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Survey for incidence of insect pests of chilli in different villages of districts of Rewari and Gurugram

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Abstract

The survey was carried in *Kharif* season, 2018-19 and 2019-20 to know the insect pest status of chilli crop in Rewari and Gurugram districts of Haryana at vegetative and fruiting stage. During the survey, the peak incidence of aphids, whitefly and mites was found in Mau village, while Ucha Majra village recorded highest population of thrips and fruit borer as compared to other villages of district Gurugram. Maximum population of thrips was recorded in village Panwar while minimum was found in village Jhabua in district Rewari. The mean number of aphids per plant was lowest in Khijuri and highest in Jhabua village. Maximum incidence of whitefly per plant was recorded from Subasheri village and minimum was found in Bawal village compared to others.

Keywords: Rewari, Gurugram, Chilli, Pests

Introduction

Chilli (*Capsicum annuum* L.) belongs to the family Solanaceae and is one of the most important commercial vegetable crop grown for the value of its fruits, which are used in green as well as ripe dried form for its pungency in India. In World, India ranks first in the chilli production followed by China, Thailand, Ethiopia and Indonesia. According to 2019-20 1st advance estimates, Indian chilli occupied an area of 7.03 lakh hectares with a production of 17.52 lakh tonnes and productivity of 2493 Kg per hectare (Anonymous, 2020) [1]. In India, the major chilli producing states are Andhra Pradesh (6.30 lakh tonnes) contributing of 35 percent production, followed by Telangana (3.04 lakh tonnes), Madhya Pradesh (2.18 lakh tonnes), Karnataka (1.95 lakh tonnes) and West Bengal (1.06 lakh tonnes) accounting for 17, 12, 11 and 6 percent of all India production respectively. In Haryana it is grown over an area of 2.21 lakh hectares with production of 4.03 lakh tonnes and average yield of 1825 kg per hectare (Anonymous, 2020) [1]. Looking to the production of Haryana state it is very low as compared to other states of India.

In Haryana, mites, thrips, aphid and whiteflies have been identified as key sucking pests of chilli of which leaf curl caused by mite and thrips is serious. "Leaf curl or *Churda murda*" is one of the most severe diseases in chilli growing regions. Murda disease is caused by mites, thrips and virus. At early stage of incidence, leaf curl virus causes vein clearing on young leaves, upward or downward curling of young and old leaves and plant stunted in most cases. In mature plants, curling of fruit could also be seen.

Many conventional pesticides are also being used to manage these pests that lead to development of pest resistance, resurgence and residue to existing insecticides. There is need to evaluate the specific pesticides and acaricides for eco-friendly management. Therefore, an effective pest management is the basic requirement for growing a good crop. Keeping in view the present investigation was carried out with following objective:

Material and Method

The survey was undertaken during *Kharif* season, 2018-19 and 2019-20 to know the insect pest status of chilli crop in Rewari and Gurugram districts of Haryana. From Rewari district, five village's viz., Jhabua (28.01°N, 76.61°E), Subasheri (28.01°N, 76.59°E), Panwar (27.98°N, 76.56°E), Khijuri (28.18°N, 76.70°E) and Bawal (28.10°N, 76.60°E) and from Gurugram district, five villages viz., Bas Padamka (28.29°N, 76.80°E), Ucha Majra (28.31°N, 76.81°E), Bohra Kalan (28.30°N, 76.83°E), Mau (28.24°N, 76.77°E) and Narhera (28.33°N, 76.83°E) were selected for survey.

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Two survey was undertaken at vegetative and fruiting stage of chilli crop on fixed plot at fortnightly interval during both the year. In each district, five villages were undertaken and from each village, one acre of chilli plot was selected and divided into four quadrats and in each quadrat ten plants were randomly selected and tagged for observations to record the incidence of insect pests on chilli crop.

For Sucking insect pests: From each village the population of mites, whiteflies, aphids and thrips were recorded using 10x magnifying hand lens from three leaves per plant one each from the top, middle and bottom leaves at vegetative and fruiting stage of chilli crop. The population of both nymphs and adults were taken into consideration.

For fruit borer, *Helicoverpa armigera*: The observations on larval population of chilli fruit borer, *Helicoverpa armigera* was also recorded at vegetative and fruiting stage of chilli crop on ten randomly selected plants of each village from both the districts.

Results

Based on the survey carried out in different villages of Rewari and Gurugram at vegetative and fruiting stage during *Kharif*, 2018-19 and 2019-20, major insect pests *viz.* Thrips (*Scirtothrips dorsalis*), Aphid (*Aphis gossypii*), Whitefly (*Bemisia tabaci*), Fruit borer (*Helicoverpa armigera*) and Mite (*Polyphagotarsonemus latus*) were noticed caused damage to chilli crop (Table 1). Variation in the population of major insect pests of chilli in different villages of both the district was due to latitudinal locations, soil types, irrigation facilities and varieties/hybrids grown by farmers. Vijayalakshmi *et al.*, (2017) [10] conducted a roving survey in nine villages of Guntur district and revealed that mites, *Polyphagotarsonemus latus* Banks, thrips, *Scirtothrips dorsalis* Hood, cut worm, *Agrotis ipsilon* (Hufn.), whitefly, *Bemisia tabaci* (Gennadius), aphids, *Myzus persicae* (Sulz.), fruit borer, *Spodoptera litura* Fab and blossom midge, *Asphondylia capsici* Barnes were noticed under shade net conditions.

