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Impact of Weather Parameters on Thrips (*Scirtothrips dorsalis* Hood) in Pomegranate

P C Yadav, M L Tetarwal, Rohit Sarvate and Ashok Singh
Krishi Vigyan Kendra, Jalore-II, Agriculture University, Jodhpur (Rajasthan)

ABSTRACT

An experiment was conducted during 2022-23 at KVK, Jalore to observe the incidence of thrips in pomegranate orchards and their relationship with weather parameters. A fixed plot survey was conducted at five locations in the Jalore district. Five locations were selected for the fixed plot survey and the weekly incidence of thrips was recorded. The data revealed that the incidence of thrips (*Scirtothrips dorsalis* Hood started in the 25th Standard Meteorological Week (18 June - 22 June) with 0.33/5cm twig/plant whereas the peak incidence of pomegranate thrips was recorded in the third week of September (38th SMW) with 14.66 thrips/5cm twig/plant and last week of March (13th SMW) with 14.33 thrips/5 cm twig/Plant during 2022-23. A simple correlation coefficient was worked out between the incidence of thrips and weather parameters revealed that temperature showed a positive and significant relationship with the population of thrips.

Key Words: Incidence, Pomegranate, Temperature, Thrips.

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INTRODUCTION

Pomegranate is a high-value crop with great economic importance. Among all fruit crops pomegranate is the only fruit crop in India and is being cultivated in arid and semiarid regions of Gujarat, Maharashtra, Karnataka, Uttar Pradesh, Andhra Pradesh and Tamil Nadu (Balikai *et al,* 2011) It is a highly adapted crop to the weather fluctuations and different ranges of soil (Pal *et al,* 2014). It is an ideal crop for the sustainability of small holdings, as pomegranate is well suited to the topography and agro-climate of arid and semiarid regions. In addition it provides ample opportunity for livelihood security has a high potential to utilize wastelands widely available in the region and an ideal crop for diversification. used.

Temperature is the key factor in the population build up of the thrips in pomegranate throughout the year . In Rajasthan, it is mainly grown in, Jalore, Barmer, and Jodhpur Bikaner districts and acreage in Thar Desert particularly Barmer, Jodhpur and Jaisalmer is increasing rapidly. Several biotic and abiotic stress have greatly influenced the growth and yield of pomegranate, among biotic factors many species of thrips belonging to the order Thysanoptera are a serious pests of pomegranate (Wang, 1994) and causing considerable losses in quality and quantity.Thrips population remains throughout the year in pomegranate orchards in different ranges (Roopa and Kumar, 2014). Temperature is the key factor in the population build-up and has been observed to slightly impact the incidence of thrips population (Ananda, 2007)

MATERIALS AND METHODS

The experiment was conducted during 2022-23 at different locations in Jalore district to record the impact of weather parameters on the thrips population under natural conditions in pomegranate orchards without spraying any insecticides and variety used was Bhagva. The field survey was conducted at farmer's field at different locations and the population of Thrips (*Scritothrips dorsalis* Hood) was recorded at weekly intervals during morning hours between 8.00 am to 9.00 am on five randomly selected and tagged on three leaves in each plot (5m x 5m) by

Corresponding Author's Email - jadamprakash@gmail.com

using a sampling technique given by Satpathy (1973). Tender shoots of five tagged plants up to 10 cm were selected randomly and tapped gently on a black paper board (40cm x10 cm).The number of thrips (both nymph and adult) was recorded with the help of a hand lens. Weekly weather parameters viz., maximum temperature, minimum temperature, relative humidity, and total rainfall were collected from the meteorological observatory, KVK, Jalore-I. The mean numbers of thrips were correlated with the meteorological data and a regression equation developed and correlation coefficient was worked out.

