

Clonal trials

Luis A. Apiolaza
School of Forestry, University of Canterbury

The project started with a simple idea

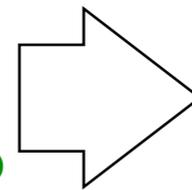
Corewood (50% volume) is poor

Fix corewood, forget about outerwood

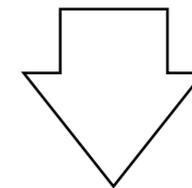
Can we select & breed trees **very** early?

Is there variability?

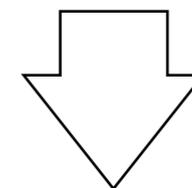
Is it under genetic control?



Both require
many samples



Unfeasible with
large trees

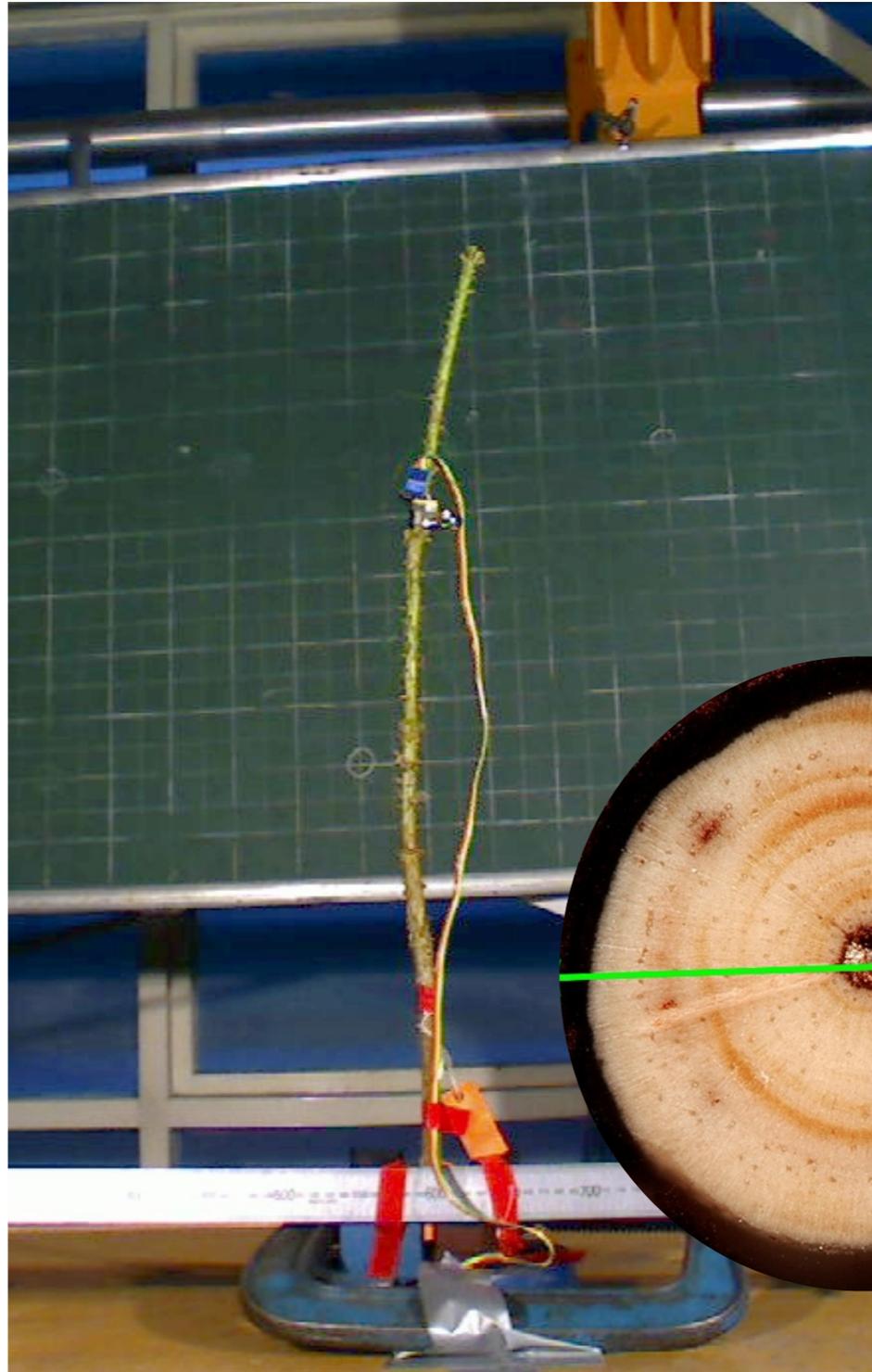


Use small trees

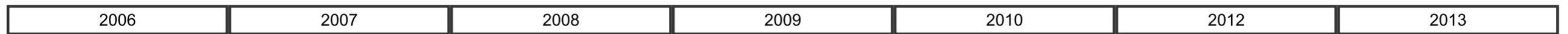
One can't trust a small tree



One can't trust a small tree



Back in 2006: What we thought would happen (on terms of experiments)



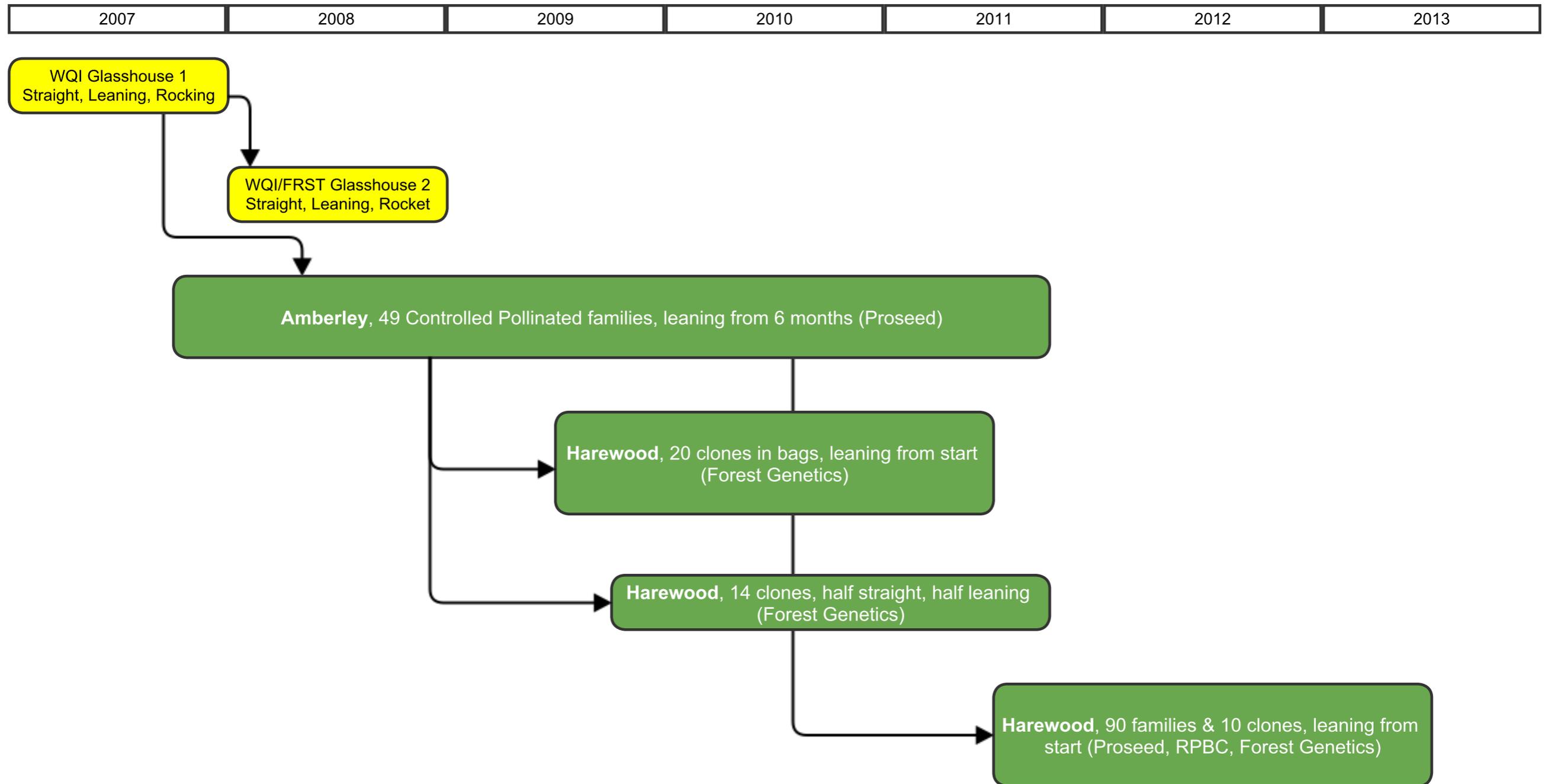
WQI Glasshouse 1
Straight, Leaning, Rocking

