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Improved management practices in pomegranate cv. Bhagwa

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Abstract

The trial on improved management practices in pomegranate was conducted in 25 ha with 50 no. of farmers at Singanamala Mandal, Narpala mandals of Anantapuram district. Results revealed that management of bacterial blight along with improved management practices right from pruning to fruiting and harvesting gave improved yields of 19.2% increase in demonstration compared to the farmers practice with support of technology as given by the proven results by Horticulture Research Station, Rekulakunta of Dr. YSR Horticulture University, Tadepalligudem. Net returns were 25% more compared to the farmers practice.

Keywords: Pomegranate, bacterial blight, yields, net returns

Introduction

Pomegranate (*Punica granatum* L.) is an important fruit crop of arid and semiarid regions of the world. It belongs to the family 'Punicaceae'. It is one of the oldest known edible fruits (fig, date, olive, grape, and pomegranate) and is associated with ancient civilizations of the Middle East. Pomegranate is a highly remunerative crop for replacing subsistence farming and alleviating poverty. It has now been taken to most parts of the tropics and subtropics occupying an area of 1442 ha in Anantapuramu dist. The best quality fruits are produced in Anantapuram dist., A.P. with cool winters and hot dry summers and it does not fruit well in very humid climate can be grown upto an altitude of 500 m. above M.S.L. It thrives well under hot, dry summer and cold winter provided irrigation facilities are available. The tree requires hot and dry climate during fruit development and ripening. Pomegranate tree is deciduous in areas of low winter temperature and an evergreen or partially deciduous in tropical and subtropical conditions. It can tolerate frost to a considerable extent in dormant stage, but is injured at temperature below -11°C . Keeping these facts in view the present demonstration was carried out. India is one of the leading producers of fruits in the world. Fruit crops are cultivated in India over 63.83 million ha with a total production of 748.78 million tones annum and productivity of 11.7 tones ha^{-1} . During 2010-11, the pomegranate was cultivated over 1.07 lakh ha with a total production of 7.43 lakh tones and productivity of 6.9 tones ha^{-1} in India (NHB, 2012). Improved management practices which include bacterial blight management which is the major problem in Anantapuramu dist. will increase the yields and net returns as documented the success story by Krishi Vigyan Kendra, Reddipalli, Anantapuram dist.

Materials and Methods

The demonstration was conducted on 5-year-old pomegranate plants of cv. Bhagwa growing under high density planting system (2 m x 2 m) at fields of adapted villages Peravali, Nayanavaripalli, East Narsapuram villages of Singanamala, Narpalamandals of Anantapuram dist. for five years from 2013-2018 The experiment was conducted on 30 plants in randomised block design.

Selection of village

The cultivation of pomegranate is predominant in B.K. samudram, Singanamala mandal of the KVK adapted villages, hence they were selected for the present study based on their area and production. Participatory Rural Appraisal (PRA) was used to access the real information of the village and villagers. The farming pattern of the village was assessed in which the cultivator's group was categorized in grain, cereal, potato, fruits, vegetable and flower cultivator etc. Among them the major group of fruit cultivator were approached. The main focus was given on those groups where bacterial blight was the major problem who has faced loss of about 80% and were removing the orchards.

Package of practices: Pomogranate was cultivated as dry land horticulture crop in arid region. Field should be cleared of all weeds, unwanted bushes and trees and leveled by ploughing and planking, prior to making of pits in a new orchard. Prune ground suckers, water shoots, cross branches, dead, dry and infected branches and twigs. Don't remove terminal portion of a bearing branch, this will lower the yield. While pruning, take care to disinfect the secatures with dettol (1%) or sodium hypochlorite (1%), so that infection, if any, may not spread from one to other.

Manures and fertilizers: (VT Jadhav *et al.*, 2009)

Table 1: Application of fertilizers like nitrogen, phosphorous & potash in the form of urea, single super phosphate & murate of potash per plant has been mentioned as P @ 250 gms/plant upto 4 years & 625 gms for next 5th year onwards N @ 125g upto 2 years and 500gms for 3rd & 4th year whereas 250gms for the 5th year & above whereas K@ 125gm/plant upto 3rd year and 250 gm/plant for the 4th year & above.

