

Betelvine Cultivation in India

by

M. R. IRUTHAYA RAJ, ✓
(Assistant Lecturer in Agronomy)

Introduction : Betelvine or *Pan* (*Piper betle*) is a perennial aromatic creeper which is cultivated in certain localities throughout India. According to Burkill (1935) this crop is apparently a native of Central and Eastern Malaysia which became a cultivated plant, spread through tropical Asia and Malaysia and to West Indies. He also claims that the plant seems to be known to North India before 600 A. D. George Watt (1892) indicates that it is highly probable that Java is the native home of betelvine. So it is seen that East Indies is the native home of this crop. Mukherji (1915), Balakrishnan (1930), Kantiraj (1941), Chowdhury (1944), Asthana and Mahmud (1945), Chowdhari (1945), Mahmud (1950 a to f), Malelu *et al* (1951), Mahmud (1952), Nagabhushanam (1956), Iyyer (1958), Nikam *et al* (1958) and Randhawa (1958) have detailed the cultivation aspects of betelvine in their respective states. This paper deals with the different states in India.

Rainfall and Soils : Betelvine is cultivated up to 3000 feet elevation in India with a wide range of rainfall from 10 inches to 80 inches or more. The soils best suited for this crop are clayey loam rich in organic matter, friable with good drainage. Red loams both light and heavy with adequate manuring and application of tank silt and other bulky organic manures are also needed.

Varieties : The following are the important varieties grown in Madras State :—

1. *Karpurakodi* : This smells like camphor and is light green to greenish yellow in colour, and linear in shape.

2. *Kallasakodi* : The leaves are broad and taper at the tip suddenly. The leaves are usually dark green, coarse in texture and very pungent but leaves from a older crop get lighter in colour, finer to the feel and less pungent to the taste.

3. *Vattakodi* : The leaf is big in size, more circular in shape than other varieties and keeps much longer than others.

4. *Chittukodi* : This is the most aristocratic of all. It is small in size, velvety to touch and very agreeable to the taste neither insipid nor very pungent.

5. *Ravesi*: The leaves are medium sized, light green and not too pungent.

6. *Kammar*: The leaves are deeper green and broader than *Ravesi* and *Karpurakodi*.

The varieties grown in Mysore are as follows:—

1. *Kumbala balli*: The leaves are very large (like pumpkin leaves), dark green in colour, somewhat pungent and generally yields a smaller number of leaves than the other varieties.

2. *Kari balli* (black vines): The leaves are medium-sized and dark green in colour and generally coarse in texture.

3. *Naga balli*: This is bland in taste and has small leaves shaped like the hood of a snake and light in colour.

4. *Ambadi*: The leaves are long and narrow, light green in colour and have a pronounced aroma somewhat resembling camphor (like the *Karpurakodi* of Madras).

5. *Kanigalu* (Oleander leaves): These are very small, narrow and light green in colour and very bland in taste.

In Bombay two varieties are grown viz:—

1. *Kali*: The leaves are dark in colour, thick and pungent to taste.

2. *Dethi*: The leaves are pale green, smaller, elongated and less pungent to taste. This is similar to *Karpurakodi* of Madras.

Assam grows three main varieties viz *Parwa*, *Purathi*, and *Sanchi* or *Chandana*; the description of these are as follows:—

1. *Sanchi*: This has a fine sweet flavour. The leaves are considerably longer than their breadth and dark green in colour. The stem and the petiole are blackish green.

2. *Purathi*: The stem is slightly reddish and the petiole is light green in colour. Leaves are large cordate and light green in colour.

3. *Parwa*: The stem and the petiole are light green in colour. The leaves are large, cordate and light green like *Purathi*.

Madhya Pradesh grows these varieties viz *Sohagpuri Bangla*, *Desi Bangla*, *Kapuri*, *Ganger*, *Kakher*, *Bariga* and *Phaphade*.

The three main varieties that are grown in Bengal are *Deshi*, *Sanchi* and *Mitha* but there are some special sub-varieties such as *Nunlia-Bantul*, *Ujani* (*Backergunge*), *Maghai*, *Karpurkath* which are specially appreciated by the connoisseur.

Rotation : This crop is rotated with many crops in different ways in different places. In Coimbatore, Madras State, the crop is usually preceded and followed by Paddy. Sugarcane for one year followed by Paddy for one year with betelvine for three years is common in Madras. In Guntur, Andhra Pradesh, betelvine is followed by Turmeric, Sugarcane or vegetables.

Betelvine is also rotated with crops like Sugarcane, Turmeric, Onion, Garlic or Chillie in most parts of Madhya Pradesh except in the Northern districts where the land is neither allowed to rest after the period of five years nor rotated with other crops as done in other parts of that state.

