The Pharma Innovation Journal 2021; SP-10(12): 1280-1282

www.ThePharmaJournal.com

The Pharma Innovation

**ISSN (E): 2277- 7695**
**ISSN (P): 2349-8242**
**NAAS Rating: 5.23**
TPI 2021; SP-10(12): 1280-1282
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www.thepharmajournal.com
Received: 07-10-2021
Accepted: 08-11-2021

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# Seasonal incidence of leaf miner *Chromatomyia horticola* (Goureau) infesting pea

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**Abstract**
The present investigations entitled seasonal incidence of leaf miner, (*Chromatomyia horticola* Goureau) infesting pea (*Pisum Sativum* L.) was carried out at experimental farm of Agricultural Entomology Section, College of Agriculture, Pune under Mahatma Phule Krishi Vidvapeeth, Rahuri during Rabi-2020-2021. In order to know the effect of weather parameters on incidence of leaf miner on pea, the study was carried out during Rabi 2020-2021. The leaf infestation (%) by leaf miner was recorded during different meteorological weeks on "Bonneville" variety of field pea. The meteorological data were collected from meteorological observatory at College of Agriculture, Pune. The data on leaf miner infestation was correlated with weather parameters to determine the relationship with the pest. The incidence of *C. horticola* on pea commenced from 3rd week of December i.e. 51th SMW with an average infestation of 4.12 per cent per plant. The leaf miner infestation is gradually increased and reached its peak level i.e. 47.17 per cent during 3rd week of February (8th SMW). Studies on correlation of pea leaf miner infestation with weather parameters revealed that the pea leaf miner infestation exhibited significant, positive correlation with maximum (r=0.639) and non-significant negative correlation with minimum temperature (r= -0.151) non-significant positive correlation with morning relative humidity (r=0.036) and non-significant negative correlation with evening relative humidity (r= -0.471) wind velocity and sunshine hours showed non-significant positive correlation (=0.193) and (r = 0.374) respectively. However rainfall showed non-significant negative correlation (r = -0.102).

**Keywords:** Bonneville, infestation, correlation *C. horticola, Pisum Sativum* L.

## 1. Introduction
Garden pea (*Pisum sativum* L.) is one of the most important legume crops in temperate climates and its classified by end use into field pea and garden pea. *Pisum sativum* is an herbaceous annual crop in the leguminaceae family. The crop is cultivated for its tender and immature pods for use as vegetable and mature dry pods for use as a pulse. Peas are highly nutritive and is a popular vegetable produced for its fresh shelled green seeds which are high in protein content (7.3 g/100 g), vitamin A (138 I.U.), calcium (21 mg), phosphorus (140 mg), energy (82 kcal),carbohydrates (14.7 g/100 g) and sugars (5.68 g per 100 g) of edible portion (Peter *et al*. 2012). It has a higher protein content, which includes critical amino acids like lysine. (Nawab *et al*. 2008) [8].
Garden Pea (*Pisum sativum* L.) is one of the most important Winter vegetable crops grown on commercial scale around the world and is consumed either as a fresh succulent vegetable or in processed form. India is the world's second-largest producer of peas, accounting for 21% of global output. Garden pea is a significant grain legume crop in India, which is primarily produced in the Rabi season and produces 54.22 thousand tonnes over an area of 5.40 thousand hectares. Maharashtra ranks 15th among all states in India in terms of yearly production with 30.60 thousand tonnes. Over an area of 3.06 thousand ha. (Anonymous 2018) [1].

## 2. Materials and Methods
### 2.1 Location of experiment
Studies on the seasonal incidence and management of pea leaf miner, *C. horticola* infesting pea (*Pisum sativum*. L) was carried out during Rabi season 2020 at experimental field of Entomology Section, College of Agriculture, Pune. This experiment was carried out on "Bonneville" pea variety.

### 2.2 Method of recording observations

The observation were recorded at weekly interval from germination to till harvest of the crop. For recording the leaf infestation percentage randomly ten plants per plot were tagged. Total number of leaves along with damaged or infested leaves of each plant were counted. Leaf infestation (%) was recorded using the formula

$$\text{Per cent infestation} = \frac{\text{Number of leaves infested with leaf miner larvae/plant}}{\text{Total number of leaves per plant}} \times 100$$

In order to know the seasonal incidence and calculation of per cent infestation of *C. horticola* on pea ten plants per plot were randomly selected and tagged for recording the observations. Numbers of mines and blistered patches on leaves of each tagged plant were recorded at weekly interval starting from the two weeks after germination till harvest of the crop. The obtained data were correlated with weather parameters (Temperature, relative humidity, wind velocity, rainfall and bright sunshine hours) to determine the correlation between per cent Infestation of *C. horticola* and the various weather parameters.

