

# Planning For Seed Crops



## Planning Annual & Biennial Seed Crops

See Vegetable Seed Training Programme – Session 3 (Planning) Webinar [here](#) for more information.

### Inbreeding Annuals:

*Peas, French beans and tomatoes with retracted stigmas. Simplest vegetables to save seed from.*

- **They have perfect flowers** that are capable of self-fertilising in an enclosed system and are less open to visiting insects.
- **Cross pollination is unlikely to occur** but the possibility of a cross shouldn't be ruled out entirely.
- **Inbreeding annuals are not likely to suffer from inbreeding depression** so seeds can be saved from a small population.

### Partial Inbreeders/Out-breeders:

*Broad beans, peppers, lettuce, runner beans and tomatoes with protruding stigmas.*

- **These are vegetables with flowers that are perfect but not enclosed and so cross-pollination will occur quite easily through insect activity.** Broad beans, runner beans, and peppers are particularly attractive to bees for example.
- **Varieties of the same vegetable type will need to be isolated from each other.**
- The type of isolation varies between vegetable and specific distances and isolation methods can be found in the Heritage Seed Library's [seed saving guidelines](#).
- Lettuces and tomatoes can be isolated and produce seeds without any additional pollination but we have found that broad beans flowers produce much greater amounts of seed when hand pollinated. Runner beans will need to be hand pollinated (mimicking a bee 'tripping the flower') to produce any seed.

- **Tripping** a flower, happens when the male and female parts of the flower are hidden away behind the keel petal. There is a spring mechanism which opens up the keel petal, this activated when a bee or lands on the petal and the structure pops out spreading pollen out and on to the bee.
- **Population sizes are moderate. An idea of range:** Lettuce 10, broad bean 24 and runner bean 20-30.

### Annual Out-breeders:

*Radish, cucurbits (squash, cucumber, melon, dudi and courgette), spinach and sweetcorn.*

- **Out-breeders have either perfect flowers that are self-incompatible (e.g. radish) or they have imperfect flowers.** Imperfect flowers can be **monoecious** with one plant having male and female reproductive structures on separate flowers (e.g. squash) or they can be **dioecious** with separate male and female flowers on individual plants. For example, spinach plants can either have all female flowers or all male flowers.
- **All need another flower to pollinate and set seed.**
- **They can cross pollinate very readily with other varieties, meaning that they can easily produce seed that is not true-to-type.**
- **If more than one variety is grown each year, they will need to be isolated from one another and will need to be pollinated either by hand or by introduced insects.**
- **Out-breeders need medium to large population sizes** to avoid inbreeding depression.
- **An idea of range:** Brassicas 100, Spinach 25-30. However, Cucurbits are an exception and don't seem to suffer from inbreeding as much. Minimum population 6.
- **Selection.** They are likely to show more variation across a variety than inbreeders so more plants will be removed through the selection and roguing process. This should be taken into account when deciding how many seeds to sow. More information on roguing can be found in the [Roguing and Selection Webinar](#).

## Biennials:

*This includes many members of the brassica family (cabbage, kale, broccoli etc.) carrots, parsnips and beetroot.*

- **All are out-breeders** so will readily cross pollinate and need to do so to create seed.
- **Multiple varieties grown in the same year will need to be isolated from one another followed by either hand or introduced insect pollination.** The same applies if you think there is a danger of cross contamination from related weeds or plants in neighbouring gardens.
- **Pollination.** Beetroot and related crops are wind pollinated so some regular and gentle shaking is all that is required once the plants are flowering. For preference, we use blowflies to pollinate brassicas, parsnips, carrots, onions, leeks and leeks.
- **Continuous inbreeding will result in inbreeding depression.** So, biennials need medium to larger population sizes.
- **Idea of range,** brassicas ideally 100 or more, carrots 20-30 and beetroot 20.

