



FRM REGISTERED 'SELECTED' SEED STAND AUDIT

Commissioned by **Forestry Commission England**
Undertaken by **Forestart Limited**
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Contents

1. Project Overview
2. FRM stand inspections
3. Future Trees Trust stand assessments
4. Review of seed stands by species
5. Summary

Table 1	Summary of findings
Appendix 1	Seed Stand assessment criteria
Appendix 2	Table of results

1. Project Overview

In Great Britain, relatively few native broadleaf species have stands registered. This means that there is not a reliable resource of quality tree seed, which leads to the importation of seed possibly maladapted to the British environment. Those species which have a significant number of seed stands still do not seem to provide a reliable regular seed quantity. This was demonstrated in 2012 by the importation of Eastern European acorns when there failed to be a mast year in Britain. What is unclear is that why this should be the case.

This Project will provide Forestry Commission, and indeed anyone else, with the intelligence and evidence to make the supply of quality broadleaf tree seed more resilient.

The Project will consist of two stages. First, an audit of the known resource – the stands currently on the FRM register. A second stage will identify seed resource for species currently not on the register.

This Stage 1 report summarises the audit of ‘Selected’ seed stands currently included on the FRM register as detailed below:-

Species	No. of ‘Selected’ stands
Pedunculate oak	35
Sessile oak	22
Silver birch	5
Beech	23
Sycamore	5
Sweet chestnut	4
Small leaved lime	1
Total	95

2. FRM stand inspections

The Forestry Commission’s FRM team’s current seed stand inspections include:-

1. Verifying the area of the stand
2. Assessing quality: Stem form, branching quality, health
3. Assessing vigour
4. Measuring isolation from inferior material of the same or hybridising species
5. Recording site characteristics including:-
 - altitude
 - rainfall
 - aspect
 - slope
 - exposure
 - FC soil type
 - Soil Association classification
 - FC geology
 - BGS geology
 - vegetation
 - ESC accumulated temperature
 - ESC moisture deficit
 - ESC soil moisture regime
 - ESC soil nutrient regime

It is considered that, while these criteria are very useful, they do not include an assessment of some of the more practical aspects of commercial seed collection.

3. Future Trees Trust ‘Selected’ stand assessments

The assessments undertaken in this audit were based on practical rather than technical criteria, with the aim of identifying improvements that could be made to stands to potentially increase seed harvests.

The assessment criteria used to assess each stand are outlined in **Appendix 1** to this report. The criteria were selected to achieve the objectives of the audit:-

1. To know the state of the registered seed stands.
2. To understand the potential of these seed stands.
3. To know what would be required to maximise their potential.
4. To develop a plan to ensure a reliable resource of British quality tree seed, including identifying the requirements to ensure this resource stays resilient.

5. To identify stands not currently registered if current resource seems inadequate.

The results of the audit itself are presented in **Appendix 2**.

4. Review of seed stands by species

Dave Richardson and Robert Lee at Forestart conducted the audit. Their comments on its completion are presented here and summarised in Table 1.

The survey undertaken indicates that the potential to harvest registered select material is not as parlous a situation as was first thought. Often in the past, collections have not been made because of a lack of demand rather than availability. If demand was there, it was not at a price that would allow for good enough royalty payments to landowners. This situation has now changed.

We can see from the spreadsheet data (Appendix 2) that although region 40 is well served with sites, other regions are not, with Scottish provenances being a particular problem. This matters on a UK-wide basis because not all regions will crop in any one year. For many years there was a split in *Quercus robur* production seasons between the south coast and the rest of the UK. In the famine year of 2012 the only oak producing acorns in any quantity in the UK was in mid-Wales. It would be better to have a spread of stands throughout the UK to increase the chance of obtaining suitable UK provenance.

Generally many sites suffer from undergrowth problems, especially *Rubus* and *Rosa* species, that can make collections almost impossible. This is severely hampering potential production. This problem is prevalent in both public and private sector woodlands. Many sites could also be extended in size with judicious pruning of poorer specimens outside the stands. Larger stands to collect from would aid in the genetic diversity of individual seedlots.

***Acer pseudoplatanus* (sycamore)**

Though not native, this species is increasing in popularity and demand for its seed is growing. Though there are no Scottish stands one might expect that supply from the northern English sites that are in need of some improvement would be adequate. Even the sites further south will be of some use, as the level of climate adaptation will not be as high as for native species. Current demand for select material is being met although stands could be enlarged and improved to provide more production.

Future Trees Trust has a 'Qualified' seed orchard and it is very likely that seed from this orchard will be used in the very near future instead of 'Selected' material. The 'Qualified' orchard material has to be considered better than the 'Selected' stands as only the very best trees were used in Future Trees Trust's sycamore breeding programme. There is a greater genetic variation within the 'Qualified' orchard material due to totally unrelated material being collected and brought together into a new stand.

