

Lecture 9. Climate, soil requirement, seed rate, preparation of field, nursery practices, transplanting, spacing, planting systems, irrigation, growth regulators, nutrition and weed management, physiological disorders, harvest, post harvest handling, storage, marketing and seed production of brinjal

- Climate and soil.
- Seasons.
- Seed rate.
- Nursery.
- Preparation of field.
- Spacing and transplanting.
- Nutrition.
- Irrigation.
- Weed control.
- Mulching
- Use of growth regulators and chemicals.
- Physiological disorders /constraints.
- Harvesting and yield.
- Marketing.
- Storage and post harvest handling.
- Seed production

Climate and soil

Brinjal is susceptible to severe frost. A long and warm growing season with temperature range of 21-27⁰C is most favourable for its successful production. Climatic conditions especially low temperature during the cool season cause abnormal development of the ovary (Splitting) in flower buds which then differentiate and develop into deformed fruits during that season. Late cultivars, however, withstand mild frost and continue to bear some fruits. The brinjal grown in warm season shows luxurious growth and starts bearing

from the initial flowers, while in cool season its growth is poor and slow and fruit size, quality and production are adversely affected.

Soil

The brinjal can be grown practically on all soils from light sandy to heavy clay loam soils are good for an early crop, while clay loam and silt loam are well suited for higher yield. Generally silt loam and clay loam soils are preferred for brinjal cultivation. The soil should be deep, fertile and well drained. The soil pH should not be more than 5.5 to 6.0 for its better growth and development.

Seasons

Brinjal can grow under a wide range of climatic conditions. The sowing and transplanting time varies according to agro climatic condition of the region. Under the harsh climate of North India two sowings are normally done 1. June-July for autumn- winter crop 2. November for spring summer crop. Sowing time in other parts of the country is from June-September and again in December-January. In hilly regions sowing of seed is done from March- April and seedlings are transplanted in May.

Nursery

Raised beds should be prepared (7.5×1.2×10-15cm) and seeds are sown in rows of 7.5 to 10cm apart. The beds are prepared well and levelled and one centimetre thick layer of farm yard manure is to applied and mixed properly. The seeds should be covered properly by a mixture of FYM and soil. As soon as the sowing is completed the bed should be covered with a thin layer of dry grass and kept moist till the seeds germinate. To avoid fungal diseases, the seeds should be treated with captan or thiram at the rate of 2g/kg of seed. For safe guarding, the seedlings should also be sprayed with mancozeb at a concentration of 2g/litre. About 250-375 g seed is sufficient to cover one hectare of land with 30,000-45,000 seedlings. The seedlings are ready for transplanting in about 4-5 weeks.

Preparation of land

Soil is prepared to fine tilth by giving 4-5 ploughings. Well rotten organic manure (25t/ha) is incorporated into the soil well before the final preparation.

Spacing and transplanting

The planting distance depends on the fertility status of the soil, growing season and cultivar. Usually, the spacing for the bushy, non spreading type should be 50 to 60 cm in both ways and for spreading cultivars row to row distance should be 75 to 90 cm and that for plant to plant 60 to 70 cm either in flat beds or ridges. Three spacing's are generally recommended i.e. 60×45, 75×60cm and 75×75 cm depending upon the size and spread of the plant besides duration of bearing period. Highly vigorous bushy and late bearing cultivars are given, wider spacing as compared to dwarf upright and early types. Stocky, healthy seedlings which are free of disease and shoot and fruit borer infestation and have attained a height of 10-12cm with 3-4 leaves are to be selected and transplanted. A light irrigation should be given immediately after transplanting.

Nutrition.

It is a heavy feeder of nutrients and requires more nutrients for better yield and quality. It removes 0.29, 0.08 and 0.50 Kg NPK for every 100 Kg fruit yield. As already mentioned 25 tonnes of FYM should be added 25 to 30 days before transplanting. NPK application is done in the form of inorganic fertilizers. Apply 25% of nitrogen as in the form of top dressing 6 weeks after transplanting and the remaining 25% N should be added in to soil 10 weeks after transplanting.