4 clones

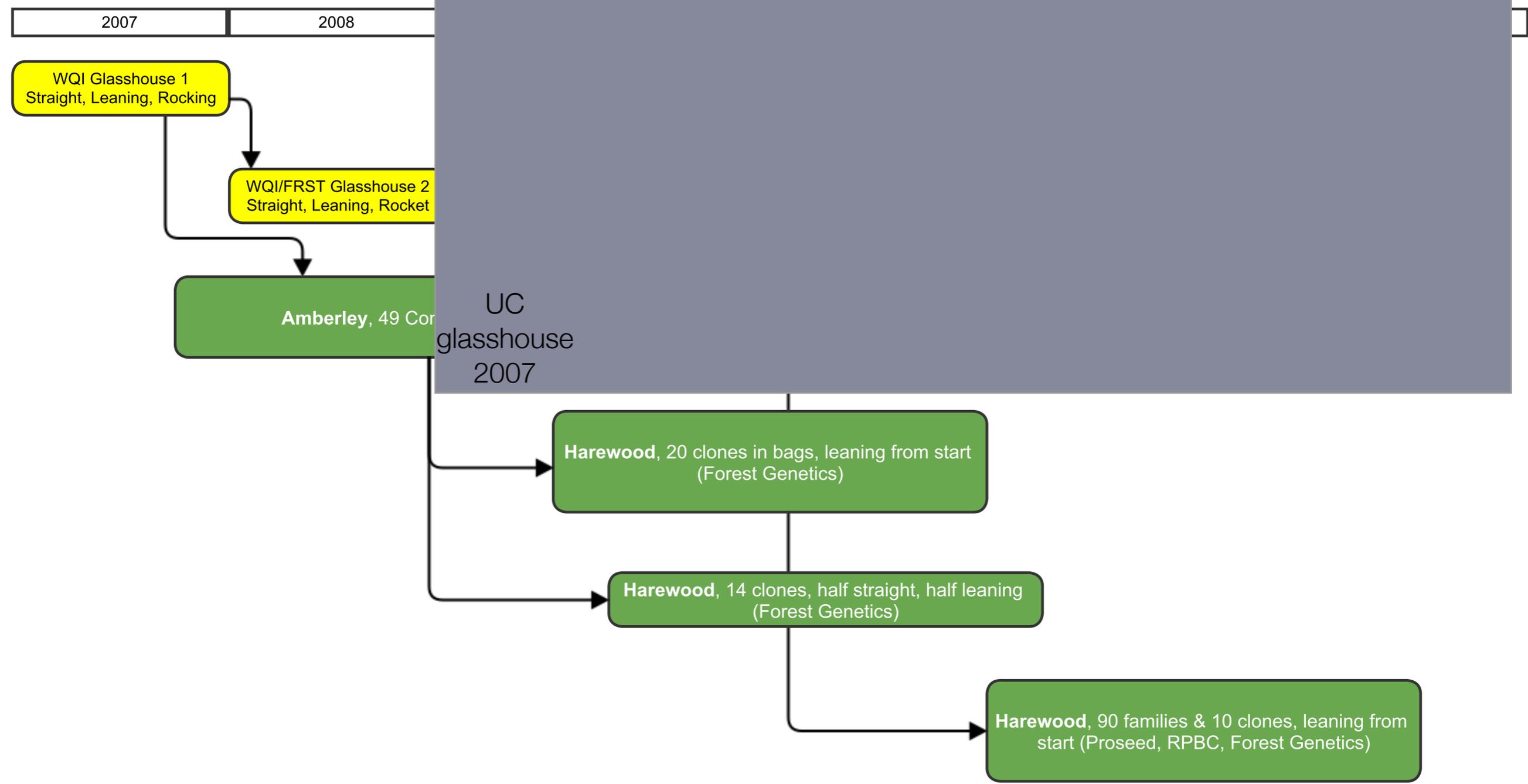
Amberley, 49 Controlled Pollinated *Pinus radiata* families (Proseed) and 49 Open pollinated *Eucalyptus nitens* families (Ruth McConnochie)

