International Journal of Entomology Research
ISSN: 2455-4758; Impact Factor: RJIF 5.24
Received: 04-02-2019; Accepted: 05-03-2019
www.entomologyjournals.com
Volume 4; Issue 3; May 2019; Page No. 23-26

Management of onion thrips (*Thrips tabaci* L.)

DR Kadam[1], PB Jadhao[2], SS Kale[3], GB Bhise[4]
[1-4] Department of Agricultural Entomology Vasantarao Naik Marathwada Krishi Vidhyapeeth, Parbhani, Maharashtra, India

Abstract
The experiment was conducted at Experimental Research Farm, Department of Agricultural Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, during the rabi season of the year 2015-16 to management of onion thrips (*Thrips tabaci* L.). Minimum thrips population at 14 DAS was noticed from the plots treated with spinosad 45 SC @ 73 g.a.i. ha^{-1} (6.80 thrips/ plants) followed by fipronil 5 SC @ 50 g.a.i. ha^{-1} (7.13thrips/plant), lamda-cyhalothrin 5 EC @ 15 g.a.i. ha^{-1} (7.33), and cypermethrin 25 EC @ 150 g.a.i. ha^{-1} (8.46thrips/plant). These treatments were at par with each other. Within the treatments comparatively maximum thrips count was recorded from plots sprayed with buprofezin 25 SP @ 250 g a.i. ha^{-1} (12.06 thrips/plant).

Keywords: thrips, Marathwada, treatments, sprayed, *Thrips tabaci*

Introduction
Onion (*Allium cepa* L.) belonging to family Liliaceae is one of the most popular bulb vegetables in India. Commercially it is also an important vegetable that can be kept for fairly long period and which can withstand the hazards of rough handling including long distance transportation. Though it is classified as vegetable, it has special qualities which add taste and flavor to food and medicinal value. It is also used for salads, sauce, soups pickles for seasoning food in culinary purpose. Hence in India it is used for cuisine and culinary preparations and commonly referred as 'Queen of kitchens'. Onion crop is attacked by number of insect pests right from seedling stage till harvest. Among the insect pests, onion thrips, *Thrips tabaci* L. is the most serious pest causing 34 - 43 per cent loss in yield. (Krishna Kumar, *et al* 2001). Onion thrips feeding results in silvering, curling of leaves which results in reduction of bulb size and weight. It is also a vector of Iris Yellow Spot Virus which is a tospo virus causing detrimental effect on bulb and seed onion crop in India.

Material and Methods
Present investigation was carried out during *Rabi* 2015-16 at Research Farm, Department of Agricultural Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani which is located at 408.50 meter mean sea level having subtropical climate. It lies between 19^0-20^0 North latitude and 76^0 East longitudes and receives an annual rainfall of 930 mm distributed well over the season. The temperature and humidity ranges from 10 to 42^{0}C and 35 to 90 per cent.
First insecticidal application was initiated when pest attained ETL (15 thrips/plant). The subsequent sprays were given at an interval of 15 days. Spraying was done early in the morning hours to avoid the mid day heat. Total three sprays were given.
For recording observations five plants were randomly selected in each experimental plot. The precount was recorded one day before application of treatments. Post application observations were recorded at 1, 5, 10 and 14 days after each spray.

Table 1

Cropping season	Dates of spraying		
	First	Second	Third
Rabi 2015-16	12/01/2016	28/01/2016	15/02/2016

The data obtained on population of onion thrips (mean no. per plant) was compiled. The data obtained were subjected to √X+0.5 transformations before analysis. The analysis of pooled data was carried out to ascertain the relative efficacy of the insecticide treatments against onion thrips. Appropriate statistical methods were employed to work out standard error (SE) and critical difference (CD) to know the significance of treatments (Gomez and Gomez, 1984).

