

Seed Collection

Where.

Gather seeds from parent trees that are the dominant trees in their area as they are likely to produce good quality seed.

Some species like willow, poplar and holly are dioecious - they have male and female trees. Only the female trees bear seeds.

When collecting seeds always use containers that can breathe e.g. hessian or open mesh bags- if seeds become damp or overheat it can reduce the chances of germination.

When.

Collect fleshy fruit as soon as they're fully ripe but before they fall.

You can harvest the cones of most pines when they have become dry enough to shed their seeds.

Commercial seed collection

Sheets are laid down beneath the tree and all material - seed, fruit, cases etc – collected together and sorted later.

At Westonbirt

Seed is collected by hand, and only the seed is gathered.

Once seed is collected an accessions record is started and added to as the process of extracting, sowing etc takes place.

Why collect from the wild?

- For climate change, e.g. yew (*Taxus baccata*) from Morocco – the most southerly part of its range, to see if it does well in Britain in the future
- To add to the national collections. There is a list of priority plants.
- For biodiversity. Plant hunters of the past probably collected from limited (more easily accessible) areas. Today seed can be collected from a much wider area, and therefore a greater diversity of plants, with permission from the country.

Seed extraction

Although some tree seeds are ready to be planted straight from the tree most must be prepared to extract the seed from the fruit. The method of seed extraction depends upon the type of seed.

Commercially

Nuts - sheet contents are emptied into bucket, filled with water to allow viable seed to sink and then water is run to remove floating material – the non-viable seeds and chaff.

Winged seeds and nutlets – a thresher is used to remove the wings and chaff

Fleshy fruits – maceration or pipping – mashing the fruit, adding water and removing floating material

At Westonbirt

All seed extraction is done by hand - maceration, de-winging, shaking capsules, splitting open fleshy fruits etc.

Air-drying.

Place fruit on a screen in a single layer, making sure they don't touch each other. This method works well for elm, mountain ash, pine, poplar, spruce, viburnum and willow.

Threshing.

Spread fruit on a hard floor and walk on them. Don't stomp your feet. You may have to remove walnut hulls by hand with a sharp knife. Use this method for catalpa, common lilac, and walnut.

Maceration

Most fleshy fruit - remove the pulp promptly after harvest by mashing between your fingers or running them over a metal screen by hand. Wash the pulp with running water. In general, collect seeds from fleshy fruit when the fruit are fully ripe.



Removing spindle seeds from the fruit

De-winging.

Rub winged seeds like those of pine, spruce, ash, birch and elm between your hands to remove the wings.

Viability tests

Flotation test

All viable nuts and fleshy fruit seeds will sink in water, although nuts will dry out very quickly and so need to be tested when freshly collected. Leave in water for 24 hours to enable dry seeds to hydrate as they may be viable and therefore sink after this time. Use 6x water to quantity of material. With rare seed, plant all whether they pass the viability test or not as this test is not 100% reliable.

Cut test

With secateurs or knife, cut through seed – if flesh is white and moist the seed will be viable. Useful test for magnolia seeds

Chemical tetrazolium tests

Triphenyltetrazolium Chloride is used. The tetrazolium salt reacts with tissues that are able to respire to form insoluble triphenylformazan. This stains the living tissue reddish-pink whilst the dead tissues remain unstained as triphenylformazan is not formed. [Bruce Macdonald, *Practical Woody Plant Propagation for Nursery Growers*]

This test is carried out at Alice Holt Forest Research

Excised embryo

International specifications state that a set number of seeds be carefully extracted (excised) and allow to develop independently under controlled light and temperature conditions.

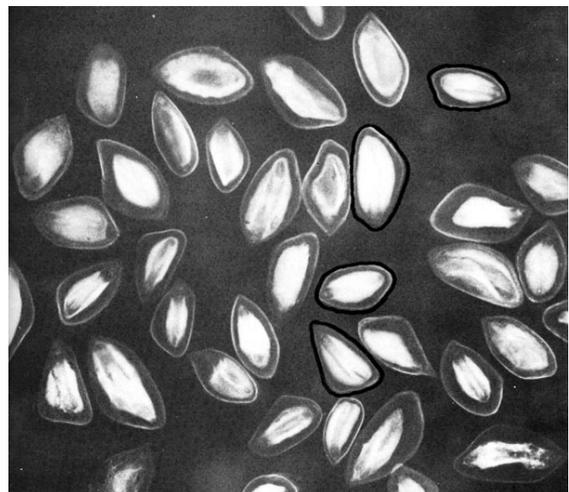
The usual method is to culture the excised embryos on moist filter paper in covered dishes under light for 10-14 days at 18-20°C. A percentage figure is derived to compare the number of embryos that develop or at least remain firm and white compared with those that deteriorate (become dark or covered in mould) [Bruce Macdonald, *Practical Woody Plant Propagation for Nursery Growers*]

X-ray

Seeds are soaked or dyed in heavy metals and then x-rayed to show viability

Most of these seeds have poorly developed gametophyte and embryo, and are dead.

A few viable seeds are indicated by the black outlines



Test sowing

With a large amount of seed undertake a pre-sow test, see how many germinate before continuing

Although only the chemical tetrazolium and excised embryo tests are the only two officially accepted methods for proving seed viability, it is recommended that propagators use a variety of viability tests, recording the results, using tetrazolium tests to back up and confirm findings where necessary.

Seed dormancy

Although some seeds can germinate as soon as they mature, others enter a state of dormancy during which they will not germinate and grow. This is a preservation mechanism to prevent sprouting in autumn and subsequent winter damage to the seedling. They will need careful handling and additional treatments to stimulate germination.

Dormancy can be mechanical and caused by seed-coat impermeability (Seed coat dormancy) or by physiological internal conditions in the seed (embryo dormancy) as in maple and birch; or by both factors (double dormancy).

Seed coat dormancy

Seeds that have seed coat dormancy need only have their coats injured in order to germinate.

Embryo dormancy

These seeds need stratification to approximate the winter conditions they might normally be subject to. Generally this treatment includes holding seeds in moist cool conditions for one to four months although conifer only need four weeks.

Double dormancy

The seeds require 2 conditions for germination (i) hard seed coat needs to be broken through to let water inside – sand paper, file, secateurs, hot water soak, acid scarification, rubbing against metal sieve; (ii) embryo dormancy – growth inhibitors or growth enablers (either need warm or cold treatments)

Other terminology

'Germinable' – species whose seeds $\leq 25\%$ success

'Recalcitrant' – short viability life span, doesn't store well, and if it dries out will not germinate

Other considerations

Some seeds will need 2 years before they germinate and seed trays are kept for 3 years.

Some seeds, such as sorbus, prefer fermenting before sowing, whereas others will go into embryo dormancy if they get mouldy (birch, ash, lime) and need to be picked green.

Know your seeds!