International Journal of Agricultural Sciences ☞ DOI:10.15740/HAS/IJAS/17-AAEBSSD/191-193
Volume 17 | AAEBSSD | 2021 | 191-193 ■ ISSN : 0973-130X Visit us : www.researchjournal.co.in

RESEARCH PAPER

Effect of integrated pest management module against major sucking pests of pomegranate (*Punica granatum* L.)

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Abstract : A field experiment was conducted to assess the performance of IPM module against major sucking pests of pomegranate on seven farmers' field in the adopted village of Krishi Vigyan Kendra, Khargone (M.P.) during 2018-19 and 2019-20. IPM module comprised *Neem* oil 1500 ppm @ 3 ml/lit at first flush of leaf+ Need based spray of Imidacloprid 17.8% SL @ 0.25 ml/lit and Thiamethoxam 25% WG @ 0.20 g/liton the rotation of 15 days'. Minimum population of aphids and thrips were recorded in IPM fields and maximum population of the aphids and thrips were recorded in non-IPM fields. Per cent insect control over non-IPM was 50.35% for aphids, and 47.72% for thrips, respectively. Fruit yield for IPM was 156.36 q/ha for both seasons as against 128.43 q/ha in non-IPM. Hence, it may be inferred that IPM module was able to enhance the yield with cost-effective production as against non-IPM.

Key Words : IPM, Non-IPM, Omegranate, Sucking pests

View Point Article : Tyagi, S.K., Khire, A.R. and Kulmi, G.S. (2021). Effect of integrated pest management module against major sucking pests of pomegranate (*Punica granatum* L.). *Internat. J. agric. Sci.*, **17** (AAEBSSD) : 191-193, **DOI:10.15740/HAS/IJAS/17-AAEBSSD/191-193.**

Article History : Received : 21.07.2021; **Revised :** 25.07.2021; **Accepted :** 30.07.2021

INTRODUCTION

Pomegranate (*Punica granatum* L.) is an important fruit crop of arid and semiarid regions of the glove. In India, it is cultivated over 233.93 thousand ha with an annual production of 2844.50 thousand metric tonnes and productivity of 12.16 metric tonnes/ha (Anonymous, 2018). Previously sucking pests namely aphid, thrips, whiteflies, mealy bugs, scale insects and mites were considered as minor pests but in recent years, they have become the major pests, capable of reducing plant vigour, quality and fruit yield (Balikai *et al*., 2009). Among different sucking pests, thrips (*Scirtothrips dorsalis* Hood) and pomegranate aphid (*Aphis punicae* Passerini) were major sucking pests (Wadhi and Batra, 1969). Gilbert (1986) reported that thripis one of the most important pestwhich feeds on the foliage as well as fruits and thus deteriorate quality. At global scale thrips are considered as a potential pest being responsible for deteriorating quality of the fruits (Wang, 1994). Sreedevi and Verghese (2009) observed the significant flower and immature fruit drop due to infestation of aphids. With this background, investigation was done to determine the effect of integrated pest management module to control major sucking pests of pomegranate.

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MATERIAL AND METHODS

The investigation was carried out in seven locations on farmers' fields during 2018-19 and 2019-20 to evaluate IPM module on pomegranate (variety Bhagwa) in comparison to the farmers' practice (non-IPM module). In IPM module comprised Neem oil 1500 ppm @ 3 ml/ lit at first flush of leaf+ Need based spray of Imidacloprid 17.8% SL @ 0.25 ml/lit and Thiamethoxam 25% WG @ 0.20 g/litre on the rotation of 15 days'. Where as in non-IPM (Farmers' practice). Treatments were applied when the thrips and aphid scrossed economic threshold level (ETL) during vegetative crop growth period in the year 2018-19 and 2019-20, respectively. Three sprays of different treatments applied with a knapsack high volume sprayer in morning hours at 15 days' intervals. Aphids population were recorded on randomly selected three young leader shoots (5cm) and number of thrips were counted from top three leaves on 15 randomly selected and labelled plants at three, seven and fifteen days after each spray. Later, mean number of insects from three sprays and pooled mean was worked out. Incidence of aphids and thrips were recorded in IPM and non IPM fields to work out per cent insect control.

$$\text{Per cent insect control (\%)} = \frac{\text{Population of insects in non - IPM} - \text{Population of insects in IPM}}{\text{Population of insects in non - IPM}} \times 100$$

Various parameters were compared as per paired "t" test of significance.

RESULTS AND DISCUSSION

The data recorded on aphids (*Aphis punicae)* and thrips (*Scirtothrips dorsalis*), yield and the various economic parameters in IPM and non- IPM fields during 2018-19 and 2019-20 are presented in Tables 1, 2 and 3.

Effect of IPM module on population of aphids :

The result based on pooled data revealed that the location specific IPM module have least infestation of aphids as comparison to non-IPM during both the years. Data indicated that on lesser number of aphids *i.e.* 7.41 and 6.43 nymph per three shoots/plant in IPM as comparison to non-IPM *i.e.* 14.27 and 13.60 nymphsper three shoots/plant. IPM succeed in controlling infestation of aphids by 50.35% over non-IPM practices.

