



Improved Cultivation of Radish

*Naval Kishor Kamboj and Chandanshive Aniket Vilas

Department of Vegetable Science,

CCS Haryana Agricultural University, Hisar-125004

*Email of corresponding author: kamboj.naval@gmail.com

Radish is one of the most important cash crops of the family Brassicaceae. It is popular in both tropical and temperate countries due to its high productivity, high medicinal value, good storability, and long period of availability. Being a quick growing crop, it is easily grown as a companion crop or inter crop between the rows of other vegetables.

Introduction

Radish is a root vegetable suitable for growing in tropical and temperate climate. It is grown for its leaves and fruits, which are eaten both as salad and as cooked vegetable. Its young leaves are also cooked as vegetable. It has a unique pungent flavour. The green leaves of radish are rich source of minerals and vitamins A and C.

It is recommended for patients suffering from piles, liver troubles, jaundice *etc.* Radish has cooling effect and prevents constipation. Juice of fresh leaves is used as diuretic and laxative. Red coloured roots are higher in ascorbic acid content. The pungency in radish is due to *isothiocyanates* and red colour is due to *anthocyanin* pigment. Radish is originated in Europe and Asia, is presently cultivated all over the world. In India, it is grown in Utter Pradesh, West Bengal, Assam, Punjab, Haryana, Himachal Pradesh and Gujarat.



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Climatic Requirement

Radish is a cool season crop, but the Asiatic varieties can tolerate more heat than the European or temperate varieties. Long days as well as high temperature lead to bolting without adequate root formation. The optimum temperature for best flavour, texture, root growth and development is 10 to 15°C.

Soil Requirement

Radish crop can be grown on a wide range of soils, however, well-drained sandy loam or loam soil rich in organic matter is considered as the best. Heavy soils produce misshapen roots. The pH of the soil should be 5.5 to 7.0 for its successful cultivation. Soil should be prepared well before sowing. To obtain the required tilth, field is prepared by ploughing 2-3 times with harrow followed by planking. All the stubbles of previous crops are removed from the field to prepare clean seedbeds.

Cultivated Varieties

There are two distinct groups of radish varieties *i.e.*, European or temperate type and Asiatic and tropical type.

- **European or temperate type:** They are quick growing, produce roots of good quality, less pungent and having short duration (25-30 days). These are recommended for cultivation in hilly region of the country. These varieties are White Icicle, Scarlet Globe, Rapid Red White Tipped, Scarlet Long and Pusa Himanani.
- **Asiatic and tropical type:** They are more pungent and have long duration (45-55 days). These are recommended for cultivation in plains of the country. These varieties are Co-1, Pusa Reshmi, Pusa Chetki, Pusa Desi, Japanese White, Chinese Pink, Punjab Pasand, Punjab Safed and Arka Nishant.

Sowing Time

In northern plains and Central India, Asiatic types are sown in the month of August to October while European types are sown from October to February. In hills, the optimum sowing time is March-May.

Seed Rate

Seed rate of radish usually varies with seed size, seed germination percentage, variety, soil type, season and climatic conditions of the growing region. Generally, the seed rate for Asiatic types cultivars is 10 kg/ha, whereas, for European types cultivars, it is 12-14 kg/ha. The seed before sowing should be treated with Thiram or Captan 3 g/kg of seed to protect the seed and seedlings from different diseases.

Sowing Method

Radish is usually grown on ridges to facilitate good root production. Its seeds are usually sown at a row spacing of 45 cm and 6-8 cm of plant spacing. For continuous supply of the produce, sowing of Asiatic type is done once in 15 days and European types are sown at 8 days interval.

Manurial Requirement

Nutritional requirement of the crop generally depends on soil type, fertility status of the soil, previous crop grown and crop spacing. A well-decomposed farmyard manure should be incorporated into the soil @ 20-25 t/ha at the time of field preparation. Besides, nitrogen 80-100 kg, phosphorus 40-60 kg and potash 50 kg per hectare are applied to obtain a good yield. The full dose of phosphorus and potash and half dose of nitrogen should be applied as basal dose before sowing. Rest of the nitrogen is top dressed at 30 days after sowing.

Irrigation Requirement

Soil moisture is an important factor for good germination of radish. The soil should have sufficient moisture at the time of sowing. Light irrigation should be applied at 7-8 days interval in summer and 10-15 days interval in winter.

Intercultural Operations

Hoeing and weeding: Weeds may pose problem in initial stage of crop growth so weeding should be done frequently in order to keep the weeds under control. One shallow hoeing 15-20 days after sowing is beneficial and necessary for keeping the weeds down and providing good soil environment to the roots for their development. At the time of top dressing earthing up is done to prevent the roots from discoloration.

To control the weeds chemically, Fluchloralin (0.5 kg/ha) or Benthiocarb (1 kg/ha) or Oxadiazon (1.0 kg/ha) may be applied as pre-emergence for effectively controls of weeds in radish.

