

Original Research Article

<https://doi.org/10.20546/ijcmas.2018.707.216>

Effect of Planting Dates on Infestation of Thrips in Garlic Bulb Crop

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ABSTRACT

The present study was conducted to observe the activity of thrips on garlic crop using variety Yamuna Safed-3 at Regional Research Station, NHRDF, Salaru, Karnal (Haryana) during three consecutive years i.e. Rabi, 2011-12, 2012-13 and 2013-14 seasons, which was based on a Randomized Block Design with six planting dates, i.e. October 1st (D₁), October 15th (D₂), November 1st (D₃), November 15th (D₄), December 1st (D₅) and December 15th (D₆). The bed size was kept as 3.6m x 1.8m with 5 replications. The data on thrips population (nymphs/plant) were counted on 10 plants selected randomly in each replication at seven days interval. The result revealed that significantly lowest mean thrips population (4.71 nymphs/plant) were recorded in 1st October planted crop, which was found at par with 15th October planted crop (6.71 nymphs/plant) and 1st November planted crop (7.74 nymphs/plant). Significantly highest mean thrips population (13.73 nymphs/plant) was recorded in 15th December planted crop due to increase in temperature from 26.56 to 35.65°C during observational period. The significantly highest yield (113.39 q/ha) was recorded in 1st October planted crop, which was found at par with 15th October planted crop (111.21 q/ha) and 1st November planted crop (105.92 q/ha).

Keywords

Garlic, Thrips, *Thrips tabaci*, Environmental factors

Article Info

Accepted:

15 June 2018

Available Online:

10 July 2018

Introduction

In India, garlic has been under cultivation for last 5000 years. The present production of garlic is about 16.17 lakh tons from an area about 2.80 lakh hectares (Indian Horticulture, 2017). Allium crops are attack by arthropod pests that can reduce crop yield and quality (Lorbeer *et al.*, 2002).

Probably the most damaging pests worldwide are the insignificant looking thrips. They are

found wherever alliums are grown, but are most severe in the warmer regions (Brewster, 1994).

Soni and Ellis (1990) listed the best known species of Thrips as *Thrips tabaci*. According to Kranz *et al.*, (1977), the number of thrips on a crop can increase rapidly in dry weather and decrease rapidly after rain. According to Changela (1993), thrips caused up to 15.35 to 46.82 per cent yield loss of garlic. Considering the above problems field trials were conducted

in three consecutive years during *Rabi*, 2011-12, 2012-13 and 2013-14 seasons on garlic variety Yamuna Safed-3 to assess the changes in number of thrips on garlic planted at different times of the growing season and to identify the time of peak incidence and decline at Regional Research Station, NHRDF, Salaru, Karnal (Haryana).

Materials and Methods

The field experiment was conducted at Regional Research Station, NHRDF, Karnal during *Rabi*, 2011-12, 2012-13 and 2013-14 seasons. The garlic cloves variety Yamuna Safed-3 was planted in a bed size of 3.6m x 1.8m at 15cm X 10cm spacing. Randomized Block Design with 5 replications was followed. The garlic cloves were planted on 1st October (D₁), 15th October (D₂), 1st November (D₃), 15th November (D₄), 1st December (D₅) and 15th December (D₆). The data on thrips population (nymphs/plant) were counted visually with the help of hand lens on 10 plants selected randomly in each plot at seven days interval after appearance. The application of fungicides viz. mancozeb @ 2.5 g/lit. and carbendazim @ 2.0g/lit. were sprayed at 15 days interval alternatively in all dates of planted crop to protect the crop from diseases. All other agronomical practices were performed uniformly as per need in all the treatments. The crop was harvested after attaining the maturity. The data of three consecutive years i.e. *Rabi*, 2011-12, 2012-13 and 2013-14 were pooled analyzed statistically and are presented in Table 1.

Results and Discussion

***Rabi*, 2011-12**

Data presented in Table 1 revealed that no significant differences for mean thrips population were recorded. Lowest mean thrips population (14.14 nymphs/plant) was recorded in D₁ (1st October planted crop) and highest

mean thrips population (15.28 nymphs/plant) was recorded in D₆ (15th December planted crop). During the entire observational period highest thrips population (47.56 nymphs/plant) was recorded in D₃ (1st November planted crop) on 13th standard week with temperature ranged from 28.8 to 14.33^oC and humidity from 61.50 to 47.50%. Highest gross yield (116.06q/ha) was recorded in D₂ (15th October planted crop) followed by D₁ (111.72q/ha), while lowest gross yield (26.85q/ha) was recorded in D₆ (15th December planted crop).

