EFFICACY OF TOLFENPYRAD 15 % EC AGAINST THRIPS (*Scriothrips dorsalis*) ON POMEGRANATE

***WALUNJ, A. R.; SUPE, V. S. AND JOSHI, V. R.**

AICRP ON ARID ZONE FRUIT
DEPARTMENT OF HORTICULTURE
MAHATMA PHULE KRISHI VIDYAPEETH
RAHURI - 413 722, DIST: AHMEDNAGAR, MAHARASHTRA, INDIA

****EMAIL: jaigurudeo63@gmail.com***

ABSTRACT

Field experiment was conducted to study the efficacy of new insecticide tolfenpyrad 15 % EC in comparison with neonicotinoids and synthetic pyretrhroids against thrips (Scriothrips dorsalis) infesting pomegranate c.v. Bhagwa at AICRP on Arid Zone Fruit Research Project, MPKV, Rahuri during the ambe bahar of 2011-12 and 2012-13. All the treatments were significantly superior over untreated control. The treatment of new chemistry molecule tolfenpyrad 15% EC at 150 g a.i./ha showed significantly least survival of thrips on 5^{th} , 7^{th}& 10^{th} days after spray and resulting in least fruit scaring damage over rest of the treatment at the time harvest. Furthermore, the treatment realized in gaining the higher yield of marketable fruits over control.

KEY WORDS: pomegranate, Scriothrips dorsalis, insecticides, pest management

INTODUCTION

Pomegranate (*Punica granatum* L.) belongs to family puniceae, is a native of Iran and one of the favorite table fruits of tropical and subtropical regions. Its nutritional value and health benefits, demand in International market for good quality pomegranate; this has widened the scope for production and trade. India ranks first in area (0.13 million ha) and production (1.14 million tonnes) of pomegranate. In India, Maharashtra ranks first (0.098 million ha) contributing 70% of the total area under pomegranate (Anonymous, 2011). Such important fruit crop is attacked by several insect and non-insect pests as well as diseases. About 47 insect species are known to attack, which are reported from India. However, the major pests key pest observed during different fruiting season of various pomegranate area, amongst them thrips is important serious pest of pomegranate found throughout the year in the most part of India, which cause 40-60 per cent damage to marketable fruit (Wadhi and Batra, 1969). Thrips are mainly phytophagous, a wide range of habitat in the tropical & subtropical. Thrips inhibits the young leaves on shoots, initiation of flower bud, flowers and fruit setting during entire period of bahar in pomegranate, which hampers the fruit quality by scarping.

Looking to the constraints in pomegranate cultivation or management, knowledge of pests, pesticide resistance, resurgence, residues and various management strategies is must, so as to adopt the management effectively. Keeping in view to above constraint

newly synthesized chemistry molecule tolfenpyrad 15 % EC was tested to study the effectiveness against thrips on pomegranate.

MATERIAL AND METHODS

A field experiment was conducted at AICRP on Arid Zone Fruit Project, Department of Horticulture, MPKV, Rahuri during *ambe* bahar of two years 2011-12 and 2012-13 by using Randomized Block Design with three replicates and seven treatments including control. The experiment was carried out on eight years old age tree of cv. Bhagwa orchard of pomegranate. For each treatment, three plants with spacing 15' x 10' were taken for evaluation. Each insecticide treatment was applied three times at an interval of 10 days (when the sufficient population of thrips was noticed) with the help of high volume knapsack sprayer by using 400 liters of water per acre. The treatments comprising of insecticides, Tolfenpyrad-15 % EC at (100,125,150 g a.i./ha), Imidacloprid 17.8% SL at 22.5 g a.i./ha, Lambdacyhalothrin 5% EC @ 150 ga..i. /ha and Fipronil 5% EC @ 50 g a.i./ha in comparison with untreated control as water spray The three sprays were given at an interval of 15 days starting from flower initiation. The observations on survival population of thrips (both nymphs and adults) per five twigs/shoot were taken on 0 as pre-count, 5, 7 and 10 days after each spray as post count. Mean survival population of thrips (nymphs and adults) per twigs was worked out in various treatments on 5, 7 and 10 days was worked out for statistical analysis, whereas the fruit scaring infestation was recorded at last spray on the basis per cent damaged fruits at the time of harvesting.

The pomegranate fruit yield obtained from individual plant of each treatment in the field at each picking made at 15 days interval from 150 days after bahar treatment up to last harvest were recorded and expressed in kg/plant.The data obtained were subjected to statistical analysis and the analysis of variance was done to find out the significance of difference in the different treatments. The significance of treatments was assessed at 5 per cent level (Fisher and Yates, 1963).