Result and Discussion
The results obtained from the present investigation as well as relevant discussion have been summarized under the following heads:

Efficacy of newer insecticides against thrips (*T. tabaci* L.)
The pre-treatment population of thrips was uniform in all the experimental treatment plots, since the average population of thrips was statistically non- significant. The average pre-treatment population was 13.56 to 14.46 thrips/plant justifying that there was need to protect the crop from thrips infestation (Table 1).

A. Performance after first spray
The post treatment observations recorded on first day (Table 4) indicated that all the insecticidal treatments were significantly superior over untreated control in reducing thrips population. Among these treatments, the plots treated with spinosad 45 SC @ 73 g. a.i. ha^{-1} recorded lowest thrips population (0.86 thrips/plant) which was statistically at par with fipronil 5 SC @ 50 g. a.i. ha^{-1} (0.93 thrips/plant), lamda-cyhalothrin 5 EC @ 15 g. a.i. ha^{-1} (1.13 thrips/plant). The next effective treatments were cypermethrin 25 EC @ 150 g. a.i. ha^{-1} (1.80 thrips/plant), dimethoate 30 EC @ 200 g. a.i. ha^{-1} (2.33 thrips/plant), acephate 75 SP @ 750 g. a.i.

ha^{-1} (2.33 thrips/plant) and buprofezin 25 SP @ 250 g. a.i. ha^{-1} (3.33 thrips/plant).

The data recorded at 5 DAS revealed that spinosad treated plots showed lowest incidence (3.06 thrips/plant) followed by fipronil (3.20 thrips/plant). The next promising treatments were lamdacyhalothrin (3.40 thrips/plant) and cypermethrin (3.66 thrips/plant).

On the 10th day after spray the treatment of spinosad was superior (4.20 thrips/plant) as compared to other test insecticides, but it was found on par with fipronil (4.53 thrips/plant), lamdacyhalothrin (4.60 thrips/plant), cypermethrin (4.86 thrips/plant) and dimethoate (5.73 thrips/plant) and acephate (5.73 thrips/plant).

The data recorded at 14 DAS clearly indicated that the plants treated with spinosad, fipronil, lamdacyhalothrin and cypermethrin recorded minimum incidence (5.30, 5.46, 5.53 and 6.26 thrips/plant, respectively) and were statistically at par with each other. However, maximum count was recorded from the plants treated with buprofezin (8.76 thrips/plant).

B. Performance after second spray

The thrips population recorded on untreated control plots was ranged between 25.80 (1 DAS) and 30.73 (14 DAS) thrips/plant showing an increasing trend. The observation recorded at 1 DAS showed that spinosad was the most superior treatment (0.80 thrips/plant). It was followed by fipronil (1.40 thrips/plant) and lamdacyhalothrin (1.80 thrips/plant) which were statistically at par. Highest incidence among the insecticidal treatments was found on plants treated with buprofezin (4.53 thrips/plant).

The observation on 5 DAS showed that spinosad was the most superior treatment (2.13 thrips/plant). It was followed by fipronil and lamdacyhalothrin which were equally effective treatment (3.06 thrips/plant).

The plots observed at 10 days after spray treatment indicated that the order of efficacy of insecticides was spinosad, fipronil, lamda-cyhalothrin and cypermethrin (2.87, 3.47, 3.47, and 4.93 thrips/plant), respectively.

The data recorded on 14 DAS clearly indicated that the plots treated with spinosad and fipronil recorded minimum incidence (4.20 and 4.33 thrips/plant) followed by lamda-cyhalothrin (4.93 thrips/plant). All these three treatments were statistically at par with each other. However, maximum count was recorded from the plants treated with buprofezin (8.86 thrips/plant).

C. Performance after third spray

At 1st day after third spray spinosad was found to be the most effective in suppressing the pest population to lowest number *i.e.* 1.26 thrips/plant followed by fipronil and lamda-cyhalothrin (1.86 and 2.26 thrips/plant) which were on par with each other. The next most promising treatments were cypermethrin, acephate, diamethoate, buprofrzin (3.26, 3.46, 3.86 and 4.46 thrips/plant), respectively.

