

Seed Production in Cole Crops

Sudha Singh^{1*}, Preeti Kaundil², Sakshi Singh³ and T. Ilakiya⁴

¹Department of Vegetable Science, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh (173230)

²Department of Entomology, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh (173230)

³Department of Vegetable Science, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh (173230)

⁴Department of Vegetable Science, Tamil Nadu Agricultural University, Coimbatore

ARTICLE ID: 30

Introduction

Seed is the most important factor in agricultural production, as it determines the performance and effectiveness of other inputs. To increase productivity, quality seeds that are appropriate for various agro-climatic situations must be available in adequate quantities and at reasonable prices. Continuously increasing agriculture production and productivity necessitates the creation of new and improved crop varieties, as well as an efficient seed production and distribution infrastructure.

To meet the nation's food security demands, it's critical to make a diverse selection of high-quality seeds available to Indian farmers in sufficient quantities and on a timely basis. Seed producers in the public sector will be encouraged to increase seed production in order to accomplish the goal of food and nutritional security.

The important cole crops in India are cabbage, cauliflower, knol-khol, sprouting broccoli, Brussels sprouts and kale. Study about seed production in these crops becomes very essential because of their climatic requirements and different cultural practices.

Seed Production in Cabbage

Botanical name: *Brassica oleracea var. capitata*

Cabbage plants are highly cross pollinated and pollination is by means of bees. Cabbage plants do not produced seeds in plains except tropical types. In case of mature plants need low temperature (4-6⁰c) for 6-8 weeks to flower. Dry weather during pod formation and the chilling temperature for shifting vegetative phase to reproductive phase is very important.

Places Suitable:

U.P, Himachal Pradesh, Jammu and Kashmir, Hilly areas of Tamil Nadu

Cultural Requirements:

Time of sowing: should be adjusted in order to complete curd formation before the end of October- first week of November.

Nursery rising: For early varieties: 10-25th July

For mid and late varieties: second and first fortnight of June

Transplanting: For early varieties: second fortnight of August

For mid and late varieties: first week of august

Seed rate: 500-600g

Spacing: 45cm*45cm- early varieties

60cm*45cm- mid varieties

60cm*60cm- .ate varieties

Seed Production Techniques:**1. Seed to seed (*in-situ*) method :**

This method is used for commercial seed production. In this method the crop is allowed over winter and produce seed in its original position. It is economical and does not involve any labour etc., for uprooting, storage and replanting of heads. It helps in seed producing early crop. The main disadvantage is that proper selection cannot be done for trueness of heads. This method is used for foundation seed.

2. Head to seed method (transplanting):

In this method well developed heads are selected and cross cut on given on the head and left as such. Cross cut helps in proper aeration, bolting and production of seed branches.

3. Stump and core intact method:

The heads are cut just below the base keeping the whorls of leaf intact. The beheaded portion of the plant is called stump. The heads are harvested and marketed. The stumps are stored in trenches for wintering and replanted in fields during autumn. This method is not commercial as the seed yield is low.

4. Core intact method:

In this method the outer few whorls are removed and the central core is left intact which is later given cross cut in such a way that the central growing is not damaged.

Cross cut facilitate the emergence of seed stalk. Pyramid cuts increases seed yield. This method is more economical as cut leafy portion could be marketed.

5. Head intact method:

In this method the head is kept intact and only a cross cut is given to facilitate the emergence of a stalk. Very heavy staking is needed and the seed yield is comparatively low.

Isolation Distance:

- Foundation seed: 1600m
- Certified seed: 1000m

Staking:

Seed stalks should be given support by stakes to keep them straight and exposed to sun light.

Harvesting:

- Seed stalk elongation: 10-20th March
- Flowering and pod formation: first week of April
- Ripening of pods: 15-20th June
- Harvesting: up to second week of July

The early plants are harvested first and when the pod colour is yellowish brown it is harvested completely and piled up for curing. After 4-5 days it is turned upside down and allowed to cure for another 4-5 days in the same way. It is then threshed with sticks and sifted with hand sifters. After thoroughly drying, the seeds are cleaned and stored.

Seed Yield: 500-650kgs/ha.

