POPULATION DYNAMICS OF CHILLI THRIPS, *Scirtothrips dorsalis* HOOD IN RELATION TO WEATHER PARAMETERS

BAROT, B.V., PATEL, J.J.* AND SHAIKH, A. A.

MAIN VEGETABLE RESEARCH STATION
ANAND AGRICULTURAL UNIVERSITY, ANAND-388110, GUJARAT, INDIA

***E-mail: jjpatel27664@yahoo.co.in**

ABSTRACT

A study on population dynamics of thrips, *Scirtothrips dorsalis* Hood infesting chilli (cv. GVC 111) in relation to weather parameters was carried out at Main Vegetable Research Station, Anand Agricultural University, Anand (Gujarat) during the *Rabi* 2010-11. The infestation of thrips started from 1st week after transplanting *i.e.* last week of August (35th standard week) and remained in field till to the crop maturity (3rd week of February) in the range of 0.50 to 10.54 with an average of 4.37 thrips/twig. Thrips attained first (8.80 thrips/twig), second (5.66 thrips/twig) and third as well as the highest peak (10.54 thrips/twig) during 2nd week of November, 3rd week of December and 3rd week of February, respectively. Correlation coefficient values worked out for thrips incidence and weather parameters revealed that significant positive relationship existed with Bright Sun Shine Hours, Maximum Temperature and Vapour Pressure Deficit (morning, afternoon and mean), whereas significant negative correlation was found with Minimum Temperature, Relative Humidity (morning, afternoon and mean), Vapour Pressure (morning, afternoon and mean) and rainfall.

KEW WORDS: Chilli, population dynamics, thrips, correlation coefficient

INTRODUCTION

Chilli *(Capsicum annum* L.) is an important spice-cum-vegetable crop commonly used in Indian dietary and grown throughout the year. Although, the crop has got great export potential besides huge domestic requirement, a number of limiting factors have been attributed for its low productivity. Of the various biotic stresses, ravages caused by insect pests are significant ones. Of the various insect pests, thrips, *Scirtothrips dorsalis* Hood (Thripidae: Thysanoptera) is considered as the most serious and important pest. Borah (1987) estimated losses due to thrips in chilli ranged from 50 to 90 per cent at Dharwad. Both nymphs and adults of thrips cause damage by scraping the epidermis of the leaves and suck the cell sap from the leaves resulting in the margin of the leaves rolled upwards and the leaf size reduced (Rangarajan *et al.,* 1973). The damage is resulted by sucking the cell sap leading to crinkling and curling of leaves and loss of plant vigour. Patel and Gupta (1998) estimated the yield loss of green chilli due to thrips ranged from 60.5 to 74.3 per cent. Besides damage, this thrips is transmitting leaf curl disease. Available

scientific literature showed that not much information is available especially on population dynamics and influence of various abiotic factors on the fluctuation of *S. dorsalis* on chilli in Anand region of Middle Gujarat conditions. Therefore, the present investigation was carried out.

