



MANAGEMENT OF MANURES AND FERTILIZERS FOR BETELVINE CULTIVATION

Bharat V. Patil, Ph. D.

*Matoshri Bayabai Shripatrao Kadam, Kanya Mahavidyalaya, Kadegaon, Dist-Sangli,
Maharashtra (India)*

Abstract

In the present study attempt was made to understand the application of manures and fertilizers for betelvine cultivation in the selected area of Sangli district. The role of manures and fertilizers in betelvine cultivation plays a vital role. Production of quality chewable pan depends on the appropriate application of manures and fertilizers. The Sangli district has varieties of soils on account of its geographical situation. The Shirala tahsil which has literate soil mixed with hard murum. The parts of Miraj, Walva and Palus tahsils are endowed with deep black, soil and form a fertile agricultural productivity track due to the boon of river Krishna. Atpadi and Kadegaon tahsils covered with poor soil which has no suitability of growing betelvine as assured crop. Sangli district was well-known in growing betelvine due to the hereditary skill and knack. Cultivators employed experienced labour force to exercise culture for the better yield. Different parts of Sangli district grew betelvine. However, cultivators in Sangli district were too much enthusiastic in obtaining, maintaining and retaining originality of growing betelvine leaves. Maintenance of soil quality, humidity in the betelvine garden, proper irrigation and application of manures and fertilizers affect on the yield of betel leaves. Quality leaves fetch attractive earnings to the cultivators. While using manures and fertilizers to the betelvine proper care is taken. Application of excess fertilizers badly affect on the growth of betelvine. Manures and fertilizers required to apply at the appropriate time.

Key Words: *Manures and Fertilizers, Chewable pan, suitability of growing betelvine and fertility of soil*



Scholarly Research Journal's is licensed Based on a work at www.srjis.com

Introduction

The growth of any plant depends on many factors. Betelvine is more sensitive crop. Cultivators take more precaution while cultivation of betelvine. Sangli district was considered as one of the fortunate in which all commercial crops such as sugarcane, grapes, turmeric, cotton, betelvine, pomegranate, bananas and papaya were cultivated. Sangli district is endowed with few rivers like Krishna, Warana, Verala, Agharani etc. which enrich the fertility of the soil. Due to the fertility of soil, farmers were able to grow cash crops.

Exceptionally excellent drained, fertile soil, rich in humus were the best elements of soil with sufficient moisture holding capacity, sufficient drainage arrangements and laying on elevated sloppy lands formed an ideal soil for betelvine plantation. Miraj and Walva possessed, betelvine leaf was grown on medium light to sandy loam soils. The proper soil for betelvine cultivation was clay loam, rich in humus, rich in organic matter and good drainage. Red loams both light and heavy with good depth were also scientifically justified. Slope land was treated as an ideal site. Totally, favorable soil guards and guides the proper growth of the betelvine. Cultivators of Sangli district constructed an excellent drainage which was considered as an important factor and water-logging killed vines as their roots were very sensitive to water stagnation.

Review of Literature:

Economics of Pesticides Treatment

R. V. Nakat (1995) reported that the highest net return of Rs. 11,112 was obtained from treatment with dicofol 0.25 percent Application of Phosphamidon gave return of Rs. 7197 and wettable sulphur was Rs. 6668. The highest cost benefit ratio (1:12:36) was recorded by application of phosphamidon.

Shivkumar and Marimuthu (1987) also reported that maximum yield of betel leaves was obtained in the beds sprayed with dicofol.

R. V. Nakat (1995) also reported application of dicofol gave the maximum yield of 40.10 lakhs leaves of betelvine (320.80 Dag) followed by 37.58 lakhs leaves of betelvine (300.64 Dag) in phosphamidon and 37.31 lakhs leaves of betelvine (298.48 Dag) in wettable sulphur. Highest marketable betelvine leaves were obtained from the treatment of dicofol.

Fertilizations

P. V. Nakat (1995) reported in his unpublished Ph.D. theses Ecobiology and Management of Red Vegetable Mite, *Tertanychus neocaledancius Andre* on Betelvine submitted to Mahatma Phule Agricultural University, Rahuri. He stated that increase in doses of nitrogen to the betelvine plant significantly increased the mite of infestation. It was also observed that the population of red vegetable mite in different treatments showed increasing trend of population in every week of observation till seventh week but after three weeks it declined at faster rate till the end of the experiment.

In a survey carried out by Balsubramanyam (1984-89) in Uttar Pradesh and some parts of Madhya Pradesh. It was observed that one in every three respondents followed the practice of using fertilizers for the betelvine for the better quality leaves.

