



P-ISSN: 2349-8528

E-ISSN: 2321-4902

www.chemijournal.com

IJCS 2020; 8(6): 3117-3121

© 2020 IJCS

Received: 02-09-2020

Accepted: 08-10-2020

BA Deshmukh

Assistant Professor, Department of Agriculture Extension, Directorate of Extension Education, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India

SB Shinde

Ex. Head, Department of Extension Education, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India

Assessment of knowledge of pomegranate growers in Western Maharashtra about disease management

BA Deshmukh and SB Shinde

Abstract

Pomegranate is gaining a lot of attention world over because of its high economic and nutraceutical values. India is the largest pomegranate producer in the world (8.6 lakhs tones) sharing about 36% of the world's production. India with diverse soil and climate comprising several agro-ecological regions provides ample opportunity to grow a variety of horticultural crops. These crops form a significant part of total agricultural produce in the country. The study revealed that the majority of the pomegranate growers had 36 to 50 years age, received up to degree and higher education, had higher socio-economic status, cosmopolitanism and small land holding, cultivating the pomegranate crop on 2.01 to 5.00 hectares of their land holding, had annual income between Rs. 4, 00,001/- to 7, 00,000/-, were having higher scientific orientation (60.44%), economic motivation (58.22) and innovativeness (40.44%), 44.89, 38.67 and 25.33% had partial knowledge about symptoms of various diseases viz., bacterial blight, fruit spots and wilt complex, respectively. The respondents (68.00%) had partial knowledge about spraying of bactinashak after harvest of first bahar.

Keywords: Horticultural crops, disease, bacterial blight, fruit spot, wilt

Introduction

Maharashtra state (cultivated area 82 thousand ha) is considered as pomegranate basket in India contributing almost 80 per cent of production (560 thousand tones) followed by Karnataka, Andhra Pradesh, Gujarat, Rajasthan and Tamil Nadu. Innovations in pomegranate cultivation had a dramatic impact on the livelihood of poor people in the semiarid regions of India, where farmers adopted production technology of this crop. Pomegranate (*Punica granatum* L.) is one of the important fruits of tropical and subtropical regions of the country, which belongs to family puniceae. It is also cultivated in semi-arid tracts of the country but requires irrigation water for better quality of fruit production (Prasad *et al.*, 1996) [9]. Plant protection measures are vital for successful fruit production in pomegranate. The major pests of pomegranate observed in India are termites, pomegranate butterfly, bark eating caterpillar and the diseases are fungal and bacterial leaf and fruit spots and wilt. This study is a pioneering one of its kind and aims to identify the functional knowledge level about disease management measures in pomegranate cultivation.

Materials and Methods

In Maharashtra the pomegranate is being grown on larger area in Nashik, Solapur, Sangali, Ahmednagar, Satara and Jalgaon districts. Considering larger area under pomegranate cultivation Sangli, Solapur and Nashik districts from Kolhapur, Pune and Nashik divisions are selected for the present investigation. One tahasil having maximum area under pomegranate cultivation from each selected district was considered for the study. Hence, three tahasils viz., Atpadi, Sangola and Satana were selected for the study. Five villages from each tahasil were selected randomly on the basis of maximum area under pomegranate cultivation. In all total fifteen villages were selected for the study. The data were collected from 225 pomegranate growers with the help of personal interview schedule specially structured for the purpose and the data were analyzed. The emphasis in the study was on knowledge level of farmers with respect to the plant protection measures amongst the pomegranate growers. Hence, for conducting the present study an exploratory design of social research was used.

Corresponding Author:**BA Deshmukh**

Assistant Professor, Department of Agriculture Extension, Directorate of Extension Education, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, India

Results and Discussion

A) Personal traits of pomegranate growers in Western Maharashtra

The data regarding the personal traits of the respondent's *viz.*, age, education, socio-economic status and cosmopolitanism of pomegranate growers are depicted as follows.

The results revealed that more than half of the pomegranate growers were of 'middle' age. Fifty five% of the total respondents were 'middle' age followed by 32.89% 'young' age respondents and 11.56% 'old' respondents. It is inferred from the table that more young and middle aged farmers are engaged in the pomegranate cultivation.

The results presented in Table 1 shows that maximum number of respondents (36.00%) were educated upto 'degree' and higher education level, followed by respondents educated upto the 'secondary' and 'higher secondary' level (21.78 and 20.00% respectively). Respondents having 'primary' level of education were only 1.78%; however, there were 20.00% respondents educated upto 'primary' level of education.

