

# **DR. SUBHRAJYOTI CHATTERJEE**

**B.SC. (HORT.), M.SC. (HORT.) VEGETABLE SCIENCE, PH.D.  
VEGETABLESCIENCE**

**RESEARCHGATE:**

<https://www.researchgate.net/profile/Subhrajyoti-Chatterjee-4>

**GOOGLE SCHOLAR:**

<https://scholar.google.com/citations?user=Fj1lUPoAAAAJ&hl=en&authuser=1>

**Cabbage**

**Botanical Name:** *Brassica oleracea* var. *capitata* L.  
**Family:** Brassicaceae  
**Chromosome number** 2n=18  
**Origin :** *Mediterranean Region*

♥ **Cabbage was introduced much earlier than cauliflower in our country.**

♥ **Reported to be grown during the Mughal period though exact date is not available.**

♥ **Typically a cool season cole crop, grown for thickened main bud called head.**

♥ **The most popular vegetable around the world in respect of area, production and availability almost round the year.**

♥ **In India, ranks next to cauliflower in area and production.**

♥ **Traditionally, grown to a larger extent in the southern, eastern and coastal area of India**

♥ **With the development of hybrid and some tropical lines, it is produced almost round the year throughout the country.**

- ☉ Cabbage is one of the most important cash crop of mid and high hills of Kullu, Sirmour, Shimla and Mandi districts of Himachal Pradesh where ago-climatic conditions are favourable to grow it during off-season.

## Uses

- ☉ It is rich source of vitamin A, G & C and also contains P, K, Ca, Na & Fe in sufficient quantity.
- ☉ It is known to possess medicinal properties.
- ☉ It was used in ancient times against ailments like gout, diarrhea, stomach and cardiac troubles.
- ☉ It has anti-cancer property as it protects against bowel cancer due to presence of indole-3-carbinol.
- ☉ Cabbage Juice was used as a remedy against poisonous mushrooms and as a gargle against hoarseness.
- ☉ The leaves were used to cover wounds and ulcers.
- ☉ It is said to help digestion.

# Soils

- ♠ Cabbage can be grown in all types of soil with good fertility and good water regime.
- ♠ The mid season and late crop will grow very well in medium, medium heavy and heavy soils.
- ♠ For early crop, a light to light medium soil should be preferred so that the drainage is easier in the rainy season.
- ♠ On heavy soils, plant grows more slowly and the keeping quality is improved because of compactness.
- ♠ It prefers a soil reaction ranging from pH 6 to 6.5.
- ♠ Most cabbages are some what tolerant to salt.
- ♠ In saline soils, the plants show die back margins and dark foliage & become more susceptible to the diseases like black leg.
- ♠ C-index is a measure of salt content (i.e. g of NaCl per lt. of soil moisture). For Red Cabbage, the limit of salt tolerance is C-4 whereas for savoy and white cabbage it is C-6. At C-8 the crop may show reduction of 40% yield.

# CLIMATE

- ▶ It can withstand extreme cold and frost better than cauliflower.
- ▶ It thrives best in a relatively cool and moist climate,
- ▶ The optimum seed germination is obtained at 12.6-15.6 °C soil temperature.
- ▶ The optimum temperature for growth and head formation is 15-20 °C whereas above 25 °C, the growth is checked.
- ▶ The minimum temperature for its growth is just above 0 °C.
- ▶ Withstand temperature of 10-40 °C for a few days only.
- ▶ After cold treatment at 4-10 °C for 7-9 weeks, the plants bolt sooner with abundant flowers but plant should have passed juvenile phase.
- ▶ If the plants are not exposed to chilling temperature for required duration the cultivar remain vegetative.

😊 The cabbages are classified into three broad groups

- 😊 **White cabbage** – most commonly cultivated in India. Pointed, Round and Flat or Drumhead are the shapes
- 😊 **Red cabbage** – Leaves have distinct coat of wax and tolerant to diamond back moth.
- 😊 **Savoy cabbage** – Blistered leaves and the shape is pointed round and flat.





