

BANANA CULTIVATION

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Banana can be successfully cultivated in humid sub-tropical and tropical regions up to an altitude of 2000 m above sea level. It is cultivated in India from 80 to 280 north latitude in areas with 12-38 degree Celsius temperature and 500-2000 ml annual rainfall. The ideal temperature for banana cultivation is 20 to 30 degree Celsius. Above or below it, the growth of banana stops. Plant growth stops at a temperature below 12 °C. Because the milk-like secretion inside the banana plant gets frozen. If a banana swarm emerges in the winter season, it is affected by winter. Appears to be trapped inside the stem and sometimes comes out with a delay, tearing the stem. Therefore, both extreme cold and heat are harmful for banana plants. Water logging conditions in the field also affect its growth, whereas banana is a water loving crop. In order to protect the banana plant from hot and strong winds, windproof plants or trees should be planted on the side of the field or on the ridge. Banana should be moved from one place to another at 12-13 degree Celsius only because respiration is lowest at that temperature. Plants are prone to scorching at high temperatures. No relationship has been established between light and banana growth. But in summer, bananas can be cultivated even in 50 percent shade. Even in rainwater based farming, 25 mm of rainfall/week is sufficient, otherwise, irrigation has to be arranged.

Land Selection

Banana cultivation can be done in different types of land provided that land has adequate fertility, moisture and good drainage. To make any soil suitable for banana cultivation, it is necessary that the structure of the soil should be improved, arrangements for good drainage should be made. Although banana can be grown in soils with pH values ranging from 4.5 to 8.0, the best soil P values for its cultivation are between 6 and 7.5. For the expected improvement in the structure of the soil, organic matter must be mixed in it. In heavy soils, adequate amount of manure and fertilizers should be applied to ensure proper drainage system and proper level of nutrients in the soil. A soil in which acidity is not high

organic matter is sufficient, the amount of nitrogen, phosphorus and potash is appropriate, suitable for banana cultivation.

Varieties

About 500 varieties are grown in India but the same variety has different names in different regions. More than 79 species of banana are stored near Rajendra Agricultural University, Pusa. Banana plant is formed from tender stem without branches, whose height ranges from 1.8 m to 6 m. Its stem is called false stem or virtual stem because it is formed from the collection of the lower part of the leaves. The real stem is below the ground which is called rhizome. The inflorescence emerges from its central part.

Transplanting material

Banana is propagated by sucker or rhizome. Plants prepared by tissue culture are also used for planting. There are two types of suckers.

Pointed sucker

These suckers are thin and have sharp leaves (like a sword). Weak insight, but highly suitable for amplification.

Water hybrid

It has broad broad leaves. They look strong in appearance but internally they are weak. Their use for amplification is prohibited. Sucker should always be taken only from plants of healthy high quality varieties, in which there is no outbreak of diseases and insects. Two to three months old vigorous sucker is good for propagation. New plants can be prepared from the rhizome of the banana. Many plants use the entire rhizome or its pieces to cut them quickly.

It does take a little longer to form a plant, but the plants of the first crop are more homogeneous. The average weight of the rhizome should be about one to one and a half kilograms. After digging the sucker, after cleaning it, it is treated by putting it in an aqueous solution of carbendazim (0.1%) monocrotophos (0.2%) for 90 minutes.

After that, keeping the sucker in the sun for 7 days, it becomes free from bacteria/mold. Where there is a problem of nematode, after dipping the sucker in cow dung, after treatment with neem based insecticide, neem cake @ 2-3 kg/pit should be used, special care should be taken in the selection of sucker for planting because planting Due to the lack of material, the

crop of banana is also not uniform, due to which there is a huge difference in its harvesting time and the management of the crop becomes difficult.

Propagation of Banana by Tissue Culture Method

For the last few years, plants of improved species of banana are being prepared by tissue culture method. There are many benefits of cultivating bananas from plants prepared by this method. These plants are healthy, disease free. Plants grow evenly. Therefore, flowering, fruiting, harvesting occurs simultaneously in all plants, due to which marketing is facilitated. The shape of the fruit is uniform and firm. Fruiting occurs about 60 days earlier in plants prepared by tissue culture as compared to rhizomes. In this way, the first crop of banana is obtained in 12-13 months after planting. Whereas the first crop is obtained after 15-16 months from the plants prepared from the rhizomes. Plants prepared by the tissue culture method give an average yield of 30-35 kg per plant. After taking the first crop, in the second ripe crop (ratoon), the depth comes again within 8-10 months. In this way, two banana crops can be taken in 24-25 months, whereas it is not possible with plants prepared from rhizomes. Planting such plants saves time and money. As a result, capital recovery is quick.

Soil management

The root system of banana is shallow which can be damaged due to cultivation, so it is advisable not to take crops that are covered on the surface. However, for the first four months of banana, short-duration crops such as radish, cauliflower, cabbage, arvi, hawthorn, turmeric, ginger, cowpea and marigold are recommended. Pumpkin-grade vegetables should never be taken as an intercrop because these crops are prone to viral diseases.

