

SEMESTER II

PRODUCTION OF ROOT CROPS

Dr. Rajendra Prasad Tiwari

TURNIP

BOTANICAL NAME - Brassica rapa L.

FAMILY - Cruciferae

CHROMOSOME NO. – $2n = 20$

ORIGIN - The Mediterranean Region

INTRODUCTION

Turnip is biennial in nature. Turnip greens are extensively used as green fodder and seldom as a green vegetable. Roots are good source of vitamin 'B' and 'C'. Green leaves are rich source of vitamin 'A' (15660 IU/100 g). The edible part is modified root (napiform), which is a hypocotyl. Turnip is grown in Northern parts of India specially in Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Western Uttar Pradesh and Bihar. It can be grown at an elevation of 1,500 MSL or above but it is not suitable for growing in low lands of wet tropics. Turnip is mainly grown for its enlarged root.

BOTANY AND TAXONOMY

- The fleshy thickened underground portion of turnip is actually the hypocotyl. A distinct tap root and secondary roots arise from the lower part of the swollen hypocotyl.

- Normally roots attain edible maturity in 40-80 days depending on cultivar and cultural condition.
- The leaves and petioles are hairy and coarse, and yellowish-green in colour. The inflorescence is a terminal raceme on the main stem.
- Propagation Methods of Turnip- Mass selection is commonly adopted for turnip improvement. Turnip has strong saprophytic system of self incompatibility there is no need of emasculation.
- Sodium chloride and carbon dioxide can also be used for overcoming self-incompatibility.

Nutrient Content

Raw Turnip	Amt per 100 gm	Raw Turnip	Amt per
Protein	0.5 g	Phosphorous	40.0 mg
fat	0.2 g	Iron	0.4 mg
Minerals	0.6 g	Riboflavin	0.04 mg
Carbohydrate	6.2 g	Vitamic C (green leaf 180 mg)	43 mg
Calories	29.0 g	Nicotinic acid	0.05 mg
fibere	0.9 g		
Calcium	30.0 mg		

VARIETIES

European or Temperate types –

- ❖ **PURPLE TOP WHITE GLOB** - It is large rooted and heavy yielding variety developed at IARI Regional Station, Katrain. Roots nearly round, large, smooth, skin purplish red on upper portion which extend above soil surface, lower portion creamy coloured. Best for dehydration. Mature in 60-65 days after sowing. Average yield 250-300 q/ha.
- ❖ **GOLDEN BALL** - It was bred at IARI Regional Research Station, Katrain. It gives globe shaped, smooth, yellow roots with sweet and yellow flesh. It yields 200-250 q/ha.
- ❖ **Pusa Chandrima** - It is an early maturity variety. It is developed by hybridization between Japanese White (Asiatic type) Golden Ball (European type). Roots medium to large in size, 8-9 cm in length and 9-10 cm in diameter, white skin with white colour flesh, fine grained, sweet and tender.
- ❖ **PUNJAB SAFAED 4** - Recommended for cultivation in Punjab and Haryana. Its roots are pure white, round and medium sized with mild taste.
- ❖ **L1** - its roots are round and pre white smooth crisp . its average yield of 105 qtl of roots per acre.
- ❖ Other variety are- **Pusa Sweti, Pusa Kanchan, Snowball** etc.

CLIMATE

- . The most favourable weather for the development of root is 10°- 13° C air-temperature and 18°-23° C soil-temperature.
- The crop required cool and moderate climate. It can tolerate frost and mildly freezing temperature.
- High temperature adversely affects quality, the roots become woody, tough and bitter in taste in hot weather.
- Asiatic varieties can tolerate quite warm weather compared to the European types. Temperature below 10° C induces flowering and causes bolting.

SOIL

- The best suited soil for turnip is deep loam to clay loam .
- A moderately deep, friable, fertile well drained soil is ideal .
- The optimum pH is 5.5 - 6.8.

SOWING TIME

Seeds are sown on the ridge at a depth of 1.5-2.5cm deep.

Tropical Type - End of July to September.

Temperate Type – September to December.

- Lower Hills – July – October.
- High Hills - July – September.

METHOD OF SOWING

There are two methods – seed to seed method and root to seed method

- **SEED TO SEED METHOD**- this method is used for certified seed production of those varieties which do not withstand transplanting well. The source of seed used are genetically pure.
- **ROOT TO SEED METHOD**- this method is used for nucleus /foundation seed production
 - ✚ Plough the field thrice and prepare fine tilth.
 - ✚ Sow seeds on ridges.
 - ✚ Uproot the seedlings at the stage of edible maturity.
 - ✚ Examine and select true to type roots.

MANURE AND FERTILIZERS

Turnip requires high amount of N and P similar to other root crops.

Application of 200-500 q. well rotten FYM, 60-80 kg N and 40-50 kg each of phosphorus and potassium per hectare.

Nitrogen should be applied in two splits i.e. half at the time of field preparation and remaining dose as top dressing at the time of knob formation.

The entire dose of phosphorus and potash each should be applied at the time of field preparation.

IRRIGATION

- Pre-sowing irrigation is essential for better germination of seeds.
- The water requirement would be about 300 mm.
- In general, the crops is irrigated at 7 days intervals till harvest.

INTER-CULTURE AND WEED CONTROL

- Thinning is an essential operation to maintain optimum plant population.
- Infected plant should be thinned out keeping a distance of 10-15 cm from plant to plant.
- About two shallow weeding and hoeings are sufficient to raise a healthy crop.
- One earthing at 20-25 days after sowing should be done to provide good environment for proper root development.
- Weeds can also be checked with pre-emergence application of herbicides like Pendimethalin (1 kg/ha) or Fluchloralin (1-1.5 kg/ha) or Nitrofen (2.5 kg/ha) .

HARVESTING

- Turnip is harvested when the roots are tender and attain marketable size.

- Harvesting roots of 5.0-7.5 cm diameter would be ideal and larger roots are often coarse in texture and bitter in taste.
- A light irrigation is necessary just before harvesting to facilitate lifting.
- The entire plant are uprooted, roots separated, cleaned and tops are cut.
- The keeping quality of turnip is poor. Dipping the roots in hot paraffin will help reduce shrinkage and improve the appearance.

DISEASE

Downey Mildew, Powdery Mildew, Brown Heart are the major disease affecting the crop.

CONTROL

Application of Borax at 20-25 kg/ha and spraying Indofil M 45 at 0.2% will be effective in controlling these diseases.