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Evaluation of new insecticidal combination against onion thrips (*Thrips tabaci* Lindeman)

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Abstract
Pooled analysis of two *Rabi* seasons (2016-17 and 2017-18) data on bioefficacy of spirotetramate 120 + imidacloprid 120 SC (W/V) on onion indicated that two rounds of foliar application of the insecticide @ 75 + 75 g a.i./ha starting from Economic Threshold Level (ETL) of thrips was significantly superior in reducing the nymphs and adults of *Thrips tabaci* and observed the survival population in the range (5.67-11.00 thrips/plant) as against (24.83-27.20 thrips/plant) in untreated control. However, the treatment with spirotetramate 120 + imidacloprid 120 SC (W/V) @ 60 + 60 g a.i./ha was found at par with this treatment and observed the population of thrips in the range (6.60 – 12.50 thrips/plant). Whereas, in respect of yield of onion bulbs also these two treatments *viz;* spirotetramate 120 + imidacloprid 120 SC (W/V) @ 75 + 75 and 60 + 60 g a.i./ha recorded maximum bulb of yield *i.e.* 257.40 and 249.90 q/ha respectively, as against 162.10 q/ha in untreated control.

Keywords: *Thrips tabaci* L., bioefficacy (readymix insecticide), *Allium cepa*

1. Introduction
Onion (*Allium cepa* Lindeman) is one of the most important vegetable crop among the various bulbs producing vegetable. Among the various insects pests attacking onion thrips, *Thrips tabaci* Lindeman has been identified as a pest of national importance in India. It is polyphagous, infesting all vegetable crops, ornamental and fruit crops (Anantha Krishnan, 1971) [1]. The pest is active throughout the year and found on onion and garlic from November to May. The infested leaves get twisted and develop white patches. It causes considerable losses in quality as well as yield (Mote, 1977) [7]. The crop suffer heavy losses even up to 50 per cent (Rahman and Batra, 1945) [10].
The principal from of damage caused by onion thrips results from the piercing of cells and removal of cell contents by larva and adults. In case of severe infestation the bulbs remain undersized and distorted (Butani and Verma, 1976) [3]. In onion this leads to an irregular or blotchy whitening of leaves, a condition sometimes termed “blast” heavy leaves of feeding injury causes the hormonal imbalance of the plant, causing the leaves to curl and twist and the foliage to be stunted (Kendall and Bjostad 1990) [5].
Most of the insecticides with predominant systemic when used alone, fail to check internal feeders, defoliators and sap feeders together in onion. To brooaden the spectrum of control there is a trend for redaymix formations of mixture of two insecticides of different modes of action. In the present study, an effort was therefore made to test the bioefficacy of spirotetramate 120 + imidacloprid 120 SC (W/V) for management of major pests of onion thrips.

2. Material and methods
A field trial with eight treatments (Table 1) along with three replications were carried out in Randomized Block Design during *Rabi* 2016-17 and 2017-18 at All India Coordinated Research Project on Vegetable Crops, MPKV, Rahuri for the management of onion thrips. Cv. N-2-4-1 was transplanted every year in the 1st week of January in a plot size 3.00 x 2.00 m. with plant spacing 15 x 10 cm. The treatment consists of spirotetramate 120 + imidacloprid 120 SC (W/V) @ 45+45, 60+60, 75+75 g a.i./ha, spirotetramate 150 OD (W/V) @ 75; imidacloprid 200 SL @ 75; dimethoate 30 EC @ 200 and lambda-cyhalothrin 5 EC @ 15 g a.i./ha. Each insecticidal treatment was applied for two times after occurance of ETL of onion pests by using 500 lit. of water per hector with the help of hand operated Knapsack sprayer. Survival number of nymphs and adults of *T. tabaci* per plant were recorded prior to spraying

and at 3rd, 5th and 7th days of each spraying from five randomly selected plants in each replication and untreated check. Onion yield was recorded at the time of harvest (120-130 days) after transplanting and expressed as quintal per hector. The data on survival population of thrips was transformed in to square root formulation $\sqrt{x+0.5}$ and statistical analysis was done by following Panse and Sukhatme (1989) [9].

