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Seasonal activity and their relation with weather parameters of thrips infesting bitter gourd

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Abstract

The present investigation was carried out to study the seasonal activity and their relation with weather parameters of thrips infesting bitter gourd during *rabi*-summer season of 2017-18 at Centre of Excellence for Mango, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S).

Results revealed that there were marked differences observed in infestation of thrips. The population of thrips (4.60 ± 1.05) was noticed in the 13th SMW (26th March - 1st April). Minimum thrips population (1.00 ± 1.05) was recorded in 23rd SMW (5th - 11th June), while maximum (4.60 ± 1.05) population was recorded during 13th SMW (26th March - 1st April). The data on correlation between mean population of thrips infesting bitter gourd and different weather parameters revealed that the minimum temperature was found to be negatively significant with thrips population while remaining all the meteorological parameters *viz.*, maximum temperature, morning relative humidity and evening relative humidity were found to be non-significant.

Keywords: Thrips, seasonal activity, bitter gourd, weather parameters, correlation

Introduction

Bitter gourd is considered as a very important vegetable crop. Therefore, this crop was chosen as an experimental crop in this investigation. It is well known that the piercing sucking insects cause yield losses in vegetable crops as well as other crops (El-Khouly *et al.*, 1998) [3]. Among these insect pests, certain Homoptera such as aphids and white flies, Thysanoptera such as thrips have great economic importance which cause serious damage either directly by sucking plant juice or indirectly as vectors of plant pathogenic viruses. (El-Lakwah, 2011) [2].

Thrips tabaci Lindeman (Thysanoptera: Thripidae) both the nymphs and adults lacerate the tissue and suck the sap from upper and lower surfaces of leaves, flowers and stem. In heavy thrips infestation, the leaves became silvery due to the formation of white patches or streaks which finally caused scarring and distortion of leaves and cup upward (Janu *et al.*, 2017) [4]. They are susceptible to environmental changes and because of the polyphagous nature of species, one can determine their abundance by the types of plant formations. They are also essential elements of the soil, occurring at depths of 10-30 cm in the soil (Ananthkrishnan, 1984) [1].

Due to variation in the agro climatic conditions in every year, insects show varying trends in their incidence also in nature and extent of damage to the crop. Besides, some known and unknown factors also play a key role in determining the incidence and dominance of a particular pest or pest complex. Available scientific literature shows that not much information is available especially on the relation between the influences of various environmental factors on the fluctuation of thrips on bitter gourd under Konkan region conditions of Maharashtra. Hence a region oriented on study the seasonal activity and their relation with weather parameters of thrips infesting bitter gourd may be helpful in developing pest management strategy.

Materials and Methods

To study the seasonal incidence of thrips infesting bitter gourd, the field experiment was carried out at Centre of Excellence for Mango, College of Agriculture, Dapoli from February 2018 to May 2018. The details of experiment are given below.

Details of the field experiment

1	Size of plot	:	9.00m ²
2	Total plot size	:	27.00 m ²
3	Method of planting	:	On small hills
4	Spacing	:	1.50 m x 0.50 m
5	Cultivar	:	Kokan Tara

Method of recording observations

All the agronomic practices were followed as per the package of practices except the plant protection measures which was not undertaken throughout the crop season. The observations were recorded as soon as the incidence was noticed.

Twenty five plants were selected randomly to record the observations. The number of thrips from top, middle and bottom leaf was recorded for damage of these pests. The observations were recorded at weekly interval till the harvesting of crop and the data were analyzed statistically.

The observations of bitter gourd thrips population was recorded at weekly interval as per standard meteorological week. The data on weather parameters *viz.*, maximum and minimum temperature, morning relative humidity and evening relative humidity was collected from the Department of Agronomy, College of Agriculture, Dapoli, Dr. B.S.K.K.V., Dapoli and correlation was worked out.

Results and Discussion

Seasonal incidence of thrips infesting bitter gourd

The data on seasonal incidence of thrips infesting bitter gourd are presented in Table 1 and graphically illustrated in Fig. 1.

The mean population of thrips (4.60 ± 1.05) was observed in the 13th SMW (26th March -1st April). During cropping season, the population was in the range of 1.00 to 4.60 thrips per three leaves per plant. Minimum thrips population (1.00 ± 1.05) were recorded in 23rd SMW (5th -11th June), while maximum (4.60 ± 1.05) population was recorded during 13th SMW (26th March -1st April). The mean population declined in 14th SMW (2nd - 8th April) and again increased upto 17th SMW (23rd - 29th April) and then gradually declined till harvest of the crop.

