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Grape grower's awareness and their outlook on pest management in Western Maharashtra

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Abstract

A survey was conducted in the Ahmednagar, Pune, Solapur, Sangli and Nashik districts of Western Maharashtra to study the grape grower's knowledge about pest management during January 2020 to March 2020. As regard awareness and grape grower's outlook survey revealed that 88.66% growers knew severity of insect pest problems in grape, only 19.33% growers were aware about the natural enemies and 59.33% know about bio-pesticides usage. While the awareness percentage for the usage of recommended pesticides in grapes was very less and accounted just for 12%. 27.33% growers were followed the safe waiting periods. 68.00% of growers were well aware of the ill effects of pesticides. 24% of grape growers were found using mobile applications to collect information on pest management.

Keywords: Western Maharashtra, grape growers, natural enemies, bio-pesticides, mobile applications

Introduction

Grape (*Vitis vinifera* L.) belong to the family *Vitaceae* is one of the most important fruit crops of temperate zone, which has acclimatized to sub-tropical and tropical agro climatic conditions prevailing in the Indian Sub-Continent (Mani *et al.* 2014) [9]. It is widely grown in United States of America, Italy, Spain, France, Turkey, China, Argentina, Chile, Iran, South Africa, Egypt, Australia, Brazil and India. In world over it is mainly grown for wine making, raisin making and for table purpose but in India it is mostly consumed as fresh fruit and only small quantity is utilized for the production of raisins and wine. The major grape growing states in India are Maharashtra (75.94%), Karnataka (19.16%), Mizoram (1.76%), Tamil Nadu (1.55%), Andhra Pradesh (0.58%), Telangana (0.25%) and Punjab (0.21%) amounting to nearly 99 percent of the total production. Maharashtra ranked first in production of grapes, producing about 78.30 percent of the total production of grapes in India (Anonymous, 2018) [1]. Grapes have a great demand in foreign market especially in the countries like United Kingdom, Saudi Arabia and United Arab Emirates (UAE) fetching valuable foreign exchange for the country. The grape sector in India includes various stakeholders such as grape growers, wineries and allied industries and has potential to continuously generate employment. Per hectare yield obtained in the well maintained vineyards of Thompson seedless in Maharashtra is about 30 tonnes and is reported to be perhaps the highest in the world. The area under grapes has increased in Western Maharashtra particularly in Nasik district and declined in Sangli and Solapur districts. The productivity of grapes in Maharashtra has declined by 23.20 percent and it has declined by 0.28 percent during last ten years (Bhosale *et al.* 2016) [2].

Besides the vagary of nature insect pest ravages is one of the most serious problem in grape cultivation faced by growers. All the commercial varieties are susceptible to various insects. Extensive and intensive cultivation of grapes tends to attract various kinds of pests to the vineyards. Bourmier (1977) [3] listed 132 insects that are known to attack grape vine in the world. According to Butani (1979) [4] over 85 species of insects are known to occur on grapes in India. The major insects infesting grapevine are mealybugs, thrips, jassids, mites, flea beetles, caterpillars, stem borers and nematodes (Yadav and Amala, 2013) [22]. Considering the facts of pest incidence status and management strategies followed in the major grape growing belts of Western Maharashtra it felt imperative to check grape grower's knowledge for enhancing the quality and sustained farming.

Materials and Methods

An extensive survey carried out during January 2020 to March 2020. Major grape growing

areas of Western Maharashtra *viz.*, Ahmednagar, Pune, Solapur, Sangli and Nashik districts were selected for the survey. In each district thirty farmers were randomly selected and interviewed with structured questionnaire Table 1. The questionnaire was prepared to collect the data on various parameters with questions in the format of Yes / No or multiple choice answers to know the grape growers knowledge.

Results and Discussion

General awareness of grape growers about pest management

The growers were surveyed for their general awareness regarding the pest, natural enemies and management practices they carried out. The data collected was converted to percent respondents. The data is presented in the Table 2 and Fig 1, respectively. The result of the present investigation cannot be compared due to a lack of literature. Therefore, pertinent literature on others crops is discussed.

