

In the earlier days, vanilla was used in medicines as a mild sedative. Now, it is no longer considered as a medicinal plant. Both natural and synthetic vanillin are extensively used in food industry as a flavouring agent for making cakes, chocolates, biscuits, ice creams etc. Perfume industries also make use of vanillin.



Vanilla cultivation

A profitable agri-based enterprise

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Vanilla (*Vanilla planifolia*) is a climbing terrestrial orchid suitable for the warm humid tropics. This exotic orchid, the beans of which on processing yields 'vanilla' of commerce rules the world of food flavours. It is the second most expensive flavouring spice after saffron.

Vanilla, a native of South Eastern Mexico and other parts of Central America, was domesticated about 1000 years ago. During the 18th century, vanilla vine cuttings were taken out of Mexico to Europe and other parts of the world. The major vanilla growing areas are Madagascar, Mexico, and Comoro islands, Reunion Island, Uganda, Jawa, Philippines, Papua New Guinea, Fiji, Jamaica, Costa Rica and Peninsular India. Vanilla is a natural alternative to synthetic vanillin. USA is the biggest consumer of vanilla followed by Germany, France, Canada, Australia and

Japan.

In the international market, the demand for natural vanillin is increasing @ 7 to 10 per annum as the world is shifting towards herbal products. Vanilla grown in Bourbon Island consisting of Madagascar, Comoro, Seychelles and Reunion known as Bourbon vanilla is in great demand all over the world. The political situation and the climatic conditions prevailing in Madagascar decide the price of vanilla in the international market. There was a sharp decline in the market price of vanilla and it went down to 20 USD due to liberalization of vanilla sales by the Government of Madagascar. Steep escalation in the price was observed since 2000 subsequent to occurrence of natural calamities in Madagascar. It is estimated that in the international market, the price of cured beans may range from 20 to 200 USD per kilo

gram.

The total area under vanilla in India is around 2545 ha and it is proposed to expand its cultivation to 5000 ha during the 10th plan period. Karnataka occupies the largest area of vanilla cultivation in India with 1465 ha followed by Kerala (812 ha) and Tamil Nadu (268 ha).

Ecophysiological requirements

Vanilla can be grown upto an altitude of 1500 m above mean sea level. It is



well adapted to the humid tropics. The optimum temperature for the successful growth of vanilla ranges from 25° to 32° C. A well distributed rainfall of 150 to 300 cm throughout the ten months of the year with dry periods during flowering and harvesting is most ideal. Well drained loose and friable soil rich in organic matter sustains a good crop of vanilla. The crop cannot withstand water logging. It can be successfully introduced into the existing cropping systems especially coconut based farming systems of the warm humid tropics since the crop prefers partial shade. In the open areas also, it can be raised with the support of standards which provides a little shade which is

sufficient. Low branching leguminous trees with rough bark and small leaves are ideal as standards for vanilla. Glyricidia is widely recommended as a standard for vanilla both under open and partial shade. Being leguminous in nature, it takes care of soil health as well.

Land preparation and planting

The land is cleared of weeds and undergrowth and the cuttings of support trees are planted at least three months before the planting of vanilla cuttings. The recommended spacing is 2.5 m x 2.0 m. Once the standard is established in the field, vanilla can be planted preferably with the onset of south west monsoon. Vanilla is propagated through vine cuttings and one metre long cuttings are preferred for planting. Longer cuttings come to flowering and fruiting from the third year of establishment onwards. Pits of size 30 x 30 x 30 cm are dug 30 cm away from the base of the standard at a row spacing of 2.5 m and plant to plant spacing of 2.0 m and filled with FYM, sand and top soil and mixed well. Vermicompost, enriched vermicompost, coir pith compost or enriched coir pith compost can be used for substituting FYM. Incorporation of enriched coir pith compost is beneficial for *in situ* rain water harvest and conservation. On an average, 2000

cuttings can be planted in one hectare. While planting one metre long cuttings, the basal three or four leaves are pruned and the pruned basal portion of the cutting is pressed into the soil in such a way that all the three or four nodes are in close contact with the soil. The top portion of the cutting is tied to the support tree with the help of banana fibre facilitating trailing of vines as in the case of black pepper. Rooted cuttings raised in poly bags or hardened tissue culture plantlets having at least 30 cm height can also be used for direct planting. The juvenile phase would be longer if shorter cuttings are planted. Planting material should always be taken from the juvenile unflowered portion of the vine as yielded and over matured portion of the vines are shy in rooting and slow in sprouting. Slight wilting of vine cuttings prior to planting ensures early root initiation and better establishment.

