

## PEST AND DISEASES PROBLEMS EXPERIENCED BY THE POMEGRANATE GROWERS

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### ABSTRACT

India is one of the largest producers of pomegranate in the world. Maharashtra is the leading state in India other important states are Karnataka, Andhra Pradesh and Gujarat. The area under pomegranate cultivation is increasing rapidly in Guajrat and especially in Banaskantha district. It was 210 ha in 2005-06 which was increased to 10951 ha in 2018-19. At present pomegranate cultivation in the district is at cross road. It is observed that because of some Disease and Pest problems farmers are not realizing the potential yield and quality. This paper summarizes Disease and Pest problems and provides suggestions for needed research and promotion of policies to cultivation of better quality pomegranates.

**Keywords:** pomegranate growers, pest and diseases, problems

### INTRODUCTION

Pomegranate is an important fruit crop of arid and semiarid regions of the world. It is elieved to be originated from Iran. It has both cultivated (*Punica granatum* L.) and wild types (*Punica protopunica*). The cultivated types are adapted to the Mediterranean regions of Central Asia, Africa and Europe. Pomegranate is also popular in South East Asian countries.

India is one of the largest producers of pomegranate in the world. During 2014-15, pomegranate was cultivated over 1.81 lakh ha with an annual production of 17.89 lakh tonnes and productivity of 9.88 tonnes/ha in India. At present, Maharashtra is the leading state in acreage covering about 68.7 per cent of the area under pomegranate. Similarly, around 70.2 per cent of total production comes from Maharashtra. It is proposed that by the year 2025, the area under pomegranate is projected to increase to 1.20 lakh ha from 7.0 lakh ha at present. The other important states next to Maharashtra with respect to pomegranate cultivation are Karnataka, Gujarat and Andhra Pradesh. It is observed that because of some pest and diseases problems, farmers are not realizing the potential yield and quality because the some serious diseases like fruit spot, wilt, fruit rot and bacterial blight and pest like thrips, anar butterfly and shot hole borer *etc.* This study attempts to investigate the pest and diseases problems faced by the pomegranate growers in the cultivation of pomegranate.

### OBJECTIVES

(1) To find out pest and diseases problems experienced by

the pomegranate growers in pomegranate cultivation

(2) To study the relationship between personal, socio-economic, psychological, communicational and situational characteristics with problems faced by pomegranate growers

### METHODOLOGY

The present investigation was carried out in Banaskantha District of Gujarat State. "Ex-post facto" research design was used for the study. Multistage Sampling method was selected for the study. The Banaskantha district was selected purposively as it has highest area under pomegranate cultivation. Among the fourteen talukas of Banaskantha District, Tharad, Lakhani and Dhanera talukas was selected purposively for the study because the area and production of these three talukas is higher than other talukas of the district. Among the selected three talukas, six villages from each taluka was selected randomly from the list of villages in which at least ten pomegranate growers was available thus the 18 villages from three talukas was selected for the study. Ten pomegranate growers from each village were selected randomly for the study thus the total number of respondents were 180. The dependent variables undertaken in this study was problems in adoption of pomegranate cultivation practices.

The problems are operationally defined as the difficulties experienced by the farmers in adoption of pomegranate cultivation practices. At the first instance all the problems were studied in terms of frequency and percentage

to each difficulty experienced to cause a problem by a farmer. Than the collected information was tabulated and analyzed and interpreted on frequency and percentage.

Sr. No.	Degree of problems	Score
1	Most important	4
2	Important	3
3	Less important	2
4	Not important	1

To study the intensity of problems experienced by the pomegranate growers in adoption of recommended

pomegranate cultivation practices, each respondent was asked to mention the constraints for each item in order of degree of difficulties experienced by them on a four points continuum scale with score value as below.

The total score of problems was derived by adding score of various difficulties experienced by pomegranate growers. Then the mean score of each item was calculated and the practice-wise as well as group-wise rank to each constraint was assigned. The higher rank indicates high intensity of problem and low rank indicates lower intensity of the problems.

**RESULTS AND DISCUSSION**

**Table 1 : Distribution of pomegranate growers according to importance of problems of diseases** (n = 180)

Sr. No.	Problems of diseases	Most important	Important	Less important	Not Important	Mean score	Rank
1	Bacterial blight	25 (13.88)	41 (22.77)	30 (16.66)	84 (46.66)	2.03	VI
2	Wilt	76 (42.22)	49 (27.22)	35 (19.44)	20 (11.11)	3.00	II
3	Fruit rot	69 (38.33)	53 (29.44)	31 (17.22)	27 (15.00)	2.91	III
4	Fruit spot	92 (51.11)	62 (34.44)	14 (07.77)	12 (06.66)	3.30	I
5	Leaf spot	65 (36.11)	21 (11.66)	16 (08.88)	78 (43.33)	2.40	IV
6	Oily spot on fruit	37 (20.55)	29 (16.11)	23 (12.77)	91 (50.55)	1.82	VII
7	Nematode/ physiological disorder	31 (17.22)	19 (10.55)	18 (10.00)	112 (62.22)	2.06	V

The seven major problems experienced by the pomegranate growers in disease management practices were: (i) Bacterial blight, (ii) Wilt, (iii) Fruit rot, (iv) Fruit spot, (v) Leaf spot, (vi) Oily spot on fruit and (vii) Nematode/ physiological disorder.