The data recorded on 5 DAS clearly indicated that the plots treated with spinosad, fipronil and lamdacyhalothrin recorded minimum incidence (2.60, 3.13 and 3.80 thrips/plant, respectively) showing no statistical difference in order of their efficacy. However, maximum count was recorded from the plants treated with buprofezin (5.80 thrips/plant).

At 10 DAS spinosad was the superior treatment (4.20 thrips/plant). It was followed by fipronil (4.33 thrips/plant) and lamda-cyhalothrin (5.13 thrips/plant) which were on par with spinosad.

The observations recorded at 14 days after spray treatment indicated that the order of efficacy of insecticides was spinosad, fipronil, lamdacyhalothrin, cypermethrin, acephate, diamethoate and lastly buprofrzin (6.80, 7.13, 7.33, 8.46, 8.53, 10.33 and 12.06 thrips/plant), respectively.

1. Overall efficacy of newer insecticides against onion thrips (*Thrips tabaci* L.)

Pooled average in respect of efficacy of newer insecticides against onion thrips are presented in Table 5. The precount of thrips before initiation of the spray treatments was in the range of 13.56 to 14.53 thrips/ plant. The thrips incidence in all insecticidal treatments was significantly low indicating that all the insecticides were significantly effective. As compare to untreated control the treatments comprised of spinosad 45 SC @ 73 g a.i. ha^{-1}(5.43 thrips/plant), fipronil 5 SC @ 50 g a.i. ha^{-1} (5.64 thrips/plant), Lamda-cyhalothrin 5 EC @ 15 g a.i. ha^{-1} (5.93 thrips/plant) and cypermethrin 25 EC @ 150 g a.i. ha^{-1} (6.95thrips/plant) were the most effective treatments at 14 DAS and were at par with each other. The remaining insecticides also effectively controlled the thrips but their persistence lasted up to ten days showing more number of thrips/plant at 14 DAS.

The present results are in conformity with the findings of Lazano and Kilchher (1998) who reported that spinosad may also be useful in controlling thrips in field conditions. Hosamania *et al.* (2010) reported that fipronil 80 WG @ 60 ha^{-1} was effective in reducing the thrips populations with increased yield of onion. Spinosad @ 56.25 g a.i. ha^{-1} was the most effective treatment at 14 DAS and was on par with fipronil @ 25 g a.i. ha^{-1} followed by lambda cyhalothrin as shown by Kadam *et al.* (2012).

Table 1: Efficacy of newer insecticides against onion thrips (*Thrips tabaci)* L.)

