ISSN: 0974 - 0376

The Ecoscan : Special issue, Vol. IX: 521-524: 2016
AN INTERNATIONAL QUARTERLY JOURNAL OF ENVIRONMENTAL SCIENCES
www.theecoscan.com

COMPARATIVE EFFICACY OF DIFFERENT INSECTICIDES AGAINST THRIPS ON ONION CROP

Shimla Gupta *et al.,*

KEYWORDS

Onion
Thrips (*Thrips tabaci* L.)
Efficacy of insecticides

**Proceedings of National Conference on
Harmony with Nature in Context of
Resource Conservation and Climate Change**
(HARMONY - 2016)
October 22 - 24, 2016, Hazaribag,
organized by
Department of Zoology, Botany, Biotechnology & Geology
Vinoba Bhave University,
Hazaribag (Jharkhand) 825301
in association with
National Environmentalists Association, India
www.neaindia.org

The Ecoscan
AN INTERNATIONAL QUARTERLY JOURNAL OF ENVIRONMENTAL SCIENCES

SHIMLA GUPTA*, NAVNEET RANA AND HEMKANT CHANDRAVANSHI
Department of Entomology,
College of Agriculture, IGKV, Raipur - 492 012 (C.G.)
e-mail: guptashimla27@gmail.com

ABSTRACT

The investigation was conducted at Horticultural Research Farm, College of Agriculture, IGKV, Raipur during *rabi,* 2014-15. The results of the study revealed that among different insecticidal spray, acetamiprid 20SP @ 100g ha^{-1} followed by imidacloprid 200SL@ 250 ml was the most effective against onion thrips as it recorded lowest population however, fipronil 5SC @ 800 ml ha^{-1} and water spray was least effective as it recorded highest thrips population per plant from two spray observation with 15th days interval.

***Corresponding author**

INTRODUCTION

Onion (*Allium cepa* L.) is important crop in the world, used as vegetable crop. Onion bulb is also used as spices (Suresh, 2007). The onion plant is attacked by several insect pests like thrips (*Thrips tabaci* L.), jassid (*Amrasca biguttula biguttula*) etc. Among these pest thrips cause significant yield losses about >50% but can be even more problematic when it transmits some maggots (*Delia antiqua*), cut worms (*Agrotis ipsilon)* and viral diseases (Diaz-Montano *et al.,* 2011). Insecticides are the main strategy to manage onion thrips and in Honduras, onion growers typically apply insecticides weekly, resulting in 9–12 insecticide applications per cropping season (Rueda *et al*., 2003). The concept of an economic threshold (ET) for timely insecticide applications when they are needed is a viable alternative to calendar sprays (Pedigo *et al*., 1986). Efficacy of some new insecticides which are to-date recommended on tomato against sucking insect pests to farmers, so far these insecticides are considered less toxic to the predators of sucking insects pests. Bharani *et al*., (2015) made attempt to study the effect of different insecticides viz., imidacloprid 30.5 SC and thiamethoxam 25 WG against the onion thrips in the tomato ecosystem. After the introduction of the new molecules, which were tested and found effective against this pest. Hence, the present study was mainly focused on the effective management strategies on the thrips of onion and keeping the above points in view, the present study was formulated.

MATERIALS AND METHODS

The experiments were conducted in *rabi,* 2014-15 at Horticultural Research Farm, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur. In the experiment onion variety Agrifound Light Red was transplanted on 26th November 2014 (48th standard meterological week) by adopting recommended agronomical practices. The experiment was conducted in a Randomized Block Design with a plot size of 4 x 10 m the row to row and plant to plant spacing were maintained at 15 cm and 10 cm, respectively with three replications. Eight insecticides and water spray were evaluated for the management of *T. tabaci* L. Pretreatment observation were recorded a day prior to insecticides application while, post treatment observations were recorded after 1,3,5,7,10 and 15 days of spraying. All the insecticides were sprayed at 15 days interval between two sprays by using high volume knapsack sprayer. Thrips were counted as pretreatment observations before spraying of insecticides and post treatment observations after spraying of insecticides recorded on randomly selected five plants on each plot obtained were converted into square root transformation, by using the formula ($\sqrt{x}$ +0.5). This transformed data analyzed by the method of analysis of variance as described by Gomez and Gomez (1984). The "F" test was used at 5 per cent level of significance. Critical Difference (CD) values were analyzed at 5 per cent level of significance.

