

Project number: 6644
Funding source: Teagasc

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Birch and Alder Improvement_6644



Key external stakeholders:

Farm forest growers, tree nurseries, commercial forestry companies, COFORD (Council for Forest Research and Development) and Forest Service, Department of Agriculture, Food and Marine.

Practical implications for stakeholders:

The objective of this project is to provide a sustainable supply of improved, adapted and healthy seed of birch and alder within the framework of the EU Forest Reproductive Material (FRM) regulations.

- This will enhance the diversification of broadleaf growing stock.
- Underpin a vibrant rural economy.
- Encourage environmental sustainability and biodiversity.
- Improved birch plant material available to farmers and landowners wishing to plant forestry.

Main results:

- Birch plant material from the improvement programme available for commercial planting.
- Birch from the improvement programme added to the species list by the Forest Service for the first time.
- None So Hardy Nurseries selected as Teagasc partner for the commercial production of improved birch and alder seed and plant material.
- The Teagasc indoor alder seed orchard relocated from Teagasc Kinsealy Research Centre, to new facilities at the Teagasc Research Centre, Ashtown in 2017.
- Plants from the alder improvement programme grafted in 2018 and 2019 will be used to establish a seed orchard for the commercial production of improved seed and plant material by Teagasc commercial partner None So Hardy Nurseries.

Opportunity / Benefit:

The primary stakeholders for this research are farmers, landowners and the nursery producer None So Hardy. None So Hardy Nurseries have established an indoor seed orchard with improved plant material from the Teagasc birch programme. The nursery is producing plants for commercial planting and with improved birch on the recommended species list; farmers and landowners are availing of the improved planting material to increase the monetary and ecological value of their forests.

Collaborating Institutions:

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Teagasc project team: Mr. Oliver Sheridan
Dr. Nuala Ni Fhlatharta

External collaborators:

1. Project background:

Two species of birch are native to Ireland i.e. downy birch (*Betula pubescens* Ehrh.) and silver birch (*Betula pendula* Roth). Until recently birch was not on the Forest Service recommended species list for afforestation grants. This was mainly due to poor stem quality of naturally regenerated birch and the poor survival and growth rates that have followed importation of seed from abroad. The development of birch as a commercial forestry tree species supports government policy to increase forestry area, increase the broadleaf component of forestry, use more native species and to increase the diversity in Irish forestry. The physiology of birch and alder means that they can be planted on land not suitable for other broadleaved species e.g. common oak (*Quercus robur* L.). The discovery of ash dieback (*Chalara fraxinea* caused by the fungus *Hymenoscyphus fraxineus*) on our native ash (*Fraxinus excelsior* L.) has resulted in a ban on ash planting and in turn has focused further emphasis on alternative native broadleaved species.

The birch project began with an initial study 'Pilot project for the genetic improvement of Irish Birch' (1998 – 2000). Further projects followed with a series of other COFORD funding. The improvement of common alder (*Alnus glutinosa* (L.) Gaertn), a species that is on the forest service schedule, was initiated in 2005 and was tied in with the birch improvement programme to take advantage of similarities in the techniques of tree breeding. Three provenance/progeny birch field trials were established in 2001 and three alder field trials established in 2008 – 2009. Arising from the birch 10 year assessments the best 100 trees were selected and scion material collected and grafted. Ninety clones grafted successfully and then used to establish an indoor clonal seed orchard which includes both downy and silver birch. The indoor seed orchard also housed 100 clones from alder plus-tree selections. In 2013 the indoor seed orchard was awarded qualified status by the Forest Service.

2. Questions addressed by the project:

- Do better quality provenances of birch (downy and silver) and alder exist in Ireland and can they be recommended as suitable seed collection areas?
- Can superior individuals of birch and alder be identified to be used as a base population for an improvement programme?
- Do the characters of growth and stem form display heritability for cyclical and concurrent selection and improvement?
- Can superior families of birch and alder be identified in progeny trials, indicating high value parent trees to retain in the breeding population?
- How do the selected clones respond to growing in a managed seed orchard and what is the annual seed yield?

