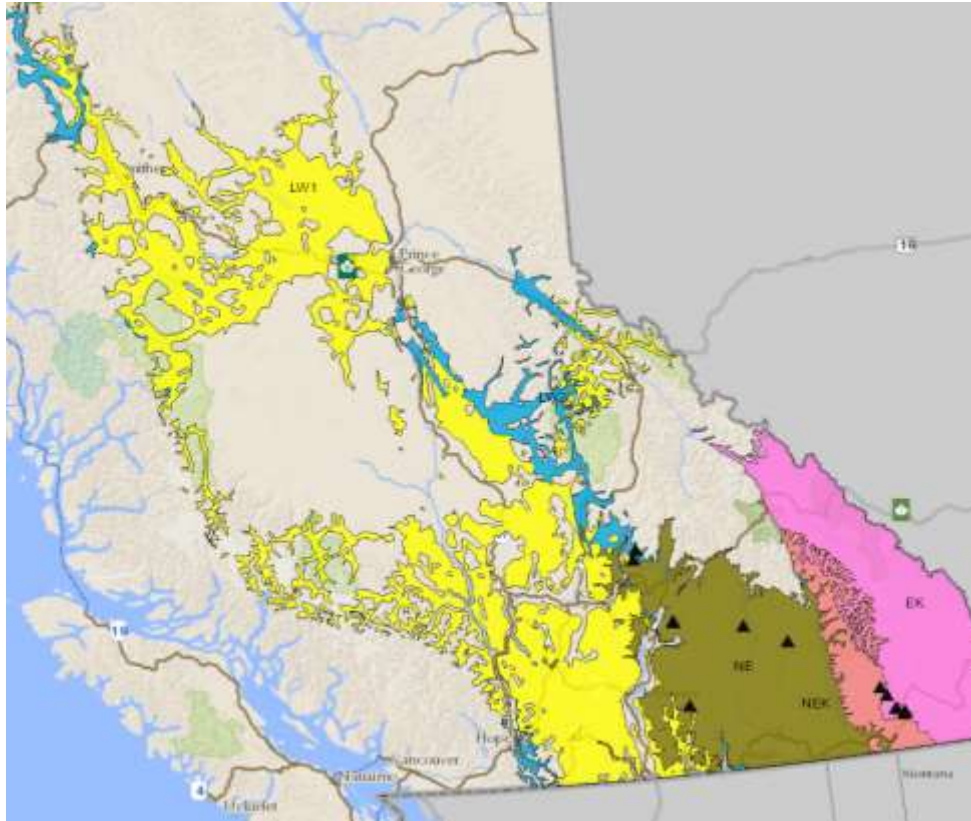




Interior breeding update:
spruce, Douglas-fir, western larch.

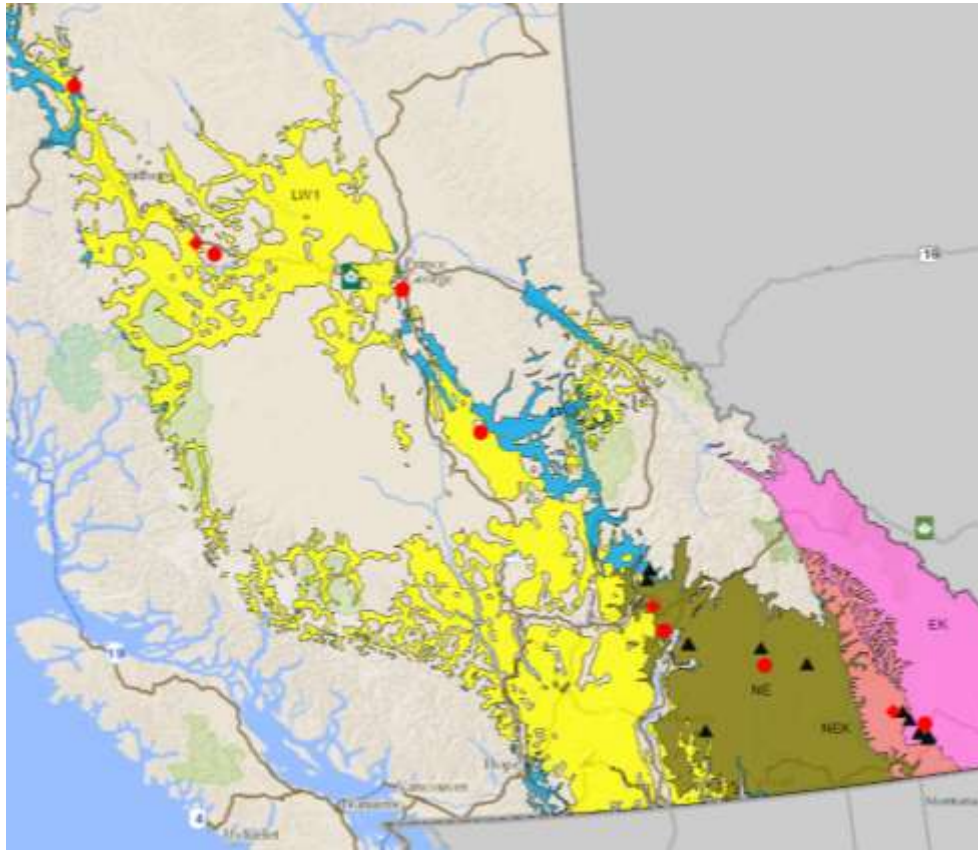
Trevor Doerksen & Barry Jaquish

Lw progeny testing – cycle 1.



- 1st cycle tests planted in original SPZ:
 - EK (pink)
 - NE (brown).
- Lw range projected to expand (Rehfeldt & Jaquish) NW:
 - LW1 (EK)
 - LW2 (NE)
- cycle 2 crossing complete (2016).

