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EVALUATION OF EFFECT OF DISEASES ON BETELVINE YIELD

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Abstract

At present, there is no central institute exclusive engaged in betelvine research. In 1981, the All India co-ordinated Research Project on Betelvine was carried out in nine centers located in eight agricultural universities and National Botanical Research Institute, Lucknow. The head quarter of the Project is located at the Indian Institute of Horticultural Research, Bangalore. In the village area of Kasbe Digraj, nearby eight kilometers from Sangli city, the agricultural research centre, the All India Co-cordinated Research Project on Betel vine was running. But the All India Co-cordinated Research Project on Betel vine at Kasbe Digraj is also closed during last three years. Betelvine grew under good supply of soil moisture humidity. It grew vigorously in areas where a required rainfall was assured. Betelvine was grown in open but conservative wind supply. The betelvine was grown strongly and healthy in the natural environment. Betelvine cultivation needed shade and support by planting quick and rapid growing trees such as shevari Sesbania aegyptiaces poir, Pangara Enythrina India lam mulberry morus alba linn. and Drumstick Moringa oleifera lam. In the paper attempt was made to study the disease management practices of betel vine in the selected research area and analyses the loss of yield of betelvine due to different diseases.

Key Words: *Betelvine diseases and disease management*

2. Review of Literature

2.1 Foot and leaf rot (Phytophthora)

Singh and Chand (1973) estimated loss due to foot and leaf rot disease ranged from 44 to 86 per cent in Madhya Pradesh.

Mc Rae (1934) stated that in some cases entire plantations were destroyed in West Bengal due to foot and leaf rot (Physophthora).

Maithi and others (1978) reported that for the control of leaf rot cumin L; doxon and dithane m-45 was effective.

Nema (1990) observed that application of nitrogen was found to increase disease susceptibility white phosphorous and potash reduced it.

Annon. – All India Co-ordinated Research Project on Betelvine (1988-1991) were noted that nitrogen application through oil-cakes reduced the disease intensity in comparison to nitrogen through inorganic sources.

Thyagarajan et al. (1972) observed that from yard manure in combination with super phosphate considerably reduced the diseases incidence.

2.2 Leaf Spot – Anthrachose

Anthrachose was noted as another major disease on betel leaves which was characterised by presence of spot on leave brownish – black center and yellowish halo. The infected regions gradually became thin and dry.

Maiti and Sen (1982) reported that due to leaf spot crop loss ranged between 10 to 35 percent in West Bengal. Damage to the leaves was more serious than on the stem and branches.

Singh and Joshi (1971) reported that upto 60 percent in Madhya Pradesh and 20 to 80 percent in Uttar Pradesh the disease was visible. For the control of leaf spot – Anthrachose spraying of Bordeaux mixture (0.5 %) was quite effective in trails of All India Co-ordinated Research Project on Betelvine (1988-91).

Maiti and others (1978) suggested that the benzimidazole fungicides, Bavistin (0.10%) and benlate (0.1%) were highly effective in controlling leaf spot which was wide spread in West Bengal.

Das and others (1989) reported that application of neem cake of mustered cake disease. They also further recommended application of K_2O at 125 kg per hectare annually for the disease management.

2.3 Steam Rot

Uppal (1928, 1930) reported that stem rot of betelvine considered to be serious in Bombay presidency (Maharashtra). Choudhary (1945) reported that it was also serious in Asam. 4 to 30 percent loss was due to stem rot.

Palakshappa (1988) reported that 30 to 42 percent in Madhya Pradesh, upto 30 percent in Karnataka.

The symptom of stem rot was darkening of the stem of the foot of the plant near to the ground level. The leaves immediately turned to yellow and become hanging and dropped of the whole vine lost freshness and at last dried up.

Choudhary (1946) suggested that the infected vine was removed from betelvine garden and deep ploughing was recommended for the successful management application of manures and fertilizers and soil amendments were required.

Meiti et al., (1985) reported that the control of stem rot application of benodanil and chloroneb was found effective. Mahapatra and Das (1990) suggested that application of toclofosmethy (0.2%) as sol drench was found effective. They also reported that soil application of T. harzianum could control the basal rot.

2.4 Root-Knot

Due to root-knot growth of plant was gradually affected and yellowing the leaves. Root-Knot disease was observed in all betelvine growing states. Root knot disease found most destructive in the light soil.