Treatments	Dose g.a.i/ha	Average no. of thrips/plant												
		Pre-count	1st spray				2nd spray				3rd spray			
			1 DAS	5 DAS	10 DAS	14 DAS	1 DAS	5 DAS	10 DAS	14 DAS	1 DAS	5 DAS	10 DAS	14 DAS
T_1 Acephate 75 SP	750	14.46 (3.86)	2.33(1.52)	5.16(2.27)	5.73(2.36)	7.13(2.67)	2.87(1.54)	3.96(2.11)	5.03(2.38)	6.66(2.57)	3.46(1.85)	4.86(2.20)	6.68(2.61)	8.53(2.92)
T_2Buprofezin 25 SP	250	13.86 (3.78)	3.33(1.82)	5.26(2.29)	7.60(2.75)	8.76(2.95)	4.53(2.12)	5.80(2.50)	7.63(2.75)	8.86(2.97)	4.46(2.08)	5.80(2.39)	8.73(2.95)	12.06(3.44)
T_3 Cypermethrin 25 EC	30	13.56(3.74)	1.8(1.34)	3.66(1.91)	4.86(2.20)	6.26(2.50)	2.40(1.29)	3.60(2.02)	4.93(2.20)	6.13(2.47)	3.26(1.80)	4.13(2.01)	5.83(2.42)	8.46(2.90)
T_4 Dimethoate 30 EC	200	13.96(3.80)	2.33(1.52)	4.7(2.16)	5.73(2.35)	7.23(2.68)	3.07(1.75)	3.93(2.10)	5.03(2.38)	6.20(2.48)	3.86(1.85)	4.80(2.16)	6.70(2.57)	10.33(3.19)
T_5 Fipronil 5 SC	50	14.33(3.85)	0.93(0.95)	3.2(1.78)	4.53(2.12)	5.46 (2.33)	1.40(1.02)	3.06(1.88)	3.47(2.12)	4.33(2.08)	1.86(1.36)	3.13(1.75)	4.33(2.07)	7.13(2.67)
T_6 Lamdacyhalothrin 5 EC	15	13.83(3.78)	1.13(1.06)	3.4(1.83)	4.60(2.14)	5.53(2.34)	1.80(1.06)	3.06(1.88)	3.47(2.12)	4.93(2.22)	2.26(1.50)	3.80(1.94)	5.13(2.26)	7.33(2.70)
T_7Spinosad 45 SC	73	14.53(3.87)	0.86(0.92)	3.06(1.73)	4.20(2.11)	5.30(2.29)	0.80(0.85)	2.13(1.62)	2.87(2.04)	4.2(2.04)	1.26(1.12)	2.60(1.61)	4.20(2.03)	6.80(2.61)
T_8Water spray	-	14.43(3.86)	15.66(3.95)	21.43(4.62)	22.73(4.76)	24.13(4.91)	25.80(5.09)	28.63(5.39)	29.63(4.76)	30.73(5.54)	30.93(5.56)	32.06(5.65)	34.73(5.89)	40.06(6.32)
S.E.±	-	0.67	0.05	0.11	0.08	0.07	0.08	0.55	0.09	0.06	0.13	0.11	0.08	0.13
C.D. at 5%	-	NS	0.16	0.33	0.26	0.22	0.25	1.68	0.28	0.19	0.41	0.35	0.25	0.41

*Figures in parentheses are root transformation
*DAS: Days After Spray
* NS: Non Significant