A. Narain (1983) observed in Orissa that oil-cakes of mustard, Til-neem and Karanji (*Pongamia Pinnata*) were used and fertilizers like urea and ammonium sulphate were rarely used. The oil-cake was decomposed with fresh cow-dung slurry for two weeks and then applied to betelvine. Near about 2-15 tonnes of oil-cake per hectare/year were used.

Madhane and Narkhade (1983) reported that heavy manure was used at frequent intervals in Bassein area of Maharashtra where castor-cake was the main source of organic manure. In Western Maharashtra farm-yard-manure 12-15 tones at lowering of betelvines and 30-35 tonnes per hectare during July-August was generally applied.

Shanmugam (1983) observed in Tamil Nadu that manures were not applied before planting. After two months of planting 50 tonnes per hectared of farm-yard-manures was applied. 300 Kg per hectare a groundnut cake each time for six times at an interval of 1.5-2 months was also applied. Farmers applied fertilizers like 17:17:17 or diammonium phosphate 16:20:0 (NPK) at 250 Kg per hectare along with 300 Kg groundnut cake at an interval of 4, 6 and 9 months after planting. Green manure at 5-10 tonnes per hectare was also applied by farmers.

In Andhra Pradesh, Papa Rao (1983) reported that in addition to farm yard manure 50 tonnes per hectare, groundnut cake was applied after planting and subsequently fertilizers, such as urea, CAN at 200 Kg. Per hectare were applied once in two months interval and at lowering farmyard manure was repeated.

Amzad Hussain (1986) suggested that there was no standard recommended schedule for fertilizers application in Bangla Desh. Application of oil cake as a manure alone varied from 1.25 to 9 tonnes per hectare in Bangla Desh.

Effects of Fertilizers (Nitrogen) on Betelvine

Das J. N. and others (1989) reported the effect of nitrogen on yield and incidence of diseases on betelvine in Orissa Application of urea alone or with mustard oil cake for betelvine increased bacterial leaf spot anthracnose and vine rot. The addition of mustard and neem cakes resulted in significant reduction in the diseases.

Das J. N., and others (1990) reported the effect of potash on leaf yield and disease incidence on betelvine leaves in Orissa. Application of P₂O₅ at 125 Kg. per hectare annually gave the maximum height of betelvine and maximum leaf yield with the lowest incidence bacterial leaf spot anthracnose and vine rot.

Results of Fertilizer Experimentations

Sarkar and others (1984) in West Bengal observed that 8.4 tonnes per hectare of mustered cake alone or mustered cake in combination with calcium ammonium nitrate (1:1) 210 Kg nitrogen per hectare gave the maximum response in terms of yield of Bangla leaves.

Pradhan and Das (1984) concluded that the disease incidence was more at 105 Kg nitrogen per hectare per month during rainy season (total 420 Kg nitrogen per hectare). They also observed that vines fertilized with urea suffered loss due to disease then those vines treated with calcium ammonium nitrates.

Mishra and others (1984) also recommended calcium nitrate application at 420 Kg. Nitrogen per hectare for better growth and yield of betelvine leaves.

Gosh and others reported their experience that steramel or calcium ammonium nitrate to mustered cake at 420 Kg nitrogen per hectare was useful for better yield of betelvine leaves.

Debnath and others observed that C. V. Bangla variety application resulted better by applying 240 Kg Nitrogen through mustered cake 240 Kg P₂O₅ as super phosphate and 240 Kg P₂O₅ as murinate of potash per hectare which gave much quality of betel leaves. Under this treatment betel vines were comparatively free from diseases and the benefit cost ratio was 5:1.

Narayan Reddy (1984) suggested that 682.5 Kg nitrogen as groundnut cake and 56.9 Kg P₂O₅ as super phosphate and 56.9 Kg. P₂O₅ a muriate of potash with basal dressing of 50 tonnes of compost per hectare for better yield of betel leaves in Andhra Pradesh.

Pawar (1987) in Maharashtra observed that application of 200 Kg nitrogen 50 Kg P₂O₅ as super phosphate and 50 Kg. P₂O₅ as muriate of potassium per hectare gave maximum yield of kapoori leaves.

Samiappan and others (1984) observed in Tamil Nadu that maturing formed the major item in the working expenses.

Balsubramanyam and others (1991) carried out a trial that critical factor of the nutrient elements for maximum response of yield was observed by applying 188 Kg. nitrogen 155 Kg. potash, 105 Kg k, 17 Kg. mg and 20 Kg Zn per hectare. These, subsequent, trials, showed that neem cake at 150 Kg nitrogen per hectare in appropriate split doses were sufficient to get optimal yield of betel leaves.

