



ORIGINAL RESEARCH PAPER

Botany

SURVEY ON POMEGRANATE ORCHARD HEALTH IN RELATION TO NUTRIENT AND DISEASE MANAGEMENT

KEY WORDS: pomegranate, Nutrient Management, Disease Management.

S. K. Alane Department Of Botany, Dayanand Science College, Latur.

S. D. Dhavle Department Of Botany, S.A.S. College. Mukhed, Dist. Nanded.

C. S. Swami Department Of Botany, Dayanand Science College, Latur.

ABSTRACT The present survey was conducted during year 2013 -14 at village Shivli, Tahsil: Ausa, District: Latur, on 10 orchards having plantation of Bhagwa variety of pomegranate, maintained variably by farmers. Weekly visits, discussion with farmer and observations were done regularly. It is observed that the orchards which were maintained properly regarding nutrient and disease management practices had incidence of bacterial blight which increased as season passes but the incidence of fungal diseases was very less. On the other hand the orchards which are not maintained since one year do not show incidence of bacterial blight though other fungal disease incidence was very high.

INTRODUCTION:

Pomegranate (*Punica granatum* L.) is a shrub from family lythraceae. The fruits are delicious, refreshing, had high nutritional properties and contain sugars, polyphenols, antioxidants and vitamins. Now a day's pomegranate plantation is expanded throughout the world except some extremely cold regions. The plant can survive under semi arid to arid climatic conditions and therefore it is one of the best fruit crop choice by farmers in Maharashtra, Andhra Pradesh, Telengana, Karnataka, Tamil Nadu, Gujarat, Rajasthan and Madhya Pradesh etc. states of India. Though this fruit crop is best regarding edaphic and climatic requirements and had good domestic and export markets but the cultivation has a challenge from a bacterium *Xanthomonas axonopodis* pv. *Punicae*, the causal Organism of bacterial blight disease of Pomegranate. This disease damages the quality and quantity and fruits are not of saleable quality in domestic as well as in export markets. The diseased leaves and fruits develop oily spot, over the time, oil spots develop into brownish black patches of dead tissue, further leads to leaf drop and fruit split and drop Sharma et.al. (2017). The bacteria can spread through the vascular tissues of plant to other plant part Ryan et.al. (2011). In field bacterial blight spread through rainwater human interference, farming tools Sharma et.al. (2015). Nutrient and disease management practices play important role in the plant health. It is observed that bacterial blight disease management with five spray of Bactinashak (500 ppm) in combination with COC (2000 ppm) was effective in reducing the disease Ravikumar and Yenjerappa (2005). The disease resistance is higher in plant when they are supplied with sufficient nutrients. Here in present study the survey of 10 orchards was done by taking the data of nutrient supply and disease management practices and orchards health was observed.

MATERIAL AND METHODS:

Weekly visits were done to 10 orchards form January 2013 to June 2013. In most of these orchards, the ambia bahar was followed. The farmers gave irrigation gap of about one month called bahar treatment. During bahar treatment, most of farmers apply organic manure like poultry litter and FYM along with chemical fertilizers like DAP, MOP, urea, zinc sulphate, ferrous sulphate, magnesium sulphate, calcium sulphate, and mix micronutrients. After one month, irrigation was started and a spray of ethrel was taken for senescence followed by spray of Bordeaux mixture. Within a week, sprouts were developed and in a month plant were flourished with flowers. Here at this stage the bacterial blight disease was appearing on the leaves, flowers and young fruits.

During the bahar farmers provide nutrients through drip irrigation in the form of soluble fertilizer like 19:19:19, 12:61:00, 00:52:34, phosphoric acid, potash, Jivamrut, calcium

nitrate, zinc sulphate, magnesium sulphate, ferrous sulphate, boron, etc.

Disease control was done by periodic spray of Roko, Bavistin, M-45, Z-78, Bordeaux mixture, copper hydroxide, Streptocycline, Bactinashak etc.

Table 1.

Orchard no.	Name of Farmer	Survey/ Gat no.	Cultivation area (In Acres) and No. of plants	No. of Plants
1	Limbraj Kundlik Alane	172	3	1400
2	Shivaji Kundlik Alane	165	4	1050
3	Mahaling Kashinath Chikle	180	2	500
4	Satish Dagdu patil	430	3	900
5	Laxman Narayan Surwase	422	2	669
6	Jaishri Narayan Patil	423	2	530
7	Balaji Nivarti Alane	439	1.75	502
8	Rajaram Sopan Surwase	390	2	650
9	Dinkar Mahadev Mohite	182	1.5	450
10	Vijaykumar Kashinath Kshirsagar	170	1.5	500

Table 1 has data of orchard number, name of the farmer, Survey/ Gat no., area under pomegranate cultivation (in acres) and number of pomegranate plants

From Table 2 orchards number 1, 2, 4 and 6 applied organic manure, chemicals fertilizer as per NRCP Solapur recommendations during rest and bahar period. In these orchards disease control spray schedule was also up to the recommendation of NRCP. Orchards number 3, 5, 7 and 8 applied organic manure and chemical fertilizer quite less than the NRCP recommendation and disease control spray schedule was also quite less frequent. Orchard number 9 and 10 do not maintain their orchards since last one year or more.

