

# Seed cleaning and Storage

## What is seed cleaning:

*This is getting the seed out of its 'container' and removing anything else to just have the seed left. 'Separating the wheat from the chaff'.*



## Why seed clean?

- There may be pests hidden in the chaff that will damage the seed.
- There may be detritus that will pass on pathogens to the seed or promote mould growth.
- When sowing seeds, if they are not cleaned, you risk sowing chaff too, and so may end up with patchy establishment.
- A final stock of good quality seeds will have a high percentage of 'pure' seeds and very low proportion of inert substances. E.g., parts of unviable seed, seeds without seed coat, soil, small stones, fungal bodies and weed seeds.
- Seed for marketing will need to meet the 'purity' test standards as inspected by the Animal and Plant Health Agency (APHA). Seeds certified in this way are showing that they meet UK quality standards for purity and germination rate. For more information

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/602853/seed-certification-technical-annex.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/602853/seed-certification-technical-annex.pdf).

# What equipment do you need for seed cleaning

*Much of the work at the Heritage Seed Library (HSL) is done by hand using low tech methods and equipment that you might have at home such as sieves for dry cleaning and jam jars for fermenting tomato seeds.*

## Equipment for small scale seed processing:

- Jam jars
- Sieves in a range of sizes
- Trays
- Funnels
- Jugs
- Scales
- Sheets
- Bags
- Knives/spoons



## Additional equipment recommended for larger scale seed cleaning:

- Gravity seed separator (instructions for making a homemade winnower: <https://www.realseeds.co.uk/seedcleaner.html>)
- Threshing/winnowing machinery
- Lab standard test sieves in a range of sizes (most useful for seed saving are between 1.00-4.00mm, although a mesh size of 0.6mm is useful for reverse screening, such as lettuce, described below). They can be found new and second-hand online.
- Dust extraction unit
- Face masks/goggles
- Gloves
- Anti-static bands
- Incubator for germination testing

There are additional resources to be found online regarding refurbished agricultural threshing machinery and home-made seed cleaning devices.

## Cleaning large, dry seeded crops

*Once the pods are dry peas and beans are easily removed from their pods.*

- Can be done by hand or large quantities can be threshed in a pillowcase or sack. Seeds threshed this way will need additional cleaning by winnowing.
- If necessary, set the seeds out to dry further and remove any that are damaged or discoloured.
- **Special attention should be taken to check beans and peas for small holes or round indentations in the beans which are a sign of pea or bean weevil.** At the HSL, after drying, we freeze all broad beans for 1 week.



## Cleaning small, dry seeded crops

*Including seeds that form on umbels (carrot), seed heads (alliums), parachute plumes (lettuce), seed pods/siliques (brassicas) and attached to a seed stem (beetroot)*



*Umbels (e.g. carrot)*



*Seed heads (alliums)*



*Parachute plumes (e.g. lettuce)*



*Seed pods/siliques (e.g. brassicas)*



*Seed stems (e.g. beetroot)*

- You will be able to see the seed starting to form, it is ready when the plant starts to become dry and brittle.
- The seed is easiest to separate from the flower/stalk when really dry

- Once fully dry the seeds need to be separated from the rest of the plant and winnowed to remove other plant material and under-size seeds.

#### Cleaning umbels (e.g. carrot) and allium (e.g. onion) heads:

- Use friction, such as a sieve surface, to separate the seeds from the casings
- Pass through a coarse sieve (bigger than seed size) stacked on top of a fine sieve (smaller than seed size). Seeds will be retained in the middle layer and can be winnowed to eliminate chaff.
- As a general rule we winnow out the lightest 1/3 of the seed.
- In the case of alliums you can also do a float test. This involves soaking the seeds in a transparent container for around 30 minutes, stirring regularly. All viable seed will sink leaving chaff and non-viable seed on the surface where it can be skimmed off.
- The process can create a lot of dust so use an extractor unit or a dust mask and goggles.

#### Cleaning small seed pods/siliques (e.g. brassicas):

- Break up pods by banging with a rolling pin or stepping on them e.g. contained in a pillow case.
- Sieve through a large sieve (at least 2mm) to get rid of the casings and broken stalks
- Winnow the results to remove the chaff
- If necessary, a final clean can be done by rolling the seeds down an incline on a smooth surface such as a tray.

