



**Where is conifer  
breeding at  
today?**

**What are the  
options for the  
future?**

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We have selected plus trees, carried out genetic field trials and established breeding populations for



**Sitka spruce**      **Scots pine**  
**Corsican pine**      **Hybrid Larch**

Improved planting stock from seed orchards exists for all these species. Veg. prop. material is available for Sitka spruce (only).

*We no longer work with:*

**Lodgepole pine** - some  
(untested) seed orchards exist.

*We still have progeny tests to  
assess for:*     **Douglas Fir**



We see Sitka spruce as our most important species and this received about 80% of our resources. This is the only species for which we have a plan of continued improvement at the moment.     We cost about £700k per year

***The objective has always been to breed timber suitable for the construction industry.***

We aim to improve the next generation of forests relative to previous one!

- straighter
- stronger
- finer branched
- good growth rate





# Predicted gains from Sitka spruce seed orchards and half-sib family mixtures.

	<u>Diameter</u>	<u>Stem Str.</u>	<u>Wood Den</u>
<i>Seed Orchard</i>	15-20%	2-10%	-9%
<i>Family mixtures</i>	15-22%	5-15%	0%

**Moving forward into the next generation. We are 75% through a big programme of making crosses between parents selected for the breeding programme based on good progeny performance.**

**25% of this programme has been planted; 50% is in store ready to plant once finances allow; the other 25% have not been created yet.**



**Some good full-sib** families have already been identified from the first full-sib tests (1985/6). About 300 other full-sib families are now approaching 6 to 10-years old.

The best of such families are mass produced for veg. prop. and breeders select the best tree in the best families for further breeding work.



# Traditional progeny tests

- Expensive to establish
- Expensive to maintain
- Expensive to assess
- Take a long time to yield results.

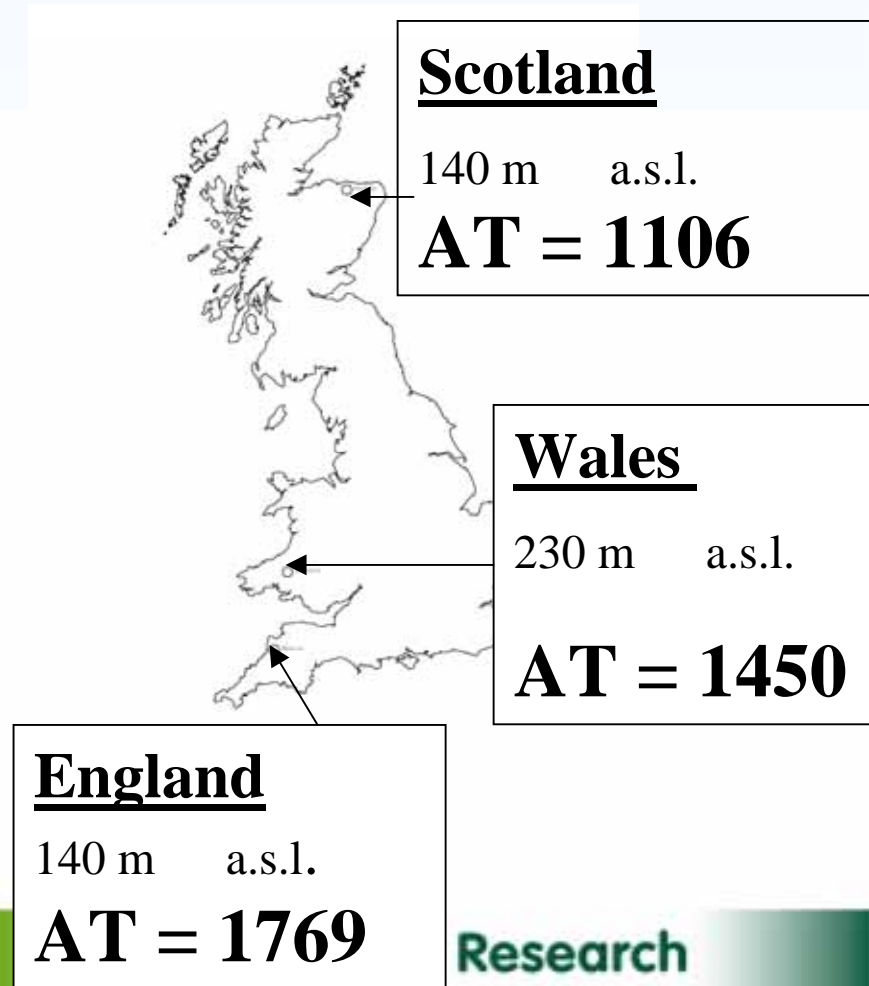
**In order to get more *targeted* gains to the forest *faster* we are introducing new technologies**

