

Lodgepole Pine and Western White Pine Breeding Program Updates

Jarrett Columbus, Sarah Leroux and Nicholas
Ukrainetz

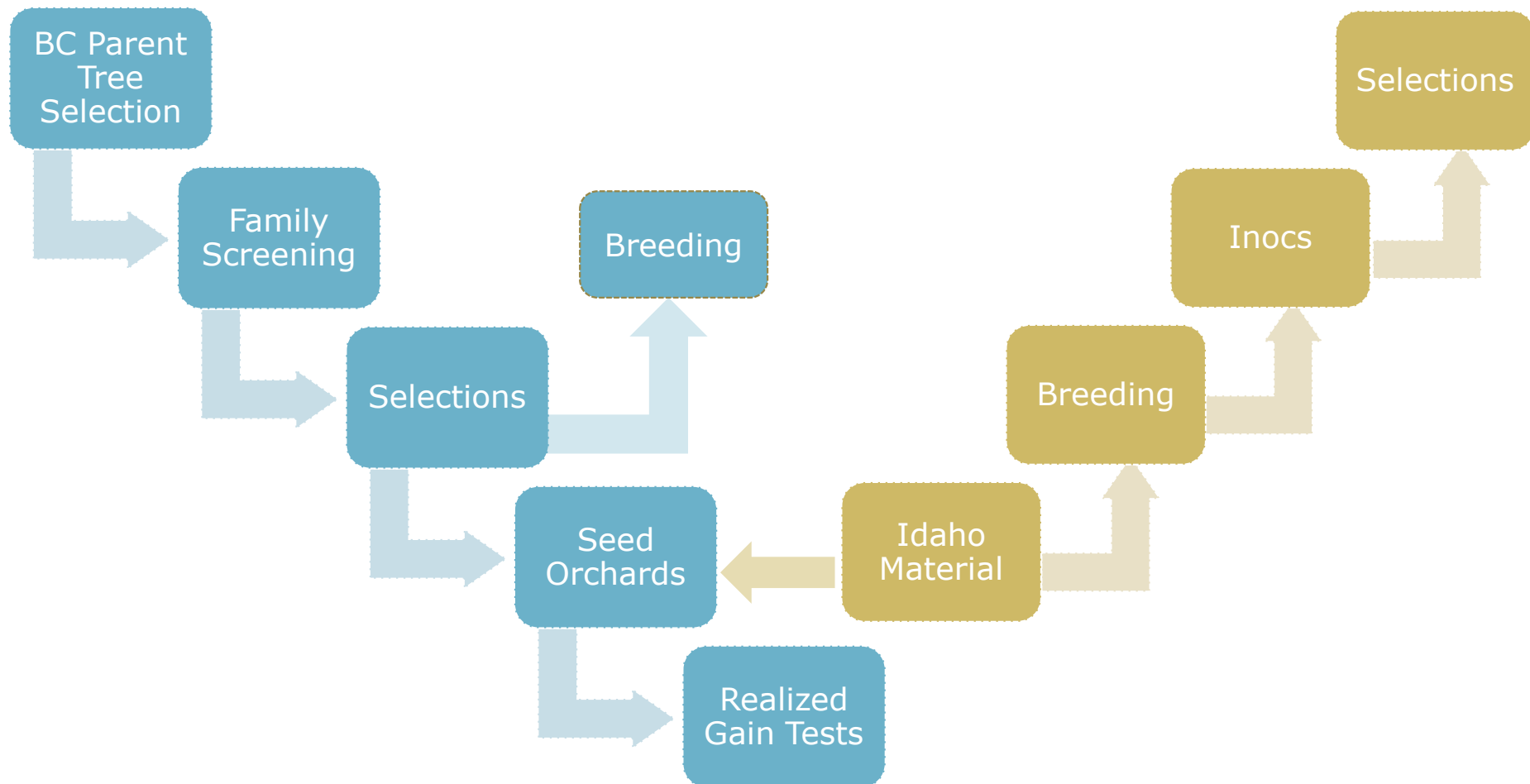


Western White Pine



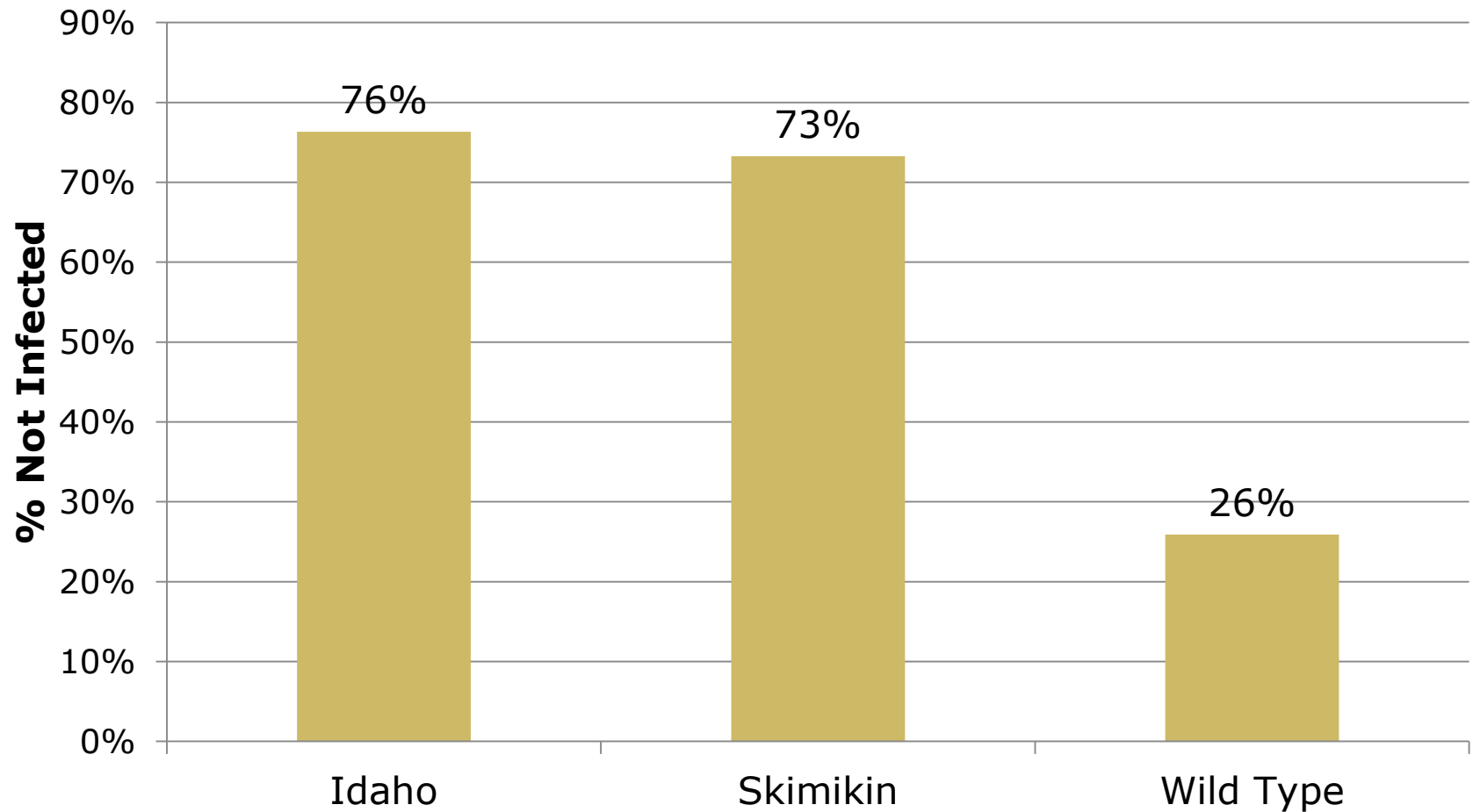
Ministry of
Forests, Lands and
Natural Resource Operations