***Rabi*, 2012-13**

Data presented in Table 2 revealed that thrips population did not appeared in D₁ (1st October planted crop) and D₂ (15th October planted crop) during entire observational period. Lowest mean thrips population (1.66 nymphs/plant) was recorded in D₃ (1st November planted crop) and highest mean thrips population (10.84 nymphs/plant) was recorded in D₆ (15th December planted crop). During the entire observational period highest thrips population (14.54 nymphs/plant) was recorded in D₆ on 14th standard week with temperature ranged from 32.25 to 14.17^oC and humidity from 63.17 to 45.00%. Significantly highest gross yield (105.55q/ha) was recorded in D₁ (1st October planted crop) followed by D₂ (97.53q/ha), while lowest gross yield (23.63q/ha) was recorded in D₆ (15th December planted crop).

***Rabi*, 2013-14**

Data presented in Table 3 revealed that thrips population did not appeared in D₁ (1st October planted crop) and D₂ (15th October planted crop) during entire observational period. Lowest mean thrips population (5.51 nymphs/plant) was recorded in D₃ (1st November planted crop) and highest mean thrips population (18.83 nymphs/plant) was recorded in D₆ (15th December planted crop).

During the entire observational period highest thrips population (27.78 nymphs/plant) was recorded in D₆ (1st November planted crop) on 14th standard week with temperature ranged from 32.32 to 15.2^oC and humidity from 58.80 to 38.20%. Significantly highest gross yield (122.89q/ha) was recorded in D₁ (1st October planted crop) which was at par with D₂ (120.03q/ha), while lowest gross yield (75.65q/ha) was recorded in D₆ (15th December planted crop).

Combined result during Rabi, 2011-12, 2012-13 & 2013-14

As regard to pooled data pertaining to mean thrips population presented in Table 4 and

Figure 1 revealed that significantly lowest mean thrips population (4.71 nymphs/plant) were recorded in 1st October (D₁) planted crop, which was found at par with 15th October (D₂) planted crop (6.71 nymphs/plant) and 1st November (D₃) planted crop (7.74 nymphs/plant). Significantly highest mean thrips population (13.73nymphs/plant) was recorded in 15th December planted crop due to increase in temperature from 26.56 to 35.65^oC during observational period. The significantly highest yield (113.39 q/ha) was recorded in 1st October planted crop, which was found at par with 15th October planted crop (111.21 q/ha) and 1st November planted crop (105.92 q/ha).

Fig.1 Effect of planting dates on infestation of thrips in garlic bulb crop at RRS, Karnal (Pooled data of 3 consecutive years during Rabi, 2011-12, 2012-13 and 2013-14