It is seen from Table 1, that majority of the pomegranate growers (51.55%) belonged to 'high' to very higher socio-economic status, followed by the respondents (21.78%) belonging to 'medium' socio-economic status. While, 18.22% of them had 'low' socio-economic status.

It is observed from Table 16 that, majority of the pomegranate growers (46.67%) had 'higher' level of cosmopolitanism, followed by 28.89% and 24.44% had 'medium' and 'low' level of cosmopolitanism respectively. The data thus indicated that large proportions of respondents were had higher cosmopolitanism.

Table 1 depicts that majority of the pomegranate growers (41.33%) had annual income between Rs. 4, 00,001/- to 7, 00,000/-. However, an equal proportion of respondents had income upto Rs. 4, 00,000/- and Rs. 7, 00,001/- to 10, 00,000/- respectively. While, 17.78% had income above Rs. 10, 00,000/-.

It was apparent from Table 1, that nearly two-fifth of the respondents (38.67%) belonged to the category of 'small' land holding ranging from 2.01 to 4.00 ha. It was followed by (32.00%) 'medium' land holding possessing land from 4.01 to 10.00 ha. and (19.11%) respondents belongs to 'large' holding category *i.e.* above 10.00 ha.

It was observed from Table 1, that majority of pomegranate growers (52.00%) belonged to the category of 'small' area under pomegranate cultivation from 2.01 to 5.00 ha. followed by (25.33%) 'marginal' category holding area up to 2.00 ha. and (14.22%) respondents belongs to 'medium' category *i.e.* from 5.01 to 7.50 ha. The data thus indicated that a large proportion of the respondents were having '2.01 to 5.00 hectare' area under pomegranate.

From Table 1, it was apparent that most of the respondents (52.89%) had experience up to 7 years in pomegranate cultivation. It was followed by (32.44%) respondents who had experience from 8 to 12 years and only (14.67%) of the respondents had experience above 13 years in pomegranate cultivation. The findings are consistent with the observations made by Fulzele *et al.* Table 1 indicates that a majority *i.e.* 60.44% of the respondents had 'high' economic motivation category. However, 26.22 and 13.33% had 'medium' and 'low' economic motivation category, respectively.

It is seen from Table 1 that 58.22% of the respondents were in 'high' scientific orientation category. However, 29.78 and 12.00% had 'medium' and 'low' scientific orientation category, respectively.

The data presented in Table 1 indicates that, 53.78% of the respondents were in 'medium' innovativeness category. However, 40.44 and 5.78% had 'high' and 'low' innovativeness category, respectively. Similar findings were reported by Bhagyalaxmi *et al.* (2003) [10].

B) Overall knowledge level of pomegranate growers about disease management

The overall knowledge level of the respondents in relation to plant protection measures of pomegranate was assessed. For this purpose, a knowledge test was specially developed was used. As per the test the knowledge score of each respondents was calculated and the knowledge index was calculated. On the basis of knowledge index range respondents were grouped in to three categories with the help of range *viz.*, low, medium, high knowledge level as shown in Table 37.

It is evident from the Table 2 that majority (40.44%) of the respondents were in the 'high' knowledge level, while 27.56% and 22.00% of them were having 'low' and 'medium' knowledge level respectively. Thus, it could be stated that the knowledge level of majority of the respondent of satisfactory. This might be due to the fact that the most of the pomegranate growers might have been exposed to the various disease management techniques. Further, this might also be due to the better educational level and better socio economic status of the respondent farmers had evidenced in the study.

Practice wise knowledge level of pomegranate growers

The information pertaining to the knowledge level of respondents about disease management in pomegranate under different major heads *viz.*, control of diseases like bacterial blight, leaf and fruit spot, wilt complex etc. are depicted hereunder.

Disease management

It is necessary for any farmers to know the symptoms of various diseases observed in pomegranate. The information about knowledge of pomegranate growers about symptoms of disease were collected and presented as shown in Table 3.

The results presented in Table 3 indicate that, 44.89, 38.67 and 25.33% had partial knowledge about symptoms of various diseases *viz.*, bacterial blight, fruit spots and wilt complex, respectively. While, more than one third of the respondents had no knowledge about symptoms of above diseases.

Control of bacterial blight disease

The bacterial blight disease is prime and devastating disease in pomegranate. This has contributed in heavy losses to the farmers. The knowledge of farmers about control of this disease decides success in pomegranate cultivation. The data regarding knowledge of pomegranate growers regarding control of bacterial blight disease was collected and presented in Table 4.

Table 4 revealed that, 68.00% of the pomegranate growers had partial knowledge about spraying of bactinashak after harvest of first bahar. Nearly two-fifth of the respondents had no knowledge about control of bacterial blight disease *viz.*, drenching soil surface (44.44%), spraying of bacti-nashak ten days interval on new growth after defoliation (36.89%).