Yield loss due to root-Knot was estimated to be 19 percent in Sangli (Maharashtra), 28.33 % in Jorhut (Assam), 16.80 % in Chinthalapudi (Andhra Pradesh), 20.80 % in Jabalpur (Madhya Pradesh) 37.5 % in Bhuvaneshwar (Orissa) and 50.9 % in Pusa (Bihar) were reported in annual report of All India Co-ordinated Research Project on Betelvine (1991-1992). Acharya et al., (1988) observed that application of neem cake of one tonne per hectare reduced root-knot.

Sitaramaiah et. al., (1993) reported that the application of neem at 0.5 tonne per hectare plus carbofurum at 0.75 kg per hectare + NPK (150:100:50) was most effective in increasing the leaf yield and reducing the root-knot disease.

2.5 Biological Control of Foot Rot-Phytophthora

In the annual report of All India Co-ordinated Research Project on Betelvine (2000-01) reported the result of experiment carried out at Mahatma Phule Agriculture University at Sangli center concerned control of foot rot disease. The results of the experiment suggest that the treatment of four application of Trichoderma inoculated in 500 kg oil-cake per hectare at quarterly application showed lowest foot rot intensity (12.196%) and gave highest yield of betel leaves (51.82 lakhs per hectare) with maximum return.

2.6 Integrated Disease Management for Betelvine

Annual report of All India Co-ordinated Research Project on Betelvine (2000-01) showed data relating to integrated disease management of Mahatma Phule Agricultural University at Sangli center that application on Sanitation + B. M. 1 % at Pre-mansoon + Biologic agent one month after B. M. application + B. M. two months after first B. M. application has give lowest vine rot (7.15 %) and reduce leaf disease and give maximum yield which was 60.78 lakhs per hectare then other treatment.

2.7 Growth of Mite

R. V. Nakat (1995) reported that the mulberry (Morus Alba Linn) plants acted as alternative host of red vegetable mite. T. neocaledonicus. Other live supported plants grown in betelvine garden did not support the multiplication of this mite. The survey carried out in betelvine growing areas in West Maharashtra reveled that none of the betelvine garden was free from the attack of red vegetable mite. The peak occurrence of mite was observed during pre-mansoon period in May, while the occurrence of mite was negligible during post mansoon period October.

2.8 Loss Due to Mite

R. V. Nakat (1995) explained in his unpublished Ph.D. thesis Ecobiology and management of Red vegetable mite, Tetranychus neocaldoncus Andre on Betelvine submitted to Mahatma Phule Krishi Vidyapeeth, Rahuri that the avoidable mite T. neocuedonicus in betelvine was estimated to 9.7 and 19.65 percent respectively.

2.9 Root and Foot Disease

Naik M. K., and others (1990) studied the influence of infection by colletotrichun gloeospovioides on betelvine was higher in August (disease index 49%) followed by September (43%) and July (32%) and lowest in April (2%). During the rainy season between June and September disease index was high. The low disease index during early summer was associated with low relative humidity and high temperature.

Siddappa M. K.; Anilkumar T. B. (1989) studied the root and foot rot of betelvine and its control. The root and foot of betelvine was caused by Fusarium solani was servere problem in Karnataka. Several fungicides like carbendazim emisin and thiram were tried to control the pathogen in various type of soils. The activity of fungicides was relatively less in latertic soil as compared to red loam soil and black cotton soil.

Nayak M. L.; Wasnikar A. K. (1989) reported that susceptibility decreased gradually with the increase in betelvine leaf age. In old betel leaves, the population of bacteria remained relatively low after inoculation as compared to young leaves.

Hiremath P. C. and others (1987) carried out, survey showed that none was free from disease caused by colletotrichum gloeosporidoides incidence was 11 percent to 19 percent.

R. V. Nakat (1995) reported that the application of predatory mite, Amblyscius Largoensis and thrip, Scolothrip Spp. In betelvine garden gave better results in the management of red vegetable mite T. Neocaledonicus being potent natural biocontrol agents.

2.10 Bacterial Leaf Spot

Anon, All India Co-ordinated Research Project on Betelvine (2000-01) reported that maximum and minimum temperature, relative humidity, bright sunshine hours and rainfall had positive correlation where as number of rainy days and number of cloudy days had negative correlation effect on disease in cadence at Assam Agricultural University.

