E-ISSN: 2618-0618
P-ISSN: 2618-060X

www.agronomyjournals.com
2024; 7(12): 126-129
Received: 12-09-2024
Accepted: 18-10-2024

Shubham H Gore
Ph.D. Research Scholar, Department of Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Sanjeev D Bantewad
Associate Dean and Principal, College of Agriculture, Ambajogai, Maharashtra, India

Mahesh V Ugale
Ph.D. Research Scholar, Department of Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Corresponding Author:
Shubham H Gore
Ph.D. Research Scholar, Department of Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra, India

Seasonal incidence of yellow thrips in relation to weather parameters on chilli

Shubham H Gore, Sanjeev D Bantewad and Mahesh V Ugale

DOI: https://doi.org/10.33545/2618060X.2024.v7.i12b.2103

Abstract
Chilli (*Capsicum annuum* L.), a vital spice and commercial vegetable crop in India, faces significant productivity challenges due to pests such as yellow thrips (*Scirtothrips dorsalis*). This study, conducted at the VNMKV experimental farm, Parbhani, during summer 2022-23 and *Rabi* 2023-24, aimed to investigate the seasonal incidence of yellow thrips and their relationship with weather parameters. Parbhani Tejas variety, grown on a 100 m² plot under standard practices. Weekly observations of thrips populations on randomly selected plants were correlated with weather data using WASP 2.0 software. The results showed thrips infestations beginning 15 days post-transplanting in both seasons. During summer 2022-23, thrips populations peaked at 14.10 per three leaves in the 10th SMW before declining. Similarly, the *Rabi* 2023-24 season recorded a peak of 15.7 thrips per three leaves in the 47th SMW. Weather parameters showed varied correlations with thrips populations. Maximum temperature exhibited a significant positive correlation during *Rabi* (r = 0.446*), while minimum temperature showed a significant negative correlation (r = -0.605*). Rainfall, humidity, and wind speed displayed weak, non-significant correlations in both seasons. Regression analysis revealed that weather parameters explained 50.10% and 70.80% of the thrips population variation in summer and *Rabi*, respectively.

Keywords: Seasonal incidence, chilli, parameters, yellow thrips, post-transplanting

Introduction
Chilli (*Capsicum annuam* L.) is an important spice as well as commercial vegetable crop grown all over India. It is an essential ingredient of Indian curry, which is characterized by tempting colour and titillating pungency (Reddy *et al*. 2011) [11]. In India, green chilli is cultivated in an area of 292 thousand hectares with annual production of 2955 thousand metric tonnes during 2015-16 (Berke & Sheih, 2000) [2]. Chilli accounts for 40 per cent of the total spices exported from India and 23 per cent in terms of value. Although, the crop has got great export potential besides huge domestic requirement, a number of limiting factors have been attributed for low productivity (Reddy *et al*. 2011) [12]. Chilli is widely grown in states among them occurrence of viral diseases as well as ravages caused by insect pets are significant ones (Gundannavar *et al*. 2007) [5]. Chilli is known to be affected by 57 insect and non-insect pests of which thrips, *Scirtothrips dorsalis* are most destructive sucking pests and are considered as major pest (Berke & Sheih, 2000; Reddy & Puttaswamy, 1984) [1, 10]. Chilli thrips affected leaves curl “upward” resulting in a typical damage known as ‘leaf curl syndrome’ (Sarkar *et al*. 2013) [15]. Economic yield loss may be 11-75% quantitatively and 60-80% qualitatively in the event of serious infestation (Ghosh *et al*. 2009) [3]. Since there is great variation in different agro climatic conditions of various regions; the pests show varying trends in their distribution, incidence, nature and extent of damage to the crop. Besides, there may also be some known and unknown factors contributing a key role in determining the incidence and dominance of a particular pest or pest complex (Meena & Kanwat, 2010; Patel *et al*. 2009) [7, 9]. Knowing the peak period of pest infestations could help in taking pest management tactics more effectively with less incorporation of highly toxic chemical substances in the field. Keeping above aspects in mind, the present investigation was aimed to study on the seasonal incidence yellow thrips in relation to various weather parameters like rainfall, temperature, relative humidity etc.