Rapid propagation method

Large scale production of quality planting materials of vanilla can be brought about by establishing a progeny garden. The selected area is cleared of weeds and dug well. Trenches of 60 cm width and 45 cm depth and convenient length are taken at a spacing of 60 cm apart. 50 per cent shade is ensured by erecting a *panthal* with 50 per cent shade net at a height of six to seven m. The trenches are filled with FYM, top soil and sand and mixed well. Vanilla cuttings of 30 cm length are planted in two rows at spacing of 45 cm in each trench and nylon net is erected in between two such rows for trailing juvenile vanilla vines. The advantage of using nylon net is that the aerial roots of vanilla never coil with the net and the vine can be removed from the net without any injury. Mulching the trenches with coconut husk and micro irrigation provide ideal micro climate for vegetative growth and one metre growth can be expected once in every three to four weeks. Cuttings with three nodes can be taken for planting in poly bags filled with potting mixture consisting of FYM, sand and

soil in 1 : 1 : 1 proportion. Poly bag saplings will be ready for sale or planting within two months.

Crop nutrition

Basically there are three approaches in crop nutrition. Organic farming, integrated nutrient management and chemical farming are practiced to supply nutrients for crop growth. In organic farming, organic manures, both bulky and concentrated besides bioinoculants are liberally used to sustain soil health. Where as in integrated nutrient management, all the three components, *viz*, organic manures, inorganic fertilizers and bioinoculants are integrated. Chemicals alone are used in chemical farming which results in pollution of the environment and several other ill effects. Organic farming approach is ideal for vanilla gardens. FYM, vermicompost, coir pith compost, neem cake, wood ash, bone meal, dry leaves etc. can be used for manuring. Bioinoculants such as, Fluorescent pseudomonads, Azospirillum and phosphorus solubilizing bacteria are also beneficial for promotion of plant growth. NPK requirement of vanilla varies and the general recommendation is 40 to 60 g N, 20 to 30 g P₂O₅, and 60 to 100 g K₂O per vine per year. Organic manure is incorporated with the onset of south west monsoon in June and fertilizers are applied in two to three splits.

Trailing and coiling

A special system of trailing is practised to facilitate induction of flowering and promotion of vegetative growth. When the vines attains a height of 150 cm, the after growth has to be trailed downwards very close to the ground leaving a gap of 30 cm and again coiled up like a loose loop. Support trees are suitably pruned at a convenient height for easy trailing of vines. Bamboo poles or split areca nut stump fixed at a convenient height on the support tree can also be used for trailing of vines. This is an essential farm operation for flowering. Besides, it helps for easy hand

pollination and facilitates the formation of aerial roots. Production of more number of yielding vines is also possible when this type of trailing is adopted. The top most leaf of the hanging vine which is positioned at the point of coiling, i.e., 150 cm height from the ground, is folded backwards and the axillary bud is exposed to sunlight. A new shoot starts developing from the axillary bud. After a few years, the support tree may not be able to bear the weight of vines and pods and it breaks off. So, it is necessary to remove the yielded senile portion of the vine periodically to maintain the support tree in good condition.

Interculture

Vanilla is a surface feeder and the surface soil should not be disturbed once the crop is established. However, weeds should be removed by slashing and the



weed biomass is spread around vanilla basins as a mulch.

Pruning or lopping of shade trees or standards is carried out to provide 50 % shade to vanilla vines. The prunings or loppings are also used for mulching the vines. A slight reduction in shade is necessary one or two months prior to flower bud initiation.