3. Results and Discussion

All the insecticidal treatments (Table 1-2) were found significantly superior over an untreated control for the management of onion thrips and also obtaining good yield of onion bulbs.

The treatment with spirotetramat 120 + imidacloprid 120 SC (W/V) @ 75+75 g a.i./ha was found to be most effective during *rabi* 2016-17 and 2017-18 for control of onion thrips at seven day spray interval and observed the thrips population in the range 5.33 – 10.00 and 6.00 – 12.00 thrips/plant as against 24.00 – 26.00 and 26.20 – 28.40 thrips/plant, respectively in an untreated control. However, the treatment with spirotetramat 120 + imidacloprid 120 SC (W/V) @ 60 + 60 g a.i./ha found at par with this treatment and observed thrips population on onion in the range 6.20 – 11.33 and 7.00 – 13.67 thrips/plant, respectively.

From the two years pooled data, the treatments with spirotetramate 120 + imidacloprid 120 SC (W/V) @ 75+75 and 60+60 g a.i./ha exhibited statistically effective results and recorded thrips population in the range 5.67 – 11.00 and 6.60 – 12.50/plant of onion; respectively as against 24.83 – 27.20/plant in an untreated control.

In respect of yield on onion bulbs, the treatment with spirotetramat 120 + imidacloprid 120 SC (W/V) @ 75 + 75 g a.i./ha found most effective during *rabi* 2016-17 and 2017-18 and recorded highest *i.e.* 256.56, 258.23 q/ha yield as against 161.60, 162.77 q/ha, respectively in an untreated control. However, the treatment with spirotetramat 120 + imidacloprid 120 SC (W/V) @ 60 + 60 g a.i./ha found at par with this treatment and recorded 248.73 and 251.07 q/ha yield of onion bulbs.

Pooled mean of two years revealed that the treatment with spirotetramat 120 + imidacloprid 120 SC (W/V) @ 75 + 75 g a.i./ha was found most effective in obtaining good yield of onion bulbs which recorded 257.40 q/ha as against 162.10 q/ha in an untreated control. Whereas, the treatment with spirotetramat 120 + imidacloprid 120 SC (W/V) @ 60 + 60 g a.i./ha found at par with this treatment and recorded 249.90 q/ha yield of onion bulbs. Earlier Goncalves and Guimaraes (1995) [4] reported that lambda-cyhalothrin 5 EC 15 g a.i./ha at 7 days interval obtained better results for reducing population of onion thrips. Whereas, Bocak (1995) [2] also reported that dimethoate 30 EC @ 200 g a.i./ha and lambda-cyhalothrin 5 EC @ 15 g a.i./ha showed relative effectiveness in reducing thrips population of onion.

Nevgi *et al.,* (2018) [8] tested combination products betacyfluthrin 90 + imidacloprid 210 OD @ 18 + 42 g a.i./ha and spirotetramat 120 + imidacloprid 120 SC @ 60 + 60 g a.i./ha against sucking pests of brinjal and they emerged as most effective treatments. Wale *et al.,* (2018) [13] also revealed that the dose of betacyfluthrin 90 + imidacloprid 210 OD at (21.6 + 50.4 – 27.9 + 65.1) g a.i./ha found most effective for control of aphids, thrips, whitefly and fruit borer of chilli. However, the similar type of combination of thiamethoxam 14.1% SC + lambda-cyhalothrin 10.6% SC required the dose @ 44 g a.i./ha to reduce the incidence of thrips, *Scirtothrips dorsalis* in chilli at 3 and 7 days after second spray (Tatagar *et al.,* 2012) [11].

Among the treatment doses, fipronil 5% + buprofezin 20 SC at 50 + 200 – 100 + 400 g a.i./ha found effective for control of chilli thrips and aphids and the impact of these treatments in respect of green chilli yield was also good (Kumpar Deepak *et al.,* 2019) [6]. Thangavel K. *et al.,* (2018) [12] tested readymix formulation, Alika 247 ZC (thiamethoxam 12.6% + + lambda-cyhalothrin 9.5%) against major pests of onion and they identified Alika 247 ZC @ 150 ml/ha as effective field dose for the management of *T. tabaci* and *S. exigua* on onion, besides recording highest yield. Thus, the earlier observations of reacymix insecticides for reducing the population of sucking pests in different vegetable crops are confirmatory with present findings and could support the results.