Materials and Methods

The present investigations was carried out during summer 2022-23 and *Rabi* 2023-24 at experimental farm, Department of Entomology, VNMKV, Parbhani. The chilli variety Parbhani Tejas was grown on an area of 100 m^2 by adopting the spacing of 60 x 45 cm following the recommended package of practices. One week of after transplanting, an observation for yellow thrips was recorded on weekly basis till last picking. Ten plants from plot were randomly selected and tagged. Observation of nymph and adult of thrips recorded from six leaves per plant, two each from upper, middle and lower canopy of the plant. Mean of sucking pests worked out as population per three leaves per plant. The data pertaining to seasonal incidence were correlated with weather using WASP 2.0 software.

Results and Discussion

The data of seasonal incidence of yellow thrips, *S. dorsalis* during summer 2022-23, graphically presented in Figure 1 revealed that infestation of yellow thrips commenced from about 15 days after transplanting and recorded 0.70 thrips per three leaves in 5th standard metrological week (SMW). Steady increase was observed in thrips population in subsequent period, from 3.6 to 12.20 thrips per three leaves from 6th SMW to 9th SMW. The peak activity of yellow thrips was observed in 10th SMW with counting 14.10 thrips per three leaves. After the peak, population start declining from 11.40 thrips per three leaves to 1.8 thrips per three leaves in 22nd SMW. In agreement with these findings, Samanta *et al*. (2017) [14] recorded the highest mean thrips population (6.15 per leaf) in the 15th and 17th SMW. Further, Ghosh *et al*. (2018) [4] observed peak thrips incidences of 6.71 and 5.77 thrips per two leaves during the 12th and 14th SMW for 2015-16 and 2016-17, respectively. The data graphically shown by Figure 2 revealed that infestation of yellow thrips, *S. dorsalis* during *Rabi* 2023-24 commenced from about 15 days after transplanting and recorded 0.2 thrips per three leaves. Steady increase was observed in thrips population in subsequent period, from 1.8 to 14.4 thrips per three leaves from 39th SMW to 46th SMW. The peak activity of yellow thrips was observed in 47th SMW with counting 15.7 thrips per three leaves. After that population start declining from 10.50 thrips per three leaves to 1 thrips per three leaves in 2nd SMW. These observations align closely with those of Meena and Tayde (2017) [8], who reported the presence of yellow thrips starting in the rainy season at the 38th SMW with an average of 0.38 insects per plant, reaching a peak of 6.38 insects per plant by the 45th SMW. Similarly, Jayewar *et al*. (2018) [6] noted peak thrips populations at 12.36 and 9.86 thrips per leaf during the 43rd and 47th SMW for the 2016-17 and 2017-18 seasons.

The correlation coefficients between weather parameters and the population of yellow thrips during the summer 2022-23 are presented in (Table No. 1). The relationship between the yellow thrips population on chilli and various weather parameters showed positive but non-significant correlations, maximum temperature (r=0.286) and morning relative humidity (r= 0.037) were weakly associated with yellow thrips, indicating a mild positive response. Negative but non-significant correlations were found with rainfall (r= -0.125), minimum temperature (r= -0.338), evening relative humidity (-0.072) and wind speed (r= 0.364) suggesting minimal influence from these factors. Zainab *et al*. (2016) [16] noted a non-significant positive correlation between thrips populations and maximum temperature, while negative correlations were observed with rainfall, morning relative humidity, evening relative humidity, and minimum temperature. These results align with our findings of minimal influence of temperature and humidity on yellow thrips populations.