FRST project

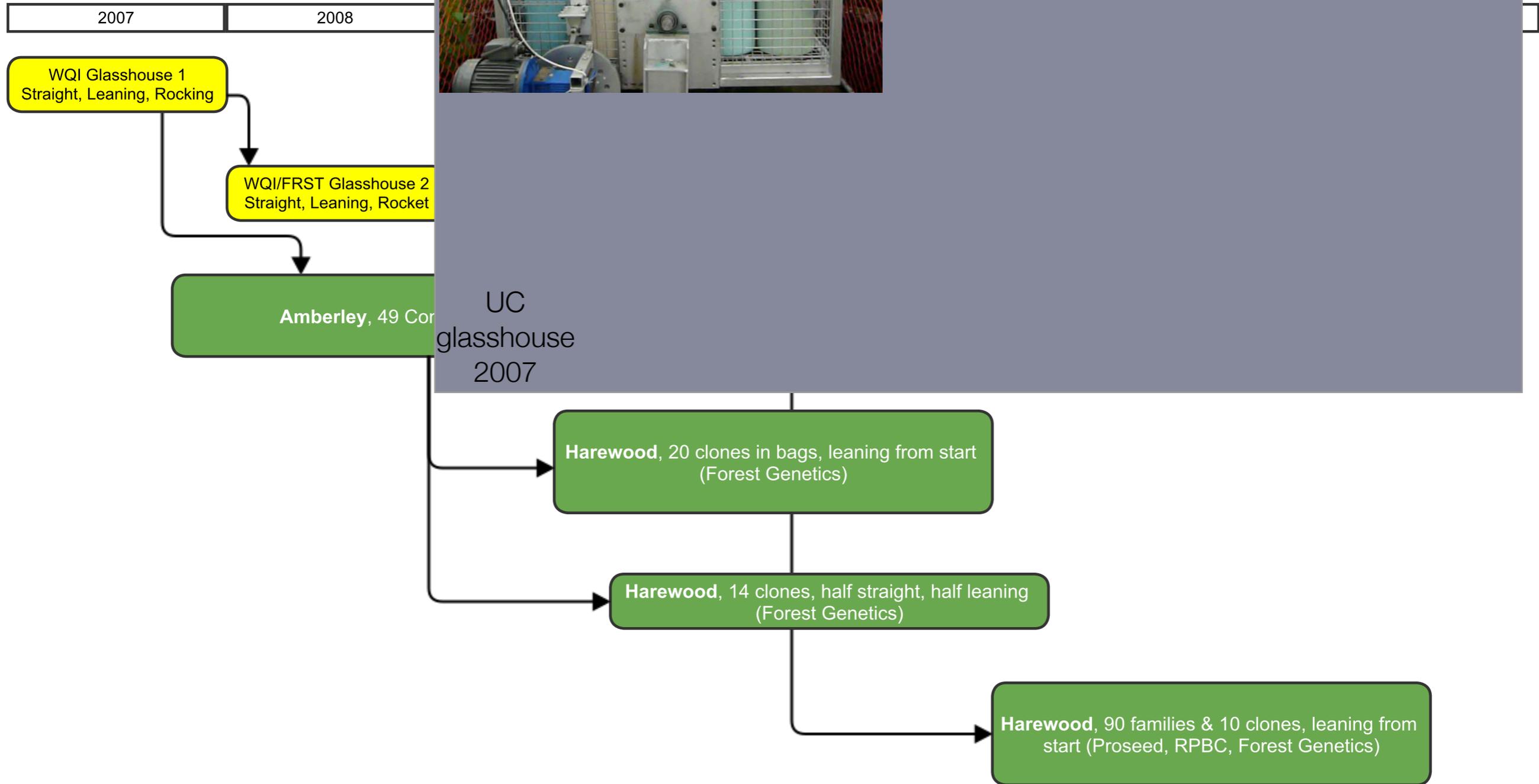
What really happened



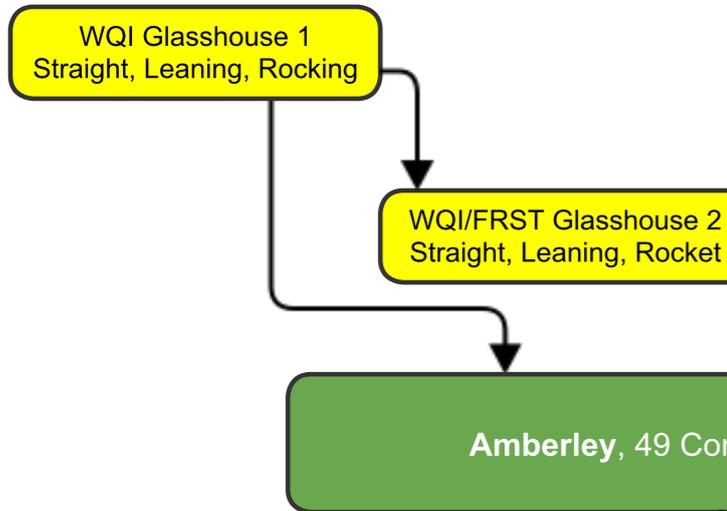
What really happened



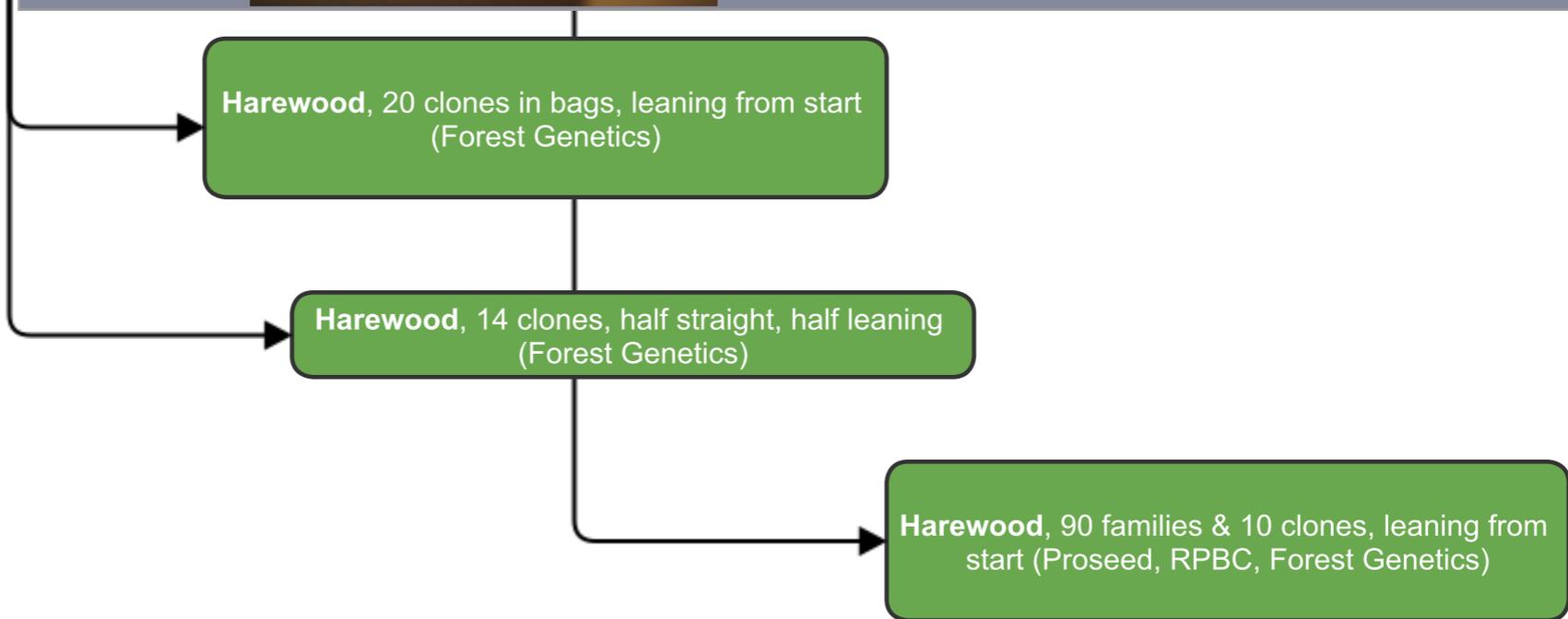
What really ha



What really ha



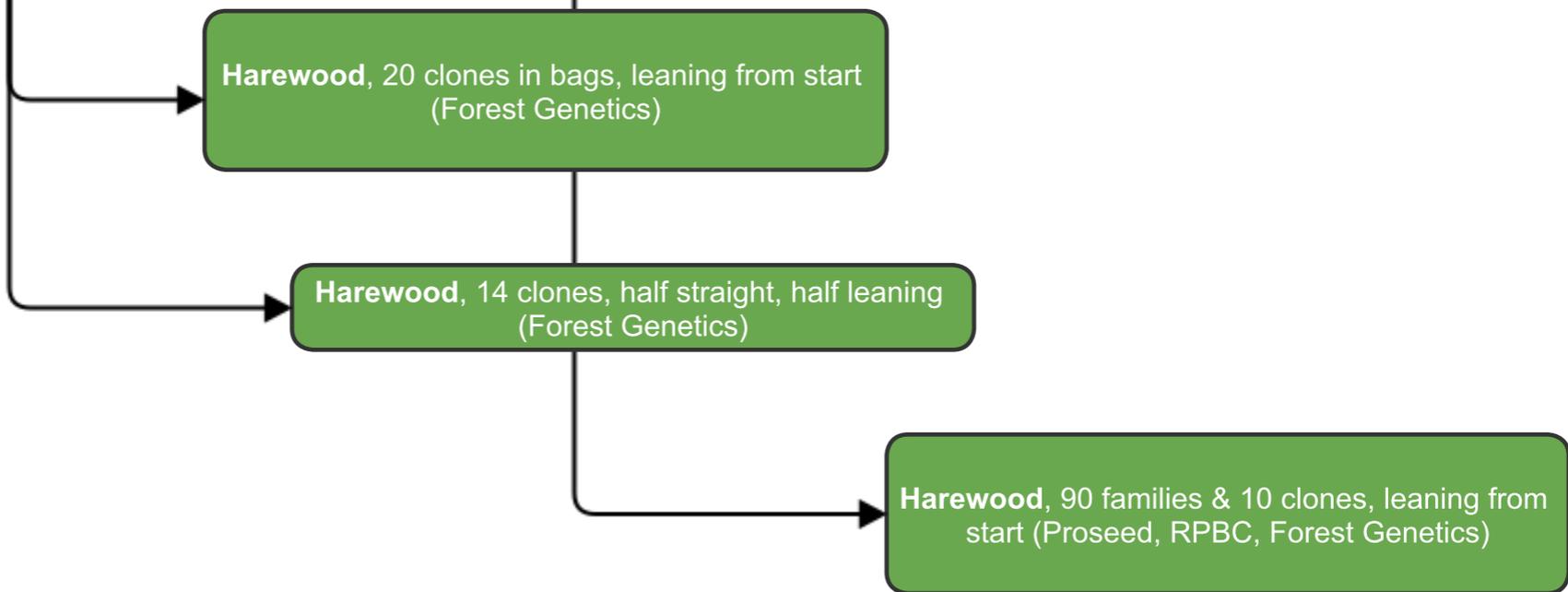
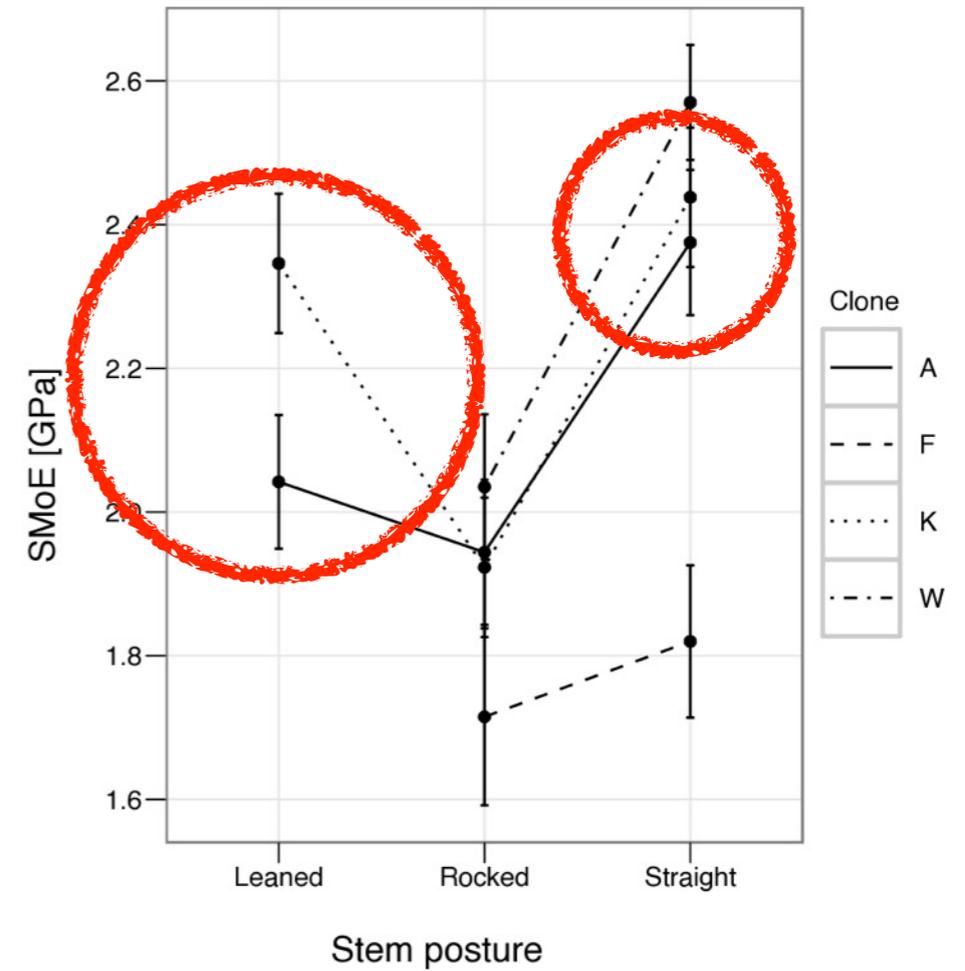
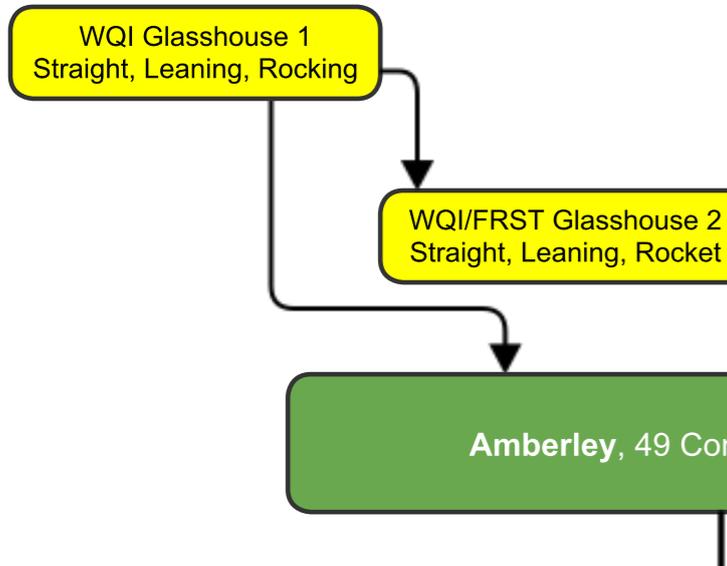
UC
glasshouse
2007



