

Adoption of Recommended Grape Cultivation Practices

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ABSTRACT

This study on adoption of recommended grape practices was conducted in Theni and Dindigul districts of Tamil Nadu by employing a combination of purposive and proportionate random sampling method with 150 grape growers. The data were collected with the help of a well-structured and pretested interview schedule. The findings revealed that out of the 25 practices considered for the study, 16 practices were adopted by all the respondents, whereas the remaining nine practices were not adopted by majority of them. The less adopted practices are soil analysis (74.70%), spacing (54.67%), pit filling mixture (62.00%), manure (98.00 %), fertilizers (97.00%), disease management (98.70%), insect management (98.70%), weed management (97.00%) and time of harvesting (98.78%). Lack of technical knowledge, lack of education on keeping the environment safe, lack of awareness on various forms of toxicity of pesticides and chemicals and health hazards were also some of the main factors that influenced the less adoption of recommended package of practices. Hence, it is the need of the hour to educate the grape growers for improving the level of adoption in the study area.

Key words : Adoption, Recommended package, Grape

Grape cultivation in India has been commercially taken up under a wide range of soil and agro climatic conditions. Grape is an important commercial fruit crop which is mainly used for table purpose. It is grown in tropical conditions mainly in Maharashtra, Karnataka, Tamil Nadu and Andhra Pradesh, using double pruning system. The current area and production under grape in India (2013-14) is estimated as 1,18,740 ha with a production of 25,85,340 MT (Source: Indian Horticulture Database, 2014). In respect of export of grape from India, 54,049.87 tonnes were exported during 2005-2006, which increased to 192616.91 MT in 2013-2014 (APEDA database).

The area and production in Tamil Nadu is 28,400 ha and 47,720 MT in 2013-14 (Source: Indian Horticulture Database, 2014). The production of grape in Cumbum valley of Theni district was 90,000 tonnes of Paneer Grape and 10,000 tonnes of Thomson seedless grape. The unique feature in this region is that the fruits are harvested throughout the year and grape is cultivated in the same land for many decades. Paneer Grape, which is a special type of black grape, are endemic to Dindigul.

Nakov et al. (2002) reported that excessive use of chemicals (application of systemic fungicides with specific activity to certain pathogens) and some other non-scientific driven activity on grape ecosystem have led to greater spread of pathogens, outbreak of new ones and soil pollution with pesticide and heavy metal residues in the area.

Venkateswarlu et al. (2007) using a sensitive and selective liquid chromatography method found that the fresh grape samples collected from an agricultural area in Hyderabad, South India, contained monocrotophos above the permissible limits. Boopathi (2009) reported major issues of soil health under Indian context as physical degradation caused by compaction, crusting, excessive cultivation or puddling, water

logging and soil erosion, chemical degradation as wide gap between nutrient demand and supply, high nutrient turnover in soil-plant system coupled with low and imbalanced fertilizer use and biological degradation due to organic matter depletion and loss of soil fauna and flora.

Vidyavathi and Yadahalli (2010) reported that though chemical fertilizer is an indispensable factor in modern agriculture, excessive use of the same not only affects soil and plant health but also economic health of farmers as the cost of chemical fertilizers are escalating day by day. Excessive use of chemical fertilizers especially nitrogenous and phosphatic fertilizers lead to environmental pollution such as eutrophication and nitrate toxicity of ground water.

Hinge et al. (2013) found that a large majority of the wine grape growers of Maharashtra followed summer pruning in April (71.87%) and winter pruning in September (90.62%) but very negligible per cent of the respondents applied the filling material (10.00%), organic manure (11.87%) and chemical fertilizers to their orchards as per recommendation. A large majority of the respondents (80.00%) did not adopt the gibberlic acid treatment.

Many recent studies have reported a number of environmental issues in the grape growing regions and hence, it was decided to carry out the present study among grape growers of Theni and Dindigul districts with the objective: To assess the adoption pattern of recommended grape cultivation technologies among grape growers.

