



## Selection and improvement of Irish birch and alder

### PROJECT TEAM

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### BACKGROUND

In recent years the demand for native species has risen in accordance with increased use of broadleaves in afforestation. The birch improvement programme (*Betula pendula* and *B. pubescens*) began in 1998 with a view to providing additional native species with timber potential to the Forest Service schedule of acceptable species. The improvement of alder (*Alnus glutinosa*), a species included in the Forest Service schedule, was initiated in 2005. In the recent COFORD review<sup>1</sup>, alder and birch were confirmed as native species of high potential for improvement in the Irish context.

### OBJECTIVES

The overall objective of the research is the development of a sustainable supply of improved, adapted and healthy seed within the framework of the EU Forest Reproductive Material regulation. The specific steps are:

- Locating the best plus trees as a basis for the improvement programme;
- Establishing seed orchards, and clone banks;
- Establishing progeny trials to assess the genetic value of plus trees.

### PROGRESS

Location and collection of new material for the breeding programmes is ongoing. In 2009, grafts from 16 new birch and 26 alder plus trees were successfully established.

Clones of 81 alder genotypes, collected in 2006 and 2007, were used to establish a clone bank at Teagasc Research

Station, Kinsealy. The birch clone bank was extended using recently collected clones.

The breeding values of the birch and alder plus trees are being tested in field trials. Two alder progeny tests, using seed collected from the 2006 plus trees, were established in 2008 and a third was established in 2009 in Sligo. Trials are monitored for growth and survival; quality assessments will be introduced at a later date. Over the winter of 2008/2009, height, diameter and quality assessments were carried out at two progeny/provenance birch trials that had been established in 2001. Results indicate significant differences between families (Figure 1).

Indoor seed orchards for both birch and alder were established (Figure 2). The alder seed orchard is based on clones of selected plus trees. The birch seed orchard was mainly based on selections within the progeny trials, based on early results.

### ACTIVITIES PLANNED

The best birch trees from the best families, based on the latest data from the progeny trials, will be used to update the seed orchards.

The flowering and pollen release dates of the seed orchard material will be recorded to ensure that the flowering period does not overlap with that of the clones outside. The number of male catkins, and thus pollen contribution, from each clone will be noted.

In 2010, the seed from individual clones in the seed orchard will be collected to determine the contribution of each clone to the overall production of seed.

The alder trials will be assessed for growth and survival and monitored for pests and diseases in 2010.

### OUTPUTS

Hemery, G., Clark, J., Aldinger, E., Claessens, H, Malvolti, M., O'Connor, E., Raftoyannis, Y., Savill, P. and Brus, R. Growing scattered broadleaved tree species in a changing climate – risks and opportunities. *Forestry Advance Access* published on 24 December 2009. doi:10.1093/forestry/cpp034.

Active participation in BIHIP birch group.

<sup>1</sup> Cahalane, G., Doody, P., Douglas, G., Fennessy, J., O'Reilly, C. and Pfeifer, A. 2007. *Sustaining and developing Ireland's forest genetic resources - an outline strategy*. COFORD, Dublin.

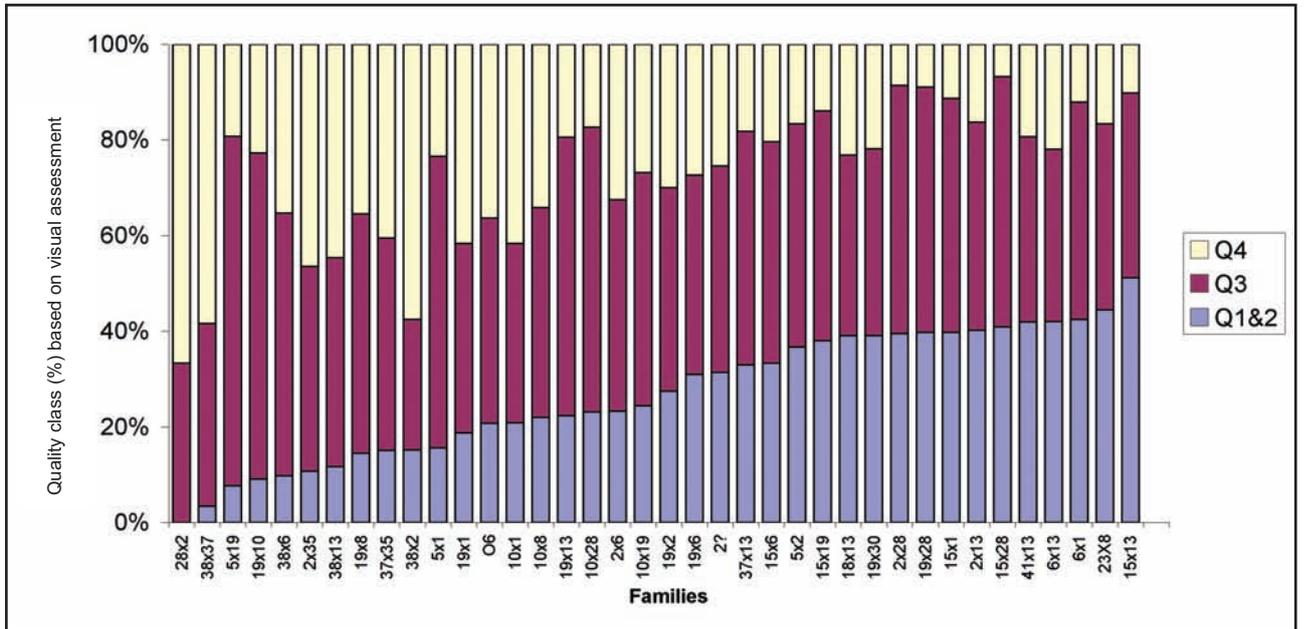


Figure 1: The proportion of different quality values within birch families at age eight. (Q1&2 = very good and good; Q3 = moderate; Q4 = poor quality).



Figure 2: Indoor alder seed orchard at Teagasc Research Station, Kinsealy.