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## Influence of weather factors on the incidence and distribution of leaf miner infesting ridge gourd

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**Abstract**

The present study was carried out on the influence of weather factors on the incidence and distribution of leaf miner infesting ridge gourd during *kharif* season of 2017 at the Central Experimental Station, Wakawali, Dist. Ratnagiri. The results revealed that there were marked differences in infestation of leaf miner. The infestation of leaf miner ( $0.04 \pm 0.26$ ) was started in the 28<sup>th</sup> SMW (09 - 15 July). Minimum leaf miner infestation ( $0.04 \pm 0.26$ ) was recorded in 28<sup>th</sup> SMW (09 - 15 July) and 29<sup>th</sup> SMW (16 - 22 July), while maximum ( $0.84 \pm 0.26$ ) infestation was noticed during 33<sup>rd</sup> SMW (13 - 19 August). The data on the correlation between mean infestation of leaf miner with different meteorological parameters found to be non significant.

**Keywords:** Seasonal incidence, leaf miner, correlation, ridge gourd

**Introduction**

Konkan region is situated in between the Arabian Sea and the Western Ghats in Maharashtra and the climatic conditions of Konkan are warm and humid. Due to red lateritic soil, moderate climatic conditions with high annual rainfall, there is great scope for cultivation of various types of vegetables in different season. In rice based cropping system, one can commercially grow important crops like brinjal, chilli, okra, yard long bean and cucurbitaceous crops etc. (Singh, 2014) [5].

Ridge gourd (*Luffa acutangula* L. Roxb.), popularly known as *Kalitori* and called as angled gourd, angled loofah, chinese okra, silky gourd and ribbed gourd. Ridge gourd belongs to genus *Luffa* of *cucurbitaceae* and has chromosome number  $2n = 26$  (Karthick *et al.* 2017) [2].

The genus *Liriomyza* contains more than 300 species known in the world. In which, approximately 23 species of *Liriomyza* have been reported as being economically important in which *L. trifolii* is very dominating in vegetable crops like tomato, cucurbitaceous crops, vegetable pea *etc.* This insect has the potential to infest on 250 crop species in India (Sharma, 1994) [4]. 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) [3]. Photosynthesis rates in mined tissues were reduced by 62 percent as compared with those in unmined leaflets (Johnson *et al.* 1983) [1].

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 influence of weather factors on the incidence and distribution of leaf miner infesting ridge gourd.

**Materials and Methods**

The field experiment was carried out at Central Experiment Station, Wakawali, from June 2017 to September 2017. The details of experiment are given in below.

**Details of the field experiment**

- 1 Size of plot : 10 m x 10 m (100 m<sup>2</sup>)
- 2 Method of planting : On small hills
- 3 Spacing : 1.50 m × 0.50 m
- 4 Cultivar : Konkan Harita
- 5 Date of sowing : 12<sup>th</sup> June, 2017

**Method of recording observations**

The experimental plot was kept unsprayed throughout the crop season. The observations were recorded as soon as the incidence is noticed. Twenty vines were selected randomly and marked permanently to record the observations. The observations were recorded at weekly interval throughout the crop season. The leaf mines were counted from top, middle and bottom leaf of vine for leaf miner damage. The mine leaves were counted from top, middle and bottom leaf of vine for leaf miner damage. The average pest population per three leaves per plant was taken and standard deviation was worked out. The observation of leaf miner infesting ridge gourd was recorded at weekly interval as per standard meteorological week. Data on incidence of mean infestation of leaf miner on ridge gourd and different weather parameters were correlated.

**Results and Discussion****Seasonal incidence of leaf miner infesting ridge gourd**

The data on the seasonal incidence of leaf miner infesting ridge gourd are presented in Table 1.

The infestation of leaf miner ( $0.04 \pm 0.26$ ) was started in the 28<sup>th</sup> SMW (09 - 15 July). During the cropping season, the infestation was in the range of 0.04 to 0.84 leaf mines per three leaves per plant. Minimum leaf miner infestation ( $0.04 \pm 0.26$ ) were recorded in 28<sup>th</sup> SMW (09 - 15 July) and 29<sup>th</sup>

SMW (16 - 22 July), while maximum ( $0.84 \pm 0.26$ ) infestation was recorded during 33<sup>rd</sup> SMW (13 - 19 August). Leaf miner infestation gradually increased and reaching peak (0.84 leaf mines per three leaves per plant) during 33<sup>rd</sup> SMW (13 - 19 August), thereafter it declined till harvest of crops. The present data are supported by the results of Sunil (2015) [6]. He revealed that leaf miner numbers in *kharif* varied from 0.00 to 0.03 with a mean of 0.01.