Awareness of pest problems

The information generated through survey indicated that, the grape growers (88.66%) were well aware of the pest problems. The respective percent awareness showed that growers from Ahmednagar (86.66%), Pune (90%), Solapur (83.33%), Sangli (90.00%) and Nashik (93.33%) aware about various pests infesting grape crop, respectively. The growers from Nashik district were found to be more vigilant for pest problems. Overall all the growers knew the major insect's infesting grape *viz.*, mealybug, thrips, flea (udadya) beetle and stem borer. Many growers were also aware about problem of nematodes. Most of the growers frequently face the problem of mealybugs and thrips infestation while growers from Solapur and Sangli stressed the problem of mites and stem borers, respectively. Malgie *et al.* (2015) [8] reported that the farmer's knowledge about pest problems is the basic need to start over the management practices and borers and whitefly were the most troublesome pests according to the majority of the respondents in all three stages of several vegetable crops, including tomato, cabbage, string beans and lettuce. Guru (2018a) [5] reported that 73.23 percent polyhouse and 21.33 percent open field capsicum growers were well aware of the pest problems. Mawtham *et al.* (2022) [10] conducted intensive survey in major gourd growing districts of Tamil Nadu, 96.67 percent farmers reported melon fruit fly was major predominant pest. Shinde *et al.* (2022) [19] reported that nearly 69.50% of spinach growers were aware of the severity of pest problems and were able to differentiate between the insect pests of spinach.

Awareness about natural enemies

Barely, (19.33%) of growers were aware of natural enemies encountered in their vineyards. The respective percent awareness was Ahmednagar (13.33%), Pune (16.66%), Solapur (13.33%), Sangli (23.33%) and Nashik (30.33%), respectively, which indicates that almost (86.67%) growers do not know about the role of natural enemies and they primarily rely on pesticides to manage the pest problems. Further, the information generated through the survey indicated that the growers from Nashik (30.00%) and Sangli (23.33%) were more aware of natural enemies; they had used lady bugs (predators) *viz.* *Cryptolaemus montrouzieri* and *Scymnus coccivora*, sometimes to control sucking pests of grape. The

present findings are in agreement with Ramakrishnan *et al.* (2015) [16] who reported that only 16% curry leaf growers knew about natural enemies.

Awareness about bio-pesticides

It was found that neem-based formulation products (neem oil and azadirachtin) were one of the commercial bio-pesticide that growers commonly applied to control insect pests. The data revealed that the bio-pesticides usage by growers was Ahmednagar (40.00%), Pune (50.00%), Solapur (56.66%), Sangli (70.00%) and Nashik (80.00%), respectively. Unfortunately, lack of quick pest knocks down as against insecticides and comparatively less promotion regarding benefits of their usage grape growers usually kept them as subsidiary option for pest management. Although, (59.33%) growers use bio-pesticides and this will have more scope to use in future. This finding in corroboration with the findings of Sawant *et al.* (2018b) [18] and Guru *et al.* (2018b) [6] who reported that majority of the cabbage and capsicum growers of Ahmednagar, Pune and Nashik districts were aware about the application of bio-pesticides, respectively. According to Shinde *et al.* (2022) [19] 78, 74 and 54% of spinach growers of Pune, Nashik and Ahmednagar districts were aware about the bio-pesticides and their benefits.

Awareness about recommended pesticides in grape

The awareness about the recommended pesticides in grape was very less (12.00%) only and many of the growers were using the pesticides which are not recommended by the Central Insecticide Board and Registration Committee (CIB & RC). The information generated through the survey also indicated that, the respective percentage usage of recommended pesticides in Ahmednagar (3.33%), Pune (10.00%), Solapur (6.66%), Sangli (13.33%) and Nashik (26.66%), respectively. Survey carried out by earlier workers support the present findings. Kelageri *et al.* (2016) [7] reported that, awareness on pesticide related issues was varying among poly house and open field tomato farmers with some commonality, where (35.71%) poly house farmers know about recommended pesticides while only (16.67%) open field farmers aware on this issue. Farmers were used various insecticides belonging to different chemical group, but majority were not recommended on tomato by Central Insecticide Board and Registration Committee (CIBRC). Vemuri *et al.* (2016) [21] study revealed that, (28.57%) poly house farmers know about recommended pesticides while only (10%) open field farmers growing capsicum were aware of this issue. Priyadarshini *et al.* (2017) [15] studied on pesticide usage pattern in curry leaf growing areas they observed that, 35.71 percent farmers know about recommended pesticides while only 24.29 percent of farmers were aware of pesticide classification based on toxicity.