RESULTS AND DISCUSSION

Seasonal incidence

The data (Table 1) and in (Figure 1&2) indicated that the thrips population in pomegranate orchards appeared during the 25th standard meteorological week (SMW) *i.e.,* 18th June-24 June (3rd week) with a mean population of 0.33 thrips/ 5cm twig/plant. The population increased gradually and attained the peak in the third week of September (38th SMW) with a mean population of 14.66 thrips/5cm twig/plant. Later on, the population of thrips declined and reached a minimum level of 1.00 thrips/5cm twig/plant during the 5th SMW *i.e.,* 29th January -4th February and the population again attends its peak in the last month of March (13th SMW) with 14.33 thrips/5 cm twig/plant.

Correlation with weather parameters

Thrips exhibited a non-significant and positive correlation (r1 = 0.07986) with average temperature and a non-significant negative correlation with relative humidity (r2 = -0.06468). Jadhav *et al* (2019) studied the seasonal incidence of major sucking pests of pomegranate and reported that the thrips infestation was close conformity to the present study. Similar results were also reported by Elango and Sridharan (2017) and Bagle (1993) the high-density plantation is more favorable for the thrips population built up and exhibited a positive significant relation with average temperature. Mishra and Kumar (2023) reported that thrips exhibited a non-significant positive correlation with maximum temperature and population of thrips in chilli crop and Asma and Hanumantharaya (2015) reported a positive correlation between the population of thrips and maximum temperature. Lakshmi *et al* (2024) reported that the reproductive activity of thrips was increased due to temperature and sunshine hours. Rizwana *et al* (2024) reported that the higher humidity levels decrease the thrips population but temperature increases the pest population in chilli.

CONCLUSION

Thrips are the significant insects that remain throughout the crop season in the pomegranate orchards and are majorly influenced by weather parameters, especially minimum and maximum temperature. Population in pomegranate orchards appeared during the 3rd week of June with a mean population of 0.33 thrips/ 5cm twig/plant and remained up to the last month of March with 14.33 thrips/5 cm twig/plant and showed a non-significant and positive correlation with average temperature.

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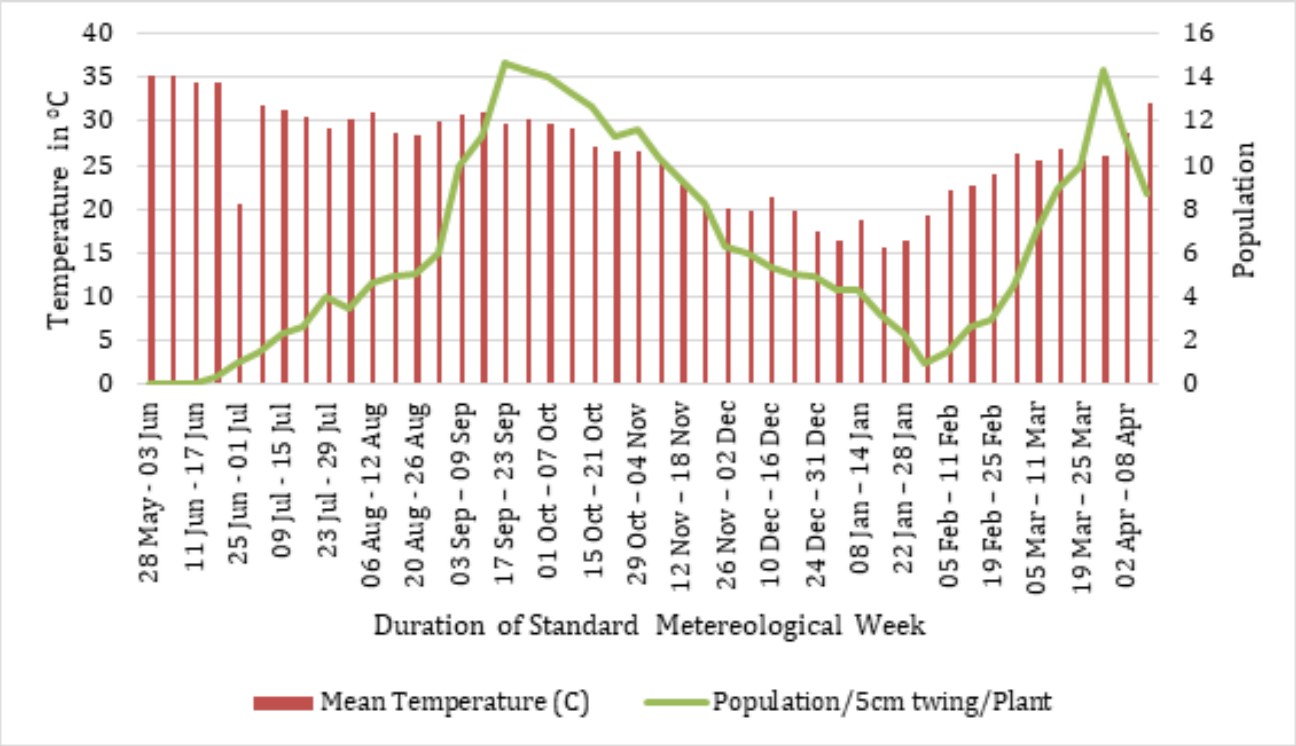


