



The Biofore Company **UPM**

Industry Research Needs – Growing Sector

SIRT Timber Research Workshop
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The Grower

- Most are financially driven
 - They want to maximise £/ha at Clearfell and minimise costs of establishment and maintenance
- Need to grow what Industry needs
- 30-40 year crystal ball – a bit cloudy in detail
- Net Discounted revenue driven rather than annual cash budget
- Facing the relentless increase in costs as the pound weakens and timber increasingly being a global commodity



The Grower

- Needs to be able to grow crops that are healthy
 - Need to be vigorous – good defence against disease – capturing carbon fast
 - Need to have genetic resistance to pest and disease
- Needs to grow most flexible crop he can
 - High quality timber – straight uniform, dense, light branching, vigorous
 - You can always burn high quality timber – if that is what society needs of its forests





The Grower

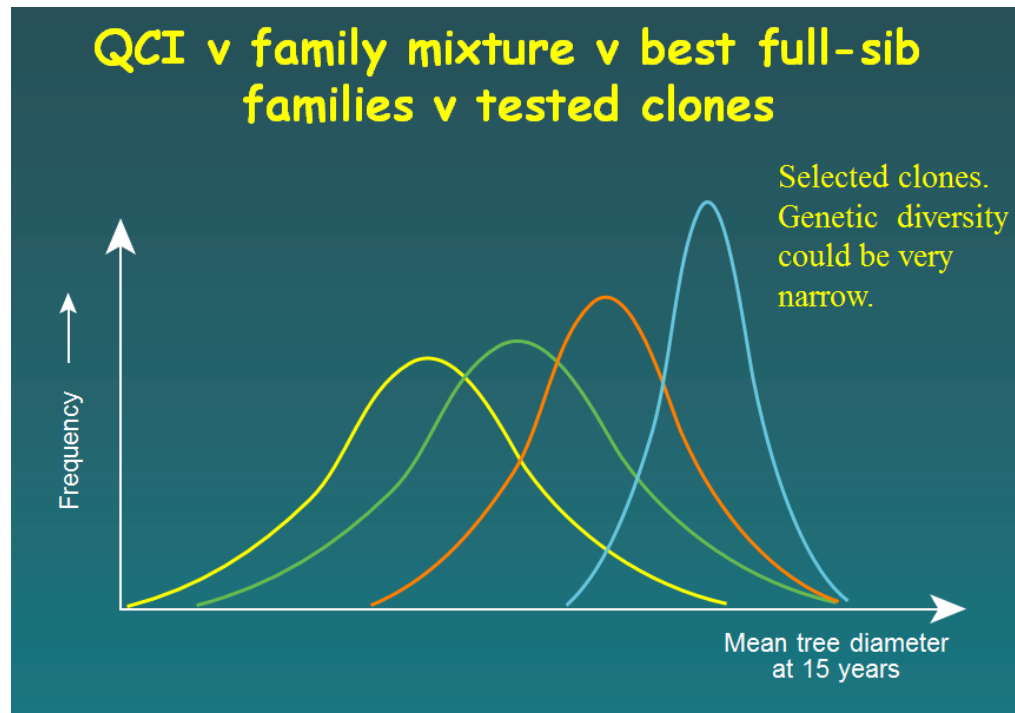
- Needs to be able to respond quickly and adapt to change
 - Climate change – the right species for the site and for industry as the climate changes
 - Do we have time for lengthy research programmes – Just in Time delivery
- Needs to be able to compete in the UK and the Global economy
 - Better product
 - Shorter rotations
 - Better plant quality,
 - Better crop protection





Quality versus Genetic diversity

- Tree breeding leads us down a route of narrowing genetic base



- But increasing pests and diseases would suggest we should diversify
- Arguably we need to do both
- Thanks to Steve Lee for the graph



Quicker Research results

- Research into Sitka Spruce breeding commenced in the early 1960's
- The objective has always been to breed trees that yield timber suitable for the construction industry
- Wide scale trials were set up in Spadeadam forest and over the last 10 years in particular have yielded significant results
- Initial predictions from 1990's were
 - 15% volume gain rising to 25% by 2000
 - Straightness and branching gains would compensate for lower density
- This research started over 40 years ago is now delivering with better timber for the second rotation

- BUT

- Can we as a nation afford 40-45 years??



