

Cultivation of Carrot

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Introduction

Botanical name: *Daucus carota* – Carrot

Family : Umbelliferae

Origin : Central Asia

Chromosome number $2n = 18$

Carrot is grown all over India and is used for human consumption as well as per forage and particularly for feeding. It is taken raw as well as cooked in curries and is made into pickle and sweet meats. Black carrots are used for the preparation of a sort of beverage called kanji, which is a support to be a good appetite. The orange coloured varieties are rich in carotin a precursor of vitamin A and contains appreciable quantity of thiamine and riboflavin.

Edible Portions

The edible portions of the root varies in colour and size the outer portion of the tap root is more fleshy contains more sugar than the inner core which is more pithy. Carrot is grown in winter crop in tropical conditions. In temperate countries it is grown as spring summer crop. It is a root vegetable and has worldwide distribution. From economic point of view it ranks after tomato, cucumber, lettuce and sweet corn.

Types: They are two groups.

1. Asiatic type
2. European type

S. No	Asiatic	European
1	They produce roots and seeds, freely in the plains	They produce good roots in plains but fail to produce seeds.
2	The Asiatic type have the root ends conical	Root ends are blunt.
3	The roots are red with more anthocyanins	They produce orange coloured roots
4	produce large core heavy tops	Rich in carotene and core is comparatively less and soft.
5	More juicy	Less juicy
6	Cores are less coloured	Cores are self coloured
7	Produce more	Core less core
8	Early maturing and have high sugar content	Late maturing
9	They are tropical and sub- tropical (annual)	Temperate (biennial)
10	No chilling requirement for seed production	Chilling requirement is must for seed production

Asiatic type see suitable tropical and sub-tropical. European type are suitable to temperate area. Asiatic type have more red water soluble anthocyanin pigment and less water soluble and lycopene pigment. Vitamin A content less. In European types, vitamin A content is more.

Varieties

In India long orange coloured smooth rooted types are more popular. For exotic types sown for taking late crop varieties like chanteney, nantes and scarlet horn are the best. Seeds of chanteney nantes half long are supplied for vegetable research station in kulu valley in Punjab. The following varieties released by IARI Delhi

- 1. Nantes:** It is a European type, gives skin stumpy orange group, perfect and cylindrical. The core is tender sweet self coloured. Get ready in 120 days.
- 2. Chanteney:** European varieties it has attractive deep reddish orange. It has a tapering but distinct stump end and core sweet and indistinct gets ready in 120 days.
- 3. Pusa kesar IARI:** Local red x nantes half long. It is a selection from a cross between local red with nantes half long. It has self coloured central core less. Branching of root and short leafy top. A notable feature of this variety, so that the root stay a month longer in field without any sign of bolting. Varieties released by Punjab agricultural university.
- 4. Pusa Meghali (Temperate type) Half Long:** Nantes pusa yamadagni and coreless are some more improved varieties are

Climate

Carrot is cool season crop. Some of the tropical types tolerate quite high temperature. A colour development and growth of roots is affected by temperature. At the temperature of 10 to 15°C they will produce longest roots (but they develop poor colour). The effect of temperature will vary with the variety and soils. At very low temperature 4 to 7°C colour development very poor roots become enlarged and they are tapered very little enlarge of very little top growth was observed. Temperature on germination: Off temperature for germination 7.2 to 23.9°C. Optimum temperature for better growth 18.3 to 20.9 °C. Temperature on carotene content: Carotene content is reduced at temperature at below 15.6°C and above 21.1°C that is why carrots grown 15 to 20°C will develop good colour. Poor light is essential for producing carrots. The tropical types produce roots even at high temperature of 25°C.

Soil

It requires deep well drained sandy loam. This type of soil is particularly good for early crop. Heavy soils will check the development of roots and cause forked lateral roots. It is grown in rainy season under heavy soil condition or black soil condition even then it

will produce abnormal or forked roots. Roots impeded by rich soil strengthened or thickened with increased branching. Carrot does not grow well in highly acidic soil. Maximum yield can be obtained at pH of 6.5

Seed Rate

5 to 6 kg per ha it can be up to 6 to 9 kg per ha is the variety Premnath. Sowing time is September (best). Optimum temperature for germination 7.2 to 23.9°C. it can be sown from June-July, August, September and in hills the month of January – February. Tropical type up to September to October. Temperature types are sown from October onwards. Several successive sowing at interval of 2 to 4 week help to ensure a continuous harvest of marketable roots. The seeds are sown on ridges on flat land about 1.5 cm deep.

Method of Sowing

Seeds are directly sown in the field in ridges per furrow or flat bed. In rainy season, ridges and furrows are made. In Rabi season if the soil is loose, sowing is done on flat beds. If the soil is hard, sown on ridge and furrow. Seeds are thin and light there are mixed with soil or broken rice at 1:1 or 1:0.1 or 10:1 ratio. Seeds are sown to a depth of 1 to 5 cm at a spacing of 30 cm between rows. (within rows 5 cm). The seeds germinate within 5 to 10 days after sowing under good moisture conditions. Thinning has to be done at distance 5 to 10 cm. thinning is done at 8 to 10 days after germination the resulted spacing is 30 x 5 to 10 cm.

Manuring

Carrot is a heavy feeder. Potassium requirement is high. For an yield of 100 tonnes per hectare, crop remove around 14 kg Nitrogen, 8 kg P and 45 kg Potassium. For an yield of 200 q per hectare a crop removes 40 kg N, 225 kg P and 125 kg Potassium per hectare. Depending on soil fertility Farm Yard Manure at the rate of 30 tonnes per hectare is applied at the final Ploughing and dosage of 40 to 60 kg nitrogen, 25 to 50 kg of phosphorus and 90 to 110 kg of potassium per hectare is recommended has basal dosage. Excess nitrogen reduces root quality damage the content of sugar, dry matter, carotene and vitamin C. fresh cow dung should not be applied it may cause forking of roots.

Irrigation

First irrigation is given soon after seed sowing this has to be followed. Four to six days after sowing. Irrigation is given at 6 to 10 days interval.

Earthing up

Should be done at 60 to 70 days after sowing to help in development of roots the soil is earthed up covered the top of developing roots to prevent loss of colour of tops, the tops becomes green and toxic on exposure to sun light.

Mulching

Field is mulched with soya bean stubbles or rye mulch comparatively to conventionally tilled plots.

Harvesting and Yield

Early carrots are harvested when they are partly developed. For the purpose of distinct markets otherwise they are retained in the soil till they reach full maturity stage they should not be retained afterward. They have become puffy core becomes hard and is unfit for consumption. There are two

Methods of Harvesting

1. Roots are dug out when they are sufficiently moist which khurpa or spade in black. Light irrigation has to be given before harvest, so that easy pulling of roots can be facilitated without damage by holding the leaves.
2. In case of Asiatic variety the roots are harvested when they attain marketable stage 2.5 to 5 cm in diameter, at the upper end after harvesting the roots they are trimmed and washed before sending them to the market. They are packed with gunny bags.

Yield

Production must be varies by the variety:

- Tropical types give around 20 to 30 tonnes per ha.
- Temperate type may give 10 to 15 tonnes per ha.

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