



EFFECT OF SOWING DATES ON THE INCIDENCE OF GARLIC THRIPS

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ABSTRACT

The influence of sowing dates on the incidence of garlic thrips (*T. tabaci*) was studied at the Horticulture Farm, SKN College of Agriculture, Jobner during rabi 2011-12. The lowest incidence of thrips (24.10/plant) was recorded on the crop sown early on 15th October; however, the maximum clove yield of 230 q/ha was obtained from the normal sown crop on 29th October. The maximum incidence of thrips (44.60/plant) and minimum clove yield (211 q/ha) were recorded for the late sown crop on 12-Nov-2011. The incidence of thrips had significant positive correlation with sowing times; whereas, clove yield had negative correlation with both sowing times and the incidence of garlic thrips.

Key words: Dates of sowing, incidence, garlic, *Thrips tabaci*

INTRODUCTION

Garlic, *Allium sativum* L. is the second most important cultivated clove crop of the country after onion. It is used as a spice or a condiment, in pharmaceutical preparations, flavouring and seasoning vegetables and meat dishes. Garlic is a rich source of proteins, phosphorus, potash, calcium, magnesium and carbohydrates. The garlic clove contains the enzyme allinase (allicin), which is a major flavouring component and used in reducing the blood cholesterol. India is one of the garlic exporting country of the world. India ranks second after China in area (171.45 lakh ha⁻¹) and third in production (923.25 thousand metric tonnes) of garlic with an average productivity of 5.38 t ha⁻¹ (Anonymous, 2009). The major garlic producing states of the country are Madhya Pradesh, Orissa, Rajasthan, Karnataka and Gujarat. The major insect pest of economic significance is the onion thrips *Thrips tabaci* (Lindeman).

MATERIAL AND METHODS

The present investigations were conducted at the Horticulture Farm, S.K.N. College of Agriculture, Jobner (Rajasthan) on garlic crop during *rabi*, 2011-12. Geographically, Jobner is located at longitude of 78°28' East latitude, 26°26' North and at an elevation of 427 meters from mean sea level (MSL) in Jaipur district of Rajasthan. The experiment was laid out in a simple randomized block design (RBD) with five treatments *i.e.* sowing times (15th, 22nd, 29th October, 5th, and 12th November), each replicated four times. The local variety of garlic was sown in plots size of 1.5 x 1.5 m² keeping row to row and plant to plant distance of 15 and 10 cm,

respectively. Recommended horticultural practices including FYM application, fertilization, hoeing and weeding, and irrigation were followed to raise the crop. However, the crop was kept pesticide free to allow natural infestation by thrips with a view to record the incidence of thrips on the crop sown at different dates. Observations on thrips were recorded at weekly interval. The data obtained on the population of thrips were transformed into $\sqrt{x} \pm 0.5$ values and was subjected to analysis of variance. The population data were correlated with the prevailing abiotic factors of the environment and the regression equations were analyzed. The clove yield of garlic in each plot was also computed, compared and converted into quintal per hectare.

RESULTS AND DISCUSSION

The population of thrips was recorded just after appearance at weekly intervals. The data presented in Table 2 reveal that there was a significant difference in the population of thrips on the crops sown on different dates. The incidence of thrips started from 30th January in the crop sown on 15th October (2.80 thrips /plant), 22nd October (1.60 thrips /plant) and 29th October (0.80 thrips /plant), whereas from 6th February on the crop sown on 5th November (2.90 thrips /plant) and 12th November (0.95 thrips /plant); thereafter, their population increased gradually. During second week of February (13.2.2012), the maximum population of thrips were recorded on the crop sown on 15th October (12.68 thrips /plant) followed by that on 22nd October (10.49 thrips /plant). The minimum population of thrips (4.95 thrips /plant) was recorded on the crop sown on 12th November. During peak, the maximum population of thrips was recorded on

Table 1. Correlation coefficient, regression equation and coefficient of determination (variance explained)

S.No	Particulars	Correlation coefficient	Regression equation	Coefficient of determination
1	Thrips incidence (Y) v/s sowing times (X)	0.997	$Y = 10.439 + 2.91 X$	99.33
2	Clove yield (Y_1) v/s sowing time (X_1)	-0.457	$Y_1 = 152.415 - 0.53 X_1$	20.87
3	Clove yield (Y_2) v/s thrips incidence (X_2)	-0.517	$Y_2 = 241.916 - 1.31 X_2$	26.69

the crop sown on 12th November (44.60 thrips /plant) i.e. late sown followed by 5th November and 29th October sown crop, which resulted in 41.67 and 38.10 thrips per plant and were statistically at par with each other. The minimum population of thrips (24.10 thrips /plant) was recorded in the crop sown on 15th October i.e. early sown followed by that on 22nd October (30.10 thrips /plant) sown crop and were also statistically at par. The data showed that with the delay in sowing times the population of thrips increased. On the basis of mean thrips population of all the observations, the maximum population of thrips (19.00 thrips /plant) was observed on 12th November sown crop (late sown). The minimum population of thrips (11.95 thrips /plant) was observed on 15th October sown crop (early sown).

