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Seasonal Incidence of *Thrips tabaci* (Lind) (Thysonoptera: Thripidae) on onion, *Allium cepa* (L.)

Vinuthan, K. D[1], Rajashekharappa, K[2*], Meghana, J[1] and Revanna Revannavar[1]

[1]Department of Entomology, College of Horticulture, Mudigere, Karnataka, India

[2]Department of Entomology, UAHS, Shivamogga, Karnataka, India

*Corresponding Author E-mail: rajukacarology@gmail.com

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ABSTRACT

Studies on the seasonal incidence of Thrips tabaci during kharif-rabi and rabi-summer revealed that thrips population was high during rabi-summer (December 2014 transplanted crop). An average of 31.81 thrips per plant was recorded with peak population of 61.04 thrips per plant on 8th March 2015 and less population was noticed during kharif-rabi season (August 2014 transplanted crop). In kharif, the average thrips population was 8.47 thrips per plant with peak activity observed on 29th September 2014 (27.16 thrips/pl.). The correlation studies between thrips population and weather factors indicated that the maximum temperature was significantly positive correlated with thrips population in both the seasons, while maximum and minimum relative humidity was significantly negatively correlated. In kharif, rainfall was significantly negative correlated with thrips population.

Key words: *Seasonal incidence, Thrips tabaci, Onion.*

INTRODUCTION

Onion, *Allium cepa* (L.) is one of the most important bulb crop. It belongs to the family Amaryllidaceae and is native to Western Asia India cultivates onion in 120.3 thousand hectares with production of 19401.7 metric tonnes, with an average productivity of 16.1 tonne per hectare and stands second next to China. Onion thrips *Thrips tabaci* (Lind) (Thysonoptera: Thripidae) is one of the common and the most destructive pest on onion which causes 34-43 per cent yield loss and also act as vector for Tospo virus causing Iris yellow spot virus in onion[1]. This polyphagous insect pest is distributed worldwide and infests *Allium* spp. Both nymph and adults found between the leaf sheaths and lacerate the leaf tissue to suck the sap which causes silvery patches on the leaf sheath. In case of severe infestation, the bulb remains undersized and distorted which leads to reduction in yield. Failure in controlling the thrips timely and effectively causes considerable damage and results in immense economic losses by reducing yield up to 50 per cent. Considering the importance of the onion thrips the present investigation was carried out to know the seasonal incidence of thrips on onion.

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MATERIAL AND METHODS

To study the seasonal incidence of thrips on onion crop, experiment was carried at Zonal Agricultural and Horticultural Research Station (ZAHRS), Babbur farm, Hiriyur taluk of Chitradurga District, Karnataka. Onion variety, Arka Kalyan was transplanted in a plot size of 10m x 10m and grown at spacing of 20 cm x 15 cm during *kharif -rabi* and *rabi-summer* season. The crop was allowed for natural infestation by thrips without any plant protection measures against thrips. The observations were made to record the number of thrips (adults and nymphs) per plant by selecting 50 plants randomly at weekly intervals from 15 days after transplanting up to 95 days of transplanting. The mean population of thrips per plant was calculated and the data was correlated with weather parameters prevailed during experiment period. The various weather parameters like maximum and minimum temperature, maximum and minimum relative humidity (%) and rainfall (mm) prevailed throughout the crop growth period was obtained from ZAHRS, Babbur and monthly mean values were calculated.

RESULT AND DISCUSSION

Seasonal incidence of onion thrips

Investigation on the seasonal incidence of *T. tabaci* on onion during *Kharif-rabi* season revealed that, minimum thrips population was noticed in early stages of crop growth on 1st September (2.36 thrips/pl.) and maximum thrips population was noticed in later stages of crop during 29th September (27.16 thrips/pl.). The crop transplanted during *Kharif-rabi* recorded the minimum population of thrips (8.47 thrips/pl.) because of heavy rainfall and low temperature during this season. Heavy rain can wash thrips off from the surface of onion plants results in sharp decline in population density of thrips[2]. Hence there was a significant decrease in thrips population during *kharif*. These results were in conformity with the findings of[3] who reported the seasonal trends in the population level of *T. tabaci* which increases when the amount of rainfall was decreasing and the temperature was increasing showing positive relation between the temperature and thrips population.

Investigation on the seasonal incidence of *T. tabaci* on onion during *rabi-summer* season revealed that, minimum thrips population of 1.8 thrips per plant was noticed in early stages of crop growth (18th January 2015) and maximum thrips population of 61.04 thrips/pl. was noticed on 8th March. The crop transplanted during *rabi* recorded the maximum population of thrips (31.81 thrips/pl.) when compared to *Kharif* transplanted onion crop. This may be due to low rainfall and increase in temperature which favours the thrips population build up.