In Bombay betelvine is preceded and followed by Banana, *Phaseolus mungo* or *Phaseolus radiatus* or vegetables.

Preparatory Cultivation : No ploughings are given in Madras State, but trenches are dug 2' broad and 1½' deep along the length of the field during June — July. *Agathi* (*Sesbania grandiflora*) is sown on the ridges of these trenches.

During June — July in Guntur, Andhra Pradesh, the land is ploughed 3 or 4 times, levelled and furrows are made three feet apart.

The previous crop *Phaseolus mungo* or *Phaseolus radiatus* or vegetables are cleared and furrows are made in October in Bombay. The furrows are 10' long, 7" to 8" wide and 5" to 6" deep.

During April — May 40 to 60 cart loads of farm yard manure are applied to the land in Madhya Pradesh ploughed and covered except in Gwalior where this operation is carried out during December — January. The land is then laid into series of ridges and furrows.

In Assam during April — May the land is ploughed a number of times and heavily manured with well rotten cowdung and laid into ridges and furrows.

Bengal adopts a method by which a trench is dug up around the area where the cultivation is taken up. The soil is dug up to a depth of 18 inches and then ridges and furrows are formed.

Manures and Manuring: Cattle manure and horse dung are usually applied in parts of Madras State. Sometimes tannery refuse is also applied. Three months after planting the cuttings, farm yard manure is applied at the rate of 25 to 30 cart loads per acre once in 3 or 4 months.

No manure is applied before planting in Coimbatore, Madras State. A fortnight after planting the vine cuttings, a dressing of 15 cart loads of cattle manure is given in 3 or 4 doses. The second dose is just before the first picking and the third in December before pruning and the fourth in the 3rd years. There is also a special practice in this area of applying *Calotropis* leaves at the rate of 4 to 6 cart loads per acre each time. *Kolingi* or *Wild Indigo* leaves are preferred because they are supposed to give colour to the leaves.

In Guntur district of Andhra Pradesh well decomposed farm yard manure is applied. Heavy manuring is believed to give good colour and fine texture to the leaves. Groundnut cake or castor cake is applied in the absence of farm yard manure. Usually 50 to 60 cart loads of farm yard manure and 8 to 10 bags of groundnut or castor cake are applied in 2 or 3 doses once in 4 to 6 months.

Castor cake is preferred as manure in Bombay since it is believed to be a preventive against white ant attack. Nearly 15 to 16 applications are given during the life period of the crop, the rate of each application being 1500 to 1600 pounds per acre. A special practice adopted in Bassein is to apply raw fish which is available in plenty as manure. In cold season dry fish is also applied alone or mixed with castor cake.

Amaravathi and Western districts of Madhya Pradesh have a practice of applying 40 cart loads of farm yard manure before the commencement of preparatory cultivation. Then before the planting, the ridges and furrows are dressed with farm yard manure at 20 cart loads per acre. In June every year after earthing up, 20 cart loads of farm yard manure are applied. If available, sheep and goat manure is also used. In addition to this the crop is applied with Linseed or 'til' (*Sesamum orientale*) oil-cakes once every month from February to September at the rate of 7 maunds per acre per application. i. e. 8 to 56 maunds per acre per annum. In northern districts of Madhya Pradesh Linseed flour or Linseed or 'til' oil-cakes or castor cakes or Neem (*Azadirachta indica*) cakes are used as manures.

Mahmud (1950. b.) has described that there are two forms of application of this manure to the crop in the northern districts of Madhya Pradesh.

In Chuikkadan and southern districts of Madhya Pradesh no dressing is given, but the crop is top-dressed with oil-cakes like 'til', Linseed, Sarso and Neem cake.

Mahmud (1950. f.) reports that the application of Linseed cake at the rate of 40 maunds per acre per annum gave the maximum growth and yield.

After planting and cutting, the crop is irrigated with a liquid manure made up of cowdung in Assam which is said to accelerate rooting. Mustard cake is considered to be the most suitable manure in this area. The manuring is done only in May — June to October.

In Bengal dried, pulverized pond-mud, dried, powdered cowdung and powdered oil cakes are used as manure each time when earthing-up is done. Castor cake is not used since it is said to be injurious to the crop and mustard cake alone is used. As a special practice, brick dust is also used as manure sometimes.

Sowing the Standard: Generally in Madras, Andhra Pradesh and Mysore *Agathi* (*Sesbania grandiflora*) seeds are sown on the ridges at 4 to 6 seeds in each hole at a spacing of 6". *Cassia occidentalis* is mixed with agathi in the ratio of 4:1 and sown on the ridges in Chingleput district of Madras State. Sometimes along with agathi gogu (*Hibiscus cannabinus*) and moringa (*Moringa oleifera*) are also sown in Coimbatore district of Madras State, the former for fibre and and the latter for standard.