With regards to the problem viz., Bacterial blight 53.31 per cent of pomegranate growers experienced problem among them 22.77 and 16.66 per cent of pomegranate growers experienced it as important and less important problems remaining 13.88 per cent of the pomegranate growers faced it as most important problems whereas 46.66 per cent of the growers did not faced this problem.

The problem of wilt was experienced by 88.88 per cent of the pomegranate growers among them 42.22 and 27.22 per cent perceived it as most important problem and important while, 19.44 per cent of the pomegranate growers perceived it as less important problem while, 11.11 per cent of pomegranate growers did not experienced this problem.

The problem regarding fruit rot disease 84.99 per cent of pomegranate growers perceived as problem, 38.33 per cent of the pomegranate growers perceived it as most important while, 29.44 per cent and 17.22 per cent important and less important, Whereas, 15.00 per cent of the growers did not faced this problem.

The problems of fruit spot was experienced by 93.32 per cent of the pomegranate growers among them 51.11 and 34.44 per cent of the pomegranate growers who perceived it as most important and important problem while, 7.77 per cent of growers perceived as less important problem whereas, 6.66 per cent of growers did not faced the problem.

In problem of leaf spot disease 56.65 per cent of the pomegranate growers faced this problem, 36.11 per cent and 11.66 per cent perceived as most important and important problem. While, 08.88 per cent of them perceived as less important problem whereas, 43.33 per cent of the growers did not experienced this problem.

In problem of oily spot disease 49.43 per cent of the pomegranate growers faced this problem among them 20.55 per cent and 16.11 per cent perceived as most important and important problem while, 12.77 per cent of them perceived as less important problem whereas, (50.55 per cent) of the growers did not experienced this problem.

The problems of Nematode/physiological disorder was experienced by 38.32 per cent of the pomegranate growers among them 17.22 and 10.55 per cent of the pomegranate growers who perceived it as most important and important problem while, 10.55 per cent of growers perceived as less important problem whereas, 62.22 per cent of growers did not faced the problem.

**Table 2 : Distribution of pomegranate growers according to importance of problems of insects**

(n = 180)

Sr. No.	Problems of insects	Most important	Important	Less important	Not Important	Mean score	Rank
1	Thrips	78 (43.33)	35 (14.44)	21 (11.66)	46 (25.55)	2.80	I
2	Shot hole borer	45 (25.00)	33 (18.33)	19 (10.55)	83 (46.11)	2.22	III
3	Stem boring beetles	39 (21.66)	24 (13.33)	22 (12.22)	95 (52.77)	2.03	V
4	Whitefly	41 (22.77)	38 (21.11)	13 (07.22)	88 (48.88)	2.17	IV
5	Fruit sucking moth	34 (18.88)	32 (17.77)	21 (11.66)	93 (51.66)	2.03	VI
6	Anar butterfly	72 (40.00)	38 (21.11)	16 (08.88)	54 (30.00)	2.71	II
7	Mealy bugs	27 (15.00)	16 (08.88)	08 (04.44)	129 (71.66)	1.67	VIII
8	Scolytid beetle	24 (13.33)	21 (11.66)	18 (10.00)	117 (65.00)	1.73	VII

The eight major problems experienced by the pomegranate growers in insects management practices were: (i) Thrips, (ii) Shot hole borer, (iii) Stem boring beetles, (iv) Whitefly, (v) Fruit sucking moth, (vi) Anar butterfly, (vii) Mealy bugs and (viii) Scolytid beetle.

With regards to the problem of thrips a majority (69.43 per cent) of pomegranate growers experienced problem among them 43.33 and 14.44 per cent of pomegranate growers experienced it as most important and important problems remaining 11.66 per cent of the pomegranate growers faced it as less important problems whereas, (25.55 per cent) of the growers did not faced this problem.

The problem of shot hole borer was experienced by 53.88 per cent of the pomegranate growers among them 25.00 and 18.33 per cent perceived it as most important problem and important problem while, 10.55 per cent of the pomegranate growers perceived it as less important problem while, 46.11 per cent of pomegranate growers did not experienced this problem.