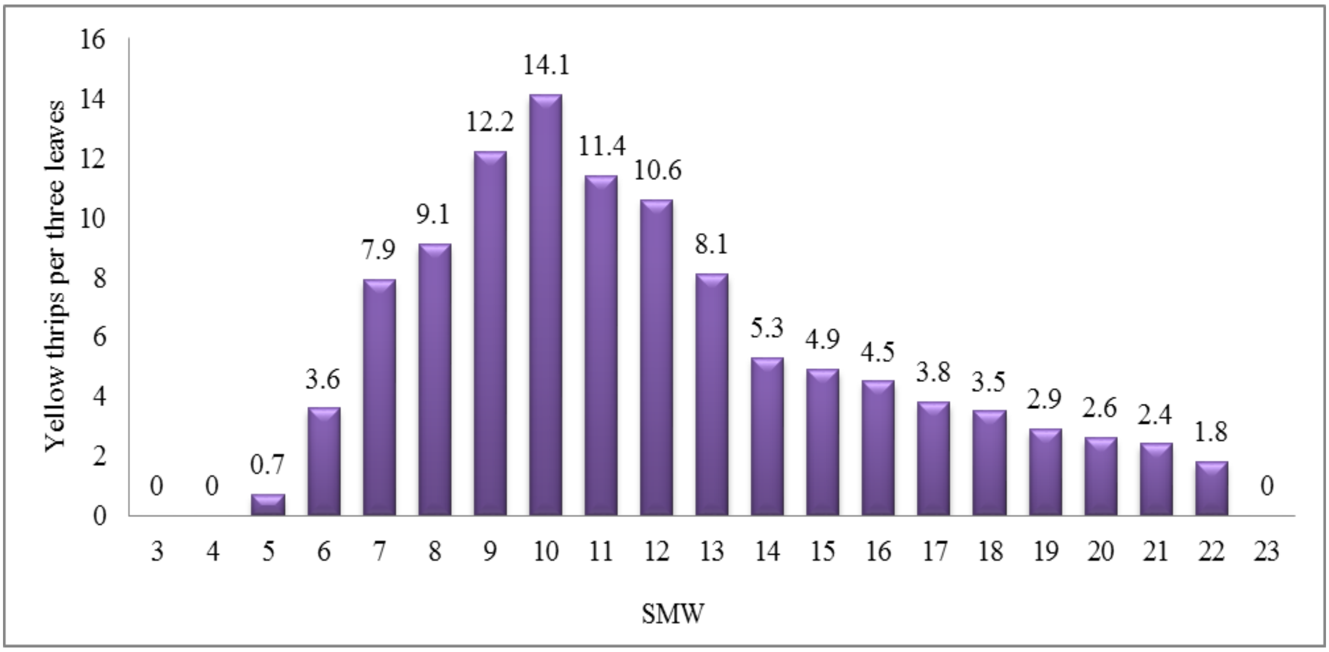

Fig 1: Seasonal incidence of yellow thrips during summer 2022-23

Table 1: Correlation OD yellow thrips with weather parameter during summer 2022-23 and Rabi 2023-24

Weather parameters	Rainfall	Maximum Temperature	Minimum Temperature	Morning Relative humidity	Evening relative humidity	Wind speed
Summer 2022-23	-0.125	0.286	-0.338	0.037	-0.072	-0.364
Rabi 2023-24	-0.385	0.446*	-0.605*	-0.015	-0.414	-0.428

