



E-ISSN: 2320-7078

P-ISSN: 2349-6800

[www.entomoljournal.com](http://www.entomoljournal.com)

JEZS 2021; 9(1): 763-765

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Received: 10-11-2020

Accepted: 12-12-2020

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## Effect of meteorological parameters on population fluctuation of leaf miner infesting bitter gourd

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**Abstract**

The present studies was conducted to know the effect of meteorological parameters on population fluctuation of leaf miner infesting bitter gourd during *rabi-summer* season of 2017-18 at Centre of Excellence for Mango, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S).

The observation of bitter gourd leaf miner population was recorded at weekly interval as per standard meteorological week. The influence of weather factors on population density of leaf miner was analyzed by a simple correlation study and coefficients were worked out. Results indicated that there were marked differences observed in infestation of leaf miner. The population of leaf miners ( $0.32 \pm 0.22$ ) was observed in the 13<sup>th</sup> SMW (26<sup>th</sup> March - 1<sup>st</sup> April). Minimum leaf miner infestation ( $0.01 \pm 0.22$ ) were recorded in 23<sup>rd</sup> SMW (5<sup>th</sup> - 11<sup>th</sup> June), while maximum ( $0.50 \pm 0.22$ ) infestation was recorded during 15<sup>th</sup> SMW (9<sup>th</sup> - 15<sup>th</sup> April) and 16<sup>th</sup> SMW (23<sup>rd</sup> - 29<sup>th</sup> April). The data on correlation between mean population of leaf miner infesting bitter gourd and different weather parameters revealed that all the meteorological parameters *viz.*, maximum temperature, morning relative humidity and evening relative humidity were found to be non-significant with mean population of leaf miner. The minimum temperature was negatively significant with leaf miner population.

**Keywords:** Bitter gourd, correlation, leaf miner, meteorological parameters, population fluctuation

**Introduction**

Leaf miners is one of the 12 species under Agromyzidae, truly polyphagous, whose larvae feed on economically important crops and destructive to ridge gourd, bitter gourd, tomato, melons, cucumber, lettuce *etc.* The adult female cause damage by repeated insertion of sclerotized ovipositor and young larvae feed on leaves by making mines like serpentine. The extent of losses varies between 30 to 100 per cent depending on the cucurbit species and season (Duradundi *et al.*, 2015)<sup>[3]</sup>. This insect has the potential to infest on 250 crop species in India (Sharma, 1994)<sup>[7]</sup>. Leaf miner is damages the crop by making feeding and oviposition punctures on the leaves and then by leaf mining by the maggot. The larvae tunnel inside the mesophyll and feed inside on the palisade mesophyll tissues. The destruction of chlorophyll containing tissues interferes with the photosynthetic activity of the plant as a result of which growth and yield of the infected plants in adversely affected. When one fourth of the leaf area was mined, photosynthesis decreased by <1% (Martens and Trumble, 1987)<sup>[5]</sup>. Photosynthesis rates in mined tissues were reduced by 62 percent as compared with those in unmined leaflets (Johnson *et al.* 1983)<sup>[4]</sup>.

In view to determine the appropriate time of action and suitable management practices to be adopted regular crop pest surveillance and monitoring needs to be developed. Therefore, the present study was undertaken on the effect of meteorological parameters on population fluctuation of leaf miner infesting bitter gourd.

**Materials and Methods**

To study the seasonal incidence of leaf miner infesting bitter gourd, the field experiment was carried out at Centre of Excellence for Mango, College of Agriculture, Dapoli from February 2018 to May 2018. The details of experiment are given below

**Details of the field experiment**

1	Size of plot	:	9.00m <sup>2</sup>
2	Total plot size	:	27.00 m <sup>2</sup>
3	Method of planting	:	On small hills
4	Spacing	:	1.50 m x 0.50 m
5	Cultivar	:	Kokan Tara

**Method of recording observations**

All the agronomic practices were followed as per the package of practices except the plant protection measures which was not undertaken throughout the crop season. The observations were recorded as soon as the incidence was noticed.

