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Role of granular insecticides in the management of pomegranate sucking pest management

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ABSTRACT
A field experiment was conducted at Regional Agricultural Research Station, Bijapur during 2001-2002 and 2002-03 to study the effect of granular insecticides in the management of pomegranate sucking pest (Aphids & Thrips). Three granular insecticides were used at different dosages. During both the years significantly higher per cent reduction in aphid population (91.4% and 88.1% during 2001-02 and 2002-03, respectively) was observed in the treatment treated with phorate 10G @ 30g /plant. The same trend was noticed in respect of thrips population also. Among the different dosages of carbofuron 3G, 100 g /plant was found most effective in reducing aphid and thrips population (97.2% & 100% reduction in aphid population during 2001-02 and 2002-03 and 90% and 100% reduction in thrips population during 2001-02 and 2002-03 respectively). Significantly higher yield was recorded in higher dosages of both the chemicals (45.25 q/ha and 46.13 q/ha in treatment carbofuron 100 g/plant during 2001-02 and 2002-03 respectively).

Key words : Pomeogranate, Aphids, Thrips, Granular insecticides.

INTRODUCTION

Pomegranate (*Punica granatum*) is one of the important fruit crop and is valued for its delicious fruits. It is gaining popularity in arid and semiarid regions of India due to its hardy nature, high yield, low maintenance cost and good keeping quality (Khodade *et al.,* 1990). It is cultivated on commercial scale in the states of Maharashtra, Gujarat, Andrapradesh, Tamila Nadu, and Karnataka. The yield in pomegranate is decreasing in certain area due to several reasons among them insect pest problem is major one. Pomegranate in affected by several pests. After pruning the fresh leaves and flowers were severely attacked by sucking pests like aphids and thrips. They suck the sap from leaves as well as flowers, as a results curling of leaves and scab like patches on the fruits can be noticed. The excess sap will be released from the body in the form of honey dew on which shooty mould will be developed. This shooty mould interferes with the photosynthesis, thereby decreasing in the yield. Usually sucking pest were managed by spraying of systemic insecticide. However in the present investigation the effort was made by using granular insecticide like phorate 10G, carbofuran 3G and lindane 6G. These were applied at the plant base.

MATERIALS AND METHODS

The field experiment was conducted during two years *viz.,* 2001-02 and 2002-03 at Regional Agriculture Research Station, Bijapur. The experiment was laid out in Randomized Block Design (RBD) with 3 replications. The pomegranate variety used was Ganesh. For the management of sucking pest three granular insecticides *viz.,* phorate 10G, carbofuran 3G and lindane 6 G were used. In order to test the appropriate dose per plant, Phorate 10G was used at various doses like 10, 20 and 30 gram per plant. The insecticide carbofuran 3G was also applied at 10,25,50,75 and 100 gram per plant. Another insecticide lindane 6G was used @ 20gram per plant. This experiment was repeated in next year also (2002-03). In both the years, untreated check was also maintained. All the Agronomic practices were followed as per package of practices except plant protection.

Observations were made on aphids and thrips population a day before, 7 days after and 15 days after spraying. Aphid population was recorded by taking 5 cm length of 3 tender tips of plant. While thrips population was recorded by counting the actual number of thrips per five tender leaves and later converted into mean population per leaf. Like wise the population was recorded in all three replication and finally the data were subjected to statistical analysis. Fifteen days after spraying, instead of original number of pests, per cent reduction in pest population was calculated and presented in tabular form. During harvest the yield was calculated by counting the number of fruits per plant in both the years. Finally these fruits were weighed and expressed the fruit yield in terms of q/ha.

RESULTS AND DISCUSSION

The result obtained by various treatments with respect to aphid population in pomegranate is presented in the Ttable-1. One day before spray the results indicate that, there was no significant differences in the population of aphids between different treatments, where in there was no effect of treatment on the population reduction. Seven days after application of insecticides, the aphid population was not much reduced because all the three treatments (at different dosages) are in granular form, where in release of inert toxic is slow. Even though there was no satisfactory effect of chemical on reduction in aphid population seven days after spray, but different dosages shows their effect differently. In all the chemicals, as the dosage increases the aphid population decreases (Table - 1).