The problem regarding Stem boring beetles (47.21 per cent) of pomegranate growers perceived as problem among them 21.66 per cent of the pomegranate growers perceived it as most important while, 13.33 and 12.22 per

cent perceived it as important and less important whereas, (52.77 per cent) of the growers did not faced this problem.

The problems regarding whitefly was experienced by 51.10 per cent of the pomegranate growers among them 22.77 and 21.11 per cent of the pomegranate growers who perceived it as most important and important problem while, 7.22 per cent of growers perceived it as less important problem whereas, 48.88 per cent of growers did not faced the problem.

In problem of fruit sucking moth 48.31 per cent of the pomegranate growers faced this problem among them (18.88 per cent) and (17.77 per cent) perceived as most important and important problem while, 11.66 per cent of them perceived as less important problem whereas, (51.66 per cent) of the growers did not experienced this problem.

In problem of anar butterfly 69.99 per cent of the pomegranate growers faced this problem among them (40.00 per cent) and (21.11 per cent) perceived as most important and important problem while, 08.88 per cent of them perceived as less important problem whereas, (30.00 per cent) of the growers did not experienced this problem.

**Table 3 : Relationship between personal, socio-economic, psychological, communicational and situational characteristics with problems faced by pomegranate growers in pomegranate cultivation practices (n = 180)**

Sr. No.	Independent variables	Correlation Coefficient ('r' value)Problems
X <sub>1</sub>	Age	-0.91**
X <sub>2</sub>	Education	-0.87**
X <sub>3</sub>	Size of land holding	-0.144 <sup>NS</sup>
X <sub>4</sub>	Area under pomegranate	-0.144 <sup>NS</sup>
X <sub>5</sub>	Social participation	0.29**
X <sub>6</sub>	Annual income	-0.278**
X <sub>7</sub>	Risk preference	-0.136 <sup>NS</sup>
X <sub>8</sub>	Economic motivation	-0.272**
X <sub>9</sub>	Attitude	-0.321**
X <sub>10</sub>	Source of information	-0.191*
X <sub>11</sub>	Extension participation	-0.243**
X <sub>12</sub>	Cosmopolitaness	-0.213**
X <sub>13</sub>	Distance from market	0.199**
X <sub>14</sub>	Marketing channel	-0.136 <sup>NS</sup>
NS	= Non-Significant	
*	= Significant at 0.05 level of significance, and	
**	= Significant at 0.01 level of significance.	

28.32 per cent of the pomegranate growers among them 15.00 and 08.88 per cent of the pomegranate growers who perceived it as most important and important problem while, 4.44 per cent of growers perceived as less important problem whereas, 71.66 per cent of growers did not faced the problem.

In problem of Scolytid beetle 34.99 per cent of the pomegranate growers faced this problem among them (13.33 per cent) and (11.66 per cent) perceived as most important and important problem while, 10.00 per cent of them perceived as less important problem whereas, (65.00 per cent) of the growers did not experience this problem, which were ranked as first to eighth, respectively.

Table 3 showed that the relationship of problems experienced by pomegranate growers in pomegranate practices was observed positive and highly significant with social participation and distance from market whereas, negative and highly significant with seven independent variables viz., age, education, annual income, economic motivation, attitude, extension participation and cosmopolitaness. While, the independent variables area under pomegranate and source of information were found negatively and significantly correlated with problems. Size of land holding, risk preference and marketing channel had negative and not significant relationship with problems experienced by them.

The problems of mealy bugs was experienced by

**Table 4 : Multiple regression analysis of the selected independent variables with problems faced by pomegranate growers in pomegranate cultivation practices (n=180)**

Sr. No.	Variables	Regression coefficient (b)	S.E. of b	't' value
[I]	<b>Personal characteristics</b>			
X <sub>1</sub>	XAge (X <sub>1</sub> )	0.000	0.009	-0.059
X <sub>2</sub>	Education (X <sub>2</sub> )	-0.382	0.068	-5.629
[II]	<b>Socio-economic characteristics</b>			
X <sub>3</sub>	Size of land holding (X <sub>3</sub> )	-0.134	0.060	-2.240
X <sub>4</sub>	Area under pomegranate crop (X <sub>4</sub> )	-0.253	0.111	-2.276
X <sub>5</sub>	Social participation (X <sub>5</sub> )	-0.227	0.087	-2.610
X <sub>6</sub>	Annual income (X <sub>6</sub> )	-0.313	0.082	-3.816
[III]	<b>Psychological characteristics</b>			
X <sub>7</sub>	Risk preference (X <sub>7</sub> )	0.356	0.044	8.175
X <sub>8</sub>	Economic motivation (X <sub>8</sub> )	0.035	0.046	0.755
X <sub>9</sub>	Attitude (X <sub>9</sub> )	0.093	0.016	5.628
[IV]	<b>Communicational characteristics</b>			
X <sub>10</sub>	Source of information (X <sub>10</sub> )	0.106	0.033	3.270
X <sub>11</sub>	Extension participation (X <sub>11</sub> )	0.157	0.015	10.279
X <sub>12</sub>	Cosmopolitaness (X <sub>12</sub> )	-0.171	0.027	-6.348
[V]	<b>Situational characteristics</b>			
X <sub>13</sub>	Distance from market (X <sub>13</sub> )	-0.115	0.034	-3.383
X <sub>14</sub>	Marketing channel (X <sub>14</sub> )	-1.199	0.110	-10.900