RESULTS AND DISCUSSION

Before taking treated plant observation, pretreatment observation are necessary for

knowing about insect population in normal situation. In the pretreatment observation average thrips population ranged from 47.27 to 73.47 per plant which was almost uniform in all treatments including untreated control and among the treatments data showed non-significant differences. All the tested newer insecticides were found significantly superior over untreated control in reducing the insect population at each observation days after spraying. After 1st day of first spray, acetamiprid 20SP @ 100g ha^{-1} recorded most effective treatment and found minimum thrips population (19.13 thrips per plant), followed by imidacloprid 200SL @ 250 ml ha^{-1} (27.13 thrips per plant), whereas chlorfenapyr 10 SC @ 100 ml ha^{-1} and water spray @ 500 l ha^{-1} was found as least effective treatment and recorded maximum thrips population as 35.87 thrips per plant and 49.47 thrips per plant respectively in the order of their toxicity/ effectivity. After third day, minimum thrips population recorded in acetamiprid with 16.73 thrips per plant. Whereas water spray least effective against thrips with the population of 50.33 thrips per plant. After 5th days of 1st spray the thrips population on onion crop ranged from 14.67 to 92.40 thrips per plant. The plot treated with acetamiprid was recorded best effective treatment and at par with imidacloprid (17.07 thrips per plant) and maximum thrips found in water spray (47.60 thrips per plant). After 7th days of 1st spray acetamiprid recorded least 10.13 thrips per plant population per plant and it was at par with imidacloprid with 12.27 thrips per plant and highest in water spray with 34.87 thrips per plant. After 10th days of 1st spray, the plot treated with imidacloprid noticed the lowest thrips population (8.40 thrips per plant). It was statically at par with acetamiprid (8.73 thrips per plant) whereas water spray (30.33 thrips per plant) was least effective against onion thrips, respectively. After 15th day of 1st spray, among all treatment acetamiprid recorded as most effective treatment against thrips population(7.07 thrips per plant), followed by imidacloprid (7.20 thrips per plant). whereas water spray was recorded least effective against thrips population 22.27 thrips per plant.

During second spray it was found that in post treatment observation (after 1st, 3rd, 5th, 7th, 10th, and 15th days after treatment). After 1st day of second spray, the plot treated with acetamiprid recorded least thrips population (27.53 thrips per plant) and most effective treatment however it was at par with imidacloprid (30.73 thrips per plant) and all other newer insecticides, whereas water spray (50.47 thrips per plant) was recorded the least effective against thrips and showing highest population. After 3rd day of second spray, the thrips population on onion crop ranged from 25.33 to 130.60 per plant. Among the tested insecticides the minimum thrips population was

Table 1: Bioefficacy of different insecticide against onion thrips after first spray

Notation	Treatments	Dose (g or ml/ha)	Pretreatments	Post treatments 1 DAT	3 DAT	5 DAT	7 DAT	10 DAT	15 DAT
T1	Thiamethoxam25WG	200 g	73.27(8.60)*	31.67 (5.71)	29.27 (5.49)	18.87 (4.45)	14.40(3.89)	11.00(3.46)	9.80(3.27)
T2	Acetamiprid 20SP	100g	72.73(8.58)	19.13 (4.48)	16.73 (4.20)	14.67 (3.95)	10.13 (3.33)	8.73(3.12)	7.07(2.83)
T3	Methomyl 40SP	1125g	68.20(8.31)	31.93 (5.73)	31.20 (5.67)	21.20 (4.70)	19.07(4.47)	13.27(3.77)	12.27(3.63)
T4	Imidacloprid 200SL	250 ml	70.47(8.44)	27.13 (5.30)	25.13 (5.11)	17.07(4.24)	12.27(3.63)	8.40(3.06)	7.20(2.85)
T5	fipronil 5 SC	800 ml	69.60(8.39)	38.27 (6.26)	34.40(5.94)	40.40(5.87)	32.87(5.81)	26.67 (5.25)	22.27(4.82)
T6	Chlorfenapyr10 SC	100 ml	73.47(8.61)	35.87 (6.06)	32.47 (5.78)	33.00(5.57)	21.60 (4.73)	18.87(4.45)	16.40(4.16)
T7	Spinosad 45 SC	160 ml	64.00 (8.02)	34.33 (5.94)	29.93 (5.56)	21.93(4.78)	13.80(3.83)	12.33(3.62)	11.00(3.46)
T8	Lambdacyhalothrin 5%EC	300 ml	73.00(8.59)	34.67 (5.97)	32.33 (5.77)	26.67 (5.25)	20.67(4.62)	14.47(3.93)	13.93(3.86)
T9	Water spray	500 l	71.27(8.47)	49.47(7.1)	50.33(7.16)	47.60 (6.43)	34.87(5.98)	30.33(5.59)	25.53(5.15)
T10	control		70.27(8.8)	74.00(9.10)	86.07(9.77)	92.40(10.11)	101.87(10.59)	109.47(10.96)	114.60(11.2)
	SEm ±		0.33	0.10	0.10	0.12	0.20	0.16	0.10
	CD at 5%		NS	0.32	0.31	0.37	0.61	0.50	0.31