The present findings are supported by Saleh *et al.* (2017) [5]. They revealed that the thrips began to appear on cucumber on

third week of April (3.0 individuals/ leaf) and its population gradually increased to reach the maximum (18.0 individuals/ leaf) during 2015. In 2016 season, thrips began to appear early on the last week of April (4.55 individuals/ leaf). Its population increased to reach the maximum 16.92 individuals/ leaf in the second week of May.

Sunil *et al.* (2017) [6] reported that the mean population of thrips varied from 0.30 in *kharif* and 1.50 in *rabi*, respectively.

Correlation between mean population of thrips infesting bitter gourd and weather parameters

Data on correlation coefficient of mean population of thrips in relation to different weather parameters are given in Table 2 and graphically illustrated in Fig. 1.

During cropping season, the data on correlation between mean population of thrips infesting bitter gourd and different meteorological parameters revealed that the maximum temperature, morning relative humidity, evening relative humidity were non-significant. Among these maximum temperature ($r= 0.336$) and morning relative humidity ($r= 0.162$) had positive correlation while, evening relative humidity ($r= -0.095$) had negative correlation with population of thrips. The thrips population showed negative significant correlation with minimum temperature ($r= -0.770$).

Saleh *et al.* (2017) [5] reported that the minimum relative humidity showed a negative significant correlation in the first season in 2015 and a positive an insignificant effect ($r= 0.0399$) in the second season in 2016 of the study on cucumber. The maximum relative humidity cleared a negative significant ($r= -0.7475$) effect in 2016 season.

During *kharif*, a non-significant negative correlation existed between the thrips incidence and maximum temperature ($r = -0.22$), minimum temperature ($r = -0.01$), maximum relative humidity ($r = -0.04$), minimum relative humidity ($r = -0.12$) and rainfall ($r = -0.03$). Similarly, during *rabi*, non-significant positive correlation was observed between thrips population and maximum temperature ($r = 0.08$) and non-significant negative correlation existed between thrips and minimum temperature ($r = -0.25$), maximum RH ($r = -0.03$) and minimum RH ($r = -0.25$) reported by Sunil *et al.* (2017) [6].

