

VANILLA

(*Vanilla planifolia* Andr.)

Vanilla belongs to the family Orchidaceae and is the only orchid of significant economic importance as an edible crop. It is the only spicy orchid of the tropics and valued for its cured fragrant beans, which makes one of the most expensive spices second only to saffron. Though over 50 species have been described, only three are important as source of vanillin. They are *Vanilla planifolia* Andrews, formerly known as *Vanilla fragrans* Saslisb Ames; *Vanilla pompona*



Schiede and *Vanilla tahitensis*, Moore. Of these, *Vanilla planifolia* is the most preferred commercially and therefore, widely cultivated.

The plant, native of Mexico and Central America has been introduced to all parts of the tropics and grown extensively in Madagascar, Reunion and Comoro Islands.

Under natural conditions, *Vanilla* climbs, covers its support, and flowers when it reaches the top of the canopy.

World production of vanilla beans is approximately 2000 tonnes per annum. Madagascar provides about 50% of the world supply and the rest is from Comoro (9%), Reunion and Indonesia (13%). Production in Indonesia varies between 300 to 500 tonnes.

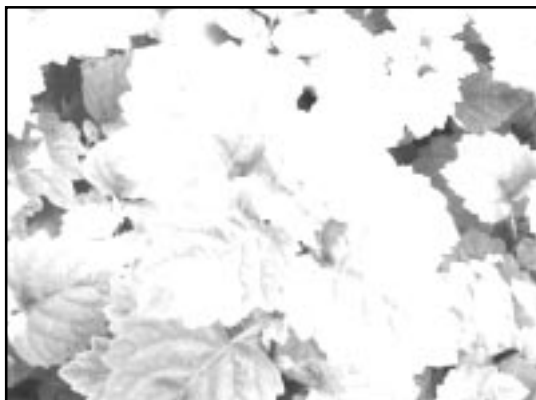
Climate and Soil

Vanilla needs warm and moist conditions with well-distributed rainfall of 1500-3000 mm with a temperature range of 25 to 32°C and comes up well from sea level to around 500 m above mean sea level. Although vanilla thrives best under moist conditions, excessive humidity and moisture will lead to diseases. Dry climate and direct sunlight may cause yellowing by sun scorching. This weakens the plant portions and favours rotting due to fungal attack. The ideal growing condition for vanilla is moderate rainfall evenly distributed throughout 10 months of the year, with dry periods during the flowering and harvesting period. Production of beans in a particular year is directly related to the conditions of vines growing during the previous year. Soils for vanilla should be loose and friable with high

organic matter content and of loamy texture. It prefers land with gentle slope and the soil must be well drained.

Cultivation

Vanilla grows best under filtered sunlight. It flourishes well in partial shade that cuts out about 50 % sunlight. Since it is a climbing vine, it requires support for growing. Dead wooden posts, few species of *Erithrina*, *Glyricidia* are suitable standards for trailing vines. *Jatropha curcas* plant can be used as standard. Galvanized wire on RCC posts can also be used as support.



Planting material

Vanilla is commercially propagated by shoot (stem) cuttings. If possible cuttings with 18 to 24 internodes should be used as they come to flower earlier than shorter cuttings and usually come to flower in the third year after planting. The length of cutting is to be adjusted depending upon availability of planting material and extent of area to be planted. However, cuttings with less than 5 to 6 internodes and 60 cm length should not be used for planting directly in the main field. Presently there is increased demand of planting material for commercial cultivation. Generally for making planting materials two methods are followed.



- (1) Place vanilla cuttings in a 3-5 gallon pot / Polybag. Fill the container one half to two third full with potting mix. To plant vanilla cuttings the lowest leaf is removed and inserted the cut end into potting medium. Place the rest of the cutting horizontally on the surface to encourage root growth. Long cuttings (2-3 ft) can be cut into smaller pieces; each with 3-5 leaves and then planted. Water the medium well to keep in a moist, shaded environment until the plants are established.
- (2) Another method is where vanilla cuttings are planted in about 6-inch pot filled upto 3 quarters with peat mix. Plant 3-4 cuttings with lowest leaves removed and water well. Keep the newly planted cuttings in a cool, moist, shady environment and



new shoots will develop in 4-6 weeks. After 3 months, the vines developing from the cuttings will be long enough to attach to a support. The entire pot of 3-4 rooted, established cuttings should be transplanted into a 3-5 gallons pot with the support inserted. The potting medium used in this larger pot can be of the same as earlier. Or it may contain a gravel bottom with the peat mix in the upper two thirds of the pot.

Method of planting

When there is plenty of material then long selected cuttings of about 1 m in length is taken from strong, healthy and actively growing vines and planted directly in the main field. After cutting into pieces of about 1 m in length the bottoms 3-4 leaves are removed at the node and kept in a shady place for one week to loose water content. Cuttings for planting should be collected in advance, and after removing 3-4 basal leaves, dipped them in 1% Bordeaux mixture and kept in shade to loose moisture for about a week. They are then planted at the rate of two per support.

Later they are planted close to the base of the support by laying the 3-4 basal nodes from where leaves have been removed on to the soil surface and gently press these nodes to the soil or put sufficient soil to cover the nodes. While planting, care should be taken to ensure that the basal cut end portion of the cutting is kept just above soil, as otherwise chances of decay are more. The top end of the cutting is to be tied to the base of the support tree gently so that it will eventually climb on them. Partially decomposed organic materials (plant origin) such as coconut husk, mulch, straw, leaves etc. should be placed over the newly planted cutting at the base of the support tree to a thickness of 10-15 cm or more. If shade is not sufficient from the support tree, temporary extra arrangement should be provided.