Note : *Figure in parenthesis are square root transformed value; DAT : Days After Treatment

Table 2: Bioefficacy of different insecticide against onion thrips after second spray

Notation	Treatments	Dose(g or ml/ha)	Post treatments 1 DAT	3 DAT	5 DAT	7 DAT	10 DAT	15 DAT
T1	Thiamethoxam25WG	200 g	33.47(5.84)	32.01(5.70)	30.35(5.55)	26.91(5.24)	23.73(4.91)	15.33(4.02)
T2	Acetamiprid 20SP	100 g	27.53(5.32)	25.33(5.10)	24.07(4.99)	24.17(5.01)	17.83(4.32)	13.13(3.75)
T3	Methomyl 40SP	1125g	36.27(6.03)	34.27(5.86)	32.57(5.71)	30.39(5.59)	24.95(5.01)	16.63(4.18)
T4	Imidacloprid 200SL	250 ml	30.73(5.63)	29.03(5.47)	27.49(5.33)	20.47(4.61)	21.23(4.71)	15.19(4.00)
T5	fipronil 5 SC	800 ml	47.93(6.8)	46.37(6.87)	44.07(6.70)	41.97(6.55)	37.43(6.19)	25.09(5.09)
T6	Chlorfenapyr10 SC	100 ml	38.67(6. 17)	35.87(6.05)	34.33(5.82)	30.67(5.50)	27.27(5.31)	17.00(4.23)
T7	Spinosad 45 SC	160 ml	33.67(5.84)	32.03(5.71)	30.43(5.57)	27.33(5.26)	24.57(4.98)	15.91(4.10)
T8	Lambdacyhalothrin 5%EC	300 ml	37.93(6.14)	35.70(5.96)	33.85(5.89)	28.50(5.34)	26.47(5.11)	16.97(4.22)
T9	Water spray	500 l	50.47(6.98)	47.95(6.99)	46.57(6.89)	41.99(6.6)	38.83(6.29)	25.69(5.16)
T10	control		128.60(11.81)	130.60(11.92)	133.19(12.0)	129.39(11.3)	122.38(11.55)	118.81(11.4)
	SEm ±		0.41	0.42	0.42	0.43	0.45	0.28
	CD at 5%		1.25	1.26	1.27	1.30	1.35	0.84

Note : * Figure in parenthesis are square root transformed value; DAT : Days After Treatment

