

Clonal Forestry in Britain: What's in it for us?

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What's the problem with the breeding of Sitka spruce today?

- It takes too long;
- It costs too much
- It gives a variable product
- It is hard to combine vigour and quality

Wouldn't it be nice if SS
plantations were uniform and
were consistently good for
growth rate and wood density

Clonal Forestry could make this happen.



Where we are now:

Half-sib family forestry: Multiplication of scarce seed already happens following controlled pollination

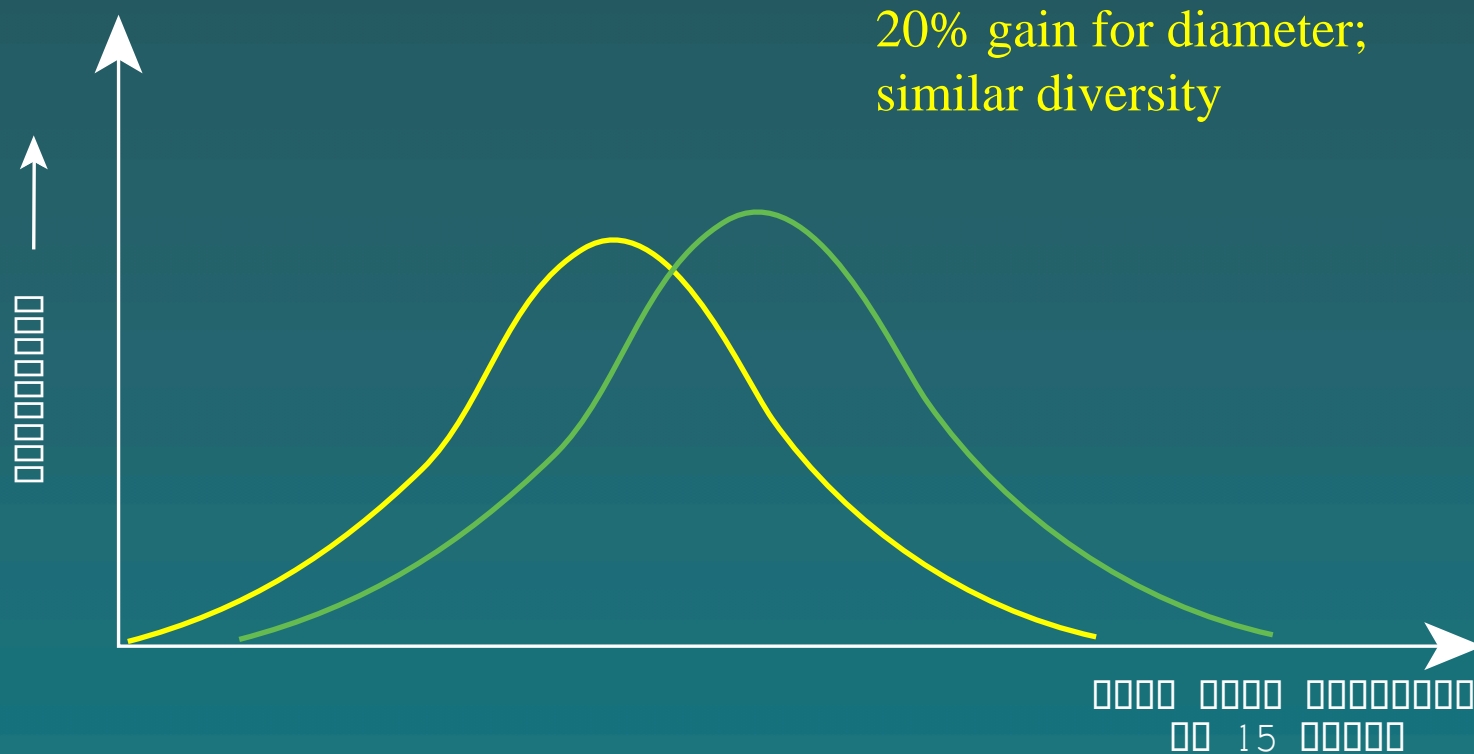


Stock plants are raised from seed -
everything is mixed up.