Table 1: Evaluation of spirotetramate 120 + imidacloprid 120 SC (W/V) against onion thrips (Av. of two sprays).

Sr. No.	Treatments	Dose g a.i./ha	Av. survival population of thrips / plant (2016-17)				Av. survival population of thrips / plant (2017-18)				Av. survival population of thrips / plant Pooled of two years			
			Pre count	3 DAS	5 DAS	7 DAS	Pre count	3 DAS	5 DAS	7 DAS	Pre count	3 DAS	5 DAS	7 DAS
1	Spirotetramate 120 + imidacloprid 120 SC (W/V)	45 + 45	22.33 (4.78)	14.33 (3.85)	8.00 (2.91)	9.67 (3.18)	24.00 (4.94)	16.00 (4.06)	9.40 (3.14)	10.20 (3.27)	23.17 (4.86)	15.17 (3.96)	8.70 (3.03)	9.93 (3.23)
2	Spirotetramate 120 + imidacloprid 120 SC (W/V)	60 + 60	21.67 (4.70)	11.33 (3.43)	6.20 (2.58)	7.33 (2.80)	23.33 (4.88)	13.67 (3.76)	7.00 (2.73)	8.00 (2.91)	22.50 (4.79)	12.50 (3.60)	6.60 (2.66)	7.67 (2.85)
3	Spirotetramate 120 + imidacloprid 120 SC (W/V)	75 + 75	23.33 (4.88)	10.00 (3.24)	5.33 (2.40)	6.67 (2.68)	23.67 (4.91)	12.00 (3.53)	6.00 (2.54)	7.33 (2.80)	23.50 (4.90)	11.00 (3.39)	5.67 (2.48)	7.00 (2.73)
4	Spirotetramate 150 OD (W/V)	75	21.00 (4.64)	17.00 (4.18)	9.00 (3.08)	10.33 (3.29)	25.00 (5.05)	18.40 (4.35)	10.67 (3.33)	11.00 (3.39)	23.00 (4.85)	17.70 (4.26)	9.83 (3.21)	10.67 (3.34)
5	Imidacloprid 200 SL	75	22.67 (4.81)	17.67 (4.26)	10.00 (3.24)	11.00 (3.39)	24.33 (4.98)	19.00 (4.14)	11.33 (3.44)	12.00 (3.53)	23.50 (4.90)	18.33 (4.34)	10.67 (3.34)	11.50 (3.46)
6	Dimethoate 30 EC	200	21.00 (4.64)	16.00 (4.06)	8.60 (3.01)	9.20 (3.11)	23.33 (4.88)	17.00 (4.18)	9.20 (3.11)	10.00 (3.24)	22.17 (4.76)	16.50 (4.12)	8.90 (3.06)	9.50 (3.16)
7	Lambda cyhalothrin 5% EC	15	22.00 (4.74)	14.67 (3.89)	7.40 (2.80)	8.67 (3.02)	24.67 (5.01)	15.33 (3.98)	8.00 (2.91)	9.00 (3.08)	27.33 (4.88)	15.00 (3.93)	7.70 (2.85)	8.83 (3.05)
8	Untreated control	--	23.00 (4.85)	24.00 (4.94)	25.20 (5.07)	26.00 (5.14)	25.00 (5.05)	26.20 (5.17)	27.00 (5.24)	28.40 (5.37)	24.00 (4.95)	24.83 (5.03)	26.10 (5.16)	27.20 (5.26)

	S.E.±	--	0.08	0.13	0.11	0.14	0.08	0.08	0.10	0.08	0.05	0.08	0.09	0.08
	C.D. at 5%	--	NS	0.41	0.34	0.41	NS	0.25	0.31	0.23	NS	0.26	0.27	0.25

* Figures in parentheses are $\sqrt{x+0.5}$ transformed values.