Garlic thrips incidence had positive correlation ($r = 0.997$) with sowing times and clove yield had negative correlation with both sowing times ($r = -0.457$) and thrips incidence ($r = -0.517$) (Table 1). The regression equation for the effect of sowing times on the thrips incidence showed that 'b' (regression coefficient) value was 2.91 with 99.33 per cent coefficient of determination (variance explained), which indicated that the thrips incidence increased by 2.91 units with a unit delay of sowing time. The regression equation for the effect of sowing times on clove yield of garlic showed that regression coefficient 'b' value as 0.53 with 20.87 per cent coefficient of determination, which indicated that the clove yield of garlic decreased by 0.53 unit with a unit delay in sowing time. The regression coefficient between thrips incidence and clove yield of garlic value was 1.31 with 26.69 per cent coefficient of determination, which indicated that clove bulb yield decreased by 1.31 units with the increase per unit thrips population.

The data on the effect of variation in sowing times indicated that there was a definite pattern of incidence of thrips on garlic crop in relation to the different sowing times. The minimum population of thrips (24.10 thrips /plant) during peak period was recorded in the crop sown on 15th October (early sown) followed by crop sown on 22nd October (30.10 thrips/plants); whereas, the maximum population of thrips was recorded on the crop sown on 12th November (44.60 thrips /plant) i.e. late sown followed by 5th November and 29th October sown

crop & which exhibited 41.67 and 38.10 thrips per plant. Similar trends of thrips population were also observed in overall mean population of thrips; thus, it could be concluded that thrips population increased with delay in sowing time.

The thrips incidence had positive correlation ($r = 0.997$) with sowing times and clove yield had negative correlation with both sowing times ($r = -0.457$) and thrips incidence ($r = -0.517$). The early sown crop had crossed clove formation stage hence, escaped the vulnerable stage of attack, whereas, late sown crop suffered heavily. Chhatrola *et al.* (2006) reported significantly lowest mean incidence of thrips in garlic crop sown on 25th October and highest on 15th November i.e. late sown crop. Khayat *et al.* (1997) reported that thrips infestation in onion crop increased with delay in sowing or transplanting both in nursery and field conditions.

The maximum clove yield of 230.00 q ha⁻¹ was obtained from crop sown on 29th October (normal sown) followed by that from 22nd October sown crop (226.00 q ha⁻¹) (Table 2). The minimum clove yield of 211.00 q ha⁻¹ was recorded from crop sown on 12th November (late sown), which was at par with the clove yield of 5th November sown crop. Our findings with regard to the yield of garlic clove are in accordance with earlier observation that date of planting had significant effect on thrips incidence in onion crop. The highest population of thrips was recorded on 15th November planted crop with lowest bulb yield due to the coincidence of high infestation of thrips at bulb initiation, formation and development stages (Anonymous, 2000b and 2001). Similarly, low incidence of thrips on onion crop planted during 1st and 15th November was recorded than late planted crop i.e. 1st December to 1st January. The highest yield loss was recorded in 1st January and 15th December planted crop and lowest was in 1st November planted crop (Anonymous, 2010b). The findings of Srinivas and Lawande (2003), Kadri and Goud (2005) and Ibrahim (2010) also support the present results.

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Table 2. Effect of sowing times on the incidence of thrips, *T. tabaci* during Rabi, 2011-12

S.No	Sowing times	Mean population of thrips /plant												Mean	Clove yield (q ha ⁻¹)
		30.01.12	06.02.12	13.02.12	20.02.12	27.02.12	05.03.12	12.03.12	19.03.12	26.03.12	02.04.12	09.04.12			
1	15 th Oct.	2.80 (1.82)	5.18 (2.38)	12.68 (3.63)	16.80 (4.16)	19.23 (4.44)	22.67 (4.81)	24.10* (4.96)	16.23 (4.09)	8.47 (2.99)	2.16 (1.63)	1.10 (1.26)	11.95 (3.53)	221	
2	22 nd Oct.	1.60 (1.45)	4.80 (2.30)	10.49 (3.32)	13.98 (3.81)	18.01 (4.30)	21.53 (4.69)	30.10* (5.53)	23.97 (4.52)	14.73 (3.34)	9.43 (2.59)	5.21 (1.65)	13.99 (3.81)	226	
3	29 th Oct.	0.80 (1.14)	3.67 (2.04)	7.23 (2.78)	11.43 (3.45)	15.19 (3.96)	29.01 (5.43)	38.10* (6.21)	29.67 (5.49)	20.67 (4.60)	15.22 (3.96)	7.68 (2.86)	16.24 (4.11)	230	
4	5 th Nov.	0.00 (0.71)	2.90 (1.84)	6.70 (2.68)	10.78 (3.36)	14.72 (3.90)	28.70 (5.40)	41.67* (6.49)	33.92 (5.87)	27.67 (5.31)	19.67 (4.49)	11.67 (3.49)	18.04 (4.31)	218	
5	12 th Nov.	0.00 (0.71)	0.95 (1.20)	4.95 (2.45)	8.97 (3.08)	13.92 (3.80)	29.00 (5.43)	44.60* (6.72)	37.42 (6.16)	31.90 (5.69)	23.90 (4.94)	13.43 (3.73)	19.00 (4.42)	211	
	S. Em. ±	0.03	0.05	0.08	0.10	0.13	0.16	0.37	0.32	0.27	0.20	0.15	0.11	2.81	
	CD (p=0.05)	0.10	0.16	0.25	0.32	0.40	0.49	1.14	0.99	0.82	0.62	0.45	0.34	8.67	

Figures in the parentheses are X+0.5 values. * Peak population of thrips during the crop season.

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