3. The experimental studies:

The long term objective of this research programme is the genetic improvement of birch and alder tree germplasm for deployment in farm forestry. In 2015 the research was at a stage where there was downy birch and alder material suitable for commercialization. The downy birch material is based on selections within a progeny trial established with family seed lots from selected plus-trees (forward selection). The alder material is based on plus-tree selections. In 2015 None so Hardy Nurseries were selected as a commercial partner to commercialize seed and plant production of birch and alder from the Teagasc improvement programme.

4. Main results:

- None So Hardy Nurseries established a qualified indoor birch seed orchard in a specially constructed polyhouse with plant material supplied to them under license from the Teagasc Improvement Programme.
- The commercial production of seed will lead to self-sufficiency in the supply of improved, adapted and healthy plant material.
- Improved birch plant material was available for commercial planting from None So Hardy Nurseries for planting season 2016/2017.

- Improved birch added to the recommended species list by the Forest Service for the first time. This means that farmers and land owners wishing to plant birch for forestry can apply for grant and premia provided they use improved birch material.
- Two birch progeny field trials were established with plant material derived from the Teagasc qualified indoor seed orchard, one in Waterford and the other in Sligo.
- Seed collected from the Teagasc indoor alder seed orchard will be used to produce plant material to establish field trials to test this material.

5. Opportunity/Benefit:

- The establishment of commercial qualified seed orchards by None So Hardy Nurseries with plant material from the Teagasc improvement programme will lead to the provision and self-sufficiency of improved, adapted and healthy seed and plant material to forestry owners.
- The use of improved plant material can enhance the monetary and ecological value of forests for their owners.
- With the availability of improved birch plant material the Forest Service added it to the recommended species list.
- Birch has a relatively short rotation compared to other broadleaves and as a result will offer quicker financial returns.
- Birch can be planted as an alternative to some of our native species that have succumbed to disease e.g. ash (*Fraxinus excelsior*).
- The improved planting material also feeds into schemes in the Forestry Programme 2014 – 2020 e.g. The Forest Service Native Woodland Scheme (NWS) which is aimed at protecting and expanding Ireland's native woodland resources.

6. Dissemination:

- Teagasc Forestry Web Page.
- Teagasc YouTube video on birch and alder improvement.
- Forestry and Timber Show, Stradbally, 2015 & 2017.
- Tullamore Show 2016, 2017 & 2018.
- Sheep – Farm to Fork, Athenry 2018.
- Ploughing Championships, 2016, 2017, & 2018.
- Open days – Ballyhaise College – 30 years of forestry training and education 2018.
Teagasc Ashtown Open Day 2018.
Teagasc staff Ashtown, May 2018.
- Presentations – Forestry Development Department staff and Walsh Fellows, 2015, 2016.
Irish Plant Scientists Association 2018
- Visiting groups – Japanese delegation 2016, OPW 2018, CoFoRD Council (Council for Forestry Research and Development) 2018, Norwegian delegation 2018, Coillte 2018, LUKE 2018, Ballyhaise College Forestry Students 2019, Swiss delegation 2018.
- Events – field – Birch Trial Coolbaun, Co. Tipperary, members present at the event were from The Forest Service, Future Trees Trust, Coillte, UCD, Nursery Industry, Teagasc, 2015.
- Hardwood Marketing Event, Abbeyleix 2016.
- Future Trees Trust Inaugural Irish Supporters Day 2016.
- Meetings – presented reports – Future Trees Trust Birch Group at Forestry Research, Roslin, Edinburgh 2017, 2018.
- Seminar – Response to combat ash dieback disease. Ashtown 2018 – reported to the group, progress on the birch and alder improvement programme.

Main publications:

Popular publications:

- Farming Independent – Private nursery sector reaping the rewards of long-term birch research.
- Irish Farmers Journal – Growing quality broadleaved trees.

7. Compiled by: [Oliver Sheridan](#)