Seed Production in Cauliflower

Botanical name: *Brassica oleracea* var. *botrytis*

Cauliflower is also a highly cross pollinated crop and it requires a cool, moist climate for seed production. The optimum temperature is 15-20^oc. Similar to cabbage, early and mid varieties produce seeds in plains and late varieties in temperate regions.

Cultural Requirements:

- **Time of sowing:** In the hills, the sowing time is adjusted that the plants put up the maximum leafy growth by 15th December.
- **Optimum sowing time:** last week of August

- **Transplanting:** end of September
- **Curd formation:** February – March
- **Seed rate:** 375-400g/ha
- **Spacing:** 60-90cm*45-60cm

Methods of seed production:

1. *in situ* method (seed to seed method)
2. **Transplanting method** (head to seed method)

For seed production, seed to seed method is recommended since the head to seed method in India has not been very successful. In seed to seed method the crop is allowed to over winter and produce seed in the original position, where they are first planted in seedling stage. There are three types of curd cutting methods in cauliflower. They are

1. **Scooping:** Here the central curd is scooped using knife. Approximately half of the curd is removed from the centre.
2. **Curd pruning:** The outermost curd lets are removed 5cm away from the centre
3. **Half curd removal:** Half part of the curd is removed. They are cut vertically into two and one is removed and the other is kept intact with the plants.

Isolation Distance:

- For certified seed: 1000m
- For foundation seed: 1600m

Harvesting:

Harvesting can be done when the pods brown. Too ripe pods dehisce. Seeds should not crush pods split when rubbed between hands. The harvesting is done when 60-70% of the pods turn brown.

After harvesting it is piled up for curing. After four or five days it is turned upside down and allowed to cure for another four to five days in the same way. It is then threshed with sticks and sifted with hand sifters. After thorough drying of seed in the sun it is cleaned and stored.

Seed Yield: 250-400kg/ha

Seed Production in Knol-Kohl

Botanical name: *Brassica oleracea* var. *gangylodes*

Knoll-kohl is also a cross pollinated crop which requires a cool climate for seed production. The pollination behaviour and climatic requirements resembles the other crucifers.

Cultural Requirements:**Time of sowing:**

Seed is sown in nursery: 7th to 15th August

Transplanting: first fortnight of September

The crops should not be planted during October and later, since it fails to form good knobs.

Seed rate: 900-1000g/ha

Spacing: 30*20cm

Methods of Sed Production:

The seed of knoll-kohl is usually produced by the *in situ* method. Transplanting method however, may be practised to raise the nucleus seed.

- **In-situ method:** the crop is allowed to over winter and produce seed in the original position where they were first planted in the seedling stage.
- **Transplanting method:** in this method, the mature plants are uprooted during autumn. The leaves all around the knobs and tops are removed, keeping the crown intact. The selected true to type plants are then immediately replanted in a well prepared plot. The whole stem up to the base of the knob is pushed into the soil so that the knob almost touches the ground.

Three types of plants are usually observed in the flowering stage as determined by the extent of branching shoot. They are:

- a. Non-branched type
- b. Intermediate
- c. Fully branched

The higher proportion of a fully branched plant in a seed plot gives higher seed yield. There is no appreciable difference in the quality of knobs produced by the seeds harvested from any of these types.

Isolation Distance: 1000-1600m between any two varieties of knoll-kohl

Seed Yield: 600-750kg/ha

Seed Production In Sprouting Broccoli

The seed production in broccoli can be made into a single season by adjusting the planting time. It requires warmer and less humid conditions than the cabbage and cauliflower. It must be grown during the cool months of the year.

Sowing time: September- October

Transplanting time: October- November

Seed rate: 400-500g

Seed production techniques:

- Seed to seed method
- Head to seed method

The time bolting and flowering: Mid February

Seed harvesting: May

Seed yield: 8-10 q/ha

The seed production in other cole crops like Brussels sprouts, kale etc., are same as that of cauliflower and cabbage.

Conclusion:

Seed is the critical determinant of agricultural production on which depends the performance and efficacy of other inputs. Quality seeds enhance productivity. Therefore, by knowing different methods of seed production in cole crops, bulk amount of seeds can be prepared of high yielding adaptable varieties. It will in turn meet the growing demands of farmers as well as consumers.