#### Cleaning seed stems (e.g. spinach, beetroot, amaranth)

- Best done when the stalks are very dry and brittle

- In small quantities the clusters can be snapped from the stems by combing through fingers, at HSL we would use our combing machine
- The results are then put through a large sieve to separate the seed clusters from the pieces of stem
- For larger quantities use a thresher (although we would not recommend this for beetroot/chard as the process can crush the seed clusters).
- The process can create a lot of dust so wear a dust mask

### Cleaning parachute plumes (e.g. lettuce)

- Either clean under an extractor unit or wear a dust mask (or both).
- Rub seed heads through a 1mm sieve to separate the plumes and chaff from the seeds
- Winnow to separate the chaff
- For extra cleaning use reverse screening, with a mesh that retains the fluffy, larger pieces of chaff but lets the smaller seed fall through. A fine lab standard sieve of 0.6mm works well.
- Winnow again to separate out any seeds that are too light and therefore unlikely to germinate

## Cleaning wet seeded crops

### Cleaning tomatoes

- Cut around the equator and scoop seeds out (for larger types) or crush in a container (for smaller types).
- Rinse under the tap in a sieve to wash off any skin or loose flesh
- Put into a jar filled  $\frac{3}{4}$  with water and leave for 2-4 days to ferment. Stir daily.



- Test seed, if the gel has separated drain through a sieve, wash under running water then dry
- *Check that none of the seeds have germinated – you will see an emerging root tip if germination has started. Remove germinated seed as this is no longer viable to dry and store.*



#### Cleaning cucurbits (e.g. cucumbers, melons and squashes)

- Cut down the length of the fruit and scoop the seed into a sieve
- Rinse under the tap to remove any flesh.
- Melon may need a little more work. Rub the seeds gently and put them in a large bowl with plenty of water. Hollow seeds and the pulp will float while fertile seeds sink to the bottom.
- For cucumber, if the gel is sticking to the seed then ferment for up to 3 days in water using the same method as for tomatoes. The gel should have separated and rinse away.
- Once dry winnow the seed to remove any hollow, dead seed.
- Rub off and winnow out papery husks on squash

# Drying and storing seed

*Successful drying and storage methods will inhibit the germination process in orthodox seed, effectively preventing the conditions for germination and maintain the viability of that seed for as long as possible.*



**As a general rule, the storage life of a seed is doubled for every 5oC drop in temperature and 1% drop in moisture level**

- At the HSL we have a special drying room that dries our seed. Our drying room is set at 14%RH (relative humidity) and dries the seed down to around 7%MC (Moisture content).
- At home you can do this naturally in a well ventilated room that has a relative humidity of 50% or less. The additional drying time will take at least one week, with most seed requiring two weeks or more.
- You can also use desiccants to dry seed such as silica gel, crushed charcoal, and oven-dried rice. Seed should be put in a kilner jar with the desiccant. Try to keep the amount of air in the jar to a minimum and separate the seeds from drying medium, using muslin bags, envelopes, newspaper, cotton wool layers etc.
- Seed kept for medium term (up to 8 years) is stored in breathable (e.g. paper) bags/sacks.
- Airtight containers are ideal, for example a kilner jar, but something as simple as a paper envelope, bags or sacks can be sufficient if the seed is being kept cool and dry.
- Seed saved for long term can be stored in foil heat-sealed pouches once sufficiently dry.

## The second factor, temperature, is important to extend viability of seed.



- Most seed at HSL is stored at around 6-10 degrees centigrade in our cold storage on site.
- Seed can be kept there, in good condition, for up to 20 years, although viability (germination rate) will start to drop over several years depending on the vegetable type.
- Once sufficiently dried and sealed from moisture seed can be kept in a fridge or freezer

### Quality checks on stored seed

Stored seed should be checked regularly to spot any issues early on such as pests (e.g. bean weevil, rodents) and diseases (e.g. mould). See the “Cultivation” toolkit for more information on detection and seed treatments.



### Recovery

When removing seeds from cold storage we recommend that you:

- Allow the container and its contents to come to room temperature before opening
- Allow the seeds to ‘rest’ for a few days at room temperature and ambient humidity before sowing.

This will allow the seeds to reabsorb moisture and not shock the seeds, giving a better chance of germination.