

## **Costs of establishing seed orchards and trials of improved seed**

A seed orchard, like any plantation of trees, is a growing resource and central to its management is that it does not stand from year to year untended. By appropriate and timely interventions, the manager can influence both the quality and quantity of seed produced. All plantations have similar life histories and these are shown in the Table 2 below.

In natural conditions, species can differ enormously in the time scales over which they begin and continue producing seed. Most trees do not start flowering and producing seeds until they have grown for a number of years: 5 to 10 years for some such as birch, to 40 years or more for oak and sweet chestnut (see Table 1).

**Table 1: Seed producing characteristics of some species in normal woodland conditions.**

<b>Species</b>	<b>Earliest (and best) seed bearing ages</b>	<b>Interval between good seed years</b>	<b>No. of seeds/kg (thousands)</b>
Ash	25–30 (40–60)	3-5	8.6-16.0
Birch	10–30 (40–80)	1-2	1650.0–9900.0
Cherry	2- (30)	1-3	3.2–6.6
Pedunculate oak	40–50 (80–200)	3-5	0.110–0.495
Sessile oak	40–50 (80–100)	2-4	0.130–0.649
Sweet chestnut	30–40 (50)	1-4	0.150–0.330
Sycamore	25–30 (40–60)	2-3	5.4-15.8

Most trees show considerable periodicity in seed production. Good years are invariably followed by failures or by very light production. For oak and sweet chestnut, for example, the interval between abundant crops is up to about 4 years. Periodicity depends not only on species but on many other factors—climate, predation and tree metabolism. Seed production in managed orchards can be promoted to some extent by siting them on good soils and in climatically favourable areas, and also by fertilizing the trees and manipulating the spacing between trees.

**Table 2: Costs of establishing a 1 hectare Breeding Seedling Orchard or Clonal Orchard**

<b>Year(s)</b>	<b>Operation</b>	<b>£</b>
-3	Collect seed or cuttings from 100 parent trees located throughout GB and Ireland (at £200 a tree)	20,000
-3	Sowing seeds and raising plants in a nursery (2000 plants at 0.70p each)	1,400
-0.5 to -0.1	Fencing site and preparing ground (if necessary)	3,800
0	Planting	1,000
1-5	Biannual weeding, or controlling competing vegetation with a herbicide (at £500 a time)	5,000
5-14	Maintenance (e.g. fertilising, maintaining access, controlling pests etc at £200 a year)	2,000
3, 8, 12, 15	Periodic assessments of growth and form of trees (at £200 a time)	800
3, 8, 12, 15	Statistical analysis of data from field assessments (at £500 a time)	2,000
12, 15	Removal of worst performing trees in two thinnings (at £750 a time)	1,500
4 -35 (depending on species)	Seed orchard becomes productive. Improved seed can be collected for growing in nurseries	0
<b>Total costs</b>		<b>£37,500</b>

**Table 3: Costs of establishing a 0.25 hectare demonstration or test plots of material from clonal orchards.**

<b>Year(s)</b>	<b>Operation</b>	<b>£</b>
-3	Collect seed from orchards and other sources	1,000
-3	Sowing seeds and raising plants in a nursery (500 plants at 0.70p each)	350
-0.5 to -0.1	Fencing site and preparing ground (if necessary)	700
1-5	Biannual weeding, or controlling competing vegetation with a herbicide (at £2500 a time)	2,500
5-14	Maintenance (e.g. fertilising, maintaining access, etc at £100 a year)	1000
3, 8, 12, 15	Periodic assessments of growth and form of trees (at £100 a time)	400
3, 8, 12, 15	Statistical analysis of data from field assessments (at £300 a time)	1,200
<b>Total costs</b>		<b>£7,150</b>