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SA Salunkhe
Msc Scholar, Department of Agricultural Entomology PGI, Mahatma Phule Krishi Vidhyapeeth, Rahuri, Maharashtra, India

SA Nevgi
Research Associate, HORTSAP – Mango 2020- 2021 Regional Fruit Research Station, Vengurla, Maharashtra, India

RB Kapare
Msc Scholar, Department of Agricultural Entomology PGI Vasantrao Naik Marathwada Aril. University, Parbhani, Maharashtra, India

Corresponding Author:
SA Salunkhe
Msc Scholar, Department of Agricultural Entomology PGI, Mahatma Phule Krishi Vidhyapeeth, Rahuri, Maharashtra, India

Evaluation of different insecticides and biopesticides against thrips (*Thrips tabaci* Lindeman) infesting onion

SA Salunkhe, SA Nevgi and RB Kapare

Abstract
Field trial was conducted to study and evaluation of nine insecticides and biopesticides (buprofezin 25 SC @ 0.025%, emamectin benzoate 5 SG @ 0.002%, clothianidin 50 WDG @ 0.005%, profenofos 50 EC @ 0.05%, spinetoram 18.5 EC @ 0.016%, dinotefuron 20 WG @ 0.01%, Azadirachtin 10000 ppm @ 3 ml/lit, *Lecanicillium lecanii* @ 5 g/lit and *Metarhizium anisopliae* @ 5g/lit) with untreated control. Among different insecticide and biopesticide evaluated, profenofos followed by spinetoram emerged as most effective. The treatment with profenofos 50 EC @ 0.05% recorded highest. i.e. (25.65q/ha)yield of onion with ICBR (1:11.31) as against (16.14q/ha) in untreated control. Whereas, the treatment with spinetoram 18.5 EC @ 0.016%, was found equally effective with this treatment and recorded (24.90 q/ha) yield of onion with (1:2.48) ICBR.

Keywords: *Thrips tabaci*, insecticides, biopesticides

Introduction
Onion (*Allium cepa* Lindeman.) is one of the most important vegetable crops among the various bulbs producing vegetables. It is a member of Amaryllidaceae family which is commercially grown in tropical and subtropical countries. It suffers severely due to the attack of insect pests, which reduce its bulb yield and quality. Major pest is thrips **(***Thrips tabaci* L)
The present day need to emphasizes not only to use the different chemical for control pest also use different biopesticides with minimum dose. Since as development of insect resistance against insecticide has been reported from various parts of the world, so it is desirable to screen the new insecticide molecules and biopesticides with the existing insecticides for their efficacy against onion thrips.

Materials and Methods
Nine different insecticides and biopesticides *viz.*, buprofezin 25 SC @ 0.025%, emamectin benzoate 5 SG @ 0.002%, clothianidin 50 WDG @ 0.005%, profenofos 50 EC @ 0.05%, spinetoram 18.5 EC @ 0.016%, dinotefuron 20 WG @ 0.01%, Azadirachtin 10000 ppm @ 3 ml/lit, *Lecanicillium lecanii* @ 5 g/lit and *Metarhizium anisopliae* @ 5g/lit where evaluated with untreated control. The trial was laid out in RBD replicated 3 times in the plot size of 3.0 m x 2.0 m with the spacing 15 x10 cm. First spray of insecticides was given on appearance of thrips and subsequent teo sprays were given at 14 days interval by using Knapsack sprayer with 500 lit. of water /ha. For recording observations, five plants were selected randomly in each net plot area and recorded pest. The observation were recorded a day before treatment as per count and then at 3rd, 7th,14th days after each spray of post count. Cumulative efficiency of insecticidal treatment was studied on the basis of average the sprayes. The bulb yield was recorded from each plot. Thus the data obtained on population of pest where analysed after transforming them into square root, while fruit yield was converted to quantle/ha.

Result and Discussion
All the insecticides and biopesticides treatment werw found significantly superior in suppressing the pest population over untreated control. Three days after spray the treatment with profenofos 50 EC @ 0.05%, found very effective against onion thrips and recorded (2.19 thrips/plant)and it was at par with the treatment of with spinetoram 18.5 EC @ 0.016% (2.37 thrips/plant), The next effective group of treatments clothianidin 50 WDG @ 0.05% (6.47 thrips/plant), dinotefuron 20 WG @ 0.01% (8.31 thrips/plant), emamectin benzoate 5 SG @ 0.002% (8.05 thrips/plant), buprofezin 25 SC @ 0.025% (7.93 thrips/plant), *L. lecanii* @ 5