RESULTSAND DISCUSSION

The new generation chemical used in these studies belongs to 21 IARC mode of action classification and offer unique mode of action.Tolfenpyrad (4-chloro-3-ethyl-methyl-N-[4-(p-tolyloxy) benzyl] pyrazole-5-carboxamide) is novel molecule belonging to pyrazole class of insecticide. The insecticides acts mainly through contact inhibiting respiration of the target pestand resulting in rapid insecticidal response including cessation of movement and feeding, lack of fecundity and even ful death of pest.

The results showed significant difference among all the treatments in both the consecutive year of experimentation. Among the treatment doses of newer molecule tolfenpyrad 15% EC registered least survived population of thrips and fruit scaring damage with maximum marketable yield of pomegranate fruit.

It was the evident from Table1 that pre-count of thrips was non-significant showing even survival of thrips before spray treatments. On 5^{th} days of observation, all the treatment reduced the population survival of thrips over untreated control. The treatment of tolfenpyrad 15 % EC at 150 g a.i./ha registered significantly least population of thrips per twigs/fruiting bodies (0.73, 0.32 and 0.16) and (1.33, 0.53 & 0.27/ twigs) on 5^{th}, 7^{th} and 10^{th} days after spray in 2011 and 2012 respectively; over

imidacloprid 17.5 SL @ 22.5 g a.i./ha @, lambdcyhalothrin 5% EC at 150 and tolfenpyrad 15 % EC at 100g a.i./ha. The treatment dose of tolfenpyrad 15 % EC at 125 g a.i./ha was found next best treatment in recording least population followed by the treatment of fipronil 5% EC at 50 g a.i./ha in minimizing thrips population survival. The treatment of Tolfepyrad 15% EC at 150 g a.i./ha found significantly superior in registering least av. number of thrips i.e.0.16-0.27/fruiting bodies/shoot on 10^{th} day after sprays.

With regards to the per cent fruit damage due to thrips after last spray (Table 2), the treatment of tolfenpyrad 15 % at 150 g a.i./ha registered significantly least per cent damage in the range of 2.44 and 3.13 as against 27.19 and 19.93 per cent in untreated control during 2011 and 2012, respectively. Thus, the treatment of tolfenpyrad 15 % at 150 g a. i./ha was most effective over the rest of the treatments in reducing the per cent fruit area damage in pomegranate due to thrips and exhibited good protection against thrips on pomegranate. With regards to the marketable yield, the treatment of Tolfenpyrad 15% EC @ 150 g a.i./ha registered significantly highest yield of 16.75 and 16.92 kg/plant as against rest of the treatment (Table 2). The treatment of fipronil 5% EC @ 50 g a.i./ha, which was next best treatment during the in gaining maximum marketable highest yield of pomegranate.

Several workers evaluated different new group neoniconoids, spinosyn, pyrozole & synthetic pyrethriods in field and vegetable crops for the control of sucking pest. The thiamethoxam 25 WG @ 0.2 g/l and imidacloprid 200 SL @ 0.25 ml/l were most effective in controlling sucking pest of pomegranate by reducing the incidence by 85.90 and 83.54 as reported by Bagale (1993) and Ananda *et al*. (2009). Moreover, the cyzepyr 10% OD @ 75-90 g a..i./ha also found most effective for the control of thrips and fruit borer on pomegranate as reported by Walunj and Supe (2012). However, the research work with this new molecule in horticultural fruit crop especially in pomegranate is scanty. The efficacy of tolfenpyrad 15% EC against the thrips with least scaring damage on fruit with higher yield in pomegranate in present investigation are confirmative to earlier studies with the tolfenpyrad effectively control sucking pest on chilli and cotton thrips and fruit borer as reported by Mandal (2013). Whereas the spinosad 2.5 SC at 75 g a. i./ha was found most effective and recommended for the control of thrips (*Scriothrips dorsalis*) on pomegranate (Anonymous, 2009). Tolfenpyrad 15% EC @150 g a.i./ha was found effective against sucking pest of okra as reported by Bajpai *et al.* (2010). Significantly reduction against hoppers complex with the tolfenpyrad 15%EC @ 150 g a.i./ha on mango are in confirmative with this investigation (Ramesh Babu and Singh, 2014).

CONCLUSION

From the results, it can be concluded that tolfenpyrad 15% EC at 150 g a.i./ha showed significantly least survival of thrips on 5^{th}, 7^{th}& 10^{th} days after spray and resulting in least fruit scaring damage can be used for controlling the thrips in pomegranate as well as getting the higher fruit yield.

REFERENCES

Anonymous (2009). Effect of some insecticide, neem and entomopathogenus fungi against pomegranate thrips. *Research Review Committee report of AICRP on Arid*

Zone Fruit for the year 2008-09, pp. 15-22.

Anonymous (2011). Annual Report. NHM, (M.S.) India, pp. 7-11.

Ananda, A.; Kotikal, Y. K. and Balikan R.A. (2000). Management practice for major sucking pest of pomegranate. *Karnataka j. Agric. Sci*. **22;** 790-795.