# White cabbage cultivars are divided into 3 groups on the basis of maturity of heads after transplanting

<b>Early Group</b>	<b>Mid season Group</b>	<b>Late Group</b>
Takes 55-70 days	Cultivars fall under early and late	Takes 85-130 days
Golden Acre, Pride of India, Copenhagen Market, Pusa Ageti, Pusa Mukta, Pusa Sambandh (Synthetic variety)	Glory of Enkhuizen, September, Pusa Drum Head	Late Large Drum Head

# Hybrid varieties

- ▶ **BS 32 (Bejo shetal), Nath 401 and Sri Ganesh Gole (Maayco), Hari Rani Gole, Quisto, Bajrang, Kranti, Mitra are some with promise & identified through AICVIP.**

## Varieties of Red Cabbage

- ▶ **Red Acre**
- ▶ **Red Mammoth**

## Varieties of Savoy Cabbage

- ◉ **Perfection (Syn. Chieftain)**

# Cultivars suitable for growing in Himachal Pradesh

1.	Golden Acre	Suitable for cultivation in all areas of the state, heads are small and compact weigh around 1-1.5kg with few outer cup shaped leaves, early in maturity and gets ready in 60-70 days which is a week earlier to Pride of India, average yield 225-250q/ha
2.	Pusa Mukta	An early variety with medium sized solid, flattish round and attractive heads, slightly late than Golden Acre and gives higher yield (250-300q/ha), resistant to black rot, a suitable variety for summer season in Zone II and Zone III
3.	Pride of India	Small round compact heads with medium sized frame, matures in about 70-75 days, heads remain small and loose under less favourable conditions, harvesting at proper stage is essential otherwise heads crack, average yield 250-300q/ha.
4.	Pusa Drum Head	Large flattened and solid heads, higher yield but consumers preference is less, late in maturity and ready in 90 days, field resistant to black leg, average yield 375-435 q/ha.

# Planting Time

Mainly grown as a winter crop from October –January in the Northern Indian plains

Zone	Time of nursery sowing
Low Hills	August – September
Mid Hills	August – September February – March
High Hills	April- May

- Seedlings become ready for transplanting in 4-5 weeks time.
- Seedlings 5mm in diameter are better for field setting
- Seedlings must be about 10-12cm in length at the time of transplanting.

## Seed Rate

**Early season: 600-800 g/ha**

**Main season: 200-500 g/ha**

## Spacing

<b>Early varieties</b>	<b>45cm X 45cm</b> <b>45 cm X 30 cm or 30cm X 30 cm</b> <b>(round &amp; smaller heads)</b>
<b>Mid and Late season varieties</b>	<b>60cm X 45cm or 60 cm X 60 cm</b>

# Manures and Fertilizers

## Open pollinated varieties

FYM (q/ha)	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
	(Kg/ha)		
250	125	100	50

- ☺ Full dose of farmyard manure and phosphorus and one-third of N and half of potassium should be applied at the time of transplanting.
- ☺ Remaining part of N should be top dressed at an interval of one month each while half of potassium is to be applied alongwith N during second top dressing.

# Harvesting

- ☺ In general, the heads are harvested when they are firm and solid.
- ☺ The heads are cut with a knife, frequently attached with some non-wrapper leaves which give protection to the heads from bruising injury.
- ☺ Delay in harvesting results in cracking and rotting of heads.

## Yield (q/ha)

Early varieties	250-300
Late season varieties	400-500

# Pre and post harvest handling

- ⇒ Harvesting should be done preferably in the late evening or early morning so that the product remains turgid and fresh
- ⇒ Trimming of diseased, damaged, rotten and discoloured leaves.
- ⇒ Avoid direct contact of heads with the soil and exposure to direct sunlight.
- ⇒ Proper packing to avoid bruising.
- ⇒ Grading for uniform produce.
- ⇒ Sprinkle water over the heads to maintain turgidity and freshness.

## Storage

- The early varieties can be stored for 4-6 weeks at 0°C-1.7°C and RH between 92-95% while the late ones for 12 weeks due to firmness of heads.



# Cracking

- ❖ Leaves may grow through head.
- ❖ Plant so, crop develops in mild or cool weather.

## Possible Reasons

- ❖ Excess N fertilizer
- ❖ Hot, dry weather

## Management

- ❖ Do not let soil dry out.
- ❖ Fertilize properly.



Head cracking