Twenty five plants were selected randomly to record the observations. The leaf mines were counted from top, middle and bottom leaf of vine for leaf miner damage. The observations were recorded at weekly interval till the harvesting of crop and the data were analyzed statistically.

The observation of bitter gourd leaf miner population was recorded at weekly interval as per standard meteorological week. The data on weather parameters *viz.*, maximum and minimum temperature, morning relative humidity and evening relative humidity was collected from the Department of Agronomy, College of Agriculture, Dapoli, Dr. B.S.K.K.V., Dapoli. The influence of weather factors on population density of leaf miner was analyzed by a simple correlation study and coefficients were worked out for a period of cropping season.

**Results and Discussion****1. Seasonal incidence of leaf miner infesting bitter gourd**

The data on seasonal incidence of leaf miners infesting bitter gourd are presented in Table 1 and illustrated in Fig 1.

The mean infestation of leaf miners ( $0.32 \pm 0.22$ ) was noticed in the 13<sup>th</sup> SMW (26<sup>th</sup> March-1<sup>st</sup> April). During cropping season, the infestation was in the range of 0.01 to 0.50 leaf mines per three leaves per plant. Minimum leaf miner infestation ( $0.01 \pm 0.22$ ) were recorded in 23<sup>rd</sup> SMW (5<sup>th</sup> -11<sup>th</sup> June), while maximum ( $0.50 \pm 0.22$ ) infestation was recorded

during 15<sup>th</sup> SMW (9<sup>th</sup> -15<sup>th</sup> April) and 16<sup>th</sup> SMW (23<sup>rd</sup> - 29<sup>th</sup> April). Then the leaf miner infestation was observed to be gradually decreased till harvest of crop.

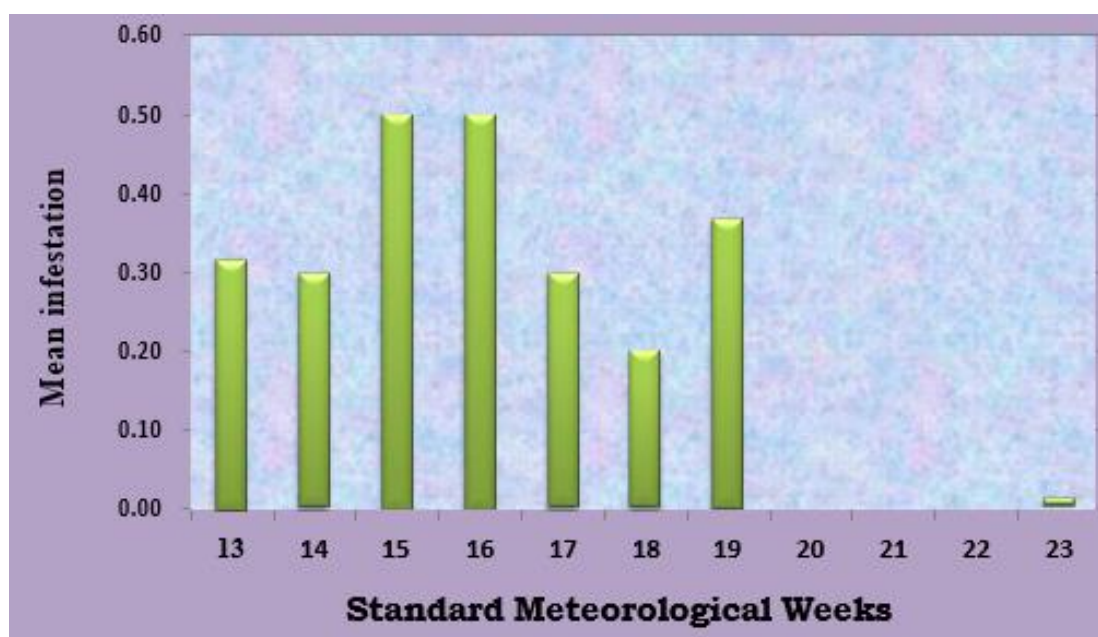
The present findings are more or less conformity with Aawathanarayana Reddy and Ashok Kumar (2004) [1]. They found that the peak infestation of leaf miner on melons was noticed during March – April. Saha *et al.* (2018) [6] noticed that the leaf damage by leaf miner on cucumber was maximum (3.30 to 4.20 mines/ vine) during last week of April to third week of May.