The genetic diversity is very wide

Unimproved QCI v seed orchard or family mixture



Full-sib family forestry: The next stage is to bulk up seed of tested full-sib families



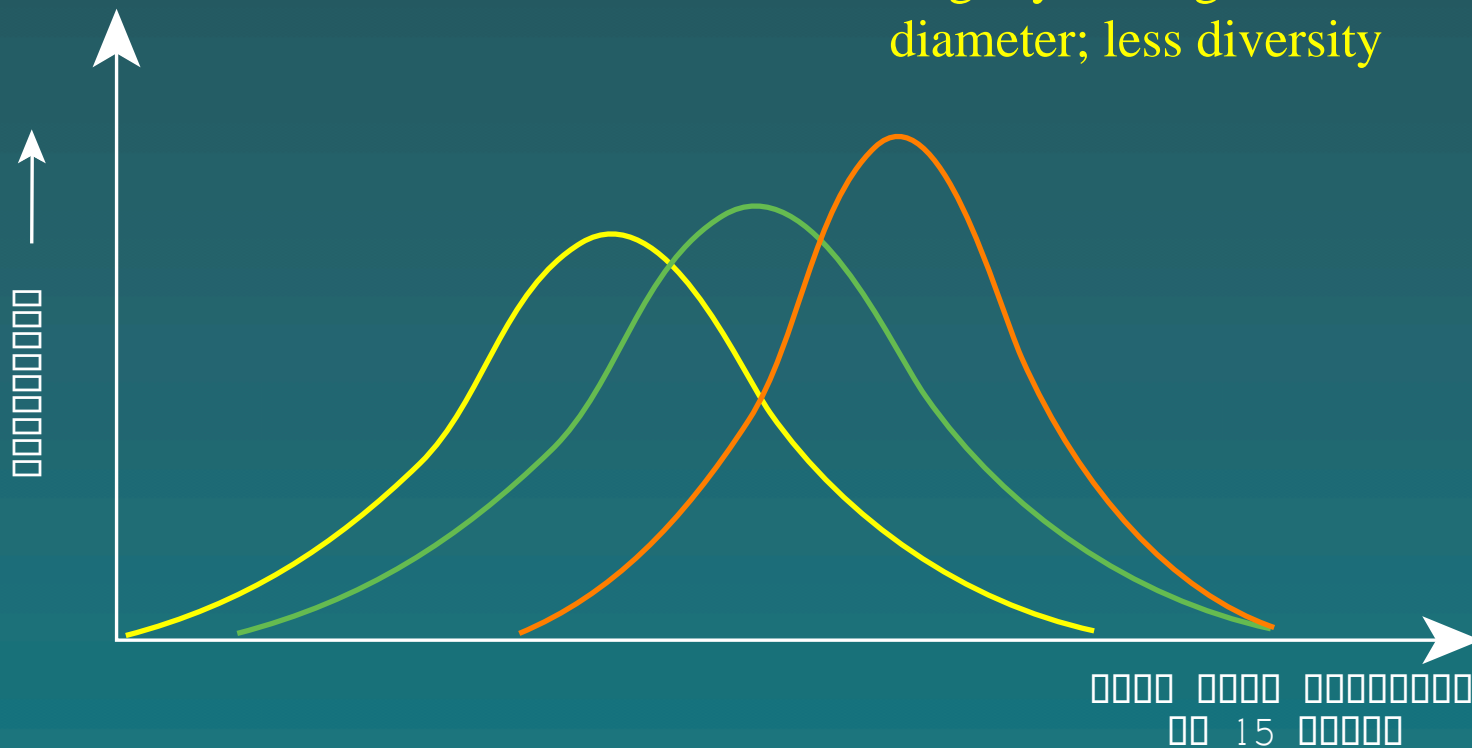
We are just about to enter this stage



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QCI v family mixture v best full-sib families