Lw progeny testing – cycle 2.



cycle 1 (black) & cycle 2 (red) test sites

- 7 NE progeny tests planted (2017).
 - ▣ not ideal -> hot, dry, fires!
 - ▣ survival mapping surveys (2018).
- EK progeny tests
 - ▣ sown & lifted (2017)
 - ▣ 4 sites identified for planting (2018).



Lw

NE cycle 2 progeny crop (Landing Nursery, 2017)



Lw test sites (2017).

Cranbrook (east Kiakho)

Lw test sites (2017).



Kispiox



Cranbrook (east Kiakho)



Lw test sites (2017).

Alex Fraser Research Forest



Lw test sites (2018).

Kimberly (Meachen)

Huge thanks to all collaborators!!



Sx – weevil resistance screening.

Sx – artificial infestation.



- Challenge:
 - ▣ uniform infestation
 - artificially raise
 - release weevils on young progeny tests (e.g. raised-bed)
 - ▣ broad inference
 - across environments
 - relative to other genotypes

Sx – artificial infestation.

□ Challenge:

▣ uniform infestation

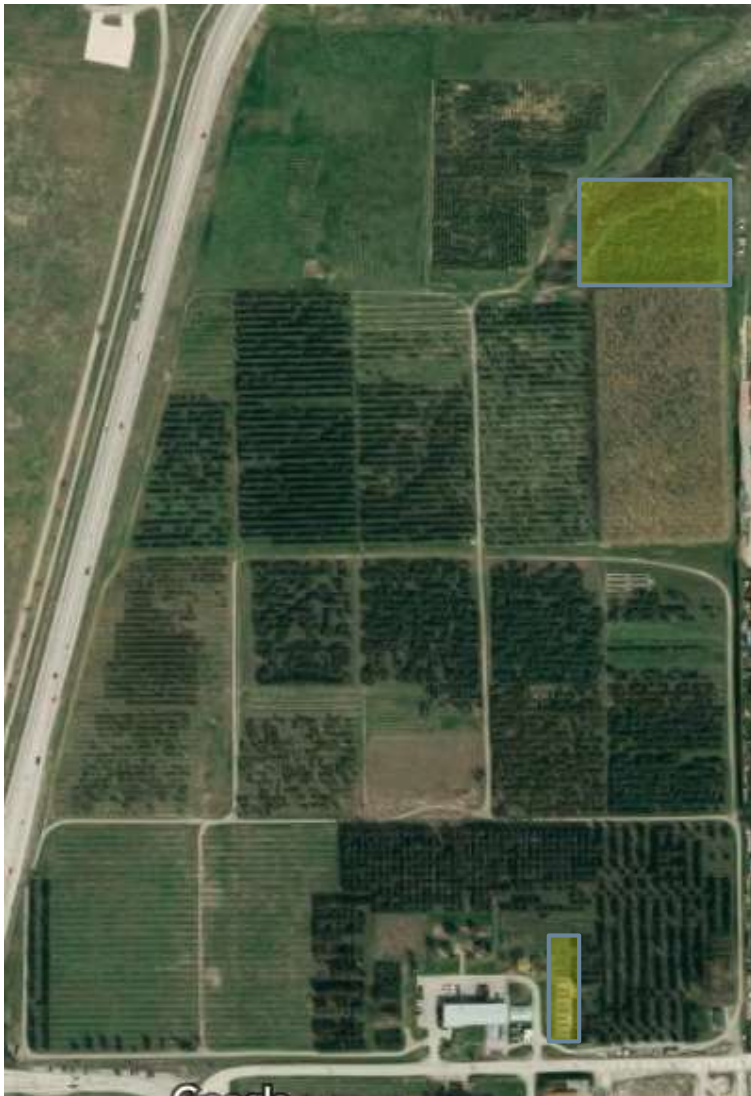
- artificially raise
- release weevils on young progeny tests (e.g. raised-bed)

▣ broad inference

- across environments
- relative to other genotypes



Sx – weevil resistance screening



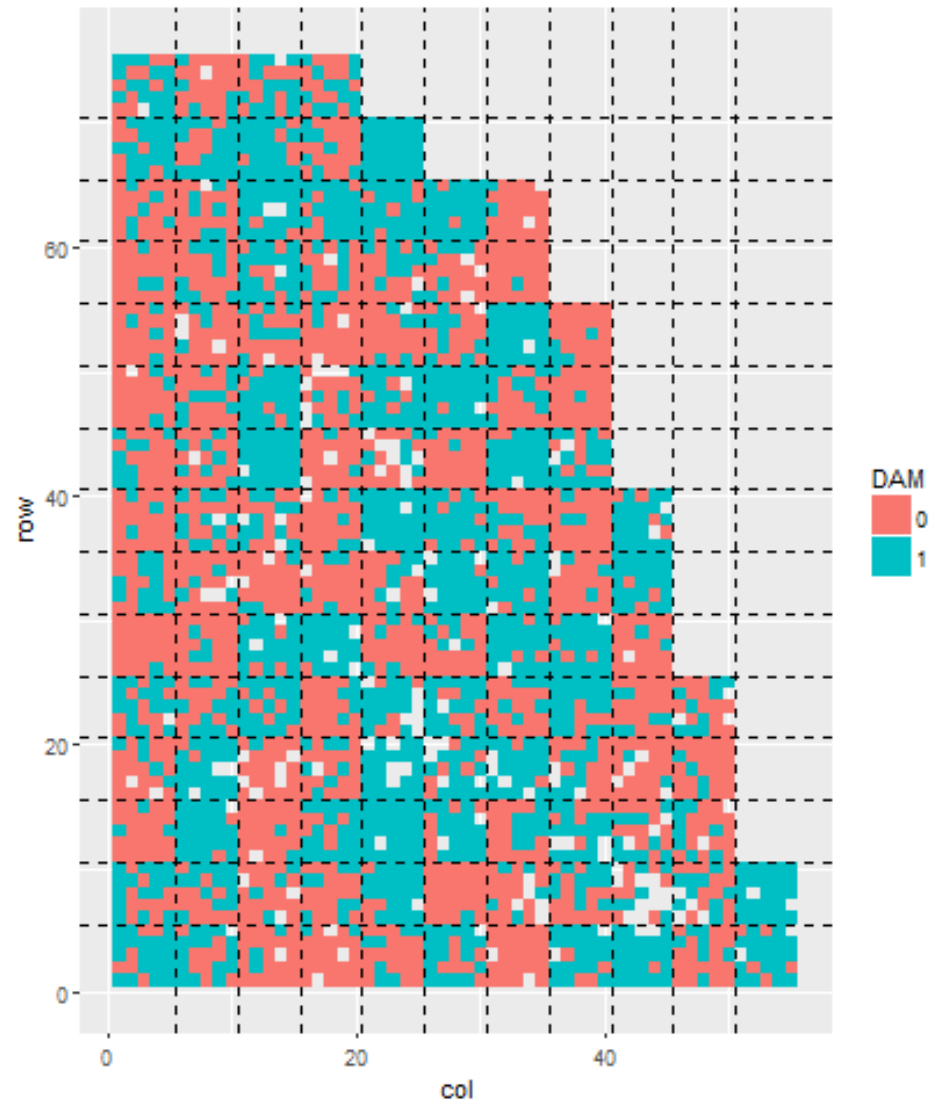
- Challenge:
 - ▣ uniform infestation
 - artificially raise & release weevils on young progeny tests (e.g. raised-bed)
 - ▣ broad inference
 - across environments
 - relative to other genotypes
- combine experiments!
 - ▣ 2 Kal + 2 Skimikin