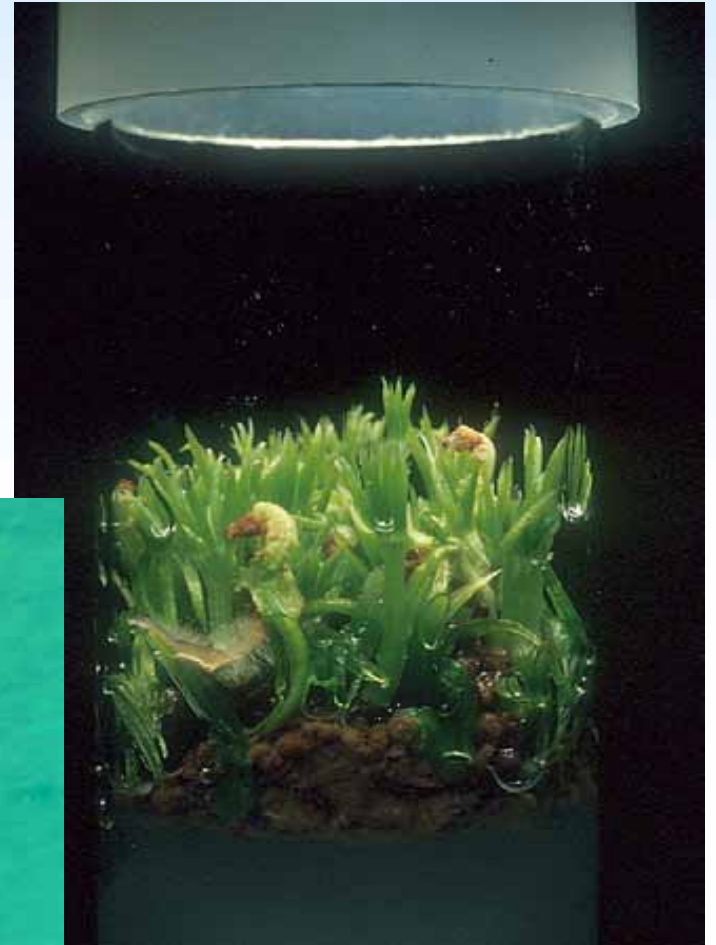
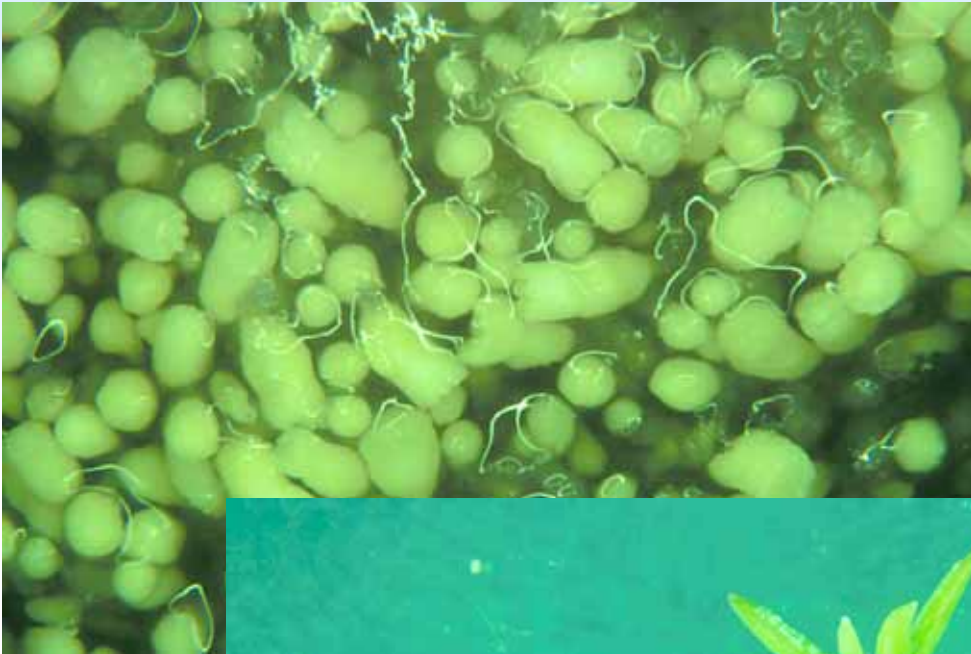
- Clonal forestry
- Very early screening



# Very Early screening: Marker Aided Selection in Sitka spruce

- In spring 2005, we planted 3 large clonal trials designed to establish a link between laboratory-based DNA markers and performance in the field
- We are constructing a linkage map to help look for these markers. The map is over 50% completed.





**We are developing clonal forestry technologies such as somatic embryogenesis and cryopreservation**





**Clonal forestry brings uniformity  
and helps make MAS a reality**

# What are our options?



- Continue carrying out and planting the full-sib families in field tests.
- Push forward with Marker Aided Selection
- Push forward with clonal forestry - develop the techniques required and establish clonal tests.
- Demonstrate the uniformity of clonal forestry
- Do nothing new - just screen the best full-sib families from existing tests.