Slightly more gain for diameter; less diversity



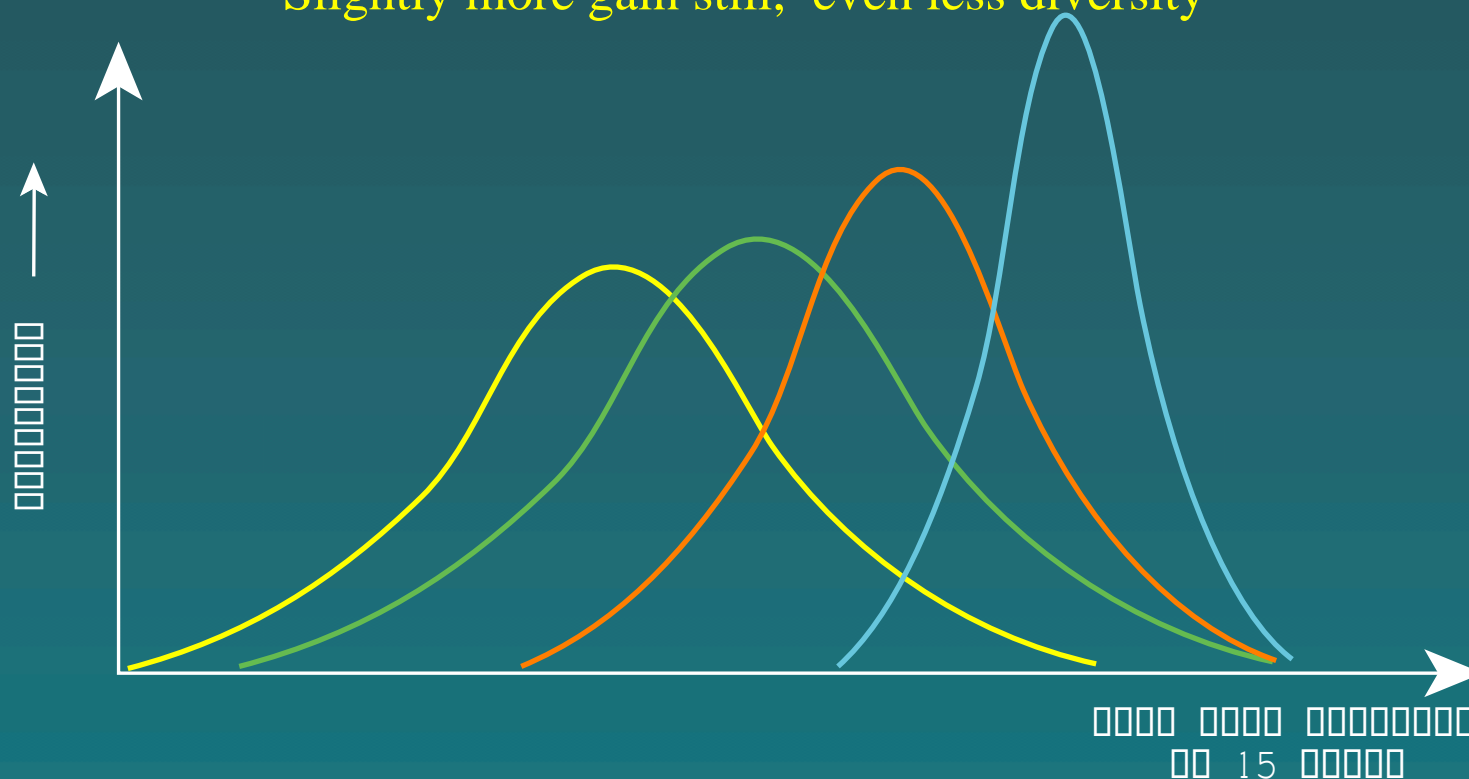


The next stage is
to multiply up
individual, tested
genotypes or
clones

True clonal
forestry

QCI v family mixture v best full-sib families v tested clones

Slightly more gain still, even less diversity



We can gain some insight of the benefits of clonal forest from the clonal test in Newcastleton forest we visited yesterday