## 3. Results and Discussion

### 3.1 Seasonal incidence of leaf miner on pea crop

The infestation by the leaf miner was recorded from third week of December i.e. 51$^{th}$ standard meteorological week (SMW) to last week of February i.e. 8$^{th}$ SMW. The incidence of *C. horticola* on pea was commenced from third week of December (51$^{th}$ SMW) and increase gradually end of crop season. The pest first appeared with 4.12 per cent infestation per plant during third week of December and continued up to 3$^{rd}$ week of February. The infestation of pest ranges from 4.12 per cent in 51th SMW to 47.17 per cent in 8$^{th}$ SMW. In the present study of leaf infestation (%) of leaf miner *Chromatomyia horticola* was first observed when the crop was at seedling or nursery stage and was available till maturity. The present findings are in conformity with Hemalatha and Maheswari (2004) [6] they observed that the pest appeared from nursery stage of the crop to the maturity of crop The infestation of leaf miner observed from 3$^{rd}$ week of December to the last week of February (8$^{th}$ SMW). In accordance with scientists Galande and Ghorpade (2010) [10] they reported that the maximum incidence of the pest was observed from January to April with highest incidence in the month of February. Mondol and Kumar (2012) [7] they observed the maximum infestation from 3$^{rd}$ week of February to 2$^{nd}$ week of March. Srivastava and Singh (1972) also reported maximum population on Pea leaf miner of pea in February and March.

**Table 1:** Influence of various abiotic factors on the infestation of leaf miner on pea crop

| SMW | Temperature (°C) | | Relative humidity (%) | | Wind speed (Km/hr) | Rainfall (mm.) | BSH | Infestation (%) |
|---|---|---|---|---|---|---|---|---|
| | Max. | Min. | Morning | Evening | | | | |
| 49 | 30.3 | 11.8 | 95 | 30 | 2.2 | 0.0 | 9.1 | 0 |
| 50 | 29.1 | 17.0 | 93 | 54 | 1.2 | 4.5 | 4.4 | 0 |
| 51 | 29.3 | 11.6 | 96 | 37 | 1.8 | 0.0 | 8.3 | 4.12 |
| 52 | 29.6 | 11.8 | 96 | 37 | 1.5 | 0.0 | 8.6 | 9.86 |
| 01 | 29.5 | 16.9 | 91 | 51 | 2.0 | 0.0 | 4.8 | 13.52 |
| 02 | 29.7 | 17.2 | 96 | 56 | 1.3 | 36.8 | 6.2 | 18.91 |
| 03 | 31.9 | 16.0 | 94 | 40 | 0.9 | 0.0 | 7.5 | 23.84 |
| 04 | 32.1 | 13.0 | 94 | 34 | 1.4 | 0.0 | 9.0 | 27.79 |
| 05 | 30.5 | 11.9 | 93 | 32 | 1.5 | 0.0 | 8.5 | 33.67 |
| 06 | 30.4 | 9.9. | 92 | 26 | 1.7 | 0.0 | 9.8 | 37.58 |
| 07 | 32.0 | 13.8 | 90 | 30 | 1.2 | 0.0 | 8.0 | 42.23 |
| 08 | 30.7 | 14.4 | 87 | 34 | 3.2 | 0.0 | 8.1 | 47.17 |

SMW – Standard meteorological week
BSH- Bright sunshine hours

### 3.2 Correlation studies between leaf miner infestation and weather parameters on pea.

The fluctuation in the infestation of leaf miner on pea crop in natural condition is largely depends on different types of abiotic factors like temperature, relative humidity, wind velocity, rainfall and bright sunshine hours etc. To know the effect of various weather parameters on the infestation of leaf miner on pea crop, a simple correlation was worked out between weekly mean infestation of leaf miner and weekly weather data of different weather parameters during research programme are presented in the table 1. Studies on correlation of pea leaf miner infestation with weather parameters revealed that the pea leaf miner infestation exhibited significant, positive correlation with maximum temperature (r=0.639) and non-significant negative correlation with minimum temperature (r= -0.151), non-significant positive correlation with morning relative humidity (r=0.036), and non-significant negative correlation with evening relative humidity (r= -0.471), Wind velocity and sunshine hours showed non-significant positive correlation (=0.193), and r=0.374), respectively. However rainfall showed non-significant negative correlation (r=-0.102). This finding is in agreement with Mondol and Kumar (2012) [7] who observed negative and non-significant correlation of rainfall As per the result of Tamilnayagan *et al*. (2017) [10] population of *L. trifoli* had significant positive correlation with maximum temperature and relative humidity. The study conducted by Choudhary and Rosaiah (2000) [4] on the influence of weather parameters on the leaf miner incidence revealed that minimum temperature and evening relative humidity had negative correlation while wind velocity and sunshine hours showed positive correlation. As per the study of Chen *et al*. (1998) [3] on infestation of *L. sativae* on tomato crop and revealed that high temperatures found favourable for its reproduction and its population increased as per the study of Chen *et al*. (1998) [3] on infestation of *L. sativae* on tomato crop and rapidly up to April. Increase in temperature in March 2$^{nd}$ week onwards reported by Brar and Sandhu (1976) [2]. Rai and Ram (1997) [9] reported that weather parameters appeared to be the major regulatory factors for leaf miner infestation under field conditions.

