

## Rabi – summer chilli crop-the specrum of major insect pests

■ LAXMI KANT YADAV, SONALI DEOLE\*, Y. K. YADU AND RASHMI GAURAHA

Department of Entomology, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, RAIPUR (C.G.) INDIA

### ARTICLE INFO

Received : 21.12.2016  
Revised : 27.02.2017  
Accepted : 04.03.2017

### KEY WORDS :

Chilli, *Helicoverpa armigera*,  
*Scirtothrips dorsalis*, Thrips

### ABSTRACT

Insect pest succession on chilli crop against thrips, *Scirtothrips dorsalis* (Hood) was studied during 2014-2015 at the Horticulture Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). During the course of study four insect species viz., Thrips (*Scirtothrips dorsalis*), aphid (*Aphis gossypii*), whitefly (*Bemisia tabaci*), fruit borer (*Helicoverpa armigera*) and mite (*Polyphagotarsonemus latus*) were noticed causing damage at various growth stages of crop. Majority of the insects are active from vegetative to fruiting stages of crop (February to June). The peak population of thrips (*Scirtothrips dorsalis* Hood), whiteflies (*Bemisia tabaci* Genn) and fruit borer (*Helicoverpa armigera*) were observed on chilli crop from mid April to mid May with 45.86, 6.28 and 1.56 insect per plant.

### \*Corresponding author:

Email : [sonalideoleigkv@yahoo.com](mailto:sonalideoleigkv@yahoo.com)

**How to view point the article :** Yadav, Laxmi Kant, Deole, Sonali, Yadu, Y.K. and Gauraha, Rashmi (2017). Rabi – summer chilli crop-the specrum of major insect pests. *Internat. J. Plant Protec.*, 10(1) : 47-51, DOI : 10.15740/HAS/IJPP/10.1/47-51.

## INTRODUCTION

*Capsicum annum* L., commonly known as chilli is one of the most valuable crop which is grown largely for its fruits all over the India. It is used as a principal ingredient of various curries, chutneys, vegetables, spices, condiments, sauces and pickles. Pungency in chillies is due to the active constituent “Capsaicin”. Capsaicin, an alkaloid, is extracted from chillies and is used in medicine (Das, 2001). The word chilli, which is of Mexican origin, is still under usage in India (Sendhilkumaran and Vadivel, 2002). It is popularly grown in all part of Chhattisgarh during rainy, spring and summer season. Since it is grown all round the year, there is carryover of insect pest from one season to other and from sowing to harvest. The intensification of agriculture utilizing high yielding varieties

grown under new agronomic practices with increased irrigation facilities and extensive use of agrochemicals has also resulted in increasing incidence of pest outbreaks.

In chilli production, there are several constraints responsible for reduction in yield amongst them, insect pest is one of the most important factor. Among the different insect pest of chilli crop thrips *Scirtothrips dorsalis* Hood is the important one which can cause 60.5- 74.3 per cent yield loss (Patel and Gupta, 1998). Fruit borer *Spodoptera litura* is another important pest which can affect the quality and quantity of green chilli. The yield of green chilli is also affected by aphid (*Aphis gossypii* Koch.) and Jassid (*Empasca* spp.) white fly (*Bemisia tabaci*) and mite (*Hemitarsonemus latus* Bank.) under field condition (Anonymous, 1979).

Knowledge of seasonal cycle of insect ecosystem is prerequisite for successful pest management and insecticides, a major and indefensible component in the pest management system, though giving a quick satisfactory control.

## MATERIAL AND METHODS

In order to study the incidence of thrips (*Scirtothrips dorsalis* Hood), whiteflies (*Bemisia tabaci* Genn), aphids (*Aphis gossypii* Glover) and mites (*Polyphagotarsonemus latus* Banks) in field, the chilli variety "Shilpa" which recommended for this region was used for the experiment, transplanting was done after 45 days *i.e.* on 27<sup>th</sup> January in the laid out fields at the spacing of 50 cm x 45 cm. The present investigation was conducted during *Rabi*-summer 2014-15 at Horticulture Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). To study the seasonal incidence of insect pests of chilli were done by counting the population of insect pests on twenty five randomly selected plants plots of 5.0 x 10 m<sup>2</sup> were maintained without employing any plant protection measures. The population of thrips and whiteflies (nymphs and adults) were recorded from three leaves one each from the upper, middle and lower position on five randomly selected plants. The numerical count method described by Heathcoate (1972) was used to record the population of aphid. The population was counted only on three leaves as per the method suggested by Satpathy (1973). The aphid population was expressed on per plant basis. The density of *P. latus* (eggs and mobile stages) was recorded under stereo binocular microscope on 2 x 2cm leaf bit area. The incidence of fruit borer was recorded on the basis of larvae per plant. The observations were recorded on the parameters of insect appearance, peak active period, crop stage and disappearance of insect.

