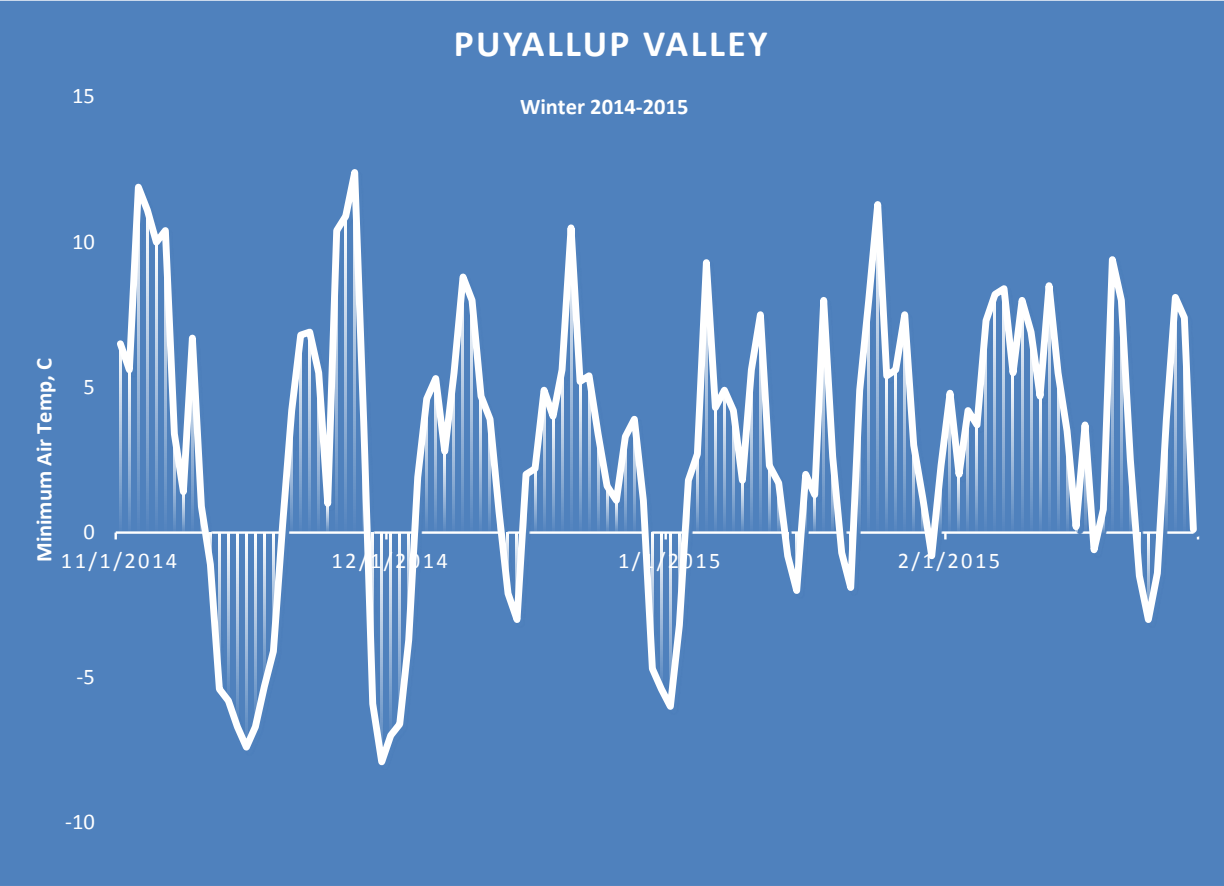
Other blight fungi: *Phomopsis velata*, *P. vaccinii*