	Diam	Den					
SS(C20216)	116%	103%					
SS(C20214)	118%	105%					
SS(C20213)	92%	118%					
SS(C20212)	109%	109%				Diam	Density
SS(C20211)	92%	119%	Family Mean			107%	111%
SS(C20210)	112%	108%	Extra Gain			3%	4%
SS(C20209)	110%	115%	◀			110%	115%

SS(C20208)	115%	94%					
SS(C20207)	115%	98%					
SS(C20206)	125%	89%					
SS(C20204)	125%	89%				Diam	Density
SS(C20203)	127%	85%	Family Mean			120%	93%
SS(C20202)	109%	114%	◀			109%	114%
SS(C20201)	123%	81%	Extra Gain			-11%	21%

SS(C20200)	114%	91%					
SS(C20199)	125%	96%					
SS(C20198)	100%	94%				Diam	Density
SS(C20197)	100%	106%	Family Mean			105%	105%
SS(C20196)	103%	115%	◀			103%	115%
SS(C20195)	99%	114%	Extra Gain			-2%	10%
SS(C20194)	104%	106%					
SS(C20193)	97%	120%					

SS(C20192)	139%	80%	Family Mean			117%	94%	
SS(C20191)	120%	101%	◀			120%	101%	
SS(C20190)	109%	103%	Extra Gain			3%	7%	
SS(C20189)	123%	89%				Diam	Density	
SS(C20188)	104%	102%						
SS(C20187)	115%	95%						
SS(C20186)	112%	92%						
SS(C20185)	112%	90%						

SS(C20176)	99%	104%						
SS(C20175)	112%	99%						
SS(C20174)	99%	106%						
SS(C20173)	116%	96%						
SS(C20172)	122%	86%				Diam	Density	
SS(C20171)	110%	98%	Family Mean			112%	98%	
SS(C20170)	132%	98%	◀			132%	98%	
SS(C20169)	104%	100%	Extra Gain			20%	0%	

Newcastleton 36 P1990			
After 12 growing seasons			
	Diameter	Density	Selected clones
QCI	100%	100%	
Mean of all clones	116%	96%	110% 115%
Best for DM	146%	69%	109% 114%
Best for DN	97%	120%	103% 115%
Mean of selected clones	115%	109%	120% 101%
(Heritability	0.95	0.97)	132% 98%