Thrips (*Scirtothrips dorsalis*)

The data indicated from table that the population of thrips per plant was recorded from 7.98 to 11.55 thrips/plant during 2018-19 and 9.30–13.06 in 2019-20 respectively. Maximum population of thrips 11.55 and 13.06 was recorded in village Panwar while minimum population of thrips in chilli was found in village Jhabua which were 7.98 and 9.30 in district Rewari. In district Gurugram, survey was undertaken from five villages namely, Bas Padamka, Ucha Majra, Bohra Kalan, Mau and Narhera. The mean population of thrips were minimum in village Bohra Kalan 7.26 and 8.45 during 2018-19 and 2019-20 respectively. Further, in ascending order the thrips population was 8.38 and 9.88 in Narhera, 9.01 and 10.50 in Mau, 9.53 and 10.97 in Bas Padamka villages and maximum thrips was recorded in Ucha Majra village of 10.42 and 11.96 during both the years. The mean population indicated from table that the more thrips per plant were recorded in District Rewari as compared to Gurugram at vegetative and fruiting stage. The present results partially confirm to the findings of Khan *et al.* (1978) [5] who reported an interview of hundred randomly selected farmers from twenty villages with intensive *Capsicum* sp. cultivation in the Gouribidanur area of Kolar district, Karnataka, India and they

revealed that *Spodoptera exigua* and *Scirtothrips dorsalis* were found to be the most important insect pests in the nursery, while, *S. dorsalis*, aphids and fruit borers in the field. Tatagar *et al.*, (2002) [9] surveyed in the villages of Shiggaon, Haveri, Kundagol and Savanur talukas and observed the leaf curl damage caused by thrips infestation ranged from 0 to 3.20 LCI/plant.

Aphid (*Aphis gossypii*)

Based on the survey carried out in different villages of Rewari district (Table 1) it is found that during 2018-19 and 2019-20, the mean number of aphids per leaf was ranged from 21.38 to 33.44 and 19.49 to 31.49 aphids per plant which was lowest in Khijuri and highest in Jhabua village, respectively. In other village's *viz.*, Bawal, Subasheri and Panwar the population was 23.79 & 21.83, 27.03 & 24.78 and 29.47 & 27.59 aphids per plant, respectively. In Bas Padamka village of Gurugram district, aphids incidence were recorded lowest (23.47 & 21.46) during both the years as compared to other villages, while highest number of aphids was observed from Mau village 29.31 & 27.38 aphids per plant. The population of aphid per plant in villages, Bohra Kalan 28.38 & 26.44, Narhera 27.36 & 25.34 and Ucha Majra 23.92 & 22.15 were recorded during 2018-19, 2019-20 respectively, it was further indicated from table that the mean aphid population was more in 2018-19 as compared to 2019-20 season, mean population of five villages was more in district Rewari as compared to Gurugram. Goksu and Keyder (1974) [3] conducted a survey on the infestation of pests of chilli grown for export in the Bursa and Bilecik regions of Turkey and found that aphid population was in abundance in Bursa region, while in other region, it was least distributed. Yasaraknc and Hncal (1997) [12] also reported the *Tetranychus urticae*, *Myzus persicae* and *Aphis gossypii* population density in greenhouses planted with chilli crop.

Whitefly (*Bemisia tabaci*)

The results of survey revealed that maximum incidence of whitefly per plant was recorded from Subasheri village (5.98 & 4.95) followed by Panwar (5.66 & 4.56), Khijuri (5.01 & 4.12), Jhabua (4.46 & 4.02) and minimum was found in Bawal village (4.29 & 3.25) of district Rewari during 2018-19 and 2019-20 showed in Table 1. In district Gurugram survey found that lowest whitefly population was observed in Bohra Kalan (5.12 & 3.99) and highest were recorded from Mau (6.87 & 5.91). The mean population data indicated that incidence of whitefly was more in Gurugram district as compared to Rewari during both the years in chilli crop. The present findings conveyed with Dharmasena (1998) [2] who surveyed in the North Central Provinces (NCP) of Sri Lanka and recorded the presence of leaf curl complex in chilli caused by *Bemisia tabaci* (Genn.), *P. latus*, *Aphis gossypii* Glover and *S. dorsalis*.