Table 2: Yield of onion bulbs

Sr. No.	Treatments	Dose g a.i./ha	Yield (q/ha)		Pooled yield of two years (q/ha)
			2016-17	2017-18	
1	Spirotetramate 120 + imidacloprid 120 SC (W/V)	45 + 45	223.24	224.91	224.08
2	Spirotetramate 120 + imidacloprid 120 SC (W/V)	60 + 60	248.73	251.07	249.90
3	Spirotetramate 120 + imidacloprid 120 SC (W/V)	75 + 75	256.56	258.23	257.40
4	Spirotetramate 150 OD (W/V)	75	208.25	209.92	209.08
5	Imidacloprid 200 SL	75	200.42	202.08	201.25
6	Dimethoate 30 EC	200	217.75	218.74	218.25
7	Lambda cyhalothrin 5% EC	15	218.25	219.91	219.08
8	Untreated control	--	161.60	162.77	162.10
	S.E.±	--	9.67	8.16	7.16
	C.D. at 5%	--	29.17	24.65	21.49

4. Conclusion

On the basis of present investigation of thrips on onion crop concluded that spirotetramat 120 + imidacloprid 120 SC (W/V) at 60 + 60 – 75 + 75 g a.i/ha is identified effective field dose for the management of *T. tabaci* on onion, besides recording highest yield of onion bulbs.

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6. References

1. Anantha Krishnan TN. Thrips (*T. tabaci* Lind.). In agriculture Horticulture and Forestry Diagonsis, Bionomics Control. J Sci. and Indus Res. 1971; 30(3):113-114.
2. Bocak L. The efficacy of different insecticides against *T. tabaci* on onion. J Econ. Entomol. 1995; 22(3):73-75.
3. Butani DK, Verma S. Insect pest of vegetables and their control onion and garlic. Pesticides. 1976; 10(11):33-35.
4. Goncalves PA, Guimaraes DR. Chemical control of *T. tabaci* in onion. Horticulture Brasileria. 1995; 13(1):28-31.
5. Kendall DM, Bjosted LB. Phytohormone ecology hebivary by *Thrips tabaci* induces greater ethylene production in insect onions than mechanical damage alone J Chem. Ecol. 1990; 16:981-991.
6. Kumar Deepak, Sharma KR, Raju SVS. Field efficacy of insecticidal combination against chilli thrips *Scirtothrips dorsalis* (Hood) and *Aphis gossypii* (Glover). Ann. Pl. Protec. Sci. 2019; 27(3):324-328.
7. Mote UN. Active and feeding period of onion thrips and proper time of application of endosulfan for their control. Veg. Sci. 1977; 5(2):143-144.
8. Nevgi SA, Pawar SA, Datkhile RV, Bhalekar MN. Bioefficacy of insecticidal mixtures against sucking pests of brinjal (*Solanum melongena* L.) Ann. Pl. Protec. Sci. 2018; 24:425-427.
9. Panse VG, Sukhatme PV. Statistical methods for Agricultural workers, 4th Edition, ICAR, Publications, New Delhi, 1989.
10. Rahman KA, Batra AL. The onion thrips, *T. tabaci* (Thripidae: Thysanoptera). Ind. J Agril. Sci. 1945; 14(4):308-310.
11. Tatagar MH, Mohankumar HD, Mesta RK, Shivprasad M. Evaluation of bioefficacy of new molecule, thiamethoxam 14.1% SC + lambda-cyhalothrin 10.6% SC to chilli thrips. *Scirtothrips dorsalis* Hood. Pestology. 2012; 36:19-23.
12. Thangavel K, Murali Baskaran RK, Suresh K. Field efficacy of readymix formulation, Alika 247 ZC (Thiamethoxam 12.6% + Lambda-cyhalothrin 9.5%) against major pests of onion. Ann. Pl. Protec. Sci. 2018; 26(1):16-20.
13. Wale SD, Pawar SA, Mohite DB. Evaluation of new insecticides against different pests on chilli (*Capsicum annum* L.). Ann. Pl. Protec. Sci. 2018; 26(1):10-15.