METHODOLOGY

The research was carried out using Expost-facto research design during 2013-14 in Theni and Dindigul districts of Tamil Nadu since these districts are the intensive grape cultivation zones in Tamil Nadu. A combination of purposive and proportionate random sampling method was employed. The districts

viz., Theni and Dindigul were selected purposively since grape is a major crop being cultivated in about 2,122 ha. Discussion with progressive farmers and local extension personnel revealed that grape is cultivated continuously for more than 25 years and three crops are cultivated in a year in both the districts. Three Taluks viz., Uthamapalayam taluk of Theni district, Dindigul taluk and Nilakottai taluk of Dindigul district were purposively selected considering their maximum area under grape. Among the ten blocks, Chinnamanoor block of Theni district, Athoor block and Nilakottai block of Dindigul district were selected by purposive sampling, based on the judgement of extension personnel of the State Department of Horticulture and Agriculture who opined that grape is being grown for the past 25-30 years in the above three blocks. Totally there were 600 grape cultivators in the three selected blocks. It was decided to conduct the study with one-fourth of the farmers and hence the

sample size was fixed as 150. Random sampling was used to draw the 150 respondents from the three blocks. The data were collected with the help of a well-structured and pretested interview schedule developed for this purpose.

RESULTS AND DISCUSSION

The adoption of recommended technologies by the grape growers was studied and the results are given in Table 1.

I. Land preparation : Around one-fourth (25.30%) of the respondents had analyzed their soil before taking up grape planting and more than two-third of the respondents (74.70%) had not analyzed their soil before taking up grape planting. Even after planting they could have gone for soil analysis, but their skeptical nature on soil analysis results and their sole dependence on chemical fertilizers for replenishing the soil fertility influenced them to ignore the importance

Table 1
Distribution of respondents according to their practice-wise adoption of recommended grape cultivation technologies (n=150)

Sl. No	Practices	Adopted (No.)	Percentage	Non - adopted (No.)	Percentage
I	Land Preparation				
1.	Soil analysis	38	25.30	112	74.70
II.	Propagation and planting				
2.	Varieties	150	100.00	-	-
3.	Season of planting	150	100.00	-	-
4.	Selection of cuttings	150	100.00	-	-
5.	Number of buds per cutting	150	100.00	-	-
6.	Length of the cuttings	150	100.00	-	-
7.	Spacing	68	45.33	82	54.67
8.	Pit size	150	100.00	-	--
9.	Pit filling mixture	57	38.00	93	62.00
10.	Planting	150	100.00	-	-
III	Agronomic practices				
11.	Manures	3	2.00	147	98.00
12.	Fertilizers	5	3.30	145	96.70
13.	Time of application	150	100.00	-	-
14.	Irrigation	150	100.00	-	-
15.	Training	150	100.00	-	-
16.	Pruning	150	100.00	-	-
17.	Level of pruning	150	100.00	-	-
18.	Pruning season	150	100.00	-	-
19.	Special practices	150	100.00	-	-
20.	Growth regulator	150	100.00	-	-

IV	Plant protection measures				
21.	Disease management	2	1.30	148	98.70
22.	Pest management	2	1.30	148	98.70
23.	Weed management	3	2.00	148	98.00
V	Harvest				
24.	Time of harvesting	2	1.30	148	98.70
VI	Post harvest				
25.	Bunches packed in wooden/cardboard boxes/bamboo/stacked baskets using paper shreds	150	100.00	-	-

of soil analysis for grape cultivation.

II. Propagation and planting : With respect to propagation and planting the practices viz., varieties, season of planting, selection of cuttings, number of buds for cutting, length of the cuttings, pit size and planting method were adopted by all the respondents. With regard to spacing, less than half of the respondents (45.33%) had adopted the recommended spacing, while more than half of the respondents (54.67%) had not adopted proper spacing. Lack of technical knowledge and desire to have more productivity in an unit area would have motivated them to go for less spacing.