Pwi Program Update



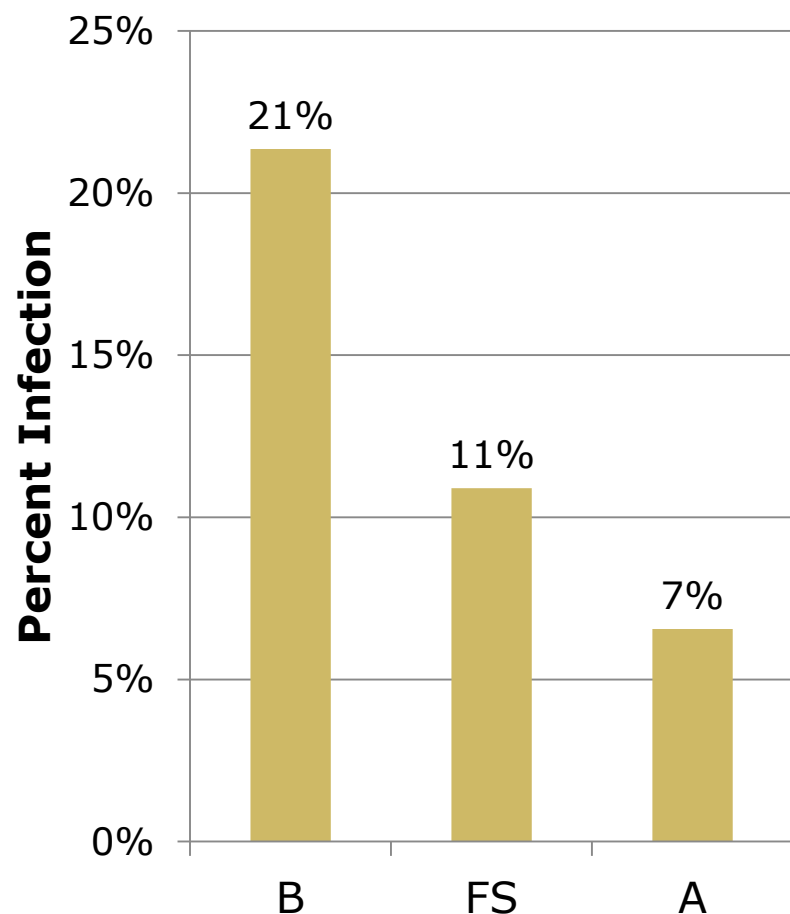
RGG – Baird Lake

Blister Rust Infection

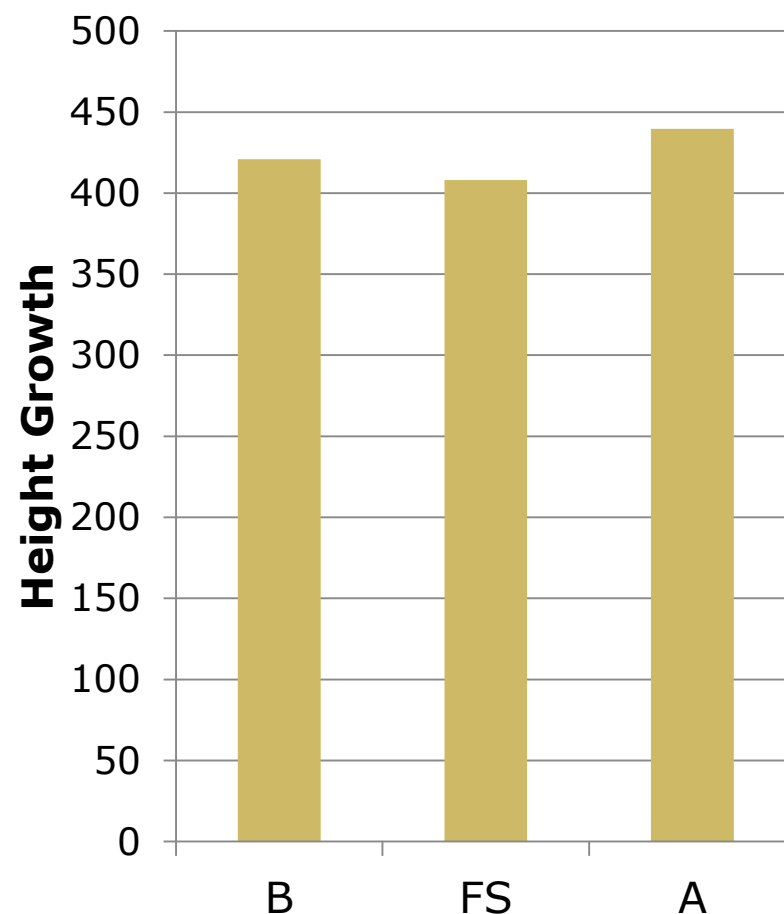


SORGG – Currie and Hidden

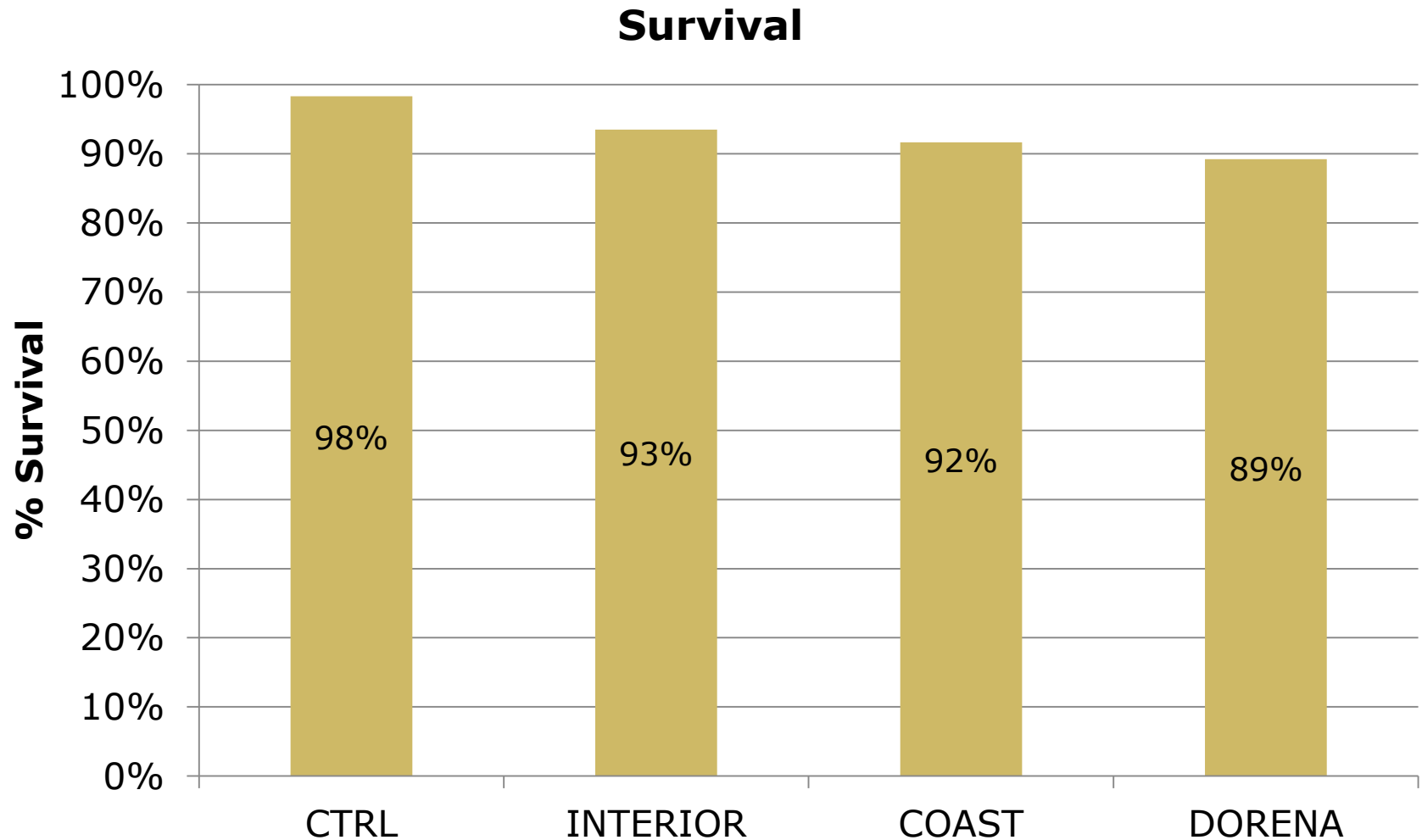
% Blister Rust Infection



Mean Height Growth



Series 5 – Coast/Interior Trials



Pwi Future Plans

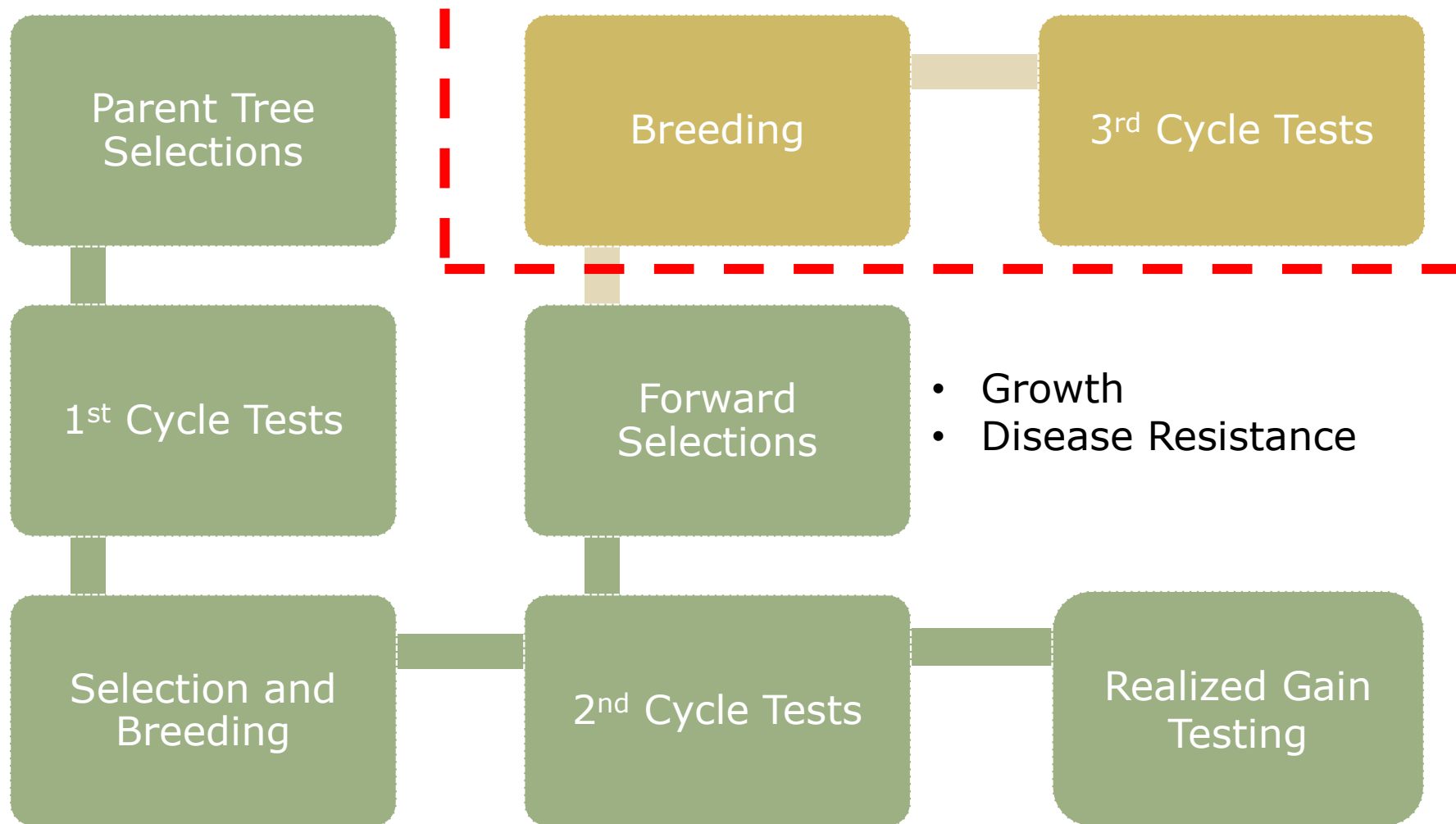
- Plant progeny tests!!!