MATERIALS AND METHODS

The study on population dynamics of thrips, *S. dorsalis* in chilli (cv. GVC 111) was carried out at Main Vegetable Research Station, Anand Agricultural University, Anand (Gujarat) in *Rabi* season during 2010-11. The crop was grown in a plot size 10 x 20 m with spacing of 60 x 60 cm. All the recommended routine agronomic practices except plant protection were followed for raising the crop. The whole experimental plot was kept free from any insecticide application. Population of thrips was recorded at weekly interval from 3 terminal twigs from 25 randomly selected plants. The observations were started from one week after transplanting and continued till to the removal of crop. Thus, the data obtained were converted as average number of thrips per twig. In order to find out the specific impact of different weather parameters on thrips in chilli, the data on thrips population recorded in the experimental plot of population dynamics study were correlated with the different meteorological parameters [Rainfall, Bright Sunshine Hours, Temperature (Maximum, Minimum and Mean), Relative Humidity (Morning, Evening and Mean), Vapour Pressure (Morning, Evening and Mean), Vapour Pressure Deficit (Morning, Evening and Mean) and Wind Speed] recorded at standard meteorological weeks by Department of Agricultural Meteorology, B. A. College of Agriculture, Anand Agricultural University, Anand. The correlation was worked out by standard statistical procedure (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Data recorded on thrips per twig are presented in Table 1 revealed that the appearance of *S. dorsalis* on chilli crop commenced from last week of August (35^{th} standard week) and remained in field till to crop maturity (3^{rd} week of February). The population of thrips per twig ranged from 0.50 thrips per twig (35^{th} standard week) to 10.54 thrips per twig (8^{th} standard week) with an average of 4.37 thrips per twig during the cropping period. The incidence gradually increased and reached to the first peak (8.80 thrips/twig) during 2^{nd} week of November (45^{th} standard week). Then after, it suddenly decreased to 2.56 and 1.14 thrips/twig during 3^{rd} and 4^{th} week of November, respectively. Further, the population slightly increased and reached to the second peak (5.66 thrips/twig) during 3^{rd} week of December (50^{th} standard week). The population further declined up to 2^{nd} week of January and then after gradually increased till to the harvesting and reached to the highest peak (10.54 thrips/twig) during 3^{rd} week of February. The incidence of thrips was observed higher during 3^{rd} week of October to 2^{nd} week of November, 3^{rd} week of December and from 4^{th} week of January to 3^{rd} week of February in present investigation. Thus, the reports of Desai (1994), Lingeri *et al.* (1998) and Hosmani (2006) are more or less corroborated with present findings, while the report of Patel *et al.* (2009) is strongly supported the present results.

Correlation coefficient values (Table 2) worked out for the incidence of *S. dorsalis* and weather parameters revealed that the population of thrips had significant negative correlation with RF, MinT, MoRH, EvRH, MeRH, MoVP, EvVP and MeVP with correlation coefficient (r) value of –0.43114**, -0.43373**, -0.58465**, -0.68100**, -0.70874**, -0.51821**, -0.59090** and -0.55900**, respectively., whereas significantly positively correlated with BSS, MaxT, MoVPD, EvVPD and MeVPD with correlation coefficient (r) value of 0.65900**, 0.72781**, 0.43769**, 0.58908** and 0.47124**. Thus, BSS, MaxT, MoVPD, EvVPD and MeVPD increased the incidence of thrips also increased or vice versa.

The correlation between weather parameters and thrips incidence in chilli was studied and reported by various scientists. Hosmani (2006) reported that minimum temperature, total rainfall and number of rainy days significantly negatively correlated with thrips. Similarly, negative correlation with evening relative humidity, rainfall and positive correlation with bright sunshine hours (Bhede *et al.*, 2008), positive correlation with bright sunshine hours as well as maximum temperature and negative correlation with morning, afternoon and mean relative humidity, morning, afternoon and mean vapour pressure as well as rainfall (Patel *et al.,* 2009) with thrips population was reported. Thus, the above reports of positive and negative correlation are strongly supporting the present finding.

CONCLUSION

From the present investigation, it can be concluded that the infestation of thrips started from 1st week after transplanting and remained in field till to crop maturity (3rd week of February) in the range of 0.50 to 10.54 with an average of 4.37 thrips/twig. Thrips/twig attained three high peaks during 2nd week of November, 3rd week of December and 3rd week of February. Correlation coefficient values worked out for thrips incidence and weather parameters revealed that significant positive relationship existed with bright sun shine hours, maximum temperature and Vapour Pressure Deficit (morning, afternoon and mean), whereas significant negative correlation was found with Minimum Temperature, morning, afternoon and mean relative humidity, vapour pressure (morning, afternoon and mean) and rainfall.

REFERENCES

Bhede, B. V., Suryawanshi, D. S. and More, D. G. (2008).Population dynamics and bioefficacy of newer insecticides against chilli thrips, *Scirtothrips dorsalis* (Hood). *Ind. J. Ent.,* **70**(3): 223-226.

Borah, D. C. (1987). Biology of *Polyphagotarsonemus latus* (Banks) (Acari: Tarsonemidae) and *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae) infesting chilli and their natural enemies. Ph.D. Thesis submitted to U. A. S., Dharwad, pp. 330.