Fig: 1 Effects of temperature on thrips population in pomegranate.

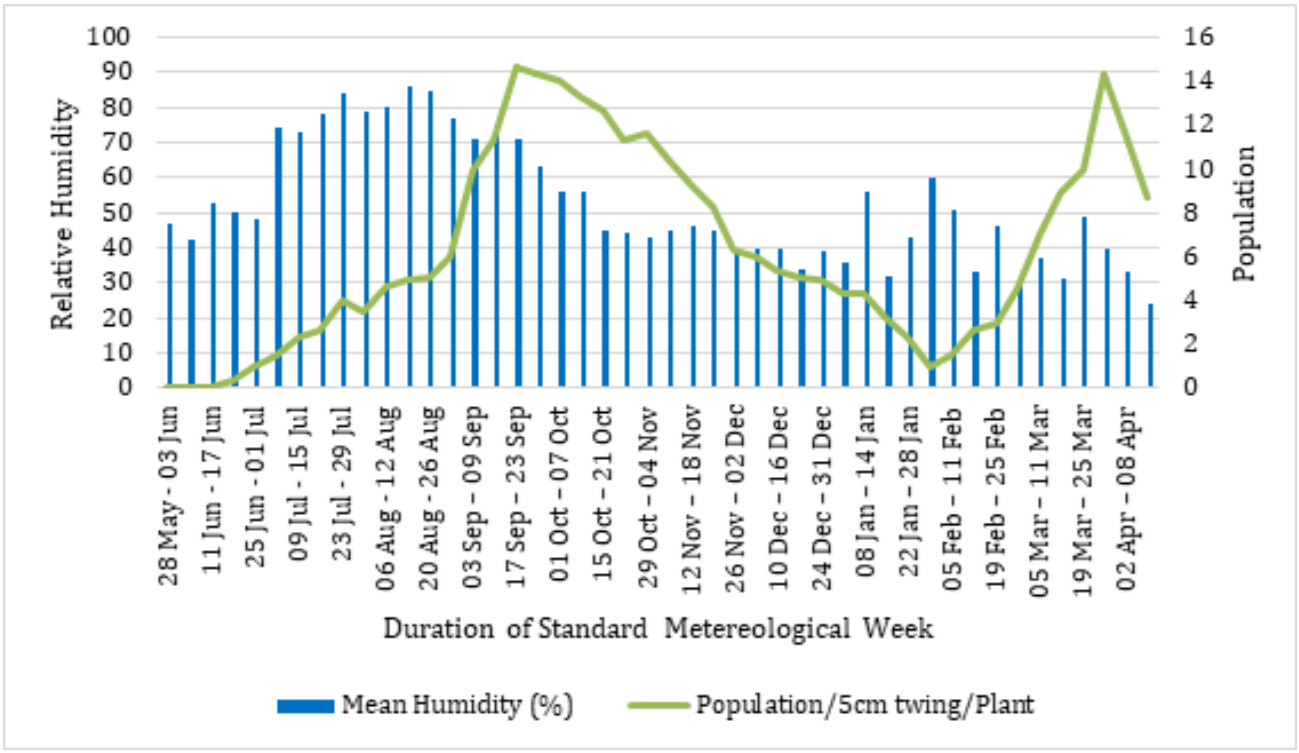


Fig: 2 Effects of relative humidity on thrips population in pomegranate.