There will also be more sycamore trees to harvest from. Most tree species tend to crop at the same time but with sycamore there is a tendency for a crop to be produced every year but from different trees. Sometimes this will be a small crop and therefore collecting is not viable. The Future Trees Trust 'Qualified' seed orchards have more trees in them than the select stands making collections every year more likely. They are also safer and easier to collect from.

In the long term, Future Trees Trust's sycamore orchards are going to produce far more seed than the market requirements at the moment.

***Betula pendula* (silver birch)**

Most of these stands are not cropping on a regular basis and have been monitored for some years. Two of the stands (105-01 and 105-02) could be considered hazardous and difficult collection sites. Stand 201-02 can only be harvested with some difficulty, although this could be remedied by cutting down individual trees as has happened in the past but results in stand destruction.

This leaves only two possibilities – stand 202-01 which is on the Balmoral Estate (where the Queen is in residence at harvest time) and stand 201H-01 - a high level harvestable site that though it has not recently produced a crop has the potential to be able to do so. It is however difficult to access and improvements would need to be made. This site is over 300m altitude and would still be needed, even if

Future Trees Trust's 'Qualified' seed orchards made the other stands redundant as they may well do in the near future (for all the reasons stated with sycamore above).

A 'Selected' stand at 300m is unique in regards to altitude and any seed produced might be considered good for high altitude plantings.

***Castanea sativa* (sweet chestnut)**

This species could experience some supply difficulties due to the ban on continental imports imposed following the Chestnut Blight outbreak. There are currently only a limited number of 'Selected' stands and many would benefit greatly from improved understory management.

Stand 40-03 could increase production significantly if it was managed with seed production as a priority. Stand 40-04 suffers from predation by wild boar.

Of all the species assessed in this audit, the biggest threat to seed supply is with sweet chestnut. There is a significant need to address the lack of 'Selected' stand material for this species.

***Fagus sylvatica* (European or common beech)**

Demand for seed of this species is generally being met and there are enough 'Selected' stands from north to south to meet current demand. The sources for these stands, where known, do not vary dramatically and so their location and provenance is something of a misnomer. An orthodox seed such as beech is one that can survive being dried and / or freezing for long term storage. In practise, beech seeds are collected in a good year and stored for up to five years, providing a supply from stock in those years without a crop.

Ground vegetation is often not such a pressing issue on these stands though some stands have very limited potential because of their gradient. Some stands such as 40-09 form part of a nature reserve and so would probably not be amenable to management of the stand for seed production. Stand 40-01 forms part of the Mother Shipton's Cave tourist attraction and so would be unsuitable, as would some other stands.

If demand were to increase, there are very suitable stands that could be improved and enlarged, such as Stand 40-15.

***Quercus petraea* (sessile oak)**

Quercus petraea crops less reliably than *quercus robur* and so the lack of stands in the north and west does not aid the supply of UK seed.

Of the Scottish sites, Stand 10-01 is very small while Stands 10-02 and 20-01 are on climatically very challenging sites. This is well illustrated by collection last year in the north of Scotland. Stand 20-01 was netted and produced less than 100kg while a 'Source Identified' stand not 20 miles away in a much more sheltered micro climate achieved well over 500kg. Production potential is greatly influenced by local climatic conditions in some cases and hence there is a need for more 'Selected' stand sites

There are few stands in region 30 but these could be expanded and improved. In some years the Lake District or Wales may be the only areas in the UK with a crop.

Some registered stands are struggling because of undergrowth issues but it was encouraging to note that one or two of the Forestry Commission stands have been worked on and improved already. If just a few sites were improved and Forestry Commission stands made available to the private sector on a more widespread basis, the number of region 40 sites would be more than adequate. Of special note is Stand 40-08 - a large and potentially productive stand which is much underutilized. The Forestry Commission maintain a small area for their own collections but the vast majority of the available area is overgrown and unpickable even by hand. Upgrading and opening up this site to the private sector would reap great benefits for the industry as a whole.

The problem of wild boar in the Forest of Dean has caused considerable problems and needs to continue to be tackled. It has resulted in the traditional use of some stands being discontinued and new sites being sought in other areas which are often not as productive or regularly cropping.

***Quercus robur* (pedunculata oak)**

Again there are few stands in Scotland and Stand 20-02 would benefit greatly from investment in it as a seed stand. There is also a deficit of region 30 sites and on talking to the owner of Stand 30-05 (one of the most regularly cropped stands in the UK) we discovered that while receiving advice on her Tir Gorfal environment scheme it was suggested that she fell her registered stand, take the cash crop and re-plant. There needs to be greater awareness within the industry of the value of these resources especially at Natural Resources Wales which has incorporated the old Forestry Commission in Wales.