Table 1. Recommendations of NPK levels in some states of India

| State | NPK (kg) |
|----------------|------------|
| Andra pradesh | 100-60-60 |
| Madhya pradesh | 100-60-25 |
| Orrissa | 125-80-110 |
| Punjab | 125-62-30 |
| Karnataka1 | 125-10-50 |
| Tamil Nadu | 100-50-30 |
| Uttar pradesh | 100-50-50 |
| West Bengal | 120-50-50 |

Micronutrients

The deficiency of micronutrients in brinjal has not been noticed in field. But some workers have studied the effect of their application. The application of minor elements had no effect on vegetative growth of the plant. However, Cu increased the number of flowers and fruits, Zn improved the weight of fruits and Mn showed similar but less pronounced effect on flowering and fruiting.

Irrigation

It requires several irrigation for successful cultivation. Timely irrigation is essential for fruit set and its development. Usually the crop is irrigated weekly once for higher yield. Proper drainage facilities should be provided in rainy season to remove excess of water from the field. Drip irrigation is beneficial for decreasing water use and weed control.

Weed control

It is essential to keep weeds under control from the initial growth itself. Shallow inter cultivation is given to remove the weeds. Three to four hoeings are normally followed for effective control of weeds, proper aeration and good growth of the plants. Orabanche is one of the serious weed affecting solanaceous crops in some areas. It is a root parasite and should be controlled effectively. A pre-planting treatment of 1.0 kg ai/ha of fluchloralin followed by one hand weeding at 30 days after transplanting is effective.

Mulching

The most beneficial effect of mulching is that it conserves soil moisture and controls weeds. Mulching in brinjal crop with black polyethylene film reduces weed growth, accelerates crop growth, induces early bearing and increases yield.

Use of growth regulators and chemicals.

Application of 2, 4-D (2ppm) at flowering induces parthenocarpy, increases fruit set, advances fruit maturation and significantly increases total yield. Spraying of 4 CPA(Para-chlorophenoxy acetic acid)(20ppm) and N-metatolylphthalamic acid (0.5%) promotes fruit set in brinjal. NAA (60ppm) alone or in combination with BA(30ppm) applied on open flowers improved fruit set and ascorbic acid, GA₃, IAA and thiourea advances the flowering by 4-5 days. Spray of mixtalol (long chain C₂₄-C₃₄ aliphatic alcohols) on Cv. Arka Navneet has given beneficial effect with single spray of 4 ppm solution.

PHYSIOLOGICAL DISORDER/CONSTRAINTS

1. Calyx withering

This disorder occurs between mid-February and mid - April. The affected fruits become reddish brown in colour and lacking in normal luster and thus marketability of fruits is hampered. The affected fruits have much higher calcium and nitrate content than healthy ones.

2. Poor fruit set

In brinjal, four types of flower, according to length of style, are recognized irrespective of the variety namely, long styled, medium styled, pseudo short styled and short styled. Pseudo short and short styled flowers do not normally set fruit but their numbers in a plant are normally higher than long and medium styled of lower which produce fruits.

In brinjal, flowers are normally borne solitarily as well as in clusters. The solitary flowers are mostly long or medium styled whereas mixtures of short styled, pseudo short-styled and medium /long styled flowers are found in the cluster. Obviously ratio of short styled flowers to long/medium styled flowers in cluster is much high (3-4:1). So, fruit set depends on the plant. Natural drop is also a problem in brinjal which may be as high as 50% in medium styled flower and 30% in long styled flower.

Control: True short styled flowers are actually sterile flowers which cannot be induced to set fruits. However, application of growth substances on pseudo short styled, medium styled and long styled flowers produce higher percentage of fruit set.