Leaf blight caused by *Phacidiopycnis washingtonensis* at PV site



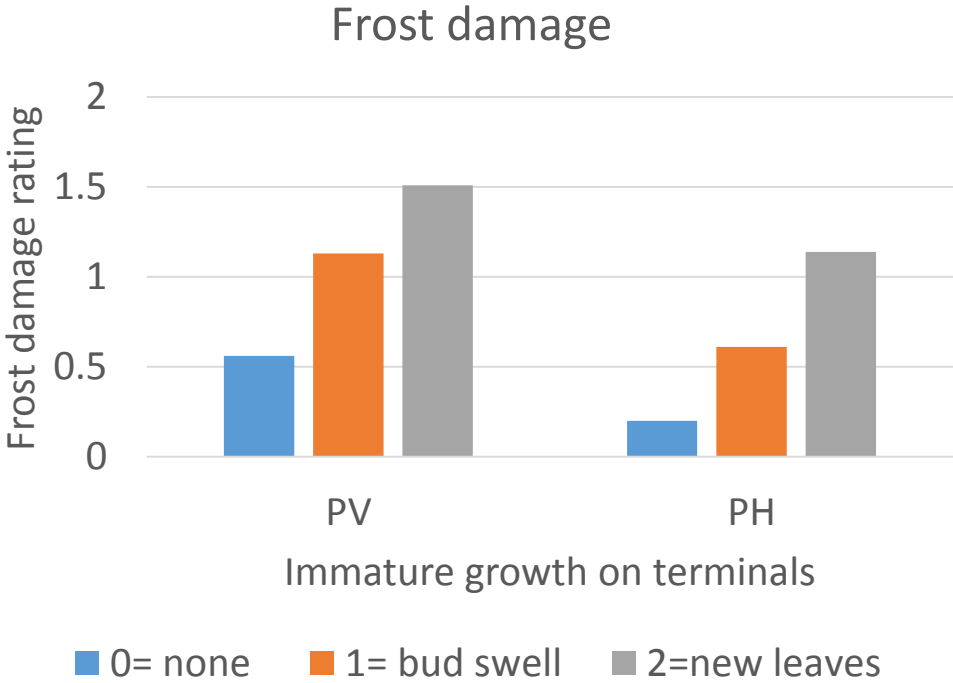
Relationship of leaf phenology to cold damage at the Washington common garden sites



Minimum air temperatures for winter 2014-2015 showing periods of sub-freezing temperatures.



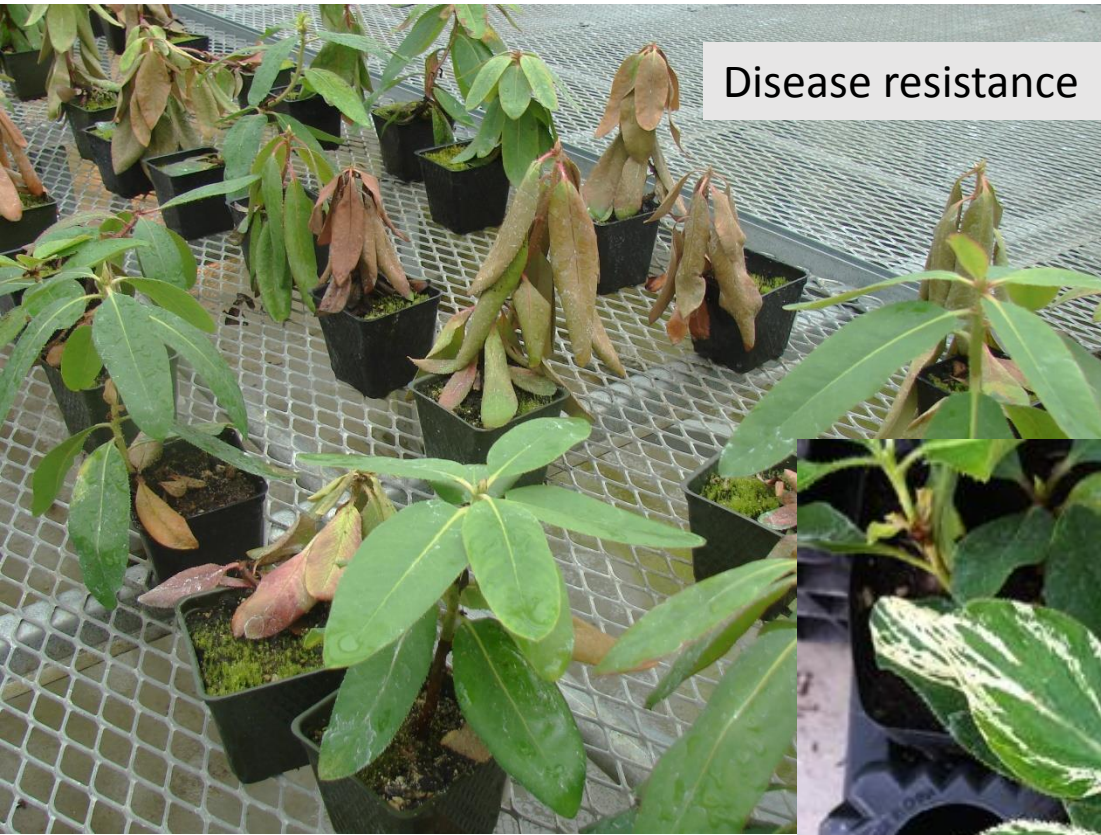
Cold damaged new foliage at Puyallup Hill



Further study

Relationship of climate,
phenology, and disease

Disease resistance



Population genetics

Projected movement
under climate change

And more

Horticultural varieties