### Statistical analysis :

The data obtained were analyzed statistically after

using appropriate transformation. The populations of Insect pests data obtained were converted into square root transformation, by using the formula (+0.5). This transformed data was then analyzed by the method of analysis of variance as described by Gomez and Gomez (1984). The "F" test was used at 5 per cent level of significance.

## RESULTS AND DISCUSSION

The occurrence of insect pest complex commenced from 15 days after transplanting. The incidence of insect pests and associated natural enemies were observed on variety Shilpa (435/7) during *Rabi* 2014-15. Observation on pest incidence *i.e.* population of insect pests were recorded on randomly selected twenty five plants at weekly interval. During the course of study, four insect species *viz.*, thrips (*Scirtothrips dorsalis*), aphid (*Aphis gossypii*), whitefly (*Bemisia tabaci*), fruit borer (*Helicoverpa armigera*) and mite (*Polyphagotarsonemus latus*) were noticed causing damage at various growth stages of crop. The present findings are almost similar to those of Tripathi *et al.* (2002) who reported three major insects *i.e.* thrips (*Scirtothrips dorsalis*), aphid (*Aphis gossypii*) and jassid (*Amrasca biguttula biguttula*). More or less similar findings were reported by Roopa *et al.* (2009) on chilli, the mite *P. latus* occurred throughout the period of plant growth during summer. Meena *et al.* (2013) observed the incidence of thrips (*Scirtothrips dorsalis* Hood), whitefly (*Bemisia tabaci* Genn), aphid (*Aphis gossypii* Glover) and mites (*Polyphagotarsonemus latus* Banks) were appeared on the chilli crop soon after transplanting.

### Thrips, *Scirtothrips dorsalis* (Hood) :

Periodical observations, on the incidence of chilli thrips, revealed that the nymphs and adults of thrips appeared in first week of February (6<sup>th</sup> SMW). Initially the population of thrips was 4.22 per plant. The peak population (45.86 per plant) was noticed during second

**Table 1 : Population of major insect pest of chilli during *Rabi* 2014-15**

Sr. No.	Insect pest	Mean	Period of activity	Peak activity period
1.	Thrips ( <i>Scirtothrips dorsalis</i> )	4.22-45.86	I <sup>st</sup> Week of Feb-III <sup>rd</sup> Week of June	II <sup>nd</sup> Week of April
2.	White fly ( <i>Bemisia tabaci</i> )	0.36-6.28	I <sup>st</sup> Week of Feb- I <sup>st</sup> Week of June	II <sup>nd</sup> Week of April
3.	Aphid ( <i>Aphis gossypii</i> )	0.12-4.02	I <sup>st</sup> Week of Feb- IV <sup>th</sup> Week of April	IV <sup>th</sup> Week of March
4.	Mites ( <i>Polyphagotarsonemus latus</i> )	0.06-1.28	I <sup>st</sup> Week of Feb- I <sup>st</sup> Week of May	III <sup>rd</sup> Week of March
5.	Fruit borer ( <i>Helicoverpa armigera</i> )	0.36-1.56	III <sup>rd</sup> Week of March- II <sup>nd</sup> Week of June	II <sup>nd</sup> Week of May

week of April (15<sup>th</sup> SMW), Thereafter, the population gradually decreased reaching 4.88 thrips per plant during third week of June. The population ranged from 4.22 to 45.86 thrips per plant during first week of February to third week of June whereas, Rashid *et al.* (2013) observed peak incidence of thrips during last week of February. Patel *et al.* (2009) recorded thrips incidence from first week of September with peak in November and March. Bhede *et al.* (2008) reported the highest incidence of thrips in the 40<sup>th</sup> SMW. Panicker (2000) recorded the activity of thrips from 1<sup>st</sup> week of September to 2<sup>nd</sup> week of January. The above observation were recorded in *Kharif* sown chilli crop.

