



Reviewed by

Dr.N.K. Meena
ICAR-National Research Centre on
Seed Spices,
Tabiji, Ajmer (Rajasthan) India
narottammeena@gmail.com

*Correspondence

K.D.Shah
kalpit195@jau.in

Received: 11 February, 2025

Revision: 27 March, 2025

Accepted: 28 March, 2025

Citation

Elakkiyaa, U., Shah, K.D., Talaviya, J.R., Nandaniya, M.G., Solanki, B. and Prajapati, A.P. 2024. Seasonal Incidence of Thrips, *Thrips tabaci* Lindeman infesting Cumin, (*Cuminum cyminum* L.). *Int J Seed Spice*, 14 (2) : 23-27

DOI

<https://doi.org/10.56093/IJSS.v14i2.1>

Affiliation

¹ Department of Entomology, College of Agriculture, Junagadh Agricultural University, Junagadh (Gujarat)-362001

² Department of Plant Pathology, College of Agriculture, Junagadh Agricultural University, Junagadh (Gujarat)-362001

³ Department of Agricultural Statistics, College of Agriculture, Junagadh Agricultural University, Junagadh (Gujarat)-362001

Seasonal Incidence of Thrips, (*Thrips tabaci* Lindeman) infesting Cumin (*Cuminum cyminum* L.)

U. Elakkiyaa¹, K.D. Shah^{1*}, J.R. Talaviya², M.G. Nandaniya¹, B. Solanki¹ and A. P. Prajapati³

Abstract

A field experiment was conducted to study the seasonal incidence of thrips, *Thrips tabaci* Lindeman, infesting cumin (variety GC-4) at Instructional Farm, Department of Entomology, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat during the *Rabi* season of 2019. The infestation of thrips was initiated in the third week of December (51st SMW), corresponding to 20 days after sowing (DAS), and continued till third week of February (8th SMW), with thrips population ranging from 0.4 to 22.79 thrips per plant. The peak infestation of thrips (22.79 thrips per plant) was observed during third week of January (2nd SMW). Following this peak, the thrips population gradually declined and reached 5.21 thrips per plant by the third week of February (8th SMW). The correlation between thrips population and weather factors revealed a negative and non-significant relationship with minimum temperature ($r=-0.281$) and mean temperature ($r= -0.528$). A significant positive linear correlation was observed between the thrips population and bright sunshine hours (BSS: $r= 0.716^*$), Maximum temperature ($r= -0.541$), wind velocity ($r= -0.441$) and evening relative humidity ($r= -0.451$) showed negative correlations and morning relative humidity ($r= 0.342$) was non-significant and positively correlated with the thrips population.

Keywords: *Cuminum cyminum*, seasonal incidence, thrips, *Thrips tabaci*

Introduction

India is known as the home of spices, produces a wide range of seed spices. In the country, Rajasthan and Gujarat states have emerged as seed spices, jointly contribute more than 80 per cent of the total seed spices production. Indian spices are highly acceptable worldwide due to their unique aroma, texture, and flavour. Cumin (*Cuminum cyminum* L.) is commonly known as *Jeera* belongs to Apiaceae family. It is one of the most popular condiments used all over the world. Cumin, which originated in Egypt, has become a

widely cultivated spice in hot, arid regions around the world, including major producers like India, North Africa, China, and the Americas. According to Meena et al. (2022), India holds the position of the world's largest cumin producer. The frost and high humidity can induce disease and pest incidence. There are a large number of insects associated with the cumin. Among various insect pests attacking cumin crop, aphids, *Aphis gossypii* Glover, *Myzus persicae* (Sulzer), and thrips, *Thrips tabaci* Lindeman, *Frankliniella schultzei* Trybom, *Caliothrips indicus* are the major and jassids, *Empoasca kerri*, and whitefly, *Bemisia tabaci* are the minor threat to the crop (Meena et al., 2018). Last few years, the farmers of Gujarat are facing the infestation of thrips and causes the considerable damage to the crop. This emerging pest is attacking after 20 to 30 days of sowing of the crop. The pest sucks the cell sap continuously from the cumin plant which leads to drying up of the compound leaves followed by branches and stem and thus it hinders the vegetative growth and development of the crop. Very scattered and scanty information is available on cumin thrips. Due to global climate change, living organisms tend to change their living habitat which directly affect their span of life. Insects have capacity to modify their behaviour and habitat with the changing of the atmosphere and so, it is necessary to see the impact of changing pattern in abiotic factors on cumin thrips.

Materials and Methods

To determine the seasonal incidence of cumin thrips, a field experiment was carried out at Instructional Farm, Department of Entomology, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat on cumin variety GC-4 during *Rabi*-2019. The crop was raised as per the scientific recommendations. The crop under the experiment was kept free from any insecticidal sprays throughout cropping season. For recording the observations, the plot was divided in twenty equal quadrates each sized of 1.0 m x 1.0 m from which 5 plants were randomly selected and tagged. Population of thrips was recorded by observing each plant (by tapering the plant on white paper) at weekly interval from appearances of the pest till harvest.