## Biennials: Additional Things to Consider.

*Biennials require quite a bit of effort but will reward you with lots of seed!*

*Biennials flower and set seed in their second year and so, in comparison with annuals, they have a longer cultivation time and multiple stages to go through before they produce seed.*

- **There will be longer exposure to pests and diseases.** Pests in the first year may over winter on the crop and emerge again in the second year. There may be losses over winter.
- Some plants may fail to re-establish or flower after replanting.
- **Selection and overwintering.** The best examples will need to be selected & overwintered either in or out of the ground. The process of rogueing and selection after the first year's growth is important step in seed saving. The **timing of when** you do this is also important because the vegetables need to be at the mature, eatable stage in order to rogue and select them successfully. Vegetables will need a cool, frost free area to over winter. Either in suitable containers or in the ground.

- **The potential losses** from all these factors will impact on numbers sown from seed and final harvest plant numbers. In short, you will need more of a surplus of plants to allow for more losses.

## Rotations

*Having a good rotation is fundamental to growing organically and organic seed production.*

**There are additional factors to consider when planning a seed crop rotation:**

- **Variable crop size.** Crop requirements, such as the required final population size, and seed yield data will determine the growing space.
- **Not all the growing areas in your rotation will be of equal size** this must be planned for within your rotation.
- **The crop yield data and population size will need to be known** before planning your rotation.
- **Biennials that are replanted in their second year** and will need to be fitted in to a rotation for the following year.

Further resources available:

[Crop Planning and Rotation Webinar](#)

[Planning Your Planting](#)

[Crop Rotation Plan](#)

## Plant Spacing

*As a general rule, more space is needed for seed crops.*

- **Many seed crops such as French beans, tomatoes, peas, broad beans and runner beans** don't really take up any more space than equivalent edible crops would. However, because you are not harvesting any pods/ fruit until the seed matures, they benefit from wider spacing to allow for greater air circulation.

- For climbing French beans, gently removing a few lower leaves and leaves around the pods can also help with air circulation.
- **Other seed crops grow for longer and do grow larger before harvest than an equivalent food crop would.** For example, brassicas, biennials, lettuce and dudi.
- **Extra space can be needed upwards as well as outwards.** Flower and seed stalks can get very tall. For example, lettuce stalks can reach up to 1.5 m high. In poly tunnels with curved sides this can be an issue at the back of the side beds where the roof is much lower. Isolation cages also need to accommodate the increased height. Flowers that touch the mesh can still be visited by insects and potentially pollinated.
- **Spacing for biennials and pollination.** Individual plants will be much bigger in their second year and will need wider spacing than in their first year vegetative stage. For example, 2<sup>nd</sup> year kale and leafy brassicas need 1m space each way.
- **Some carrot seed producers believe that by planting second year carrots close together they will encourage the production of the primary 'king' umbels** (which have the largest seed heads and potentially the best quality seeds) at the expense of the smaller secondary, tertiary etc. seed heads.
- **For insect and wind pollinated crops, planting in a block aids pollination.** There will be a greater number of flower heads in close proximity to each other when block planted rather than in a long narrow bed.
- When planning a seed grow out it is good to check first that you have enough space (rotation space too) to accommodate crops with large population sizes and space requirements.
- Individual crop spacing requirements can be found in the Heritage Seed Library's [Seed Saving Guidelines](#).

## Support Structures

- **Crops will need sturdy structures to support the weight of maturing seed pods.** There may be lots of seed pods (if none have been harvested) or very heavy fruit with maturing seeds inside.

- If grown outside, they will need sturdy support to prevent them being blown over on windy days.
- Well supported flower stalks will make flowers more accessible to pollinators and hand pollination easier.
- **Plants need good air circulation around them to allow the seed pods to dry.**
- Seed stalks need to be supported and kept upright to keep heavy pods, seed heads off the ground.

### Examples of support structures used.

*It is easier and far more successful to support crops before they show signs of falling over!*

#### Different Methods:

- **Sturdy canes and string.** Either with a series of canes spaced in and around the crop with a lattice of string. This method supports carrot, parsnip and broad beans pretty well. Or one cane per flower stalk or per cluster of stalks is a better system for onion, leeks and lettuce.
- **Heavy fruits may need additional support.** For example, dudi fruits are far larger and heavier at seed maturity than at edible harvest. Stretch material or net hammocks, upturned bricks or bins to support from underneath will help.