**Correlation between mean infestation of leaf miner infesting ridge gourd and weather parameters**

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

The data on the correlation between mean infestation of leaf miner infesting ridge gourd and different meteorological parameters revealed 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. Among these maximum temperatures ( $r= 0.043$ ), minimum temperatures ( $r = 0.270$ ), morning relative humidity ( $r= 0.173$ ) and Bright Sunshine Hours ( $r= 0.106$ ) had positive correlation. While, evening relative humidity ( $r= -0.413$ ) and rainfall ( $r= -0.366$ ) had negative correlation with an infestation of leaf miner.

The present findings are more or less similar with the results of Sunil (2015) [6]. He reported that during *kharif* season positive correlation existed between leaf miner with maximum temperature ( $r = 0.07$ ), minimum temperature ( $r = 0.43$ ), maximum RH ( $r = 0.02$ ), minimum RH ( $r = 0.10$ ) and a negative correlation with rainfall ( $r= -0.26$ ).

**Table 1:** Mean infestation of leaf miner infesting ridge gourd in relation to weather parameters

SMW No.	Date of week	Temperature (°C)		Relative Humidity (%)		BSS*	Rainfall (mm)	Mean Infestation
		T max	T min	RH I	RH II			
26	25/06/17-01/07/2017	29.46	24.09	95.86	92.71	0.59	577.6	0
27	02/07/2017-08/07/2017	29.67	23.87	94.71	80.43	4.09	244.6	0
28	09/07/2017-15/07/2017	28.44	23.71	95.14	82.86	2.26	161.3	0.04
29	16/07/2017-22/07/3017	27.51	23.74	94.43	92.86	0.82	516.9	0.04
30	23/07/2017-29/07/2017	28.69	24.31	94.86	86.86	1.06	138.6	0.32
31	30/07/2017-05/08/2017	29.54	23.83	97.00	85.57	4.23	116.8	0.36
32	06/08/2017-12/08/2017	29.54	24.00	96.14	82.14	2.81	113.1	0.36
33	13/08/2017-19/08/2017	29.83	23.97	96.43	80.43	2.87	43.2	0.84
34	20/08/2017-26/08/2017	29.60	23.51	97.57	85.29	3.01	151.6	0.6
35	27/08/2017-02/09/2017	29.06	23.54	97.00	94.80	2.70	246.3	0.2
36	03/09/2017-9/09/2017	31.31	23.43	98.16	93.82	4.35	71.6	0
37	10/09/2017-16/09/2017	31.35	24.20	97.14	84.18	3.32	97.3	0
38	17/09/2017-23/09/2017	26.54	22.83	97.00	94.10	0.79	514.9	0
39	24/09/2017-30/09/2017	29.89	23.23	97.30	88.00	2.60	103.5	0
40	01/10/2017-06/10/2017	30.43	23.49	95.10	84.18	3.90	24.2	0
<b>SD</b>								<b>±0.26</b>

\*BSS: Bright Sunshine Hours

**Table 2:** Correlation coefficient of mean infestation of leaf miner infesting ridge gourd in relation to different weather parameters

Climatic parameters	Correlation coefficient (r)
Maximum temperature (T <sub>max</sub> )	0.043
Minimum temperature (T <sub>min</sub> )	0.270
Morning relative humidity (RH I)	0.173
Evening relative humidity (RH II)	-0.413
Bright Sun Shine Hours (BSS)	0.106
Rainfall	-0.366
*Significant at 5 per cent level	$r= 0.514$

**Conclusion**

From the present investigation, it can be concluded that the infestation of leaf miner ( $0.04 \pm 0.26$ ) was started in the 28<sup>th</sup> SMW (09 - 15 July). Minimum leaf miner infestation ( $0.04 \pm 0.26$ ) was recorded in 28<sup>th</sup> SMW (09 - 15 July) and 29<sup>th</sup> SMW (16 - 22 July), while maximum ( $0.84 \pm 0.26$ ) infestation was noticed during 33<sup>rd</sup> SMW (13 - 19 August). The data on the correlation between mean infestation of leaf miner with different meteorological parameters showed that the various meteorological parameters found to be non significant.

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