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EFFECT OF INTEGRATED MANAGEMENT PRACTICES ON THE YIELD OF ASLP MANGO DEMONSTRATION BLOCK

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ABSTRACT: *The Studies on the different management practices were carried out in the ASLP-Mango Integrated Research block at district Mirpurkhas, Sindh Pakistan. The experiment was laid out with randomized complete block design, having four treatments such as Pruning + Fertilizer applications +Fungicide and insecticide applications + Basin formations (T1), No pruning+ Fertilizer applications +Fungicide and insecticide applications + Basin formations (T2), Pruning +No Fertilizer applications+ No Fungicide and insecticide applications+ No Basin formations (T3), No Pruning+ No Fertilizer applications+ No Fungicide and insecticide applications+ No Basin formations T4 (Control) with four replications. Twenty five years old mango trees of sindhari variety were selected. The results showed highly significant difference at P < 0.05. Maximum fruit yield 406.00 kg was recorded in T2 followed by 382 and 191 kg in T4 and T1 respectively, the minimum yield 160.25 kg was obtained in T3 during 2013. The second year trial production showed highly significant effect among different treatments. The maximum fruit yield 599.25 kg was recorded in ASLP-Mango Demonstration Block T1 followed by 480.50 kg and 420.00 kg in T3 and T2 respectively whereas, the minimum yield 352 kg was obtained in block T4 during 2014. The die back disease incidence was also recorded in all treatments. The highest disease incidence 45.50 and 42 was recorded in T4 during the years of 2013 and 2014 respectively, whereas, the minimum disease incidence percent 02.00 and 21.00 was recorded in T1 during 2014 and 2013 respectively.*

Key words: Integrated, management, mango, demonstration, yield

INTRODUCTION

Mango (*Mangifera. indica* L.) is one of the most popular and important delicious tropical fruits of the various countries including Philippine, Mexico, India, Brazil, Pakistan, China and Thailand [6]. Mango is famous among all the fruits and commonly known as "king of fruit". It is the second major fruit crop of Pakistan followed by citrus. In 1970's, Pakistan was considered as the second largest producer of the mango worldwide, however, now it is ranked down to 5th level [10]. Currently, India is a leading mango producing country followed by China, Thailand, Mexico, producing 53.51, 13.03 and 5.73 percent, respectively [5]. Pakistan produces 5.99 percent of world mango [2]. The climate conditions and soil of Pakistan are highly suitable for mango cultivation and production. In Pakistan, mango is mainly grown in Sindh and Punjab provinces with an average production of 1730 thousands metric tons on an area of 166.5 thousands hectares [3].

There are more than 250 cultivars of mango grown in Pakistan [1]. Among them few famous varieties produced by Sindh province of Pakistan such as Sindhri, Zafran, Siroli, Langra, Dusehri and Gulab Khasa amongst the early varieties, whereas Swarnarika, Summer Behisht, Chaunsa, Beganpali, Saleh Bhai and Anwar Ratole from mid-season and Neelum as late season variety [7].

The yield and quality of mango crop is affected due to many biotic and abiotic factors. The mango seedlings, trees and fruits are attacked and damaged by different diseases and pests. Among them anthracnose, powdery mildew, mango malformation and die back diseases are most important fungal diseases in terms of yield reduction. Mango yields in Pakistan is reported, 8-9 tonnes/ha, which is quite considerably less than the average world yield of 25 tonnes/ha [9]. The gap between potential and actual yields is very wide. This yield gap is the result of poor management practices and post-harvest losses. It has been observed that the majority of growers do not follow the recommendations for an effective use of fertilizer, sprays, pruning practices and timely irrigation.

Keeping in view the economic importance of mango and the role of integrated management practices for the improvement of yield and its components, the present studies were under taken to assess the effect of different integrated management practices on the yield and disease incidence in the mango orchard.

