

MANAGEMENT OF ONION THRIPS (*Thrips tabaci*) THROUGH BOTANICALS AND BIO-PESTICIDES

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ABSTRACT : A field experiment was conducted at Regional Research Station, NHRDF, Karnal in two consecutive years during Rabi, 2008-09 and 2009-10 seasons on onion variety Agrifound Light Red for the management of onion thrips by using some botanicals and bio-pesticides. The botanicals and bio-pesticides evaluated were neem crude oil @ 4%, dasparni @ 50ml/lit, *Beauveria bassiana* @10¹³ spores/ha, spinosad @ 56g a.i./ha, profenofos @ 1.0ml/lit (check) and unsprayed plot served as control. Pooled data of two years revealed that significantly lowest thrips populations were recorded in check treatment i.e profenofos @ 1.0ml/lit followed by spinosad @ 56 g a.i./ha at 4th day after each spray. Significantly highest gross yield (282 q/ha) was recorded in profenofos @ 1ml/lit followed by spinosad (262 q/ha). The highest cost : benefit ratio (1:15.79) was also recorded in profenofos followed by *Beauveria bassiana* @10¹³ spores/ha i.e.1:5.86. Further the study revealed that five sprays of profenofos @ 1.0ml/lit at 10 days interval was found better for the management of onion thrips as well as increasing the yield and botanicals and bio-pesticides alone were less effective on thrips management in onion.

Keywords : Onion, thrips, botanicals, bio-pesticides, management.

Onion (*Allium cepa* L.) is grown all over the world and is a favourite vegetable in India. It is relished mostly as salad and Indian cuisine is incomplete without onion. India is the second largest onion producing country in the world with approximately 7.6 lacs ha onion growing area and annual production of 12.2 lacs MT during 2009-10 (Anon., 3). Thrips (*Thrips tabaci* Lindeman) is a regular and potential pest of onion and cause considerable losses as high as 90% in quality and yield (Gupta *et al.*, 9; Dharmasena, 6; Sudharma and Nair, 16). Thrips attack onion at all the stages of crop growth but their count increases from bulb initiation and remain high up to bulb development and maturity. Both nymphs and adults cause damage directly through feeding and indirectly through the transmission of lethal plant viruses. It is difficult to control this pest with insecticides because of its small size and cryptic habits (Lewis, 13). Failure to control this pest by timely and effective means causes considerable damage and results in immense economic loss by remarkably reduced yield (Anon. 2; Juan, 11).

The farmers are extensively and successfully using contact and systematic insecticides and also synthetic pyrethroids for controlling the pest. However, repeated application of same group of chemicals is not a desirable practice as this could lead to undesirable resistance problems. To avoid further resistance in this pest different entomologist tried

different non chemical methods. Use of natural plant products or plant-based insecticides has been found effective in controlling the insect pest in many vegetable crops (Gupta *et al.*, 10; Udainyan, 17; Devi *et al.*, 7; Bhandari, 4). Vestergaard *et al.*, (18) and Brownbridge (5) reported that *B. bassiana*, *M. anisopliae* and *V. lecanii* were more active against the western flower thrips, *Frankliniella occidentalis* than *P. fumosoroseus*. The present study is a step forward in this direction to assess the effect of some botanicals and bio-pesticide for the management of thrips in onion.

MATERIALS AND METHODS

The field experiment was conducted at Regional Research Station, NHRDF, Karnal during Rabi 2008-09 and 2009-10 seasons. Seedlings of onion variety Agrifound Light Red were transplanted in a bed size of 3.6m x 1.8m at 15cm x 10cm spacing. Randomized Block Design with 3 replications was followed. The treatments evaluated were neem crude oil @ 4.0%, pongamia crude oil @ 4.0 %, dasparni @ 50ml/lit, *Beauveria bassiana* @ 10¹³ spores/ ha, spinosad @ 56g a.i./ha, profenofos @ 1.0 ml/ha as check treatment and control treatment run simultaneously without spray. The application was started at appearance of the thrips and a total of 5 sprays were given at 10 days interval. All other agronomical practices were performed uniformly as per need in all the treatments.

Table 1: Management of onion thrips through some botanicals and bio-pesticides.