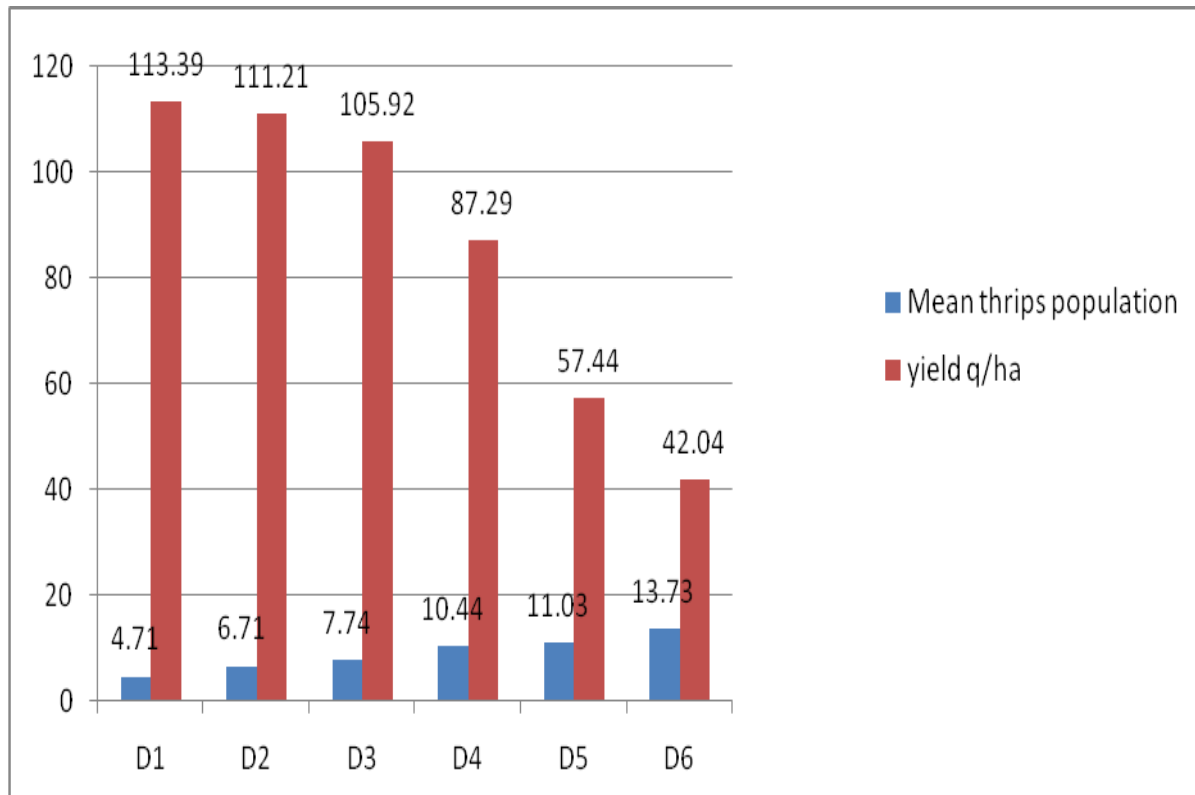


Table.1 Effect of planting dates on infestation of thrips in garlic at RRS, Karnal during *Rabi*, 2011-12

Treatments	Average No. thrips /plant at 05/03/2012	Average No. thrips /plant at 12/03/2012	Average No. thrips /plant at 19/03/2012	Average No. thrips /plant at 26/03/2012	Average No. thrips /plant at 02/04/2012	Average No. thrips /plant at 09/04/2012	Average No. thrips /plant at 16/04/2012	Mean thrips population	yield q/ha
D₁	0.24	1.08	12.96	44.76	20.72	5.10	0.00	14.14	111.72
D₂	0.36	1.16	13.12	45.00	24.00	4.68	0.00	20.12	116.06
D₃	0.24	1.22	14.46	47.56	19.96	5.78	0.00	14.95	108.95
D₄	0.34	0.94	13.50	47.12	19.62	9.00	9.38	14.29	97.65
D₅	0.36	1.20	13.50	44.50	21.14	9.40	9.52	14.24	46.59
D₆	0.20	1.32	14.22	43.88	20.96	15.76	10.66	15.28	26.85
S.Em±	0.07	0.21	1.16	2.28	1.04	1.38	0.87	3.17	6.77
CD at 5%	NS	NS	NS	NS	2.17	2.88	1.81	NS	14.12
CV %	39.67	28.67	13.42	7.94	7.79	26.25	27.84	32.29	12.64

Table.2 Effect of planting dates on infestation of thrips in garlic at RRS, Karnal during *Rabi*, 2012-13

Treatments	Average No. thrips /plant at 4/03/2013	Average No. thrips /plant at 31/03/2013	Average No. thrips /plant at 07/04/2013	Average No. thrips /plant at 14/04/2013	Mean thrips population	Yield q/ha
D₁	0.00	0.00	0.00	0.00	0.00	105.55
D₂	0.00	0.00	0.00	0.00	0.00	97.53
D₃	6.64	0.00	0.00	0.00	1.66	95.68
D₄	8.06	12.44	8.20	0.00	7.18	62.96
D₅	7.50	10.96	9.54	0.00	7.00	30.12
D₆	7.50	9.64	14.54	11.66	10.84	23.63
S.Em±	0.50	0.71	0.61	0.61	0.34	2.02
CD at 5%	1.04	1.48	1.27	1.27	0.71	4.21
CV %	16.10	20.44	17.90	49.82	12.23	4.61