Regarding the application of pit filling mixture, more than one-third of the respondents (38.00%) had filled the pits with a mixture of topsoil, decomposed FYM / compost / green leaves, super phosphate and potash as per the recommendation but, majority (62.00 %) of the respondents had not adopted as per recommendation. Non-availability of organic materials such as FYM/ compost / green leaves even in small quantity forced them to mix topsoil with chemical fertilizers for filling the pits.

III. Agronomic practices : With respect to adoption of agronomic practices, all the grape growers had adopted the following agronomic practices: time of application, irrigation, training the vines, pruning the vines, level of pruning, pruning season, special practices (tipping of shoots, tying of cluster after fruit set, nipping of growing shoots of auxiliary bud and terminal bud, and thinning of compact berries at pea stage) application of growth regulator as per recommendation. But, they have not adopted the recommendations related to application of manures and fertilizers.

Regarding the application of organic manure, almost all (98.00%) the respondents had not applied the recommended dose of manures. Grape being a perennial crop need to be enriched with farm yard manure, compost and green manures continuously. But organic manure was applied less than the recommended dose by the grape growers due to its less availability and exorbitant price.

With respect to fertilizer application, about 97.00 per cent of the respondents had not applied the recommended dose of fertilizers. An enquiry on the actual adoption of manures and fertilizers was carried

Table 2
Deviation in application of manures and fertilizers by grape growers

Sr. No.	Manures and fertilizers	Recommended dose kg/vine	Adopted dose kg/vine	Deviation
1.	Panneer			
	Farm yard manure	50 kg/vine	15 kg/vine	- 35 kg/vine
2.	N	0.20 kg/vine	0.45 kg/vine	+ 0.25 kg/vine
3.	P	0.16 kg/vine	0.30 kg/vine	+ 0.14 kg/vine
4.	K	0.40 kg/vine	0.07 kg/vine	- 0.33 kg/vine
1.	Thompson			
	Farm yard manure	50 kg/vine	20 kg/vine	- 30 kg/vine
2.	N	0.30 kg/vine	0.56 kg/vine	+ 0.26 kg/vine
3.	P	0.16 kg/vine	0.36 kg/vine	+ 0.20 kg/vine
4.	K	0.80 kg/vine	0.24 kg/vine	- 0.56 kg/vine

out and the details are presented in Table 2.

Table 2 shows that the grape growers had applied manures (FYM) in less quantity against the recommended dose whereas, had applied nitrogenous fertilizers and phosphatic fertilizers more than the recommended doses. Potash was applied in lesser quantity than the recommended dose.

Due to less availability of FYM, they depended more on inorganic fertilizers which are readily available in required quantity at their local village input dealers.

Growth regulator : All the respondents were using growth regulators such as GA3, CCC but not as per the recommendation. It was known during the enquiry that they used growth regulators along with fungicides and insecticides for saving labour cost.

IV. Plant protection measures : The adoption pattern of plant protection measures was studied and the results are presented in Table 1

From Table 1 it is vivid that majority of the respondents (98.70%) had not followed the

adopted the recommended dose of insecticides to manage pests. Indiscriminate use of insecticides was witnessed in the study area. Mite problem was a real threat in Theni and Dindigul districts. Farmers had used new insecticides to control mites. Hence, an effort was made to know the actual amount of various pesticides being used by the grape growers. The details of the enquiry are shown in Table 3.

From Table 3 it is clear that for Downy mildew two fungicides viz., Mancozeb 75 WP and Cymoxanil+ Mancozeb 64 WP were applied about 26 g and 300g more than the recommended doses respectively. Similarly for Powdery mildew, Flusilazole 40 EC was applied 2.5 ml more than the recommended dose and for Anthracnose, Carbendazim 50 WP was applied 130 g more than the recommended dose. For controlling mealy bug, Methomyl 40 SP, Dichlorvos 76 EC were applied 13 g and 3 ml more than the recommended dose respectively.