#### Aphid, *Aphis gossypii* (White) :

First appearance of aphids were observed on first week of February (6<sup>th</sup> SMW) with mean population of 1.12 aphids per plant. The peak population (4.02 nymph and adult per plant) was noticed during fourth week of March (13<sup>th</sup> SMW); Thereafter, the population gradually

decreased reaching 0.12 aphids per plant during last week of April. The population ranged from 0.12 to 4.02 aphids per plant during first week of February to last week of April. The present findings are in agreement with Shrivastava *et al.* (1971); Venzon *et al.* (2006); Pandey *et al.* (2007) and Sarkar *et al.* (2008) who reported that the aphid infestation occurred on crop throughout the crop season and their peak activity was noticed during second fortnight of January.

#### Mite, *Polyphagotarsonemus latus* (Banks) :

Mites were observed on first week of February (6<sup>th</sup> SMW) as 0.32 mites per plant. The peak population (1.28 mites per plant) was noticed during third week of March (12<sup>th</sup> SMW) Thereafter, the mites population gradually decreased reaching 0.06 per plant during first week of May during *Rabi*, 2014-15. The population ranged from 0.06 to 1.28 mites per plant during first week of February to first week of May. The present findings are almost similar to those of Borah (1987); Lingeri *et al.* (1998)

**Table 2 : Seasonal incidence of major insect pest on chilli during *Rabi* 2014-15**

SMW	Month and date	Insect/plant				
		<i>S. dorsalis</i>	<i>A. gossypii</i>	<i>P. latus</i>	<i>B. tabasi</i>	<i>H. armigera</i>
4	Jan 22-28	0	0	0	0	0
5	Jan 29-04	0	0	0	0	0
6	Feb 05-11	4.22	1.12	0.32	0.36	0
7	Feb 12-18	14.68	1.24	0.20	0.96	0
8	Feb 19-25	23.44	2.00	0.92	1.24	0
9	Feb 26-04	31.22	2.42	0.86	3.04	0
10	March 05-11	33.48	3.04	1.08	3.62	0
11	March 12-18	34.62	3.00	1.12	4.52	0
12	March 19-25	37.82	3.26	1.28	5.56	0.36
13	March 26-01	39.06	4.02	1.24	5.12	0.48
14	April 02-08	42.42	3.46	1.04	5.82	0.52
15	April 09-15	45.86	1.16	0.40	6.28	0.56
16	April 16-22	17.64	0.72	0.40	4.46	0.64
17	April 23-29	19.22	0.12	0.16	3.22	0.86
18	April 30-06	16.48	0	0.08	3.00	0.72
19	May 07-13	20.28	0	0.06	3.68	0.98
20	May 14-20	23.22	0	0	3.54	1.34
21	May 21-27	28.64	0	0	3.98	1.56
22	May 28-03	15.86	0	0	3.00	0.72
23	June 04-10	11.82	0	0	2.56	0.46
24	June 11-17	7.62	0	0	0	0.12
25	June 18-24	4.88	0	0	0	0
	Seasonal mean	21.48	1.16	0.42	2.91	0.42