Fifteen days after application of granular insecticides, there was significant difference in different treatments with respect to reduction in aphid population. Significantly higher per cent reduction (91.4%) was observed in the treatment treated with phorate 10 G@ 30 g / plant (2001 - 02). Phorate application @ 20 g/plant also gave the satisfactory results which was on par with higher dosage of phorate 10 G (30 g / plant). Whereas, phorate application @ 10 g/ plant was least effective by recording minimum per cent reduction of aphids (67.6%) (Table - 1). Similar trend was noticed during 2002-03 also. When carbofuran 3 G application was concerned, cent per cent reduction in aphid population was noticed in dosage @ 100g / plant (2002 – 03). During both the years' carbofuran application @ 50 and 75 g/plant also shows good effect in reduction of aphid population (Table-1). These two treatments were found on par with each other and next best to its higher dosage of carbofuran 3 G (100 g/plant). If mean of both the years was taken, as dosage of chemical increases the per cent reduction in aphid population also increase. The results obtained from the present study confirm the findings of Mote. *et al* (1993).

Lindane, which was applied @ 20 g/plant was also shows its significant effect on aphid population. This treatment was found next best to carbofuran 3G @ 100 g/plant treatment. During 2002-03 the above said treatment maintained its consistency throughout the observation period. Phorate 10G @ 30 g/plant and carbofuran 3G, which was applied @ 100 g/Plant proved best among their respective lower dosages (Table-1).

When thrips population was concerned the same trend was noticed as in aphid population during a day before and seven days after spraying. Seven days after spraying least population was

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Table 1 : Effect of different Granular insecticides on Pomegranate Aphids

Sl. No.	Treatment	Number of Aphids/3 Tender tips of 5cm. Length								
		1DBA			7DAA			15 DAA (per cent reduction)		
		2001-02	2002-03	Mean	2001-02	2002-03	Mean	2001-02	2002-03	Mean
I.	Phorate 10 G									
1	10 g/plant	126.60	123.30	124.90	116.60	108.30	124.40	67.6 (55.3)	58.0 (49.6)	62.8 (52.4)
2	20 g/plant	136.60	135.00	135.80	108.30	113.30	110.80	92.6 (74.2)	81.5 (64.6)	87.0 (68.9)
3	30 g/plant	111.60	128.60	122.60	91.60	110.00	100.80	91.4 (72.9)	88.1 (70.3)	89.7 (71.3)
II.	Carbofuran 3 G									
1	10 g/plant	131.60	128.30	129.90	113.30	121.60	117.40	73.4 (58.9)	61.1 (51.4)	67.25 (55.2)
2	25 g/plant	116.60	136.60	126.60	91.60	111.60	104.10	77.2 (61.5)	71.0 (57.4)	74.1 (59.4)
3	50 g/plant	133.30	138.30	135.80	91.60	105.00	98.30	90.0 (71.5)	94.9 (77.2)	92.4 (74.0)
4	75 g/plant	110.00	133.30	121.60	86.60	113.30	99.90	95.2 (77.3)	95.9 (78.7)	95.5 (77.7)
5	100 g/plant	116.60	128.30	122.40	78.30	103.30	90.80	97.2 (80.4)	100.0 (90.0)	98.6 (83.2)
III.	Lindane 6G									
1	20 g/plant	123.30	130.00	126.60	83.30	111.60	97.40	91.8 (73.4)	83.2 (65.8)	87.5 (69.3)
IV	UTC	133.30	130.00	131.60	150.00	143.30	146.60	0.0 (0.0)	0.0 (0.0)	
	CD (0.05)		NS	NS		25.50	28.4		16.2	11.4

DBA : Days Before Application DAA : Days After Application
Figures in parenthisis are angular transformed value

