

# Scope of Vanilla Cultivation in the Santhal Pargana, Jharkhand

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**Abstract-** Vanilla can be grown in the forest areas of Jharkhand where trees are sparsely present. It can also be grown under artificial shade provided with firm shade nets. Agro-climatic condition of Jharkhand is almost similar to the agro-climatic condition required for vanilla cultivation. Vanilla does not require much water. It requires well drained soil having pH ranging between 6.0- 6.5, which should be rich in humus and organic matter. Fortunately, Santhal Pargana Jharkhand has suitable soil for cultivation of vanilla. Reported ideal time for its cultivation is May-June. The vine normally starts yielding from the third year after planting and the yield stabilize by the fifth year. It yields optimum for next 8-10 years. Initially pilot level intervention and adaptation can be helpful to understand the ecology, economics and management of this crop. Once it gets established, both large and small scale adoption of this crop for the cultivation can be convinced and achieved amongst the farmers. Thus, it can be concluded that vanilla cultivation can provide a diversified cultivation practices amongst the farmer and once get established properly can improve the socioeconomic condition of the people of Santhal Pargana, Jharkhand.

**Keywords:** Santhal Pargana, Jharkhand, Vanilla, Cultivation, Forest, Horticulture

## INTRODUCTION

Situated in the part of the India, the State of Jharkhand is regarded as the “land of forest”. Blessed with reserve of rich mineral resources like coal, mica and iron ore makes it one of the richest states of India in terms of the natural resource and its diverse cultural heritage. The Sub-division of Santhal Pargana was formed in year 1855 (Jha, 2010). Geomorphologically, it is rugged and dissected upland plateau region presents wavy terrain with average relief of about 400-650m (infnlibnet.ac.in). The major region of santhal pargana, is bestowed with natural resources like forest, mineral deposits, rivers, wetlands

and vast agricultural areas. It comprises of six districts namely Godda, Deoghar, Dumka, Jamtara, Sahibganj and Pakur. In the 2011 census, the total population of Santhal Pargana was reported 69,69,097 of which Hindus were 67.95 %, Muslims 22.73 %, and Christians 4.21 %. Of the total population in 2011, the tribal population was 28.11 %. 70% of its population still depends on the agriculture and its allied activity. The cultivation of Paddy during the kharif season is widely practiced in the state despite of its not very promising performance and output generation. Horticulture crops like fruits and vegetables are also grown by the farmers. The crop production systems with high water requirements are sensitive to vagaries of monsoon, droughts and cyclones; suffer from unscientific irrigation/ fertilization practices as well as pest attacks. (Mohabey et. al., 2015). The region is predominantly dependent on agriculture, and there are limited opportunities for non-agricultural employment. This makes it difficult for the population to sustain themselves, leading to migration to other parts of the country (Khatun and Singh, 2024). Sustainable and diversified agricultural activity is one of the available options to address the common emerging livelihood issues and migration problems. This can not only crate a steady income generation but can also ensure the food security of the people in these regions, specially the tribal communities.

## METHODOLOGY

Source of Data:

1. Primary Data: Field Survey
  - a. Observation,
  - b. Interview (face to face) with the small scale and large-scale farmers.
2. Secondary Data: Review of Literature
  - a. Books
  - b. Journals

c. Internets

d. Other

## RESULT AND DISCUSSION

Vanilla plant (*Vanilla planifolia*) of family Orchidaceae is a climbing orchid with sessile leaves and succulent green stems which produces arial roots (Velamen roots) at the nodes. Vanillin is a phenolic aldehyde, which is assumed to be the natural flavoring compound obtained from the vanilla pods. Vanillin (4-hydroxy-3-methoxybenzaldehyde) has got a wide range of application in the food, beverages and pharmaceutical as well as perfumery and cosmetic industries. Vanillin is approved by the FDA as a vegan and vegetarian product which do not need approval from food and drug administration authority (Ahmed et. al., 2022). It comes under the category of (GRAS- generally recognized as safe). In world it is grown in Madagascar, Indonesia, Mexico, Comoro and Reunion, among which Indonesia is the largest producer in the world. It was introduced in India in year 1835 and is native to Mexico. In India, Vanilla is cultivated in Karnataka, Kerala, Tamil Nadu, Lakshadweep, Andaman and Nicobar Islands. Karnataka occupies the largest area (1465 ha) under vanilla cultivation in India, followed by Kerala (812 ha) and Tamil Nadu (268 ha) (Thakur and Singh, 2014). The crop has economic significance in the Indian economy and has significant demand in the international market. The income from the crop usually increases by 10 per cent every year (Krishnamurthy and Melanta, 2002). Cultivation of Vanilla beans can be one of the best, promising viable option in the Santhal Pargana due to its conducive agro-climatic conditions and available workforce in the region. If the crop is scientifically managed it has great potential for the high return and widespread adaptation potentials.