Lodgepole Pine



Pli Program Update

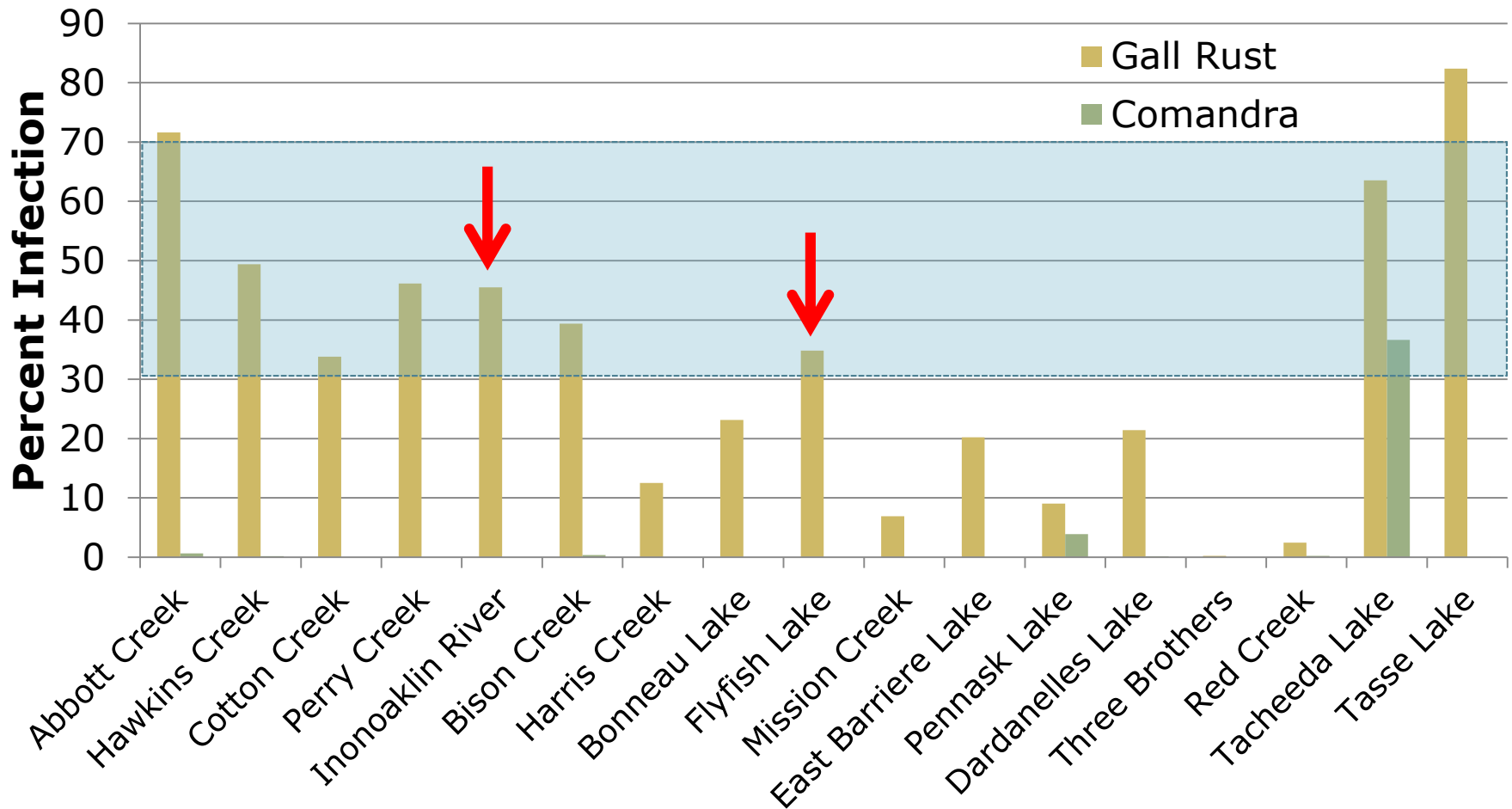


Disease Resistance Work and the UBC CoAdapTree Project



Disease Resistance Work

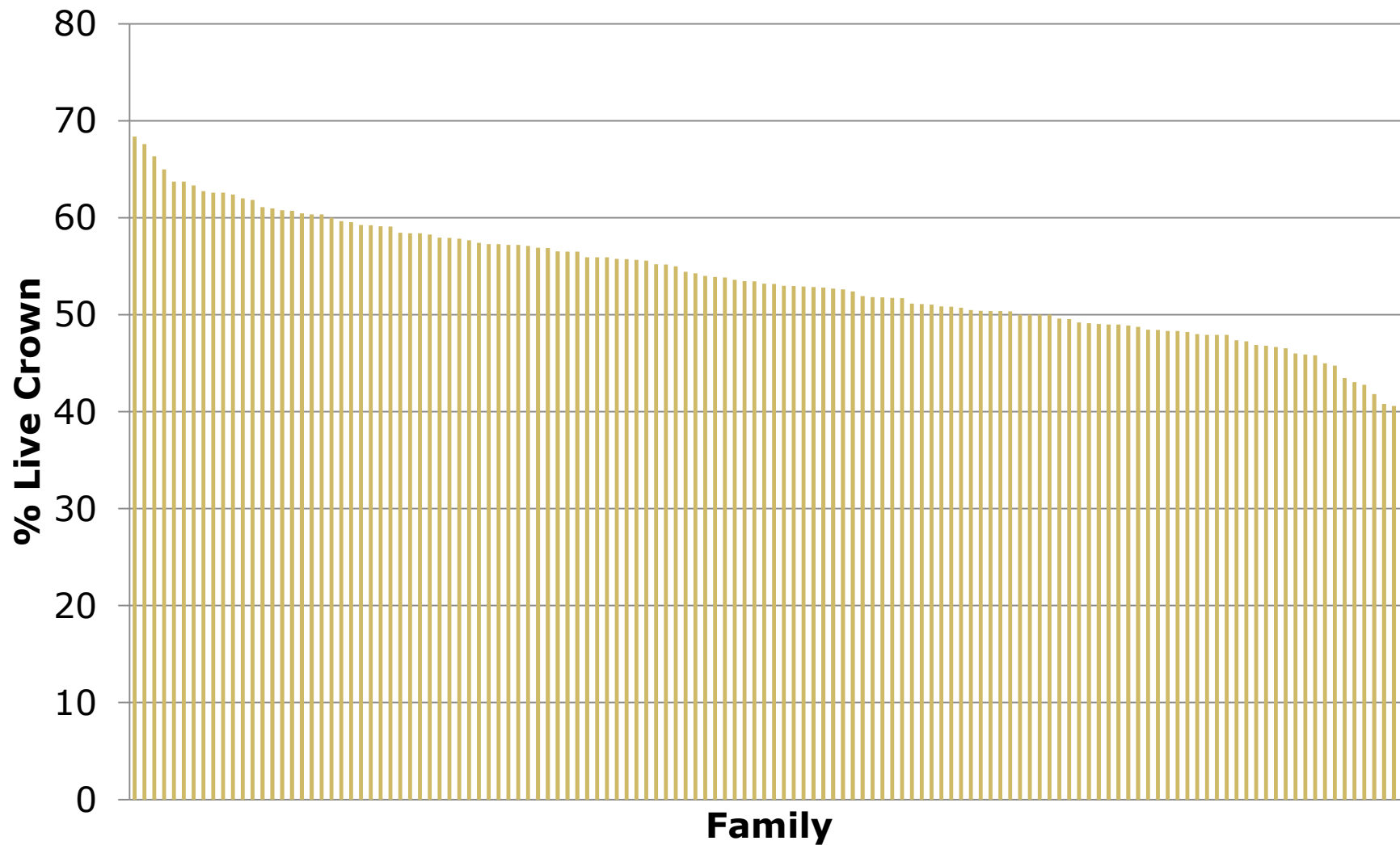
CNC Disease Survey Results Southern Sites



Dothistroma



Dothistroma

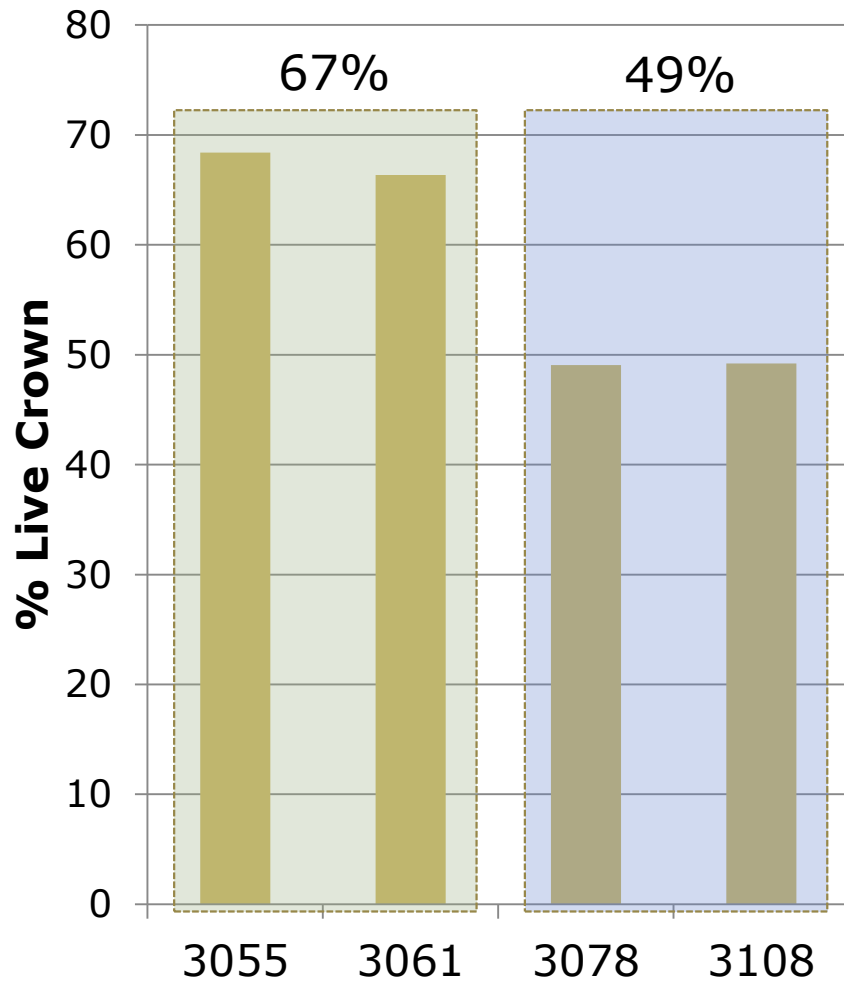


Dothistroma and CoAdapTree

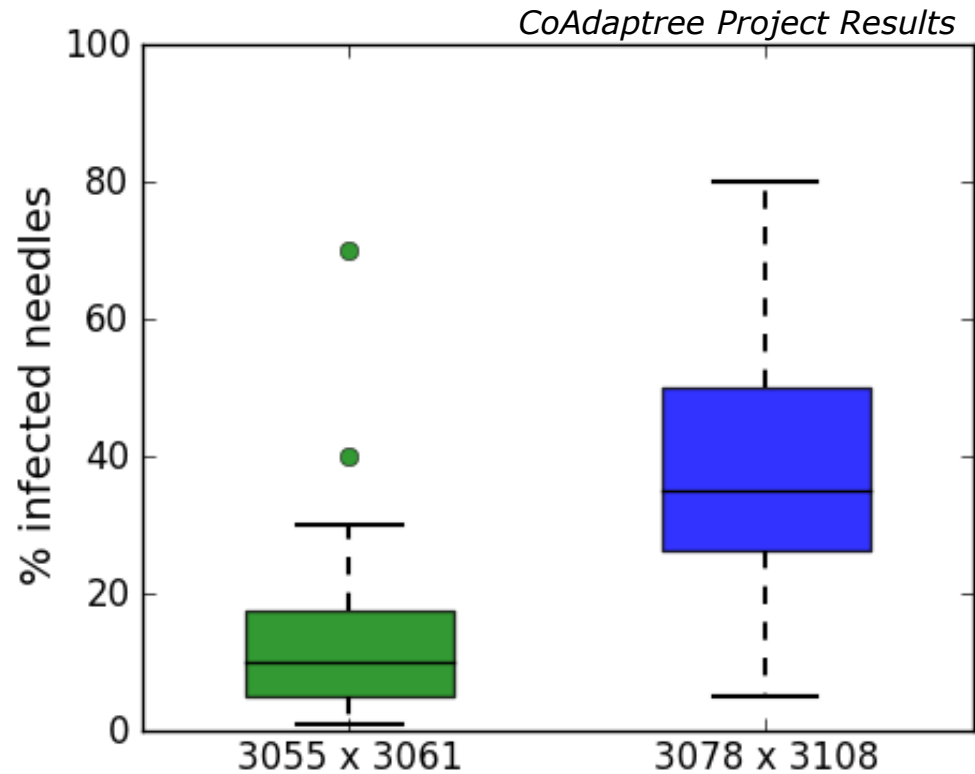
- UBC CoAdapTree Project – Activity 2
 - Dothistroma resistance in lodgepole pine
 - Swiss Needle Cast resistance in Douglas-fir
- Dothistroma Resistance Work
 - i. Patterns of resistance across BC
 - ii. Genetic variation in dothistroma
- Two inoculation experiments
 - i. Resistant vs Susceptible crosses
 - ii. Provenances (4,000 seedlings; lodgepole and jack pine)

