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## Seasonal activity of red pumpkin beetle on ridge gourd and weather relation

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**Abstract**

The present study was carried out on the seasonal activity of red pumpkin beetle on ridge gourd and weather relation during *khariif* season of 2017 at Central Experimental Station, Wakawali, Dist. Ratnagiri. The results on seasonal activity revealed that there were marked differences in infestation of red pumpkin beetle. The infestation of red pumpkin beetle ( $0.84 \pm 0.73$ ) was found in the 26<sup>th</sup> SMW (25 June - 1 July). The lowest ( $0.52 \pm 0.73$ ) infestation of red pumpkin beetle was recorded in 35<sup>th</sup> SMW (27 August - 2 September), while maximum ( $2.84 \pm 0.73$ ) infestation was recorded during 31<sup>st</sup> SMW (30 July - 5 August). The data on correlation between mean infestation of red pumpkin beetle with different meteorological parameters showed that the positive correlation with minimum temperature ( $r=0.362$ ), while negative correlation with remaining weather parameters *viz.*, maximum temperature, evening relative humidity, Bright Sun Shine Hours and rainfall were found to be non-significant.

**Keywords:** Seasonal incidence, weather parameters, correlation, red pumpkin beetle

**Introduction**

Ridge gourd (*Luffa acutangula* L.) is considered to be old species with its native to the tropical Africa and South East Asian region including India. It is widely grown in tropical and subtropical parts of the country. It belongs to family Cucurbitaceae and genus *Luffa*. It is one of the important crops belonging to cucurbits and locally called as *Shiral*, *Dodka* (Marathi), *Turai* (Gujrat) and *Koshataki* (Sanskrit).

India is producing around 175 million tonnes vegetables annually from an area of around 10 million hectares and the second largest producer of vegetables in the world, after china (Anon., 2017) [2]. In India, ridge gourd is cultivated in approximately 24,800 acres with 3,16,925 tonnes total production (Anon., 2015) [1]. In Maharashtra, vegetables are produced from an area of 6.93 lakh ha with annual production of 103.60 lakh tonnes (Anon., 2017) [2].

Cucurbits are attacked by several pests which affect the quality and quantity of produce adversely. Most of the insect-pests cause damage at any stage of plant growth, but some of them are serious at seedling stage *viz.*, red pumpkin beetle, leaf miner, flea beetle, while fruit fly appears at fruiting stage (Ram *et al.*, 2009) [4].

Damage caused by cucurbit pests depends mostly on the prevailing climatic conditions and the diversity of hosts in a particular agro ecosystem. Therefore, it is necessary to study the seasonal incidence of the pest species which helps in determining appropriate time of action and suitable method of management (Vignesh and Viraktamath, 2015) [7]. Though the crop is economically important, the information on the fruit flies and seasonal incidence and its correlation with weather factors are very much lacking particularly in Konkan region in Maharashtra. Hence, the present investigations were undertaken on seasonal activity of red pumpkin beetle on ridge gourd and weather relation.

**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 scrapped galleries were counted from top, middle and bottom leaf of vine for red pumpkin beetle damage. The average pest population per three leaves per plant was taken and standard deviation was worked out. The observations of red pumpkin beetle infesting ridge gourd was recorded at weekly interval as per standard meteorological week. Data on incidence of mean infestation of red pumpkin beetle on ridge gourd and different weather parameters were correlated.

## Results and Discussion

### Seasonal incidence of fruit flies infesting ridge gourd

The data on seasonal incidence of red pumpkin beetle infesting ridge gourd are presented in Table 1 and depicted in Fig. 1.