Table 2 : Effect of different Granular insecticides on Pomgranate Thrips

Sl. No.	Treatment	Number of Aphids/3 Tender tips of 5cm. Length								
		1DBA			7DAA			15 DAA (per cent reduction)		
		2001-02	2002-03	Mean	2001-02	2002-03	Mean	2001-02	2002-03	Mean
I.	Phorate 10 G									
1	10 g/plant	3.30	3.70	3.50	1.30	3.30	2.30	81.8 (64.7)	52.7 (46.7)	67.2 (55.1)
2	20 g/plant	3.60	3.30	3.40	1.00	3.60	2.30	91.6 (73.2)	71.1 (62.8)	81.3 (64.4)
3	30 g/plant	3.00	3.70	3.30	0.30	3.00	1.60	100.0 (90.0)	91.7 (80.0)	95.8 (78.2)
II.	Carbofuran 3 G									
1	10 g/plant	3.00	4.00	3.50	1.60	2.60	2.10	80.0 (63.4)	58.3 (50.0)	69.2 (56.3)
2	25 g/plant	3.30	4.00	3.60	1.60	3.30	2.40	90.9 (72.4)	66.6 (54.7)	78.7 (62.5)
3	50 g/plant	3.30	3.70	3.50	0.60	2.60	1.60	100.0 (90.0)	83.3 (70.2)	91.6 (73.1)
4	75 g/plant	3.30	4.00	3.60	0.30	3.60	1.90	100.0 (90.0)	95.8 (83.1)	97.9 (81.7)
5	100 g/plant	3.00	4.00	3.50	0.60	3.00	1.80	90.0 (71.6)	100.0 (90.0)	95.0 (77.1)
III.	Lindane 6G									
1	20 g/plant	3.00	4.00	3.50	0.60	3.60	2.10	90.0 (71.6)	69.4 (56.9)	79.7 (63.2)
IV	UTC	3.00	3.30	3.10	4.00	4.00	4.00	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
	CD (0.05)		NS	NS		1.4	1.5		27.9	16.4

DBA : Days Before Application DAA : Days After Application
Figures in parenthisis are angular transformed value

Table 3 : Pomegranate yield as influenced by different granular insecticides

Sl. No.	Treatment	Yield (q/h)		
		2001-02	2002-03	Mean
I.	Phorate 10 G			
1	10 g/plant	28.90	31.50	30.20
2	20 g/plant	32.15	33.75	32.95
3	30 g/plant	41.84	43.87	42.87
I.I	Carbofuran 3 G			
1	10 g/plant	31.45	29.25	30.35
2	25 g/plant	33.00	32.63	32.82
3	50 g/plant	39.16	41.63	40.40
4	75 g/plant	45.00	46.13	45.56
5	100 g/plant	45.25	46.13	45.69
II.I	Lindane 6G			
1	20 g/plant	37.96	39.37	38.67
IV	UTC	20.60	22.50	21.50
	CD (0.05)	2.20	1.8	

recorded in higher dose of Phorate 10G (@ 30 g/plant), while there was not much difference among the lower dosages, where 10 and 20 g/plant was applied. The same trend was noticed in both the years. The results also evidenced that carbofuran 3G with its different concentrations not shown much differences in reduction of thrips population. However, the combined results both the years shows that carbofuran 3G @ 50g/plant was better even as compared to higher dosages of carbofuran i.e. 75 and 100 g/plant where in the thrips population was least (1.60). On the other hand lindane 3G @ 20 g/plant was also not gave the satisfactory results as compared to phorate 10G @ 30 g/plant. The population of thrips in both the years increase in untreated check where there was no chemical applied.

The per cent reduction in thrips population presented in table-2 was recorded 15 days after spraying. During the both the year's per cent reduction in the thrips population was increased drastically as dosages of chemicals increases.

Cent percent reduction in thrips population was noticed in phorate 10G @ 30 g/plant as well as 75 and 100 g/plant dosages of carbofuran 3G treatment during 2001-02 (Table-2). These treatments were found promising in reducing thrips population. The same trend was noticed during next year also where significantly higher reduction on thrips population was noticed in higher dose (30 g/plant) of phorate 10G. In carbofuran treatments also mortality rate was increasing trend as dosages increases, but 100% reduction was recorded @ 100 g/plant carbofuran application. Among the three granular insecticides treatments, carbofuran 3G @ 75, 100 and 30g of phorate 10G were found most effective in reducing thrips population.

Further, significantly higher yield (41.84 q/ha) was recorded in treatments like phorate 10G @ 30 g/plant as well as higher dosages carbofuran 3G (Table-3). This consistency was maintained in both the years. This may be due to the lesser incidence of sucking pest where these pests were managed most effectively. From this investigation it is suggested that application of phorate 10G @ 30 g as well as 75 and 100 g/plant of carbofuran were best for the management of sucking pest.

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