Thinning: In radish, thinning is an important operation to maintain optimum spacing among plants and to provide better conditions to the plants for their growth and development. It is also essential to reduce competition among plants for space, light, nutrients and moisture. Thinning must be done 15-20 days after sowing to maintain spacing of 6-8 cm.

Harvesting

The European types are ready for harvesting 25-30 days after sowing while Asiatic type are harvested 40-50 days after sowing. A light irrigation may be given before harvesting to facilitate lifting of roots.

Post-harvest Management

After harvesting, the roots are washed, graded and packed for transportation to the market. Radish can be stored at 0°C temperature and 90-95% relative humidity for about 2-3 months.

Yield

The yield of radish depends upon variety, soil fertility, growing season and cultural practices adopted during cultivation of crop, however, the average yield for Asiatic type ranges from 15-20 t/ha and for European type it is 5-7 t/ha.

Plant Protection Measures

A number of insect-pests and diseases attacks radish crop during the growing season. Some of the insect-pests and diseases along with their control measures are given below:

Insect-pests

Aphids (*Myzus persicae*)

Small soft-bodied insects suck cell sap from underside of the leaves, which as a result turn yellow. If aphid infestation is heavy, it may cause yellowing, curling of leaves, reduces plant vigor, yield and quality of the produce. Aphids secrete honeydew like substance, which promotes the growth of sooty mould, which inhibits photosynthesis and ultimately reduces the yield of the crop.

Control

- Spray the crop with Dimecron (0.05%), Enosulfan (0.05%), or Malathion (0.1%).

Flea beetle (*Phyllotreta* spp.)

The beetle causes damage by making small holes or pits on leaves, which give the foliage a characteristic shot hole appearance. The young plants and seedlings are more susceptible. The affected plants become stunted, but under heavy infestation, the plant may be killed.

Control

- Spray the crop with 5% *neem* seed kernel extract.
- Spray the crop with 0.03% dimethoate or 0.05% Phosphamidon.

Mustard saw-fly (*Athalia proxima*)

This is a common pest of radish. It appears when the crop is in flowering and at vegetative stage. The damage is done by the group by biting and making holes in the leaves and roots.

Control

- Spray the crop with 5% *neem* seed kernel extract.
- Spray the crop with 0.03% dimethoate or 0.05% Phosphamidon.

Diseases**Alternaria blight (*Alternaria raphani*)**

Symptoms usually first appear on the leaves in the form of yellowish, slightly raised spots or lesions. These lesions enlarge many times on seedpods. Infection spreads rapidly during rainy weather. The fungus penetrates the pod tissues ultimately infecting the seeds. The infected seeds may lose their viability.

Control

- Follow 2 to 3 years crop rotation.
- Use only disease free healthy seed.
- Spray the crop with Dithane M-45 0.2%, Blitox 0.2%, or Bavistin 0.1% and repeat at 7-10 days interval if necessary.

Downy mildew [*Pseudoperonospora parasitico*]

It is a serious and most destructive disease of radish. The disease is characterized by the appearance of the purplish brown spots on the under surface of the leaves. These spots may remain small or enlarge considerably. The upper surface of the leaf above the lesion is tan to yellow. Severely infected leaves roll upward with brownish tinge that produces a blighted appearance. Grayish black downy fungal growth is observed on under surface of leaf in humid weather.

Control

- Field sanitation by burning crop debris helps in reducing the inoculums.
- Protective spray of mancozeb 0.25% at seven days interval gives good control.
- In severe cases, foliar spray of Metalaxyl + mancozeb @ 0.2% may be given only once.

Powdery mildew [*Erysiphe* sp.]

The infection appears first on upper side of the leaves and stem as white to dull white powdery growth, which quickly covers most of the leaf surface and leads to serious photosynthetic rate. In due course of time, all the above ground parts are infected. Finally, the lesions turn brown and necrotic. The affected leaves become yellowish, dry and get defoliated.

Control

- The fungicidal spray of penconazole (0.05%) can give very good control of the disease.
- Spray the crop with Karathane 1.5 ml/liter, carbendazim 0.1%, Calixin 0.1%, or Sulfex 2.5 g/litre.

White rust (*Albugo candida*)

It produces a white powdery substance in patches on the under surface of the leaves. It mainly appears on the leaves and flowering shoots, which are deformed and bear only malformed flowers.

Control

- Use only disease free healthy seed.
- Follow long crop rotation and clean cultivation.
- Spray the crop with Dithane M-45 0.2%, Blitox 0.2%, or Bavistin 0.1% and repeat at 7-10 days interval if necessary.

Conclusion

With proper management practices in radish crop, total yield of 15-20 tones/ha can be obtained from Asiatic type varieties and 5-7 tones/ha from European type varieties.