Almost all (98.00%) the respondents used high dose of herbicides to control weeds. A very

Table 3
Deviation in application of pesticides by grape growers

Sr. No	Chemicals	Recommended dose	Adopted dose	Deviation
Downy mildew				
1.	Mancozeb 75 WP, 35 % SC (Indofil M-45, Dithane M-45) NS	1.5-2.0 g/l (24g/12lit)	50 g in 12lit	+26 g
2.	Cymoxanil + Mancozeb 8%+64 WP (Curzate M-8) S+NS	2 g/ l (300 g /150 lit)	600 g in 150 lit	+ 300 g
Powdery mildew				
3.	Flusilazole** 40 EC (Nustar) S	25 ml / 200l (2.5 ml in 12 lit)	5 ml in 12 lit	+ 2.5 ml
Anthracnose				
4.	Carbendazim 50 WP, 46.27 SC (Bavistin) S	1 g/ l, 1 ml/l (120 g in 120 lit)	250 g in 120 lit	+ 130 g
Mealy bug				
5.	Methomyl 40 SP (Lannate) NS	1.0 g/l (12 g in 12 lit)	25 g in 12 lit	+ 13 g
6.	Dichlorvos 76 EC (Nuvan) NS	1.0 ml (12 ml in 12 lit)	15 ml in 12 lit	+ 3 ml

recommendations for disease management (had applied dosages higher than that of the recommendation) and only 1.30 per cent of the respondents applied as per recommendation (even lesser than the recommended dose). To control the devastating diseases (Downy mildew and powdery mildew) and to get more income, grape growers used all the new fungicides available in the market as per the input dealers' recommendations. Only two respondents were self motivated and shifted to the organic manure panchakavia and used less (or) no fungicides in their field and obtained good yield.

Majority of the respondents (98.70%) had not

meager percentage (2.00%) of the respondents had followed the recommended weed control measures. Earlier, hand weeding and mechanical weeding methods were practiced, thereby soil was loosened periodically. During the time of investigation, they neither followed cultural method nor mechanical method and hand weeding was rarely followed because of non-availability and high cost of labour.

V. Harvest : In grape to get maximum yield the crop should be harvested between 100-200 days after pruning. But almost all (98.78%) of the respondents harvested the crop between 80-90 days after pruning. The unhealthy competition among the grape growers to

get more yield and high remuneration had motivated the grape growers to harvest the crop earlier. Consequently, the maturity and ripening processes were enhanced using chemicals which contributed for the fruit residues and health hazards.

VI. Post Harvest : It was found that all the respondents had packed the bunches in wooden (or) card board boxes (or) bamboo to stacked baskets and paper shreds were used to avoid damage to berries.

CONCLUSION

The study revealed that the practices viz., soil analysis, spacing, pit filling mixture, manure, fertilizers, plant protection measures and time of harvesting was not adopted by majority of grape growers. They expressed that they didn't follow the recommended practices as they were more concerned

about getting immediate profit. Besides lack of technical knowledge, lack of education on keeping the environment safe, lack of awareness on various forms of toxicity of pesticides and chemicals and health hazards were also some of the main factors that influenced the less adoption of recommended package of practices. Hence, it is the need of the hour to educate the grape growers to protect the natural resource base i.e., soil, water and environment. Educational module can be developed highlighting the importance of soil, soil organisms, soil degradation by human activities, ground water contamination, produce residues and it's effect on human health in general and recommended grape cultivation practices for improving the level of adoption in the study area.

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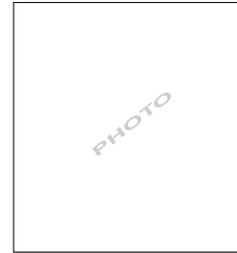
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