Table.3 Effect of planting dates on infestation of thrips in garlic at RRS, Karnal during *Rabi*, 2013-14

Treatments	Average No. thrips /plant at 20/03/2014	Average No. thrips /plant at 27/03/2014	Average No. thrips /plant at 03/04/2014	Average No. thrips /plant at 10/4/2014	Average No. thrips /plant at 17/4/2014	Average No. thrips /plant at 24/4/2014	Mean thrips population	yield q/ha
D₁	0.00	0.00	0.00	0.00	0.00	0.00	0.00	122.89
D₂	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.03
D₃	6.10	11.98	14.96	0.00	0.00	0.00	5.51	113.14
D₄	4.56	10.46	15.92	18.28	19.34	0.00	11.43	101.26
D₅	8.70	12.94	18.12	19.50	16.64	14.02	14.99	95.63
D₆	12.22	14.98	27.78	20.34	21.16	16.50	18.83	75.65
S.Em±	0.71	0.64	2.03	1.58	0.50	0.82	0.54	1.73
CD at 5%	1.48	1.34	4.23	3.30	1.04	1.71	1.13	3.61
CV %	21.34	11.98	25.06	25.76	8.35	25.35	10.17	2.61

Table.4 Effect of planting dates on infestation of thrips in garlic at RRS Karnal (Pooled *Rabi*, 2011-12, 2012-13 & 2013-14)

Treatments	Average No. thrips/plant at I st Week	Average No. thrips/plant at II nd Week	Average No. thrips/plant at III rd Week	Average No. thrips/plant at IV th Week	Mean thrips population	yield q/ha
D₁	0.08	0.36	6.91	1.70	4.71	113.39
D₂	0.12	0.39	8.00	1.56	6.71	111.21
D₃	4.33	4.40	11.64	1.93	7.74	105.92
D₄	4.32	7.95	14.58	9.09	10.44	87.29
D₅	5.52	8.37	16.27	9.63	11.03	57.44
D₆	6.64	8.65	21.09	15.92	13.73	42.04
S.Em±	0.65	0.73	1.76	1.63	2.42	5.42
CD at 5%	1.45	1.62	3.92	3.62	5.38	12.08

Details of Treatments:

- D₁- Planting on 1st October
- D₂- Planting on 15th October
- D₃- Planting on 1st November
- D₄- Planting on 15th November
- D₅- Planting on 1st December
- D₆- Planting on 15th December

Different strategies have to be involved for keeping the pest in check and stabilizing the productivity of the cropping system. Date of planting is one of the crop habitat diversifications that are to be looked in to, to minimize the incidence of thrips on garlic crop so that its yield can be enhanced. However, there is no much information in literature to suggest the effect of date of planting on the activity of thrips on garlic except very few reports. The present study was conducted to observe the activity of thrips on garlic crop at Regional Research Station, NHRDF, Karnal (Haryana) during *Rabi*, 2011-12, 2012-13 & 2013-14 aimed to enhance its bulb yield with minimum thrips intensity.

The thrips population showed a rising trend from its appearance during 1st week of March to 3rd week of April and a little declining trend thereafter due to maturity symptoms of crop as well as increase in temperature. The similar trend was also found by Sujay and Giraddi (2014) that late planted crop was liable for heavy infestation by insect pests. Time of planting of garlic influences the intensity of thrips. The results of this study are in agreement with Rahim, (1988) who showed that delay planting time reduced significantly the bulb yield. It may be due to that plant did not receive a long cool growing period which was essential for the development of the bulb (Swati *et al.*, 2013).

In the light of combined data regarding thrips of garlic as affected by sowing dates as a pest control measure, it is concluded that early planting (1st October or 15th October) resulted in low incidence of thrips. Such low level of thrips population caused less crop injury which resulted in enhancing bulb yield of garlic. So, it is suggested that for early planting at Karnal region of Haryana the appropriate planting time can be October 1st and/or October 15th.

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How to cite this article:

Sujay Pandey, M.K. Pathak, B.K. Dubey and Gupta. P.K. 2018. Effect of Planting Dates on Infestation of Thrips in Garlic Bulb Crop. *Int.J.Curr.Microbiol.App.Sci*. 7(07): 1827-1832.
doi: <https://doi.org/10.20546/ijcmas.2018.707.216>