In the annual report of All India Co-ordinated Research Project on Betelvine (2000-01) explained that near about 18 percent yield loss was due to tobacco caterpillar at Acharya N. G. Ranga Agricultural University, 12 percent loss was due to mite at Mahatma Phule Agricultural University and 51 percent yield loss was due to scale insect at Tamil Nadu Agricultural University were observed.

2.11 Precaution in Case of Mite Infection

R. V. Nakat (1995) reported that it was necessary to plucking of infested leaves along with mite at weekly interval which reduced 39.90 percent mite infection.

Gupta (1991) suggested the cultural practices such as removing of inter cropping of non-host crops, collection and destruction of damaged leaves and plant parts and adoption of clean cultivation.

R. V. Nakat (1995) suggested that need based spraying dicofol 0.05 percent, wettable sulphar 0.5 percent, phosphamidon 0.05 percent, malathion 0.05 percent and tobacco decoction 2 percent were significantly superior to control mite infection on betelvine.

3. Methodology

3.1 Objectives of the study

- To study the disease management of betel vine practices in the selected research area.
- To suggest measures to overcome the problems of disease management of betelvine.

3.2 Hypotheses

- Diseases badly affects on the productivity of betel leaves.
- The yield of betel leaves depends on disease management.

3.3 Research Design

3.3.1 Selection of Area

The area under betel vine cultivation was increasing day by day in Sangli district. Miraj and Walva which were noted tahsils showed increasing trend for more cultivation of betel vine and therefore the researcher selected these two tahsils for the intensive study.

3.3.2 Selection of Villages

Five villages from each of tahsil were selected purposely based on maximum area under the betel vine cultivation. Thus ten villages were selected with specific purpose. The sampling techniques were adopted for the investigation of two stage sampling. At the first stage, village as the primary unit and the second was in regard to betel vine cultivators.

3.3.3 Selection of Samples

Six betel vine cultivators were selected from each of the selected villages out of which two from small size of group, two from medium size of group and two from large size of group. Thus, total sample in two tahsils accounted to sixty betel vine cultivators. The total samples from two tahsils were further classified that twenty cultivators from small size of group, 20 cultivators from medium size of group and twenty cultivators from large size of group.

4.3.4 Scope of the Study

The present research study was applicable to only Sangli district in which Miraj and Walva tahsils were selected. Sixty farmers were selected and personal contacts, questionnaires were solicited.

4. Discussion

4.1 Plant protection

Betelvine crop was more sensitive and it was victimized to various diseases like mite attack, stem root, root knot and anthracnose. Betelvine crop required frequent spraying to control pesticides and fungicides. All respondents used frequent spraying to protect betelvine from diseases. The details of spraying were given as follows in Table 1.

Table No. 1 Classification of Respondents for Spraying Pesticides

Sr. No.	Frequency of Spraying	No. of Respondents	% to Total to Respondents
1	0 – 2	09	15.00
2	3 – 4	27	45.00
3	5 – 6	22	36.67
4	7 and above	02	3.33
Total		**60**	**100**

Source: Primary data

Table no.1 indicated the overall sprays of pesticides applied by respondents to control diseases in betelvine garden. Out of total respondents, 9 respondents i.e. 15 per cent respondents applied maximum two sprays of pesticides during the agricultural year. 27 respondents, 45 per cent sprayed pesticides three to four times to protect from diseases. 22 respondents, 36.67 per cent respondents sprayed pesticides five to six times to protect betelvine crop. But two respondents, 3.33 per cent, spread 7 times during the agriculture

year. After spraying pesticides and fungicides respondents were required to stop plucking betelvine leaves for minimum 8 days.

4.2 Loss of yield due to diseases

The researcher observed and enquired the various causes of diseases during roving survey. Respondents were punctual to protect betelvine from diseases. Table 2 reveled losses due to the various diseases.

Table No. 2 Loss Due to Various Diseases

Sr. No.	Type of Diseases	% of Loss of Yield
1	Mite	0 to 0.5
2	Stem Rot	0.5 to 50
3	Root Knot	0.5 to 2
4	Anthracnose	0.5 to 2

Source: Primary data

Table no. 2 showed the loss of yield due to various types of diseases. Due to mite, loss of yield of betel leaves was up to 0.5 per cent. Another serious disease of betelvine was steam rot which causes of loss of yield up to 50 per cent of total yield received to the respondent during the agricultural year. Yield loss due to root knot ranges 0.5 to 2 per cent of total yield followed by anthracnose 0.5 to 2 per cent of total yield from betel leaves.

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