Sx – KAL GBU



- 13 parents classed as:
 - resistant (R)
 - susceptible (S)
- 42 full-sib families:
 - RxR (G)
 - RxS (B)
 - SxS (U!)
- cumulative weevil attacks (binary) over time
 - 0 = attacked (susceptible)
 - 1 = healthy (resistant)

Sx – KAL GBU

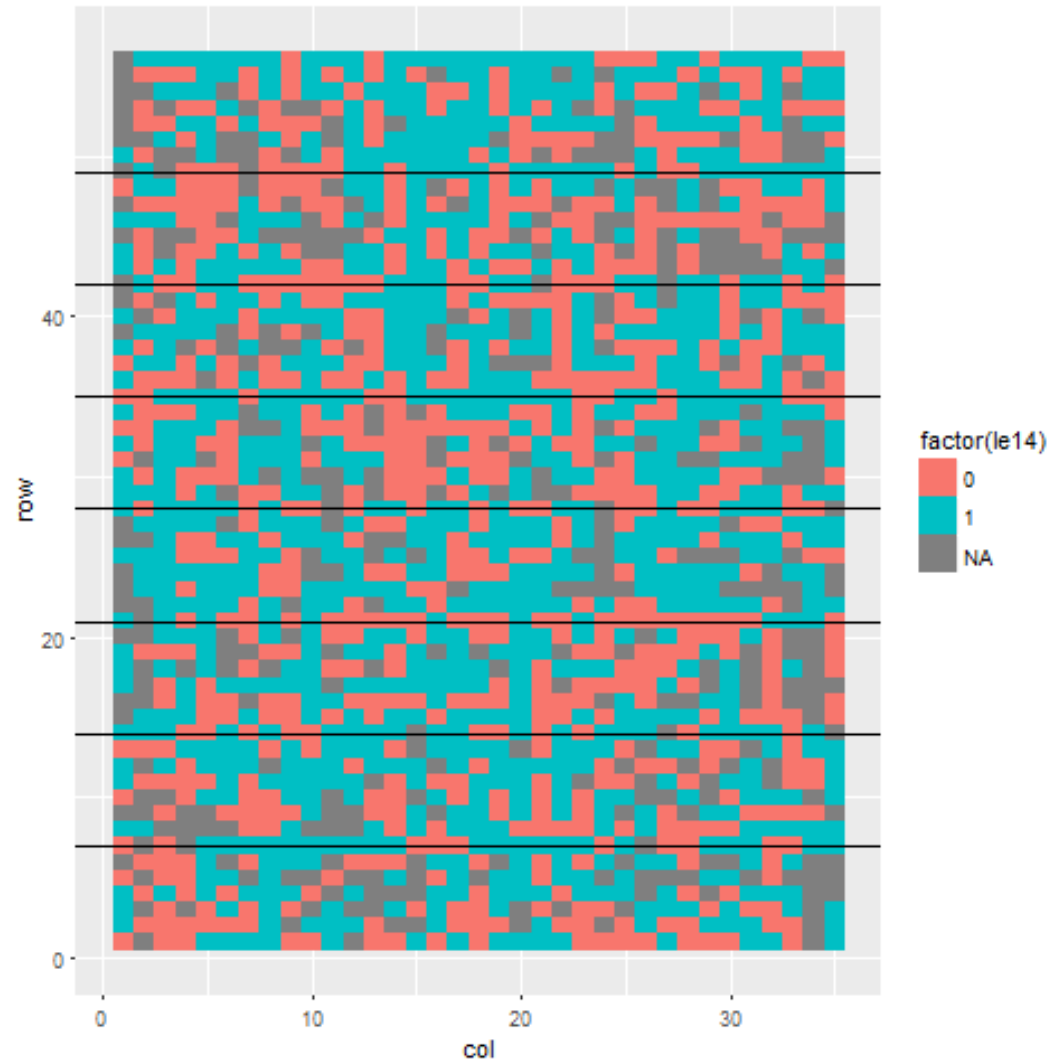


Sx – KAL raised bed



- 58 parents
 - OP seed (VSOC orchard 211)
 - half-sib families

Sx – KAL raised bed



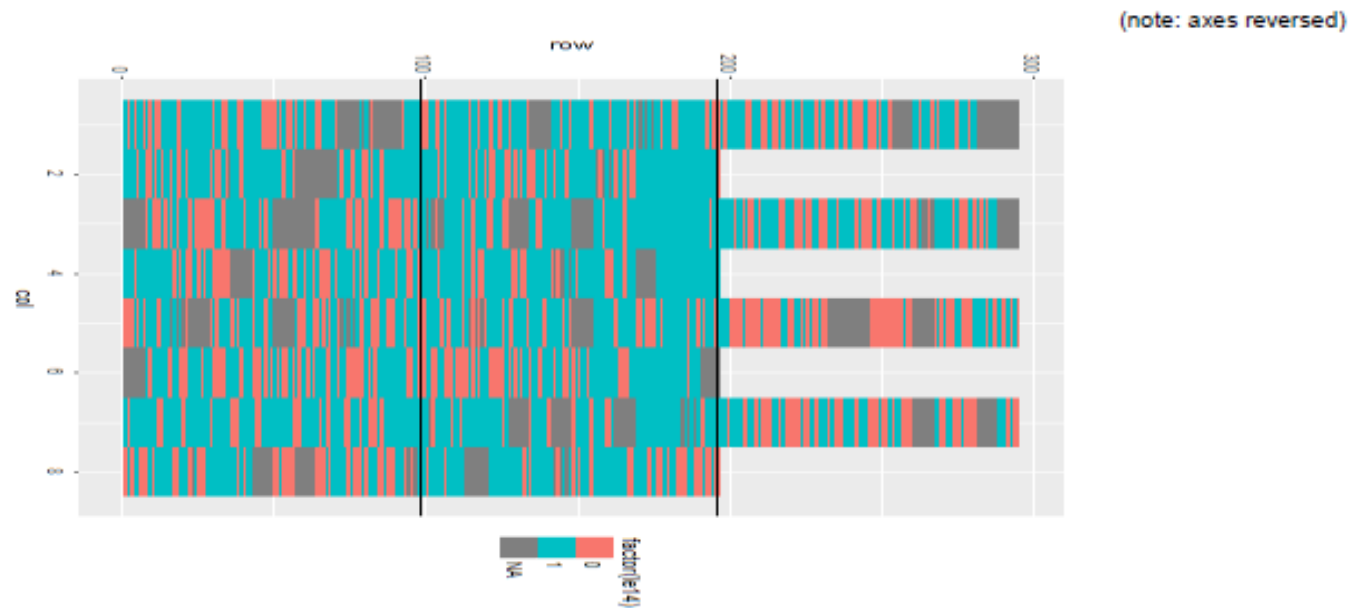
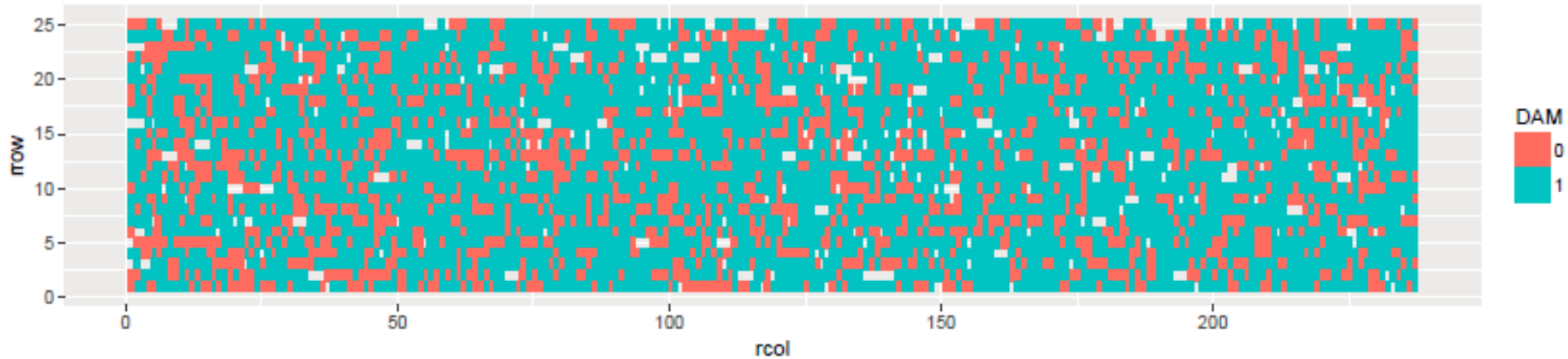
Sx – Skimikin:

PGS2 progeny test & 'raised bed'.



Sx – Skimikin:

PGS2 progeny test & 'raised bed'.



Sx – weevil resistance screening

summary data

site	type	parents	trees	0	1
KAL-RB	HS	58	1351	0.44	0.56
SKIM-RB	HS	50	1383	0.35	0.65
GBU	FS	13	2973	0.52	0.48
SKIM-PT	FS	142	5568	0.28	0.72

- only 4 common parents in GBU -> lump together
KAL-RB

Sx – weevil resistance screening

summary data

site	type	parents	trees	0	1
KAL-GBU	HS+FS	67	4324	0.49	0.51
SKIM-RB	HS	50	1383	0.35	0.65
GBU					
SKIM-PT	FS	142	5568	0.28	0.72

- min 44 common parents among tests
- reduced animal model (RAM), inference only on parent trees with offspring
- multivariate -> estimate genetic correlations among traits in different tests (?)