Time of planting in main field

The ideal time for planting vanilla is when the weather is neither too rainy nor too dry. Planting in April-June and Sept/October will give good result under our condition.

Cultural needs

Vanilla loves a lot of organic matter and decomposed mulch, as they are the main source of nutrients for the plants. A thick layer of organic debris also helps to retain enough moisture and give a loose soil structure for the roots to spread. Hence it is very important that easily decomposable organic matter is applied around the plant base at least 3-4 times in a year. Roots are very tender confining to surface layer of soil it should not be damaged by any cultural operations. Weekly irrigation of 2-3 litres of water per plant is enough.

The vines may be allowed to grow to a height of 1.2-1.5 m and allowed to hang down. Such branches should be brought back to the ground and a portion is placed under the mulch after it is brought up by providing support. Thus the vines are trailed up and down

for the first two years so that the plant produces enough vines to form bearing branches.

Manuring:

Spraying 1 % of 17:17:17 NPK complex to give a full coverage of the foliage and stem has been found to be beneficial to enhance the growth of vines. Fertilizers made or formulated for orchids or anthuriums are also useful.

Any new shoot of vanilla plant should be allowed to attach to the support tree with their own roots. The vines should grow upwards on the support tree. By nipping off the tip of vines, one can produce more number of shoots or branches in a particular plant.

Pod formation

Natural pollination in vanilla is difficult as stigma is prevented from coming into contact with another by a flap like projection known as “rostellum”. So artificial hand pollination is a must for production of beans.

Small greenish flowers will begin to develop the vining stems after about 3 years. These need to be hand pollinated for the pods (capsule or beans) to develop. To pollinate, pull the labellum (or lip) completely out, to expose the column. Remove the pollen with a toothpick or thumbnail. Lifting the rostellum or flap, with other thumbnail, expose the stigma. Smear the pollen on the stigma and close the rostellum. If the flower is still attached to the stem a few days later, there is a good chance that pods will develop. Pods take 8-9 months to mature and as they ripen, the pods turn brown, crack open and release their seeds.

Harvesting and curing

After pollination, a full-length bean is attained in 6 weeks time, which in turn takes 6-10 months to reach full maturity. Commercially, vanilla pods are harvested when the pod colour is yellowish-green. The harvested beans are cured by a heating process. Dried them in the sun on a felt blanket and stored them covered at night in a cooler. The fragrance of vanilla will fill the drying room during curing.

Method of curing involves the following four stages

1. Killing the vegetative life of the beans to allow the onset of enzymatic action (Vanillin is developed as a result of the enzyme action on the glucosides during the process of curing).
2. Raising, temperature to promote this action and to achieve rapid drying to prevent harmful fermentation.
3. Slower drying for the development of different fragrant substances.
4. Conditioning the product by storing for a few months. Curing of Bourbon vanilla (produced in Madagascar, Comoro and Reunion), which contributes more than 70 % of the world production, is very simple compared to the traditional method practiced in Mexico.



The beans are immersed in hot water of temperature 63^o to 65^o C for 3 minutes for the cessation of vegetative life. After a rapid drying, when the beans are still very hot, they are kept in chest lined with blankets. The beans are then spread out in the sun on dark coloured cotton covers for 3 to 4 hours and after rolled up to retain the heat. This is repeated for 6 to 8 days during which the beans loose some weight and become very supple. Later the beans are dried by spreading out in trays under shade in an airy location. The duration of drying varies according to the beans, which usually last for two months. Properly dried beans are kept in trunks where the fragrance is fully developed. Finally they are graded according to the size, bundled and placed in iron boxes lined with paraffin paper. The vanillin content of properly cured beans will not be less than 2.5 percent.

Yield

Under reasonable levels of management, vanilla yields about 300-625 kg-cured beans/ha/year.

Economics of cultivation

Economics of vanilla is difficult to work out here since there is no systematic cultivation has taken place yet. However, considering the cost of cultivation, processing and taking the prevailing prices of inputs and labour charges economics can be estimated enabling us to give a guidelines in its commercial cultivation.

Cultivation cost per hectare

Year	Cost in Rs	Processed bean, Kg	Gross return (Lakhs)	Net return (Lakhs)
Cost of cultivation for the 1 st year	125,000	-	-	-
Cost of cultivation for the 2 nd year	15,000	-	-	-
Cost of cultivation plus processing of beans for the 3 rd year	10,000	150 kg	4.50	3.00
Cost of cultivation plus processing for the 4 th year	11,250	375 kg	11.25	11.13
Cost of cultivation plus processing for the 5 th year to the 15 th year	1,23,750	625kg x 11 = 6,875 kg	206.25	205.01
Cost of cultivation plus processing for the 16 th year to the 18 th year	33,750	500kg x 3 = 1500 kg	45.00	44.66

Total 318,750 8,900 kg 267.00 263.80

(Assuming the selling price at Rs. 3000/kg of cured beans)

Threat to vanilla cultivation

A major threat to the vanilla development is from synthetic substitute, ethyl vanillin that has nearly the same aroma as that of the processed Vanilla beans. The synthetic essence is over 20 times cheaper than the essence from the natural source. However, natural vanilla essence is quality –wise much superior and preferred the world over by the consumer.