Vines Response to Nitrogen

In Maharashtra, maximum yield of marketable leaves was obtained when the vine was treated with 200 Kg nitrogen per hectare through neem cake, Annual Report 1991 if All India

Co-ordinated Research Project on Betelvine. In general, the maximum response was obtained within nitrogen applied at 150-200 Kg per hectare.

Vines Response to Phosphorus

Nayak and others (1984) reported that betelvine response to phosphorous was positive and those high does of 250 Kg. P₂O₅ per hectare increased the yield of leaves and reduce the mortality of vines caused by foot rot. In Maharashtra 100 Kg. P₂O₅ per hectare significantly increased the yield of betel leaves. (Anon, 1991)

Vines Responses to Potassium

Co-ordinated trial of vines response to potassium on the yield and quality of betel leaves was carried out in Agricultural Universities of different states (Annon, 1990). In these trials a fixed dose of 150 Kg nitrogen and 100 Kg potassium through oil cake and super phosphate respectively were given. The results in Andhra Pradesh, West Bengal, Maharashtra etc. showed that 100 kg per hectare increased the yield and quality of betel leaves. Loss due to disease was less under the treatment.

Mishra and others (1991) observed in Uttar Pradesh that application of potassium at 100 kg per hectare was sufficient to get the maximum yield of acceptable quality.

Mishra and others (1991) observed that application of potassium at 100 kg per hectare was felt to be increased with oil contents and it was felt essential to improve quality of leaves. Under these treatments betel leaves remained fresh when stored upto 30 days. The spoilage at the end of one month was 25 percent.

Pawar (1987) in Maharashtra suggested that application of potassium at 125 kg. P₂O₅ per hectare improved the quality by application of fertilizers and diseases were wiped out.

Diseases by Application of Fertilizers

Nayak (1987) Suggested that application of potash increased the yield, reduced the root rot incidence and improved the quality of betelvine leaves. Application of neem and linseed cake reduced the incidence of disease in Maharashtra.

Tryagavajan and others (1972) in Tamil Nadu observed that higher doses of nitrogen increased diseases whereas application of super-phosphate prevented the diseases.

Sen Gupta and Das Gupta (1988) observed the positive correlation between disease incidence and level of potassium applied. The diseases were more on vine when chemical fertilizers calcium ammonium nitrates at higher levels were used.

Pesticide Residues

Sivakumar and others (1987) reported that the residue of dicofol, wetttable sulphur and eithin were estimated in / on betelvine. The residues on the first day after spray were 9.46,

5.85 and 5.39 ppm respectively. On the tenth day after spray, of dicofol, wettable sulphur and eithin residues were 0.92, 3.02 and 0.36 ppm respectively.

Result and Discussion:

Application of Manures and Fertilizers

Betelvine crop required adequate supply of plant nutrients and soil management practices. Betelvines plant required nutrients not only in optimum quantity but also at the appropriate time for its healthy growth and even to produce quality leaves. Respondents supplied farm yard manures, fertilizers, various types of oil-cakes and sheep penning for improving soil fertility. Farm-yard manures were applied twice in a year and the first dose was applied before the start of monsoon and second dose was applied after monsoon. Application of manures and fertilizers was frequent and regular. Table 5.19 revealed the supply of manures and fertilizers.

Table 1 Classification of Respondents According to Application of Manures and Fertilizers

Sr. No.	Types of Manures & Fertilizers	No. of Respondents	% to Total
1	Farm-Yard Manures	26	43.33
2	Oil Cakes	NA	NA
3	Fertilizers	NA	NA
4	1 + 2	08	13.33
5	1 + 3	05	8.34
6	1 + 2 + 3	21	35.00
Total		60	100

Source: Primary data

Table 1 indicated the application of manures, oil-cakes and fertilizers by the respondents for the betelvine cultivation. Out of total respondents, 26 respondents i. e. 43.33 per cent were regular in using farm-yard manures. These respondents did not use fertilizers to avoid diseases. None of the respondents used only either oil-cakes or fertilizers. 8 respondents, 13.33 per cent, applied mixed farm yard manures and oil-cakes. 5 respondents, 8.34 per cent used both farm-yard manures and fertilizers which included urea, potash and DAP. 21 respondents, 35 per cent applied farm yard manures including sheep - penning, oil-cakes and fertilizers to supply appropriate quantity of nutrients to increase the fertility of the soil.