Age of the plant (years)	FYM (Kg)	Nitrogen (gms)	Phosphorous (gms)	Potash (gms)
1	10	250	125	125
2	20	250	125	125
3	30	500	125	125
4	40	500	125	250
5 & above	50	625	250	250

Bacterial blight management aspects to be followed (VT Jadhav *et al.*, 2009):

Table 2: As mentioned in table 2 schedule for management of bacterial blight has been followed right from selection of disease free plants from nursery itself, spacing maintenance of 4x4 m. followed by pruning of infected plants, spraying of 1% Bordeaux mixture, copper oxi chloride @ 30 gm + 3gm streptocycline twice with 10 days gap as per the schedule gave good results & yield which has reduced cost of cultivation.

Steps	Details (after 1 st year)
1	Selection of disease-free plants.
2	4x4 m. spacing for plants
3	Dip pruning secatures in dettolspirit (1%)
4	Cut the stems diseased 2 inches below
5	2% urea or ethereal defoliation (2 ml lit ⁻¹ of water)
6	Prune infected twigs & clean cultivation in basins and rows
7	Sprinkle bleaching powder in basins and rows (8-10 Kg acre ⁻¹)
8	After pruning spray 1% Bordeaux mixture
9	Based on rainfall spray COC @ 30g + 5 g 10 lit. of water twice with 10 days gap.
10	In flowering stage use carbendizium instead of COC
11	September - October pruned plants get bacterial spot in Dec-Jan
12	4-5 months rest after harvest and spray 1% bordeaux mixture
13	Along with Recommend dose of fertilizers Znso ₄ , Feso ₄ and MgSo ₄ @ 2 g each boric acid 1 g lit ⁻¹ of water. has been sprayed
14	250ppm Streptocycline + 0.25% COC
15	Third spray 1% Bordeaux spray (0.4%)
16	4 th spray Streptocycline + 0.10% Carbendizium
17	Streptocycline 500ppm (8-10 days interval)
18	Less water requirement is for pomogranat. Excess water encourages fresh growth.

Application of irrigation water and fertilizers through drip is the most effective way of supplying water and nutrients to the plant roots. These inputs are effectively utilized by plants as these are placed near crop root zone. For proper irrigation management, irrigation scheduling is essential, which is the process by which an irrigator determines the timing and quantity of water to be applied to the crop. Pomegranate requires supplemental irrigation and water itself is a limiting factor for commercial cultivation in arid region (Prasad *et al.*, 6) [6]. Drip irrigation along with fertigation is an appropriate answer, particularly for horticultural and cash crops as it permits the farmer to limit the watering as per water requirement of plants and optimum application of fertilizers through drip irrigation system, which enhance production and productivity per unit area. This technology saves water and fertilizers from 30 to 50 per cent (Pampattiwar *et al.*, 5) [3]. Keeping these facts in view the present experiment was carried out.

Fruiting can be taken from 4th year onwards, in bearing trees, apply N in split doses, starting at the time of first irrigation after bahar treatment and next at 3-4 weeks interval. Full dose of P and K should be applied as single dose with first irrigation. Fertilizers have been applied 30-45cm away below tree canopy upto 8 -10cm. depth covered with top soil and irrigate. If it's the drip system all fertilizers were applied in six equal split doses at 15-day intervals (from 16 August to 30 October). Weighed quantity of water-soluble fertilizers (19:19:19) along with muriate of potash as per treatment requirement were added in water and injected through ventury meter. Foliar aprays of 0.25% each of Znso₄, Feso₄ and MnSo₄ combined with 0.2% boric acid at flower initiation, increases yield, improves quality and reduces cracking of fruits. (LaRue, 1980; Obreza *et al.*, 2010; Fernandez *et al.*, 2013) [7, 5, 4] Pomogranate can bear throughout the year, three main bahars can be taken. Locking into the advantages and damage due to bacterial blight, hast bahar is recommended in blight affected areas. In other areas it can be taken depending on water availability and dmand. Hastbahar crop produces of superior quality and size.