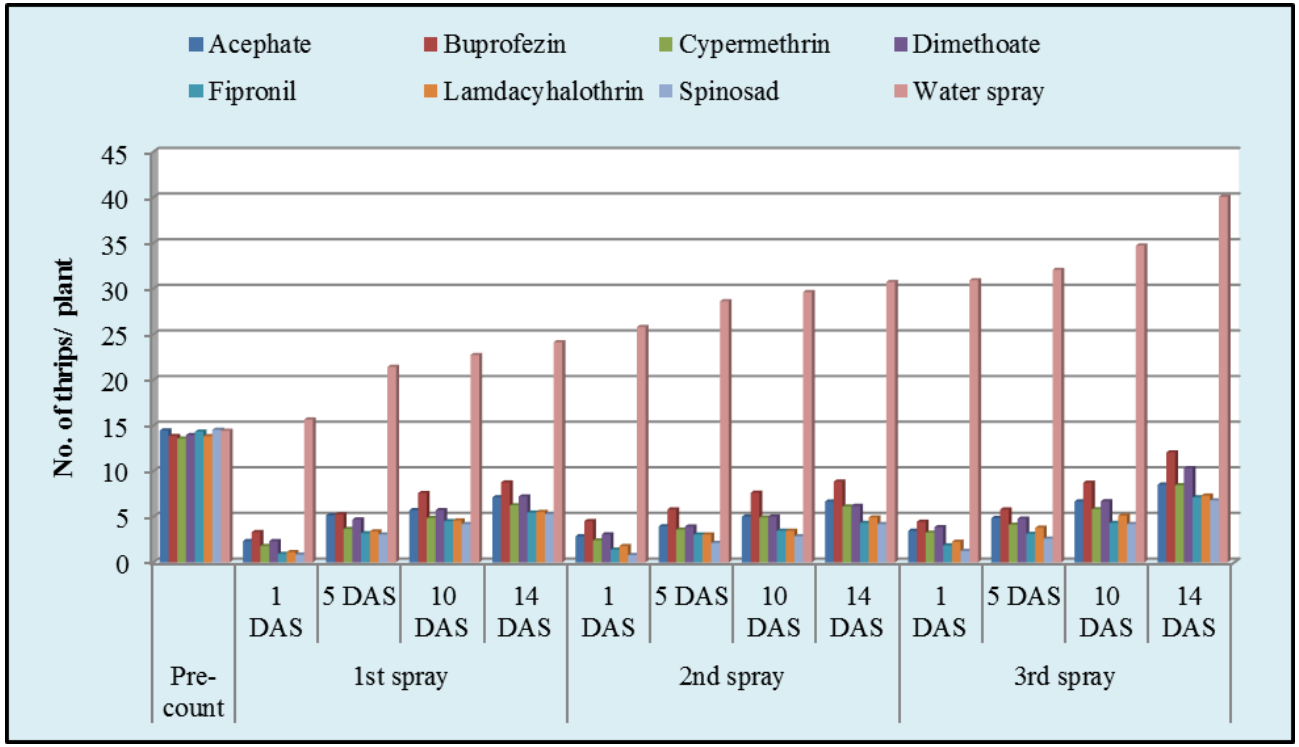

Fig 1: Effect of newer insecticides against onion thrips *(Thrips tabaci* L.)

Table 2: Overall efficacy of newer insecticides against onion thrips (*Thrips tabaci* L.)

Treatment	Dose g a.i. ha^{-1}	Pre-count	1 DAS	5 DAS	10 DAS	14 DAS
T_1 Acephate 75 SP	750	14.46 (3.86)	2.88 (1.69)	4.66 (2.15)	5.81 (2.40)	7.44 (2.72)
T_2 Buprofezin 25 SP	250	13.86 (3.78)	4.10 (2.02)	5.62 (2.37)	7.98 (2.82)	9.89 (3.13)
T_3 Cypermethrin 25 EC	30	13.56 (3.74)	2.48 (1.56)	3.79 (1.94)	5.20 (2.27)	6.95 (2.62)
T_4 Dimethoate 30 EC	200	13.96 (3.80)	3.08 (1.74)	4.47 (2.11)	5.82 (2.40)	7.92 (2.79)
T_5 Fipronil 5 SC	50	14.33 (3.85)	1.39 (1.17)	3.13 (1.76)	4.11 (2.02)	5.64 (2.36)
T_6 Lamda-cyhalothrin 5 EC	15	13.83 (3.78)	1.73 (1.80)	3.42 (1.84)	4.40 (2.09)	5.93 (2.42)
T_7 Spinosad 45 SC	73	14.53 (3.87)	0.97 (0.98)	2.59 (1.60)	3.75 (1.93)	5.43 (2.31)
T_8 Water spray	750	14.43 (3.86)	24.13 (4.86)	27.37 (5.21)	29.03 (5.36)	31.64 (5.59)
SE		0.67	0.13	0.12	0.11	0.11
CD		NS	0.41	0.36	0.35	0.35

*Figures in parentheses are root transformation
*DAS: Days After Spray
* NS: Non Significant