The present findings are in agreement with the findings of[4] who observed thrips infestation was more on the crop experiencing summer or dry weather condition with high temperature. Similarly[5] also reported steady increase of thrips populations on onion crop from February to March which confirms the present findings. These results were in line with[6] who noticed the incidence of *T. tabaci* on onion crop as major insect pest of post monsoon (*rabi*) onion crop in northern and southern part of the country which agrees with the present findings. The results of the present study are also in conformity with the findings of[7] who reported that the *T. tabaci* was more serious on the summer onion crop.

Impact of weather on thrips population

During First season (*Kharif-Rabi*) (table 2) the correlation between thrips population and weather parameters revealed that thrips population was significantly negative correlated with rainfall and relative humidity. Temperature showed significant positive correlation with thrips population.

During Second season (*Rabi-Summer*) (table 3) the correlation between thrips population and weather parameters revealed that thrips population was significant negatively correlated relative humidity and non-significant negative correlation with rainfall. Temperature showed significant positive correlation with thrips population.

These findings were in agreement with[8] who reported that the rate of

development of *T. tabaci* is positively affected by increased temperature and decreased by increased relative humidity. Similarly[9] also reported that maximum temperature showed significant positive correlation against thrips population during both *kharif* and *rabi*. Whereas, in *kharif* thrips population showed significant negative correlation with rainfall.

Table 1. Seasonal incidence of *Thrips tabaci* on onion crop during *kharif-rabi and rabi- summer* season during 2014-15

Kharif-Rabi		Rabi-Summer	
Date of Observations	**Mean No. of thrips/plant**	**Date of observations**	**Mean No. of thrips/plant**
01-09-2014	2.360	11-01-2015	0.000
08-09-2014	5.200	18-01-2015	1.800
15-09-2014	9.520	25-01-2015	6.400
22-09-2014	17.39	01-02-2015	14.80
29-09-2014	27.16	08-02-2015	21.40
06-10-2014	19.21	15-02-2015	29.40
13-10-2014	8.940	22-02-2015	39.80
20-10-2014	0.000	01-03-2015	50.20
27-10-2014	2.800	08-03-2015	61.04
03-11-2014	5.100	15-03-2015	58.90
10-11-2014	9.130	22-03-2015	55.00
17-11-2014	2.910	29-03-2015	46.80
24-11-2014	4.110	05-04-2015	28.00
Average	**8.59**	**Average**	**31.81**

Kharif transplanted date: 19-08-2014
Rabi transplanted date: 22-12-2014

Table 2. Correlation between thrips population and weather parameters (*Kharif-Rabi*, 2014-15)

Parameters	Thrips	Rainfall (mm)	Maximum Temperature (^{o}C)	Minimum Temperature (^{o}C)	Maximum RH (%)	Minimum RH (%)
Thrips	1.000	-0.688**	0.629*	0.062	-0.445*	-0.264*
Rainfall (mm)		1.000	-0.683*	-0.296	0.461	0.237
Maximum Temperature (^{o}C)			1.000	0.144	-0.104	-0.192
Minimum Temperature (^{o}C)				1.000	0.386	0.425
Maximum RH (%)					1.000	0.379
Minimum RH (%)						1.000

*Significant at p = 0.05, ** Significant at p = 0.01

Table 3. Correlation between thrips population and weather parameters (*Rabi-Summer*, 2014-15)

Parameters	Thrips	Rainfall (mm)	Maximum Temperature (^{o}C)	Minimum Temperature (^{o}C)	Maximum RH (%)	Minimum RH (%)
Thrips	1.000	-0.266	0.799**	0.646*	-0.446*	-0.901**
Rainfall (mm)		1.000	-0.019	-0.626*	0.403	0.116
Maximum Temperature (^{o}C)			1.000	0.573*	-0.357	-0.781**
Minimum Temperature (^{o}C)				1.000	0.158	-0.520
Maximum RH (%)					1.000	0.617*
Minimum RH (%)						1.000

*Significant at p = 0.05, ** Significant at p = 0.01

CONCLUSION

Studies on the seasonal incidence of *T. tabaci* during kharif-rabi and rabi-summer revealed that thrips population was high during rabi-summer. The correlation studies between thrips population and weather factors indicated that the maximum temperature was significantly positive correlated with thrips population in both the seasons, while maximum and minimum relative humidity was significantly negatively correlated. In kharif, rainfall was significantly negative correlated with thrips population.

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