Garlic Production Technology

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Garlic production technology

Garlic grows well under a wide range of climatic conditions. However, it cannot stand too hot or cold temperature. It requires cool and moist climate during vegetative growth and bulb development stages but warm dry weather during maturity. The suitable growth temperature for garlic is 13 to 24°C. It can be grown well at elevations of 1000-1300 m above sea-level. Exposure of garlic to low temperature may lead to production of bulbils in the axils of the leaves. The critical day length for bulbing is 10-12 h for short-day garlic and 13-14 h for long-day garlic.

GARLIC is one of the important bulb crop among all bulbous crops grown and used as a spice or a condiment. It is a rich source of protein, phosphorus, calcium, magnesium and carbohydrates. Besides its regular use as a vegetable and chutney, it is used in ketchup, pickles, papad etc. The low productivity of garlic in India is one of the major issues of concern. There are many reasons for low yield including short day length conditions available in India, sub-optimal standards of cultivation, climatic fluctuations, non-availability of virus-free quality planting material and use of local low yielding varieties.

CULTIVATION

Soil

Garlic grows best in well drained fertile soils that are high in organic matter. Incorporating compost or well-rotted manure into heavy soils will result in the soil being friable and suitable for production. Like onion, garlic is sensitive to highly acidic, alkali and saline soils and water logging conditions. The threshold electrical conductivity of a saturation extract (ECe) for garlic crop is 3.9 dS/m. When the ECe level exceeds this, crop yield starts declining.

Season

Planting and harvesting time of garlic in different regions of India are given in table.

State	Season	Time of planting	Time of harvesting
Chhattisgarh, Gujarat, Madhya Pradesh and Maharashtra	*Kharif* *Rabi*	June-July September-November	October-November March
Tamil Nadu	*Kharif*	June-July	October-November
	Rabi	October-November	March-April
Karnataka	*Kharif*	June-July	October-November
	Rabi	September-October	March
Andhra Pradesh	*Rabi*	September-October	March
Bihar, Haryana, Punjab, Rajasthan, Uttar Pradesh and Uttarkhand	*Rabi*	October-November	March-April
Odisha and West Bengal	*Rabi*	October-November	March
Hilly areas (Long day types)	*Rabi*	September	May

Varieties

Variety selection plays an important role in enhancing productivity of garlic. The ICAR-DOGR has developed various improved varieties suitable for cultivation in different seasons and regions of the country. Bhima Omkar is recommended for cultivation in the states of Delhi, Gujarat, Haryana and Rajasthan. It matures in 120-135 days and average yield is 8-14 t/ha. It produces medium size compact white bulbs. **Bhima Purple** with attractive purple skinned bulbs has been recommended for

Garlic grown on flat bed with sprinkler irrigation

Bhima Purple

Bhima Omkar

cultivation in Andhra Pradesh, Bihar, Delhi, Haryana, Karnataka, Maharashtra, Punjab and Uttar Pradesh. It matures in 120-135 days and the average yield is 6-7 t/ha. The garlic varieties developed by other organizations are Agrifound White, Agrifound Parvati, Agrifound Parvati-2, Yamuna Safed, Yamuna Safed-2, Yamuna Safed-3 and Yamuna Safed-4 from National Horticultural Research Development Foundation (NHRDF), Nashik and Shweta, Godavari, Phule Baswant from MPKV, Rahuri. Among these, Yamuna Safed-3 and Agrifound Parvati have bigger cloves suitable for export.

Field Preparation

Field should be ploughed using mould board plough and tilled using cultivator 3-4 times to eliminate debris and soil clods. Organic manure equivalent to 75 kg N/ha (FYM 15 t/ha or poultry manure 7.5 t/ha or vermicompost 7.5 t/ha) should be incorporated at the time of last ploughing and beds of appropriate size should be prepared after levelling. Mostly, flat beds of 1.5-2.0 m width and 4-6 m length are formed. But, for *kharif* or rainy season, flat beds should be avoided to prevent water logging. For this season, broad bed furrows (BBF) of 15 cm height and 120 cm top width with 45 cm furrow are formed, which are suitable for drip and sprinkler irrigations.