Vanilla is adapted to wide range of soil rich in humus and good drainage. A water-logged condition with the clayey soil is not suitable for its cultivation. Being a tropical plant, it requires a warm (temperature between 21-32°C) humid condition with a partial shade during the growth and flowering period. They usually propagate by a means of stem cuttings of about 60-120 cm. They are planted immediately after the stem are cut or are transplanted after the development of roots

in the nursery. Rainy season preferably between August to September is the ideal time for the transplantation. Usually meshes of supporting structure are prepared for the proper growth and proliferation of the vanilla vines. Flowers remain closed at night so hand pollination during the day time is recommended when the flowers remain open. Ripening of the pod occurs after 9-10 months and are harvested when they still remain green in color. Proper care and curing are required to develop the desirable flavor of the beans.

The vanilla cultivation practices can be started in the virgin land or an open land with a provision of shading and support mechanism. The unwanted herbs and shrubs should be also cleared from the land before the transplantation practice. It is often recommended that the land preparation should incorporate the fresh leaves and forest soil additions for better humus generation. A gentle slope which is characteristic feature of Santhal region is highly advised for the better proliferation of the plant. Washing of the grafting stem with 1% Bordeaux mixture or 0.2% of copper oxychloride help in the killing of the fungal and bacterial pathogens. Excess of moisture is avoided for better growth of the roots and later on flowering.

This crop can be grown as monocrop or intercropped with the coconut trees and arecanut are also preferred and promoted. Usually, Coconut and Arecanut provides ideal support for its growth. Poles/trellies are also made to support the vines to grow rapidly while flowering do not occur till the stem grows upward. Proper pruning of the shade trees should be made for the sunlight to reach the plants.

In India it is regarded as high valued spice, one acre of land can accommodate about more than 100 of plant and each can yield about 500 gms of beans a year. Application of vermicompost along with the oilcakes, poultry manure, wood ash and soil often give a good yield with a very low application of fertilizers soil. Application of organic manure just before the plantation is proved to be beneficial. Vanilla is mainly propagated through shoot cuttings. The vine starts flowering from third year onwards and economic yield starts from fourth year onwards. Flowering starts from December to April and peak flowering is found in April. The matured beans/pods are harvested during

October – November. Highly humid atmosphere is required throughout the year and particularly during the south west monsoon months of May to September (Suryanarayana, 2004).

The crop is susceptible to various kinds of viral and fungal diseases. Some of the guided recommendation for the control and management of the diseases are as follows in Table 1.

Apart from the fungal and viral diseases, infestation from the insect like beetles and caterpillars has been also reported. Leaves feeding caterpillars and beetles feeding on the leaves and young growing stems are very common infestation reported. Emerging

incidences of sucking bugs *Halyomorpha* sp. affecting the tips and inflorescence resulting in drying and rotting of the crop is also one of the challenges, the farmers are facing during the cultivation practices. A snail during the rainy seasons impacts the harvest of the crop also.

The beans get developed very quickly just after the pollination and fertilization. The beans attained a mature size within 9-11 months. Approximately 75-90 mature beans collective weigh 1kg. Harvesting is done at the distal end when it turns yellow in color. To develop the aroma, curing is necessary. The different stages of curing includes 4 steps as mentioned in Fig. 1

