
FROM SEED TO SEED

Educational films on seed production



CABBAGE

The cabbage is a member of the Brassicaceae family, the *Brassica oleracea* species and the *capitata* subspecies. The *brassica oleracea* species also includes kohlrabi, broccoli, Brussels sprouts, kale, cauliflower and the Savoy Cabbage. Cabbages can have different colours, green, white or red and have heads that are pointed or round. This subspecies is characterized by smooth leaves that form a tight head.

▶ **Pollination of all the cabbages of all the Oleraceae species**

The flowers of the *Brassica oleracea* species are hermaphrodite which means that they have both male and female organs. Most of them are self-sterile: the pollen from the flowers of one plant can only fertilize another plant. The plants are therefore allogamous. In order to ensure good pollination it is better to grow several plants.

Insects are the vectors of pollination. These characteristics ensure great natural genetic diversity. All of the cabbage sub-species of the *Brassica oleracea* species can cross with each other. You should therefore not grow different kinds of cabbage for seeds close to each other.

To ensure purity, different varieties of the *Brassica oleracea* species should be planted at least 1 km apart. This distance can be reduced to 500 meters if there is a natural barrier such as a hedge between the two varieties. The varieties can also be isolated by placing small hives with insects inside a closed mosquito net or by alternately opening and closing

mosquito nets. For this technique, see the module on isolation techniques in 'The ABC of seed production'.

▶ Life cycle of cabbage

Cabbage is a biennial plant that is grown for seed in the same way as cabbages for consumption. In the first year, the plant forms a head that remains over the winter and will flower the following year. The time to sow is determined by climate conditions, the overwintering method and the earliness of the variety. To overwinter heads of cabbage, sow in mid-May or at the beginning of June, even later for early varieties, to avoid over-developed and split heads at the end of autumn. Heads that are smaller but tight will winter better.

At least 30 plants should be saved the first year so that 10 to 15 remain at the end of winter. Seeds are saved from healthy plants that have been observed over the entire period of growth so that all of their characteristics are known. The most vigorous heads are chosen in accordance with the variety's specific characteristics and your selection criteria: regular and vigorous growth, formation of tight heads, storage capacity, precocity and resistance to cold.

Overwintering is the most sensitive period of seed production. There are several methods for overwintering plants depending on climate conditions, vegetation period and available infrastructure. In regions with a harsh winter, the entire plant along with its roots is harvested at the end of autumn. The outer leaves are removed so that only the tight, firm leaves of the head remain. The heads should be dry and free of soil. In regions in which the level of humidity of the air is low, plants can be stored in a cellar with an earthen floor. In regions with high air humidity, plants can be stored in a frost-free room or attic. The temperature in the room should not fall below 0° C over a long period even though the cabbages can resist short periods of frost at -5° C. Throughout winter it is necessary to keep an eye on the cabbages. The outer leaves can be attacked by gray mold (*Botrytis cinera*). They should be removed along with the rotten parts and then the wounds should be disinfected with wood ash.

Certain very resistant varieties or those grown in regions with mild winters can be left in the ground over winter. In mild climates they can also be stored in the ground: the plants along with their roots are laid in deep channels, slightly tilted up and covered with soil. The plants should not touch one another and in cases of frost must be covered with a pane of glass, manure or dead leaves. This protection is removed in spring but the plants should not be replanted. They will push up through the soil covering them and then flower.

Another technique involves saving the roots without the heads, which can be eaten. At the end of summer during a dry period, the heads are cut off at the base at a slight angle. Only the stem and the roots are kept.

These are left to dry for several days and disinfected with wood ash. To prevent rot, the dry cut can be coated with grafting wax. This method of propagation makes overwintering possible, but the stems preserved in this way produce fewer seeds of lower quality. They cannot flower from the centre of the stem from which the most beautiful seed stalks produce the best seeds.

The seed plants that have been stored over winter in a cellar or attic are replanted in the spring of the second year of the cycle, in March or April.

The cabbages are buried 60 cm apart so that the top of the heads are at ground level. The plants will grow new roots. It is important to water the plants well when they are planted and during the period of root growth.

To encourage the emergence of flower stalks from the heads it is often necessary to make an incision in the form of a cross at the top of the head using a knife. This should be 3 to 6 cm deep depending on the size of the head. Take care not to damage the base of the cabbage from which the seed stalks will grow. Sometimes it is necessary to repeat the incision if a flower stalk does not appear.

The central flower stalk produces the best seeds. Weaker secondary stalks can be removed to allow the central inflorescence to develop better and to channel all the strength of the plant into producing seed.

Since the seed stalks can reach a height of 2 meters, it is necessary to stake each plant and secure the stalks which can become very heavy when the seeds are formed.

Extracting - sorting - storing of all the Oleraceae species

The seeds are mature when the seed pods turn beige. The seed pods are very dehiscent, which means that they open very easily when mature and disperse their seed. Most of the time, the stalks do not all mature at the same time. To avoid wasting any seed, harvesting can take place as each stalk matures. The entire plant can also be harvested before all of the seeds have completely matured. The ripening process is then completed by drying them in a dry, well-ventilated place. Cabbage seeds are ready to be removed when the seed pods can be easily opened by hand.

To extract the seeds, the seed pods are spread across a plastic sheet or thick piece of fabric and then beaten or rubbed together by hand. You can also put them in a bag and beat them against a soft surface. Larger quantities can be threshed by walking or driving on them. Seed pods that do not open easily probably contain immature seeds that will not germinate well. During sorting, the chaff is removed by first passing the seeds through a coarse sieve that retains the chaff and then by passing them through another sieve that retains the seeds but allows smaller particles to fall through. Finally, you should winnow them by blowing on them or with the help of the wind so that any remaining chaff is removed.

All seeds from the Brassica oleracea species resemble one another. It is very difficult to distinguish between, for example, cabbage and cauliflower seeds. This is why it is important to label the plants and then the extracted seeds with the name of the species, the variety and the year of cultivation. Storing the seeds in the freezer for several days eliminates any parasites.

Cabbage seeds are able to germinate up to 5 years. However, they may retain this capacity up to 10 years. This can be prolonged by storing them in the freezer. One gram contains 250 to 300 seeds depending on the variety.

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