MATERIALS AND METHODS

The experiment was carried out at ASLP-Mango Integrated Research block at district Mirpurkhas, Sindh, Pakistan in 2 consecutive years i.e. 2012-13 and 2013-14. Twenty five years old orchard of the mango variety Sindhri were selected for studies. The trees were 35 feet high with almost same canopy diameter, planted 40 by 40 feet. The canopy after pruning was maintained at 25 feet height and canopy diameter in TI &T3 blocks but as control The actual size of the tree was maintained in T2 & T4 blocks. Two scheduled foliar sprays of copper oxychloride at the rate of 300g/100 lit water and lambda-cyhalothrin 50ml/100 lit water were applied during pruning and vegetative phases of mango tree. Two kg of NPK fertilizer (17-17-17) per plant was applied immediately after pruning and again after fruit set when fruit were at pea size stage, Basins were made around the main trunk of plant to restrict contact of irrigation water with the trunk (T1 & T2). In the traditional farmer managed block

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(T4) there was no pruning, no spraying, no fertilization and no basin formation. In ASLP integrated research site Irrigation was stopped only in dormancy period (November to January) where as it remained continue in the all other blocks on monthly interval. But after the dormancy period irrigation was continued fortnightly in every block.

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EXPERIMENTAL DESIGN

The experiment was laid out in randomized complete block design with four treatments and four replications as follows.

T1= Pruning+Fertilization+Fungicide and insecticide applications+Basin formations

T2=No pruning+ Fertilization +Fungicide and insecticide applications + Basin formations

T3=Pruning +No Fertilization+ No Fungicide and insecticide applications+ No Basin

T4= No Pruning+ No Fertilization+ No Fungicide and insecticide applications+ No Basin formations (Control)

Yield was recorded in Kilo Grams of 16 trees from each treatment for both years 2013 and 2014 of the experiment

Disease incidence was recorded from each treatment for both years 2013 and 2014 of the experiment

Data analysis

The data was analyzed through 'Statistix 10" model by using computer software package.

RESULTS AND DISCUSSION

Effect of different practices on the mango fruit yield

Effect of pruning, fertilizing, fungicide/insecticide applications and basin formation on the total fruits weight of mango Sindhri cultivar are shown in table. 1. It indicates that these practices could increase fruits yield in each treatment in the second year of practices 2013-2014 but the yield of fruits reduced in the first year of trial.

Table 1. Effect of IMP (Integrated management practices) on the yield 2013 - 2014

Treatments	Yield in Kilogram	
	2012-2013	2013-2014
Pruning + Fertilization +Fungicide and insecticide applications + Basin formations (T1)	191.00 c	599.25 a
No pruning+ Fertilization +Fungicide and insecticide applications + Basin formations(T2)	406.00 a	420.00 c
Pruning +No Fertilization + No Fungicide and insecticide applications+ No Basin (T3)	160.25 d	480.50 b
No Pruning+ No Fertilization + No Fungicide and insecticide applications+ No Basin formations T4(Control)	382.00 b	352.50 d
LSD =<0.05	12.829	38.974
Standard error	4.1067	12.476

Table 2. Effect of IMP (Integrated management practices) % increase/Decrease in yield.

TreatmentsIncreases /decrease %		
	2013	**2014**
Pruning + Fertilization +Fungicide and insecticide applications + Basin formations (T1)	**-50**	**70**
No pruning+ Fertilization +Fungicide and insecticide applications + Basin formations(T2)	**6.28**	**19.14**
Pruning +No Fertilization+ No Fungicide and insecticide applications+ No Basin (T3)	**-56.70**	**36.17**
No Pruning+ No Fertilization+ No Fungicide and insecticide applications+ No Basin formations T4(Control)	**----**	**-7.72**
(+) value= yield increase %, (-) value = yield decrease %		

