



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(12): 3140-3142
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www.thepharmajournal.com

Received: 01-09-2023
Accepted: 08-10-2023

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Prevalence of Leaf miner, *Liriomyza trifolii* (Agromyzidae: Diptera) on Fenugreek

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Abstract

Fenugreek is an important annual spice crop of the world. The crop is affected by many insect pests, out of which leaf miner, *Liriomyza trifolii* is also one of the major insect pest of fenugreek. An experiment was conducted to study the percent incidence of leaf miner in the student's practical crop production field of Sun Institute of Agricultural Sciences, Visakhapatnam, Andhra Pradesh, India. The survey revealed the percent incidence of 42.50 on fenugreek with mean number of 1.49 infested leaves per plant. We also studied the incidence pattern of leaf miner on fenugreek.

Keywords: Fenugreek, leaf miner, incidence pattern, Visakhapatnam

Introduction

Fenugreek (*Trigonella foenum-graecum* L.) is an annual crop belonging to the legume family. Although grown as a spice in most parts of the world, the species name "*foenum-graecum*" means "Greek hay" indicating its use as a forage crop in the past (Afsah and Hanafy, 2010) [1]. Fenugreek is an important spice in Indian cooking system and is rich in minerals, protein, and vitamins like A and C (Arya, 2000) [2]. It is also known to have some good medicinal properties (Yashin *et al.*, 2017) [3]. Vavilov (1926, 1951) [4,5] suggested that fenugreek is native to the Mediterranean region of the "Old World", while De Candolle (1964) [6] and, Fazli and Hardman (1968) [7] proposed an Asian origin for the crop. Dangi *et al.* (2004) [8] also have suggested that *T. caerulea* and *T. foenum-graecum* originated in Turkey. Such disagreements over the origins of fenugreek led Sinskaya (1961) [9] to suggest that location of the direct wild ancestor of *T. foenum-graecum* is debatable. The crop is mainly grown in parts of Europe, Northern Africa, Argentina, Canada, Australia and United States of America (Basu *et al.*, 2006) [10]. In India, the crop is grown in an area of 168 thousand hectares with a production and productivity of 254.87 thousand Metric Tonne and 1.51 Metric Tonne/Hectare (Indiastat, 2022) [11]

But infestation by the insect pests causes significant yield losses across all the prime fenugreek growing regions of the country and is a major hindrance in realizing the potential yield. About thirty numbers of pests were reported to infest fenugreek (Kakani and Anwer, 2012; Manjula *et al.*, 2015; Mittal and Butani, 1994) [12-14]. Various workers reported that aphids (*Aphis craccivora* Koch. *Acyrtosiphon pisum* (Harris), whitefly (*Bemisia tabaci* (Genn.), jassids (*Emopasca kerri* (Pruthi), leaf miner (*Liriomyza* sp.) etc. were the important pests of fenugreek (Manjula *et al.*, 2015; Karla *et al.*, 2002) [13, 15]. However, the systematic information on the incidence of the insect pests and their damages on this crop there is very limited. Out of all the pests attacking the fenugreek, the leaf miner, *Liriomyza trifolii* cause serious damage to the crop. Hence, the present study was undertaken to study the incidence of leaf miner on fenugreek crop.

Materials and Methods

A survey was conducted to study the level of incidence of leaf miner in the student's practical crop production field of Sun Institute of Agricultural Sciences, Visakhapatnam, Andhra Pradesh, India [17°48'7" NL and 83°12'5" EL]. The crop was sown on 21st February, 2023. The observations were recorded on percent incidence of leaf miner and mean number of leaves affected per plant. The percent incidence was recorded by counting the random 8 sampling areas in the field. At each sampling points, a total of five plants were observed and hence total of 40 plants were observed in the field.

The percent incidence was calculated by the formula used by Vinay *et al.*, 2023 [16],

$$\text{Percent Incidence} = \frac{\text{Number of damaged Plants}}{\text{Total number of plants observed}} \times 100$$

Whereas, the mean number of leaves affected per plant was worked out by calculating the average number of leaves showing the symptoms of damage from the damaged plants. Also, the plants showing the symptoms of damage were photographed and their damage pattern is studied.