1. Spraying the plant with 2 ppm 2, 4,-D at flowering stage when few flower clusters appear.

2. Spraying with 60 ppm NAA or 500 ppm PCPA (Parachloroacetic acid) at full bloom stage.

Harvesting and yield

Brinjal fruits are harvested when they have developed a good colour and marketable size, are still immature, tender and have not lost culinary qualities. The fruits are harvested with stalk at joint where they are attached to the branch. Normally the plucking can be done at 7 to 10 days depending upon the variety. Yield of brinjal vary according to the region,

cultivar and duration of the crop. Early crop normally yields 20-30 t/ha. While long duration crop yields 35-40 t/ha. Many F1 hybrids yield about 40-80t/ha.

Marketing

After harvest, the fruits are kept in shade and diseased and damaged fruits are sorted out. In early stage the size of fruit will be small and hence the fruits can be packed in baskets and taken to the market, but during later stage or at peak of the pickings, the fruits are packed in gunny bags and taken to the market. The attractive bright, glossy appearance having freshness and optimum size of the fruit are qualities for good market price.

Storage and post harvest handling

Brinjal green fruits had longest shelf life of 4 weeks based on the PLW discoloration, spoilage and CO₂ injury during storage at 8-10⁰C under controlled atmosphere with initial concentration of 5% CO₂. The fruits can also be stored for 7-10 days in fairly good condition at 7.2-10⁰C with 85-95% RH.

Seed production

An isolation distance of 100 to 200m for certified and foundation seed plots respectively should be maintained between two cultivars. During crop period at least 3 times plants should be rouged off. First rouging should be done before flowering and on the basis of foliage characters, the off types has to be removed. Second rouging is done at the time of flowering on the basis of flower characters and off types are to be removed. Final rouging is to be done at the fruiting on the basis of fruit characters and off types.

At all the stages disease/pest affected plants should be removed. At ripening, the fruits become light yellow in colour and at this stage they are harvested and seeds are extracted properly. The fruits are cut into pieces and washed in clean water and the seeds settled down in the bottom of the pot are collected. The seeds should be dried completely and kept in cool place.

Questionnaire

I. MULTIPLE CHOICE QUESTIONS

1. Optimum temperature requirement for successful production of brinjal should be
a. 15 -20⁰ C b. 21- 27⁰ C c. 30-35⁰ C d. 10-15⁰ C
2. Ideal soil PH for growth and development of brinjal is
a. 5-5.5 b. 5.5-6 c. 6-6.5 d. 6.5-7
3. Seed requirement for raising one hectare crop of brinjal
a. 250-375g b. 400-500g c. 500-750g d. 750-1000g
4. Brinjal seedlings are transplanted at a spacing of
a. 60x30-45 b. 75-90x60-70cm c. 50-60x50-60cm d. None of the above
5. Average yield of brinjal is _____ t/ha in F1 hybrids.
a. 10-20 b. 20-30 c. 40-80 d. 50-60
6. Chemical used for controlling root knot nematodes in brinjal is
a. Aldrin b. Nemagon c. Chloropyriphos d. None of the above
7. NPK requirement of brinjal is _____ kg/ha.
a. 100:50 :50 b. 200:100:100 c. 125:19:50 d. None of the above
8. Spraying of _____ controls poor fruit set in brinjal.
a. GA3 b. MH c. CCC d. 2,4-D
9. _____ method is followed for extraction of seeds
a. Fermentation b. Acid c. Alkali d. None of these
10. Little leaf of Brinjal is due to
a. Fungus b. Bacteria c. Mycoplasma d. Root knot nematode

11. Little leaf disease of Brinjal is transmitted by an insect vector

- a. Aphid b. leaf hopper c. butterfly d. None of the above

II. Say true or false.

1. Orabanche is the serious weed in cultivation of brinjal

Ans: True

2. Flochloralin weedicide is used for control of weeds in brinjal cultivation.

Ans: True

3. Isolation requirement for brinjal 500 & 800 Meters for breeder seed and certified seed respectively.

Ans: False.

4. Average yield of open pollinated varieties is 50 tons per hectare.

Ans: False.

5. Application of NAA induces parthenocarpy in brinjal.

Ans: False.