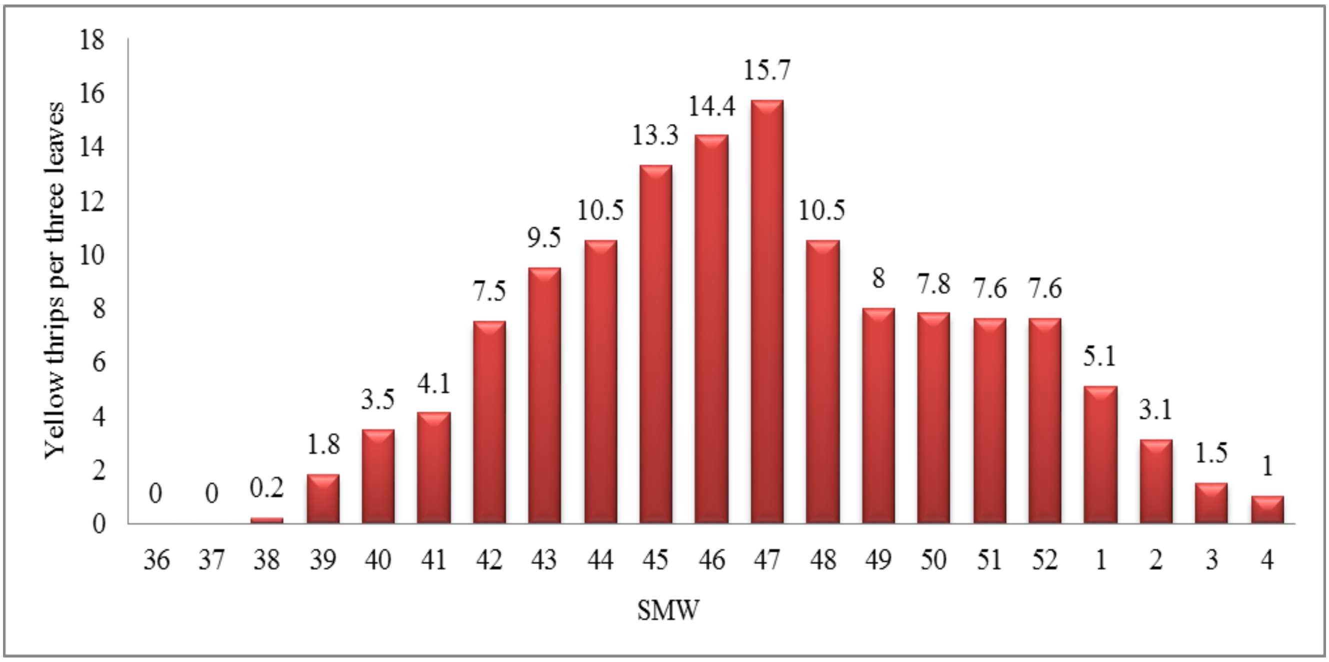

Fig 2: Seasonal incidence of yellow thrips during *Rabi* 2023-24

The correlation coefficients between weather parameters and the population of yellow thrips during the *Rabi* 2023-24 are presented in (Table No. 1). Yellow thrips showed a significant positive correlation with maximum temperature (r= 0.446*), indicating that higher temperatures favour their population growth. Minimum temperature had a significant negative correlation with yellow thrips (r= -0.605*), suggesting that lower night-time temperatures reduce their numbers. Rainfall (r= -0.385), morning relative humidity (r= -0.015), evening relative humidity (r= -0.414), and wind speed (r= -0.428) showed weak, non-significant negative correlations with chilli thrips, implying limited negative effects from these factors. These observations are in line with studies by Ghosh *et al*. (2018) [4], who also found a significant positive correlation between thrips populations and maximum temperature and negative correlations with minimum temperature.

The multiple regressions were worked out between weather parameters with yellow thrips population during summer 2022-23 and *Rabi* 2023-24. The coefficient of determination (R^2) indicates the proportion of shared variation between two variables. The study found that weather parameters accounted for 50.10 and 70.80 per cent of the total variation observed in the yellow thrips population on chili during the summer of 2022-23 and *Rabi* 2023-24, respectively. The regression equation worked out for summer and *Rabi* was as follow,

$Y = 55.226 + (0.117) \times B1 + (-0.081) \times B2 + (-1.289) \times B3 + (-0.552) \times B4 + (0.508) \times B5 + (-0.227) \times B6 + 3.760$ and $Y = -103.681 + (0.013) \times B1 + (2.157) \times B2 + (-1.401) \times B3 + (0.877) \times B4 + (-0.137) \times B5 + (-0.332) \times B6 + 3.135$, respectively.