Sx – weevil resistance screening

genetic correlations & h2

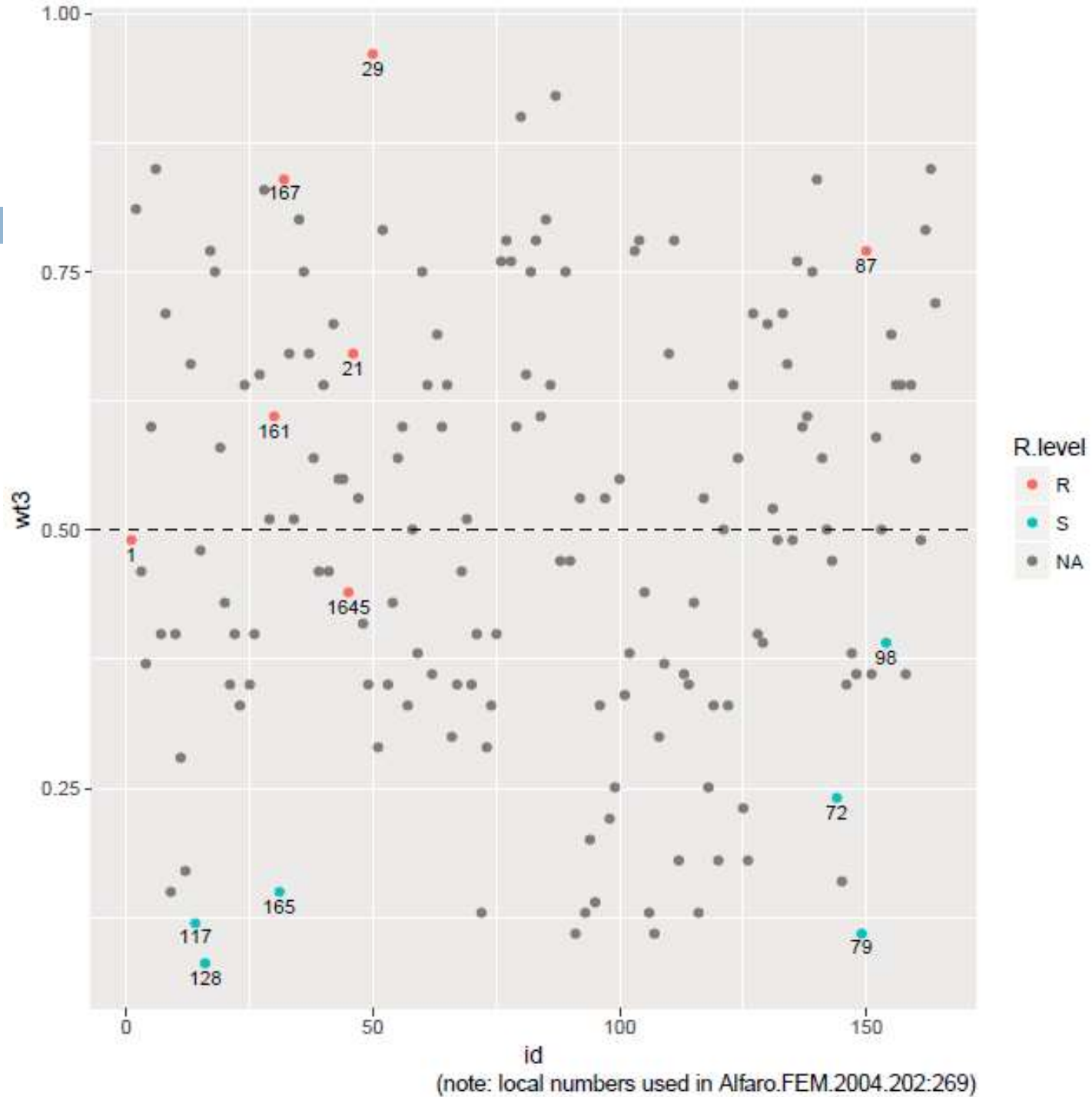
site	KAL	SKIM	SKIM-PT	h2
KAL-GBU	1	0.68	0.51	0.41
SKIM-RB		1	0.72	0.27
SKIM-PT			1	0.50