Awareness about safe waiting period (PHI)

In general, the time gap between the last pesticide application and harvest of the commodity is called as safe waiting period. Majority of the grape growers did not know about safe waiting period. Very few farmers of Ahmednagar (13.33%), Pune (20.00%), Solapur (16.66%), Sangli (30.00%) and Nashik (56.66%), respectively followed the guidelines for pre harvest interval. The major concern regarding to reluctance was fluctuation in marketable produce prices. Generally all growers harvest the crop early to fetch better price. So in all

(27.33%) growers only found aware about PHI, which might be a major reason for stresses of unwanted pesticide residues. These findings are in agreement with Sutharsan *et al.* (2014) [20] who reported that more than 89 percent of the vegetable farmers harvested their produce before the recommended pre harvest interval. Meenambigai and Bhuvanawari (2017) [11] reported that, almost (65%) farmers of the major okra growing area of Tamil Nadu followed the common waiting period of 1 day after spraying. According to Naqash *et al.* (2019) [12] 95 percent apple growers of Kashmir Valley were applying pesticides indiscriminately in violation of the scientific recommendations.

Awareness about the ill effects of pesticides

Present data showed that grape growers tend to ignore the pesticide risk. It was a routine practice for majority of growers to spray crop three to five times. The awareness found on effects of pesticides in Ahmednagar (50.00%), Pune (70.00%), Solapur (56.66%), Sangli (76.66%) and Nashik (86.66%), respectively. Many growers indicated that they were aware of the harmful effects of pesticides on human health. The majority of the growers knew about the ill effects of insecticides but they were hardly using the safeguards like apron, goggles, gloves *etc.* while application of pesticides. The mean awareness regarding the ill effects of pesticides was only (68.00%) which urges that growers should follow the safeguards to avoid the hazards of pesticides. Patil and Katti (2012) [14] reported 75 percent of labourers used either

“moderately hazardous” or “highly hazardous” pesticides as classified by World Health Organisation and 88 percent did not use any form of protection, while handling pesticides. According to Sawant *et al.* (2018a) [17] 25 percent cabbage growers, Guru *et al.* (2018a) [5] 76.67 percent polyhouse and 40 percent open field capsicum growers of Ahmednagar, Pune and Nashik of Western Maharashtra know the residual effects of insecticides.

Awareness about mobile application for getting information on pest management

From the current investigations it was found that many growers were having smartphones with them, although they did not use any mobile application for scheduling the sprays. Some farmers from Ahmednagar (3.33%), Pune (23.33%), Solapur (16.66%), Sangli (33.3%) and Nashik (43.33%) use mobile application like grape master, plantix *etc.* Besides few growers particularly from Nashik and Sangli were use mobile applications developed by National Research Centre for Grapes. The overall awareness on use of various mobile applications in this major grape growing belt was (24.00%). Nikam *et al.* (2020) [13] reported that grape growers from Sangli and Nashik districts of Maharashtra aware about mobile applications and it was top most source of information to them perhaps, low internet speed and irregular network coverage were the important constraints faced by the farmers while using mobile applications.

Table 1: Questionnaire for collecting the data on grape growers

S.N.	Particular	Answers Y/N
1	Name of grape grower	
2	Address	
3	Mobile No. of grower	
4	Survey No./Gut No.	
5	Total cultivable land	
6	Area under grape crop	
7	Variety	
8	Age of orchard	
9	Yield/ha	
10	Export/Local market plot?	
11	Pest occurrence (Mealybug, thrips, stem borer, <i>etc.</i>)	
12	Do you know about natural enemies?	
13	Information on application of bio-pesticides. (if any)	
14	Do you know about recommended insecticides in grape?	
15	Do you know about safe waiting period (PHI)?	
16	Do you know about label claim?	
17	Do you know about the ill effects of pesticides?	
18	Do you use any mobile application for getting information on pest management?	
19	Signature of grape grower and date	
20	Signature of surveyor and name	

Table 2: Awareness among the grape growers of Western Maharashtra about pest management in Ahmednagar, Pune, Solapur, Sangli and Nashik (% Respondents).