Availability of Manures

Availability of suitable manures was felt as pre-condition to improving the fertility of the soil. Betelvine plants required better nutrients for improving the quality of betel leaves.

Table 2 Classification of Respondents According to Availability of Adequate Manures

Sr. No.	Size of Group	No. of Respondents	% to size of Group
1	Small	14	70.00
2	Medium	12	60.00
3	Large	11	33.33

Source: Primary data

Table 2 presented the classification of respondents according to size of cultivators. In case of small-size group, 14 respondents, 70 per cent were able to get sufficient manures and 6 respondents, 30 per cent of small-size group faced the problem of the availability of manures.

12 respondents of medium-size-group 60 per cent, got farm yard manures in sufficient quantity, Remaining 40 per cent medium-size group cultivators faced the problem.

11 respondents of large-size group, 33.33 per cent obtained manures sufficiently while 66.67 per cent faced problems.

Sources of Manures

Betelvine cultivators obtained manures from their own farms and from outside resources.

Table 3 Classification of Respondents According to Sources of Manures

Sr. No.	Sources of Manures Manufactured	No. of Respondents	% to Total
1	Own farm Yard Manures	08	13.33
2	Outside sources of Farm Yard manures	NA	NA
3	1 +2	52	86.67
Total		60	100

Source: Primary data

Table 3 revealed the sources of manures to respondents 8 respondents, 13.33 per cent got from their own farms. 52 respondents 86.67 per cent, obtained from their farms and outside sources.

Sources of Fertilizers

There was an increasing trend in using fertilizers for betelvine cultivation. Fertilizers helped to improve fertility of the soil. Cultivators used various types of fertilizers such as nitrogenous fertilizers, phosphate fertilizers including inorganic manures. Apply of these chemical fertilizers supplemented to the organic manures such as cattle manures or green manure. Betelvine cultivators obtained fertilizers from the following sources.

Table 4 Classification of Respondents According to Sources of Fertilizers

Sr. No.	Sources of Fertilizers	No. of Respondents	% to Total
1	Co-operative Societies	12	20.00
2	Agro Service Centers	19	31.67
3	1 + 2	29	48.33
Total		60	100

Source: Primary data

Table 4 indicated the availability of fertilizers to respondents. 12 respondents, 20 per cent of the total respondents, obtained fertilizers from co-operatives societies, 19 respondents, 31.16 per cent purchased from agro-services centers. 29 respondents, 48.34 per cent purchased from co-operative societies and from agro-service centers. Manures and fertilizers were not available at reasonable rates many times cultivators applied excess fertilizers which resulted into leaf-sport.

Bibliography

- Nakat R. V., Acharya A., Sudha D. V., and others "Evaluation of The Efficacy of Paecilomyces Lilancinus in the control of Root-Knot Nematode (Maloidogvne Incognite) on Betelvine"
- Nakat R. V., Khaire V. M. and Dethe M. D., "Management of Red Vegetable Mite (Tetranychus neocaledonicus) Andre Infesting Betelvine Crop in India." MPKV, Rahuri
- Yadav B. P., Ojha K. L. and Prasad Y., "Betelvine Cultivation in Bihar", National Symposium on Betelvine Production Technology, 1993: 10-12
- Natrajan S. V. and Nagalakshmi S. "Betelvine cultivation in Tamil Nadu", National Symposium on Betelvine Production Technology, 1993 : 26-27
- Nakat R. V., "Influence of Nitrogen Fertilization to Betelvine on Population Development of Tetranychus Neocaledonicus Andre." Mahatma Phule Krishi Vidyapeeth, Rahuri
- Chaurasi R. K. "Betelvine cultivation in Madhya Pradesh", National Symposium on Betelvine Production Technology, 1993: 15-18
- National symposium on Betelvine Production Technology, 1993: 7-9
- Nakat Ramesh Vishwanath, Ecobilogy and Management of Red Vegetable Mite, Tefranychus Neocaledonicus Andre' on Betelvine, unpublished Ph.D. thesis submitted to Mahatma Phule Krushi Vidyapeeth, Rahuri, 1997
- Madane N. P. – Nakat R. V., Research Papers "Betelvine Cultivation in Maharashtra", National Symposium on Betelvine Production Technology, 1993: 3-6
- Dasgupta B., Sengupta K. and Jha S., "Betelvine cultivation in West Bangal", National Symposium on Betelvine Production Technology, 1993: 28-31
- Kashy Abraham, George Thomas, "Betelvine Cultivation in Kerala", National Symposium on Betelvine Production Technology, 1993: 36-38