Acknowledgements
The authors thank Department of Entomology, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, and Maharashtra for providing facilities.

Author Contribution Statement
Shubham H. Gore, Sanjeev D. Bantewad and Mahesh V. Ugale conceptualized and designed the study, conducted the study, analyzed the data, and authored the report under the supervision of Sanjeev D. Bantewad.

Financial Support
No funding received.

Conflict of Interest
No conflict of interest.

References
1. Berke T, Sheih SC. Chilli peppers in Asia. Capsicum Egg Plant Newsletter. 2000;19:38-41.
2. Department of Agriculture Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare. Area and production of horticulture crops - All India, 2017.
3. Ghosh A, Chatterjee ML, Chakraborti K, Samanta A. Field evaluation of insecticides against chilli thrips *Scirtothrips dorsalis* Hood. Ann Plant Prot Sci. 2009;17(1):69-71.
4. Ghosh M, Bhattacharya S, Mandal S. Seasonal incidence of pests of bell pepper (*Capsicum annum* var *grossum*) and their correlation with weather parameters. J Entomol Zool Stud. 2018;6(3):825-830.
5. Gundannavar KP, Giraddi RS, Kulkarni KA, Awaknavar JS. Development of integrated pest management modules for chilli pests. Karnataka J Agric Sci. 2007;20:757-760.
6. Jayewar N, Bhosle B, Bhede B. Short term climatic conditions influencing thrips infesting chilli. J Entomol Zool Stud. 2018;6(5):2459-2463.
7. Meena NK, Kanwat PM. Studies on seasonal incidence and relative safety of pesticides against Coccinellids in okra ecosystem. J Biol Control. 2010;24(2):116-122.
8. Meena RK, Tayde AR. Effect of abiotic factors on the population dynamics of chilli thrips *Scirtothrips dorsalis* (Hood) in chilli, *Capsicum annum* L. crop in Allahabad, India. Int J Curr Microbiol Appl Sci. 2017;6(6):2184-2187. https://doi.org/10.20546/ijcmas.2017.606.257
9. Patel BH, Koshiya DJ, Korat DM. Population dynamics of chilli thrips, *Scirtothrips dorsalis* Hood in relation to weather parameters. Karnataka J Agric Sci. 2009;22(1):108-110.
10. Reddy DNR, Puttaswamy S. Pests infesting chilli *Capsicum annuum* L. in nursery. Mysore J Agric Sci. 1984;18:122-125.

11. Reddy KG, Reddy AS, Satiss Babu J, Reddy MC. Adoption of integrated pest management (IPM) in chilli *Capsicum annuum* L.: A case study in Guntur district of Andhra Pradesh. J Entomol Zool Stud Biol Pharm Technol. 2011;2(2):117.
12. Reddy MC, Reddy KG, Tirupamma K, Siva Reddy KV. Economics of integrated pest management (IPM) in chilli in Guntur district of Andhra Pradesh. Int J Plant Anim Environ Sci. 2011;1(1):140-143.
13. Samanta A, Sen K, Basu I. Incidence study of yellow mite and thrips and their natural enemies in relation to weather parameters on chilli. J Entomol Zool Stud. 2017;5(4):1213-1216.
14. Sarkar PK, Timsina GP, Vanaldikiandl H, Chakraborty S. Arylpyrrole acaro-insecticide chlorfenapyr: a tool for managing yellow thrips *Scirtothrips dorsalis* Hood and broad mite Polyphagotarsonemus latus Banks of chilli. J Crop Weed. 2013;9(1):188-192.
15. Zainab S, Sathua SK, Singh R. Study of population dynamics and impact of abiotic factors on thrips, *Scirtothrips dorsalis* of chilli, *Capsicum annuum* and comparative bio-efficacy of few novel pesticides against it. Int J Agric Environ Biotechnol. 2016;9(3):451-456. https://doi.org/10.5958/2230-732x.2016.00058.9