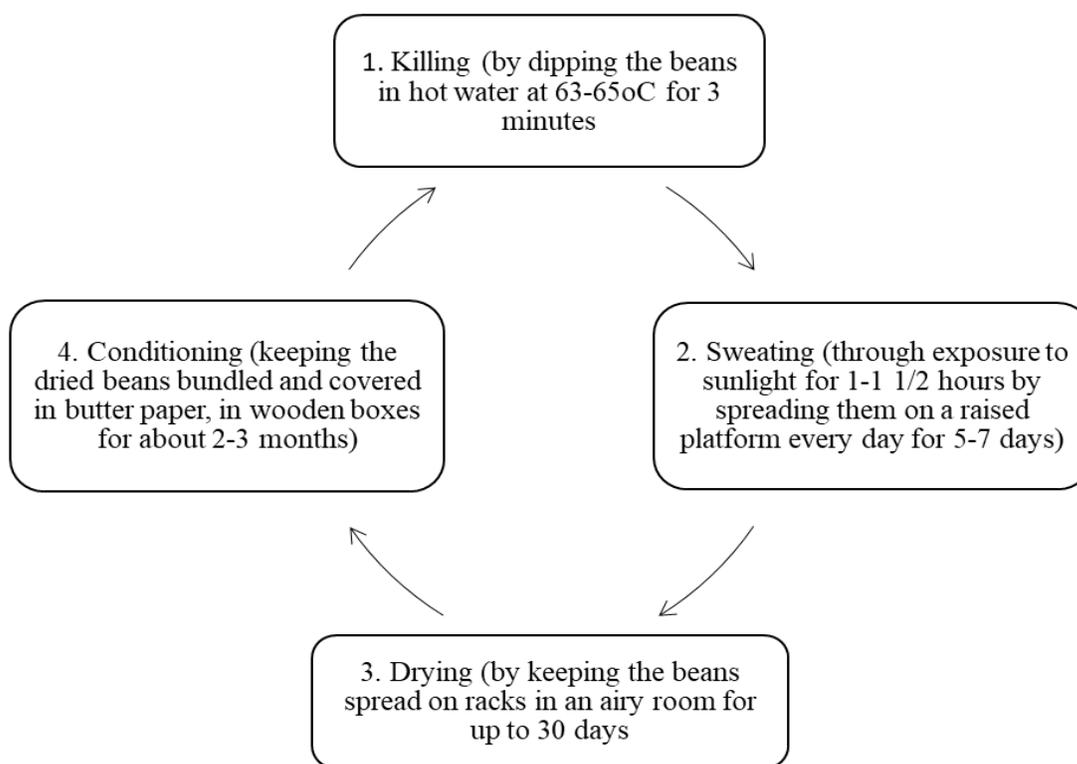


Fig.1. Different stages of curing of Vanilla beans (Source: <https://www.moice.gov.bt/wp-content/uploads/2020/07/Natural-Vannilla.pdf>)

The green /cured beans are thus ready to get marketed. The district agricultural office now act proactive and partially responsible to establish the marketing linkages amongst the farmers and should be responsible for procurement of the harvest without any further loss and complexities.

Name of the diseases caused by the Fungus/ Viruses	Causal agent	Symptoms	Precautions
Bean rot	<i>Phytophthora</i>	A rot appears initially at the tips of beans and pedicel.	Remove of the infected plant preferably careful mulching during rainy season.

		Appearance of water-soaked lesion, dark green in appearance.	Exposure of 30-50% of sunlight
		Beans can be seen with massive outgrowth of fungal mycelium.	Spraying of bordeaux mixture (1.0%) and drench soil with 0.25% copper oxychloride 2-3 times depending on the severity of infection.
		Rotting of stem, leaves, aerial roots and the entire vine.	
	<i>Sclerotium</i>	Rotting of bean tips.	Spaying of carbendazim-mancozeb mixture @ 0.25% twice at an interval of 15 day.
		Appearance of white thick mats of fungal mycelium forming a mantle around the affected bunch of beans and leaves.	Provision to provide 50% shade in whole plantation.
Premature yellowing and bean shedding		The disease initiates as dropping off of the dried corolla from the tip of immature beans which otherwise remains attached to the beans till half way through maturity.	
		Drying of corolla, and gradually its dropping, accumulation of exudates at the tips, the beans turn yellow followed by brown discoloration from the tip upwards.	Provide mist irrigation for at least 4-6 h during pollination till the onset of pre-monsoon showers in order to maintain a relative humidity of more than 70%.
		High temperature (more than 32°C) and very low relative humidity (less than 70%) during the months of February- May predisposes the plants to many kinds of infection/diseases.	Restrict the pollination to the flowers/inflorescence.
		Overcrowding of the beans also play a key role in immature bean shedding.	Spraying of dimethoate or quinalphos 0.05% during flowering period thrice at 15–20-day interval and fungicides such as thiophanate methyl 0.2% or carbendazim – mancozeb (0.25%) at 15–20-day interval thrice from February up to May.
Stem Rot	<i>Fusarium oxysporum f.sp.vanillae</i> .	Usually appears during the post monsoon period of November-February.	Remove and destroy infected plant parts (Phyto-sanitation).
		The disease appears as yellowing and shriveling of the inter-nodal area extending to both sides of the stem.	Foliar spray with carbendazim 0.2%, soil drenching with carbendazim (0.2%), copper oxychloride (0.25%) or a mixture of carbendazim-mancozeb (0.25%).
		The basal or middle portions of the vines decay and shrivel badly.	Biocontrol agents such as <i>Trichoderma harzianum</i> and <i>Pseudomonas fluorescens</i> having a cfu of 10 <sup>8</sup> g @ 50 g/vine is found to be useful.
		The remaining distal portions of the vines show wilting symptoms.	
		Stem rot and drying are generally observed at the basal portions above the ground level.	
Root rot/wilt	<i>Fusarium batatis Wollen var. vanillae</i> .	Browning and death of underground and aerial roots.	
		Aerial roots die before entering the soil resulting in flaccidity and shriveling of the stem and finally the vine droops.	
Tip rot and die back	<i>Phytophthora meadii</i> or <i>F. oxysporum</i> .	Brown discoloration of the growing tip of the vine.	Nipping off of the infected tip below the next node is found to be useful.
		Collar region of the funnel like tip which extends to the inter-nodal regions results in rotting of the tip.	Spray bordeaux mixture (1%) or mancozeb or carbendazim at 0.25% as prophylactic measure.
		Thick white mycelia of the fungus cover the water-soaked black lesion (in case infection caused by Phytophthora)	