Mite (*Polyphagotarsonemus latus*)

Among the different villages of district Rewari surveyed, incidence of mite was ranged from 6.05 to 7.18 per plant during 2018-19 and 6.95 to 7.95 in 2019-20 (Table 1). It was lowest in Jhabua village (6.05 & 6.95) and highest in Khijuri (7.18 & 7.95) with an overall mean of all villages was 6.57 & 7.36 mites per plant. In the Gurugram district, the mite incidence was lowest in Ucha Majra village 6.34 & 7.39 mites per plant and in ascending order the population of mite recorded was 6.62 & 7.41 in Narhera, 6.72 & 7.47 in Bohra

Kalan and 6.80 & 7.64 in Bas Padamka village. The maximum incidence of mites was recorded from Mau village (7.49 & 7.93) in chilli crop. It was indicated that the mean mite population was more or less similar in both the district, while the infestation of mite was more in 2019-20 as compared to previous year. Osman and El-Keie (1975) [7] conducted a survey made on the infestation of mites on *Capsicum* sp. in Tehreer province, Egypt of which *Tetranychus cinnabarinus* (Boisd.) was the most important pest species. Mite damage appears at first week of February and were at its peak during end of April. Mote (1976) [6] conducted a survey in Rahuri (Maharashtra) and found the higher infestation of mite from October to November and February to May as compared to other months. Karuppuchamy and Mohansundaram (1987) [4] surveyed for the mite population on *Capsicum annuum* and reported its peak population during the month of February.

Fruit borer (*Helicoverpa armigera*)

The fruit borer incidence was recorded maximum larval population (3.20 & 3.80) at Bawal village during 2018-19 &

2019-20 *Kharif* season. The population of fruit borer larvae in other villages of Rewari district viz., Panwar (3.18 & 3.64), Khijuri (2.83 & 3.33), Jhabua (2.66 & 3.08) and minimum population of fruit borer larvae (2.28 & 2.59) was observed from Subasheri village in chilli crop (Table 1). In district Gurugram maximum population of fruit borer larvae was recorded from village Ucha Majra (3.37 & 3.86 larvae) and minimum was observed from village Mau which was 2.20 & 2.69 larvae in both the year. The mean population data indicated that incidence of fruit borer was more in Rewari district as compared to Gurugram during both the years in chilli crop. More infestation of fruit borer larvae was recorded in year 2019-20 as compared to 2018-19. The results agree with those of Vos and Frinking (1998) [11] who reported that *Helicoverpa armigera*, thrips and *Spodoptera exigua* were infesting the chilli crop. Pathipati *et al.*, (2017) [8] conducted a survey in Andhra Pradesh and Telangana states during 2013 and 2014 on insect pests of chilli and results revealed that infestation levels of insect pests and per cent damage were lowest in poly house condition, moderate in shade net conditions and higher in open field conditions.

Table 1: Survey for assessment of major insect pests on chilli crop in Rewari and Gurugram districts during *Kharif* 2018-19 and 2019-20 seasons

| Sl. No. | Village | Mean population/3 leaves/ plant | | | | | | | | Fruit borer larvae/ plant | |
|----------|-------------|---------------------------------|---------|---------|---------|----------|---------|---------|---------|---------------------------|---------|
| | | Thrips | | Aphids | | Whitefly | | Mites | | | |
| Rewari | | 2018-19 | 2019-20 | 2018-19 | 2019-20 | 2018-19 | 2019-20 | 2018-19 | 2019-20 | 2018-19 | 2019-20 |
| 1. | Jhabua | 7.98 | 9.30 | 33.44 | 31.49 | 4.46 | 4.02 | 6.05 | 6.95 | 2.66 | 3.08 |
| 2. | Subasheri | 9.44 | 10.99 | 27.03 | 24.78 | 5.98 | 4.95 | 7.01 | 7.88 | 2.28 | 2.59 |
| 3. | Panwar | 11.55 | 13.06 | 29.47 | 27.59 | 5.66 | 4.56 | 6.08 | 7.01 | 3.18 | 3.64 |
| 4. | Khijuri | 10.33 | 11.96 | 21.38 | 19.49 | 5.01 | 4.12 | 7.18 | 7.95 | 2.83 | 3.33 |
| 5. | Bawal | 8.98 | 10.51 | 23.79 | 21.83 | 4.29 | 3.25 | 6.53 | 7.03 | 3.20 | 3.80 |
| | Mean | 9.65 | 11.16 | 27.02 | 25.03 | 5.08 | 4.18 | 6.57 | 7.36 | 2.83 | 3.29 |
| Gurugram | | | | | | | | | | | |
| 1. | Bas Padamka | 9.53 | 10.97 | 23.47 | 21.46 | 5.38 | 4.55 | 6.80 | 7.64 | 2.27 | 2.62 |
| 2. | Ucha Majra | 10.42 | 11.96 | 23.92 | 22.15 | 5.92 | 4.90 | 6.34 | 7.39 | 3.37 | 3.86 |
| 3. | Bohra Kalan | 7.26 | 8.45 | 28.38 | 26.44 | 5.12 | 3.99 | 6.72 | 7.47 | 2.56 | 3.06 |
| 4. | Mau | 9.01 | 10.50 | 29.31 | 27.38 | 6.87 | 5.91 | 7.49 | 7.93 | 2.20 | 2.69 |
| 5. | Narhera | 8.38 | 9.88 | 27.36 | 25.34 | 6.49 | 5.29 | 6.62 | 7.41 | 2.27 | 2.79 |
| | Mean | 8.92 | 10.35 | 26.48 | 24.55 | 5.95 | 4.93 | 6.71 | 7.57 | 2.53 | 3.00 |

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