Dothistroma and CoAdapTree

Nass-Skeena Data



UBC Inoculations



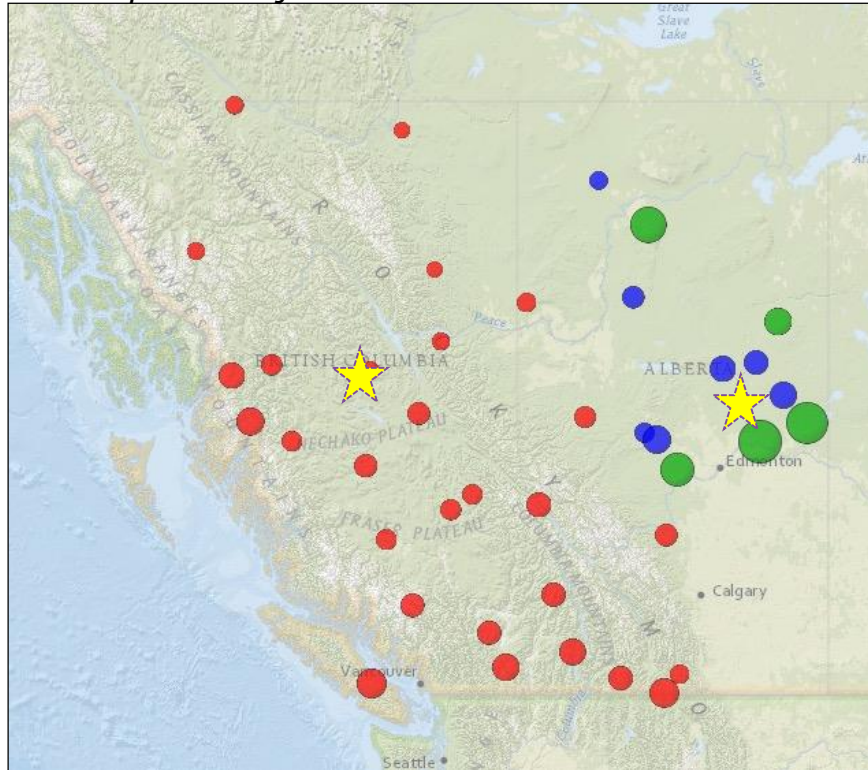
Dothistroma and CoAdapTree



CoAdaptree Project Results

Dothistroma and CoAdapTree

CoAdaptree Project Results

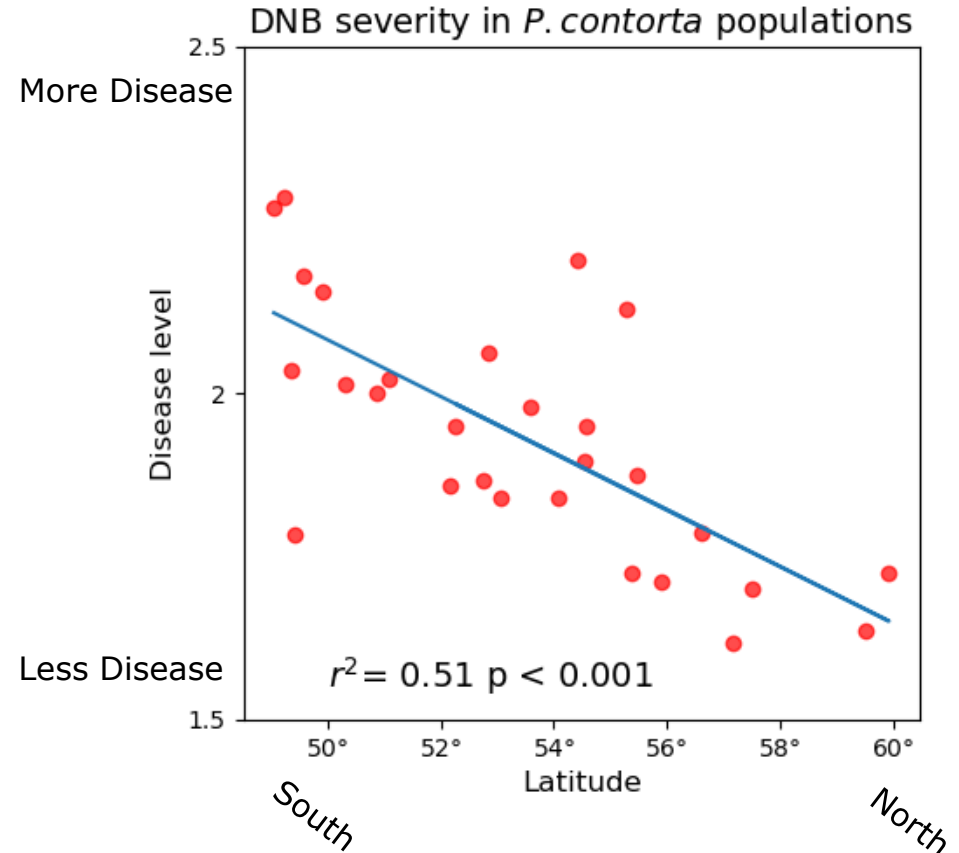


DNB severity:

- 1.5 (low)
- 2.0
- 2.5
- 3.0 (high)

Populations:

- *P. contorta*
- *P. banksiana*
- *P. contorta* x *P. banksiana*

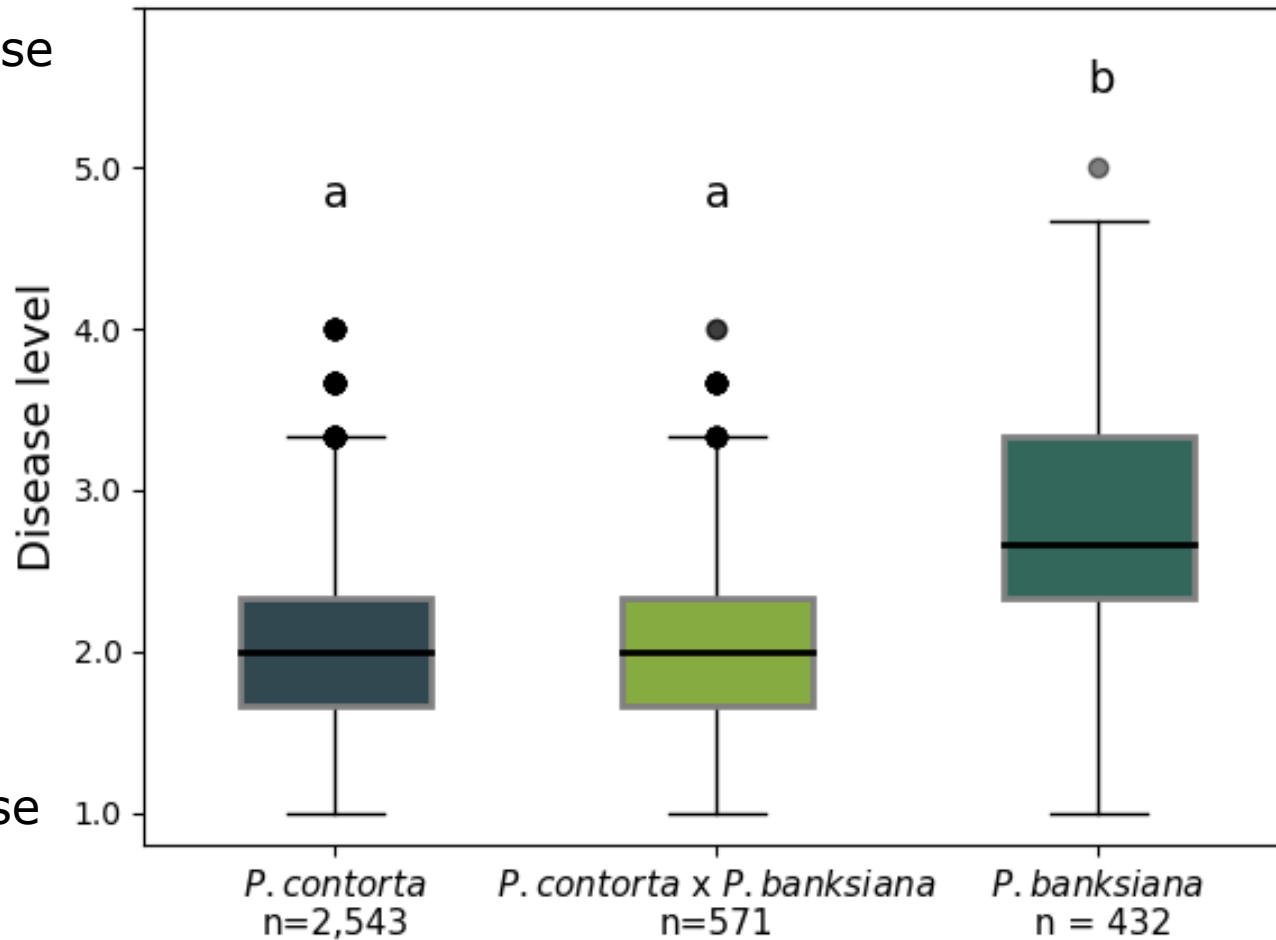


Dothistroma and CoAdapTree

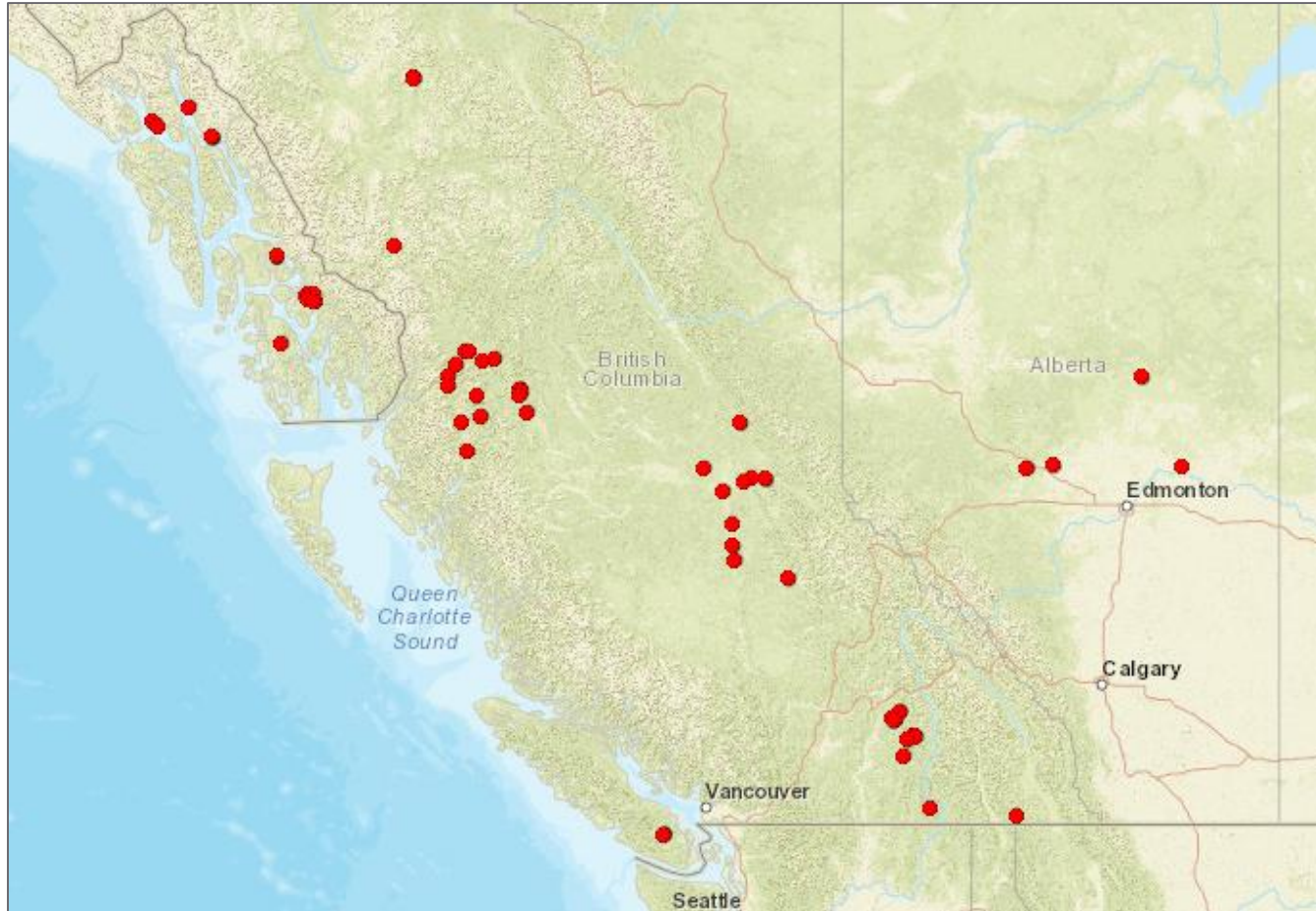
CoAdaptree Project Results

More Disease

Less Disease

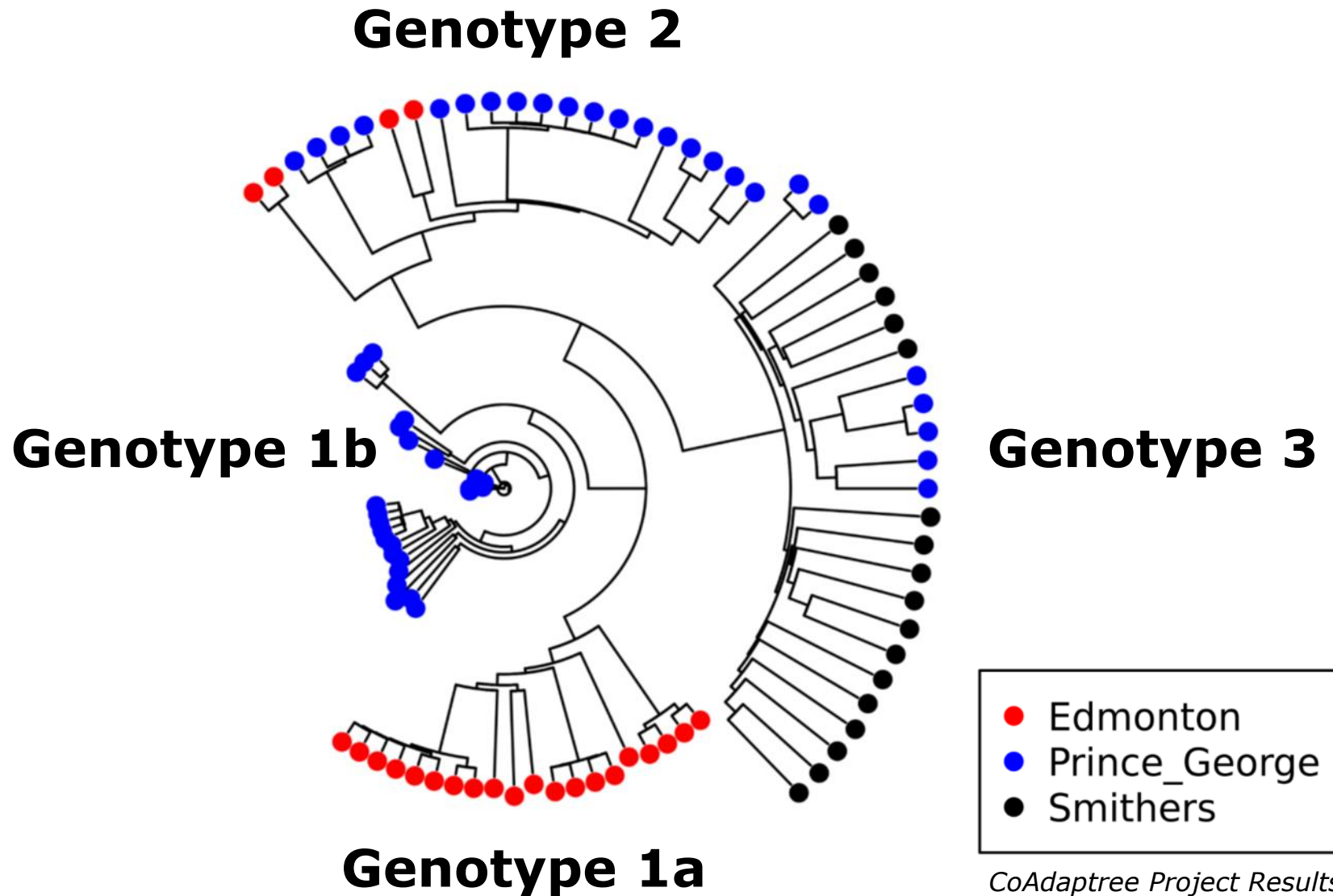


Dothistroma and CoAdapTree



CoAdaptree Project Results

Dothistroma and CoAdapTree



Conclusions

1. Field results match greenhouse inoculation results
2. Jack pine more susceptible than lodgepole pine
3. Within BC, southern populations are more susceptible than northern populations
4. There is population structure for dothistroma in western Canada
 - The population near Smithers is quite unique
5. Variation in virulence in dothistroma
 - Populations trigger different responses in the host

Forest Health - Dothistroma



UBC Inoculations

Kal Inoculations



Pli Orchards and CBST



Pli Orchards and CBST

GBST



CBST – Historic Orchards



Pli Orchards and CBST

GBST

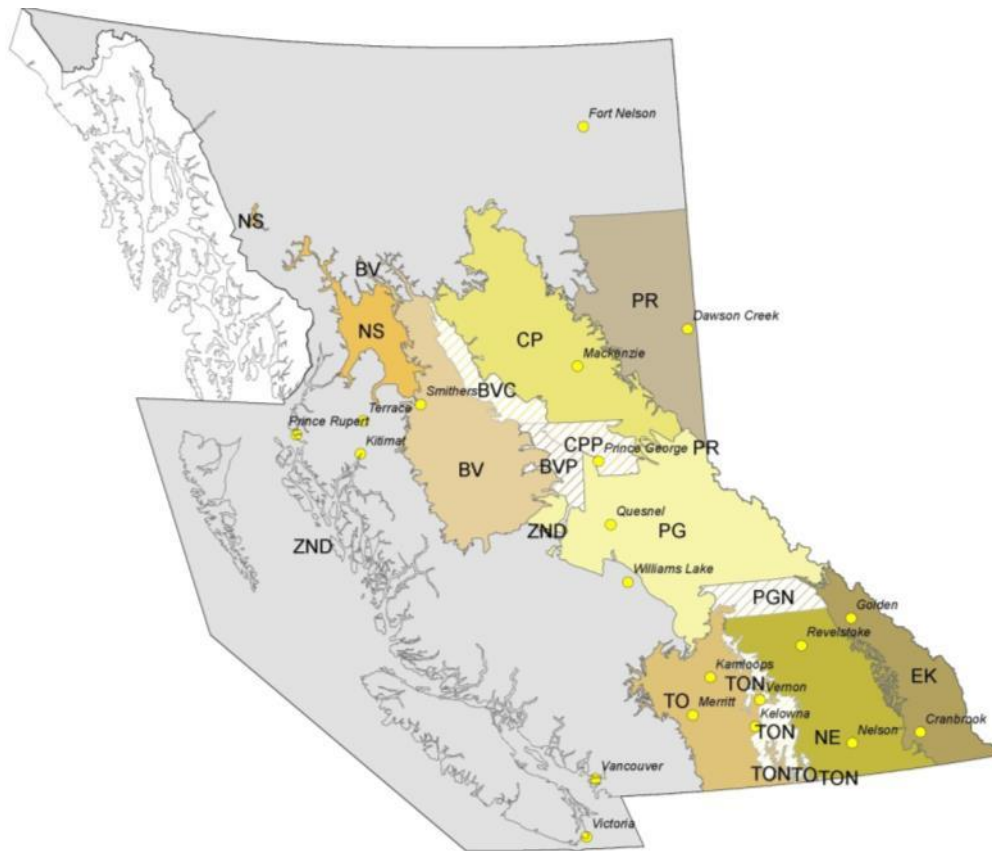


CBST – Historic Orchards

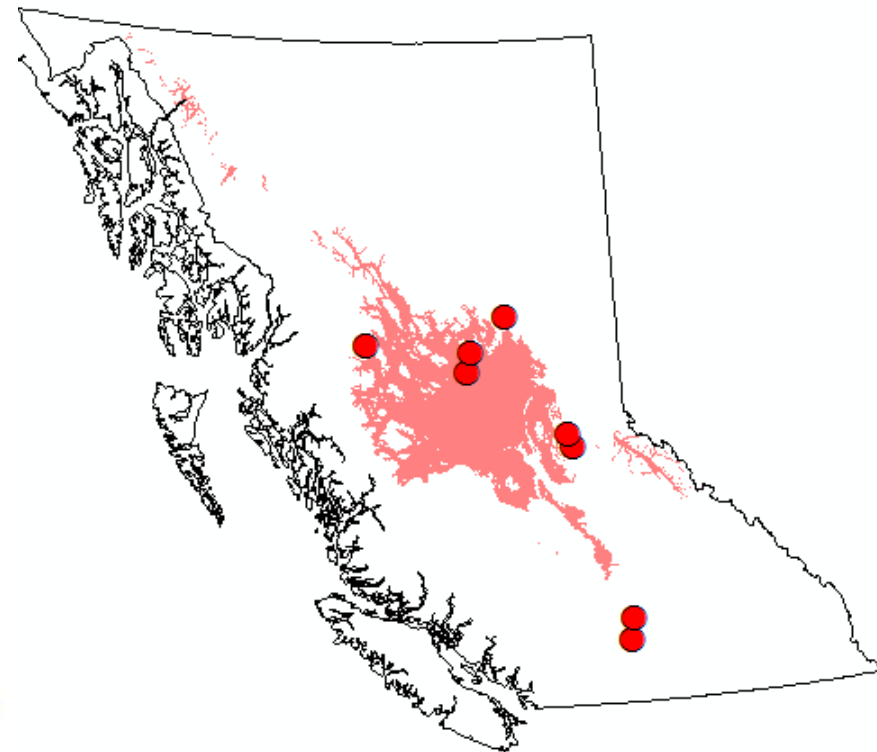


Pli Orchards and CBST

GBST



CBST – Future Orchards



Pli Orchards and CBST

CBST – Historic Orchards

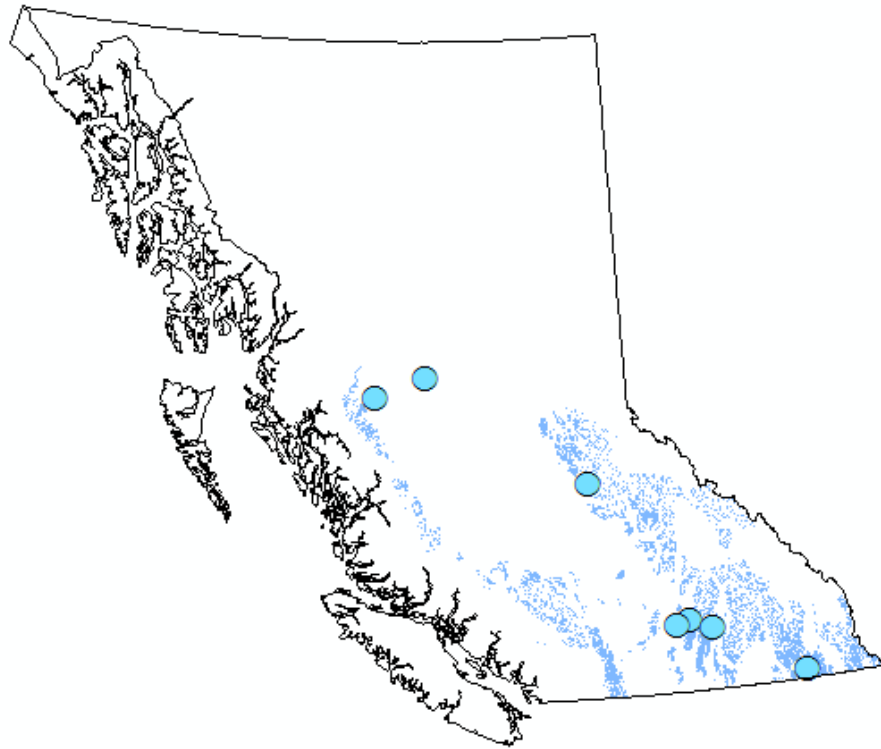
- Assisted migration
- BEC variants
- Transfer functions from provenance tests
- Climate of the parents