Treatments	Thrips before spray	Thrips population (nymphs/plant) 4 days after					Gross Yield (q/ha)	Market able Yield (q/ha)	Cost : benefit ratio
		1 st spray	2 nd spray	3 rd spray	4 th spray	5 th spray			
T ₁ -Neem crude oil @ 4 %	1	4 (43)*	3 (73)*	18 (50)*	4 (67)*	16 (12)*	232	221	01:2.27
T ₂ -Pongamia crude oil @ 4 %	1	3 (56)*	7 (40)*	21 (40)*	3 (63)*	15 (22)*	237	226	1:2.53
T ₃ -Dasparni @ 50 ml/lit	1	3 (56)*	3 (73)*	19 (45)*	3 (69)*	14 (24)*	222	211	01:2.83
T ₄ - <i>Beauveria bassiana</i> @10 ¹³ spores/ha	1	4 (42)*	5 (53)*	21 (40)*	4 (62)*	13 (41)*	220	212	01:5.86
T ₅ -Spinosad @ 56g a.i./ha	1	2 (75)*	3 (78)*	10 (71)*	1 (86)*	7 (63)*	262	253	01:4.77
T ₆ -Profenofos @ 1.0ml/lit (check)	1	1 (81)*	1 (88)*	7 (80)*	1 (91)*	4 (75)*	282	271	01:15.79
T ₇ -Control	1	7	12	36	9	21	189	173	-
CD (P=0.05)	NS	3 (37)	4 (31)	8 (20)	4 (41)	NS	36	34	-

The crop was harvested after attaining the maturity. The data on thrips (Nymph) population were

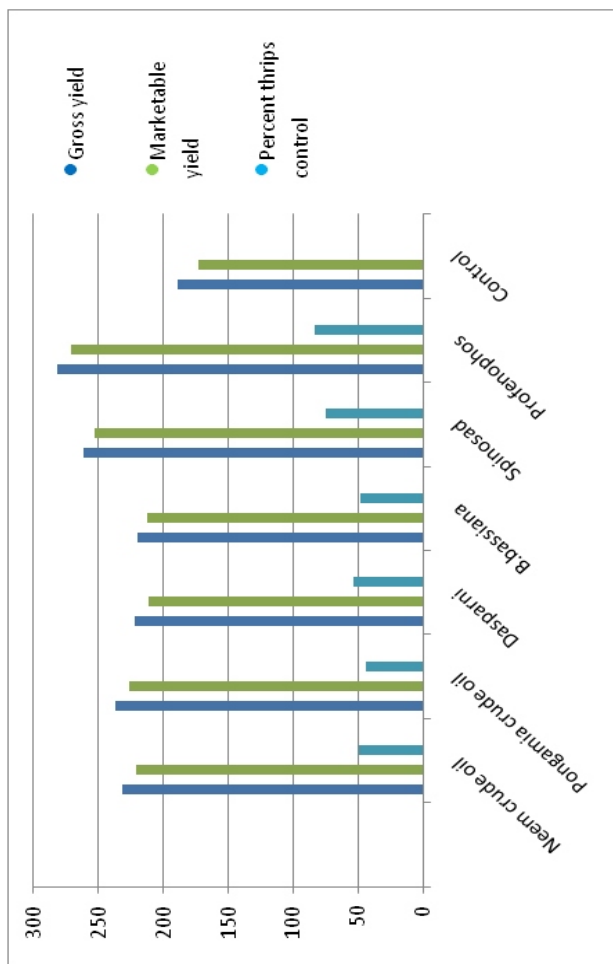


Fig. 1 : Effect of treatments on gross yield (q/ha), marketable yield (q/ha) and per cent thrips control.