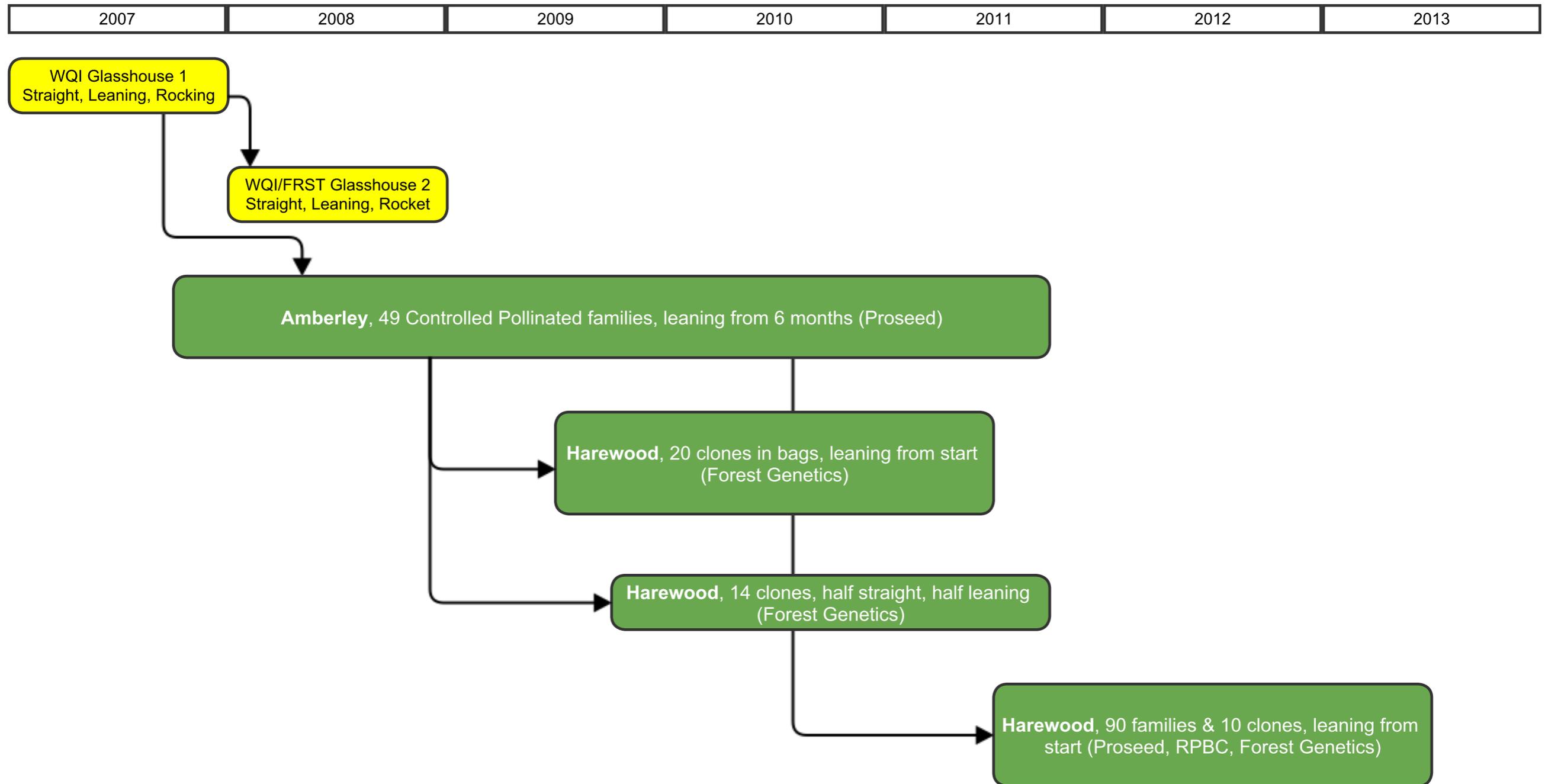
What really ha



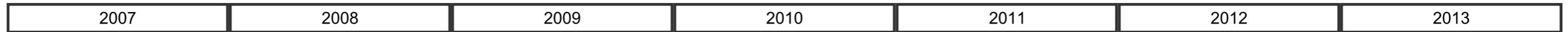
2007 2008



What really happened



What really happened



WQI Glasshouse 1
Straight, Leaning, Rocking

**Lean the
whole lot to
improve
screening!**

WQI/FRST Glasshouse 2
Straight, Leaning, Rocket

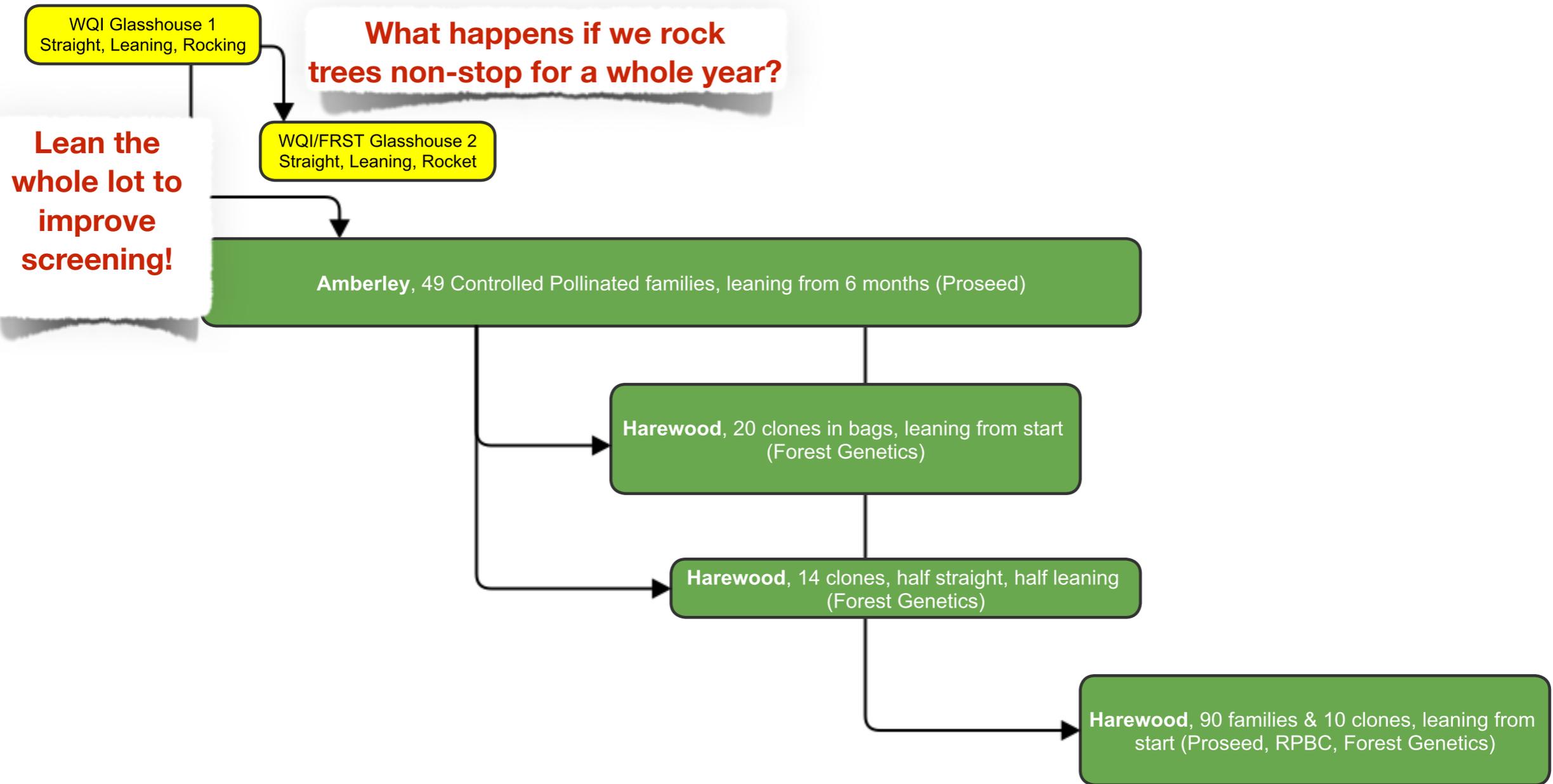
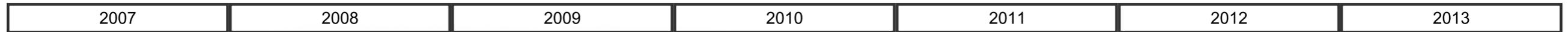
Amberley, 49 Controlled Pollinated families, leaning from 6 months (Proseed)

Harewood, 20 clones in bags, leaning from start
(Forest Genetics)

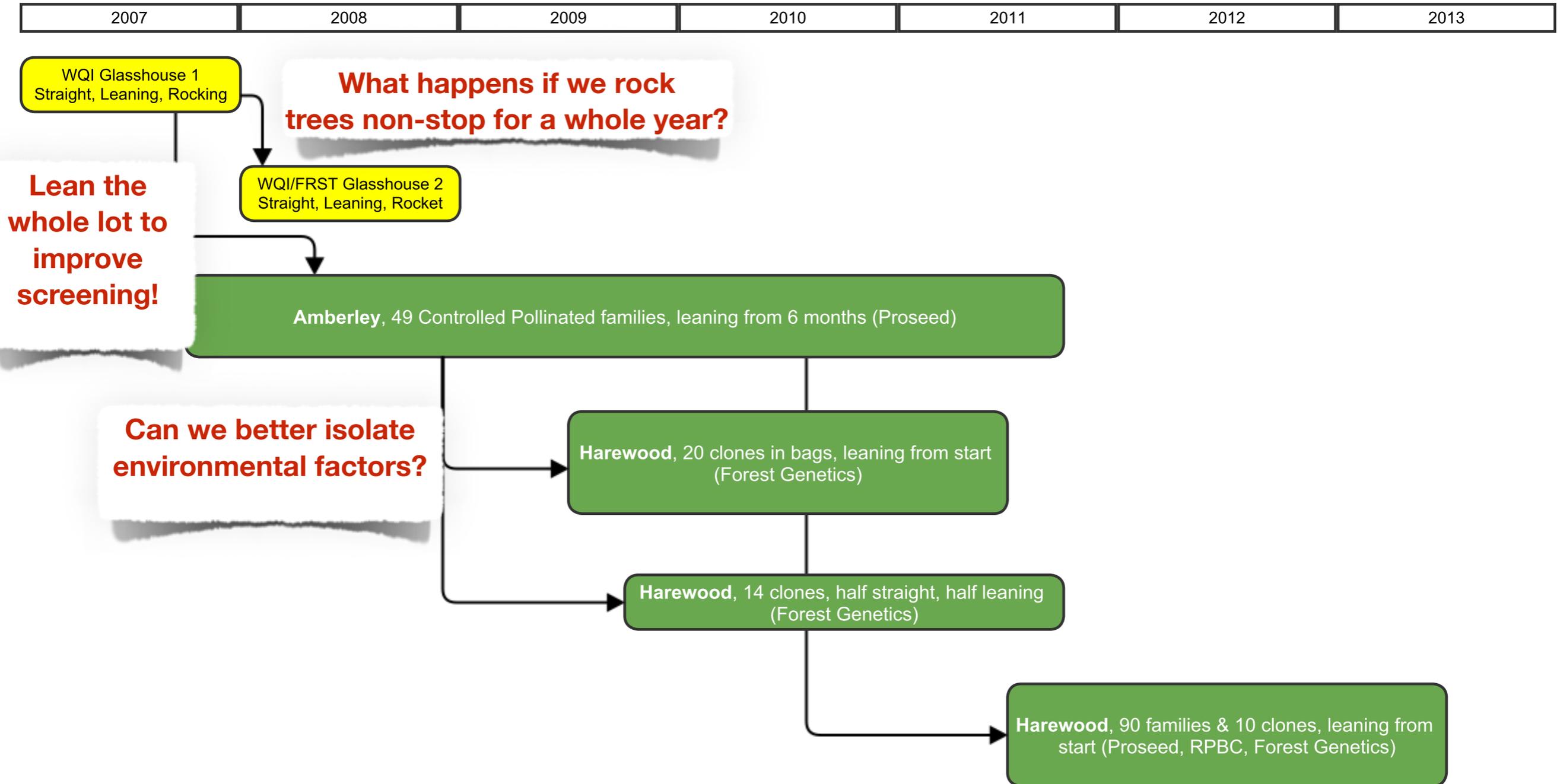
Harewood, 14 clones, half straight, half leaning
(Forest Genetics)