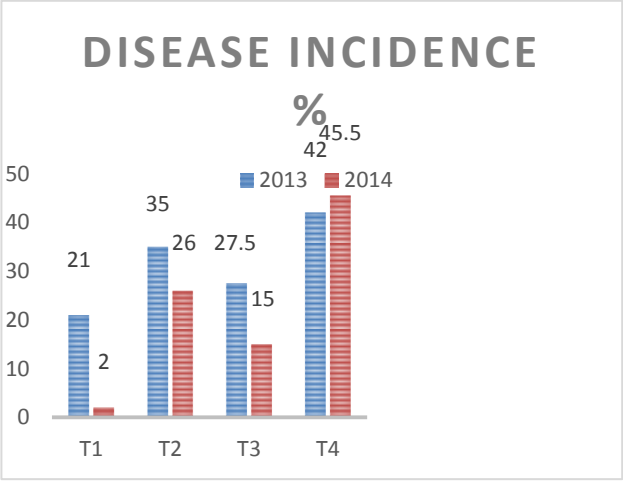

Fig.1. Effect of IMP practices on the disease incidence %

Disease incidence % = Number of infected branches x 100
Total No. of branches counted

The results showed that there was a highly significant effect (P<0.05) of different treatments on fruit yield of mango. The maximum yield 406.00 kg mango fruits were recorded in T2 followed by 382 and 191 kg T4 and T1 blocks respectively. The minimum yield 160.25 kg fruit obtained from block T3in the first year of the integrated management practices during 2013. The second year trial production showed highly significant among various treatments. The maximum fruit yield 599.25 kg was recorded in T1 followed by 480.50 kg and 420.00 kg in T3 and T2 blocks respectively whereas, the minimum yield 352 kg was obtained in Farmers block T4in 2014(Table.1).

The results presented in table .1 that if we reduces the size of plants by pruning the fruit yield decreases although putting the fertilizer N P K in the treatments T1 & T2 during the first year of practices but the fruit yield increases very high after the second year of pruning and fertilizations. Our results also resembles of Muji *et al*. [8] studies they reported that total

production of mangoes also increased due to pruning and fertilizing treatments. Mango production management through a combination of ZA fertilizer 500 gram + 1500 gram of SP36 + 1000 gram of KCl + 80 gram B + pruning could increase total production of the trees in each treatment. Moreover, it was also observed from the data that the yield production of mango fruits of all pruned plants increases with the passage of time but the yield of the un- pruned plants decreases as the time increases.

Effect of integrated management practices on increase/decrease in fruit yield

Table. 2 indicates that the severe pruning decreases the mango fruit yield ranging from50 (T1) to 56.70% (T3)even fertilizer, fungicides and insecticides applied but the yield of un- pruned (T2) increases 6.28% as compare to control (T4) in 2013 but the yield of severely pruned tree (T3&T1), increase ranging from 36.17 to 70 % fruit yield as compare to control whereas, the yield of un-pruned trees (T2) also increases the yield up to 19.14 % possibly due to fertilizer and pesticides applications but in control (T4) yield decreases 7.72 % as compared to last year yield in 2014.

It was also observed that the yield % increases after two years by applying the practices such as Pruning, fertilizer applications, fungicides and insecticide applications but if the "IMP" decreases the yield % also decreases.

Similarly Jorquera et al. [4] reported that yield and berries per plant significantly increased with decreasing pruning severity. For 4-year old blueberry plants, the slightly pruned plants had 1.3 times and 2.2 times higher yields than conventionally and severely pruned plants, respectively. For 5-year old plants, it was assessed from data that integrated management practices specially pruning by reducing the size of plant have negative impact on the yield in the first year of practices but very positive response on yield after the second year of practices.

Effect of integrated management practices on the die back disease incidence

The results showed highly significant difference at $P < 0.05$. Figure. 1 indicated that the highest 42% disease incidence was recorded in block four (T4) in which no pruning and other practices were adopted by the grower however, the minimum die back disease incidence % 21 followed by 27.5 and 35 % in T1, T3 and T2 respectively in 2013. Whereas, in 2014 the maximum 45.5 % followed by 26% and 15% die back disease incidence was recorded in T4, T2 and T3 respectively but the minimum 2% disease incidence was assessed in ASLP-Mango demonstration block T1 (Fig. 1).