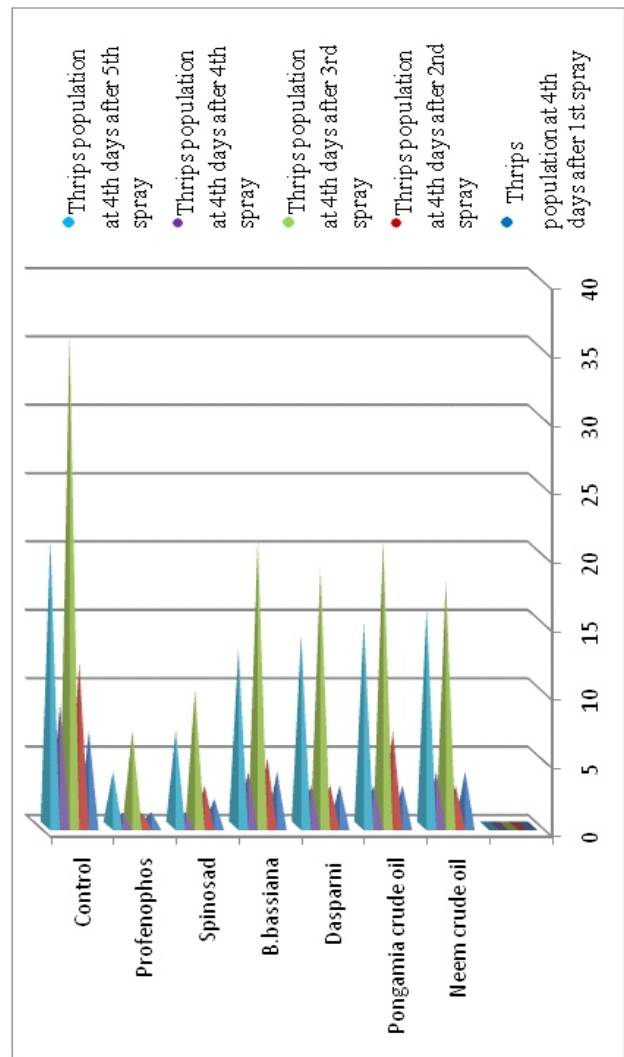


Fig. 2 : Effect of different treatments on thrips population at 4th day after each spray.

counted at the inner most leaves in 10 plant marked randomly in each treatment at 4 days after each spray. The cost benefit ratio was also worked out and data of two consecutive years i.e. Rabi 2008-09 and 2009-10 were pooled and analyzed statistically (Table 1).

RESULTS AND DISCUSSION

A perusal of data (Table 1, Fig 2) depicts the bio-efficacy of different botanicals and bio-pesticides against onion thrips. All tested components provided control of onion thrips at various degree of significance over control. Before first spray, thrips population was found non-significant. Data (Table 1) revealed that significantly lowest thrips population was recorded in profenofos @ 1 ml/lit during the entire observational period at 4th day after each spray except last observation which was recorded at 4th day after 5th spray because of less effectiveness of treatments on high temperature in the month of April (38.71°C). Among the bio-pesticides, lowest thrips population was recorded in treatment T₅ (spinosad @ 56 g ai/ha) at 4th day after each spray. Among the botanicals lowest thrips population (3.0 nymphs/plant) was recorded at four days after 1st spray in pongamia crude oil @ 4% and in dasparni @ 50 ml/lit. and found at par with *Beauveria bassiana* @ 10¹³ spores/ha and neem crude oil @ 4%(4.0 nymphs/plant). Highest thrips population at four days after 3rd spray was recorded in control plot (36.0 nymphs/plant). All the botanicals and bio-pesticides proved better for thrips management as compared to control. The data further revealed that significantly highest gross yield (282 q/ha) was recorded in profenofos @ 1 ml/lit and it was found at par with spinosad @ 56 g ai/ha (262 q/ha) and lowest gross yield (189 q/ha) was recorded in control. The highest cost : benefit ratio (1:15.79) was recorded in profenofos @ 1 ml/lit followed by *Beauveria bassiana* @ 10¹³ spores/ha i.e. 1:5.86. Patel *et al.* (15) and Noor (14) had also reported that profenofos was effective against many sap feeding insects such as onion thrips and chilli thrips. Similarly, Lazano and Kilchher (12) reported that spinosad may also be useful in controlling thrips in field conditions. Neem was less effective in controlling thrips as compared with chemical insecticides as suggested by Gupta and Sharma (8) and Altaf *et al.* (1).

Per cent Control Index

Data presented in parentheses of Table 1 and Fig.1 denotes the per cent control of thrips population over control at each observation. Significantly highest per cent control of thrips population were 81% at 4th day after 1st spray, 88% at 4th day after 2nd spray, 80%

at 4th day after 3rd spray and 91% at 4th day after 4st spray in the treatment with profenofos @ 1.0 ml/lit which was found at par with spinosad @ 56 g a.i./ha i.e. 75% at 4th day after 1st spray, 78% at 4th day after 2nd spray, 71% at 4th day after 3rd spray and 86% at 4th day after 4th spray. Data did not differ significantly at 4th day after 5th spray due to high temperature (38.71°C) during the month of April.

Conclusion

Based on above findings, it may be suggested that five spray of profenofos @ 1.0 ml/lit. or spinosad @ 56 g a.i./ha at 10 days interval can be advocated as an effective strategy for managing thrips in onion during Rabi season.

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