Harewood, 90 families & 10 clones, leaning from
start (Proseed, RPBC, Forest Genetics)

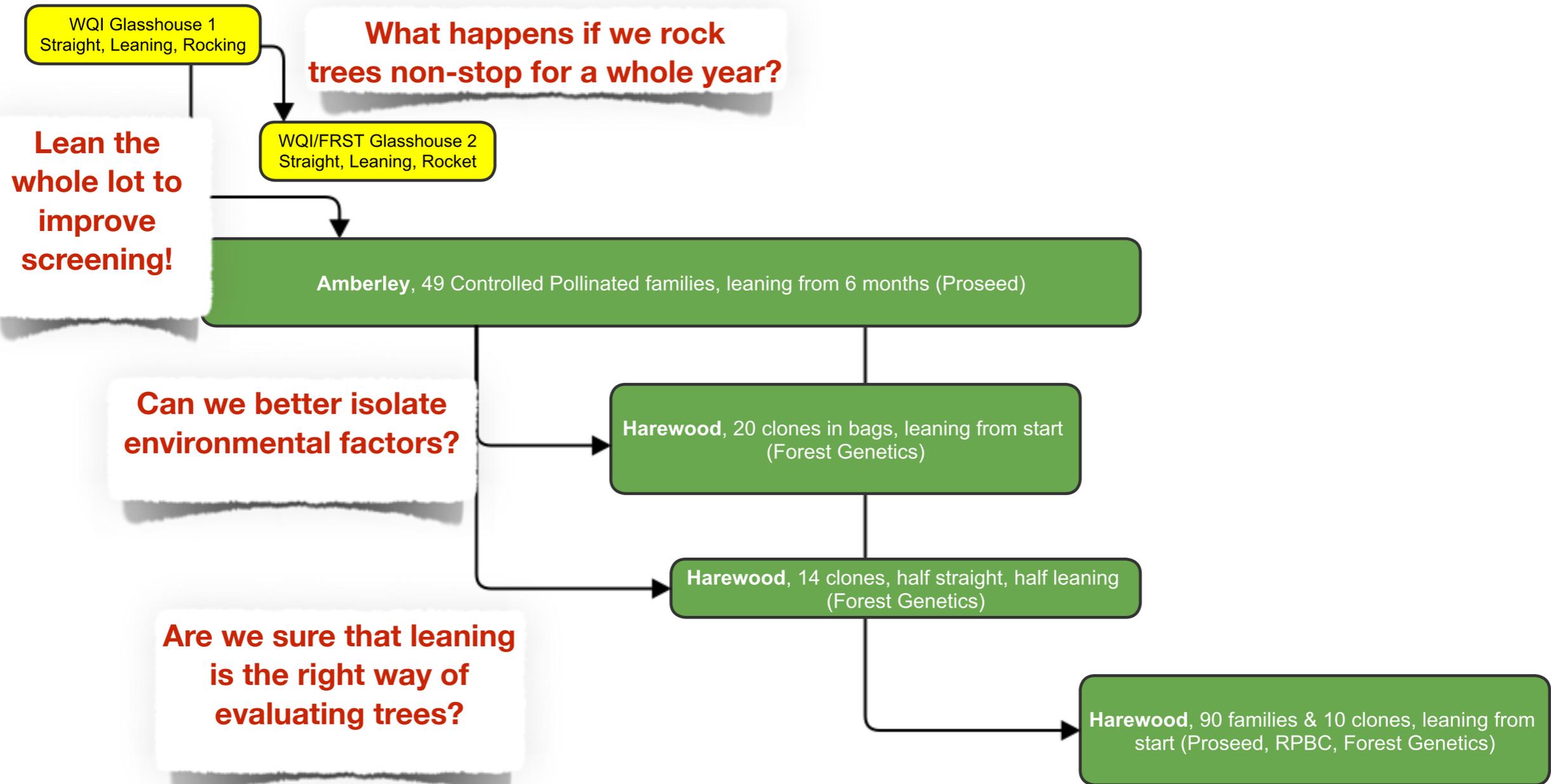
What really happened



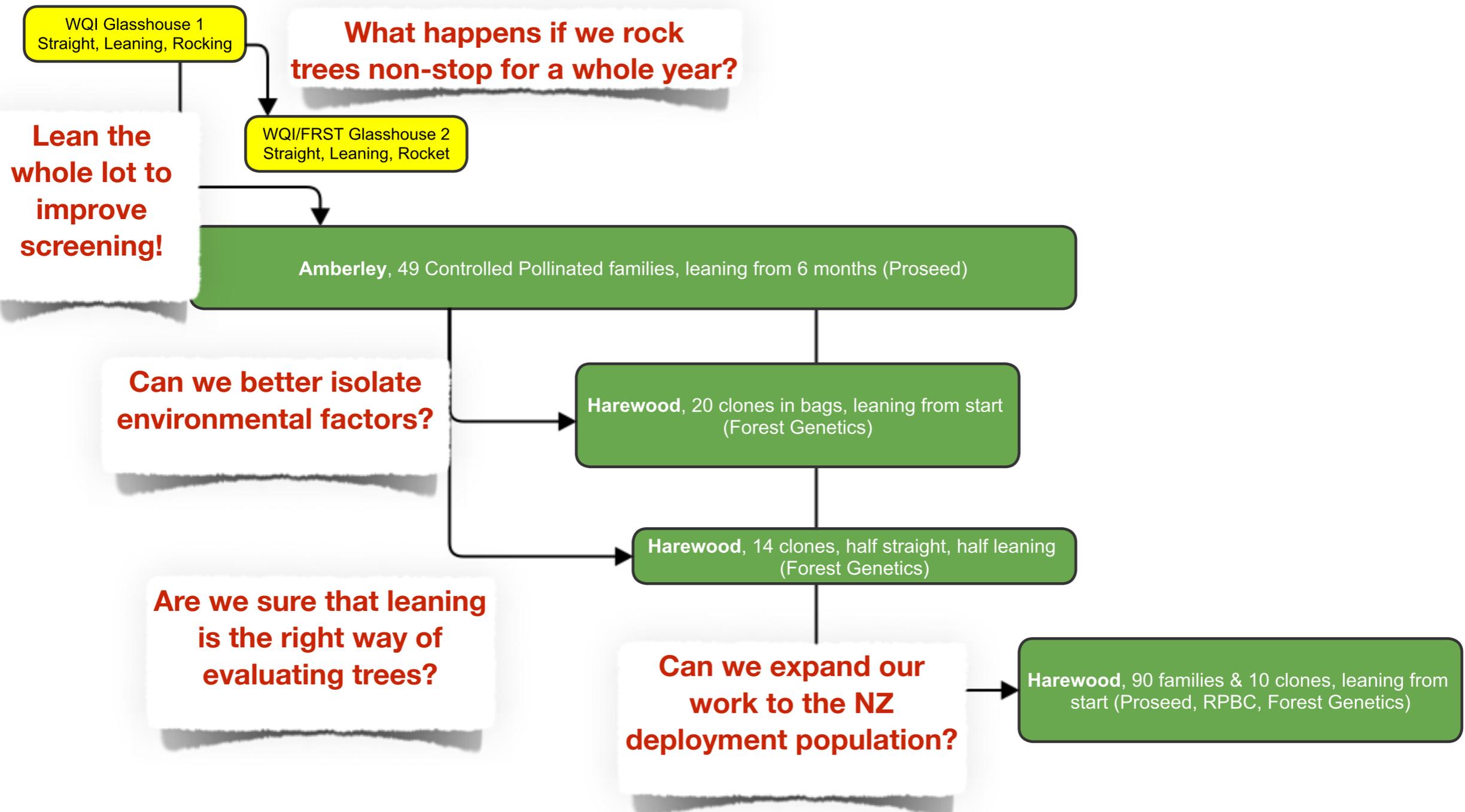
What really happened



What really happened



What really happened



What really happened



WQI Glasshouse 1
Straight, Leaning, Rocking

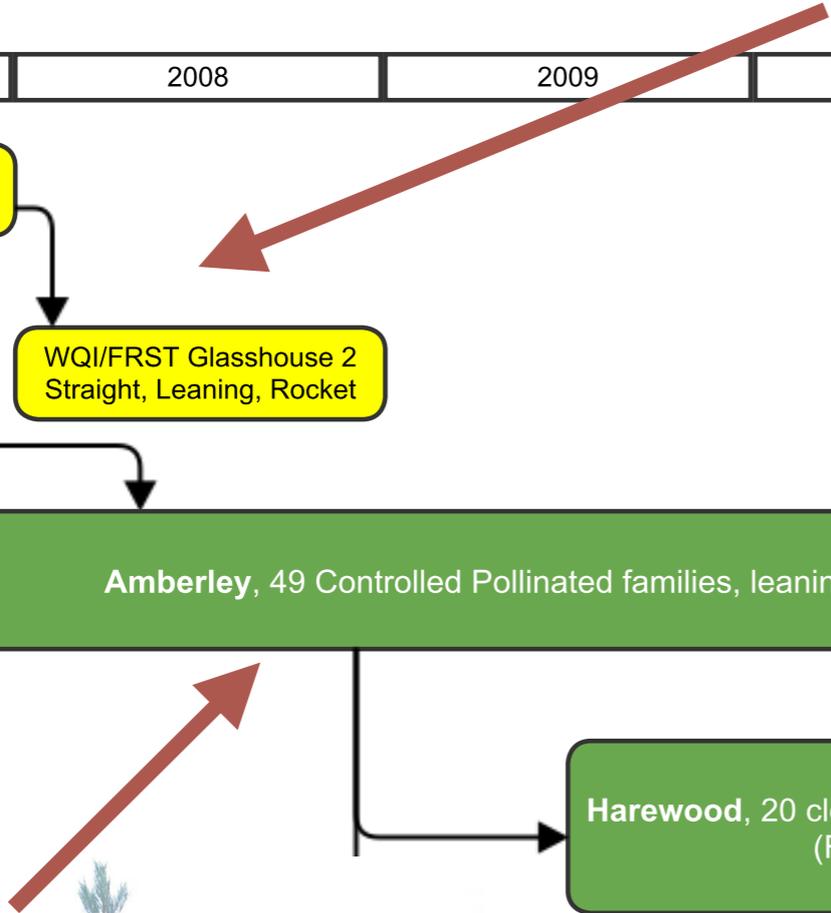
WQI/FRST Glasshouse 2
Straight, Leaning, Rocket