Correlation study: The weekly meteorological data were obtained from the meteorological observatory of

Junagadh Agricultural University, Junagadh. With a view to study the impact of different abiotic factors on pest incidence, a simple correlation between pest incidence and weather parameters was worked out.

Results and Discussion

A study was conducted during the *Rabi* season of 2019 at Department of Entomology, Junagadh Agricultural University, Junagadh, to evaluate the effect of weather parameters on the occurrence and abundance of thrips in cumin. The thrips activity was monitored periodically at weekly intervals. The recorded data on plant infestation were then correlated with various abiotic factors (Table 1) to assess the relationship between weather parameters and thrips incidence.

Thrips incidence on plants

The data presented in table 1 and figure 1 revealed that the activity of thrips was commenced from third week of December (51st SMW), corresponding to 20 days after sowing and continued till third week of February (8th SMW) which ranged from 0.4 to 22.79 thrips /plant. The thrips population fluctuated throughout the crop period. The thrips infestation was starting at 0.4 thrips per plant and firstly observed in the third week of December (51st SMW). The population was peaked at 22.79 thrips per plant during the third week of January (2nd SMW). In the following weeks, the thrips population declined and reached 5.21 thrips per plant by the third week of February (8th SMW). Starting from the germination of the crop, the thrips population showed a continuous increase. After reaching its first peak, the population steadily declined. The similar trend was observed by Changela (1993) in which thrips population was maximum during the month of January (32.91 thrips /plant) in garlic. According to Meena et al. (2018), the infestation of thrips, *Thrips tabaci* in cumin was reported on cumin plants at 20 to 30 days after germination. While, Singh (2007) reported the population fluctuation of *T. flavus* on fennel and dill in Punjab. The infestation was heaviest between March to April on both the crops. Population numbers reached a peak at the beginning of April.

In the investigation, it was found that the incidence of thrips, *T. tabaci* was found maximum after six weeks of crop germination. Due to continuous feeding of the pest the growth of the crop was retarded. After 65 days of germination, the crop itself found capable to withstand

against the pest population and the pest was also decreased after 65 days of germination. Overall, the results of the investigation follow more or less similar trend with earlier reports and it increases the need of farmers to combat this pest at early stage of the crop.

Effect of weather parameters on *T. tabaci* population

The correlation between the thrips population and weather factors indicated a negative and non-significant impact of minimum temperature ($r= -0.281$) and mean temperature ($r= -0.528$) on the incidence of *T. tabaci* (Table 1 and Figure 1). However, a significant positive linear correlation was observed between the thrips population and bright sunshine hours ($r= 0.716^*$). The maximum temperature ($r=-0.541$), wind velocity ($r=-0.441$), evening relative humidity ($r=-0.451$) were negatively correlated with the incidence of thrips and morning relative humidity ($r=0.342$) was positively correlated with the incidence of thrips population but the relationship was non-significant. More or less the same results were found as positive association between temperature and thrips population in onion (Lorini and Junior, 1990). Changela (1993) reported a negative correlation between minimum temperature

and thrips incidence in garlic. Thus, the previous reports of a negative association between thrips population and temperature strongly support the present findings. Waiganjo *et al.* (2008) reported a positive association between wind speed and thrips. However, in the present study, wind speed showed a negative and non-significant association with thrips. This difference in results may be attributed to variations in crop environment and location.

Conclusion

The incidence of *T. tabaci* began in the third week of December (51st SMW), 20 days after sowing, and continued till the third week of February (8th SMW), with thrips population were ranging from 0.4 to 22.79 thrips per plant. The first peak occurred in the third week of January (2nd SMW). The correlation between thrips population and weather factors showed a negative, non-significant relationship with minimum temperature ($r= -0.281$) and mean temperature ($r= -0.528$). A significant positive linear correlation was found between thrips population and bright sunshine hours ($r=0.716^*$).