Effect of IPM module on population of thrips:

The result based on pooled data revealed that the location specific IPM module have least infestation of thrips as comparison to non-IPM during both the years. Data indicated that on lesser number of thrips *i.e.* 0.93 and 0.90 nymph per three leaves/plant in IPM as

Table 1: Effect of IPM module on population of aphids and thrips on pomegranate

Treatments	Mean no. of aphids /three shoots				Mean no. of thrips/three leaves			
	2018-19	2019-20	Mean	aphids control over Non IPM (%)	2018-19	2019-20	Mean	thrips control over Non IPM (%)
IPM	7.41	6.43	6.92	50.35	0.93	0.90	0.92	47.72
Non-IPM	14.27	13.60	13.94	-	1.77	1.74	1.76	-
t-value	6.0644	7.8087	9.9145	-	23.9650	22.5104	24.8475	-

The result is significant at $p < 0.05$

Table 2: Effect of integrated pest management module on yield of pomegranate

Treatments	2018-19		2019-20		Pooled Yield	
	Fruit Yield (q/ha)	Increase in yield (%) over Non IPM	Fruit Yield (q/ha)	Increase in yield (%) over Non IPM	Fruit Yield (q/ha)	Increase in yield (%) over Non IPM
IPM	155.29	21.59	157.43	21.90	156.36	21.74
Non -IPM	127.71	-	129.14	-	128.43	-
t-value	45.075089	-	18.765174	-	31.12026	-

The result is significant at $p < 0.05$

Table 3: Effect of integrated pest management module on economics of pomegranate

Treatments	Cost of cultivation (Rs/ha)		Gross return (Rs/ha)		Net return (Rs/ha)		B:C ratio	
	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20	2018-19	2019-20
IPM	201890	203194	594371	602514	392481	399321	2.94	2.97
Non-IPM	212028	215134	441643	452000	229615	236866	2.09	2.10

comparison to non-IPM field *i.e.* 1.77 and 1.74 nymph per 3 leaves/plant in 2018-19 and 2019-20, respectively. IPM module was found to control thrips population by 47.72 % over non-IPM practices.

Analysis of the data revealed that aphids and thrips may easily be controlled and managed using IPM module. Pandey *et al.* (2016) reported more than 50 per cent control of lepidopteran and sucking insects of cabbage in IPM plots over non-IPM.

Yield and economics:

The results presented in Table 2 that the highest yield (155.29 q/ha) was recorded in IPM fields with 21.59% gain 2018-19 and 157.43 q/ha with 21.90% gain in 2019-20, respectively over non-IPM fields. The lowest yield was recorded in non-IPM field s during 2018-19 and 2019-20. The cost of IPM was slightly lower (Rs. 201890/ha and Rs. 203194/ha) as against non-IPM (Rs. 212028/ha and Rs. 215134/ha) fields during 2018-19 and 2019-20, respectively which may be attributed to reduction in number of sprays of pesticides in IPM fields. The highest net return of Rs. 392481/ha and BC ratio 2.94 were recorded in IPM fields However, net return of Rs. 229615/ha was recorded in non-IPM fields with B C ratio of 2.09 (2018-19). Similarly, highest net return Rs. 399321/ha with BC ratio 2.97 was recorded in IPM field and Rs. 236866/ha with BC ratio 2.10 in non-IPM fields during 2019-20 (Table 3). These findings are in tune with the reports of Singh and Singh, 2015 who reported that benefit cost ratio higher in IPM plots compared to farmers' practices. Pandey *et al.* (2017) were in conformity of such findings in tomato leaf curl.

Conclusion:

Thrips and aphids are major sucking pests of pomegranate. Its high reproductive rate, short generation time, and ability to damage throughout the growing season pose challenges for the management and protection of the crop. IPM module, a combination of organic and chemical insecticides outlined above help reducing damage caused by aphids and thrips. It may be concluded that the IPM modules for management of aphids and thrips is more efficient and effective technology over non-IPM.

REFERENCES

Anonymous (2018). *Horticultural Statistics at a Glance. Horticulture Statistics Division,* Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India.

Balikai, R. A., Prasanna, P.M. and Kotikal, Y. K. (2009). Status of pomegranate pests and their management strategies in India. In: 2nd International Conference on Pomegranate and minor including Mediterranean fruits. University of Agricultural Sciences, Dharwad Karnataka (India)147-148pp.

Gilbert, M. J. (1986). First African record of *S. Dorsalis* (Thysanoptera: Thripidae) a potential pest of citrus and other crops. *J Ent. S. Africa*., **49**(11):159-161.

Pandey, A. K., Kumar, Bijendra and Dev, C. (2016). Validation of IPM module against major insect – pest and diseases of cabbage in mid-hills of Uttarakhand. *Journal of Hill Agriculture,***7** (1): 96-101.

Pandey, R., Chaturvedi, A. K., Chaudhary, R. P. and Prasad, R. (2017). On-farm leaf curl disease management of chilli (*Capsicum annuum* L.). *Journal of Phytopathology & Pest Management*, **4** (2): 53-61.

Singh, P. S. and Singh, S. K. (2015). Comparative evaluation of IPM module and farmer's practices in Mungbean, *Vigna Radiata* (L.) Wilczek against major insect pests. *International J. Agriculture, Environment &Biotechnology*, **8**(1): 215-218.

Sreedevi, K. and Verghese, A. (2009). Effect of aphid, *Aphis punicae* (Hemiptera: Aphididae) infestation on pomegranate fruits and flowers. In: 2nd *International Conference on Pomegranate and minor including Mediterranean fruits*. University of Agricultural Sciences, Dharwad, Karnataka (India). 150pp.

Wadhi, S.R. and Batra, H.N. (1969). In: Entomology in India. *Entomological Society of India,* IARI, New Delhi. pp.251.

Wang, C. L. (1994). The species of genus *Scirtothrips* of Taiwan. *J. Taiwan Museum,* **47**(2):1-7.