		The lesion becomes grayish in colour with large number of pin-head like encrustations of mycelia aggregate on the lesion (in case of infection by Fusarium)	
Mosaic disease	Mild mottle, Mild Mosaic and Mild Chlorotic Streak	When the leaf is held against light it can be seen.	Use of virus-free planting material is the primary requirement to check spread of the virus. If tissue culture raised plants are used, it is important to check for the presence of virus in the mother plant. If the mother plant is infected with the virus, the plantlets derived from this will also carry the virus thus contributing to its spread.
		These mosaics are also associated with leaf distortion with wavy margin.	Regular inspection and removal of infected plants and replanting with healthy plants is the likely option.
		Leaves also get reduced and in advanced stages, leaves become brittle and show severe crinkling.	Weed and crop hosts (especially pea, pumpkin and watermelon and other hosts) which might act, as reservoir for the virus also needs to be removed. The removed plants may be burnt or buried deep in the soil.
	Stem Necrosis	Appearance of brown necrotic patches on the stem region with shriveled appearance.	Insects such as aphids act as vectors for the different viruses. Proper identification of insects and use of insecticide spray can be recommended. Insecticides like dimethoate or monocrotophos at 0.0 5% can control aphids, and other sucking insects.
		Stem shows distinct necrotic lesions of varying length (few mm to several cm).	Movement of planting materials from infected regions to disease free regions should be avoided.
		Total blight and softening of affected region. Stem necrosis (caused by viruses) affected region appears to be very dry and hard and gives cracking sound when at- tempted to break open. Fungal diseases are commonly seen during the wet monsoon period whereas stem necrosis is seen all through the year.	Spreading of the virus is common in case of use of infected stem cuttings. Thus, such stem should be avoided.
		The stem rot affected region show a white cottony growth on the upper surface of the affected region while no such growth is seen with stem necrosis affected region of the stem rot.	Insects also play an important role in the transmission and spread of the disease. Thus, use of Insect trap can be used.
		The portion above the lesion often get wilted with yellowing of leaves whereas in stem necrosis no wilting is yet reported.	
		Necrosis is also observed on the leaves at the lower surface in the form of scab.	
		The appearance of sun scorch like figure is very often. The disease initially starts as a necrotic spot on the stem and slowly gets enlarged and encircles the stem.	

Table 1. Control and management of the diseases (Source: <https://agriculture.vikaspedia.in/viewcontent/agriculture/crop-production/package-of-practices/spices/vanilla?lgn=en>)

### CONCLUSION

Vanilla can be grown in the densely and sparsely forest areas of Jharkhand where trees are abundantly present. It can also be grown under manmade or designed

artificial shade provided by shade nets. Shade net houses can be constructed with local engineering technology of can be adapted for the established farming methods used in the vanilla cultivation in peninsular areas. The pillar can be of stone,

galvanized iron wire LDPE (Low density polypropylene ethylene) which can easily support and helps the trails to grow.

Agro-climatic condition of Jharkhand is almost similar to the agro-climatic condition required for vanilla cultivation. Vanilla does not require much water. It requires well drained soil having pH 6.0- 6.5, rich in humus and organic matter. Fortunately, Santhal Pargana Jharkhand has suitable soil and climatic conditions for cultivation of vanilla. Ideal time for its cultivation is May-June. The vine normally starts yielding from the third year after planting and the yield stabilize by the fifth year. It yields optimum for next 8-10 years (Thakur and Singh, 2014). Initially pilot level intervention and adaptation can be helpful to understand the ecology, economics and management of this crop. Once it gets established, both large- and small-scale adoption of this crop for the cultivation can be convinced and achieved amongst the farmers. Thus, it can be concluded that vanilla cultivation can provide a diversified cultivation practices amongst the farmer and once get established properly can improve the socioeconomic condition of the people of Santhal Pargana, Jharkhand.

However capacity building and awareness generation regarding the main problem faced by the farmers should be addressed initially. Scientific monitoring on the occurrence of pest and disease, non-availability of skilled labor and high initial cost in pure crop plantation should be consider in priority and guided by the department of agriculture in regular basis. Skill development and hands on demonstration for pollination in vanilla cultivation should be addressed before any field level trial and interventions. Linkages with the bank for initial loan availability in pure crop plantation should be established among the farmers. Awareness on all the available subsidy for both small and large landholding farmers should be prioritizes. Before any cultivation operation, virus free planting materials, organic manure should be made available in time. Proper training on the cultivation, processing, packaging and marketing of the vanilla should be ensured to mitigate the loss from the cultivation as well as the harvest.

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