In Guntur district of Andhra Pradesh *Sesbania grandiflora* and *Leucina glauca* are mixed and sown on the ridges. In some parts of Andhra Pradesh and Mysore there is a practice of growing *Erythrina indica*, *Moringa oleifera*, *Eriodendron pentrandum* as standards.

In Nellimerala of Vizayanagaram, Bombay, Madhya Pradesh, and Assam thin bamboos are used as standard while in Bengal daincha or jute stalk are preferred.

In some parts of Mysore and in the south there is a practice of using arecanut as standard where arecanuts are grown. Pits are dug near the bases and they are allowed to weather for a month and cuttings are planted.

Inter cropping: Banana suckers are planted at the end of the ridges in Madras, Mysore, Andhra Pradesh, Amaravathi and Western districts of Madhya Pradesh for mainly obtaining fibre to tie the vine with the standard. In Madras, Banana suckers are planted for subsidiary income and for leaves and fibre for packing.

Piper longum is often intercropped with betelvine in northern districts of Madhya Pradesh. *Basella rubra*, *Cephalandra indica*, *Tricosanthis sp*, *Zingiber officinale*, *Musa paradisiaca*, *Colocasia antiquorum*, *Capsicum frutescens*, *Pogostemon patchauli* are also often raised as catch crops in this area.

Gourds and pumpkins are grown in Bengal round the garden to give additional shelter.

Shade and Fencing: Fencing is intended to protect the crop against the beating force of the wind and against dust and dirt. Roofing is done (1) to give shade to the vines, (2) stabilise the temperature and (3) protect the crop from strong wind and scorching sun that causes sun burn of the leaves.

In Madras and Mysore the rows of agathi are tied as 'Boroj' and these provide the required shade. As a fence wild cane (*Saccharum*) and *Euphorbia tirucalli* are used according to the availability.

The crop is shaded in the other states by fixing bamboo stalks and covering the top at a height of 7' from the ground level with cholam (*Sorghum vulgare*) straw or gogu stalks or coconut and banana leaves or jute and daincha stalks according to the availability of the material in that area.

This kind of roofed betelvine gardens go by the name of 'Boroj' or 'Chick house' in the north.

As a peculiar practice in Gwalior where the seasons are severe a stone wall is erected all round the plantations as a wind break.

Planting: Usually cuttings with 3 to 4 nodes are planted as planting material. The cuttings are usually got from one year old vines. The planting season differs from place to place. September - October planting is done in Chingleput district whereas November - December planting is done in Coimbatore district in Madras State. Cuttings are planted in pairs in a slanting manner. The July - August

planting is carried out in Andhra Pradesh. In certain parts of Mysore Bengal and Madhya Pradesh there is a practice to plant rooted cuttings and then transplant them in their permanent place.

Cuttings are planted from mid September to mid October in Amaravati and Western districts of Madhya Pradesh. A slit is made on one side of the ridge with a sickle and neem (*Azadirachta indica*) is placed over the cutting to protect it against direct sun light. After a month the twigs are removed.

In northern districts of Madhya Pradesh the cuttings are planted during February - March. Mahmud (1950. a.) has described that there are three methods of planting the cuttings in the northern districts of Madhya Pradesh.

Planting is done usually in June, July, September and October in Assam and the planting material consists of vine cuttings with at least six nodes.

During July and October the plantings are taken up in Bengal. The cuttings are covered with date palm leaves and watered twice daily till they strike root.

Irrigation: Irrigations are frequently given in required amounts by means of splash method in Madras, Mysore, Andhra Pradesh, Bombay and Madhya Pradesh. Pot watering is carried out in Hoshngbad and Gwalior. In Assam and Bengal the rides and furrows are irrigated frequently.

After cultivation: In Madras after 3 or 4 months of the planting of the cuttings '*Arching*' is carried out. No arching is done in other states, since the crop is grown in '*Chick houses*'.

When the vines have grown to 6' to 7' in height, it becomes difficult to pluck the leaves and so lowering of the vines is carried out. This is done once in the first year, once or twice in the second and third year.

The vine gardens are weeded and kept clean systematically. The earthing up is done after the application of manures. The '*Chick houses*' are repaired every year.

Harvest: The picking of the leaves differs from state to state and place to place. In Chingleput district (Madras State) the first picking starts after six months of planting the cuttings; whereas in Coimbatore district (Madras State) the first picking starts when the crop is 8 to 9 months old.