**2. Correlation between mean population of leaf miner infesting bitter gourd and weather parameters**

Data on correlation coefficient of mean infestation of leaf miner in relation to different weather parameters are given in Table 2 and illustrated in Fig 2.

The data on correlation between mean infestation of leaf miner infesting bitter gourd and different meteorological parameters revealed that the maximum temperature, morning relative humidity, evening relative humidity were non-significant. Among these maximum temperature ( $r=0.299$ ) had positive correlation. While, morning relative humidity ( $r=-0.067$ ) and evening relative humidity ( $r= -0.232$ ) had negative correlation with infestation of leaf miner. The minimum temperature ( $r=-0.708$ ) had negative significant correlation with infestation of leaf miner.

The present findings are more or less similar with the results of Sunil (2015) [8]. He reported that during *kharif* season positive correlation existed between leaf miner infesting bitter gourd with maximum temperature ( $r = 0.07$ ), minimum temperature ( $r = 0.43$ ), maximum RH ( $r = 0.02$ ), minimum RH ( $r = 0.10$ ) and negative correlation with rainfall ( $r= -0.26$ ). The present findings are controversy with the results of Dubale *et al.*, (2018) [2] reported that the various meteorological parameters like maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, Bright Sun Shine Hours (BSS) and rainfall were found to be non-significant.



**Fig 1:** Seasonal incidence of leaf miners infesting bitter gourd

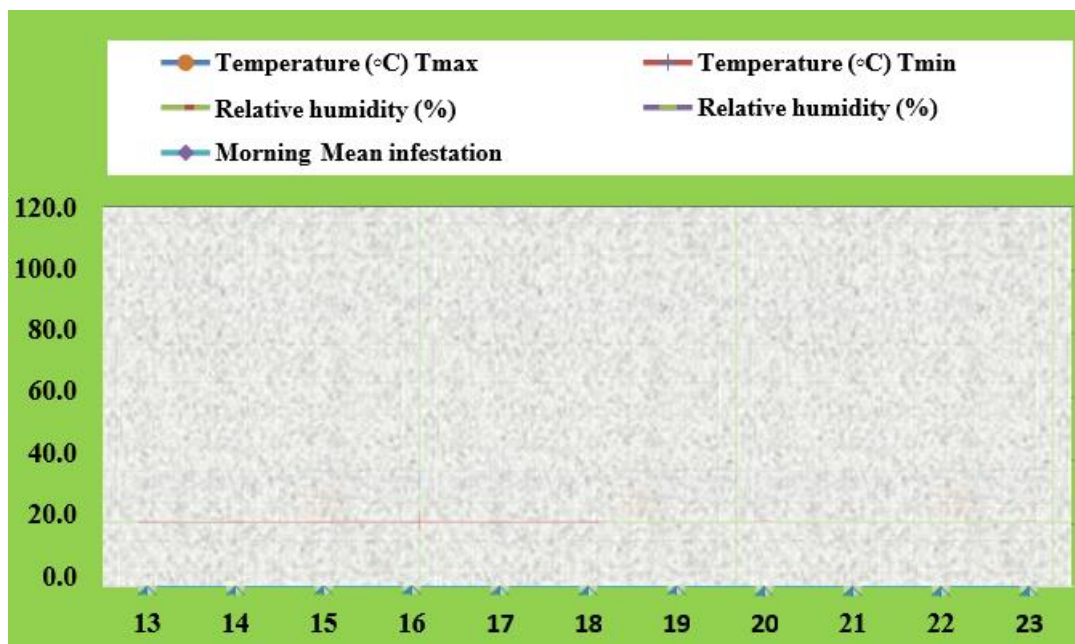


Fig 2: Mean infestation of leaf miners infesting bitter gourd in relation to weather parameters