The study revealed that there were marked differences in red pumpkin beetle infestation as regard Standard Meteorological Weeks. The initiation of pest infestation ( $0.84 \pm 0.73$ ) was found in the 26<sup>th</sup> SMW (25 June - 1 July). During cropping season, the infestation varied from 0.52 to 2.84 scrapped galleries per three leaves per plant. The lowest ( $0.52 \pm 0.73$ ) infestation of red pumpkin beetle was recorded in 35<sup>th</sup> SMW (27 August - 2 September), while maximum ( $2.84 \pm 0.73$ ) infestation was recorded during 31<sup>st</sup> SMW (30 July - 5 August). It was evident from the results that red pumpkin beetle infestation gradually increased and reaching a peak (2.84 scrapped galleries per three leaves per plant) during 31<sup>st</sup> SMW (30 July - 5 August), further declined during the 35<sup>th</sup> SMW (27 August - 2 September) and again increased up to

the 36<sup>th</sup> SMW (10 - 16 September). Thereafter, it declined till harvest of crop.

The present results are supported by Ghule *et al.* (2015) [3]. They were conducted the experiment from December second week to March second week in 2011 and March first week to June first week in 2012 Results showed red pumpkin beetle was active throughout the cropping season in both years. The peak incidence of red pumpkin beetle recorded during second week of March, 2011 and during second week of May, 2012

Roy and Pande (1991) [5] carried out a survey of *Cucurbita maxima* D. in Tripura, India in 1987-88 and established that *Rapidopalpa foveicollis* (*Aulacophora foveicollis*) was active throughout the year, being most dense in December and least dense in August.

### Correlation between mean infestation of red pumpkin beetle infesting ridge gourd and weather parameters

Data on the correlation coefficient of mean infestation of red pumpkin beetle in relation to different weather parameters are given in Table 2 and illustrated in Fig 2.

The mean infestation of red pumpkin beetle exhibited positive correlation with minimum temperature, while negative correlation with remaining weather parameters *viz.*, maximum temperature ( $r = -0.227$ ), evening relative humidity ( $r = -0.428$ ), Bright Sun Shine Hours (BSS) ( $r = -0.190$ ) and rainfall ( $r = -0.065$ ) were found to be non-significant.

The present findings are more or less similar with the results of Sunil (2015) [6]. He studied that the correlation was observed between the incidence of pumpkin beetle and weather parameters *viz.*, temperature, relative humidity (RH) and rainfall during *kharif* and *rabi* seasons. During *kharif* season positive correlation existed between the pumpkin beetle and minimum temperature ( $r = 0.40$ ) and maximum RH ( $r = 0.25$ ) and negative correlation existed between pumpkin beetle and maximum temperature ( $r = -0.30$ ), minimum RH ( $r = -0.25$ ) and rainfall ( $r = -0.20$ ). Similarly, in *rabi* season significant positive correlation existed between the pumpkin beetle and minimum temperature ( $r = 0.65$ ) and positive correlation existed between maximum RH ( $r = 0.36$ ) and minimum RH ( $r = 0.39$ ) and significant negative correlation existed between the beetle and maximum temperature ( $r = -0.47$ ).