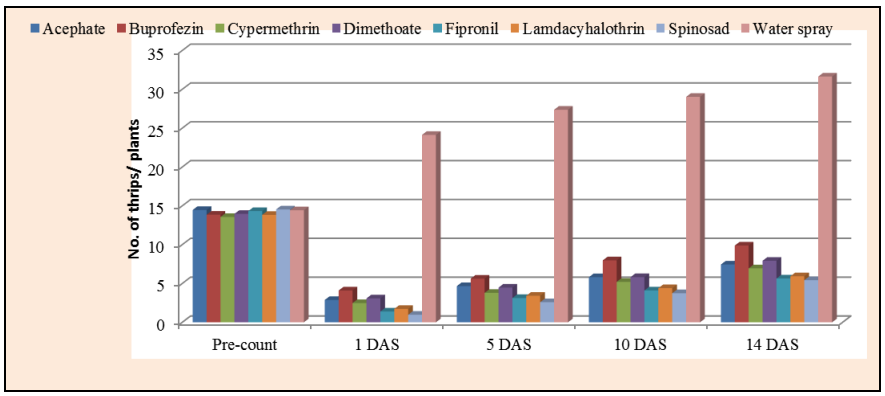

Fig 2: Overall efficacy of newer insecticides against onion thrips *(Thrips tabaci* L.)

Conclusions

Onion is one of the most popular and commercial bulb vegetables grown in India and worldwide. Being high in economic value, now a day's cultivation of onion is becoming the menace to the farmers because of the attack of the insect pests. Among these onion thrips (*Thrips tabaci* L.) is major one. This pest not only reduces the yield but also deteriorates the quality of bulb and seed yield. To overcome thrips problem, onion growers are using chemical pesticides indiscriminately. Continuous applications of same insecticides have increased the resistance and resurgence of thrips in onion. The present study was designed to study the efficacy of acephate, buprofezin, cypermethrin, dimethoate, fipronil, lamda-cyhalothrin and spinosad against infestation of thrips on onion.

Efficacy of newer insecticides against onion thrips

The insecticides including acephate 75 SP @ 750 g a.i ha^{-1} buprofezin 25 SP @ 250 g a.i. ha^{-1}, cypermethrin 25 EC @ 150 g a.i. ha^{-1}, dimethoate 30 EC @ 200 g a.i. ha^{-1}, fipronil 5 SC @ 50 g a.i. ha^{-1}, lamda-cyhalothrin 5 EC @ 15 g a.i. ha^{-1}, spinosad 45 SC @ 73 g a.i. ha^{-1} were studied for their efficacy against onion thrips in seed production programme during *Rabi* season of 2015. The results regarding efficacy of newer insecticides can be concluded by advocating the farmers to use the best treatments of the present study.

The pooled data on incidence of onion thrips (No./plant) revealed that the count of thrips before initiation of spray treatments was in the range of 13.56 to 14.46 thrips/plant. The thrips population was increased from 15.53 to 30.73 (thrips/plant) over a span of 45 days. The count of thrips in the insecticide treatments was significantly lower indicating that all evaluated insecticides were significantly effective against thrips. The minimum thrips population was observed in plants treated with spinosad 45 SC g a.i. ha^{-1} followed by fipronil 5 SC @ 50 g a.i. ha^{-1}, lamda-cyhalothrin 5 EC @ 15 g a.i. ha^{-1} and cypermethrin 25 EC @ 150 g a.i. ha^{-1}. These treatments were found most significant in controlling thrips and at par with each other.

References

1. Gomez KA, Gomez AA. Statistcal Procedures for Agricultural Research (2nd edn.) Book of Rice Res. Inst. Philippines. A Wiley Inter Science Pub. John Wiley and Sons, New York, 1984; pp. 680.
2. Hosamani AC, Bheemanna M, Vinod SK, Rajesh L, Somasekhar. Evaluation of fipronil 80 WG against onion thrips, *Thrips tabaci* L. *BIOINFOLET*. 2012; 9(4B):824-826.
3. Kadam DR, Kale VD, Deore BV. Bioefficacy of insecticide against thrips infesting pomegrante fruits. Indian Journal of Plant Protection. 2012; 40(2):146-147.
4. Krishna Kumar NK, Veere Gowda R, Sreenivas Rao E, Krishna Moorthy PN. Response of onion genotypes for thrips *T. tabaci* L. resistance. Proceedings of the second national symposium on IPM in horticultural crops new molecule pesticides, bio pesticides, Bangalore, India, 2001; pp. 17-19.
5. Lazano D, Kilchher G. How to choose oil to safely kill bugs. The press democrat, 1998; 21:1.