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Table 1. Incidence of thrips (*Scritothrips dorsalis* Hood) in pomegranate.

SMW	Date	Population/5cm wing/Plant 2022-23	Mean Temperature (ºC)	Mean Humidity (%)
22	28 May - 03 Jun	0.00	35.20	47.00
23	04 Jun - 10 Jun	0.00	35.20	42.00
24	11 Jun - 17 Jun	0.00	34.40	53.00
25	18 Jun - 24 Jun	0.33	34.30	50.00
26	25 Jun - 01 Jul	1.00	20.70	48.00
27	02 Jul - 08 Jul	1.50	31.80	74.00
28	09 Jul - 15 Jul	2.33	31.30	73.00
29	16 Jul - 22 Jul	2.66	30.50	78.00
30	23 Jul - 29 Jul	3.99	29.10	84.00
31	30 Jul - 05 Aug	3.50	30.20	79.00
32	06 Aug - 12 Aug	4.66	31.00	80.00
33	13 Aug - 19 Aug	4.99	28.60	86.00
34	20 Aug - 26 Aug	5.00	28.40	85.00
35	27 Aug - 02 Sep	5.99	30.10	77.00
36	03 Sep – 09 Sep	9.99	30.70	71.00
37	10 Sep – 16 Sep	11.33	31.00	75.00
38	17 Sep – 23 Sep	**14.66**	**29.80**	**71.00**
39	24 Sep – 30 Oct	14.33	30.20	63.00
40	01 Oct – 07 Oct	13.99	29.70	56.00
41	08 Oct – 14 Oct	13.33	29.10	56.00
42	15 Oct – 21 Oct	12.66	27.00	45.00
43	22 Oct – 28 Oct	11.33	26.50	44.00
44	29 Oct – 04 Nov	11.66	26.50	43.00
45	05 Nov – 11 Nov	10.33	25.80	45.00
46	12 Nov – 18 Nov	9.33	22.90	46.00
47	19 Nov – 25 Nov	8.33	20.70	45.00
48	26 Nov – 02 Dec	6.33	20.10	40.00
49	03 Dec – 09 Dec	6.00	19.70	40.00
50	10 Dec – 16 Dec	5.33	21.40	40.00
51	17 Dec – 23 Dec	5.00	19.90	34.00
52	24 Dec – 31 Dec	4.99	17.50	39.00
1	01 Jan – 07 Jan	4.33	16.40	36.00
2	08 Jan – 14 Jan	4.33	18.80	56.00
3	15 Jan – 21 Jan	3.20	15.70	32.00
4	22 Jan – 28 Jan	2.33	16.50	43.00
5	29 Jan – 04 Feb	1.00	19.20	60.00
6	05 Feb – 11 Feb	1.50	22.10	51.00
7	12 Feb – 18 Feb	2.60	22.60	33.00
8	19 Feb – 25 Feb	2.99	24.10	46.00
9	26 Feb – 04 Mar	4.50	26.40	31.00
10	05 Mar – 11 Mar	7.00	25.50	37.00
11	12 Mar – 18 Mar	8.90	26.80	31.00
12	19 Mar – 25 Mar	10.00	25.50	49.00
13	26 Mar – 01 Apr	**14.33**	**26.00**	**40.00**
14	02 Apr – 08 Apr	11.40	28.60	33.00
15	09 Apr – 15 Apr	8.66	32.10	24.00
Correlation coefficient between population of thrips and abiotic factors				
Mean Temperature (ºC)				0.07986
Mean relative humidity (%)				-0.06468

*SMW: Standard Meteorological Wee*k

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