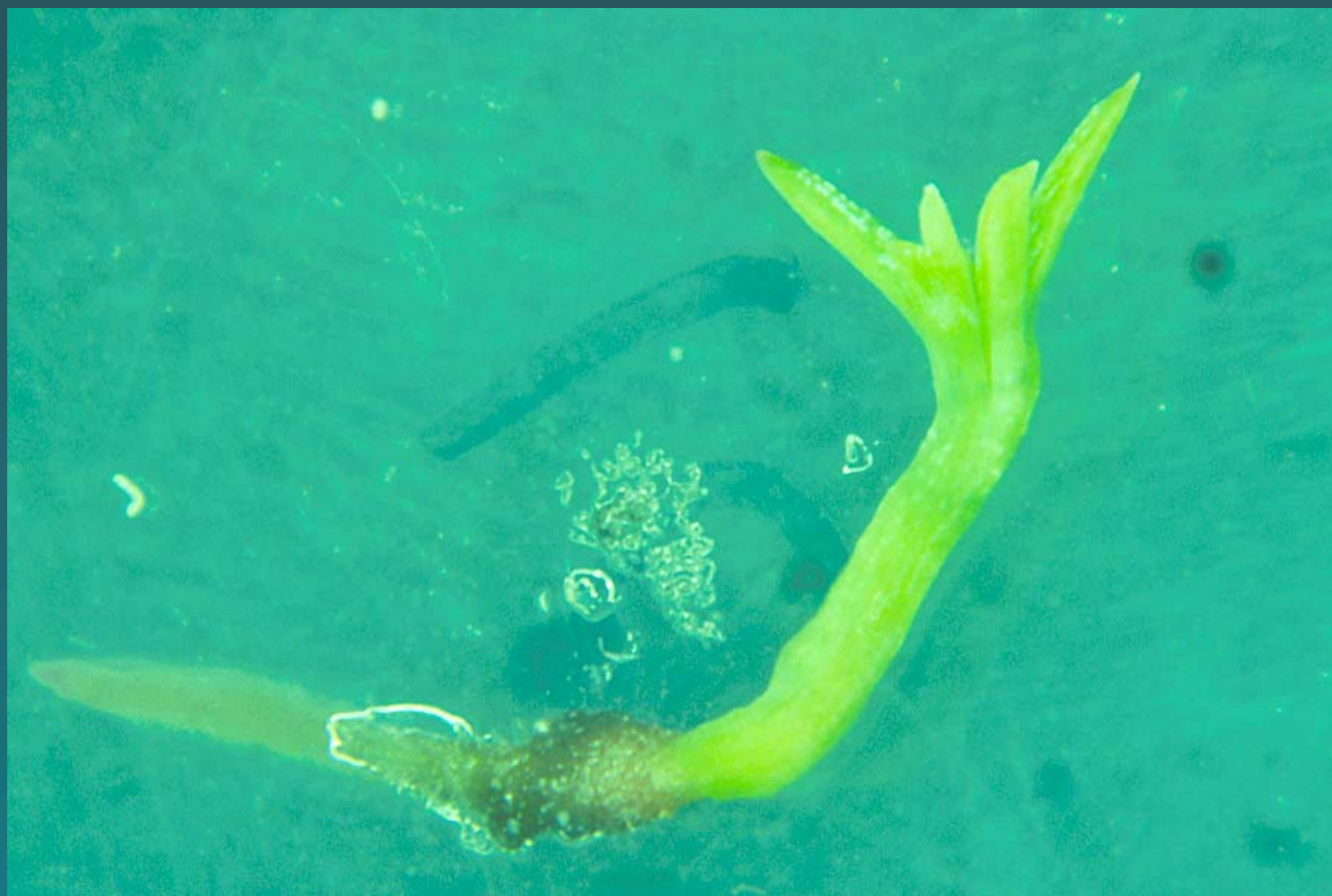
Why are we not practising clonal forestry already ?



- Only 1,000 cuttings can be taken before the stockplant becomes physiologically too mature at 6-years old
- Not all field test results become available within 6 years



..... enter somatic embryogenesis





The potential to
make thousands
of copies of
each clone



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..... also enter cryopreservation.

The ability to arrest maturation in liquid nitrogen whilst clonal testing is being carried out.

We think these technologies could be operational 3 years from now.



Problems ?

- Flies in the face of general desire to increase diversity?
- Acceptability within FSC?
- Public acceptance?
- Tarrred with the GM brush?
- Increased biotic risks?



So what's in it for us....

- It's the tree breeders dream. We can finally give people what we want to produce and what they want to receive:
 - *Quality and uniformity of product*
- And if the technology proves successful, it may be cheaper than current veg. prop. via cuttings and perhaps as cheap as transplants.



- Tree breeders want it;
- Sawmillers want it
- Nursery men want it;
- It all depends on COST! And environmental restrictions;
- Breeders have a public relations exercise to carry out speaking to all stakeholders - industry, public, environmental groups.



There could be quite a lot in it
for us!

The end.

... or the dawning of a new
era?