Conflict of Interest: The authors declare no conflicts of interest

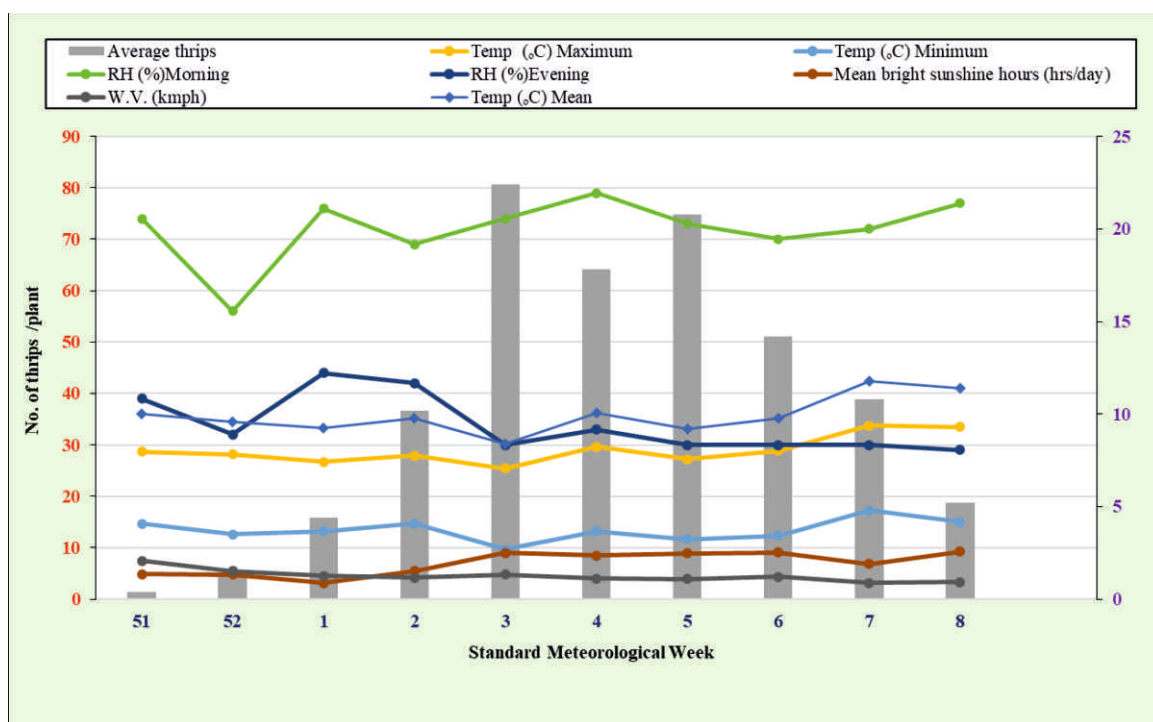


Fig. 1. Influence of abiotic factors on population of thrips, *T. tabaci* infesting cumin

Table 1: Incidence of thrips, *Thrips tabaci* infesting cummin, its correlation with abiotic factors and meteorological data

Sr.No.	SMW	Mean thrips /plant	Temperature (°C)			Humidity (%)		WV (kmph)	BSS (hrs)
			Max.	Min.	Mean	RH ₁	RH ₂		
1	51	0.40	28.70	14.70	36.05	74.00	39.00	7.50	4.90
2	52	1.20	28.20	12.60	34.50	56.00	32.00	5.50	4.80
3	1	4.48	26.70	13.20	33.30	76.00	44.00	4.50	3.20
4	2	10.47	27.90	14.70	35.25	69.00	42.00	4.20	5.50
5	3	22.79	25.40	09.70	30.25	74.00	30.00	4.80	9.00
6	4	17.87	29.60	13.20	36.20	79.00	33.00	4.00	8.50
7	5	20.83	27.20	11.70	33.05	73.00	30.00	3.90	8.90
8	6	14.21	28.90	12.40	35.10	70.00	30.00	4.40	9.10
9	7	10.19	33.80	17.30	42.45	72.00	30.00	3.20	6.90
10	8	5.21	33.50	15.00	41.00	77.00	29.00	3.30	9.30
Correlation Co-efficient			-0.541	-0.281	-0.528	0.342	-0.451	-0.441	0.716*

Note:

1. SMW: Standard Meteorological Week; BSS: Bright Sunshine Hours, hrday⁻¹; MaxT: Maximum Temperature, °C; MinT: Minimum Temperature, °C; MeanT: Mean Temperature, °C, RH₁: Morning Relative Humidity %, RH₂: Evening Relative Humidity %; WV: Wind Velocity, kmhr⁻¹

2. * Significant at 5% level; r = 0.621

References

- Changela, N.B. 1993. Bionomics, population dynamics and chemical control of thrips on garlic. M.Sc. Agri. Thesis submitted to Gujarat Agricultural University, S. K. Nagar. pp: 82-83.
- Chaudhary, N., Kant, K., Dubey, P.N., Meena, R.D., Meena, S.S., Lal, Shiv and Saxena, S.N. 2020. Efficacy of Agro Clean as pesticide in cumin and coriander. *Int J Seed Spice*, 11(2):53-57.
- Lorini, I. and Junior, V.M. 1990. Population fluctuations of *Thrips tabaci* (Lindeman) on garlic crop. *An Soc Entomol Brasil*, 19(2): 367-371.
- Meena, N.K., Kant, K. and Khan, M.A. 2018. Annual Report. ICAR - NRCSS. Sustainable management of insect pest in coriander and cumin. pp: 42 - 43.
- Meena, S.S., Bhardwaj, V., Sharma, Y.K., Mahatma, M.K., Lal, S., Meena, M. D., Meena, R.D., Chaudhary, N., and Ravi.Y. 2022. Cumin (*Cuminum cyminum* L.) an export-oriented Indian seed spice with inherent nutraceutical and therapeutic attributes: A review. *Int J Seed Spices*, 12(1):1-12.
- Singh, M.P. 2007. Production, Development, Quality and Export of Seed Spices, Malhotra, S.K. and Vashishtha, B.B. (Ed.) Integrated pest management in seed spices. pp: 141.
- Waiganjo, M.M., Gitonga, L.M. and Mueke, J.M. 2008. Effects of weather on thrips population dynamics and its implications on the thrips pest management. *Afr J Hort Sci*, 24(1):82-90.