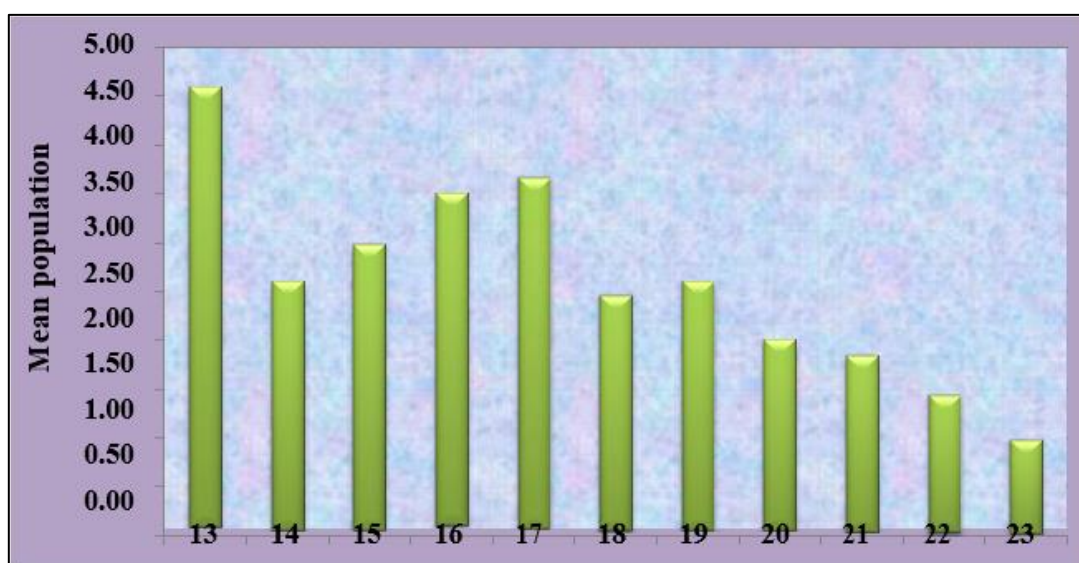


Fig 1: Seasonal incidence of thrips infesting bitter gourd

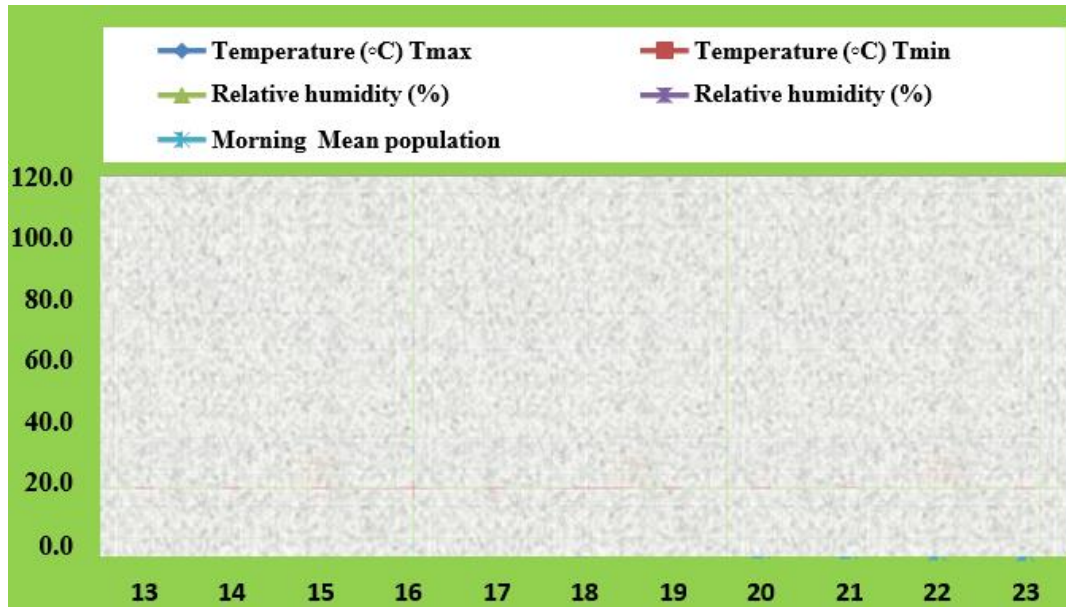


Fig 2: Mean population of thrips infesting bitter gourd in relation to weather parameters

Table 1: Mean population of thrips infesting bitter gourd in relation to weather parameters

SMW	Date of week	Temperature (°C)		Relative humidity (%)		Mean population per three leaves
		Tmax	Tmin	Morning	Evening	
13	26/03/18 – 01/04/18	33.6	19.9	96	88	4.60
14	02/04/18 - 08/04/18	32.5	19.7	92	87	2.60
15	09/04/18 – 15/04/18	34.7	20.0	91	69	3.00
16	16/04/18 - 22/04/18	33.7	20.9	90	69	3.50
17	23/04/18 – 29/04/18	34.1	19.5	90	67	3.70
18	30/04/18 – 06/05/18	33.0	21.0	91	69	2.50
19	07/05/18 – 13/05/18	34.0	24.0	89	71	2.60
20	14/05/18 – 20/05/18	34.2	23.4	91	73	2.00
21	21/05/18 – 27/05/18	33.7	24.5	90	71	1.86
22	28/05/18 - 04/06/18	33.9	25.4	89	76	1.45
23	05/06/18 – 11/06/18	32.2	23.6	95	89	1.00
SD (±)						1.05

SMW: Standard Meteorological Week

Table 2: Correlation coefficient of mean population of thrips infesting bitter gourd in relation to different weather parameters

Climatic parameters	Correlation coefficient (r)
Maximum temperature (T _{max})	0.336
Minimum temperature (T _{min})	-0.770*
Morning relative humidity	0.162
Evening relative humidity	-0.095

*Significant at 5 per cent level $r = 0.602$

Conclusion

Present study concluded that the population of thrips was noticed in the 13th SMW (26th March - 1st April). The population was increased during 13th SMW (26th March - 1st April). The minimum temperature was found to be negatively significant with thrips population while remaining all the meteorological parameters *viz.*, maximum temperature, morning relative humidity and evening relative humidity were found to be non-significant.

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