rg se ~ 0.15

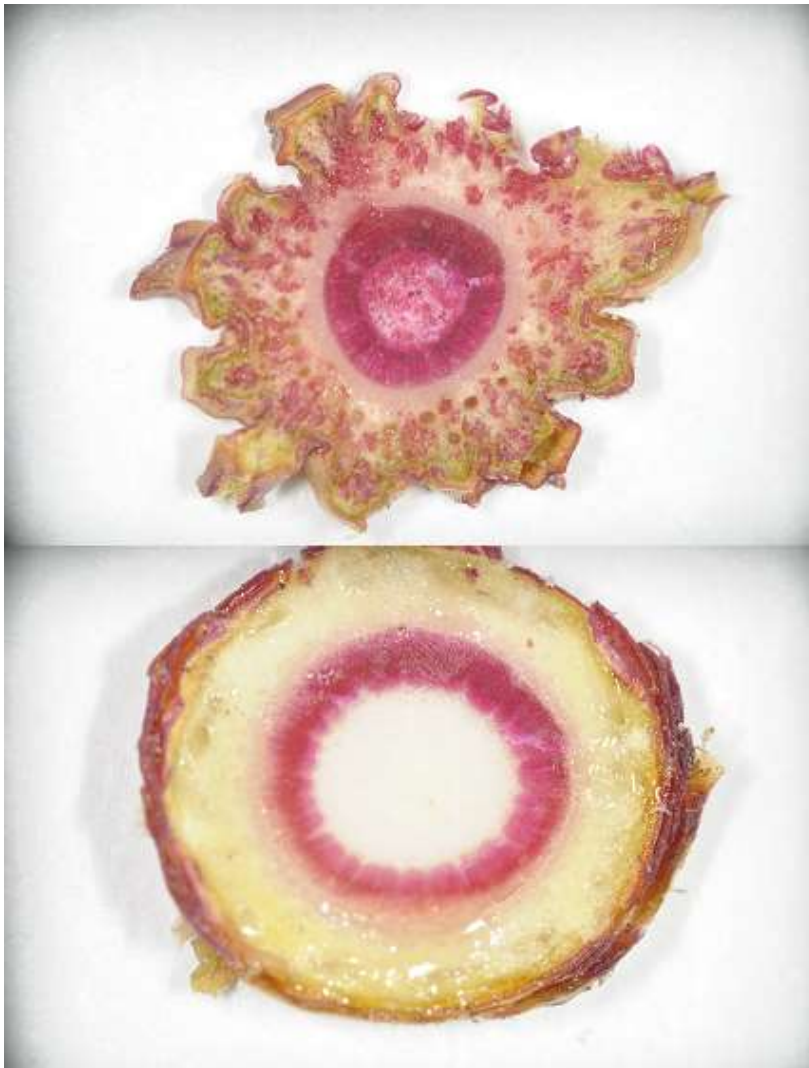
R-BLUPS

(164 parents)

(equal weight,
3 sites)



Sx – weevil resistance (other).



- stain stone cells (JW) of evaluated parent clones
 - ▣ targeting one or multiple resistance mechanisms?
- improve weevil rearing on artificial media (JW)
- release weevils on ramets of fwd selections at KAL
- 2018 – screen progeny of parents in southern Sx seed orchards

Sx – weevil resistance (other).



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Sx – weevil resistance (other).

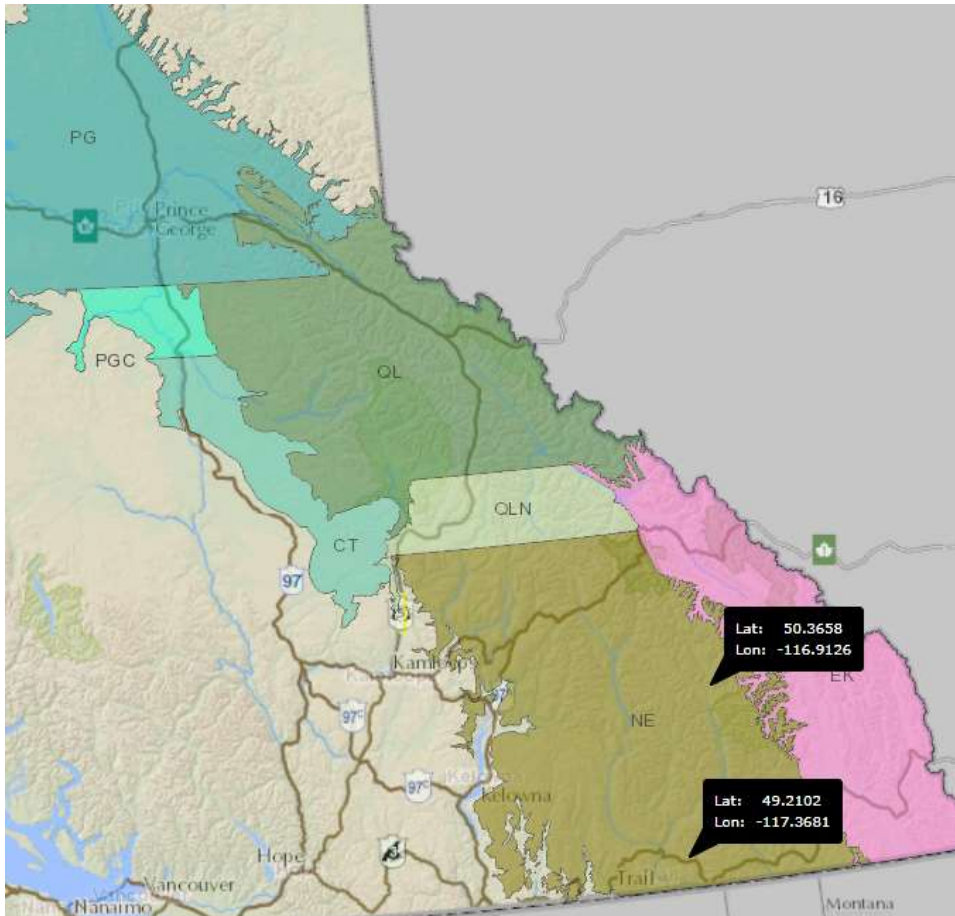
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 - ▣ targeting one or multiple resistance mechanisms?
- improve weevil rearing on artificial media (JW)
- release weevils on ramets of fwd selections at KAL
- 2018 – screen progeny of parents in southern Sx seed orchards (NE L,M,H)
 - ▣ drop off infested leaders!





Sx - weevil resistance (2018).

Fdi – wood quality.



- two linked Nelson progeny tests :
 - ▣ low (Duncan) 610m
 - ▣ high (Erie) 1250m
- 1st cycle
- OP/HS progeny
- ~30-years old

Fdi – wood quality.