Control of leaf spot, fruit spot and fruit rot

The information about the knowledge of respondents about control of leaf spot, fruit spot and fruit rot was collected and presented as shown in Table 5.

A critical examination of Table 5 concluded that, 76.89% of the pomegranate growers had partial knowledge regarding spraying of Captan or Ziram or Mancozeb etc. at flower initiation stage. While, 60.44% of the respondents had 'partial knowledge' recommended spraying schedule.

Control of wilt complex

The Wilt complex disease is major determinant factor in pomegranate cultivation. This leads to complete dying of plant in the field. This disease hinders the growth of plant and affect on yield potential of pomegranate cultivation. The data about knowledge status of pomegranate growers about control

of wilt complex was collected and presented as shown in Table 6.

The data presented in Table 6 shows that more than half (54.22%) of the pomegranate growers had 'complete knowledge' about procedure for complete destruction of wilt infected plant. While, 48.89% and 44.44% of them had 'complete knowledge' about material used for pit filling and spraying of whole plant with Hexaconazole, respectively. However, nearly one fifth of the respondents had 'complete knowledge' pertaining to drenching and dusting of chemicals during the pit filling.

Table 1: Distribution of pomegranate growers according to their personal traits

Sl. No.	Characteristics (s)	Respondents (N= 225)	
		Number	Percentage
Age (yrs)			
1.	Young (upto 35 years)	74	32.89
2.	Middle Aged (36 to 50 years)	125	55.56
3.	Old (51 and above years)	26	11.55
Education			
1.	Pre-Primary (Std. I to IV)	45	20.00
2.	Primary (Std. V to VII)	04	01.78
3.	Secondary (Std. VIII to X)	49	21.78
4.	Higher Secondary (Std. XI to XII)	45	20.00
5.	Higher (Degree and more)	82	36.44
Socio-economic status			
1.	Very low (Up to 05.21)	19	08.45
2.	Low (05.22 to 08.37)	41	18.22
3.	Medium (08.38 to 11.52)	49	21.78
4.	High (11.53 to 14.67)	57	25.33
5.	Very high (14.68 and above)	59	26.22
Cosmopliteness			
1.	Low (up to 3 score)	55	24.44
2.	Medium (4 score)	65	28.89
3.	High (5 & above score)	105	46.67
Annual income			
1.	Up to 4,00,000/-	47	20.89
2.	400001/- to 700000/-	93	41.33
3.	700001/- to 1000000/-	45	20.00
4.	10,000,00/- & above	40	17.78
Land holding			
1.	Marginal (Upto 2.00 ha)	23	10.22
2.	Small (2.01 – 4.00 ha)	87	38.67
3.	Medium farmers (4.01 – 10.00 ha)	72	32.00
4.	Big farmers (10 ha and above)	43	19.11
Area under pomegranate cultivation			
1.	Marginal farmers (Upto 2.0)	57	25.33
2.	small farmers (2.01 – 5.00)	117	52.00
3.	Medium farmers (5.01 – 7.50)	32	14.22
4.	Big farmers (7.51 & above)	19	08.45
Farming Experience			
1.	Up to 7 yrs.	119	52.89
2.	8 to 12 yrs.	73	32.44
3.	13 yrs & above	33	14.67
Economic motivation			
1.	Low (up to 18 score)	30	13.33
2.	Medium (19 to 23 score)	59	26.22
3.	High (24 & above score)	136	60.45
Scientific orientation			
1.	Low (up to 19 score)	27	12.00
2.	Medium (20 to 24 score)	67	29.78
3.	High (25 & above score)	131	58.22
Innovativeness			
1.	Low (up to 12 score)	13	05.78
2.	Medium (13 to 17 score)	121	53.78
3.	High (18 & above score)	91	40.44

Table 2: Distribution of respondents according to their overall knowledge level about disease management in pomegranate

Sl. No.	Knowledge level	Respondents (N = 225)	
		Number	Percentage
1.	Low (up to 109 score)	62	27.56
2.	Medium (110 to 139 score)	72	22.00
3.	High (140 & above score)	91	40.44
	Total	225	100.00

Maximum Score =169, Minimum Score = 79

Table 3: Distribution of respondents according to knowledge of disease management