Amberley, 49 Controlled Pollinated families, leaning from 6 months (Proseed)

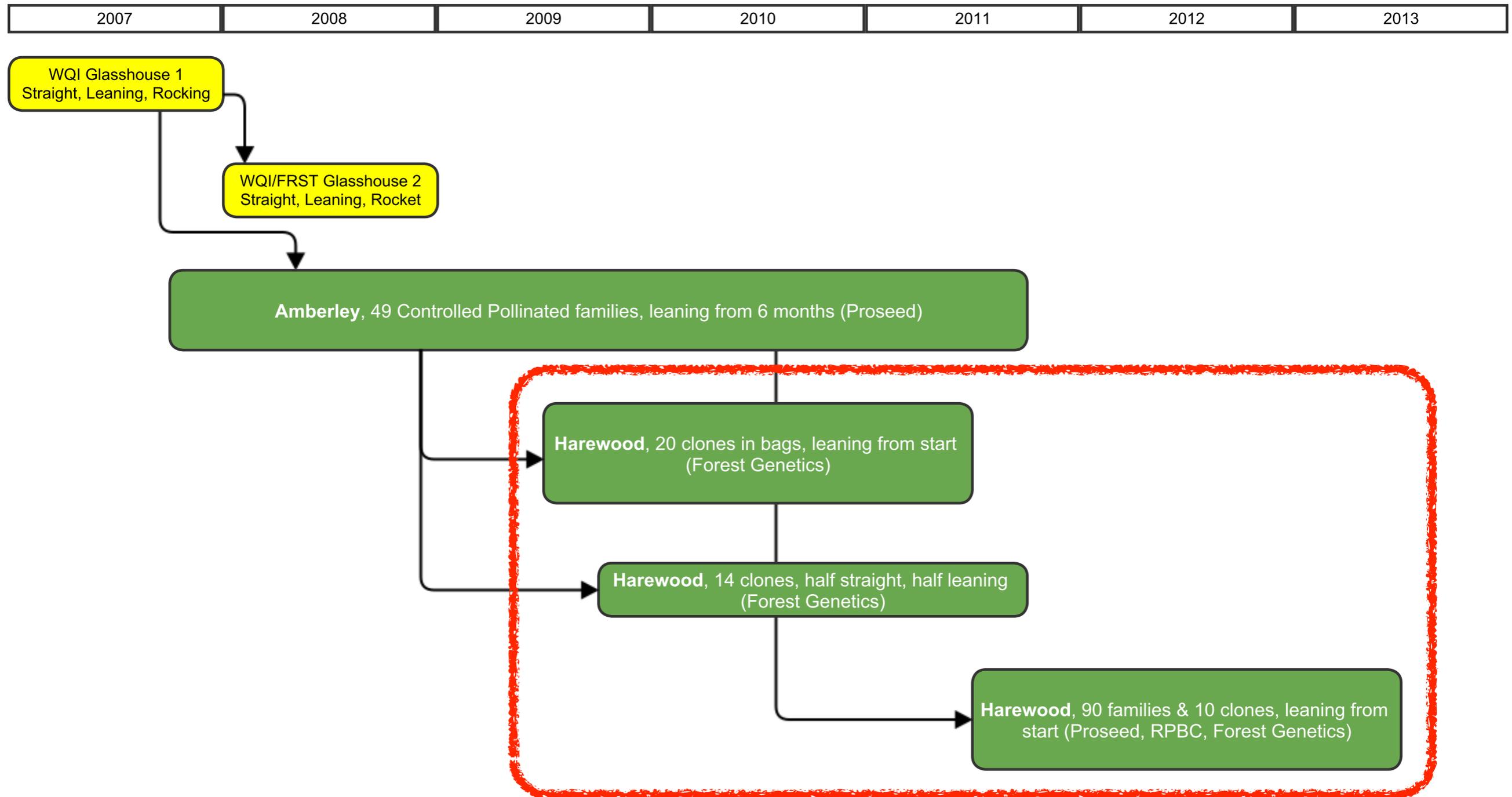
Harewood, 20 clones in bags, leaning from start (Forest Genetics)

Harewood, 14 clones, half straight, half leaning (Forest Genetics)

Harewood, 90 families & 10 clones, leaning from start (Proseed, RPBC, Forest Genetics)



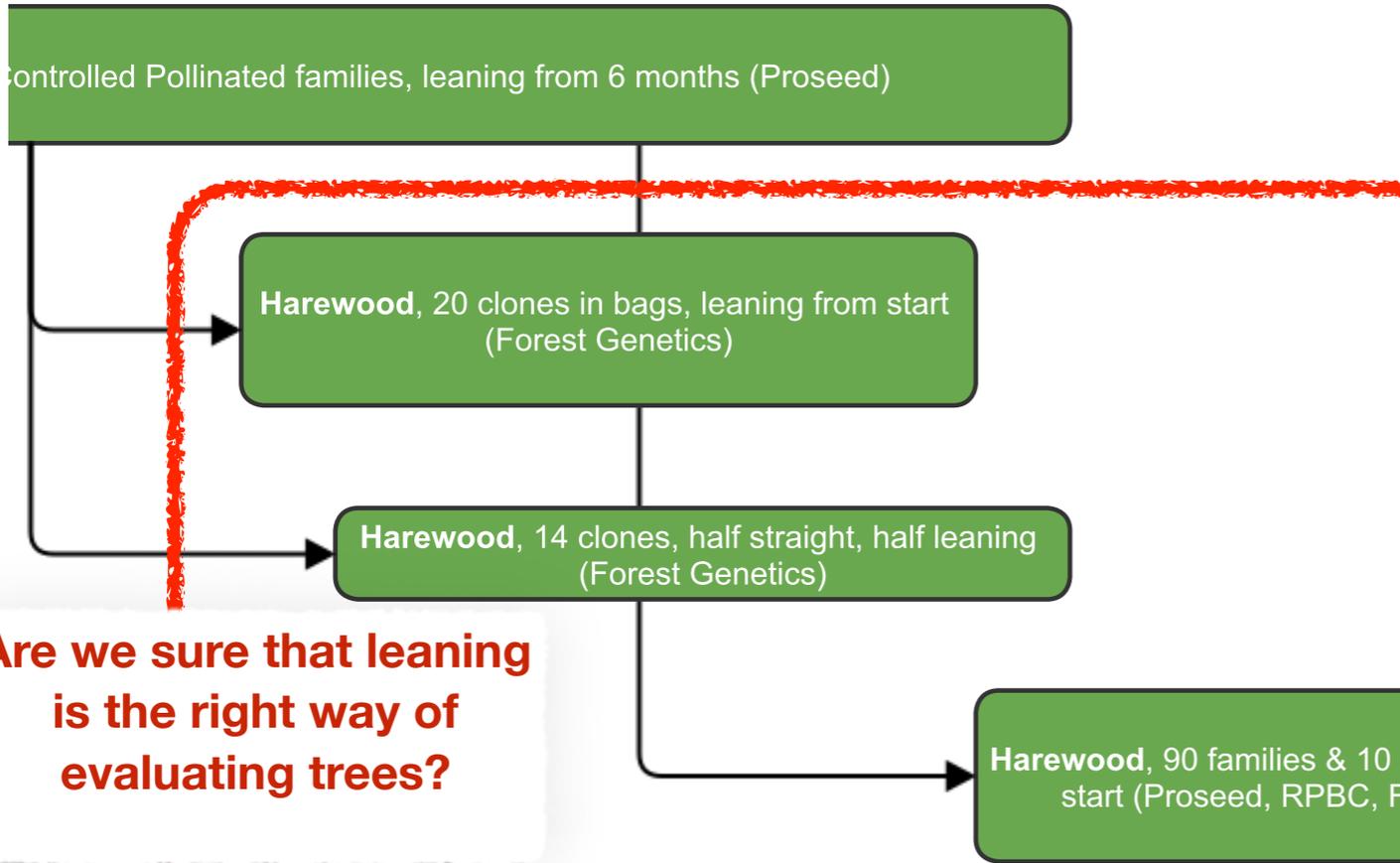
What really happened



Is leaning representative?