Table 1: Mean infestation of leaf miners infesting bitter gourd in relation to weather parameters

SMW	Date of week	Temperature (°C)		Relative humidity (%)		Mean infestation per three leaves
		Tmax	Tmin	Morning	Evening	
13	26/03/18 – 01/04/18	33.6	19.9	96	88	0.32
14	02/04/18 – 08/04/18	32.5	19.7	92	87	0.30
15	09/04/18 – 15/04/18	34.7	20.0	91	69	0.50
16	16/04/18 – 22/04/18	33.7	20.9	90	69	0.50
17	23/04/18 – 29/04/18	34.1	19.5	90	67	0.30
18	30/04/18 – 06/05/18	33.0	21.0	91	69	0.20
19	07/05/18 – 13/05/18	34.0	24.0	89	71	0.37
20	14/05/18 – 20/05/18	34.2	23.4	91	73	0.00
21	21/05/18 – 27/05/18	33.7	24.5	90	71	0.00
22	28/05/18 – 04/06/18	33.9	25.4	89	76	0.00
23	05/06/18 – 11/06/18	32.2	23.6	95	89	0.01
SD (±)						0.22

SMW: Standard Meteorological Week

Table 2: Correlation coefficient of mean infestation of leaf miners infesting bitter gourd in relation to different weather parameters

Climatic parameters	Correlation coefficient (r)
Maximum temperature (T <sub>max</sub> )	0.299
Minimum temperature (T <sub>min</sub> )	-0.708*
Morning relative humidity	-0.067
Evening relative humidity	-0.232

\*Significant at 5 per cent level  $r = 0.602$

## Conclusion

From the present study, it can be concluded that the leaf miners was observed in the 13<sup>th</sup> SMW (26<sup>th</sup> March - 1<sup>st</sup> April). The peak activity of leaf miner infestation was recorded during 15<sup>th</sup> SMW (9<sup>th</sup> - 15<sup>th</sup> April) and 16<sup>th</sup> SMW (23<sup>rd</sup> - 29<sup>th</sup> April). The minimum temperature was negatively significant with leaf miner population.

## References

1. Aawathanarayana Reddy N, Ashok Kumar CT. Studies on the seasonal incidence of insect pests of tomato in Karnataka. Pest Manag. Hort. Ecosyst 2004;2:113-121.
2. Dubale MM, Jalgaonkar VN, Munj AY, Naik KV, Golvankar GM. Influence of weather factors on the incidence and distribution of leaf miner infesting ridge gourd. J. Ent. and Zool. Studies 2018;6(5):2024-2026.

3. Duradundi S, Jayappa J, Siddartha D, Madarakhandi S. Screening of ridge gourd genotypes against the fruit fly *Bactrocera cucurbitae* (Coquillett). J Exp Zool 2015;18(2):681-684.
4. Johnson MW, Welter SC, Toscano NC, Ting IP, Trumble JT. Reduction of tomato leaflet photosynthesis rates by mining activity of *Urollyza sativae* (Diptera: Agromyzidae). J Econ. Entomol 1983;76(5):1061-1063.
5. Martens N, Trumble JT. Structural and photosynthetic compensation for leaf miner (Diptera: Agromyzidae) injury on lima beans. Environ Entomol 1987;16:374-378.
6. Saha T, Chandran N, Kumar S, Kumari K. Effect of weather parameters on incidence of insect pests of cucumber in eastern Bihar. J Agromet 2018;20(1):57-61.
7. Sharma D. American pest- Threat to Indian crops; Pesticides News 1994;25:14.
8. Sunil. Pest complex of bitter gourd (*Momordica charantia* L.) with special reference to the management of melon fruit fly, *Bactrocera cucurbitae* (Coquillett) (Diptera: Tephritidae). M. Sc. (Agri.) thesis submitted to UAS, Bengaluru. 2015, 1-2.