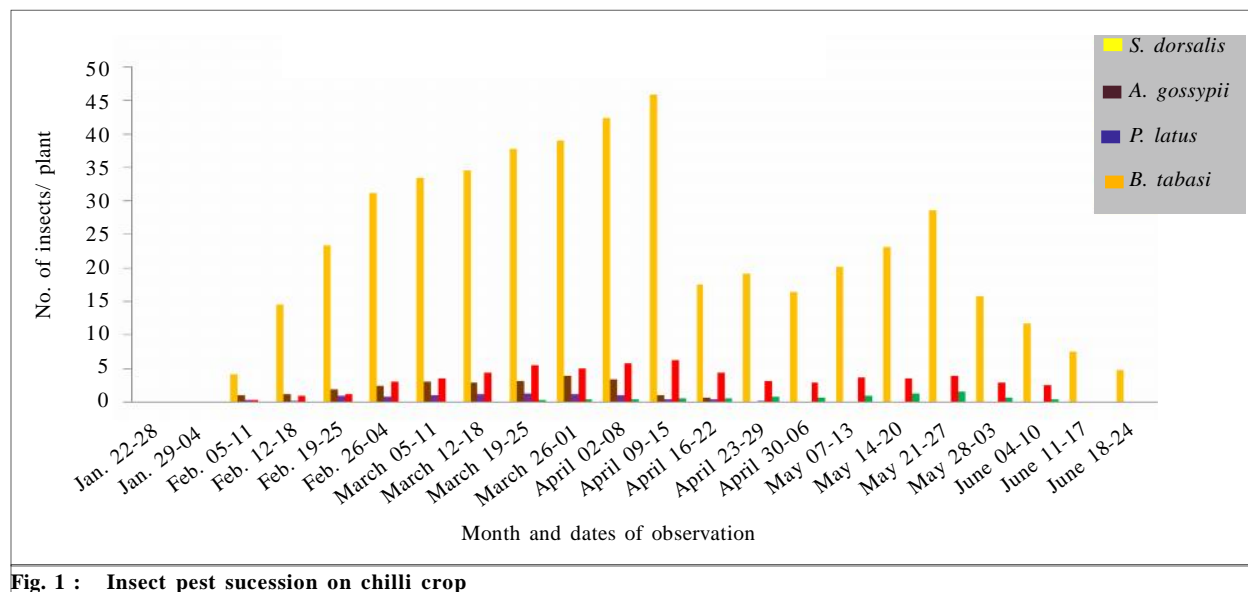


Fig. 1 : Insect pest succession on chilli crop

and Patil (2003) who reported that the mites infestation occurred on crop throughout the crop season. More or less similar findings were obtained by Roopa *et al.* (2009) who reported the chilli mite *P. latus* occurred throughout the period of plant growth during summer. Peak mite population 6.34 per leaf was noticed on 17<sup>th</sup> SMW (April 23-29), then declined sharply in 20<sup>th</sup> SMW (May 14-20).

#### Whitefly, *Bemisia tabaci* (Gennadius) :

Periodical observations on the incidence of whitefly on chilli revealed that the whitefly population first appeared in first week of February (6<sup>th</sup> SMW). Initially the whiteflies were 0.36 per plant. The peak population (6.28 whiteflies per plant) was noticed during second week of April (15<sup>th</sup> SMW). Thereafter, population gradually decreased reaching 2.56 per plant during first week of June during *Rabi*, 2014-15. The population ranged from 0.36 to 6.28 whiteflies per plant during first week of February to first week of June. The present findings are almost similar to those of Farman *et al.* (2004) who reported that the whitefly infestation started in mid of May and reached to its peak in July. More or less similar findings were obtained by Paul and Konar (2005) who reported that whitefly first appeared on the crop during first week of December with peak in last week of December. Rashid *et al.* (2013) recorded peak activity during third week of December and Mathur *et al.* (2012) reported peak activity of whitefly during

January second week.

#### Fruit borer, *Helicoverpa armigera* (Hubner) :

The incidence of fruit borer on chilli revealed that the larvae of fruit borer appeared in third week of March (12<sup>th</sup> SMW). Initially the larval population of fruit borer was 0.36 per plant. The peak larval population (1.56%) was noticed during third week of May (21<sup>th</sup> SMW) (Table 1). Thereafter, the larval population gradually decreased reaching 0.12 larvae per plant during second week of June as the crop approached maturity. The larval population ranged between 0.12 and 1.56 per plant during third week of March to second week of June. More or less similar findings were obtained by Vos and Frinking (1998) who found that *H. armigera* damaging the chilli crop during reproductive stage. Shivaramu (1999) who reported the peak incidence of *H. armigera* larvae *Kharif* crop during September second fortnight. Nadaf and Kulkarni (2006) who reported peak incidence of *H. armigera* egg during September second fortnight and incidence of larvae was peak during November first fortnight.

#### REFERENCES

- Anonymous (1979). Losses due to aphid incidence in chilli. *Hindu*, **16**: 8.
- Bhede, B.V., Bhosle, B. B. and More, D.G. (2008). Influence of meteorological factors over the incidence of chilli mite, *Polyphagotarsonemus latus* and its chemical control

strategies. *Indian J. Plant Prot.* **36**(2) : 200-203.

**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, University of Agricultural Sciences, Dharwad, Karnataka (India) pp. 330.

**Das, P.C. (2001).** *Vegetable crops of India*. Kalyani Publishers, pp. 100-101.

**Farman, A., Hayat, B., Aneesur, R. and Shab, S.B. (2004).** Population density of cotton whitefly, *Bemisia tabaci* and mites, *Tetranychus urticae* on brinjal and their chemical control. *Asian J. Plant Sci.*, **3**: 589-592.

**Gomez, K.A. and Gomez, A.A. (1984).** *Statistical procedure for agricultural research*, John Wiley and Sons Publication 2<sup>nd</sup> Ed.