The practice of spreading organic waste materials such as dry leaves, bushy, chopped dry stems etc, around the base of plants is called mulching. Mulching

with dry leaves preferably loppings from the support trees is widely practiced in vanilla gardens mainly for enriching soil organic matter. Mulching with coconut husk is ideal for soil moisture conservation. Besides, it provides a favourable soil microclimate for root development. Coconut husk acts as an insulator for the surface feeding roots of vanilla from adverse weather conditions.

Plant water potential, *ie*, internal plant water status decides the pattern of growth in vanilla. A lower plant water potential results in induction of flowering and a higher potential encourages vegetative growth. Growth is arrested under certain moisture regimes. Being an orchid, it is able to absorb atmospheric moisture if the atmospheric moisture potential is higher

than that of vanilla. So, sprinkler irrigation is ideal for promotion of vine growth since it provides a favourable microclimate for absorption of moisture through leaves besides supplementing soil moisture. Modern micro irrigation systems can also be installed depending upon the availability of water and edaphic and topographic features. Drip irrigation can also be practiced. As far as possible, flooding should be avoided as vanilla can not withstand water logging.

Flowering and artificial pollination

Juvenile phase of vanilla lasts for about two to three years. Depending upon the length of the planting material, vanilla starts flowering from the second or third year of planting. Regulation of shade and slight wilting of vines encourage flowering. Partial lopping of support trees and avoiding irrigation and removal of the top 15 cm of vine one to two months prior to flower bud initiation are ideal. Lopping of shade trees should be done without causing any damage to the hanging and fruiting vines. The normal flowering season is from December to March and there is generally only one flowering season in an year. It takes 45 days from the initiation of inflorescence to opening of its first flower. The racemose inflorescence in the leaf axil consists of around 15 to 20 greenish yellow flowers. Self pollination never happens in vanilla because a structure called rostellum prevents stigma coming into direct contact with the pollen grains. Hence, artificial hand pollination is resorted to by pushing back the rostellum with the help of a tooth pick or a pointed bamboo splinter. The pollen sac is further pressed to spread pollen over the stigma. Artificial pollination starts from early morning and completed before noon as the flower closes in the afternoon. The retention of flower and enlargement ovary are indications of the success of artificial pollination. A skilled worker can pollinate 1000 flowers a day. Even though every plant produces 18 to 20 inflorescences, only 10 to 12 inflorescences are allowed to develop and in each inflorescence only 10 to 15 flowers alone are hand pollinated to ensure the formation of high quality beans. Generally only one flower opens a day and flowering continues for about three weeks. Pods take about eight to nine months to attain maturity. During flowering chemicals should not be sprayed as it may result in scorching of ovaries and subsequent scab formation in beans.



Plant protection

Vanilla is susceptible to many fungal and viral diseases. *Fusarium sp.*, *Sclerotium sp.*, *Phytophthora sp.* and *Collectotricum sp.* cause rots of various plant parts, viz, root, stem, leaf, bean and shoot apex which could be controlled by spraying Bordeaux mixture (one per cent), Bavistin (0.2 per cent) and Copper oxy chloride (0.2 per cent). The disease spread can be managed by soil application of Trichoderma @ 0.5 kg per plant in the rhizosphere and foliar application of Pseudomonads @ 0.2 per cent. Mosaic, leaf curl and Cymbidium mosaic potex virus are the common vanilla viral diseases. The diseases are transmitted through sap and hence affected plants are to be destroyed and the affected vines discarded for new planting. The insect pests of vanilla include beetles and weevils attacking flower, caterpillar, snakes and slugs damaging tender parts of shoot, flower buds and immature beans and grasshoppers and crabs cutting shoot tips. If organic agriculture is practiced, insecticides are avoided and mechanical measures alone are adopted for pest management.

Harvesting and processing

Vanilla pods are ready for harvest after eight to nine months of flowering. Generally harvesting begins in October and ends in December. As there is no uniformity in the development of pods

even in a single inflorescence due to variations in flower bud initiation, there is no synchronization in the maturity of pods and each pod is harvested separately by looking at its colour. Immature dark green pods are not harvested. Pale yellow discoloration which commences at the distal end of the beans is an indication of the maturity of pods. Mature pods alone are picked and its commercial value is fixed based on the length of the pod. If the pod length is more than 15 cm it is categorized under first quality. 10 to 15 cm long pods are put under second quality and pods having less than 10 cm length under third quality. Harvest should be done at the appropriate stage as overmature pods are likely to split causing a reduction in market value. Green vanilla pods are odourless and flavourless and contain little vanillin which may fetch Rs 800 /- to Rs 1000 /- per kg (60 to 80 pods).