Planting

Clove selection is important for garlic planting. Individual cloves from seed garlic bulbs should be separated but not long before planting. Twist off the outer skins and take the cloves apart without breaking the basal plate of the cloves, as that makes them unusable for planting. The selected clove should be big (>1.5g) for planting. Small, diseased and damaged cloves should be rejected. The cloves should be dipped in carbendazim solution (0.1%) just before planting to reduce the incidence of fungal diseases during establishment. About 400-500 kg seeds are required for one hector area. Cloves should be planted vertically 2 cm below soil surface with plant to plant spacing of 10 cm and row to row spacing of 15 cm.

Manures and Fertilizers

A sustainable agricultural system is one that is economically viable, provides safe, nutritious food, and conserves resources and enhances the environment. Garlic is a heavy feeder but the fertiliser recommendation should be guided by soil test results. Application of 75:40:40:40 kg NPKS/ha along with a combination of two or three organic manures (FYM, Poultry manure and Vermicompost) equivalent to 75 kg N/ha (7.5 t/ha Poultry manure or 7.5 t/ha vermicompost or 15 t/ha FYM/ha) is recommended for Bihar, Chhattisgarh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and Tamil Nadu (Ooty). Application of 100:50:50:50 kg NPKS + 20 t FYM/ha is recommended for Haryana, Uttarkhand and Uttar Pradesh. Recommended organic manures should be applied before last ploughing and mixed well in the soil. One third of nitrogen and full recommended dose of phosphorus, potassium and sulphur should be applied as basal at the time of planting. Remaining two third of nitrogen should be applied in two equal splits at 30 and 45 days after planting.

Weed Management

Control of weeds at the initial growth stages is essential for getting high marketable bulb yield. Because of labour scarcity, chemical control of weeds along with cultural methods is inevitable. Application of Oxyflurofen 23.5% EC @ 1.5 -2.0 ml/l or Pendimethalin 30% EC @ 3.5-4ml/l before or at the time of planting followed by one hand weeding at 40-60 days after transplanting is recommended for efficient weed control.

Irrigation

Garlic has a relatively shallow root system and it is therefore sensitive to moisture stress throughout the growing season. The quantity of water that should be applied depends on the weather and the soil conditions.

Garlic grown on raised-bed with drip irrigation

Garlic crop should be irrigated immediately after planting and subsequently at 7-10 days interval depending upon the soil moisture. In general, *kharif* crop needs 5-8 irrigations and *rabi* crop 12-13 irrigations. Irrigation needs to be stopped when the crop attains maturity (10-15 days before harvest). Excess irrigation is always harmful and dry spell followed by irrigation will result in the splitting of the outer scales in garlic. Avoid waterlogged conditions at all stages as these lead to development of diseases like basal rot and purple blotch. Similarly, continuous irrigation towards maturity leads to secondary rooting which, in turn, produces new sprouts and such bulbs cannot be stored for long. Modern micro-irrigation techniques such as drip and sprinkler irrigation help in saving

irrigation water and improve the marketable bulb yield significantly.

Harvesting

Harvesting begins when the leaf tops begins to dry, discolour and bend towards the ground. Another indication of bulb maturity is the reduced thickness of the sheath leaves surrounding the bulb. Generally, garlic matures in 130-180 days depending upon the cultivar, location and season. Early harvest results in bulbs which are immature and tend to shrivel when cured, while late harvest may result in bulbs which have stained, and have partially decayed wrapper leaves and exposed cloves. Garlic bulbs along with top may be cured/ dried in the field for two to three days after harvesting to increase storage life by minimizing microbial and fungal infection and water loss during storage.

For further interaction, please write to:
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