CBST – Future Orchards

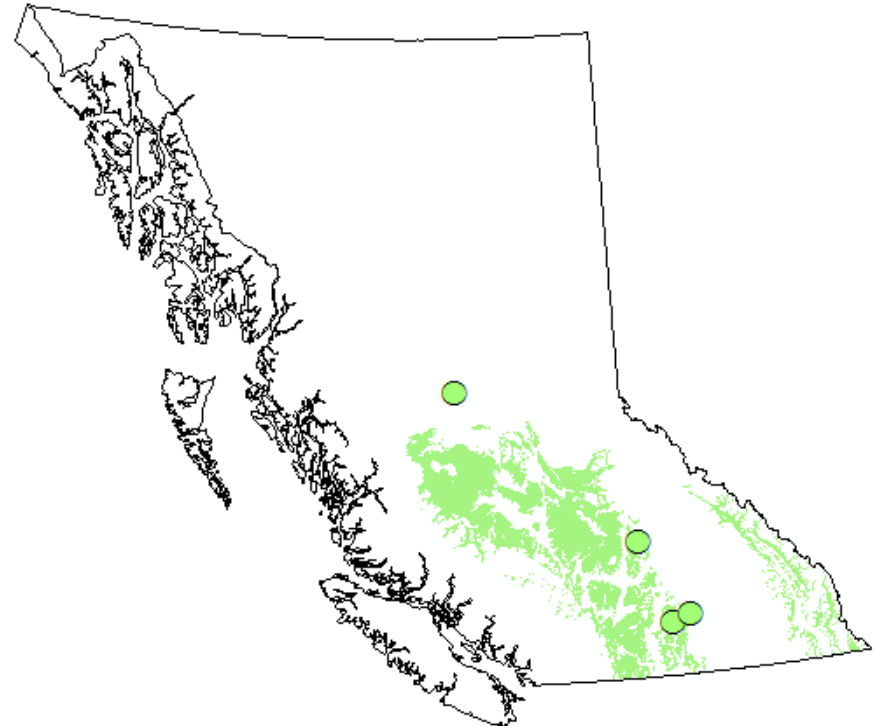
- Assisted migration
- BEC variants
- Transfer functions from provenance tests
- Climate of the test sites