Every hanging vine has the potential to produce an inflorescence in every leaf axil. Once the hanging vine has fully transformed into the fruiting vine and all the leaf nodes have produced a flower bunch each, which may take about two to three years, the vine can be cut and removed to reduce the biomass load on the support tree. The pod yield depends on the care and management given to the hanging and fruiting vines. Any practice directed to stimulate aerial root production has a direct bearing on vine productivity. A five year old vine can produce 1.5 to three kg pods which may increase steadily to six kg after a few years. The harvested green pods can be sold as such or processed for getting a better market price.


Four steps are involved in the curing process of harvested vanilla pods. The process consists of a) killing by dipping the pods in hot water (63 to 65°C) for three minutes to arrest the vegetative growth of pods and initiation of enzymatic reactions for the development of aroma, b) Sweating by wrapping in woolen clothes to raise the temperature of beans and alternate storing in air tight wooden boxes during night and exposing to sun during day for about eight to ten

days, c) Slow drying by spreading beans in a wooden rack at room temperature for three to four weeks which results in considerable reduction in bean weight. The weight is reduced to one third and the beans become flexible and can be twisted on a finger and d) conditioning of beans by storing in closed boxes for a few months. The processed beans are sorted, graded and bundled and wrapped in paraffin paper and preserved for the development of desired bean qualities, especially flavour and aroma. The cured vanilla beans contain 2.5 % vanillin and it fetches Rs 10,000 /- per kilo gram in the international market.

Uses and applications

In the earlier days, vanilla was used in medicines as a mild sedative. Now, it is no longer considered as a medicinal plant. Both natural and synthetic vanillin are extensively used in food industry as a flavouring agent for making cakes, chocolates, biscuits, ice creams etc. Perfume industries also make use of vanillin. The price of synthetic vanillin is far below when compared to natural vanillin. However, consumers prefer natural vanillin as the essence of natural flavour is no way comparable to that of its synthetic counterpart.

Occupational hazards

The temporary discomfort that develops when sensitive workers are working in vanilla gardens and curing yards is called vandalism. It is characterized by headache, lassitude and allergic skin reactions. Blistering of skin takes place when it comes into contact with vanilla sap. If vanilla sap enters the eyes, it results in conjunctivitis. Even the behaviour of the workers change ie, they become irate, impatient, annoyed and quarrelsome if they happen to work in vanilla garden for a very long period. This change in behaviour and attitude is temporary and normalcy restored once the workers move out of vanilla gardens. It is reported that the sap of vanilla contains a caustic gel with calcium oxalate base which is responsible for hypersensitive reactions in sensitive workers. 

PERSONALITY

Sarah Joseph A writer of women, for women



Dr. Mariamma Panjikaran

Sarah Joseph emanates more light and heat as she climbs up the literary horizon, and as a result her fiction draws serious critical appraisal. Both the Kerala Sahitya Academy Award and the Kendra Sahitya Academy Award for *Aalabayude Penmakkal* (Daughters of God the Father) have alerted serious rethinking on woman's writing and subaltern literature in the literary circles of Kerala.

Sarah Joseph was born at Kuriachira in Thrissur in 1946. Her father Louis was inclined to Marxian ideology and was keen on reading periodicals and books related to it. Her mother Kochumariam was a typical conservative Christian housewife who took special care to marry her daughter off before the age of fifteen. As Sarah could continue her studies, the only difference that she felt after her marriage to Joseph was that she could wear a 'davani' (half-saree). She went for the teacher's training course and got a job as a school teacher. Later she did her M.A and joined the collegiate service. That phase of her teaching career at Pattambi Sanskrit College was the smithy of her formation as a feminist. She has retired from government service and lives at 'Geethanjali', Mulamkunnathukavu in Thrissur.