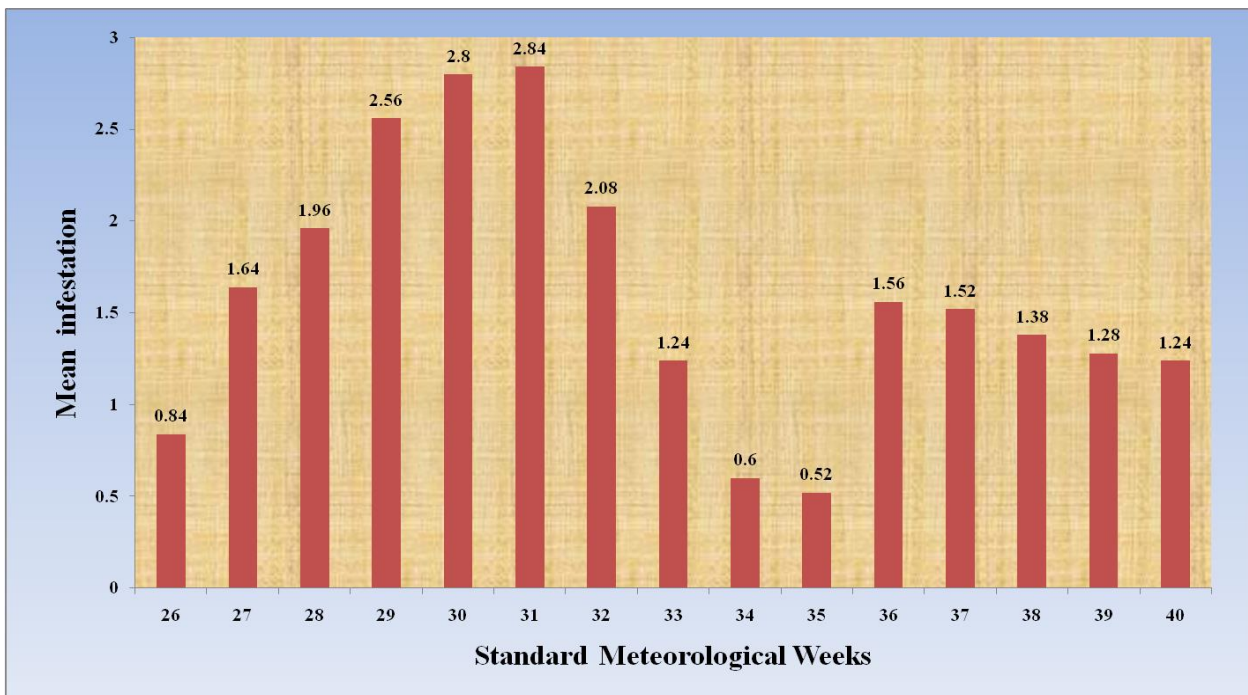
**Table 1:** Mean infestation of red pumpkin beetle infesting ridge gourd in relation to weather parameters

SMW No.	Date of week	Temperature (°C)		Relative Humidity (%)		BSS*	Rainfall (mm)	Mean infestation
		Tmax	Tmin	RH I	RH II			
26	25/06/17-01/07/2017	29.46	24.09	95.86	92.71	0.59	577.6	0.84
27	02/07/2017-08/07/2017	29.67	23.87	94.71	80.43	4.09	244.6	1.64
28	09/07/2017-15/07/2017	28.44	23.71	95.14	82.86	2.26	161.3	1.96
29	16/07/2017-22/07/3017	27.51	23.74	94.43	92.86	0.82	516.9	2.56
30	23/07/2017-29/07/2017	28.69	24.31	94.86	86.86	1.06	138.6	2.80
31	30/07/2017-05/08/2017	29.54	23.83	97.00	85.57	4.23	116.8	2.84
32	06/08/2017-12/08/2017	29.54	24.00	96.14	82.14	2.81	113.1	2.08
33	13/08/2017-19/08/2017	29.83	23.97	96.43	80.43	2.87	43.2	1.24
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	0.52
36	03/09/2017-9/09/2017	31.31	23.43	98.16	93.82	4.35	71.6	1.56
37	10/09/2017-16/09/2017	31.35	24.20	97.14	84.18	3.32	97.3	1.52
38	17/09/2017-23/09/2017	26.54	22.83	97.00	94.10	0.79	514.9	1.38
39	24/09/2017-30/09/2017	29.89	23.23	97.30	88.00	2.60	103.5	1.28
40	01/10/2017-06/10/2017	30.43	23.49	95.10	84.18	3.90	24.2	1.24
SD								±0.73