**Heathcoate, G.C. (1972).** Evaluating aphid population on plants. In: *Aphid technology* (Ed. H.V. Van Emden.) Academic Press, New York. pp. 105-145.

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

**Mathur, A., Singh, N.P., Meena, M. and Singh, S. (2012).** Seasonal incidence and effect of abiotic factors on population dynamics of major insect pests on brinjal crop. *J. Environ. Res. & Develop.*, **1**(7): 53-55.

**Meena, R.S., Ameta, O.P. and Meena, B.L. (2013).** Population dynamics of sucking pests and their correlation with weather parameters in chilli, *Capsicum annum* L. *Crop. Bioscan*, **8**(1): 177-180.

**Nadaf, A.M. and Kulkarni, K.A. (2006).** Seasonal incidence of the fruit borers, *Helicoverpa armigera* (Hubner) and *Spodoptera litura* Fabricius on chilli in Dharwad. *Karnataka J. Agric. Sci.*, **19** (3) : 549-552.

**Pandey, R., Rai, M.K., Sharma, K. and Chaudhari, D. (2007).** Studies on population dynamics of *Myzus persicae* on potato crop with special reference to its relation with various weather parameters. *Veg. Sci.*, **34** (2) : 167-169.

**Panicker, B. (2000).** Population dynamics of various species of thrips, on different host crops and their chemical control. M.Sc. (Ag.) Thesis, Gujarat Agricultural University, Sardar Krushinagar, GUJARAT (INDIA).

**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 21<sup>st</sup> century Biodiversity, Sustainability, Environmental safety and Human Health. held at Rajasthan College of Agriculture, Udaipur, on 30<sup>th</sup> April to 2<sup>nd</sup> May, 1998.

**Patil, Roopa, S. and Nandihalli, B.S. (2009).** Seasonal incidence of mite pests on brinjal and chilli. *Karnataka J. Agric. Sci.*, **22** (3) : 729-731.

**Patil, S.R. (2003).** Evaluation of indigenous products for the management of chilli mite, *Polyphagotarsonemus latus* (Banks) (Acari: Tarsonemidae). M.Sc. (Ag.) Thesis, University Agricultural Sciences, Dharwad, KARNATAKA (INDIA).

**Paul, S. and Konar, A. (2005).** Population dynamics of whitefly on potato planted on different dates. *Tat. J.*, **1**: 251.

**Rashid, M.H., Khatun, M.J., Mahfuz, M.S., Dash, C.K. and Hussain, M.A. (2013).** Seasonal fluctuation of insect pests of brinjal at agricultural research station. *Internat. J. Expt. Agric.*, **3** (1) : 4-8.

**Sarkar, A., Konar, A., Hazra, S. and Choudhuri, S. (2008).** Incidence and chemical control on mustard in new alluvial zone of west Bengal. *J. Ent. Res.*, **31**(1):41-43.

**Satpathy, J.M. (1973).** Field tested with granulated insecticides for the control of *L. orbonalis*. *Indian J. Agric. Sci.*, **43** (12): 1081-1086.

**Sendhilkumaran, P. and Vadivel, V. (2002).** Prospects for production and export of chillies. *Spice India*. **15** (9) : 19-21.

**Shivaramu, K. (1999).** Investigations on fruit borer, *Helicoverpa armigera* (Hubner) in chilli. Ph.D. Thesis, University of Agricultural Sciences, Dharwad, KARNATAKA (INDIA) p.141.

**Srivastava, A. S., Katiyar, S. S. L., Awasthi, B.K., Srivastava, K.M. and Nigam, P.M. (1971).** Field assessment of aphid population on potato crop. *Zeitschrift Fur Angewandte Entomologir.*, **69.1**(4): 44-48.

**Tripathi, R.S., Pandey, D. and Pandey, N. (2002).** Proceeding National seminar on Horticulture development vision and vistas January 21-23 2002, IGAU, Raipur (C.G.). pp. 43 - 44.

**Venzon, M., Oliveira, C. H. C. M. de, Rosado, M. da. C., Pallini Filho, A. and Santos, I.C.D. (2006).** Pest associated with chilli crop and management strategies. (Cultivo da Pimenta) (Portuguese). *Informeagropecuario.*, **27**(235): 75-86.

**Vos, J.G.M. and Frinking, H.D. (1998).** Pests and disease of hot pepper (*Capsicum* spp.) in tropical low lands of Java, Indonesia. *J. Plant. Prot. Trop.*, **11** (1): 53-71.