In Bombay and Assam the first picking commences after 8 months of planting; whereas in the western and northern districts of Madhya Pradesh the first picking commences after 11th and 5th month of planting respectively.

Harvest is taken up in two seasons in Bengal. When planting is done in July the plucking commences in October and when planting is done in October plucking commences in May.

Usually the interval given between two pluckings in the first and second year is about a fortnight and then it is reduced to ten days in the 3rd year.

Yield: The yield of the crop varies from state to state. The yield in the south is much more when compared to yield in other states. The following table gives the yield of leaves per acre per annum in different states.

1. Madras	:	90,00,000 to 1,00,00,000
2. Andhra Pradesh	:	30,00,000
3. Mysore	:	5,00,000 to 12,00,000
4. Madhya Pradesh	:	52,00,000 to 96,00,000
5. Assam	:	60,00,000
6. Bengal	:	80,00,000

Pests and Diseases: The crop suffers heavy loss throughout India due to the following diseases:

1. Foot rot and Leaf rot caused by *Phytophthora* sp
2. Wilt caused by *Sclerotium rolfsii*.
3. Leaf spot caused by *Gloesporium* sp.

As a control measure the vine gardens have to be changed once in every 3 or 5 years. The planting materials have to be free from any disease. The cuttings have to be dipped in a solution of 2 : 2 : 50 bordeaux mixture before planting.

Where agathi is used as standard the crop is sometimes attacked by two insects (a) Agathi borer (*Azygophleps scalaris*) and (b) Agathi weevil (*Alcidodes bubo*).

Marketing: In Madras the plucked leaves are washed, cleaned, counted and arranged in baskets before they are sent out for sale. The unit of sale in Chingleput is one 'Kavuli' of 100 leaves whereas in Coimbatore one 'Kavuli' is 200 leaves. The unit of packing in Coimbatore is one 'Palagai' of 2000 leaves.

For the purpose of marketing, the leaves are graded in Andhra Pradesh into three types viz. (1) 'Kalli' (first sort), (2) 'Papadam' (second sort) and 'Kalagotha' (medium sort). They are packed in baskets containing 3000 leaves.

In Bombay the leaves are graded into two grades viz. 'Bibla' (large sized) and 'Modwan' (small sized). They are packed in baskets containing 4000 and 6000 leaves respectively.

The leaves are graded in Madhya Pradesh in two grades viz. 'Bade pan' (big leaves) and 'Khitti' or 'Natwan' (small leaves). These are arranged in bundles of 50 or 100 in baskets.

In Bombay and other parts of North India the betel leaves are sold after bleaching (cream coloured). This is known as 'Pucca pan'. Bleaching increases the essential oil content and possesses a higher diastatic activity and increases the market value twice or thrice depending upon the market and as such is highly profitable. Nagabhushanam (1956) has indicated that this kind of bleaching is also done in parts of Vizayanagaram by a few well trained people. Chowdhari (1945) has also described that there was a practice some years ago by the growers of Chuikkadan of bleaching the leaves before selling. The method was to dip the leaves in milk and arrange them in baskets. They are washed before being packed for the market. But this is not in vogue at present.

Dastane *et al.* (1958) have detailed the method of bleaching the leaves.

Conclusions and Suggestions: The cultivation of betelvine is under a very intensive system and great care has to be taken in its culture. It is observed that in general operations such as planting in South West monsoon season, application of farm yard manure as basal dressing, shading and fencing, selection of cuttings etc are some of the common practices adopted. But some differences are however noted with regard to other operations. For example the type of material used as standard is invariably decided on the climatic conditions as well as the easy availability of the raw materials in that area. Similarly the type of manure applied also follows the availability of that particular manure in abundance. Further the soil texture, water availability, source of irrigation and climatic conditions also significantly influence the type of cultivation peculiar to each place. In Bombay and other North Indian cities

the 'Pucca pan' fetches a higher price which may be also adopted by the cultivators of Madras and other States. The bleaching of the leaves before marketing has to be done by co-operative societies managed by the ryots themselves and the profit will depend upon the share of supply of leaves. The Government must grant concessional fares for the transport of the leaves by rail and top most priority for movement from one place to another.

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CURE FOR BLOOD PRESSURE

Every body over fifty is nowadays afflicted with any one of the three diseases. (1) Blood pressure (2) Heart disease (3) Diabetes.

By taking two ounces of boiled drumstick leaf at the time of midday meals daily for 25 days blood pressure is cured completely. Salt is added to the boiled leaves, not coccanut or dhal.

Those suffering from B. P. can take to this and be cured of it. More leaves will do harm for the aged people. So two ounces will do. Readers will propagato this simple cure to others suffering from blood pressuro.

— Abstract from *Light of India.*