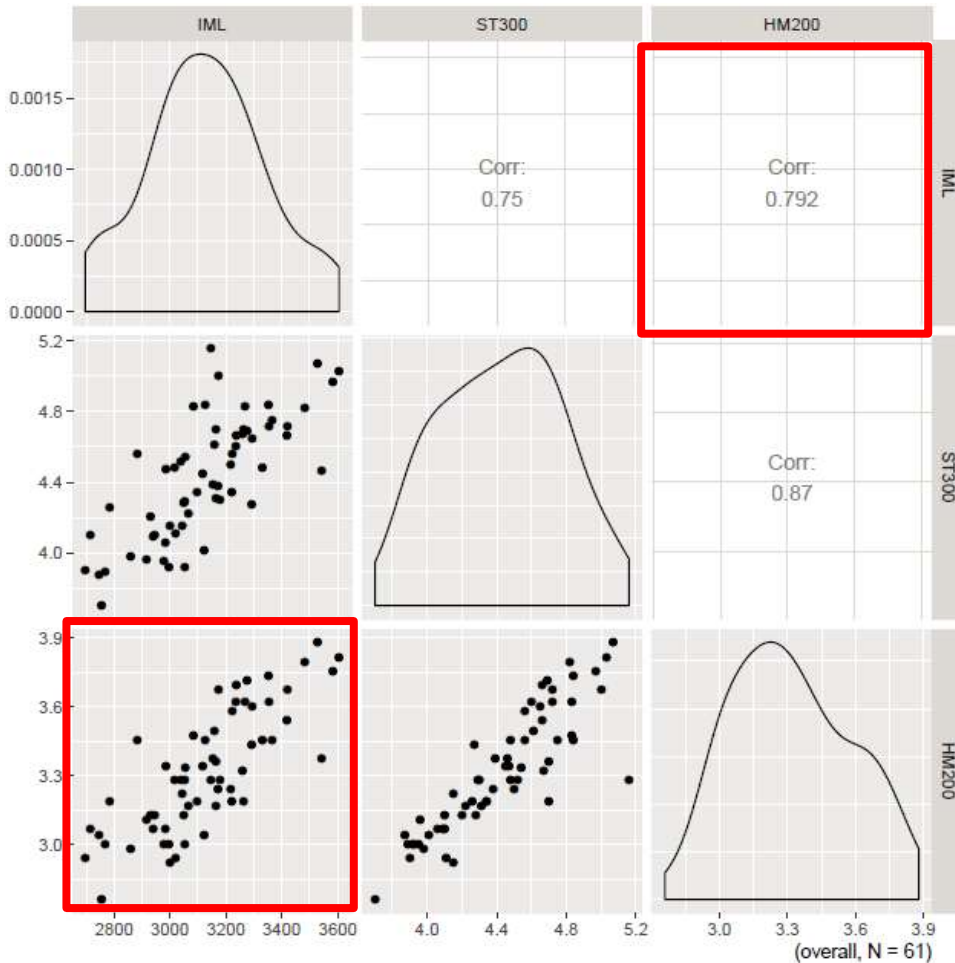
- flagged 30% of trees per site (~3450 total).
- 453 families (total):
 - ▣ 252/Duncan
 - ▣ 228/Erie
 - ▣ 27 in common
- ~8 trees/fam/site.

Fdi – wood quality.



- acoustic velocity (AV)
~fibre angle
 - ▣ predictor of wood strength (MOE, MOR)
- AV measured, 3 tools:
 - ▣ on bole (1 m) of standing tree
 - IML (all 3450)
 - ST300 (subset ~60)
 - ▣ butt of felled trees.
 - HM200 (subset ~60)

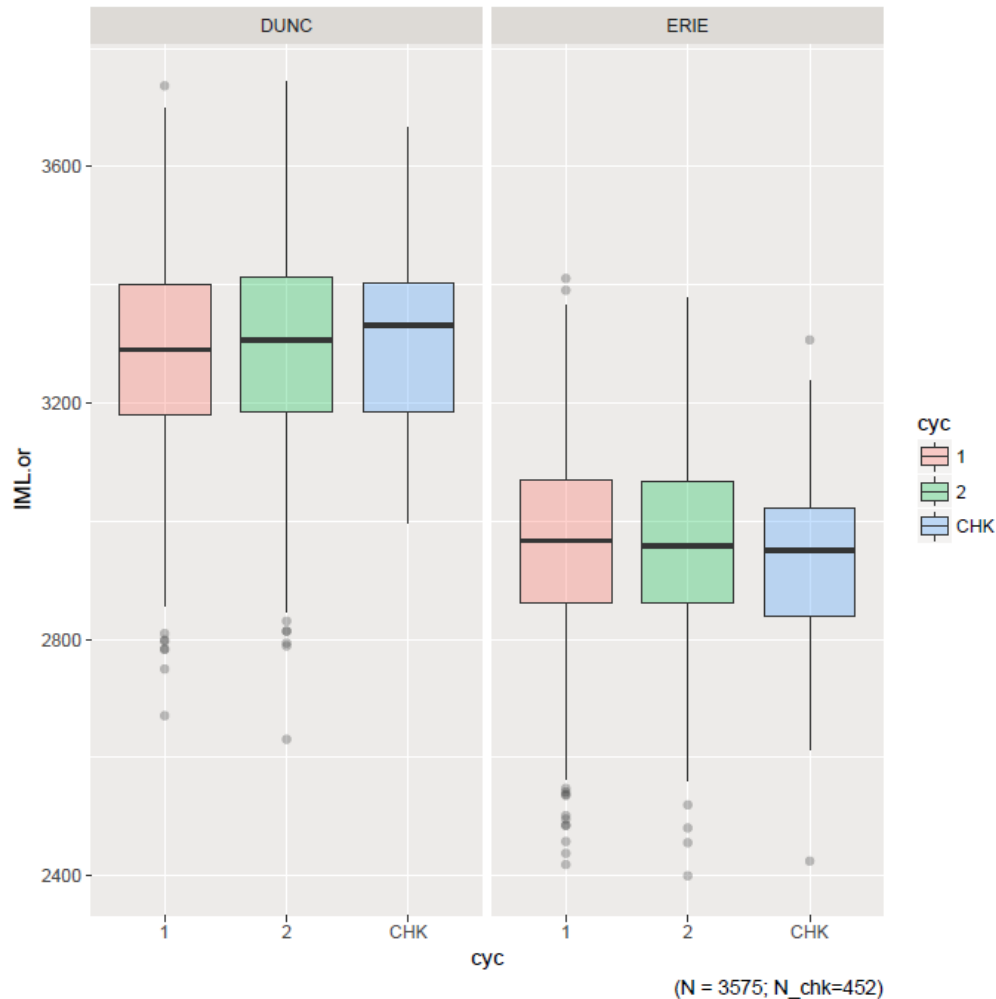
Fdi – wood quality.