found in acetamiprid with 25.33 thrips per plant and it was at par with imidacloprid (29.03 thrips per plant) whereas, water spray was least effective against thrips and showing highest population. The similar trends of supremacy were maintained which were recorded in fifth days after insecticide application, whereas acetamiprid is more superior in compare to all treatments with 24.07 thrips population per plant. It was at par with imidacloprid, thiamethoxam, spinosad, methomyl, lambda cyhalothrin with the population of 27.49, 30.35, 30.35, 32.57, 33.85 thrips per plant whereas maximum thrips population was found in water spray (46.57 thrips per plant) and noticed as a least effective against onion thrips.After 7th days of 2nd spray, minimum thrips population was recorded in imidacloprid 20.47 thrips per plant and it was at par with acetamiprid, thiamethoxam, spinosad, lambda-cyhalothrin, methomyl with the population of, 24.17, 26.91,27.33, 28.50, 30.39 thrips per plant, whereas highest thrips population was recorded in water spray (41.99 thrips per plant), respectively but significantly superior over untreated control (129.39 thrips per plant). After 10th days of 2nd spray, the plot treated with acetamiprid noticed the lowest thrips population (17.83 thrips per plant). It was significantly superior with imidacloprid (21.23 thrips per plant) and thiamethoxam (23.73 thrips per plant), Whereas thrips population was highest in water spray (38.83 thrips per plant), respectively. All the tested insecticides were found significantly superior over untreated control plot after 15th day of 2nd spray of insecticides. Among all treatments, acetamiprid was recorded the best treatment minimized the thrips population (13.13 thrips per plant) followed by imidacloprid (15.19 thrips per plant), thiamethoxam (15.33 thrips per plant). The highest thrips population was observed in water spray (25.69 thrips per plant), respectively and recorded the least effective treatment.

After first and second spray of insecticides, clearly indicated that spray of acetamiprid followed by imidacloprid was noted as most effective against thrips as it recorded lowest population. Whereas water spray onion was least effective against thrips population. Similar findings were reported by Simon and Victor (2005) who mentioned, thrips infestation was lowest (0.28 thrips per leaf at 48 and 0.19 thrips per leaf at 56 date of evaluation) when the onion crop received three consecutive applications of lambda-cyhalothrin. Ullah *et al*. (2010) also opined that maximum effectiveness was recorded for imidacloprid17.8% SL (39.45). Greenberg *et al*. (2012) who also working on newer insecticide spinosad showed great promise for *T. tabaci* control in onions with respective low lethal dose values.

REFERENCES

Bharani, G. N., Kohilambal, H., Sivasubramanian, P. and Banuprathap, G. 2015. Comparative efficacy of bio pesticides and insecticides against tomato thrips (*thrips tabaci* lind.) and their impact on coccinellid predators. *The Ecoscan*.**10(1):** 207-210.

Diaz-Montano, J., Fuchs, M., Nault, B. A., Fail, J. and Shelton, A. M. 2011. Onion thrips (Thysanoptera: Thripidae): A global pest of increasing concern in onion, *J. Economic Entomology*. **104(1):** 1-13.

Gomez, K. A. and Gomez, A. A., 1984. Statistical Procedure for Agricultural Research. John Wiley and sons publication 2nd edition.

Greenberg, S., Lopez, J., Latheef, M., Adamczyk, J., Armstrong, J. S. and Liu, T. 2012. Toxicity of selected insecticides to onion thrips (Thysanoptera: Thripidae) using a glass-vial bioassay. *J. of Life Sciences*, **6:** 428-432.

Patil, S. D., Chandele, A. G., Wayal, C. B. and Game, B. C. 2010. Efficacy of different newer chemicals and bio-insecticides against onion thrips in *kharif* season. *International J. Plant Protection*. **2(2):** 227-230.

Pedigo, L. P., Hutchins, S. H. and Higley, L. G. 1986. Economic injury levels in theory and practice. *Annu. Rev. Entomol*. pp. 341-368.

Rueda, A. and Shelton, A. M. 2003. Development and evaluation of a thrips insecticide bioassay system for monitoring resistancein *Thrips tabaci*. *Pest Manage. Sci*. **59:** 553-558.

Simon, L. J. and Victor, J. R. 2005. Integrated management of onion thrips (*Thrips tabaci*) in onion (A*llium cepa* L.). *Proc. Fla. State Hort. Soc.* **118:**125-126.

Suresh, C. H. 2007. Studies on effect of organics on seed yield and quality in onion. MSc thesis. *Dept. of seed science and technology. Dharwad University of Agricultural Science. Dharwad.*

Ullah, F., Maraj-ul-Mulk, Farid, A., Saeed, M. Q. and Sattar, S. 2010. Population Dynamics and Chemical Control of Onion Thrips (*Thrips tabaci*, Lindemann). *Pakistan J. Zool*. **42:** 401-406.