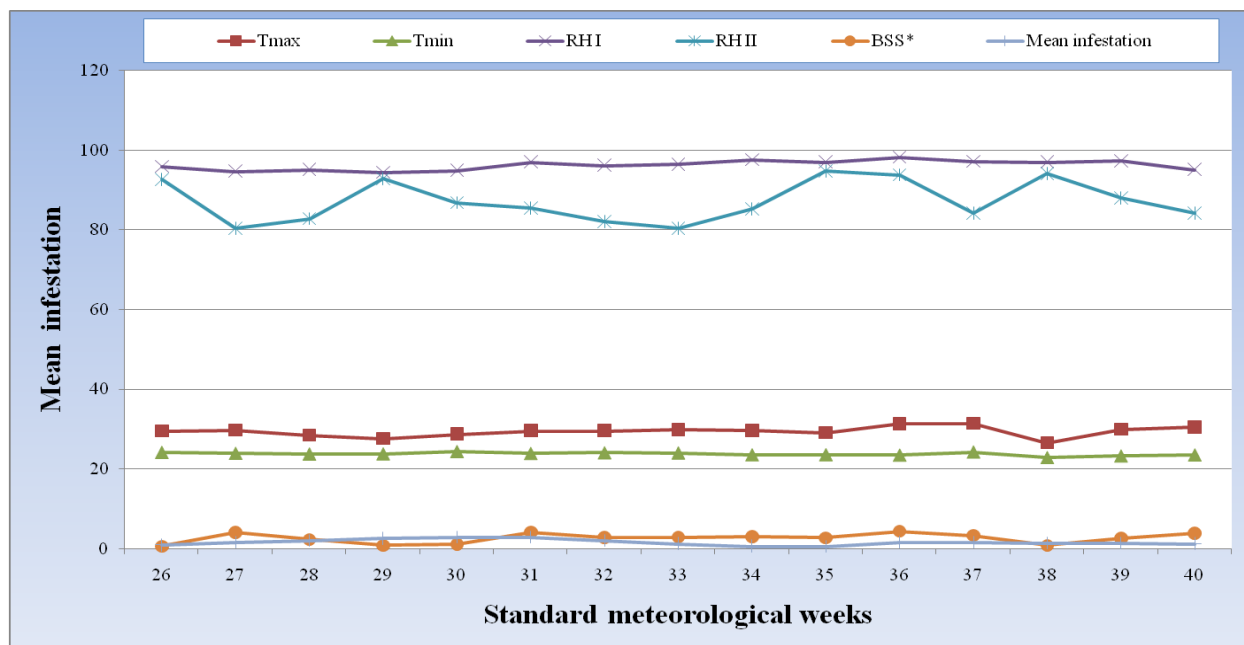
\*BSS: Bright Sunshine Hours

**Table 2:** Correlation coefficient of mean infestation of red pumpkin beetle infesting ridge gourd in relation to different weather parameters

Climatic parameters	Correlation coefficient (r)
Maximum temperature (T <sub>max</sub> )	-0.227
Minimum temperature (T <sub>min</sub> )	0.362
Morning relative humidity (RH I)	-0.428
Evening relative humidity (RH II)	-0.190
Bright Sun Shine Hours (BSS)	-0.059
Rainfall	-0.065
*Significant at 5 per cent level	r= 0.514



**Fig 1:** Seasonal incidence of red pumpkin beetle infesting ridge gourd



**Fig 2:** Mean infestation of red pumpkin beetle infesting ridge gourd in relation to weather parameters

**Conclusion**

From the present investigation, it can be concluded that the initiation of pest infestation ( $0.84 \pm 0.73$ ) was found in the 26<sup>th</sup> SMW (25 June - 1 July). The lowest ( $0.52 \pm 0.73$ ) infestation of red pumpkin beetle was recorded in 35<sup>th</sup> SMW (27 August - 2 September), while maximum ( $2.84 \pm 0.73$ )

infestation was recorded during 31<sup>st</sup> SMW (30 July - 5 August). It was evident from the results that red pumpkin beetle infestation gradually increased and reaching a peak (2.84 scrapped galleries per three leaves per plant) during 31<sup>st</sup> SMW (30 July - 5 August), further declined during the 35<sup>th</sup> SMW (27 August - 2 September) and again increased up to

the 36<sup>th</sup> SMW (10 - 16 September). Thereafter, it declined till harvest of crop. In case of correlation studies the mean infestation of red pumpkin beetle exhibited positive correlation with minimum temperature, while negative correlation with remaining weather parameters and found to be non-significant.

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