



Reproductive Material No. 13

- ▶ Seed is the basis for forest establishment in Ireland and the UK.
- ▶ Seed from appropriate provenances only should be used.
- ▶ Where possible home-collected seed from registered seed stands should be used and applicants in Ireland are encouraged to ask for plants from Irish seed.
- ▶ Progeny from an excellent stand of trees will generally out-perform unselected stock.
- ▶ Selected seed provides a reliable source of well-adapted plants at a modest cost.
- ▶ It is important that the best broadleaved stands are registered as future seed sources.

The importance of seed stands in broadleaved forestry

John Fennessy¹, Jason Hubert², Sam Samuel³ and Peter Savill⁴

Seed is the most commonly used reproductive material in Irish and UK forests. There are three ways of improving the genetic quality and productivity of broadleaved forests:

- by using seed from appropriate provenances;
- by collecting seed from registered selected superior stands (seed stands) - a requirement under national and EU regulation for the majority of species;
- by breeding improved trees from individually selected 'elite' trees or 'plus' trees.

The first option is normally observed anyway with broadleaved trees, since only native and reasonably local provenances are used that should be well adapted to the local conditions. In Ireland the Forest Service recommends that where possible home collected seed from registered stands should be used and applicants are encouraged to ask first for plants from Irish seed. In Britain first choice of provenance should be a British seed stand. Considerable progress has



▲ A potential seed stand of oak (*Quercus petraea*), in Normandy, France.

COFORD
Arena House, Arena Road,
Sandyford, Dublin 18, Ireland
Telephone: +353 1 2130725
Email: info@coford.ie
<http://www.coford.ie>
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¹ Tree Improvement Programme Manager, COFORD. Email: john.fennessy@coford.ie; seedstands@coford.ie

² Email: jason.hubert@forestry.gsi.gov.uk

³ Email: sam.samuel@forestry.gsi.gov.uk

⁴ Email: savill.peter@btinternet.com

also been made in tree breeding in recent years, but quantities of seed available are still very small, as breeding programmes are an early stage. However, as genetically superior seed becomes available from seed orchards, the need for seed stands may decline.

Gains achieved by using seed from selected stands

Potential seed stands will contain trees with superior and desirable visible characteristics. Before a stand can be used for seed collection, the forest authorities responsible for the Forest Reproductive Material Regulations will inspect it to ensure it conforms to a certain acceptability quality for inclusion in the National Register. All seed collectors must be certified by the forest authority. In Ireland the Forest Service is the forest authority.

Progeny derived from an excellent stand of trees will generally out-perform unselected stock. This has been clearly demonstrated for oak in field trials*. Raising plants from seed collected in selected stands is comparatively

cheap. Furthermore, better quality stock can be deployed almost immediately, while breeding requires a much longer time, but both approaches are usually carried out in parallel.

Gains achieved by using seed from such stands are not well documented, because they are rarely progeny-tested. For any individual character, the gains are probably in the region of 2 to 5% compared with unselected seed from a suitable provenance.

Although these improvements may appear modest, improving several characters simultaneously in the same generation can have much larger additive economic effects, and can result in significant increases in recoverable timber per tree. This can be particularly important for broadleaved trees where a small increase in overall quality of the stand can result in a very large increase in value.

There are also advantages to the owners of selected seed stands. For example, in the UK in 2006, unselected ash seed was selling for about £12/kg, while £35/kg was paid for seed from selected stands; for birch the prices were £85-90/kg for unselected, and £130-£150/kg for selected seed.



▲ Straightness and branching are heritable characteristics as these two roadside stands from the Netherlands illustrate.

* Hubert, J. (2005). *Selecting the right provenance of oak for planting in Britain*. Forestry Commission, 231 Corstorphine Road, Edinburgh EH12 7AT, Scotland.

Management of seed stands

Seed stands are usually managed to produce large quantities of healthy seed by, for example, thinning to favour the best potential parents, and removing nearby sources of genetically inferior pollen. This procedure leaves only the good trees to interbreed. Seed stands are registered by the forest authority. The seed from them generally has the following characteristics:

- it produces plants with better genetic qualities than seed from unselected stands in terms of adaptability, vigour, stem and crown characteristics and pest resistance,
- the geographic locations of the parent trees are known, and information is available to the grower about the soil and climate of the parent stand,
- selected seed provides a reliable source of well-adapted plants at a modest cost.

Although the cost of seed from selected stands may be several times that of unclassified seed, it is modest compared with advantages to be gained from using it. Seed costs are only a small proportion of the total establishment

costs and should not be the determining factor when deciding between different seed sources.

Ideally a potential seed stand should be fully stocked, and, for broadleaves, contain 50-75 trees per ha. The trees should be of an age to produce seed and:

- well-grown dominant or co-dominant trees of above average quality, with large uniform crowns,
- vigorous,
- straight stemmed with little taper, no spiral grain or significant buttressing, or fluting,
- have a desirable branch form (fine and at a flat angle), with good natural pruning,
- be free from insect and disease attack.

The minimum area should be about 2 ha (a population of at least 200 trees is preferred) to minimise contamination from outside pollen, although smaller areas are sometimes acceptable.

To maximise seed production, it is important that the crowns of seed trees are exposed to full sunlight on at least



▲ Ash seed collection by climbing.



▲ Ash seed collection using long-handled secateurs.

three sides. Selective thinning of the poorest phenotypes is the recommended form of management for selected seed stands, even if this results in gaps.

Seed stand registration

To have a stand registered in Ireland, the owner should contact the Forest Service (01-6072932) or COFORD (01-2130725; email: seedstands@coford.ie) and an arrangement will be made for the stand to be inspected. If the stand meets the selection criteria it will be issued with a Stand Number and be added to the National Register. There is no charge for seed stand registration in Ireland.

In Great Britain, forest owners, or their agents, can apply to have a stand considered for inclusion in the National Register. Details can be obtained either by writing to Cathleen Baldwin at Forest Research, Northern Research Station, Roslin, Midlothian, EH25 9SY, or from the Forestry Commission website. If using the website search for “national register”, the first link under general information provides details of the register and a FRM1A form can be downloaded to make an application. The second page of this form gives fuller guidance on the requirements for registration. The full National Register is now available from the website and is an essential source of information for growers when considering what to buy. Until recently there was a charge to have stands registered in the UK. However, the Forestry Commission announced in February 2007 that charges for inspecting and designating potential seed stands are to be abolished.