Treatment (T1): This is the demonstration treatment consists of water management, fertilizer management & bacterial management totally integrated crop management aspects taken as source from Horticultural Research Station, Rekulakunta, Ananthapuramu Dist.

Treatment (T2): This treatment includes farmers practice of indiscriminate use of complex fertilizers like 12.26.0, 13.0.45, 19.19.19 etc. and also use of plant protection chemicals especially pyrethroids for thrips and fruit borer damage.

Disease diagnosis: Bacterial blight is also known as nodal blight or black spot caused by *Xanthomonas Axonopodis Pv Punicae*

Percent incidence (PI) = Total no. of infected leaves/ Total no. of leaves observed x 100

Table 3: Scale for measurement of Bacterial Blight (Fruits) Demo: Upto1 & FP: >1-10 (VT Jadhav *et al.*, 2009)

Grade	Area covered (%)	Description
0	0.00	Healthy
1	Up to 1	<ul style="list-style-type: none"> 1-2 lesions / fruit Lesions not very big
2	>1-10	<ul style="list-style-type: none"> 3-5 lesions / fruit Lesions small/big but not coalesced Small cracks on lesions
3	>10-20	<ul style="list-style-type: none"> 6-8 lesions/fruit Some lesions big, scattered or coalesced Small cracks on some/all lesions
4	>20-40	<ul style="list-style-type: none"> 9-10 lesions / fruit Lesions very big and osome coalesce Cracks on almost all lesions
5	>40-70	

Results and Discussion

Results revealed that integrated crop management aspects in pomegranate treatment 1 showed 21.5% increase in yield over the treatment 2 as mentioned in table 1. In response with proper fertilizer management and micronutrient foliar application of micronutrients fruit yield was increased and disease score recorded in farmers practice is up to 1 in demo and > 1-10 in farmers practice (Chauhan and Chandel, 2008) [8]. This maintains the soil moisture at optimum level eliminating water stress the plant resulting in greater vigour (Subramanian, *et al.*, 10) [9].

Table 4: Performance of crop and economic outcome

Details	Demo	Farmers practice
Area (ha.)	5	5
No. of farmers	10	10
Soil type	Irrigated alfisols	Irrigated alfisols
Yield (kg ha ⁻¹)	33712	26460
Gross returns (Rs. ha ⁻¹)	485460	381024
Cost of cultivation (Rs. ha ⁻¹)	74800	75800
BC ratio	5	6
% increase over control	21.5	

Performance of crop and economic outcome: The data Table 4 indicated that the existing local farmers practice (treatment 2) of indiscriminate use of fertilizers, plant protection chemicals was out performed by demonstration of Integrated crop management practice (treatment 2) in pomegranate in parameters. Net returns in the demo plot was Rs.410660/- with benefit cost of 6:1 whereas in farmers practice net returns obtained was Rs.305224/- with benefit cost of 5:1. Finally It is evident from the data that fertigation. Management of bacterial blight and drip irrigation levels had significant effect on the yield attributes and the average data of five years indicate that there is 25.6% increase in the net returns in the demonstration of treatment 1 over the farmers practice which is the treatment 2. Rana *et al.* [7]

Conclusion

It can be concluded that all category of farmers from small to large particularly dry land pomegranate farmers if devote the cultivation with integrated crop management aspects will obtain improved yields with an average of 21% increase over the regularly followed package of practices followed by the farmer. The farmers named Sri. Subbaraiyudu has received profit of an amount of 8 lakhs from pomegranate which is cultivated in 2ha. by adapting integrated crop management practices and his success story was uploaded in Youtube with link <http://youtu.be/xovfs331swu>

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