Make good use of limited resource

- So how can we best use our limited resources in terms of time and cash?
 - Decisions need to be considered and examine how we can be more cost effective.
 - Test decisions against whether the benefit in 10-20 years is a good use of limited funds
 - Adaptability to increasing rate of change – find out more quicker and be able to react quicker
 - Build on work done by others
 - Spread the costs - partnerships



Adaptability to change

- Here we need more tools in the tool box to be able to respond to change more quickly
1. An even better understanding of heritable traits and marker aided selection

Genetic correlations

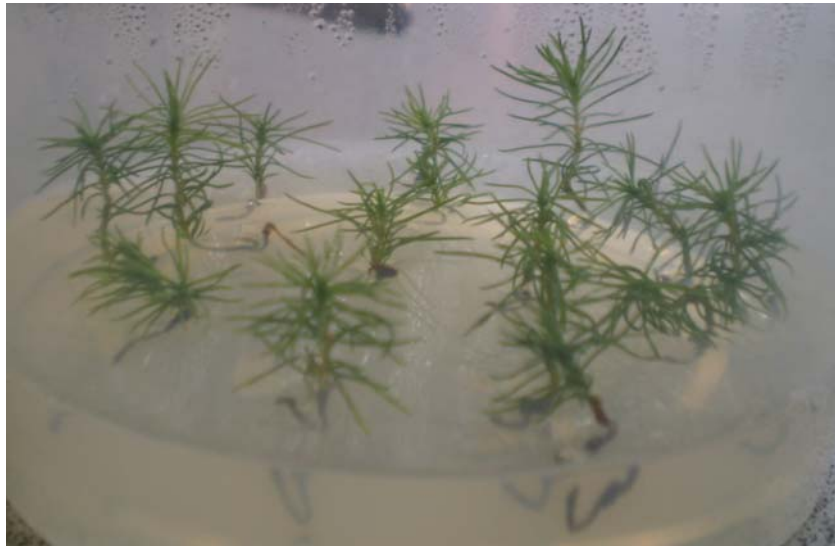
	Density	MFA	Velocity	DBH
MOE	0.86	0.79	0.81	-0.89
MOR	1.04	0.62	0.49	-0.95

2. How would such work help us with understanding disease resistance



Adaptability to change

- Somatic Embryogenesis and Cryogenesis – could reduce the timescale of getting new plant material bulked up and available to the Grower





Build on what others have done

- Can we work in collaboration
 - Sweden have an advanced programme in selecting Norway Spruce to improve yield
 - Their current estimate is for 35% increase in vigour
 - Could we use NS as a suitable replacement for our failing Pine and Larch
 - They are also carrying out Somatic Embryogenesis and VP production
 - Can we combine and share knowledge here
 - Perhaps they would take some of our Improved Sitka – increasing the market size



Partnerships



Automated Wood-quality Measurement Tool (Forest Research)

The outcome of this project was a prototype system which could be added to tree harvester heads to determine the stiffness of wood, in real time, at the moment before cutting. Being able to make such measurements has the potential to significantly increase the cost-efficiency, enabling a harvester crew to make quick, informed decisions on wood quality. In turn, this would reduce wastage and avoid logs being sent to the wrong end-product line, allowing the growers to increase their own profitability.



Partnerships

- Hylobious Protection
- Partnership formed to carry out significant trial work over the last 4 years which has led to an alternative to pyrethroids being licensed for weevil control



Lykeby, Sweden



More and even better Management Support Systems

- ESC
- Windthrow Hazard/Forest Gales
- Hylobious MSS

- Need to develop, test, refine, and educate.
- Must be readily available for all to use

- REMEMBER they are management SUPPORT systems



Summary

- Tree breeding programmes must continue with priority
 - SS will be a mainstay of Scotland plc's economy even with climate change
 - Starting with analysing and publishing microfibril angle data on existing Family Mixtures
 - Look after and safeguard our breeding material – clone banks and seed orchards
 - Look at sensible alternative species for our current SS sites
 - Seed orchard NS and Birch from Sweden?
 - More work on disease resistance
 - Don't let Sitka get Phytophthora ramorum !
 - Lets have better practical and effective measures for disinfecting timber trucks
- Get more understanding to be able to react to change more quickly
 - Marker aided selection and heritable trait mapping
 - Somatic embryogenesis
 - Cryopreservation
- Form more partnerships to enable more with less
- Polish the crystal ball



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