Sl. No.	Particulars	Complete knowledge	Partial knowledge	No knowledge	Overall (N=225)
1.	Symptoms of Bacterial blight a) Small (2-5 mm) regular to irregular grayish black water soaked (Oily) spot on leaves. b) Brown to black spot on nodes, twigs & branches. c) On fruit – water soaked lesions are seen on pericarp which later turn brown to black. d) Small L-Y shaped cracks. Sometimes fruit split.	61 (27.11)	101 (44.89)	63 (28.33)	225 (100.00)
2.	Symptoms of Wilt complex a) The bark near collar region gets rotten and it leads to wilting from head to trunk. b) Due to poor drainage infection of <i>Fusarium</i> takes place leads to wilting of plants.	83 (36.89)	57 (25.33)	85 (37.78)	225 (100.00)
3.	Symptoms of leaf spots a) Alternaria – Spots are small, light brown to purple in colour & round or irregular in shape b) Colletotrichum – Spots are small purplish black to black. Afterwards yellow hollows are observed around the spot. c) Cercospora – Spots are small roundish or irregular dark black in colour.	69 (30.67)	70 (31.11)	86 (38.22)	225 (100.00)
4.	Symptoms of Fruit spot a) Dreschslera – on fruits, small raised spots are formed. Initially, they are red in colour, afterward they convert into dark brown in colour.	37 (16.44)	87 (38.67)	101 (44.89)	225 (100.00)
5.	Symptoms of Fruit rot a) Rotting of peel and extend it to the interior portion. b) Fruits give rotting or fermented smell. c) Fruit become yellow in colour, pale and gets flattened	69 (30.67)	58 (25.78)	98 (43.56)	225 (100.00)
6.	Control measure of the diseases in pomegranate taken before commencement of diseases	123 (54.67)	77 (34.22)	25 (11.11)	225 (100.00)

Figures in the parentheses indicate percentages

Table 4: Distribution of respondents according to knowledge about control of bacterial blight disease

Sl. No.	Particulars	Complete knowledge	Partial knowledge	No knowledge	Overall (N=225)
1.	Spraying of Bacti-Nashak (500 ppm) @ 5g/10 lit after harvest of first bahar	72 (32.00)	153 (68.00)	0 (0.00)	225 (100.00)
2.	Spraying of Bacti-Nashak (Follow up spray)	35 (15.56)	105 (46.67)	85 (37.78)	225 (100.00)
3.	Collection & burning of fallen infected fruits and leaves	125 (55.56)	100 (44.44)	0 (0.00)	225 (100.00)
4.	Drenching the soil surface with Bleaching powder @ 60 kg/ha	92 (40.89)	33 (14.67)	100 (44.44)	225 (100.00)
5.	Dusting on soil surface with Copper dust (Cuprous Oxide 4% @ 20 kg/ha)	90 (40.00)	35 (15.56)	100 (44.44)	225 (100.00)
6.	Pasting neem oil on trunk	125 (55.56)	100 (44.44)	0 (0.00)	225 (100.00)
7.	Pasting on tree trunk – Bordeaux mixture (10%) @ 20 kg/ha.	101 (44.89)	124 (55.11)	0 (0.00)	225 (100.00)
8.	Spraying of Bacti-Nashak (500 ppm) @ 5g + Captan (0.5%) @ 50 g / 10 lit water on defoliated plant	62 (27.56)	107 (47.56)	56 (24.89)	225 (100.00)
9.	Spraying of Bacti-Nashak (250 ppm) @ 2.5 g /10 lit. water followed by Bordeaux mixture (1%) @ 100g Copper Sulphate + 100 g Lime / 10 lit and Captan (0.25%) 25 g/10 lits of water at 10 days interval on new growth after defoliation	64 (28.44)	78 (34.67)	83 (36.89)	225 (100.00)

Figures in the parentheses indicate percentages

Table 5: Distribution of respondents according to knowledge about control of leaf spot Fruit spot and fruit rot

Sl. No.	Particulars	Complete knowledge	Partial knowledge	No knowledge	Overall (N=225)
1.	Spraying of Captan (Captaf) 0.2% or Ziram (Ziridi) 0.25% or Mancozeb 0.25% (Dithane M-45) or Copper Oxychloride (Blitox 50 or Fytolan @0.40%) or Bordeaux mixture (1%) flower initiation/fruitletting stage	52 (23.11)	173 (76.89)	0 (0.00)	225 (100.00)
2.	Spraying intensity Mrig bahar -9 sprays at 10 days interval	89 (39.56)	136 (60.44)	0 (0.00)	225 (100.00)

	Hast Bahar – 7 Sprays at 15 days interval Ambia Bahar – 5 Sprays at 20 days interval				
--	---	--	--	--	--

Figures in the parentheses indicate percentages

Table 6: Distribution of respondents according to knowledge about control of wilt complex in pomegranate