Objectives:

- compare AV measures
- compare AV: cycle1, cycle2, check lots.
- estimate genetic corr:
 - growth & AV
 - AV: site1 vs site2.
- compare estimates to wood density from linked farm-field test.

Fdi – wood quality.



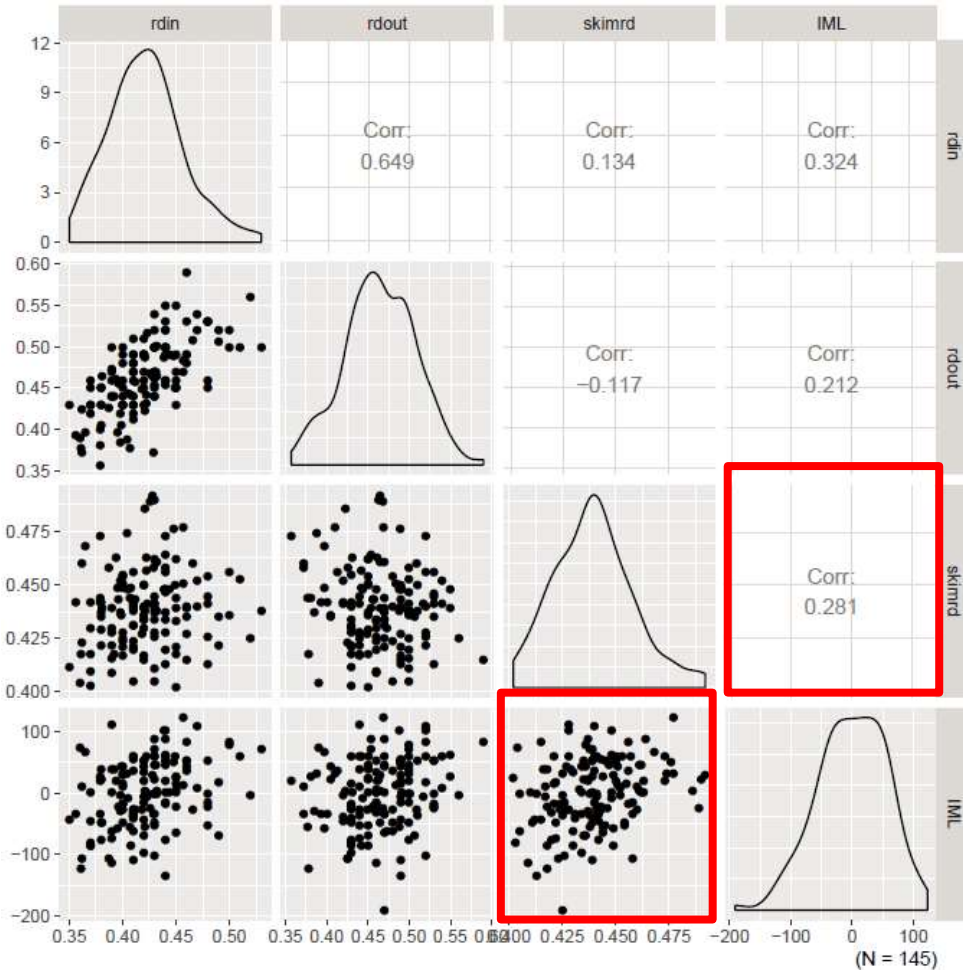
Objectives:

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Fdi – wood quality.

- growth vs AV (tri-var)
 - $rg \approx 0$ (Erie):
 - HT:AV +ve ($rg=0.12$)
 - DBH:AV -ve ($rg=-0.05$)
 - growth VC over-est.
- AV: site 1 vs 2 (bi-var)
 - $rg \sim 1$ (i.e. no GxE)
 - $h^2 \approx 0.30$
 - agrees with literature.
good news! Can pool info across sites.
- Objectives:
 - compare AV measures
 - compare AV: cycle1, cycle2, check lots.
 - estimate genetic corr:
 - growth & AV
 - AV: site1 vs site2.
 - compare estimates to wood density from linked farm-field test.

Fdi – wood quality.



Objectives:

- compare AV measures
- compare AV: cycle 1, cycle 2, check lots.
- estimate genetic corr:
 - growth & AV
 - AV: site 1 vs site 2.
- compare estimates to wood density from linked farm-field test.



Fdi – root rot screening (*Armillaria*...*Phellinus*...).

families of southern seed orchard parent clones

Fdi – root rot screening.



- challenge determining if *Phellinus* present in:
 - inoculation stick

Fdi – root rot screening.



- challenge determining if Phellinus present in:
 - ▣ inoculation stick
 - ▣ stem or root

Fdi – root rot screening.



- challenge determining if Phellinus present in:
 - ▣ inoculation stick
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Fdi – root rot screening.

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Differentiating the two closely related species, *Phellinus weirii* and *P. sulphurascens*

By Y. W. LIM¹, Y. C. A. YEUNG¹, R. STURROCK², I. LEAL² and C. BREUIL¹

¹Department of Wood Science, University of British Columbia, 2424 Main Mall, Vancouver, BC V6T 1Z4, Canada. E-mail: colette.breuil@ubc.ca; ²Canadian Forest Service, Pacific Forestry Centre, Victoria, BC, Canada

- challenge determining if *Phellinus* present in:
 - inoculation stick
 - stem or root
- on going 2018:
 - water-stress trees, to induce mortality.
 - use sp.-specific marker(s) to identify *Phellinus* presence.
 - start culturing *Armillaria*.



staff autumn 2017

Lw NE cycle 2 seedling lift