Supply of *robur* acorns is not a major problem from region 40 provenances when there is a crop, but many stands would benefit from investment

***Quercus rubra* and *tilia cordata* (red oak and small leaved lime)**

Rubra is not a major UK species and is unlikely to be so. However *tilia* demand is rising and the market would like UK seed. But seed is produced infrequently and consideration should be given to the likelihood of any particular stand producing viable seed. The better likelihood is, of course, in the south and east of the UK. The single current stand is in excellent condition.

5. Summary

Seed stands in the UK would benefit from new investment now as demand for quality seed is beginning to increase. However, investment needs to be targeted at particular geographic areas such as Scotland. There is a need for an excess of capacity to cope with years where cropping is poor or is only occurring in certain regions. Some sites, due to population density or an exposed situation, do not crop well and while situation cannot be manipulated, density can. Targeting of improvements must also take account of the movement towards seed production of some species from orchards rather than stands. This will be unlikely in the case of *Quercus* species and debatable in the case of *Castanea* in the short / medium term.

Weed control in stands would produce some of the greatest dividends and encourage more effective and cheaper collections allowing the market and landowners to benefit from better returns, creating a virtuous circle of improvement. This circle does however need to be kick-started with those willing landowners being encouraged and paid to improve their stand for the sake of the whole industry.

Of all species, the most outstanding issue in the short term is that of *Castanea sativa*. Demand is only likely to rise in the short term and we currently have an inability to satisfy this from imported seed.

Any ensuing funding must be targeted at the 'willing players' with the resources to push forward progress in seed production.

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Table 1 – Summary of findings

Species	Is current demand being met from UK stands?	Challenge	Possible solution
Sycamore	Yes	No specific current challenges	Enlarge or improve current stands. Future Trees Trust 'Qualified' orchards will easily supply market requirements.
Silver birch	Yes	Very few stands producing seed	Future Trees Trust 'Qualified' orchards will easily supply market requirements.
Sweet chestnut	No	Import ban has increased demand for UK seed. Not enough 'Selected' stands	Promote need for landowners to register 'Selected' stands. Better management of existing stands.
Beech	Yes	Possible increase in demand	Could be met by improving or enlarging existing stands.
Sessile oak	Varies from zone to zone – Scotland is poorly supplied	Infrequent crops. Subject to climatic conditions. Wild boar predation.	More 'Selected' stands needed, with emphasis on regions 30, 20 and 10. Improve and open more Forestry Commission stands for private sector seed collection.
Pedunculate oak	Varies from zone to zone – Scotland is poorly supplied	Lack of understanding by landowners of the value of their 'Selected' seed stands, particularly against value of sporting opportunities (e.g. game shoots)	Better communication of the value of 'Selected' stands. Improve and enlarge existing stands. More stands outside England needed
Red oak	Yes	Not likely to be a major UK species	
Small leaved lime	Yes, especially in south and east	Rising demand (from a low base figure) may outstrip current supply from single 'Selected' stand	More 'Selected' stands needed

Appendix 1 - Seed stand assessment criteria

	Assessment criteria
1. Suitability for collecting	
• Slope	Flat / Gentle / Moderate / Steep
• Ground Vegetation	Record vegetation type, extent and influence on ease of collection
• Drainage	Good to poor, with reference to vehicular access
• Ease of access	Owner / Land agent's permission
• Security	Identify any public footpaths adjacent to areas of high population
• Access to site	Good to Poor, with reference to vehicle access
2. Evidence of predation	
• Pheasants or pens	Record proximity of pheasant pens
• Deer	Fallow, Red, Roe, Muntjac population / control
• Wild Boar	Population / control
• Livestock	Population / control
• Grey Squirrels	Population / control / damage to mature trees
3. Likely collection method	
• Identify most likely method	Cherry-picker / nets / hand-picking / tree-climbing
• Safety	Identify any hazards
4. Other tree species in the stand	Record all other species in the stand that are likely to be a source of impurity i.e. oak in a beech stand
5. Estimated number of trees	Record no. of trees within stand (minimum = 20)
6. Canopy or density of crowns	
• Crown condition	Assess condition and consequences to seed production
• Thinning	Identify any need for thinning
7. Tree density	Assess number of trees per hectare, where appropriate

By assessing each stand in accordance with each of these parameters, we will be able to identify:-

- Improvements needed to stands to make seed collecting possible
- Improvements to stands to increase the level of seed production

Improvements are likely to include a combination of thinning, vegetation control, access improvement, pest control and removal of other tree species.