

'Alternatives' - the new buzzword?



by **Tim Liddon**
FICFor, forestry
 director, Tilhill

It is now nearly four years ago since 'resilience' was elevated to the buzz word in forestry and now it is the turn of the word 'alternatives'. Foresters are now thinking more widely about what to plant and where. The challenges of getting 'alternatives' established and to thrive are now being recognised more extensively as well. The regulators are pushing for more diversity in our forest plans and new planting.

But we need to think a little bit further to ensure the baby is not thrown out with the bath water as it were! Our great challenge in the uplands is to enhance resilience wisely. Given the relatively poor sites on which our current crops thrive we need to be careful not to put species on these site that will not thrive as that, in my view, will not be enhancing resilience.

Restructuring of the 1970s plantings is now well advanced and with this comes age diversity which is a good start. We are also seeing a good uptake of improved Sitka material being used. This is bringing enhanced quality and giving the grower the opportunity to reduce rotation lengths, thus building in more resilience as any one crop has a shorter window of exposure to pathogens. Used wisely it should be possible to maintain or indeed enhance genetic diversity. This is an area that the Conifer Breeding Cooperative considers fundamentally important and as such has commissioned a PhD so we can gain a better knowledge base in order to allow growers to make more informed decisions.

Understanding the genetics of our crops will be a critical factor in providing resilience in our plantations and equally important as shortening rotations. The desire to improve plants and animals is now very well developed. We see this in horticultural cultivars, food crops and in animals in order to provide increased yields, refine taste, increase disease resistance as well as many other advantages. These gains are delivered by selecting superior individuals and in some areas by genetic modification - but not in UK Forestry.

If we look at chicken production, genetic selection has reduced the breeding cycle from 40 weeks to 20 weeks with an increase in productivity, and has also improved resistance to disease. In forestry though, the tree breeder has some disadvantages over agriculture due mainly to the length of the crop cycle - often one year in agriculture but thirty plus years in forestry - so the gains come more slowly.

A history of improving Sitka

Fortunately, in the early 1960's the Forestry Commission started work on improving Sitka spruce, our mainstay crop. Over 1700 'plus' trees were selected as a potential breeding population. The first open-

pollinated Sitka spruce progeny tests were planted in 1967 with the objectives of ranking parent trees for genetic quality relative to unimproved material.

To start with, only height and stem straightness assessments were carried out in the progeny tests. Wood density was introduced in around 1986 and then branching habit was assessed. In the last couple of years, through the Conifer Breeding Coop (of which Tilhill Forestry is a founder member), acoustic velocity is now being assessed. This measure gives an indication of timber stiffness (strength).

Some typical gain stats are given in the table.

ID No.	Diameter	Density	Straightness	Branching	Acoustic value
psiPF65TE	7	4	30	12	-
psiPF66TE	12	0	16	0	-
psiPF69TE	17	-9	34	19	4
psiPF75TE	17	-9	34	19	4
psiPF79TE	3	11	16	8	-
psiPF80TE	16	1	36	14	3

Tree breeding in Sitka has now moved on to studying the detail of the genomics of Sitka Spruce. In 2017 a significant project was launched by researchers from Forest Research and the Universities of Oxford and Edinburgh. This research project has received significant funding from BBSRC (Biotechnology and Biological Sciences Research Council). It has also received support from the UK forest industry with significant financial support from the BSW Group.

The overall goal is to develop genomic prediction (GP) methods for Sitka spruce and transfer these lessons to the forestry industry as a whole. GP can be used to predict important traits such as productivity, resistance to insect pests and tolerance to climate change. It could also shorten the process of effective selection of new Sitka strains down to just 11 years.

But growers of course should also broaden species mix where appropriate. The Conifer Breeding Cooperative (nee Sitka Spruce breeding Cooperative) has broadened its scope to involve other productive Conifers.

More information is being pulled together so that our foresters can make more informed decisions in order to get the right species in the right place to deliver our client's objectives. This involves understanding where the best genetics for each species can be found. For example, sample plots are being established for Norway spruce from Swedish, Danish and German seed orchards, and also plots of Lutz Spruce.

We are seeing an increased interest in seed orchards and the use of 'landrace provenance' being a way of increasing productivity. Growers will need to use climate change predictions in their decision making process.

The results of the trials mentioned above will be part of the decision making and are eagerly awaited by the whole of the forest industry.

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