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Record of insect pests along with their natural enemies on chilli crop at Bilaspur

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Abstract

The experiment was carried out at horticultural research farm of BTC CARS, Bilaspur during *Rabi* 2019-20. Studies on insect pest complex of chilli along with their natural enemies revealed that thrips (*Scirtothrips dorsalis*), aphid, (*Aphis gossypii*), mite (*Polyphagotarsonemus latus*) and jassids (*Amrasca bigutulla bigutulla*) as sucking insect pest, while tobacco caterpillar (*Spodoptera litura*) as defoliator and fruit borer (*Helicoverpa armigera*) were observed as the major insect pests on chilli. The activity of aphid (0.51) was observed during fourth week of November (47th SMW) and the activity of jassids (0.40) were observed during second week of November (46th SMW) whereas, the activity of tobacco caterpillar (0.70) were observed during second week of January (2nd SMW) and the activity of fruit borer (0.30) were observed during second week of March (11th SMW). During all the stage of crop, the natural enemies viz., lady bird beetle (*Cheilomenes sexmaculata*, *Coccinella transversalis*, *Coccinella septempunctata*) and spider (*Lynx* spp.) were observed.

Keywords: Insect pests, chilli, natural enemies

Introduction

Chilli (*Capsicum annum* L.) is an important vegetable cum spice crop grown in almost all parts of tropical and subtropical regions of the world. It belongs to the family Solanaceae and originated from South and Central America where it was domesticated around 7000 BC. The genus *Capsicum* includes 30 species, five of which are cultivated: *Capsicum annum* L., *C. frutescens* L., *C. chinense* Jacq, *C. pubescens* R. & P. and *C. baccatum* L. (Bosland and Votava, 2000; and Wang and Bosland, 2006)^[2, 7].

Chilli serves both the purposes of vegetable and spice. It contains plenty of vitamin A, B and C along with phosphorous, potassium and protein. 100g of green chilli contains as much as 3 mg of vitamin C.

Thrips is a major pest which attacks the buds, leaves and flowers of chilli plant. (Kalshoven, 1981)^[4]. The attack of thrips on chili plants starts from a mild attack to heavy. Mild attack begins from damage symptoms on leaves marked with silvery white color. Furthermore, the silvery color changed to be brown. It causes chilli leaf curling to the upward. Paroxysm attack occurs when thrips act as vectors of viruses that cause disease in chilli (Ananthkrishnan, 1993)^[1].

The insect pests cause significant damage to the chilli crop. There are 39 genera and 51 species of insects and mite attacking chilli in the field, and in the storage. Aphids (*Aphis gossypii* Glover), Thrips (*Scirtothrips dorsalis* Hood), and Jassids (*Amrasca bigutulla bigutulla*) are the major insect pest of chilli (Jadhav *et al.*, 2004)^[3].

Material and methods

The experiment was carried out at horticultural research field of BTC CARS, Bilaspur. The chilli seedlings were transplanted in the plot size of 9.6 m X 9.45 m. with planting distance of 60 cm row to row and 45 cm plant to plant during first week of November with following all the improved recommended package of practices for raising the crop.

To record the observations on succession of different insect pests attacking on chilli crop. The populations of major insect pest were observed on randomly selected 25 plants of central rows from transplanting to harvesting of the crop.

Observations on sucking insect pests

The observation of sucking pest were recorded on randomly selected 25 plants at weekly interval on three leaves viz., upper, middle and lower from transplanting to harvesting of the crop. (Anubhuti Pandey, 2014)^[5].

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Observation on fruit borer

The observation of fruit borer infestation was recorded by counting healthy and damaged fruits on 25 randomly selected plants and the percent fruit borer infestation was computed as follows:

$$\text{Percent fruit borer infestation} = \frac{\text{Number of fruits damaged}}{\text{Total number of fruits observed}} \times 100$$

Result and discussion

The insect pests damaging chilli crop along with natural enemies were observed on variety Shilpa (VNR 435/7) during *rabi* season 2019-20. Population of insect pests was recorded on randomly selected 25 plants at weekly intervals. During the study period six major insect pests and two natural enemies were observed at vegetative and maturation stage of chilli crop.

The first incidence of chilli aphid (0.51/plant) was observed during fourth week of November (47th SMW) at vegetative stage and remained active up to the second week of May (19th SMW) at maturity of the crop. The maximum aphid population (18.22 aphid/plant) was recorded during second week of February (6th SMW) along with its lowest population (0.20 aphid/plant) during the second week of May (19th SMW). The first appearance of thrips (0.31/plant) on chilli was started in the fourth week of November (47th SMW) at vegetative stage and its activity remained continued up to the second week of May (19th SMW). The maximum thrips population (20.20 thrips/plant) was recorded during second week of April (15th SMW). The first record of chilli mite (0.90 mite/plant) was started in the fourth week of February (8th SMW) at vegetative stage and its activity remained continued up to the first week of May (19th SMW). The maximum mite population (2.46 mite/plant) was recorded during second week of April (15th SMW) and the lowest

population (0.40 mite/plant) during the first week of May (18th SMW). The jassids population (0.40 jassid/plant) was initiated from the third week of November (46th SMW) at vegetative stage and remained active till the first week of May (18th SMW). The lowest population (0.20 jassid/plant) was recorded in the fourth week of April along with its highest population (5.80 jassid/plant) during third week of January. The population of tobacco caterpillar (0.70 larvae/plant) on chilli crop started in second week of January (2nd SMW) and remained continued up to the first week of May (18th SMW). The population of tobacco caterpillar fluctuated throughout the season with a peak period of activity during last week of January (2.30 larvae/plant). The lowest population (0.20 larvae/plant) was recorded during the third week of April. The activity of fruit borer, *Helicoverpa armigera* (0.39 larvae/plant) on chilli crop started in third week of March (11th SMW). The population of fruit borer, *Helicoverpa armigera* fluctuated throughout the season with a peak period of activity during third week of April (1.20 larvae/plant). The population decreased slowly and reached to a minimum level (0.39 larvae/plant) during the first week of May.