\* = Significant at 0.05 level

\*\* = Significant at 0.01 level

R<sup>2</sup> = 0.797

Multiple 'R' = 0.893

All the independent variables mentioned in Table 4 explained as much as 79.70 per cent of total variation in problems faced by respondents in recommended pomegranate cultivation practices. The unexplained variation of 20.30 per cent may be due to the factors outside the scope of the study.

Table 4 further shows that, 't' values of twelve variables viz., education (-0.382), size of land holding (-0.134), area under pomegranate (-0.253), social participation (-0.227), annual income (-0.313), risk preference (0.356), source of information (0.106), extension participation (0.157), cosmopolitaness (-0.171), distance from market (-0.115), marketing channel (-1.199) and attitude (0.093) were significant either at 0.05 or at 0.01 levels of significance. Thus, these fourteen variables significantly contributed in

explaining the variation in problems faced by pomegranate growers in pomegranate cultivation practices.

It can thus, be concluded that 79.70 per cent total variation in problems faced by pomegranate growers in adoption of recommended pomegranate cultivation practices was explained by a set of 14 independent variables together. Out of 14 variables, twelve variables viz., education, size of land holding, area under pomegranate, social participation, annual income, risk preference, source of information, extension participation, cosmopolitaness, distance from market, marketing channel and attitude had significant contribution in problems faced by pomegranate growers in adoption of recommended pomegranate cultivation practices.

**Table 5 : Step-wise multiple regression analysis of the of the independent variables with respondents problems regarding pomegranate cultivation practices (n=180)**

Sr. No.	Independent variables	Partial Regression coefficient (b <sub>i</sub> )	S.E. of b <sub>i</sub>	't' value
1	Marketing channel (X <sub>14</sub> )	-1.211	0.108	-11.194
2	Risk preference (X <sub>7</sub> )	0.358	0.043	8.292
3	Extension participation (X <sub>11</sub> )	0.156	0.015	10.308
4	cosmopolitaness (X <sub>12</sub> )	-0.171	0.027	-6.400
5	Education (X <sub>1</sub> )	-0.382	0.063	-6.105
6	Attitude (X <sub>9</sub> )	0.092	0.016	5.656
7	Annual income (X <sub>6</sub> )	-0.319	0.081	-3.958
8	Area under pomegranate (X <sub>4</sub> )	-0.256	0.110	-2.322
9	Distance from market (X <sub>13</sub> )	-0.115	0.034	-3.385
10	Source of information (X <sub>10</sub> )	0.106	0.032	3.284
11	Social participation (X <sub>2</sub> )	-0.219	0.086	-2.550
12	Size of land holding (X <sub>3</sub> )	-0.128	0.059	-2.170
Constant = 20.932		R <sup>2</sup> = 0.797		Multiple 'R' = 0.893

It is clear from Table 5 that twelve variables viz., education, size of land holding, area under pomegranate, social participation, annual income, risk preference, source of information, extension participation, cosmopolitaness, distance from market, marketing channel and attitude put together explained as much as 79.70 per cent of total variation in problems faced by pomegranate growers in recommended pomegranate cultivation practices.

## CONCLUSION

It is concluded that the analysis of problem intensity based on mean score data clearly indicate that fruit spot of pomegranate disease was the most important problem ranked first followed by wilt (3.00 mean score), fruit rot (2.91 mean score), leaf spot (2.40 mean score), nematode/physiological disorder (2.06 mean score), bacterial blight (2.03 mean score) and oily spot (1.82 mean score) were ranked second

to seventh as order of importance of problems experienced by pomegranate growers. It is obvious that the fruit spot wilt, fruit rot were the important disease of pomegranate reported by the pomegranate growers. In case of the important problems regarding pest as reported by the pomegranate growers were; thrips (2.71 mean score), anar butterfly (2.31 mean score) and shot hole borer (2.22 mean score) as ranked first, second and third. There might be the possible reasons like weather condition of area; lack of knowledge of proper control measures, excessive use of pesticides and farmers mainly takes all the advice from the private input dealers for the problems of diseases and pest of pomegranate.

## CONFLICT OF INTEREST:

All authors declare that they have no conflict of interest

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