Bagle, B. G. (1993). Seasonal incidence and control of thrips, *Scrtothrips dorsalis* Hood in pomegranate. *Indian J. Entomol*., **55**: 148-153.

Bajpai, N. K.; Swami, H and Tripathi, N. N. (2013). Bioefficacy of tolfenpyrad 15%EC against aphid, *Brevicoryne brassicae* L. infesting cabbage in Rajashtan. *Indian J. Entomol.,* **75**(3): 208-211.

Fisher, R. A. and Yates, F. (1963). Statistical Tables for Biological, Agricultural and Medical Research. 6th Ed. Oliver & Boyd, Edinburgh and London. P 146.

Mandal, S. K. (2013). Tolfenpyrad 15% EC, a New pyrazole insecticide for agricultural pest management, In: New Horizon in Insect science, *International Conference on Insect Science*, 14-17 February, Bangalore, India.

Ramesh Babu, S. and Singh, V. (2014). Bioefficacy of tolfenpyrad 15 EC against hopper complex in mango. *Pest Manage. Hortil. Ecosyst.*, **2**(1): 22-25.

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

Walunj, A. R. and Supe, V. S. (2012). A new molecule, Cyazpyr 10% OD against thrips (*Scriothrips dorsalis)* and fruit borer (*Deudorix isocrates*) on pomegranate. *International Conference on Plant Health Management for Food Security* November 28-30, 2012, Hyderabad, India.pp.204.

Table 1: Efficacy of tolfenpyrad 15% EC for the control of thrips in pomegranate.

Treatments	Pre Count of Thrips/ Shoot	Average Number of Thrips (Nymphs and Adults) / 5 Fruiting Bodies / Twig (Av. of Two spray) 2011-12			Pre Count of Thrips/ Shoot	Average Number of Thrips (Nymphs and Adults) / 5 Fruiting Bodies / Twig (Av. of Two spray) 2012-13		
		5DAS	7DAS	10DAS		5DAS	7DAS	10DAS
T_1 = Tolfenpyrad-15 % EC @ 100 g a.i./ha	5.48	1.77	0.84	0.94	6.73	2.47	1.20	1.07
T_2 = Tolfenpyrad-15 % EC @ 125 g a.i./ha	6.23	1.65	0.63	0.66	6.60	273	1.13	0.87
T_3 = Tolfenpyrad-15 % EC @ 150 g a.i./ha	6.07	0.73	0.32	0.16	7.07	1.33	0.53	0.27
T_4 = Imidacloprid 17.8% SL @ 22.5 g a.i./ha	6.20	2.10	1.07	1.15	7.60	4.47	2.20	1.80
T_5 = Lambdacyhalothrin 5% EC @ 150 g a.i./ha	553	0.90	0.5	0.80	6.67	2.87	0.93	1.44
T_6 = Fipronil 5% EC @ 50 g a.i./ha	5.53	0.80	0.40	0.30	6.80	1.73	0.87	0.89
T_7 = Untreated Control	5.67	5.63	6.18	6.22	6.80	7.80	8.27	7.20
S.Em±		0.22	0.10	0.11		0.30	0.17	0.14
CD at 5%	NS	0.67	0.30	0.35	NS	0.92	0.52	0.43

Table 2: Yield and effect of different treatment on per cent surface damage due to thrips.

Treatments	% Fruit Damage due to Thrips Scaring at 10 Days After Last Spray		Yield of Marketable Fruits (kg/ Tree)	
	2011-12		2012-13	
T_1 = Tolfenpyrad-15 % EC @ 100 g a.i./ha	6.02 (14.18)	5.17 (14.25)	13.25	13.08
T_2 = Tolfenpyrad-15 % EC @ 125 g a.i./ha	3.35 (10.57)	4.33 (12.00)	14.58	15.58
T_3 = Tolfenpyrad-15 % EC @ 150 g a.i./ha	2.44 (8.94)	3.13 (10.18)	16.75	16.92
T_4 = Imidacloprid 17.8% SL @ 22.5 g a.i./ha	11.4 (19.8)	13.1 (21.2)	10.75	10.58
T_5 = Lambdacyhalothrin 5% EC @ 150 g a.i./ha	3.3 (10.5)	3.8 (10.8)	15.58	15.92
T_6 = Fipronil 5% EC @ 50 g a.i./ha	2.55 (9.15)	3.42 (10.29)	15.78	16.25
T_7 = Untreated Control	27.19 (31.43)	19.93 (26.51)	10.37	9.95
S.Em±	0.31	0.40	0.32	0.29
CD at 5%	0.96	1.18	1.02	0.88

Figures in parenthesis are arcsine transformed values.

[MS received: February 1, 2015] ***[MS accepted: March 18, 2015]***