New Breeding Zones

Nelson High

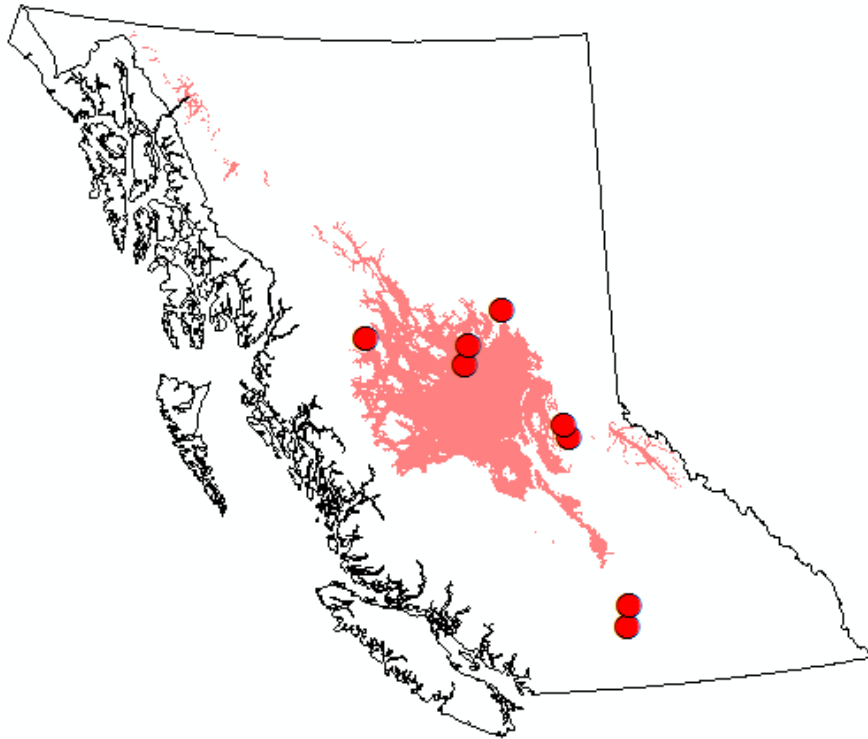


Thompson-Big Bar

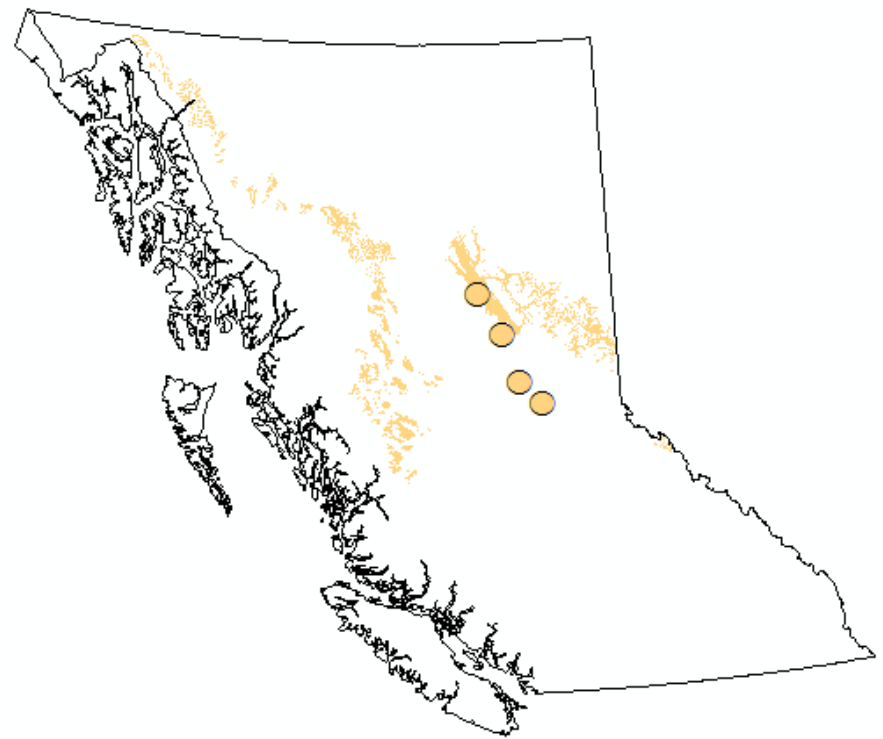


New Breeding Zones

Bulkley Valley

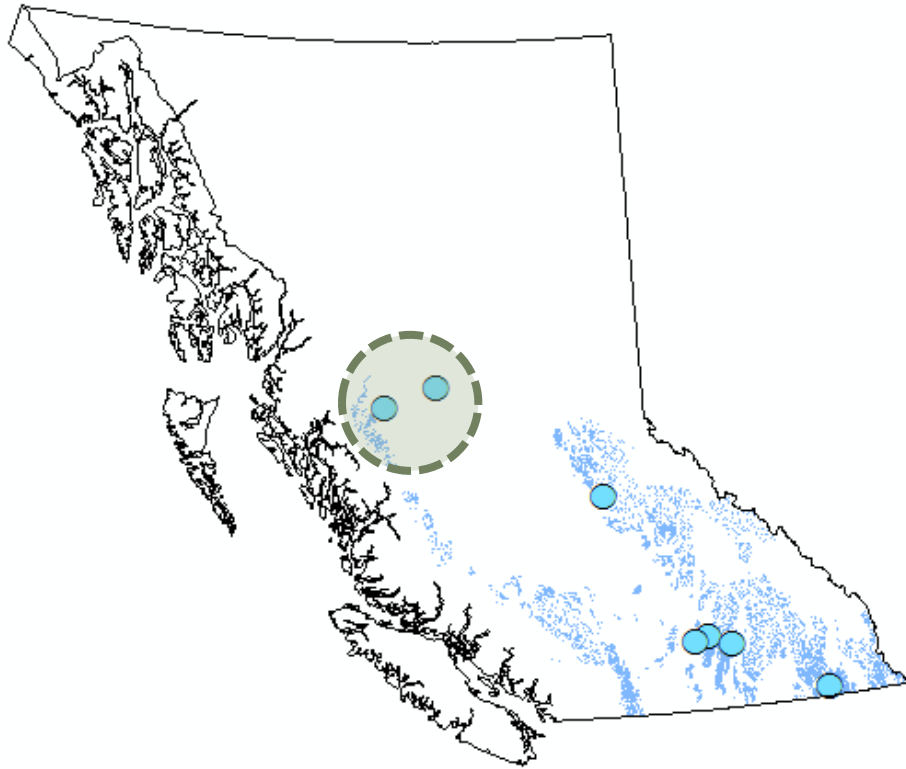


Central Plateau



New Breeding Zones

Nelson High



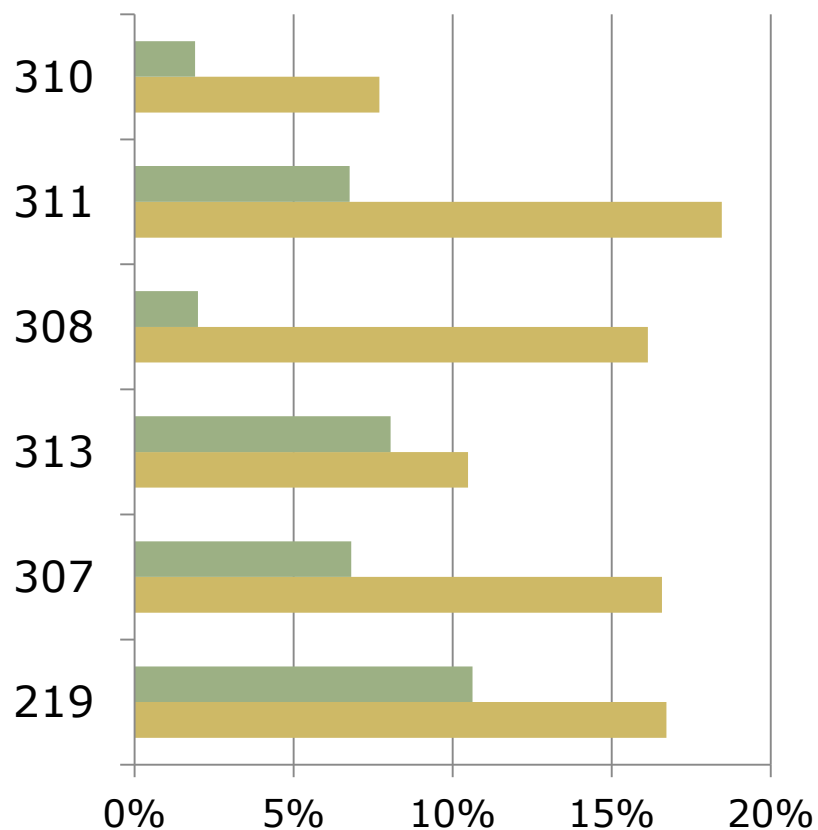
Grizzly Lake ForSels



New Breeding Zones

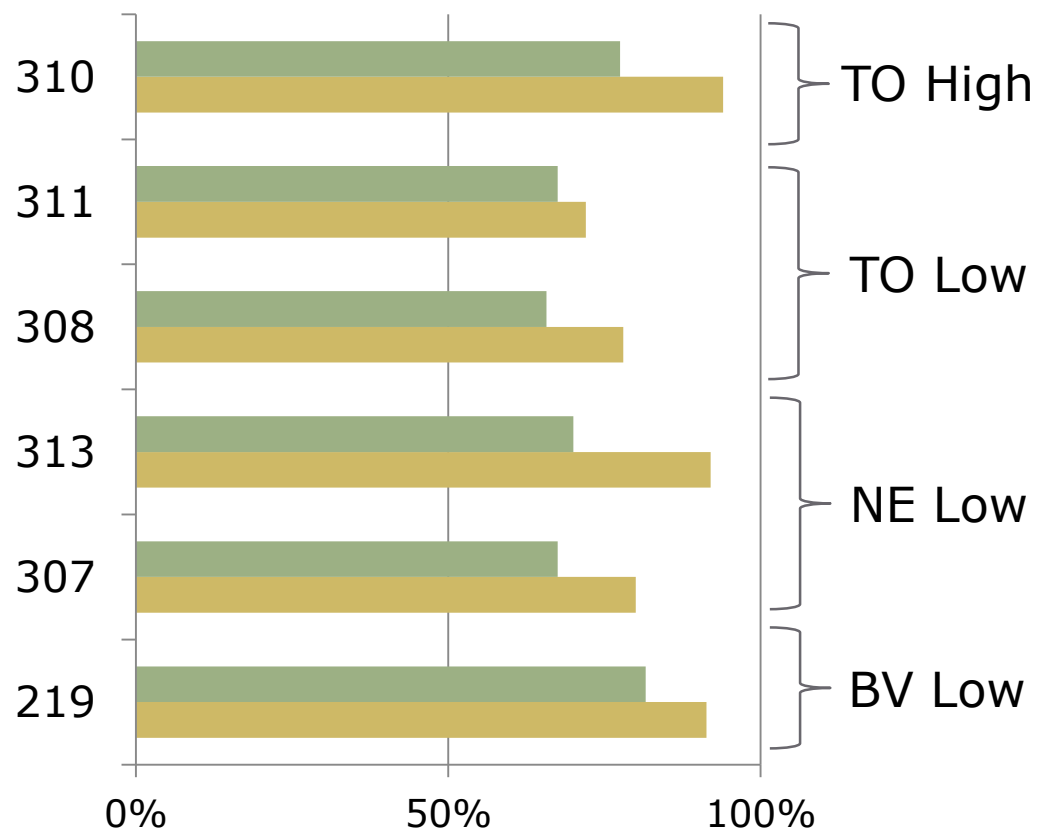
% Increase in Height

PINK GRIZ



% Survival

PINK GRIZ

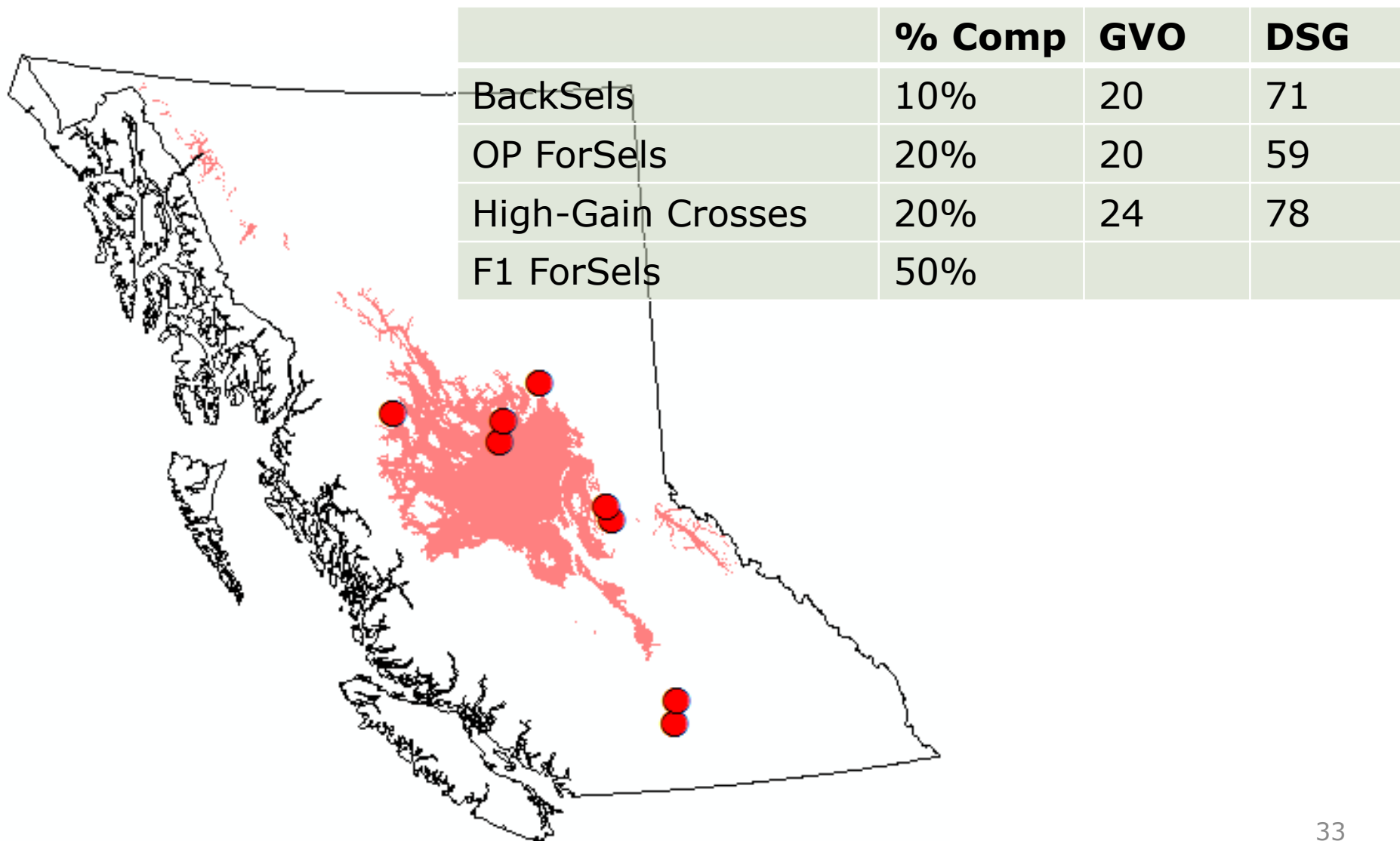


New Bulkley Valley Seed Orchard

New BV Seed Orchard

- Three new orchards
 - 5,000 ramets per orchard
 - 15,000 ramets total
- Orchard Composition
 - i. Backward selections (original parent trees)
 - ii. Forward Selections from first cycle tests
 - iii. High-gain seedlings crosses
 - iv. Forward Selections from second cycle tests