Wangungu1 *et al*. [11] studied on selected plant nutrients, fungicides and farmer practices in managing die back disease of passion fruit in Kenya. Results of his trial indicated that slowed disease spread to uninfected vines through proper field sanitation, pruning and removal of infected plants and plant parts. In plants where infected vines were not pruned, disease severity increased from a moderate rating of between 2 and 3 to a more severe infection scores of 4 or 5 within 3 weeks.

CONCLUSIONS

It has been concluded that integrated management practices have negative impact on the yield in the first year of practices which decrease 50 % in yield loss but it also has been recorded that the 70 % yield increases in the second year of the ASLP-Practices as compare to farmer block. The die back disease incidence reduced 50 % in the first year of ASLP-practices where as it reaches up to 2% disease incidence in ASLP-Mango demonstration block in the second year of practices as compare to control block.

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REFERENCES

[1] Anonymous. 2007. Economic Survey of Pakistan. Accountancy Accounting and Finance News, Articles and Forums (www.accountancy.com.pk) p. 15-25.

[2] Anonymous, 2006. Pakistan Statistical Year Book. Ministry of Food and Agriculture Economics wing, Govt. of Pakistan, Islamabad.

[3] Balal, R.M., Khan .M.M., Shahid.M.A. and Waqas .M. 2011. Mango cultivation in Pakistan. Institute of Horticultural Sciences, University of Agriculture-38040, Faisalabad, Pakistan. Available Online at http://agrihunt.com/horti-industry/293.html

[4] Jorquera, E. F., Alberdi .M. and Franck .N.2014.Pruning severity affects yield, fruit load and fruit and leaf traits of 'Brigitta' blueberry.Journal of Soil Science and Plant Nutrition, 14 (4), 855-868

[5] FAO, 2004 http:// apps.fao.org./lim 500/nphwrap.P/FAOSTAT Database/ Production. Crops. Primary & Domain= SUA. Rome: Food and Agricultural organization of the United Nations.

[6] Jam, F.A., Shafqat.M. and Zahid.A. 2013. Time Series Model to Forecast Area of Mangoes from Pakistan: An Application of Univariate Arima Model. Academy of Contemporary Research Journal.Volume 2, Issue 1, 2013, 10-15

[7] Jiskani, M. M., Pathan .M. A., Wagan. K. H. and Khaskheli. M. I. 2007. Documentation of identified and unidentified diseases of mango in Sindh, Pakistan. International Symposium on Prospects of Horticultural Industry in Pakistan. Institute of Horticultural Science, University of Agriculture Faisalabad, Pakistan, pp.176-190

[8] Muji. R., Baiq N. H., Mujiono. B T., Sohail. Q and Ian Baker.2013.Effects of Pruning and Fertilizing on Production and Quality of Mango Cultivar Gedong Gincu in West Nusa Tenggara Province – Indonesia.3rd International Conference on Chemical, Biological and Environment Sciences (ICCEBS'2013) January 8-9, 2013 Kuala Lumpur (Malaysia

[10] Sauco, V. G. (1993) The Situation of Mango Culture in the World. Acta Horticulture (Fourth International Mango Symposium, Miami, USA) 341: 31–41.

[11] Usman. M., Fatima.B.,Khan M. M and Chaudhry .M. I.2003.Mango in Pakistan: A Chronological Review.Pak. J. Agri. Sci., Vol. 40(3-4), 2003

[12] Wangungu1.C.W,Mwangi M., Gathu.R., Muasya.R.., Mbaka .J&Kori.N. 2011.Reducing dieback disease incidence of passion fruit in Kenya through management practices. African Crop Science Conference Proceedings, Vol. 10. pp. 499 – 502