Results and Discussion

The data on incidence of leaf miner, *Liriomyza trifolii* on fenugreek was recorded on 21st of March, 2023. We noticed the incidence on 17 plants out of observed 40 plants. Hence, the percent incidence was leaf miner at the site of experimentation was worked out to be 42.50 percent. Whereas, the average number of leaves affected per plant was recorded to be 1.49 ± 0.38 (Table 1 and Figure 1). Our results are in agreement with the findings of Bindhani *et al.*, 2021 [17], who observed the leaf miner incidence of 2.6 to 18.6% on fenugreek crop. Also, Karla *et al.*, 2002 [15] and Kant *et al.*, 2017 [18] reported that leaf miner, *Liriomyza* sp is the important insect pest of fenugreek crop. Abro *et al.*, 2016 [19] and Kakani *et al.*, 2012 [12] revealed that leaf miner is the most damaging insect pest of fenugreek crop and also observed that the heavy population of leaf miner developed during the flowering and fruiting stages and cause significant yield loss at the crop harvest.

Table 1: Incidence level of leaf miner, *Liriomyza trifolii* on fenugreek crop

Sampling points	Total No. of plants observed	No. of plants infested	Mean No. of leaves infested per plant
1	5	3	1.33
2	5	2	1.00
3	5	2	1.50
4	5	1	1.00
5	5	2	1.50
6	5	3	2.00
7	5	1	2.00
8	5	3	1.66
Total/Average	40	17	1.49 ± 0.38

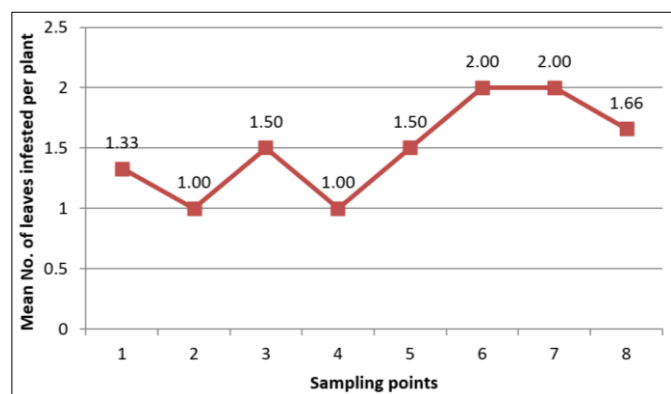


Fig 1: Graph showing the average number of leaves affected by leaf miner per plant

We also studied the damage pattern of leaf mines on the leaves. Initially, the sizes of mines were smaller at the site of

egg laying, which gradually increased with increase in the larval size. The load of excreta was also lesser at the initial stages and increases as the rate of feeding increases (Figure 2). The larvae feed on the chlorophyll content of the leaves and affect the photosynthesis rate of the plant, ultimately decrease the yield of the crop.

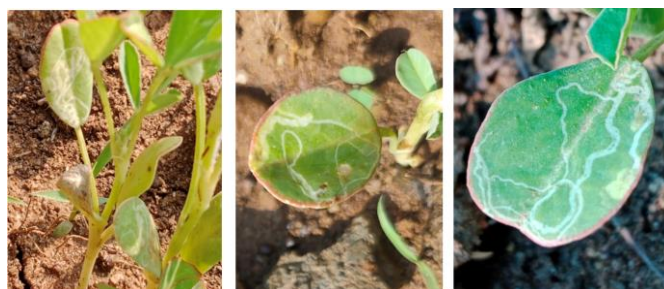


Fig 2: Damage symptoms of leaf miner, *Liriomyza trifolii* on fenugreek leaves

Conclusion

Fenugreek is an important spice crop of the world, which is attacked by many insect pests. Out of all the insect pests attacking the fenugreek crop, the leaf miner, *Liriomyza trifolii* is the serious pest and cause economic damage. The percent incidence of 42.50 was observed at the experimental site with an average infested leaves of 1.49 per plant. The spraying of chemical insecticides on fenugreek is not economical, but the pest like leaf miner necessitates the use of insecticides on fenugreek. Hence, a precautionary spray of neem oil is advisable to prevent the incidence of leaf miner on fenugreek crop.

Acknowledgements

The authors are thankful to the K. Yashoda (Chief Executive Officer) and Santhoshini Patro (HR Manager) of Sun Institute of Agricultural Sciences, Visakhapatnam for providing necessary facilities during the study.

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