New Bulkley Valley Seed Orchard



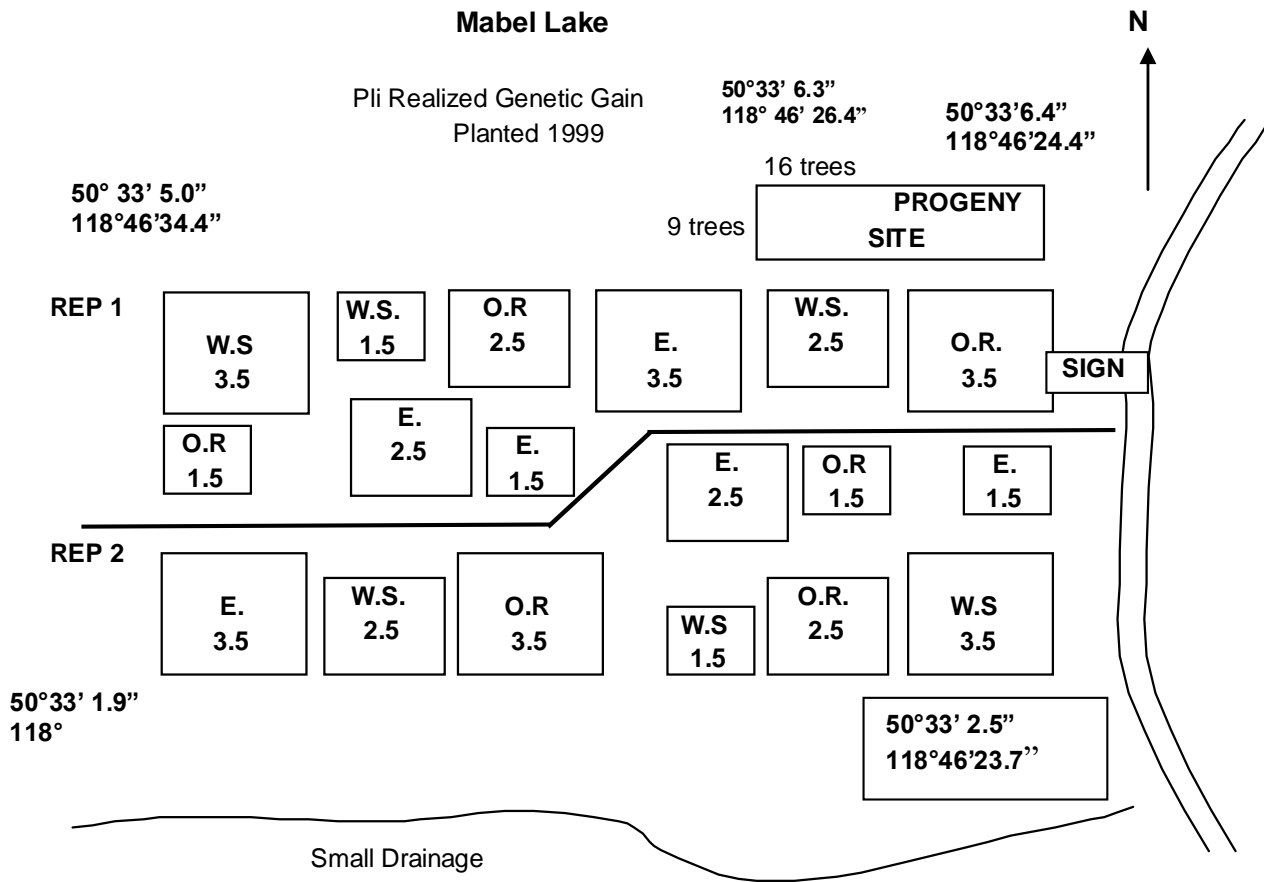
Pli Realized Gain Results



Pli Realized Gain Results

E = Top Crosses
OR = Orchard
WS = Wild Stand

1.5 = 1.5m spacing
2.5 = 2.5m spacing
3.5 = 3.5m spacing



LEGEND

Genetic Entry

W.S = Wild Seedlot

O.R. = Orchard Run

E. = Elite

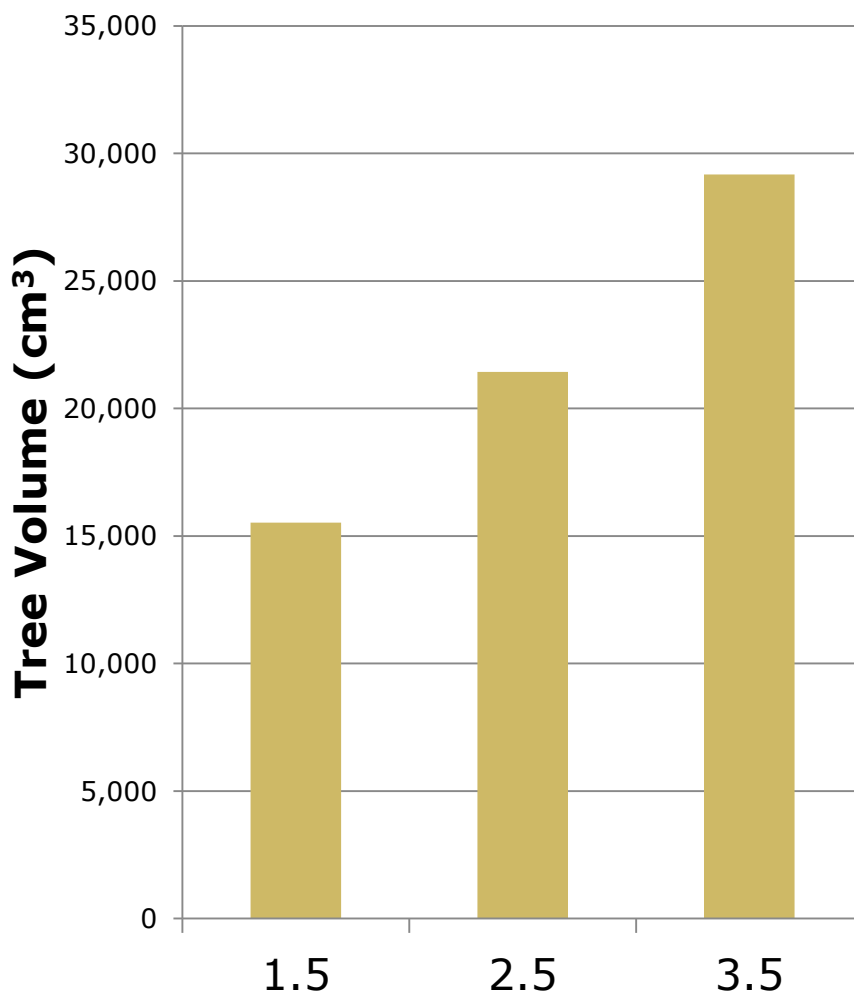
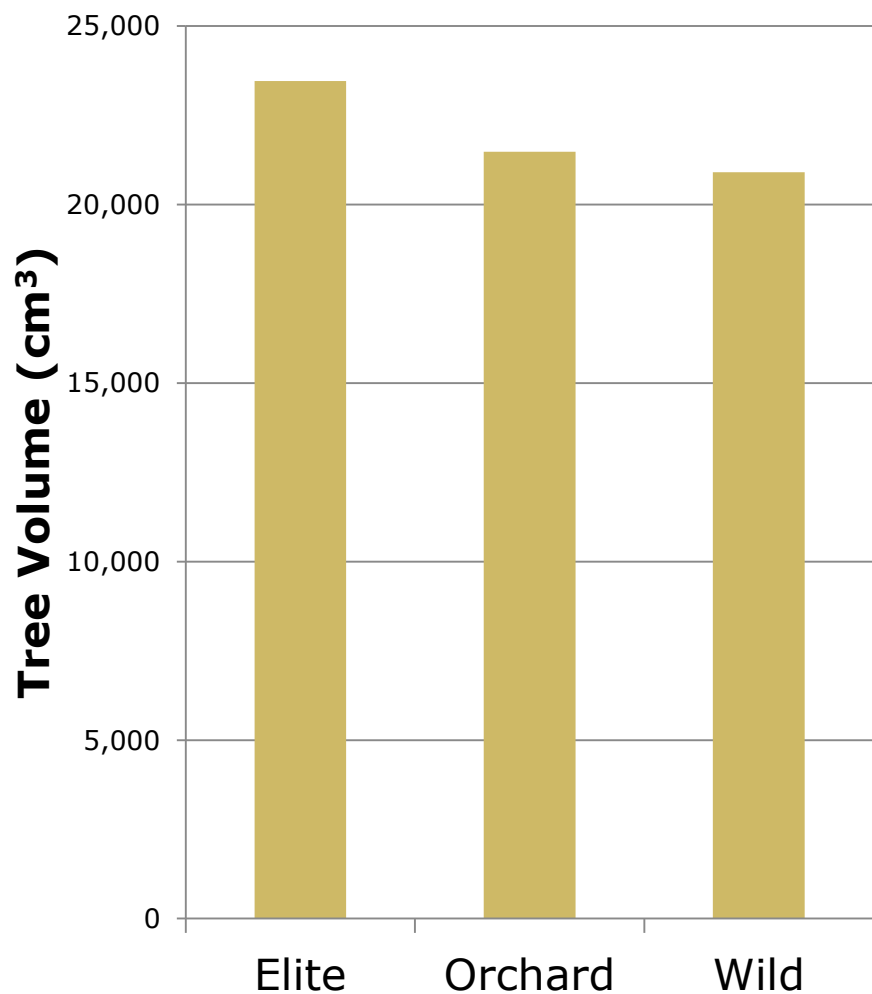
Spacing

1.5= 1.5m x 1.5 m

2.5= 2.5m x 2.5m

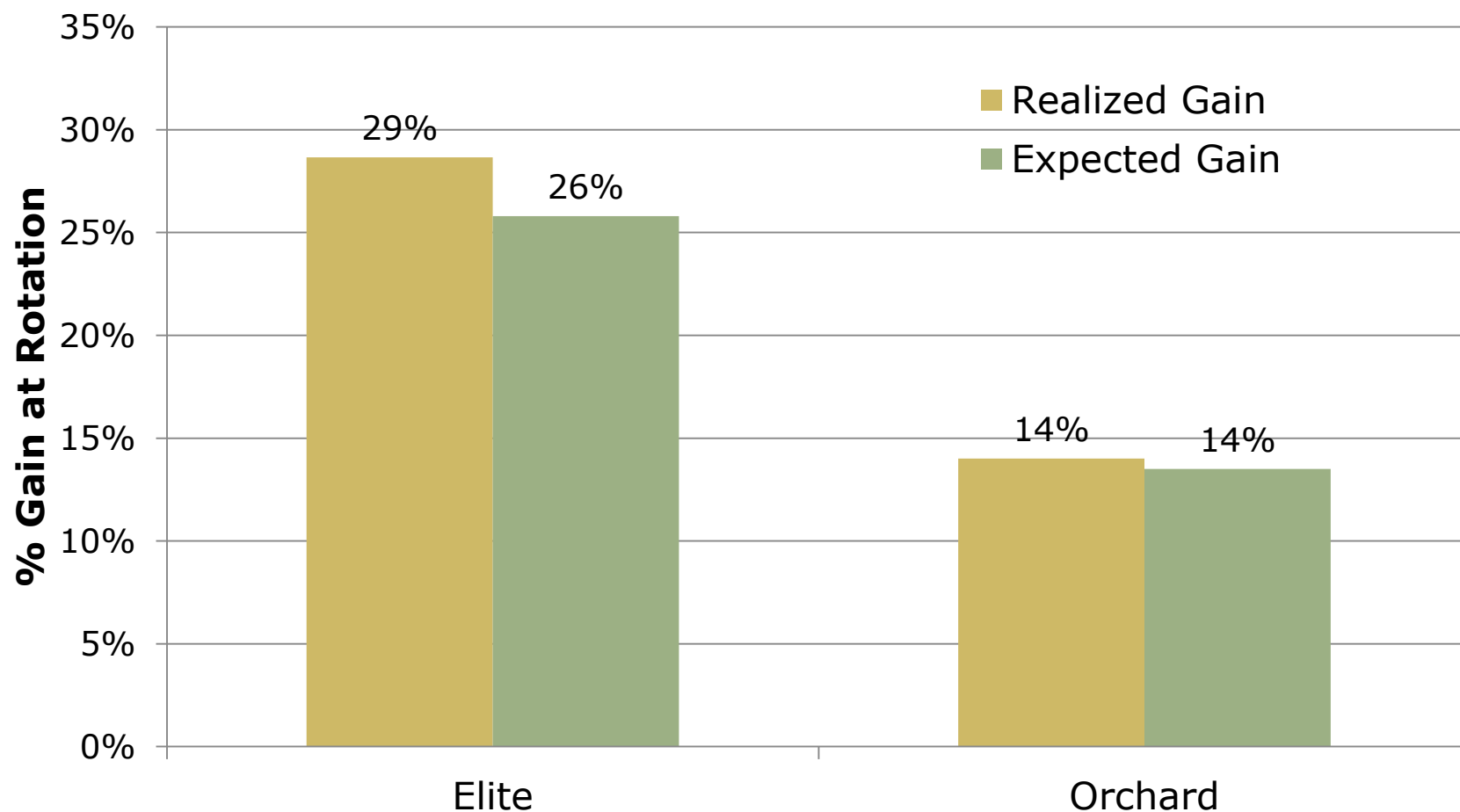
3.5= 3.5m x 3.5m

Pli Realized Gain Results



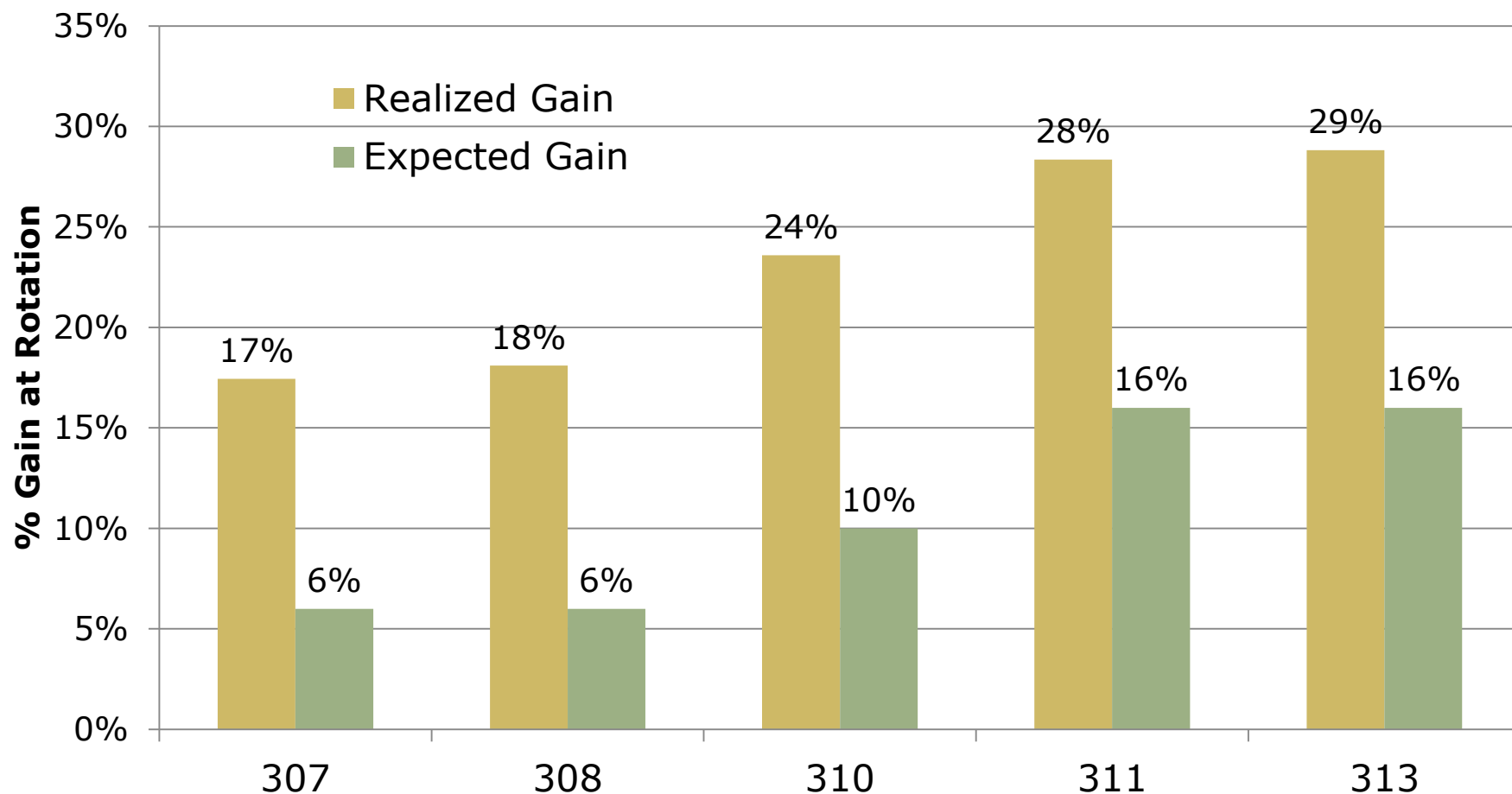
Pli Realized Gain Results

Southern Realized Gain Trials Age 21



Pli Realized Gain Results

Seed Orchard Realized Gain Southern Interior Age 16



Pli Future Plans

- Finish 15 year maintenance and measurements on F1 trials
- Continue with forward selections for different traits
- Finalize reorganization of the breeding program
- Support orchard expansion projects
- Continue research into disease screening methods