Particulars	% Respondents (Grape growers)					
	Ahmednagar	Pune	Solapur	Sangli	Nashik	Mean
Awareness about pest problems	86.66	90	83.33	90	93.33	88.66
Awareness about natural enemies	13.33	16.66	13.33	23.33	30.00	19.33
Awareness about bio-pesticides	40.00	50.00	56.66	70.00	80.00	59.33
Awareness about recommended pesticides in grapes	3.33	10.00	6.66	13.33	26.66	12.00
Awareness about safe waiting period (Pre-Harvest Interval)	13.33	20.00	16.66	30.00	56.66	27.33
Awareness about effects of pesticide	50.00	70.00	56.66	76.66	86.66	68.00
Awareness about use of mobile applications for getting information on pest management	3.33	23.33	16.66	33.33	43.33	24.00

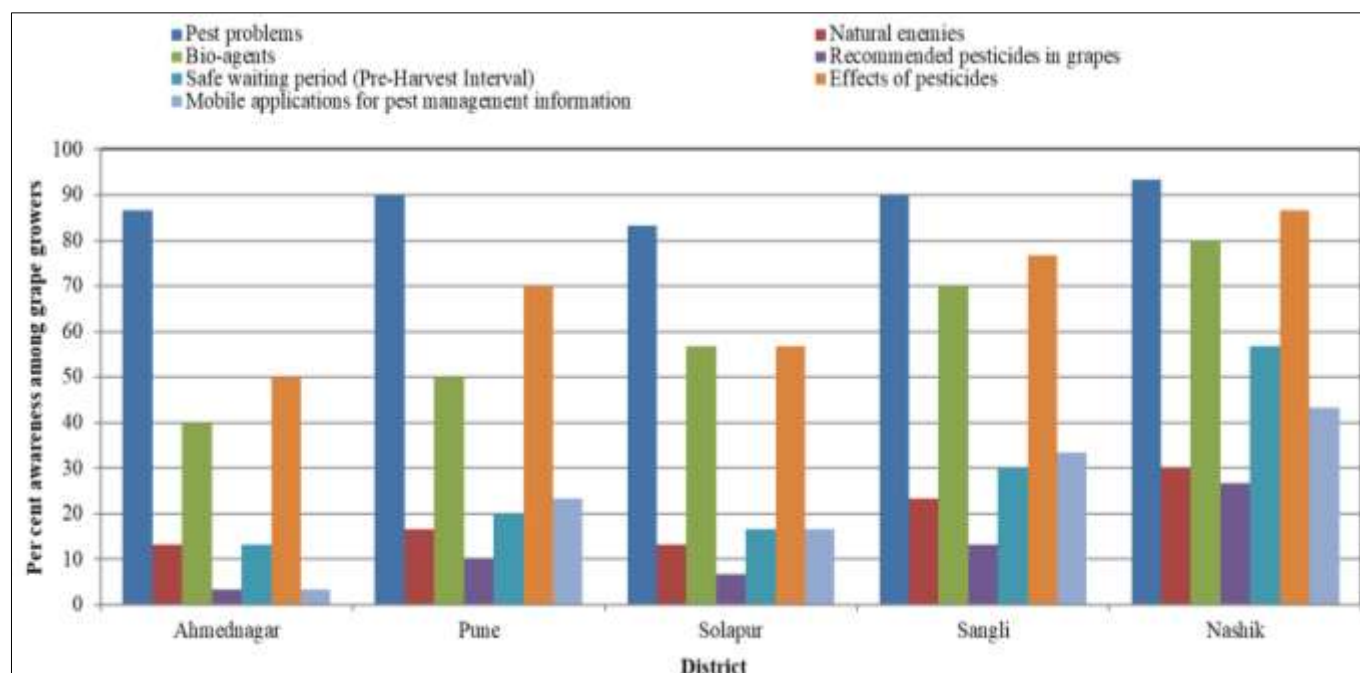


Fig 1: Awareness among the grape growers of Western Maharashtra about pest management in Ahmednagar, Pune, Solapur, Sangli and Nashik (% respondents)

Conclusion

Survey conducted on grape growers in the districts viz., Ahmednagar, Pune, Solapur, Sangli and Nashik of Western Maharashtra revealed that grape growers were able to identify the pest problems (88.66%). On the basis of incidence, the sucking pest's viz., mealybug, thrips and mites were the most commonly occurring insect pests in the region. In addition, other pests like stem borer, flea beetles, defoliators, nematodes etc. were also noticed. Grape growers were aware of natural enemies (19.33%) and bio-pesticides (59.33%). Few grape growers were aware about the use of recommended pesticides (12.00%) and safe waiting period (27.33%). Grape growers knew about the ill effects of pesticide residues (68.00%), but they did not follow precautionary measures while spraying in the field to avoid toxic effects of pesticides. Majority of the grape grower's possessed smartphones but only 24 percent among them found utilizing mobile applications for getting information of pest management. There is great scope to increase grower's participation in the usage of natural enemies, bio-pesticides and android applications based advisory for the pest management in the surveyed area.

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