Nutrient management and Disease management practices were represented by 0 to 10 scale. The scale was decided on the basis of National Research Centre for Pomegranate, Solapur (NRCP) recommendation schedule. The farmer's who followed these schedule up to the recommendation of NRCP had 10 points, with the reduction in application of fertiliser and disease control spray, the points reduced, the farmer's who do not apply any fertiliser or disease controlling sprays were given zero points.

Each time sampling was done by collecting 5 twigs of equal size. From each orchard 4 twigs were collected from 4 corners and one from centre of orchard. Total leaves and fruits were counted and diseased leaves and fruits were separated and

counted.

The bacterial blight disease and other fungal diseases severity on fruit and leaves was recorded separately. The disease severity was Calculator in percentage.

Percent disease incidence or disease index Wheeler 1969 was followed to calculate the percent severity of disease incidence.

Bacterial Blight Disease Incidence (in %)

$$= \frac{\text{Number of BB infected Fruits + leaves}}{\text{total Fruits + leaves studied}} \times 100$$

Fungal Disease Incidence (in %)

$$= \frac{\text{Number of Fungal infected Fruits + leaves}}{\text{total Fruits + leaves studied}} \times 100$$

Table 2

Orc hard no.	Nutrie nt Mana geme nt practi ces.	Dise ase Mana geme nt practi ces.	Early season		Mid Season		Late season		Sal eab le frui ts (in %)
			B. B. (in %)	F.D. (in %)	B. B. (in %)	F.D. (in %)	B. B. (in %)	F.D. (in %)	
1	9	9	2	2	19	3	76	3	5
2	10	9	1	1	6	2	60	2	7
3	7	7	5	3	24	5	79	6	0
4	10	10	1	1	5	2	55	3	10
5	8	6	5	3	26	4	85	5	0
6	9	9	2	1	7	4	71	4	6
7	8	7	4	4	39	4	76	5	0
8	8	7	8	5	61	7	88	9	0
9	0	0	0	43	0	47	0	50	0
10	0	0	0	40	0	43	0	45	0

RESULT AND DISCUSSION:

The orchid number 1, 2, 4 and 6 were maintained up to the recommendations of NRCP, Solapur for nutrient and disease management practices. These orchards had very less bacterial blight disease incidence of 2%, 1%, 1% and 2% respectively, other fungal disease incidence of approximately 2%, 1%, 1% and 1% respectively during early season and had very well developed leaf canopy. In mid season, during fruit growth phase Bacterial blight disease incidence was increased to 19%, 6%, 5% and 7% respectively and other fungal disease incidence was increased to approximately 3, 2, 2 and 4% respectively here at this stage leaf canopy was medium. In the late season that is during harvesting stage these orchards had bacterial blight disease incidence of 76%, 60%, 55% and 71% respectively where as other fungal disease incidence was 3%, 2%, 3% and 4% respectively.

Orchards number 3, 5, 7 and 8 were maintained quite below the recommendation of NRCP, Solapur recommendation for nutrient and disease management practices. These orchards had bacterial blight disease incidence of 5%, 5%, 4% and 8% percent respectively during early season and other fungal disease incidence was about 3%, 3%, 4% and 5% respectively. In mid season the bacterial blight disease incidence was 24% 26% 39% and 61% respectively and other fungal diseases are 5%, 4%, 4% and 7% respectively. During late season the bacterial blight disease incidence was 79%, 85%, 76% and 88% respectively whereas the fungal diseases incidence was 6%, 5%, 5% and 9% respectively.

The orchard number 9 and 10 were not maintained since last one year or more had no incidence of bacterial blight disease during early season but other fungal disease incidence was 43% and 40% respectively. During mid season these was no any incidence of bacterial blight but other fungal disease incidence was about 47% and 43% respectively. During late season these orchards show no incidence of bacterial blight disease whereas other fungal disease incidence was 50% and

45% respectively.

Saleable fruit with low quality were very less in orchard number 1(5%), 2(7%), 4(10%) and 6(6%), whereas the saleable fruits were not available in all other orchards.

CONCLUSION:

It is observed that farmers who take proper care of there orchards with respect to nutrient and disease management had very less incidence of fungal disease throughout the season but bacterial blight disease incidence was low during early season which increased as season passes and reached up to 88% at the time of harvesting. On the other hand the farmer's who do not maintain their orchard since last one year or more do not show bacterial blight disease incidence in their orchards though other fungal disease incidence was about 50%.

That controversial situation may be due to the natural antagonistic organisms present in the field and around the plant. The antagonistic microorganisms might be killed in orchards which are regularly sprayed with fungicides and antibiotics. Orchards which were not maintained since last one year or more may had antagonistic microorganisms in field and on the surface of plant which may be controlling the Xanthomonas axonopodis pv. punicae the causal organism of bacterial blight disease of pomegranate.

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