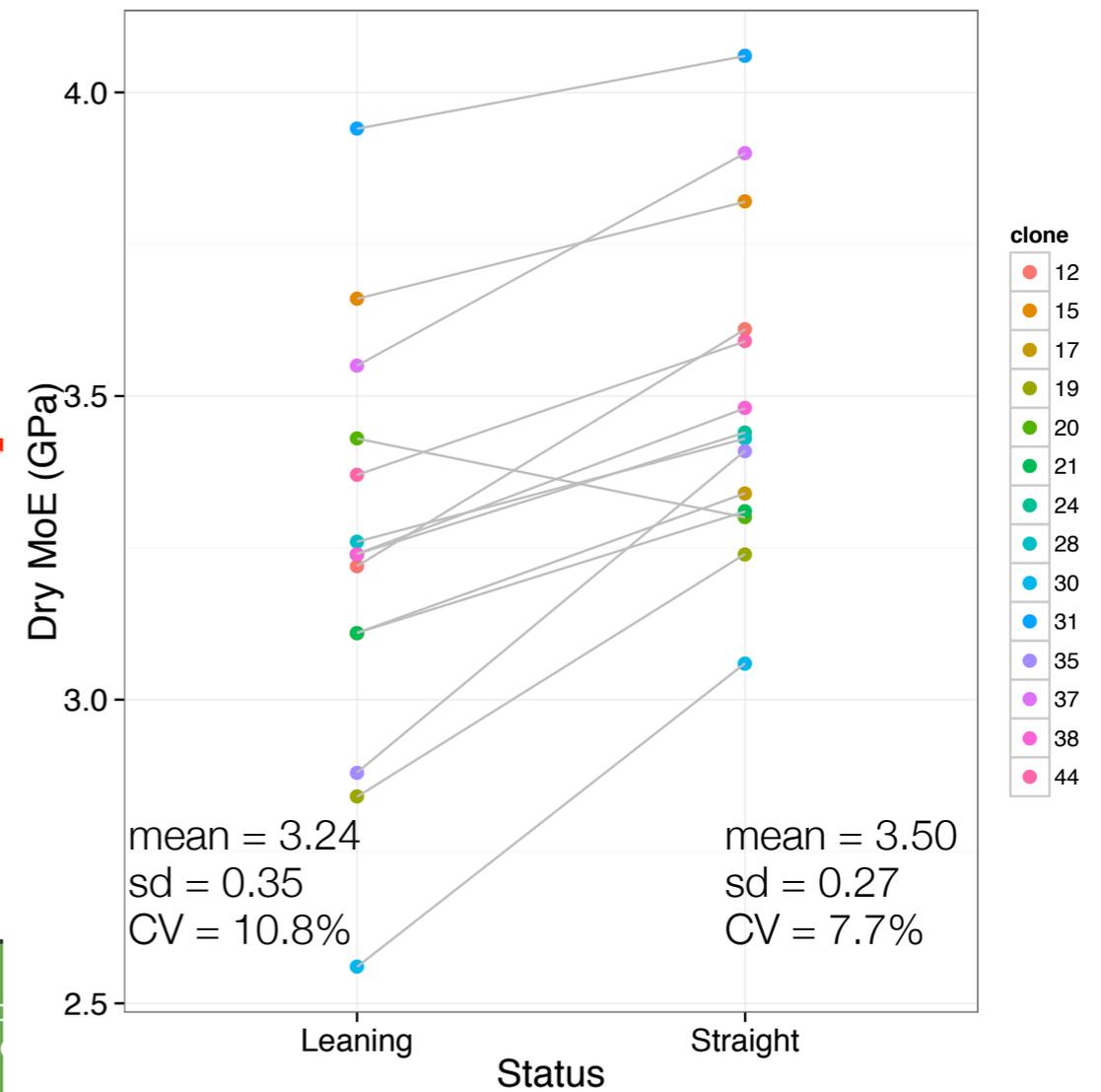


2
et

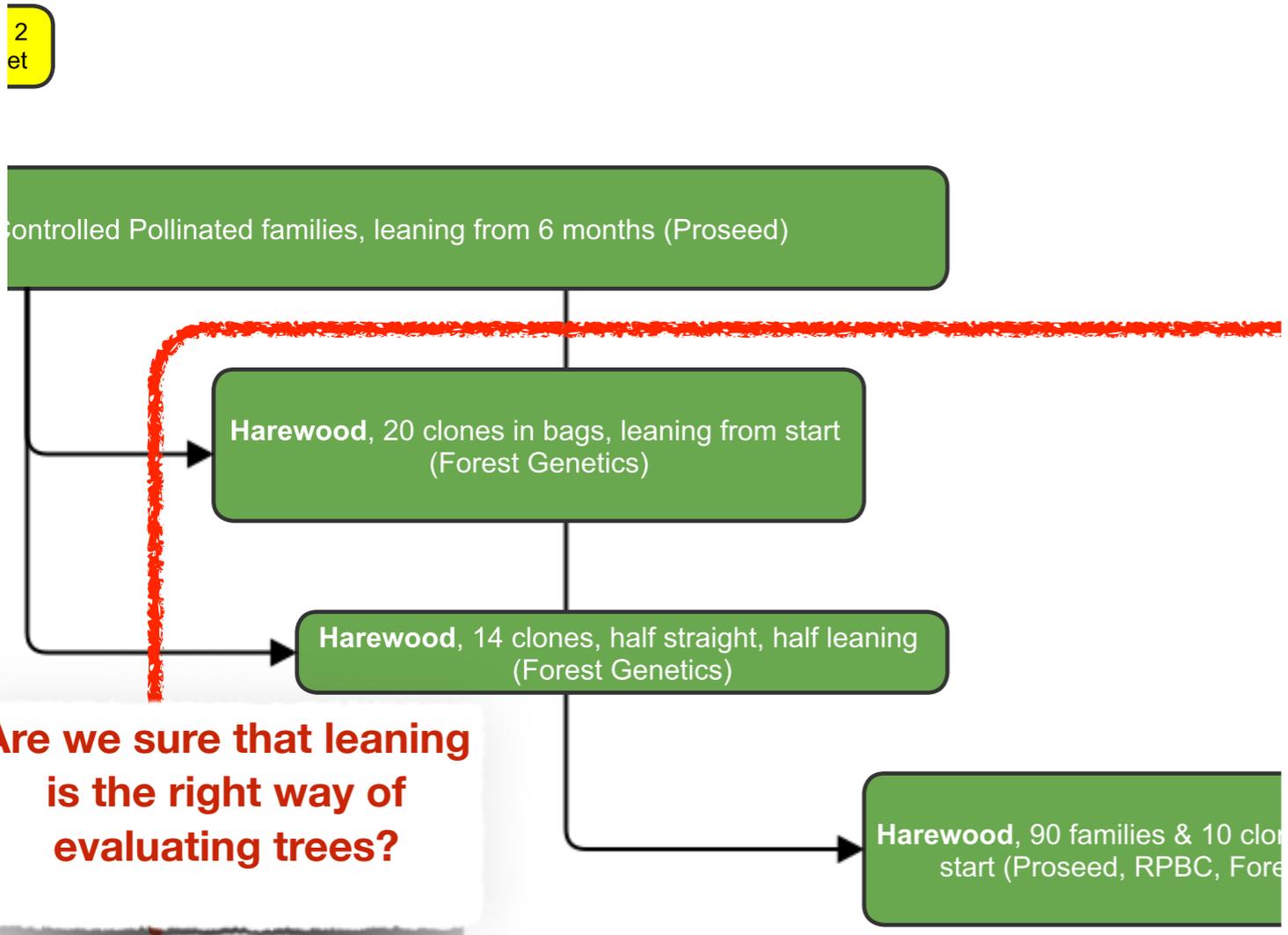


Are we sure that leaning is the right way of evaluating trees?

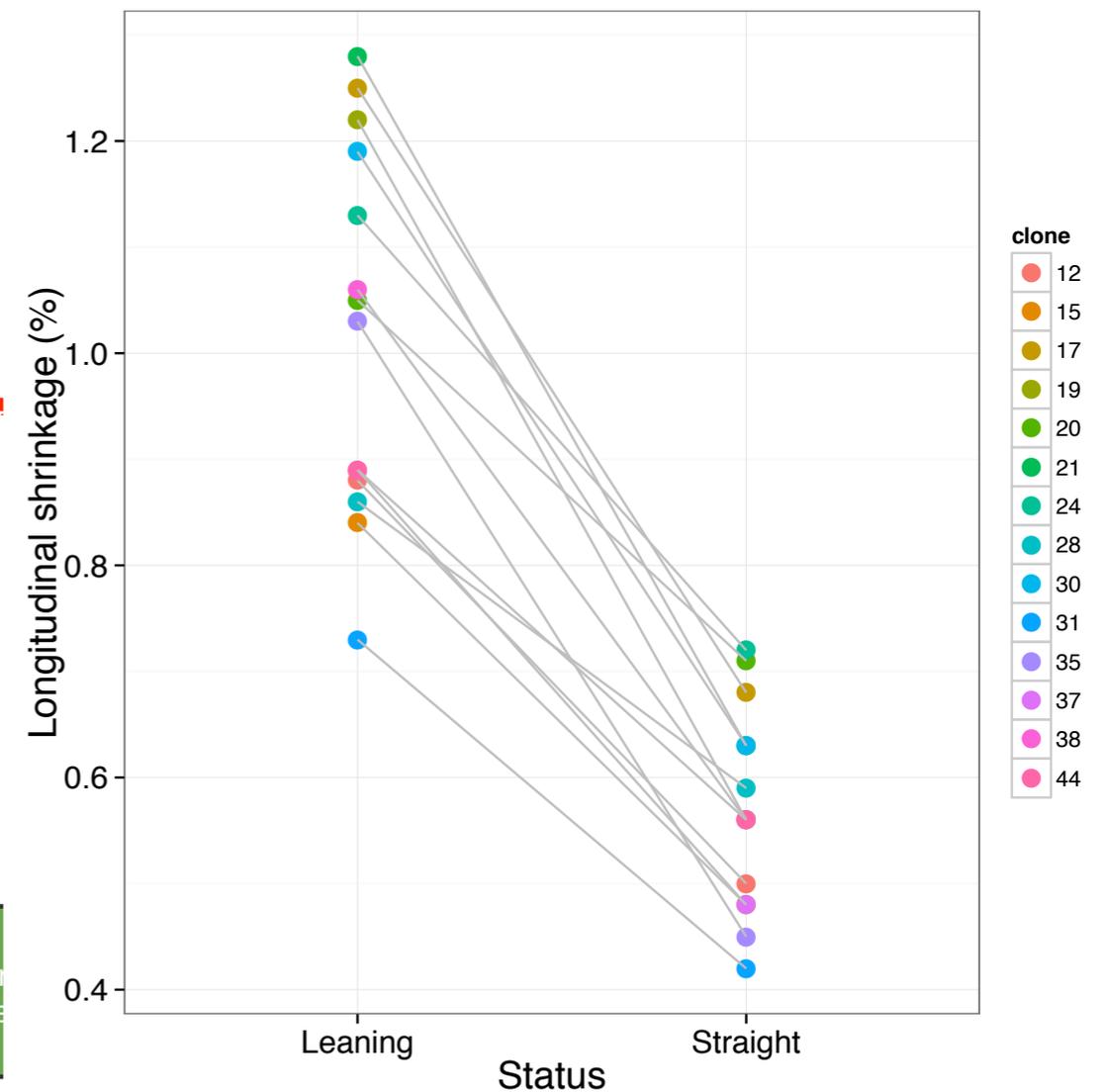
Rankings are very similar
differences more apparent



Is leaning representative?