Sl. No.	Particulars	Complete knowledge	Partial knowledge	No knowledge	Overall (N=225)
1.	Chemicals/fungicides/pesticides used during pit filling a. Drench pits with 0.2% Carbendazim in 5 lit water b. Dusting of Carbaryl or Chloropyriphos dust @ 50 g/pit on the bottom of pit. c. Treatment of pit with calcium hypochlorite @ 100 g/pit	48 (21.33)	82 (36.44)	95 (42.22)	225 (100.00)
2.	Content and quantity of various material used for filling of pit (20 kg FYM + 2 kg Vermicompost + Neem cake 3 kg + Trichoderma 25 g + Azotobactor 15 g + PSB 15 g)	100 (44.44)	125 (55.56)	0 (0.00)	225 (100.00)
3.	Spraying of whole plant with 0.1% Hexaconazole or Carbendazim 0.2%	110 (48.89)	30 (13.33)	85 (37.78)	225 (100.00)
4.	Infected plants covered with plastic during transport and destructed immediately	122 (54.22)	103 (45.78)	0 (0.00)	225 (100.00)
5.	Drench wilted plant immediately with Chloropyriphos (0.25%)+ Carbendazim (0.2%) or Propiconazole/Tilt (0.15%) or Hexaconazole (0.15%) @ 5 lit solution /tree	31 (13.78)	54 (24.00)	140 (62.22)	225 (100.00)
6.	Causes of wilt a. Cultivation in heavy and ill drained soils b. Complex disease caused due to insects, pathogens or both	111 (49.33)	114 (50.66)	0 (0.00)	225 (100.00)

Figures in the parentheses indicate percentages

Conclusion

Majority of the pomegranate growers 44.89, 38.67 and 25.33% had partial knowledge about symptoms of various diseases viz., bacterial blight, fruit spots and wilt complex, respectively. The respondents (68.00%) had partial knowledge about spraying of bactinashak after harvest of first bahar. Nearly two-fifth of the respondents had no knowledge about control of bacterial blight disease. More than two third of the respondents had partial knowledge regarding spraying of Captan or Ziram or Mancozeb etc. at flower initiation stage.

Further, 60.44% of the respondents had 'partial knowledge' about recommended spraying schedule for control of leaf spot in pomegranate. More than half (54.22%) of the pomegranate growers had 'complete knowledge' about procedure for complete destruction of wilt infected plant. While, 48.89% and 44.44% of them had 'complete knowledge' about material used for pit filling and spraying of whole plant with hexaconazole, respectively. Thus, it can be concluded that pomegranate growers were having medium to low knowledge about various disease management practices.

References

- Anitha Kumari P, Kalavathy S. Knowledge and adoption of recommended practices by coconut cultivators of recommended practices by coconut cultivars of root (wilt) affected area. *Indian Coconut J.* 2001;31(5):14-16.
- Anonymous. A study of pomegranate growers of Nashik district with special reference to die-back and marketing problems of pomegranate. A joint AGRESCO report. MPKV, Rahuri; c2001.
- Bhopale RS, Shinde PS, Nimje VR. Determinants of Knowledge and adoption behavior of orange growers. *J Maharashtra Agri. Uni.* 1996;21(1):44-97.
- Bhopale RS, Shinde PS, Dhule SS. Knowledge and adoption of biocontrol pest management in cotton. *Maharashtra J Extn. Edn.* 2001;20:18-21.
- Borkar MM, Chothe GD, Lanjewar AD. Characteristics of farmers influencing their knowledge about use of bio-fertilizers. *Maharashtra J Extn. Edn.* 2000;19:59-63.
- Chapke R. Knowledge and adoption of farmers about biocontrol measures. *Maharashtra J of Extn. Edn.* 2000b;19:41-44.
- Ghadage NG. Knowledge and adoption of recommended practices for control of oily spot disease on pomegranate in Solapur district. M.Sc. (Agri.) thesis (Unpublished), Mahatma Phule Krishi Vidyapeeth, Rahuri (M.S.); c2005.
- Howal AA. Technological gap in pomegranate cultivation. M.Sc. (Agri.) thesis (Unpublished), Mahatma Phule Krishi Vidyapeeth, Rahuri (M.S.); c2008.
- Prasad RN, Bankar GJ, Vashishtha BB. Problems and prospectus of pomegranate cultivation in arid regions. Symposium on Recent Advances in Management of Arid Ecosystem held at CAZRI, Jodhpur; c1996.
- Bhagyalaxmi A, Kadri AM, Lala MK, Jivarajani P, Patel T, Patel M. Prevalence of tuberculosis infection among children in slums of Ahmedabad. *Indian pediatrics.* 2003 Mar 1;40(3):239-42.