Plantation

To get maximum income from banana cultivation, it is necessary to pay special attention to the preparation of the field, planting time, plant, and row to row distance, selection of sucker or selection of plants prepared by tissue culture, etc.

Land Preparation

Before digging the pit, the weeds should be removed from the field by ploughing 2-3 times and the soil should be made fine-grained. Weeds should never be burnt to clean the field. After this 30 x 30 x 30 cm. m. or 45 x 45 x 45 cm. m. Dig pits of size 1.8 x 1.8 m (for dwarf species) or 2 x 2 m (for tall species) are dug. The work of digging the pit should be done in



May-June. After digging, the pits should be left in the same condition for 15 days. Due to strong sunlight, harmful insects, moulds, bacteria and insects are destroyed.

The pits should be filled with a mixture of compost and soil (1:1) 15 days before planting. The soil of the pits should be mixed with 20 kg of decomposed manure (compost), one kg of egg yolk or neem cake, 20 grams of furadan in the soil and the pit should be filled. The ratio of this mixture can be changed in problematic soils, such as lime in acidic soils, gypsum in sodium-rich soils, and adding organic matter and pyrites to the soils that result in significant improvements in soil quality. After filling the pit, irrigation is necessary, so that the soil of the pit settles.

Planting

Planting of plants prepared by tissue culture

Plants prepared by tissue culture of 8-10 inches height in polythene bags are suitable for planting. The polythene packets are cut and separated with a sharp knife or blade, and the plants are taken out, care should be taken that the soil nodules should not break. The plant should be kept upright by making a small pit equal to the earthen lump in the middle of the

already filled pits. Fill the soil around the pindi and bury it well without harming the roots of the plant, so that during irrigation, there are no pits in the soil. Planting should not be done at too deep a depth. The soil should be filled up to the pinnacle of the plant only.

Banana planting distance

Plant to plant and row to row distance in banana is affected by various factors like variety of banana, method of cultivation, soil fertility, etc. In the traditional cultivation of banana, the planting distance for different varieties has also been fixed differently, which is as follows.

Table-1 Banana species, planting distance and No. of plants per hac.

Species	Distance	Number of plants per hectare
Robusta, Dwarf Cavendish	1.8 x 1.8m	3200
Poowan, Monthan, Malbhog, Ne Poowan	2.0 x1.0 m	2500
Mixed cultivation of banana and spice (turmeric or ginger)	3.6 x 3.6 m	750

Intensive Planting Method of Banana

This is a new method of banana production. In this, it is advised to increase the number of banana plants per unit area to increase production. In this method production increases, but the cost of cultivation decreases. Proper and best use of fertilizers and water is done. Based on experiments done in Rajendra Agricultural University and other parts of the country, it can be said that more production can be achieved by increasing the number/hectare of plants of Robusta and Basrai species.

Based on the experiment conducted in Tamil Nadu University, it has been concluded that 5000 plants per hectare can be kept by keeping the number of rhizomes at one place and not three and keeping the plant to plant and row to row distance of 2 x 3 meters. In this, 25% quantity of Nitrogen, Phosphorus and Potash has to be increased as compared to conventional planting. As a result of this arrangement, a significant increase in production is possible.

Nowadays, under the intensive planting method, it is recommended to plant the bananas of the Cavendish group (plants prepared by tissue culture) in the pair row system. In this method, it is advisable to do irrigation by drip method. It has many advantages. The first crop

quantity of banana can be taken in 10-11 months and the yield is available up to at least 60 tonnes.

Planting Time

The timing of banana planting is determined by various factors like species, region's climate, market requirement, etc. The best time to plant banana in western and northern India is during the onset of the south-west monsoon i.e. June-July. Bananas are planted in the Malabar part of Kerala in South India in September-October and in some other areas in December. On the lower hills of Palni, in April, on the banks of river Kaveri, in February-March and in Tanjore district, banana is planted in the month of December-January. In Mysore, Andhra Pradesh and Orissa, bananas are planted at the end of June. Bananas are planted in June-July after the onset of monsoon in West Bengal, Bihar and Assam. In Bihar, banana should not be planted after the first week of August. Because the bananas planted in this way grow deep in winter, which turns out to be unusual due to excessive frost. Also, the period from transplanting to the harvesting of the crop planted in August gets longer as it takes more time for the fruits to be ready due to winter.

Table-2 Banana planting time in different regions of India

Region	Varieties	Planting time
Bihar	Cavendish, Alpan, Malbhog, Kothia	June-July, September-October
Tamil Nadu	Poovan, Rasthali, Karpuravalli	January – March, June – August, November – December
Kerala	Nedran, Poovan, Rasthali	August-October, December-January
Andhra Pradesh	Chakara Kelly, Poowan	August - November
Karnataka	Robusta, Dwarf Cavendish, Ne Poowan	April – June, November – February
Maharashtra	Dwarf Cavendish, Robusta	May-July, Sep-October
Gujarat	Dwarf Cavendish	May - July
North Eastern Region	Jahazi, Kachkel, Handa, Digjowa	March-April, September-October