Rankings are still similar
differences increase



Can we better isolate from environmental factors?

Pros

Yes: no water logging, no nasty microenvironment variation

Yes: much more uniform leaning

Cons

Expensive

Difficult to operationalize



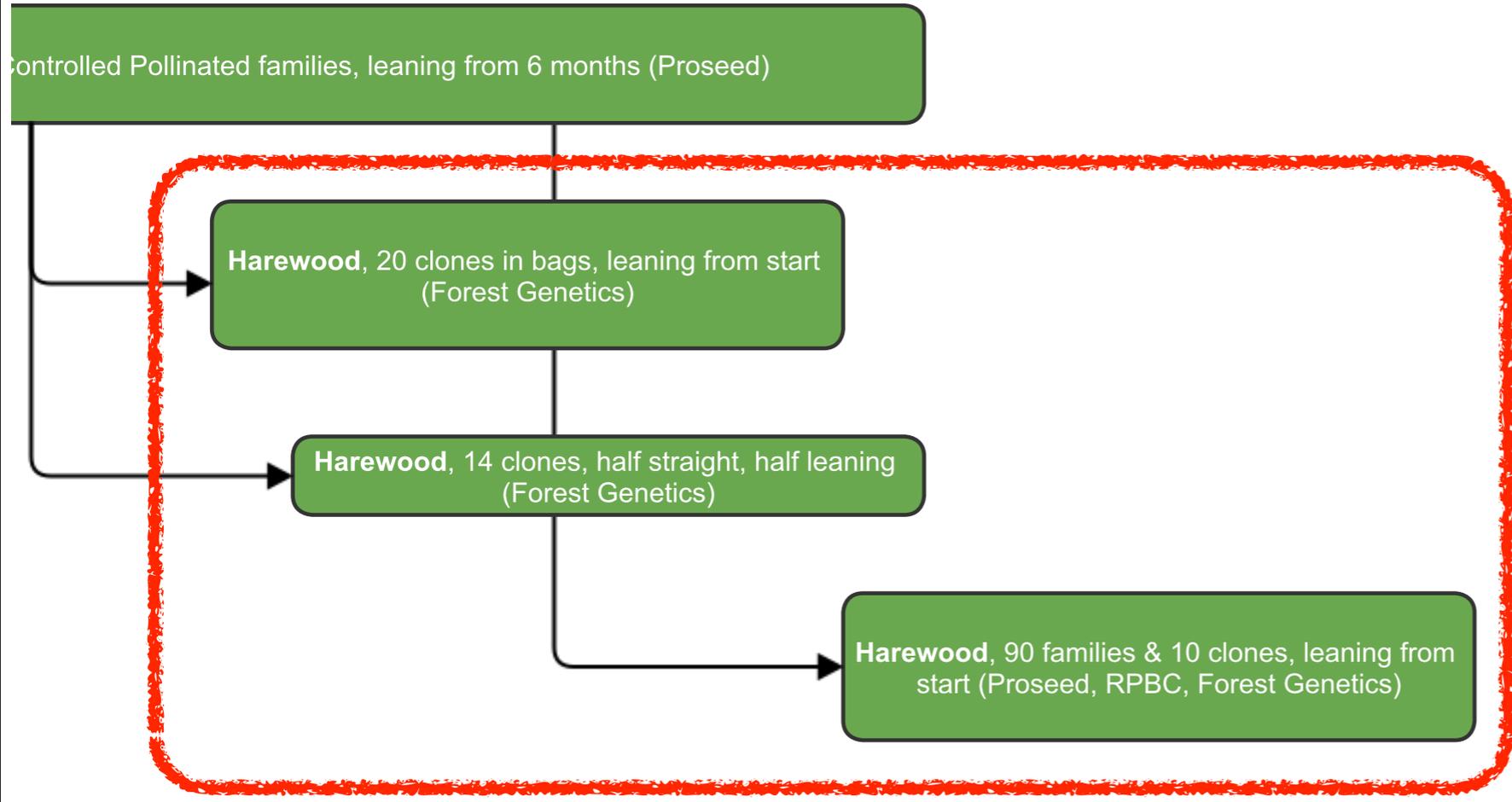
We can now exploit plenty of
variability and decent h^2

MoE

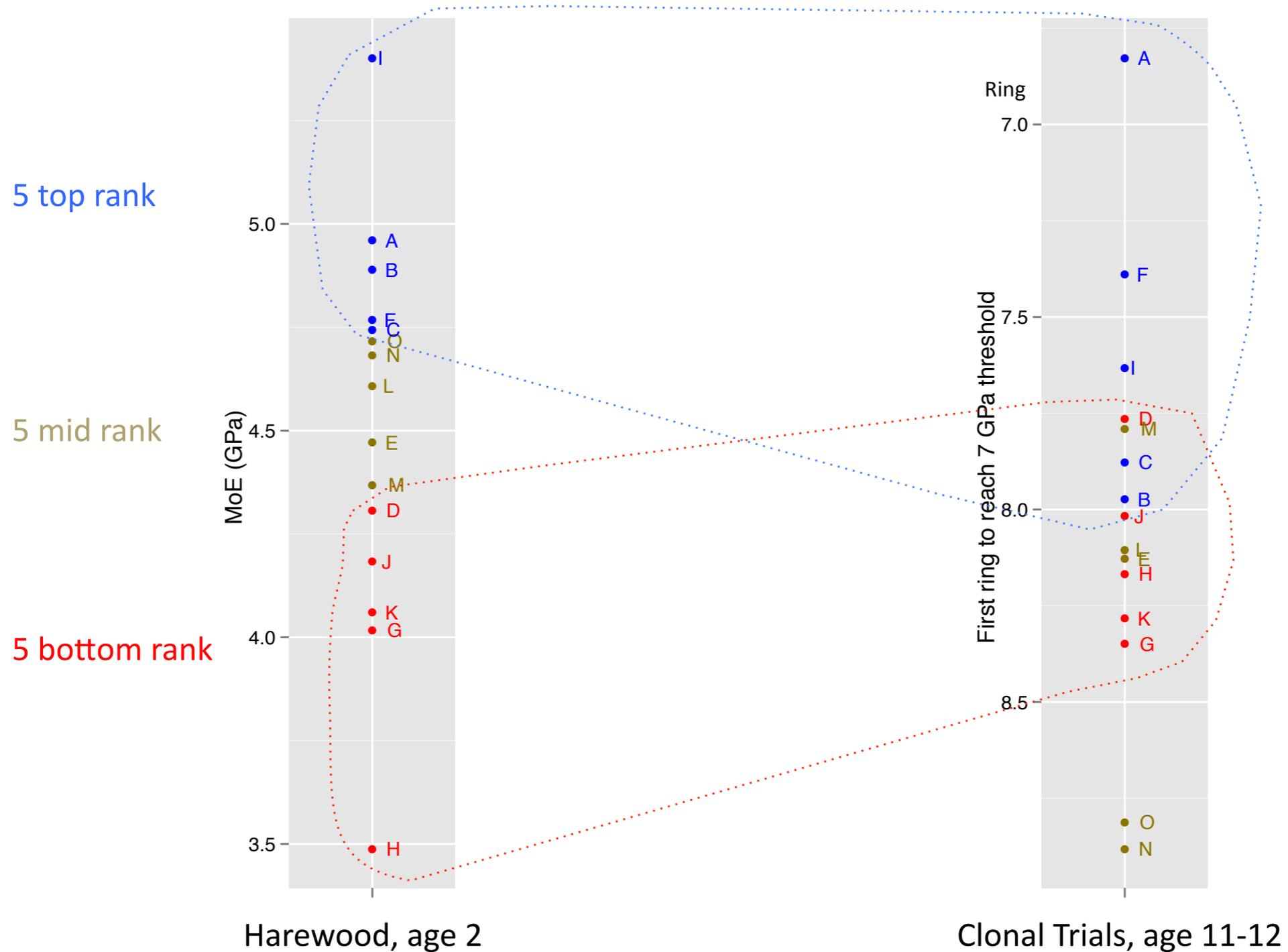
Can we predict long(ish)-term performance?



2
et



Can we predict long(ish)-term performance?



Final remarks

The use of clones was very useful for:

Removing environmental noise

Comparing early/late performance

Testing ideas for scaling up the evaluation system

References available at apiolaza.net

Rationale for very early screening

Apiolaza, L.A. 2009. Very early selection for wood quality: screening for early winners. *Annals of Forest Science* 66(6): 601-610

Tilting trees for screening purposes

Apiolaza, L.A., Walker, J.C.F., Nair, H. and Butterfield, B.G. 2008. Very early screening of wood quality for radiata pine: pushing the envelope. Society of Wood Science and Technology 51st annual convention. 10-11 November, Concepción, Chile.

Apiolaza, L.A., Butterfield, B., Chauhan, S. and Walker, J.C.F. 2011. Characterization of mechanically perturbed young stems: can it be used for wood quality screening? *Annals of Forest Science* 68: 407-414.

Genetic control of very early wood properties

Apiolaza, L.A., Chauhan, S. and Walker, J.C.F. 2011. Genetic control of very early compression and opposite wood in *Pinus radiata* and its implications for selection. *Tree Genetics & Genomes* 7(3): 563-571.

Screening tools & techniques

Chauhan, S.S., Sharma, M., Thomas, J., Apiolaza, L.A., Collings, D.A. and Walker, J.C.F. 2013. Methods for the very early selection of *Pinus radiata* D. Don. for solid wood products. *Annals of Forest Science* 70: 439-449.

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And all papers by Monika Sharma

Apiolaza, L.A., Butterfield, B., Chauhan, S. and Walker, J.C.F. 2011. Characterization of mechanically perturbed young stems: can it be used for wood quality screening? *Annals of Forest Science* 68: 407-414.

(coming soon!)

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Team

Technicians: Lachlan Kirk, Nigel Pink, John Walker

Researchers: Monika Sharma, Shakti Chauhan, John Walker,
Luis Apiolaza & Michael Hayes

Bouncing ideas: Ryogo Nakada

Modern slavery: numerous students helping out
setting up experiments