The first appearance of lady bird beetle was noticed during vegetative stage of crop. The lady bird beetle population ranged from (0.20 to 2.20 beetle/plant). The highest population (2.20 beetle/plant) of coccinellid beetle was observed during second week of January. The lowest population (0.20 beetle/plant) of lady bird beetle was noticed during third week of November. The activity of spider on chilli crop started in third week of November (0.80 spider/plant). The population of spider fluctuated throughout the season with a peak period of activity during fourth week of January (3.01 spider/plant). There after, the population declined gradually and reached to a minimum level of 0.80 spider/plant during first week of May.

Table 1: Mean population of different insect pests on chilli crop at Bilaspur during *rabi* 2019-2020

| SMW | Mean population of insect pests per plant * | | | | | |
|---------------|---|------|-------|---------|---------------------|-----------------------------|
| | Thrips | Mite | Aphid | Jassids | Tobacco caterpillar | <i>Helicoverpa armigera</i> |
| 45 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 46 | 0.00 | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 |
| 47 | 0.31 | 0.00 | 0.51 | 0.80 | 0.00 | 0.00 |
| 48 | 2.60 | 0.00 | 0.80 | 1.00 | 0.00 | 0.00 |
| 49 | 3.91 | 0.00 | 1.51 | 1.20 | 0.00 | 0.00 |
| 50 | 4.91 | 0.00 | 3.60 | 1.40 | 0.00 | 0.00 |
| 51 | 2.60 | 0.00 | 2.80 | 1.60 | 0.00 | 0.00 |
| 52 | 5.80 | 0.00 | 2.40 | 3.00 | 0.00 | 0.00 |
| 1 | 2.91 | 0.00 | 2.91 | 2.60 | 0.00 | 0.00 |
| 2 | 2.10 | 0.00 | 5.30 | 3.80 | 0.70 | 0.00 |
| 3 | 3.80 | 0.00 | 7.50 | 5.80 | 1.00 | 0.00 |
| 4 | 4.91 | 0.00 | 10.60 | 5.00 | 0.50 | 0.00 |
| 5 | 5.80 | 0.00 | 14.01 | 2.80 | 2.30 | 0.00 |
| 6 | 1.80 | 0.00 | 18.22 | 5.20 | 1.00 | 0.00 |
| 7 | 5.11 | 0.00 | 12.52 | 3.40 | 0.80 | 0.00 |
| 8 | 5.91 | 0.90 | 11.01 | 3.80 | 1.20 | 0.00 |
| 9 | 4.20 | 1.81 | 8.01 | 2.20 | 1.30 | 0.00 |
| 10 | 3.20 | 2.10 | 6.00 | 4.20 | 1.90 | 0.00 |
| 11 | 5.40 | 1.04 | 4.50 | 2.81 | 1.30 | 0.39 |
| 12 | 14.90 | 1.76 | 3.90 | 1.85 | 0.40 | 0.20 |
| 13 | 18.90 | 0.98 | 2.81 | 1.20 | 0.30 | 0.60 |
| 14 | 19.60 | 3.06 | 0.90 | 1.00 | 0.40 | 0.80 |
| 15 | 20.20 | 2.46 | 0.60 | 0.80 | 0.40 | 1.01 |
| 16 | 19.01 | 1.48 | 0.60 | 0.80 | 0.20 | 1.20 |
| 17 | 19.20 | 0.60 | 0.40 | 0.20 | 0.20 | 1.05 |
| 18 | 11.60 | 0.40 | 0.30 | 0.40 | 0.20 | 0.73 |
| 19 | 5.90 | 0.00 | 0.20 | 0.00 | 0.00 | 0.30 |
| Seasonal Mean | 7.21 | 0.60 | 4.51 | 2.11 | 0.52 | 0.23 |

*Average number of insect pests/25 plants; SMW =Standard Meteorological Week

Table 2: Mean population of natural enemies on chilli crop at Bilaspur during *rabi* 2019-2020

| SMW | Mean population of natural enemies per plant* | |
|---------------|---|---------|
| | Coccinellids | Spiders |
| 45 | 0.00 | 0.00 |
| 46 | 0.00 | 0.00 |
| 47 | 0.20 | 0.80 |
| 48 | 0.40 | 0.91 |
| 49 | 1.01 | 1.40 |
| 50 | 0.50 | 1.51 |
| 51 | 0.50 | 1.80 |
| 52 | 0.60 | 2.01 |
| 1 | 2.01 | 2.20 |
| 2 | 2.20 | 2.30 |
| 3 | 1.20 | 2.01 |
| 4 | 0.40 | 1.60 |
| 5 | 0.50 | 3.01 |
| 6 | 0.43 | 0.99 |
| 7 | 0.30 | 1.80 |
| 8 | 0.30 | 1.31 |
| 9 | 0.50 | 1.40 |
| 10 | 0.70 | 1.20 |
| 11 | 0.90 | 2.50 |
| 12 | 1.01 | 2.20 |
| 13 | 2.02 | 1.20 |
| 14 | 0.30 | 1.60 |
| 15 | 0.90 | 2.50 |
| 16 | 0.90 | 2.40 |
| 17 | 1.90 | 2.30 |
| 18 | 0.90 | 1.60 |
| 19 | 0.60 | 1.20 |
| Seasonal Mean | 0.78 | 1.53 |

*Average number of natural enemies/25 plants; SMW=Standard Meteorological Week

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