**Table 2:** Correlation between weather parameters and leaf miner infestation on pea crop

| Sr. No. | Weather parameters | Correlation coefficient |
|---|---|---|
| 1. | Maximum temperature (ºC) | 0.639* |
| 2. | Minimum temperature (ºC) | -0.151$^{NS}$ |
| 3. | Morning relative humidity (%) | 0.036$^{NS}$ |
| 4. | Evening relative humidity (%) | -0.471$^{NS}$ |
| 5. | Rainfall (mm) | -0.102$^{NS}$ |
| 6. | Wind speed (km/hr) | 0.193$^{NS}$ |
| 7. | Bright sunshine hours | 0.374$^{NS}$ |

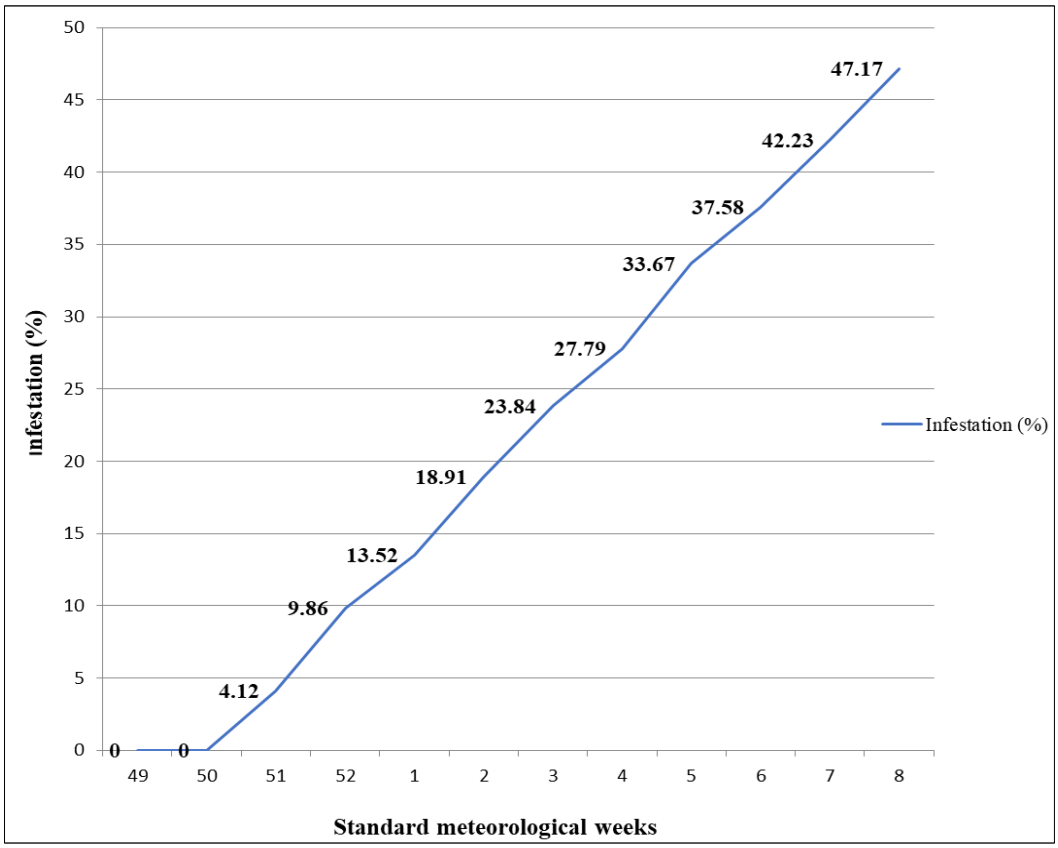


**Fig 1:** Infestation (%) by pea leaf miner on pea crop

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