Desai, H. R. (1994). Studies on pest complex of chilli with special emphasize to thrips, *Scirtothrips dorsalis* Hood, M.Sc. (Agri.) thesis submitted to Gujarat Agricultural University, Sardarkrushinagar, pp. 75.

Hosamani, A. (2006). Incidence of thrips and mites in chilli. Ph.D. (Agri.), thesis submitted to University of Agriculture Sciences, Dharwad (Institute), pp. 45-46.

Lingeri, M. S., Awaknavar, J. S., Lingappa, S. and Kulkarni, K. A. (1998). Seasonal occurrence of chilli mites (*Polyphagotarsonemus latus* Banks) and thrips (*Scirtothrips dorsalis* Hood). *Karnataka J. Agric. Sci*., **11**(2): 380-385.

Patel, B. H., Koshiya, D. J. and Korat, D. M. (2009). Population dynamics of chilli thrips, *Scirtothrips dorsalis* Hood in relation to weather parameters. *Karnataka J. Agric. Sci.*, **22**(1): 108-110.

Patel, V. N. and Gupta, H. C. L. (1998). Estimation of losses and management of thrips infesting chillies. Paper presented in National Seminar on "Entomology in 21st century Biodiversity, Sustainability, Environmental safely and Human Health. held at Rajasthan College of Agriculture, Udaipur, on 30th April to 2nd May, 1998.

Rangarajan, A. V., Mahadevan, N. R. and Iyemperumal, S. (1973). Pest complex of sunflower *(Helianthus annus*) In Tamil Nadu. *Ind. J. Ent.*, **37**: 188-191.

Steel, R. G. D. and Torrie, J. H. (1980). Principles and procedures of statistics. Publ. Mcgraw-Hill Book Company, New York.

Table 1: Population dynamics of thrips, *S. dorsalis* in chilli

Months and weeks		Week After Ttransplanting	Standard Week	No. of Thrips/Twig
August	**V**	1	35	0.50
September	**I**	2	36	1.14
	II	3	37	1.58
	III	4	38	2.14
	IV	5	39	2.56
October	**I**	6	40	3.28
	II	7	41	3.66
	III	8	42	4.24
	IV	9	43	5.30
November	**I**	10	44	6.40
	II	11	45	8.80
	III	12	46	2.56
	IV	13	47	1.14
December	**I**	14	48	2.54
	II	15	49	3.72
	III	16	50	5.66
	IV	17	51	4.10
	V	18	52	3.70
January	**I**	19	1	3.36
	II	20	2	3.10
	III	21	3	4.18
	IV	22	4	5.50
	V	23	5	6.66
February	**I**	24	6	7.96
	II	25	7	9.23
	III	26	8	10.54
			Mean	**4.37**

Table 2: Relationship between weather parameters and population of thrips,*S. dorsalis* in chilli

Weather Parameters	Correlation Co-efficient (r)
Bright Sunshine Hours, hrday-1 (BSS)	0.65900**
Rainfall, mm (RF)	-0.43114**
Maximum Temperature, 0C (MaxT)	0.72781**
Minimum Temperature, ^{0}C (MinT)	-0.43373**
Mean Temperature, ^{0}C (MeT)	-0.30461
Morning Relative Humidity, % (MoRH)	-0.58465**
Evening Relative Humidity, % (EvRH)	-0.68100**
Mean Relative Humidity, % (MeRH)	-0.70874**
Morning Vapour Pressure, mm of Hg (MoVP)	-0.51821**
Evening Vapour Pressure, mm of Hg (EvVP)	-0.59090**
Mean Vapour Pressure, mm of Hg (MeVP)	-0.55900**
Morning Vapour Pressure deficit, mm of Hg (MoVPD)	0.43769**
Evening Vapour Pressure deficit, mm of Hg (EvVPD)	0.58908**
Mean Vapour Pressure deficit, mm of Hg (MeVPD)	0.47124**
Wind Speed, kmhr-1 (WS)	-0.28709

***** Significant at 5 %and 1 per cent level of significance, respectively***

[MS received: November 05, 2012] *[MS accepted: December 11, 2012]*