g/lit (9.83 thrips/plant), *M. anisopliae* @ 5 g/lit (11.21 thrips/plant), Azadirachtin 10,000 ppm @ 3 ml/lit (8.76 thrips/plant),respectively. Hazarea *et al.* (1999) reported that highest mortality of thrips was observed (97.06%) in profenofos treatment. The average number of thrips /plant ranged from (1.82 to 2.52) in treated plots as against 26.12 thrips / plant in untreated control. Similar treand of effectiveness of each treatment was observed after seventh day after spray. At fourteen days after spray, the lowest population was recorded in the treatment profenofos 50 EC @ 0.05% recorded 5.86 thrips per plant and found most effective treatment over others except, spinetoram 18.5 EC @ 0.016% (7.04 thrips/plant). The treatment with clothianidin 50 WDG @ 0.05% (8.24 thrips/plant), dinotefuron 20 WG @ 0.01% (10.23 thrips/plant), emamectin benzoate 5 SG @ 0.002% (8.66 thrips/plant), buprofezin 25 SC @ 0.025% (9.90 thrips/plant), *L. lecanii* @ 5 g/lit (11.32 thrips/plant), *M. anisopliae* @ 5 g/lit (12.56 thrips/plant), Azadirachtin 10,000 ppm @ 3 ml/lit (10.50 thrips/plant) were found at par with each other and recorded the thrips population in the range of 8.24 to 12.56 per plant.

Yield and ICBR: The highest incremental cost benefit ratio (ICBR) (1:11.31) was recorded in the treatment with profenofos 50 EC @ 0.05%. Howere it was followed by clothianidin 50 WDG @ 0.005% (1:9.92) *L. lecanii* @ 5 g/lit, dinotefuran 20 WG @ 0.01%, *M. anisopliae* @ 5 g/lit, buprofenzin 25 SC @ 0.025% with ICBR of 1:5.66, 1:4,61, and 1:5.83, respectively. The treatments with emamectin benzoat*e* 5 SG @ 0.002%, spinetoram 18.5 EC @ 0.016%, Azadirachtin 10000 ppm @ 3 ml/lit were with ICBR of 1:3.96, 1:2.48 and 1:1.64.

Patel and Patel (2012) reported that the highest net ICBR was obtained the profenofos 0.05% (73.05%) was the 5th treatment in recording the highest net ICBR however during the present study it was the 1st treatment with highest ICBR.

Panse (2012) also reported that cost benefit : ratio and yield increase over control were worked out and highest cost benefit ratio was (1:9.36) in profenofos.

Table 1: Effect of different insecticidal against onion thrips (*T. tabaci*) (Average of three sprays)

Sr. No.	Treatments	Survival population of thrips/plant			Yield (t/ha)	ICBR
		3 DAS	7 DAS	14 DAS		
T_1	Buprofezin 25 SC @ 0.025%	7.93 (2.90)	6.39 (2.63)	9.90 (3.22)	21.84	1:4.83
T_2	Emamectin benzoate 5 SG @ 0.002%	8.05 (2.92)	5.88 (2.53)	8.66 (3.03)	22.00	1:3.96
T_3	Clothianidin 50 WDG @ 0.005%	6.47 (2.79)	5.11 (2.60)	8.24 (3.00)	24.50	1:9.92
T_4	Profenofos 50 EC @ 0.05%	4.29 (2.19)	2.81 (1.82)	5.86 (2.52)	25.65	1:11.31
T_5	Spinetoram 18.5 EC @ 0.016%	5.11 (2.37)	3.15 (1.90)	7.04 (2.75)	24.90	1:2.48
T_6	Dinotefuron 20 WG @ 0.01%	8.31 (2.97)	6.68 (2.68)	10.23 (3.28)	23.39	1:3.89
T_7	Azadirachtin 10000 ppm @ 3 ml/lit	8.76 (3.04)	7.63 (2.85)	10.50 (3.32)	20.17	1:1.64
T_8	*Lecanicillium lecanii* @ 5gm/lit	9.83 (3.41)	7.99 (2.91)	11.32 (3.30)	21.72	1:5.66
T_9	*Metarhizium anisopliae* @ 5gm/lit	11.21 (3.64)	8.45 (2.99)	12.56 (3.43)	20.84	1:4.61
T_{10}	Untreated control	26.12 (5.16)	26.01 (5.15)	22.23 (4.67)	16.15	-
	S.E. ±	0.09	0.08	0.11	-	-
	CD at 5%	0.27	0.24	0.35	-	-

* Figure in parenthesis denote $\sqrt{x+0.5}$ transformed value

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